THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION

Record of the Year

2007-2008

The Connecticut Agricultural Experiment Station, founded in 1875, was the first state agricultural experiment station in the United States. The Station has laboratories, offices, and greenhouses at 123 Huntington Street, New Haven 06511, Lockwood Farm for experiments on Evergreen Avenue in Hamden 06518, the Valley Laboratory and farm on Cook Hill Road, Windsor 06095, and a research center in Griswold and Voluntown. Station Research is conducted by members of the following departments: Analytical Chemistry, Biochemistry and Genetics, Entomology, Forestry and Horticulture, Plant Pathology and Ecology, and Soil and Water. The Station is chartered by the Connecticut General Statutes to experiment with plants and their pests, insects, soil and water and to perform analyses.

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INTRODUCTION

This Record of the Year contains new information on scientific discoveries and documents extensive outreach efforts to transfer scientific findings and knowledge to state residents. Hundreds of talks and interviews were given to civic groups and the media. Scientific articles were published in quality, peer-reviewed journals and Experiment Station Bulletins. The reduction of pesticide use on farms and homeowners' properties remains a high priority. Research on specialty crops, grapes, mosquitoes, encephalitis viruses, deer, invasive plants, plant pathogens, insect pests, ticks and the disease organisms they transmit, soil health, and on trees have progressed. Chemists found unwanted chemicals in milk, imported toothpaste and toys, and other commercial products.

The Connecticut Agricultural Experiment Station Research Foundation was established to create opportunities for scientists to apply for corporate foundation grants. The first grant received in this system was awarded by The Propane Education and Research Council to investigate the control of Japanese barberry in forest settings. Early work revealed that in or near thickets of this invasive plant, tick populations were high. The removal of Japanese barberry might significantly reduce the number of black-legged ticks, *Ixodes scapularis*. Webster Bank contributed funds to help facilitate the transfer of vegetables and fruits from our experimental farms to food banks and other charities.

During the spring of 2008, the former state nursery in Griswold and Voluntown was transferred from the Department of Environmental Protection to the Experiment Station. This property, which consists of about 14 acres of cultivated land plus a small woodland area, will be used to conduct field and laboratory experiments on mosquitoes, encephalitis viruses, invasive aquatic plants, grapes, chestnut trees, crops for biodiesel fuel, and control of insect pests and plant pathogens.

Louis A. Magnarelli
Director

BOARD OF CONTROL

The management of The Station is vested in a Board of Control as specified in Section 22-79 of the General Statutes of Connecticut.

The members of the Board of Control as of June 30, 2008 were

Governor M. Jodi Rell, President
Terry Jones, Vice President
Leon Zapadka, Secretary
Dr. Louis A. Magnarelli, Director
Commissioner F. Philip Prelli
Dr. Stephen L. Dellaporta
Norma O'Leary
Dr. Johan C. Varekamp

The Board of Control met on August 1, 2007, October 17, 2007, January 15, 2008, and April 17, 2008.

MISSION STATEMENT

The mission of The Connecticut Agricultural Experiment Station is to develop, advance, and disseminate scientific knowledge, improve agricultural productivity and environmental quality, protect plants, and enhance human health and well-being through research for the benefit of Connecticut residents and the nation. Seeking solutions across a variety of disciplines for the benefit of urban, suburban, and rural communities, Station scientists remain committed to "Putting Science to Work for Society", a motto as relevant today as it was at our founding in 1875.

STATION STAFF

The Experiment Station exists to advance the frontiers of knowledge for mankind, and that advance depends completely upon the quality of its staff. The following was the staff of The Connecticut Agricultural Experiment Station as of June 30, 2008.

ADMINISTRATION
Dr. Louis A. Magnarelli, Director
Dr. Kirby C. Stafford, III, Vice Director
Michael Last, Chief of Services
Dianne Albertini
Vickie Bomba-Lewandoski
Tess Foley
Joan Ives-Parisi
Lisa Kaczenski
Roberta Milano-Ottenbreit
Kathryn Soleski

ANALYTICAL CHEMISTRY
Dr. MaryJane Incorvia Mattina, Department Head
Terri Arsenault
Dr. Brian D. Eitzer
Dr. Lester Hankin, Emeritus
William Berger
Dr. Walter J. Krol
Craig L. Musante
Mamie O. Pyles
John Ranciato
Dr. Christina S. Robb
Dr. David E. Stilwell

BIOCHEMISTRY & GENETICS
Dr. Neil A. McHale, Department Head
Carol R. Clark
Dr. Douglas W. Dingman
Regan Huntley
Cynthia Musante
Dr. Richard B. Peterson
Dr. Neil P. Schultes
Dr. Israel Zelitch, Emeritus

BUILDINGS AND MAINTENANCE
Bancroft Nicholson, Supervisor
Ron LaFrazier
Gloria Mach
Miguel Roman
Michael Scott
Nicole Wachter

ENTOMOLOGY
Dr. Kirby C. Stafford, III, Department Head
Elizabeth E. Alves
Dr. John F. Anderson, Distinguished Scientist
Dr. Anuja Bharadwaj
Tia Blevins
Rosemarie J. Bonito
Bonnie L. Hamid
Rose Hiskes
Ira J. Kettle
Morgan F. Lowry
Dr. Chris T. Maier
Michael J. Misencik
Angela B. Penna
Tanya Petruff
Dr. Gale E. Ridge
Dr. Claire E. Rutledge
Stephen J. Sandrey
Dr. Victoria L. Smith
Dr. Kimberly A. Stoner
Heidi Stuber
Peter W. Trenchard
Michael P. Vasil
Tracy Zarillo

FORESTRY & HORTICULTURE
Dr. Jeffrey S. Ward, Department Head
Joseph P. Barsky
Joan Bravo
Dr. Martin P. N. Gent
Dr. David Hill - Emeritus
Dr. Abigail A. Maynard
Dr. William R. Nail
Michael R. Short
Dr. Paul E. Waggoner, Distinguished Scientist
Dr. Scott C. Williams

GRISWOLD RESEARCH CENTER
Robert Durgy

LOCKWOOD FARM
Richard M. Cecarelli, Farm Manager
Rollin J. Hannan, Jr.
Michael McHill

PLANT PATHOLOGY & ECOLOGY
Dr. Sharon Douglas, Department Head
Dr. Sandra L. Anagnostakis
Dr. Donald E. Aylor, Emeritus
Dr. Botond Balogh
Sandra E. Carney
Jason Corwin
Dr. Wade H. Elmer
Dr. Francis J. Ferrandino
Mary K. Inman
Dr. Robert E. Marra
Pamela Sletten
Peter W. Thiel

SOIL & WATER
Dr. Theodore G. Andreadis, Department Head
Dr. Phillip M. Armstrong
Gregory J. Bugbee
Kirsten Deeds
Shannon L. Finan
Dr. Shaoming Huang
Dr. Michelle D. Marko
Dr. Goudarz Molaei
Dr. Joseph J. Pignatello
Roslyn S. Selsky
John J. Shepard
Michael C. Thomas
Dr. Charles R. Vossbrinck
Dr. Jason C. White

VALLEY LABORATORY
Dr. James A. LaMondia, Department Head
Dr. John Ahrens - Emeritus
Jane Canepa-Morrison
Dr. Carole Cheah

Dr. Richard Cowles
Jeffrey M. Fengler
Dr. Dewei Li
Dr. Todd L. Mervosh
James Preste
Thomas M. Rathier
Michelle Salvas
Dr. Hugh Smith
John Winiarski

PLANT SCIENCE DAY 2007

August 1, 2007 was hot and sunny. Approximately 841 adults and 184 children visited Lockwood Farm on Plant Science Day 2007.

The following short talks and demonstrations drew a high public interest.

Mary K. Inman	Pruning Ornamental Shrubs
Dr. Theodore G. Andreadis	Using DNA Fingerprinting to Identify the Blood-Feeding Patterns of Mosquito Vectors of West Nile virus
Dr. Kirby C. Stafford	What is Happening to Our Honey Bees?
Ira Kettle	Beekeeping Basics
Scott C. Williams	Scattering Scats: White-Tailed Deer as Seed Dispersers
Mary K. Inman	Pruning Ornamental Shrubs
Dr. Wade H. Elmer and Dr. James A. LaMondia	Are Plant Pathogens Causing Salt Marsh Dieback?

Two walking tours, led by Dr. Robert E. Marra, were offered to visitors. They saw barn exhibits and field plots.

Dr. Jeffrey S. Ward led a tour of native shrubs in the afternoon. Visitors learned about native shrubs for naturalizing landscapes without the use of pesticides and fertilizers.

The following barn exhibits were very popular.

Oilseed to Biodiesel Fuel
Investigators: Dr. Christina S. Robb, Dr. Walter J. Krol, and Dr. James A. LaMondia

Genetics and Photosynthesis
Investigator: Dr. Richard B. Peterson

Chemical Control of Hemlock Woolly Adelgid
Investigator: Dr. Richard S. Cowles

New Crops for Connecticut
Investigators:; Dr. Abigail A. Maynard and Dr. David Hill
Assisted by: Cynthia Maxwell

Butternuts and Butternots and Their Disease Problems
Investigator: Dr. Sandra L. Anagnostakis
Assisted by: Pamela Sletten

Phytoremediation: Using Plants to Clean Contaminated Soil
Investigator: Dr. Jason C. White

A Pesticide Credit Tour was conducted by Thomas M. Rathier. Stops on the tour included:

Has the Swede midge reached Connecticut? Surveying for a new pest – presented by Dr. Kimberly A. Stoner.

Use of earthworms to suppress Verticillium wilt of eggplant – presented by Dr. Wade H. Elmer

Environmentally-friendly control of powdery mildew on perennial and annual bedding plants – presented by Dr. Francis J. Ferrandino

Ebb and flood watering of potted ornamental plants – presented by Dr. Martin P. N. Gent

Children had their own activities to pursue on Plant Science Day. The Passport for Children program led them to many displays and plots throughout the farm. They also enjoyed getting a goodie bag with small gifts. More than 180 children participated in these activities.

Lockwood Farm's field plots attracted many visitors. The plots are planted and maintained by Station scientists with help from Farm Manager Richard Cecarelli and his crew, Rollin J. Hannan, Jr. and Michael M. McHill. Summer workers A. Colleran, M. Harris, and S. Molden also helped to maintain the farm.

FIELD PLOTS

CHINESE CHESTNUT TREES. Dr. Sandra Anagnostakis, assisted by Pamela Sletten

SHEET COMPOSTING WITH OAK AND MAPLE LEAVES. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

CURIOSITY GARDEN. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

HEIRLOOM TOMATO TRIALS. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell.

CHINESE CABBAGE TRIALS. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

CALABAZA SQUASH. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

THE EFFECT OF CULTURE ON THE EFFECT OF VERTICILLIUM WILT ON TOMATO, EGGPLANT AND PEPPER YIELDS. Dr. Francis J. Ferrandino

USE OF EARTHWORMS TO SUPPRESS FUSARIUM CROWN ROT OF ASPARAGUS. Dr. Wade H. Elmer, assisted by Peter Thiel, Joan Bravo, and C. Connelly

USING SOYBEAN MEAL AND CORN GLUTEN ON TURF. Dr. Abigail Maynard and Greg Bugbee

FINDING THE SWEDE MIDGE IN CONNECTICUT. Dr. Kimberly A. Stoner, assisted by N. Brettschneider

INTEGRATED PEST MANAGEMENT OF EURASIAN WATERMILFOIL. Dr. Michelle Marko, Dr. Jason White, Greg Bugbee, Roslyn Selsky, Dr. Charles Vossbrinck, Kirsten Deeds, assisted by A. Bridgewater, D. Bridgewater, M. Albert, and R. Gent.

EFFECT OF RECYCLED NUTRIENT SOLUTION ON YIELD AND COMPOSITION OF GREENHOUSE TOMATO. Dr. Martin P. N. Gent, assisted by Michael Short and D. Gilbert

FACTORS AFFECTING COMPOSITION OF HYDROPONIC LETTUCE. Dr. Martin P. N. Gent, assisted by Michael Short and D. Gilbert

EBB AND FLOOD WATERING OF POTTED ORNAMENTAL PLANTS. Dr. Martin P. N. Gent, assisted by Michael Short and D. Gilbert

ENVIRONMENTALLY FRIENDLY CONTROLS OF POWDERY MILDEW ON PERENNIAL AND ANNUAL BEDDING PLANTS. Dr. Francis Ferrandino and Dr. Wade H. Elmer

BIOLOGICAL CONTROL OF HEMLOCK WOOLLY ADELGID. Dr. Carole Cheah, assisted by B. Ross

COMMERCIAL CHESTNUT CULTIVARS. Dr. Sandra Anagnostakis, assisted by Pamela Sletten

CONTROL OF BLIGHT ON AMERICAN CHESTNUTS. Dr. Sandra Anagnostakis, assisted by Pamela Sletten

NEW HYBRID CHESTNUT ORCHARD. Dr. Sandra Anagnostakis, assisted by Pamela Sletten

TABLE GRAPE CULTIVAR TRIAL. Dr. William Nail, assisted by Cynthia Maxwell

HYBRID WINEGRAPE CULTIVAR TRIAL. Dr. William Nail, assisted by Cynthia Maxwell

HIGH GRAFT UNION EFFECTS ON GRAPEVINE PERFORMANCE. Dr. William Nail, assisted by Cynthia Maxwell

WEST NILE VIRUS TRANSMISSION BY MOSQUITOES. Dr. John F. Anderson and Dr. Andy Main, assisted by Bonnie Hamid, Terry Goodman, Michael Vasil, Tanya Petruff, Angela Penna, A. Florek, Michael Misencik, and Elizabeth Alves

COMPOSTING LEAVES USING THE STATIC PILE METHOD. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

QUESTION AND ANSWER TENT. Dr. Sharon Douglas, Rose Hiskes, Mary Inman, Thomas Rathier, Gale Ridge, and John Winiarski.

ALIEN INSECTS IN CONNECTICUT. Dr. Chris T. Maier, assisted by Tracy Zarrillo, Morgan Lowry, Justin Beaty, and E. Silva

DEMONSTRATION TENT

CAES WEATHER STATION

USE OF EARTHWORMS TO SUPPRESS VERTICILLIUM WILT OF EGGPLANTS. Dr. Wade Elmer and Dr. Francis Ferrandino, assisted by Peter Thiel, Joan Bravo, and C. Connelly

NUT ORCHARD. Dr. Sandra Anagnostakis, assisted by Pam Sletten

VERIZON TELEPHONE TRANSMISSION SILO

MOSQUITO SURVEILLANCE FOR WEST NILE AND EASTERN EQUINE ENCEPHALITIS VIRUSES IN CONNECTICUT. Dr. Theodore Andreadis and Dr. Philip Armstrong, assisted by John Shepard, Michael Thomas, S. Finan, J. Ambrogio, J. Brelsford, E. Calandrella, E. Frank, D. Krause, W. McConaughy, L. Meany-Post, C. Pioli, K. Sweeney, M. Torretta, and T. Watson

THE FARMER'S COW

EXPERIMENT STATION ASSOCIATES

DISPERSAL OF CORN POLLEN IN THE ATMOSPHERE. Dr. Donald E. Aylor

PERSONAL-SIZED WATERMELON VARIETY TRIALS. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

AIRBORNE AND LEAF SURFACE FUNGI IN TWO GREENHOUSES IN CONNECTICUT. Dr. De-Wei Li and Dr. James LaMondia

CONNECTICUT WEEDS AND WILD PLANTS. Dr. Todd Mervosh, assisted by D. Reiss and B. Ross

OILSEED CROPS FOR BIODIESEL. Dr. James LaMonida, assisted by Jane Canepa-Morrison and K. Bradshaw

LYME DISEASE IN TICKS FROM CONNECTICUT CITIZENS. Dr. John F. Anderson, assisted by Bonnie Hamid, Elizabeth Alves, and R. Castillo

FIELD TRIALS OF THE FUNGUS *METARHIZIUM ANISOPLIAE* FOR TICK CONTROL. Dr. Anuja Bharadwaj and Dr. Kirby Stafford, assisted by Heidi Stuber

ANTIBODIES TO WEST NILE VIRUS IN HORSES. Dr. Louis A. Magnarelli, Dr. S. Bushmich (UCONN-Storrs), Dr. John F. Anderson, M. Ledizet (L2 Diagnostics), and Ray Koski (L2 Diagnostics, assisted by Tia Blevins and Bonnie Hamid

THE "DEER" TICK *IXODES SCAPULARIS*. Dr. Kirby Stafford, assisted by Dr. Anuja Bharadwaj, Heidi Stuber, G. Dunford, L. Colligan, Lisa DiFedele, and Tara Rafferty

MAMMALS AS SEED DISPERSAL AGENTS. Scott Williams, assisted by Geoff Picard

A FIELD TRIAL OF 10 DEER REPELLENTS. Scott Williams, assisted by Geoff Picard

INVASIVE AQUATIC PLANT PROGRAM. Greg Bugbee, Kirsten Deeds, Dr. Michelle Marko, Roslyn Selsky, Dr. Charles Vossbrinck, and Dr. Jason White, assisted by M. Albert, A. Bridgewater, D. Bridgewater, and A. Russell

INVASIVE AQUATIC PLANT IDENTIFICATION. Greg Bugbee, Kirsten Deeds, Dr. Michelle Marko, Roslyn Selsky, Dr. Charles Vossbrinck, and Dr. Jason White, assisted by M. Albert, A. Bridgewater, D. Bridgewater, and A. Russell

MONITORING THE RACES OF POWDERY MILDEW ON MUSKMELON. Dr. Francis Ferrandino

USING LEAF COMPOST IN HOME GARDENS. Dr. Abigail Maynard and Dr. David Hill, assisted by Cynthia Maxwell

BARTLETT ARBORETUM AND GARDENS. J. Kaechele

CONNECTICUT DEPARTMENT OF AGRICULTURE. R. Macsuga

CONNECTICUT GREEN INDUSTRIES. Robert Heffernan

CONNECTICUT GROUNDSKEEPERS ASSOCIATION. D. Tice

CONNECTICUT HORTICULTURAL SOCIETY. B. McLachlan

CONNECTICUT INVASIVE PLANT WORKING GROUP. D. Ellis

CONNECTICUT PRE-ENGINEERING PROGRAM. M. Coehlo

CONNECTICUT PROFESSIONAL TIMBER PRODUCERS ASSOCIATION. J. Nichols

NORTHEAST ORGANIC FARMERS ASSOCIATION. Bill Duesing

SOCIETY OF AMERICAN FORESTERS – CONNECTICUT CHAPTER. J. Nichols

THE GIRL SCOUTS. Terry Arsenault

USDA, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, PLANT PROTECTION AND QUARANTINE. E. Chamberlain

USDA, NATIONAL AGRICULTURAL STATISTICS SERVICE, NEW ENGLAND FIELD OFFICE. G. Keough

CONNECTICUT TREE PROTECTIVE ASSOCIATION. Rita Smith

CONNECTICUT FARMLAND TRUST. E. Moore

CONNECTICUT FARM BUREAU ASSOCIATION. S. Reviczky

NATIVE WOODY SHRUBS. Jeffrey Ward, assisted by J. P. Barsky

SURVEYS, NURSERY AND BEE INSPECTIONS. Victoria Smith, Jeff Fengler, Ira Kettle, Steve Sandrey, and Peter Trenchard

CONNECTICUT NURSERYMEN'S GARDEN.

BIRD AND BUTTERFLY GARDEN. Jane Canepa-Morrison and Rose Bonito

EASTERN BLUEBIRD *SIALIA SIALIS* NEST BOX TRAIL. Lisa Kaczenski

THE RELATION BETWEEN TISSUE AGE AND SUSCEPTIBILITY OF PUMPKINS, MELONS, AND ZUCCHINI TO POWDERY MILDEW. Francis Ferrandino

INDUCING FUSARIUM DISEASE RESISTANCE IN GLADIOLUS. Wade Elmer, assisted by Peter Thiel, Joan Bravo, and C. Connelly

SOUND SCHOOL AGRICULTURAL SCIENCE PROGRAM. Students from the Sound School

THE SPREAD OF SEPTORIA LEAF SPOT ON TOMATO. Francis Ferrandino

CHESTNUT SPECIES AND HYBRIDS. Sandra Anagnostakis, assisted by Pamela Sletten

DENSE PLANTING OF AMERICAN CHESTNUTS. Sandra Anagnostakis, assisted by Pamela Sletten

DWARF HYBRID CHESTNUT TREES. Sandra Anagnostakis, assisted by Pamela Sletten

WIND PROFILES INSIDE AND ABOVE A SOYBEAN PLANTING. Francis Ferrandino

ROCKY HILL AMERICAN CHESTNUT TREES. Sandra Anagnostakis assisted by Pamela Sletten

PINOT GRIS CULTURAL TRIALS. William Nail assisted by Cindy Maxwell

BEACH PLUM TRIALS. Abigail Maynard and David Hill assisted by Cindy Maxwell
JAPANESE PLUM VARIETY TRIALS. Abigail Maynard and David Hill assisted by Cindy Maxwell
WHITE BIRCH RESEARCH ORCHARD. Claire Rutledge

Tents, tables, and chairs were set up throughout the farm by Maintenance Supervisor Bancroft Nicholson and the maintenance crew Ralph Russell, Michael Scott, and Kareem Dixon. Farm Manager Richard Cecarelli and the farm crew, Rollin Hannan and Michael McHill prepared the plots and made the farm attractive and welcoming to visitors.

At 11:15AM Dr Louis A. Magnarelli, Director, welcomed visitors to Plant Science Day 2007.

Each year, the Connecticut Agricultural Information Council presents the Century Farm Award at Plant Science Day.

The Century Farm Award, which is given out to a farm that has been in family operation for more than 100 years, was given to Mapleleaf Farm, in Hebron, Connecticut. The Farm is owned and managed by Ned Ellis, whose family has been farming since the mid-1700's.

During the early years, farming included raising chickens, vegetables, fruit, and dairy cows. Today, dairy production is the main focus and includes a herd of 400 Holstein cows, 210 of which are milking cows averaging a yield of 67 pounds per day. To control costs, as much feed as possible is raised by growing hay and corn on about 410 acres of land.

Pumpkins are grown on the farm. This activity attracts customers to the property and provides an opportunity to educate the public about farming. Tours are given of a working dairy farm, and special efforts are made to organize field trips for school children.

Ned and his wife Renee are proponents of open space and farmland preservation. They sold the development rights for 240 acres in 2003. An additional parcel of 170 acres, which the family previously leased, was purchased and put into farmland preservation by another family.

Ned Ellis is active in farming organizations. He is a member of Very Alive and Agrimark, a delegate of the Northeast Dairy Promotion Board, and one of six founding members of "The Farmer's Cow", which is milk produced locally and sold throughout the state.

Mr. Ellis was presented a bronze plaque and a certificate signed by Governor M. Jodi Rell.

After the Century Farm Award was presented, Dr. Magnarelli introduced F. Philip Prelli, Commissioner of the Connecticut Department of Agriculture, who gave the Samuel W. Johnson lecture entitled "Connecticut Agriculture – The Local Flavor". After his talk, Dr. Magnarelli presented Mr. Prelli with a certificate signed by Governor M. Jodi Rell, President of the Board of Control, Leon Zapadka, Secretary of the Board, and himself as Director.

Upon completion of the Samuel W. Johnson Lecture, Dr. Magnarelli introduced Edmund Tucker, President of The Experiment Station Associates, who gave a few remarks and invited people to join the organization.

The entire staff of the Station, Professional, Technical, Clerical, Administrative, Maintenance, and Farm Staff all worked very hard and made an enjoyable, informative Plant Science Day possible.

EVENTS HELD AT THE STATION

SEMINARS

On August 27, 2007, Dr. Botond Balogh, Postdoctoral Associate at the University of Florida in Gainesville, presented the seminar "Bacteriophages for Plant Disease Control" in Jones Auditorium.

On September 20, 2007, Dr. Philippe E. Rolshausen, Postdoctoral Associate at the University of Connecticut in Storrs, presented the seminar "Grapevine Trunk Diseases: Risk Assessment and Management in the Northeastern U.S." in Jones Auditorium.

On May 22, 2008, Dr. Hugh Smith, Cooperative Extension, University of California in Santa Maria, CA, presented the seminar "Pest Management Priorities on California's Central Coast" in Jones Auditorium.

LOCKWOOD LECTURES

On April 10, 2008, Dr. Allen C. Steere, MD, Director of Clinical Research, Rheumatology Unit, Principal Investigator, Center for Immunology and Inflammatory Diseases, Massachusetts General Hospital, and Professor of Medicine, Harvard Medical School, gave the Lockwood Lecture "Diagnosis of Lyme Disease" in Jones Auditorium.

SPRING OPEN HOUSE

On April 24, 2008 the Station held its annual Spring Open House in Jones Auditorium. The theme was "Public Health". Tia Blevins introduced Dr. Louis A. Magnarelli, Director, who welcomed visitors to the Station. Presentations were made by Dr. John F. Anderson – "104 Years of Public Health Entomology"; Dr. Kirby C. Stafford, III, "Ticks and Lyme Disease: An Update"; and Dr. Theodore G. Andreadis – "Research and Surveillance Activities on Mosquitoes and Mosquito-Borne Diseases at CAES". Insect questions were answered by Dr. Gale Ridge, questions on plant diseases and problems were answered by Dr. Botond Balogh and Mary Inman, questions on soil were answered by Greg Bugbee, and questions about weeds were answered by Dr. Todd Mervosh. After the presentations, tours of Station laboratories were led by Beth Alves, Tia Blevins, and Kathy Soleski.

EVENTS HELD AT THE VALLEY LABORATORY

Nursery and Landscape Research Tour

Over 60 nursery and landscape professionals attended the Valley Laboratory's annual Nursery and Landscape Research Tour on September 18, 2007. Attendees were welcomed by Dr James LaMondia and then toured research plots for the following presentations: Biodiesel crops as IPM cover crops, Dr. James LaMondia; Conifer nutrition needs, Tom Rathier; Conifer transplant survival, Tom Rathier; CAES/CNLA education garden, Rose Hiskes; Connecticut weed display, Dr. Todd Mervosh and Dorothy Reiss; Container media/water relationships, Tom Rathier; Weed management in container grown plants, Dr. Todd Mervosh and Dr. John Ahrens.

The tour was concluded with the following talks: Exotic pests and invasive plants, Donna Ellis (UConn); Molds of importance to the green industry, Dr. DeWei Li; Advances in management of armored scales,

Dr. Richard Cowles; Arthropods and pesticides update, Rose Hiskes: Disease and cultural problem update, Dr. Sharon Douglas.

James Preste, Jane Morrison, John Winiarski and Ashley Sharp provided help with preparations and during the meeting.

Annual Twilight Meeting for Christmas Tree Growers

On July 10, 2007, over 60 growers and professionals attended the annual Christmas Tree Twilight Meeting at the Valley Laboratory, sponsored by the Experiment Station and the Connecticut Christmas Tree Growers Association. Attendees toured the Christmas tree plots and heard the following presentations: Fertility and cultural management, Tom Rathier; Disease management, Dr. Sharon Douglas; Shearing demonstration, Dr. John Ahrens; Insect and mite management, Dr. Richard Cowles; Weed management, Dr. Todd Mervosh; Connecticut weed display, Dr. Todd Mervosh, Ben Ross and Dorothy Reiss.

James Preste and John Duclos provided support for the meeting.

Annual Tobacco Research Meeting

About one hundred and ten people attended the Connecticut Agricultural Experiment Station's annual Tobacco Research Meeting held at the Suffield High School auditorium on February 19, 2008. Dr. Jim LaMondia and Harrison Griffin (Director of the Suffield High School Vo-Ag program) welcomed growers. The meeting addressed a wide variety of issues of concern to growers. James LaMondia spoke about research on management of tobacco pathogens including blue mold and tobacco mosaic virus and progress of the breeding program for multiple pathogen resistance. Thomas Rathier spoke about nutrient management in shade and broadleaf tobacco, and tobacco transplant production considerations. Christina Berger of the CT DEP spoke about how to comply with Worker Protection Standard laws. Mr. Cliff Parker and Arthur Carroll spoke about updates and changes in the Risk Management program and insurance programs and Ross Eddy of the Farm Services Administration provided updates on FSA services to growers. Alan Sanderson Jr. updated growers about progress on issues of concern to the Conn-Mass Tobacco Association and Robin Helrich of the New England Agricultural Statistics Service provided updates on the CT Valley tobacco crop statistics. Stephen Zapach of Syngenta spoke about product label changes and future directions. Michelle Salvas and Jim Preste assisted with much of the behind the scenes work for the meeting. The meeting qualified for pesticide applicator re-certification credit in both Connecticut and Massachusetts. Posters on 'Non-chemical disease management using plant genetic resistance' and 'Tobacco seed production to maintain resistance and cultivar identity' were presented.

STATE CAPS COMMITTEE MEETING

The State CAPS Committee met at the Valley Lboratory on June 12, 2008. This committee is charged with protecting Connecticut agricultural commodities and natural environment from exotic insects, weeds, and diseases. Rose Hiskes runs the Cooperative Agricultural Pest Survey (CAPS) program for USDA, APHIS PPQ.

LOCKWOOD FARM HAPPENINGS

Bluebird Project

In the Spring/Summer of 2007, Lisa Kaczenski continued her work with Bluebird research at Lockwood Farm. In 2005 she set up 10 and repaired 2 existing Bluebird nest boxes at Lockwood Farm. That year there were 21 successful fledglings. In 2007, only 13 fledglings survived due to increased predation, even though the number of boxes was increased to 16. Ms. Kaczenski has registered the bluebird trail with the Cornell Lab of Ornithology. At the end of the nesting season, her observations on number of nests, clutch size, number of hatchlings, and adult activity will be reported to the Cornell lab to help with research of the Eastern Bluebird. She has also expanded the trail to the Valley Lab where Jane Canepa-Morrison will be helping with the observations.

STATION OUT OF STATE

The Big E

On September 26 and 27 the Station hosted a booth in the Connecticut Building at the Big E in Massachusetts. The attendance for those two days was 42,216 and 35,001 respectively. The Station's exhibit consisted of poster displays on Sudden Wetland Dieback and Invasive Aquatic Plants. Along with Station brochures and publications, the booth had a live honey bee display, and apple slices from apples grown at Lockwood Farm were offered to visitors. Staff participants were Ira Kettle, Gale Ridge, Vickie Bomba-Lewandoski, Tia Blevins, Rose Bonito, Lisa Kaczenski, Roslyn Selsky, and Rose Hiskes.

DONATIONS MADE TO THE COMMUNITY

Lockwood Farm

A total of 11,438 pounds of tomatoes, cabbage, eggplant, squash, apples, pears, watermelon and other assorted crops were donated to St. Vincent de Paul in Waterbury, the Connecticut Foodbank of East Haven, St. Ann's Church in Hamden, High Meadows, and Casa Otonal in New Haven. Drs. Abigail Maynard, David Hill, Francis Ferrandino, Martin P. N. Gent, and William Nail generated the fresh produce. Richard Cecarelli, Rollin Hannan, and Michael McHill helped to distribute it.

Valley Laboratory

A total of 3,681 pounds of tomatoes, pumpkins, plums, Chinese cabbage, and watermelon grown at the Valley Laboratory were donated to Foodshare of Hartford, the Boy Scouts, the Sound School, and Northwest Park of Windsor. Drs. Abigail Maynard, David Hill, Todd Mervosh, and James LaMondia generated the fresh produce, and Jim Preste and Dr. LaMondia organized the distribution effort. The Valley Laboratory also provided Christmas trees to the Governor's mansion and loaned irrigation equipment to the Connecticut Epilepsy Foundation in support of their Mud Volleyball Tournament fundraiser. Mr. Preste coordinated the distribution of the irrigation equipment.

SPECIAL MILESTONES

Two Staff Members Reach 50th Anniversaries at the Station

Dr. John Ahrens started his career with the Station on August 1, 1957. Even though he officially retired in 1993, he continues to work steadily at the Valley Laboratory and has published many research papers.

On June 28, 1957 Dr. David Hill joined the staff at the Station. He started out as a researcher working on the State Soil Survey at the Valley Lab. He eventually came to New Haven and worked at Lockwood Farm where he did studies on soil amendments and growing new crops in Connecticut. He has studied more than 35 fruits and vegetables, many of which are now grown in Connecticut. Even though Dr. Hill is officially retired, he still is at Lockwood Farm every day working on growing and researching new crops. He still talks with visitors at the farm and continues to show as much enthusiasm for his work as he did 50 years ago.

Two Staff Members Awarded Ph.D. Degrees

In April of 2008 two staff members successfully defended their dissertations to receive Ph.D. degrees. They received their degrees at graduation on May 10, 2008. Dr. Gale Ridge received her degree from the Department of Ecology and Evolutionary Biology, University of Connecticut and Dr. Scott Williams received his degree from the Department of Natural Resources Management and Engineering, University of Connecticut.

AWARDS AND RECOGNITION OF STATION STAFF

For 2007-2008, Dr. Walter Krol was re-elected as Secretary of the New Haven Section of the American Chemical Society.

In September, 2007, Dr. Joseph J. Pignatello received an "Excellence in Review" Award from the American Chemical Society Journal, *Environmental Science and Technology*.

On September 25, 2007 Dr. Jason White was elected Vice President of the International Phytotechnology Society at its meeting in Denver, Colorado

On November 29, 2007 Joseph P. Barsky was elected Connecticut's representative to the Executive Committee of the New England Society of American Foresters.

On January 16th three staff members, Richard Cecarelli, Michael McHill, and Jeffrey Fengler received their certificates as Connecticut Accredited Nursery Professionals. They passed a rigorous exam which had a passing rate of less than 30% of the 102 enrolled in the course.

On January 17, 2008 Dr. Jeffrey S. Ward was honored with a Certificate of Merit for his many years of service to the Connecticut Tree Protective Association. Dr. Ward served as President of CTPA in 2004 and 2005.

On January 17, 2008 Dr. Sharon Douglas was voted a member of the Board of the Connecticut Tree Protective Association. She is replacing Dr. Jeffrey Ward who had stepped down from the position.

On January 31, 2008 Dr. Sandra Anagnostakis was honored as a finalist for the 2008 Women of Innovation Award sponsored by the Connecticut Technology Center. Although Dr. Anagnostakis was not selected as the final awardee in her category of "Community Innovation and Leadership" she was presented with a plaque and a signed official citation from Connecticut's Attorney General, Richard Blumenthal.

On February 14, 2008 Dr. MaryJane Incorvia Mattina was appointed State Chemist by Governor M. Jodi Rell – the first woman to be so designated in Connecticut.

On March 12, 2008 Dr. Charles Vossbrinck was presented a plaque by the Connecticut Science Fair Board of Directors for 6 years of service at the Connecticut Science Fair.

On May 1, 2008 Mr. Greg Bugbee was given an award for the outstanding paper of the year by the Quinnipiac University Sigma Xi Chapter.

EXPERIMENT STATION ASSOCIATES

On May 15, 2008 the Experiment Station Associates conducted a behind the scenes tour of Fort Trumbull in New London, Connecticut and the Pinchbeck Rose Farm in Guilford. They heard a presentation by Dr. Louis A. Magnarelli on Station research findings and by Dr. Martin P. N. Gent on his studies in greenhouses.

THE PRESS SPEAKS

The Hartford Courant of July 11, 2007 carried the article "Blight Fight" by Steve Grant. The article described the work of a Yale graduate student, Leila Pinchot, who is working with Dr. Sandra Anagnostakis in trying to bring back an almost all American chestnut tree.

The New Haven Register of July 20, 2007 carried the editorial "Caution advised on new playing fields". Many towns are considering putting in sports fields made out of tire "crumbs". The Experiment Station was asked by the town of Guilford to test the "crumbs" for gasses or volatile chemicals that may be hazardous to players on the fields. Preliminary testing showed gasses were released from the old rubber. As the crumbs were heated, more chemicals leached out. Towns are being encouraged to hold off on installing the fields until testing is complete.

The New York Times of July 22, 2007 carried the article "Taking on Ticks, Deer, Mice and government" by Gerri Hirshey. The reporter toured the Station and learned about research being done on West Nile virus and other viruses caused by mosquitoes, tick and Lyme disease research, and the problems looming ahead with possible discontinuing of formula funds. She spoke with Drs. Stafford and Magnarelli.

The New Haven Register of July 22, 2007 carried the article "Bedbugs causing bedlam between sheets" by Abram Katz. Dr. Kirby Stafford was interviewed and described how the number of bedbug complaints has risen recently. He described their lifecycle and how difficult it is to get rid of them once they enter a home.

The Town Times of August 2, 2007 carried the article "Plant Science Day fun and educational for all ages" by Judy Moeckel. The reporter described her day at Lockwood Farm on Plant Science Day. She also described some of the experimental plots at the farm and some of the displays at the open house.

The New Haven Register of August 6, 2007 carried the article "Station's resarch aids state agriculture" by Ann DeMatteo. Plant Science Day and the research at Lockwood Farm were highlighted. Drs. Louis Magnarelli explained the Station's mission. Dr. Jim LaMondia explained work being done on biodiesel fuel, Dr. Ted Andreadis talked about DNA fingerprinting research and how it showed West Nile virus spreading in wild bird populations. The talks and other displays were also reported on.

The Darien Times of August 16, 2007 carried the Opinion: So how are your tomatoes doing?" by State Representative John J. Ryan. He wrote of his experiences with staff at the Station and his experiences at Plant Science Day. He encouraged state residents to contact the Station and praised how "user friendly" it was, saying the staff is friendly and always willing to help. He also promoted the Station's Web Page.

The New Haven Register of August 19, 2007 carried the article "Where the Bugs Are" Uninvited Pests Arrive in Waves This Time of Year" by Jim Shelton. Stories of insect

"invasions" on homes – wasps, ants, yellow jackets, bedbugs – were described in the article. Dr. Louis Magnarelli was interviewed and gave information on insects, including yellow jackets and bedbugs.

The New Haven Register of August 20, 2007 carried the article "Group raises red flag over artificial turf" by Gregory B. Hladky. Officials of Environment and Human Health, Inc. requested that the Station test rubber "crumbs" made from old tires to see if they leached chemicals. The crumbs were found to release chemical compounds into the air and water. Testing will be ongoing as the U.S. Environmental Protection Agency stated that the crumbs were safe to use. The synthetic fields are favored because they don't have to be mowed, watered, or have chemicals sprayed on them. They can be used year round.

The Hamden Daily News of August 25, 2007 carried a photograph and caption entitled "For the Love of Chestnuts" by Betsy Driebeek. The photograph showed participants in a tour organized by Dr. Sandra Anagnostakis of the Sleeping Giant Chestnut Plantation. Dr. Anagnostakis' work on bringing back an almost pure American Chestnut tree was highlighted and she pointed out Chinese, European, Japanese and hybrid chestnut trees to the participants, and described their differences.

The Connecticut Post of September 7, 2007 carried the article "Less of a Swarm: Experts analyze evidence in hopes of protecting hives" by Michael P. Mayko. Honeybee dieoff has become a worldwide problem. The research being done on solving the mystery of the death of hundreds of thousands of bees by Drs. Kimberly Stoner and Brian Eitzer was highlighted in the article. Dr. Stoner collects pollen from a sampling of hives at the Station and throughout the state. Dr. Eitzer then analyzes the pollen. They are looking for traces of a group of pesticides from the neonicotinoid family to see if it is present in large enough amounts in the pollen collected by bees to kill them. Preliminary testing has indicated that it is present but in very tiny amounts. Further work will continue in years to come.

In September, 2007 Dr. MaryJane Mattina had a featured article in the Hartford Courant in their Newspaper in Education series. She described how chemistry is used in everyday life, and how she and other scientists in her department can detect harmful chemicals, even in the tiniest of amounts, in food and personal products. The series page also carried a paragraph on how Dr. Mattina became interested in science, her determination to break into a field that women weren't "allowed into" when she was first entering her career, and her sense of fulfillment at having succeeded.

The New Haven Register of September 2, 2007 carried the Associated Press article "Determined state gardeners on a mission to wipe out weed". Mile a Minute vine has begun to take over in the northeast part of the state, moving as far south as Greenwich. A gardening group is determined to eradicate it. Dr. Todd Mervosh was interviewed for the article stating that since the vine is new to the area it is hard to determine what methods can be used to stop its growth and kill it. The gardeners have formed a group that goes to areas where the vine is and pulls it out of the ground and then destroys it.

The Hartford Courant of September 3, 2007 carried the article "Barnum's Tree A Type Not Born Every Minute" by Steve Grant. Twelve year old Tim Pelletier researched exotic trees growing on his family's property and discovered a very rare chestnut tree. Dr. Sandra Anagnostakis identified it as a Parsons Japan chestnut, one of only 3 known to be growing in the state. The tree is of the type Dr. Anagnostakis uses in her research to try to repopulate American forests with American chestnut trees. The Parsons Japan chestnut is immune to the blight that killed all the American chestnuts, is winter hardy and rot resistant. Dr. Anagnostakis said the new tree will be a valuable part of her research.

The New York Times of October 31, 2007 carried the article "Parents Raising Concerns Over Synthetic Turf" by Jeff Holtz. As more playing fields made out of recycled tire crumbs are being installed at schools, parents of the children playing on the fields, and several environmental groups and the medical community, are raising concerns over the impact of playing on the fields to the players and the environment. The Experiment Station did preliminary testing that found several types of gasses emitted from the artificial turf, one of them a possible carcinogen. The state's Attorney General, Richard Blumenthal, requested $200,000 so that the Station can research the issue further.

The New London Day of November 1, 2007 carried the article "Agricultural agency may build in Griswold" by Megan Bard. The article reported on the transfer of property from the Connecticut Department of Environmental Protection to the Experiment Station. Dr. Magnarelli was interviewed and gave information on research that will be done on the property.

The New Haven Register of November 11, 2007 carried the article "Artificial turf full of toxins: rubber 'crumbs' can cause cancer" by Abram Katz. The article covered a controversy over the use of tire 'crumbs' in the laying down of sports fields and playgrounds at area schools. Environmentalists and the public are concerned about potentially hazardous and carcinogenic chemicals that are contained in the tire 'crumbs'. The article stated "The Connecticut Agricultural Experiment Station in New Haven analyzed rubber crumbs and the chemicals they leach, finding benzothiazole, butylated hydroxyanisole, hexadecane, a phenol, zinc, selenium, lead and cadmium. Dr. MaryJane Mattina, Chief of Analytical Chemistry at the Station, said "laboratory tests are informative but cannot reveal how the rubber granules will perform in the field. "More work is appropriate" she said".

The New Haven Register of November 11, 2007 carried the article "Natural Resources Funding Shortage Could Stall Biofuels Research" by Luther Turmelle. The article reported that research going on at the Station on biofuels is in danger of having to stop because of lack of state funding. Dr. MaryJane Mattina stated that she saw funding for the research, a million dollars over 2 years, disappear suddenly during the last legislative session. The funding was originally included in a state Senate bill, but disappeared in early June. Without the funding of the project the research will need to be stopped in two years when money runs out. The Station is already in need of new state-of-the-art equipment to catch up to research being done in other states. Connecticut lags behind in the biofuels research field.

The New Haven Register of February 27, 2008 carried the article "Hazardous ground-up tires don't belong on city sidewalks" by Nancy Alderman. Ground up tire crumbs have become popular in the building of playgrounds and artificial turf for sports fields. Recent tests done at the Experiment Station show that the crumbs contain many chemicals and carcinogens that can be harmful to children and athletes using the sports fields, and the chemicals can leach off and kill trees and plants as well. A recent suggestion was made to use the crumbs in city sidewalks. It is feared that the crumbs (which can heat up to a temperature of 160 degrees or more in spring and summer) would kill trees and plants growing along the sidewalks, be too hot to walk on and would raise the heat index in the city during hot weather. The article calls for stricter control on how the crumbs are used if at all.

The Newsletter of the Bonsai Society of Greater New Haven for Spring, 2008 had a description of Dr. Clair Rutledge's talk to their Society. It stated she gave a "very informative" talk about the many bugs that affect bonsai. She also gave a slide show and passed around specimens of different insects.

Sanctuary, Newsletter of the White Memorial Conservation Center, Spring issue, carried the article "Invasive Aquatic Plants and Plant Species Diversity" by John P. Roche. Research on keeping invasive aquatic plants from taking over habitats of native plants and wildlife was discussed. The research of Dr. Robert Capers and researchers at the Station was documented. Studies were made of 103 lakes throughout Connecticut.

The Hartford Courant of March 23, 2008 carried the article "Taking Aim At Lyme Disease" by Peter Knight. The article discusses eradicating Lyme disease by destroying most of the deer in the State of Connecticut. The article stated that most of the research on Lyme disease and its possible control was done at the Experiment Station and that the only way to bring the tick population under control is to get rid of most of the deer – it is thought that only 10 deer per mile should be left. Some groups are in disagreement with the theory.

The Hartford Courant of March 30, 2008 carried the article "Garden Fever Spreading" by Steve Grant. The planting of home and community gardens is on the rise due to rising fresh produce prices. Requests for information on gardening made to Station personnel has increased also. To fill the requests for information, two Station scientists are working on fact sheets on starting home gardens that will be available to the public. Dr. Louis Magnarelli said the increased interest in gardening serves nicely as a way to teach children how to grow plants and draw attention to the importance of a nutritious diet.

The Guilford Courier of April 10, 2008 carried the article "What's the Story with These Black Bear Cubs? By Fay Abrahamsson. The article reported on a DEP program to track black bears in the state. Dr. Scott Williams was along on a DEP expedition where a female bear was immobilized in order to change her collar and get her vital statistics. He had the opportunity to hold her two cubs who were with her. Both cubs were measured and tagged.

The New Haven Register of April 29, 2008 carried the article "DeLauro asks EPA study on fake turf" by Abram Katz. A news conference was held at the Station on April 28 at which US

Representative Rosa DeLauro, Attorney General Richard Blumenthal and others demanded that the federal EPA initiate a study of synthetic athletic fields to test them for harmful materials that may be released into the environment and hurt those playing on them. The fields, partially made up of tire crumbs, are being installed across the state and the nation. The Station did a preliminary study of the "tire crumbs" in 2007 an did identify some harmful chemicals present in the crumbs that could possible cause health and environmental problems.

The New Haven Register of May 16, 2008 carried the article "They're here, and they're hungry: Disease-carrying blacklegged ticks expected to peak in June, July" by Abram Katz. The article reported that ticks were being found in large numbers and June, July and into August was prime tick season. The article described how ticks transmit spirochetes to cause Lyme disease. Dr. Kirby Stafford gave advice on how to cut down the number of ticks on homeowners' property and how removing them quickly will prevent the spirochetes that cause Lyme disease from being transmitted to the person who was bitten. He stated "Inspect your children, your partner and yourself for ticks. If you find one within 24-48 hours, it probably has not had time to attach. After 48 hours, there is a 12 percent chance that an infected tick has infected its host. After the tick is attached for 72 hours, the odds of infection soar to 75 percent."

The Hartford Courant of May 17, 2008 carried a paragraph in the "Garden Spot" section "Getting Down to Earth" by Steve Grant. The paragraph gave information on how to get soil tested at the Station and how to start a home garden.

The Hartford Courant of May 17, 2008 carried the article "Sports Field Worries: Harzardous Turf" by Regine Labossiere and Paul Doyle. The article described the controversy over the safety of new sports fields being installed with "tire crumb" bases. The controversy is over the chemicals contained in the "crumbs" and conditions that would be harmful for people using the sports fields. The Station did preliminary testing on the crumbs and did find substances contained in the crumbs that were potentially hazardous to health. Further testing is needed, however, the state is not willing to fund the research necessary to determine the risk in using the new fields.

The New Haven Register of May 19, 2008 carried the article "State earmarks funding to study rubber in fields" by Abram Katz. $200,000, part of a $750,000 settlement between Connecticut and developers and construction companies that caused damaging mud slides in Montville in 2005, will be used to monitor the use of "tire crumbs" in athletic fields and compost. The State Department of Environmental Protection will use the money to determine if athletic fields built with the "tire crumbs" are safe for those using them, and what kinds of hazardous materials the players are being exposed to. The Experiment Station will be involved in the testing, and, during warmer weather will test 30 artificial turf fields and the players. Each field will be monitored separately because tires are all different in composition. Dr. Louis Magnarelli stated that "the origin of the tires in not known. Some may be domestic and others could be imported, meaning they could have different compositions."

The Hartford Courant of June 21, 2008 carried the article "Mosquitoes in state have West Nile". The article reported that batches of mosquitoes trapped in Stonington have come up positive for

West Nile virus. They were the first to show a presence of the virus in the 2008 season. Dr. Theodore Andreadis stated that the finding of the virus-infected mosquitoes came earlier in the year than usual and further monitoring will be conducted.

The New Haven Register of June 26, 2008 carried the article "Right in our backyard: Onslaught of invasive plants threatens native species throughout the state" by Jim Shelton. The article reports on species of plants that aren't native to the area that have established themselves in the area and that are choking out many native species. Greg Bugbee was interviewed about aquatic species that have taken over many of the lakes in Connecticut. He stated that two-thirds of the lakes and ponds that he has examined have invasive aquatic weeds. In all, there are 96 species on the invasive plants list in Connecticut.

The New Haven Register of June 27, 2008 carried the article "W. Nile virus pops up earlier this year", by Victor Zapana. The article reported that the West Nile virus has been detected earlier in the state this year, according to Dr. Theodore Andreadis. He stated that the virus usually shows up in late July and peak season lasts from August to September. Scientists weren't sure if this indicates an extended West Nile virus peak, and they warned people to take precautions.

The Hartford Courant of June 27, 2008 carried the article "Mysterious bee disorder spares state – so far" by Bill Leukhardt. For the last two years, a mysterious disease has been causing bees to disappear and not return to their hives. The condition, colony collapse disorder, has been said to have destroyed up to 90 percent of hives in other parts of the country. Ira Kettle, who checks bee colonies daily throughout the state, said he has not seen colony collapse disorder yet in Connecticut. He stated many problems have been attacking bees in recent years.

THE PUBLIC SPEAKS

On August 9, 2007, Gary M. Jones wrote the following to Peter Trenchard. "Here is a long overdue email to say thank you for your help with the issuing of phytos for the four Canadian attendees at our July CT Daylily Society sponsored Region 4 Regional. The good will your support created was immeasurable. As Chairman, the event kept me busy (garden judge workshop instructor, bus captain, master of ceremonies, etc.). I had to leave early Sunday morning to conduct an in-garden judge's workshop so I was unable to personally greet your delegate. I did hear from a very happy Nova Scotian that he arrived on a timely basis, and she was so thrilled to be able to take some daylilies home with her. I am most grateful to you and your staff; please pass the word. Thank you."

On August 17, 2007, Joseph Kaminski wrote the following to Dr. Kirby Stafford. "I am a relatively new beekeeper, having 5 hives. On several occasions it has become necessary for me to seek help and answers to the many questions surrounding this hobby. The purpose of this note is to express my appreciation for one of your employees, Mr. Ira Kettle. Ira has always answered my calls for help with enthusiasm and professionalism, returns calls promptly and has visited my apiary more than once in response to my inexperience. I feel that the personal contact I have with him is responsible for any successes I have enjoyed. "Kudos" to Ira, you, and your department."

On August 17, 2007, Nancy Alderman, President of Environment and Human Health, Inc. wrote the following to Dr. Louis A. Magnarelli and Governor Rell. "I wrote to tell you what a wonderful resource the CT Agricultural Experiment Station is for the State of Connecticut and how important their Analytical Chemistry laboratory is for our state. MaryJane Incorvia Mattina, Ph.D. is head of the laboratory. She is incredibly smart, extremely professional, and wonderful to work with. We are so lucky in Connecticut to have someone of her caliber running the laboratory for the benefit of us all. I hope the state appreciates the importance of this laboratory in keeping us safe from all kinds of threats that are continually coming into the state. It will be extremely important that this laboratory have enough funds to hire the people it needs to conduct the testing that is required to continue to keep us safe. Most recently MaryJane Mattina has directed and overseen the testing of ground up rubber tire "crumb" that are the "infill" of the synthetic turf fields that have been going into schools and towns across CT with virtually no testing being done on them to see if they are safe. This has been an extremely important project and is just one more example of how important this laboratory is – as well as how important it is to the health of Connecticut citizens. We all owe MaryJane Mattina much gratitude and many thanks for her fine and dedicated work on behalf of us all."

On August 23, 2007, Bruno L. Giulini, Chief of Police for Groton, CT, wrote the following to Dr. Louis A. Magnarelli. "Recently my department investigated a case involving cruelty to animals. During the course of the investigation my evidence officer contacted Dr. MaryJane Incorvia Mattina at the Agricultural Experiment Station in New Haven. Dr. Mattina and her highly professional staff provided prompt service. Verbal results were waiting for the evidence officer by the time he returned to police headquarters. A complete written report was received

within days of the initial request for the examination of the evidence. Please convey my personal thanks to Dr. Mattina and her staff for their prompt assistance."

On September 5, 2007, Steven C. Nelson, Executive Vice President of The American Phytopathological Society, wrote the following to Dr. Wade Elmer. "On behalf of The American Phytopathological Society, I would like to express our sincere thanks to you for your work on "Mineral Nutrition and Plant Disease". We think the book turned out well and will be a fine addition to our 2008 APS Press Publications catalog which will be sent to 25,000 scientists and librarians worldwide. …"

On September 11, 2007, Ruth MacDonald of the First Congregational Church of Cheshire wrote the following to Dr. Sandra Anagnostakis. "Thank you so much for your continued attention to our Japanese chestnut tree at First Church, and thank you especially for your presentation this past Sunday at our Homecoming Celebration. At this time of year when those pesky chestnut pricklies drop and tempt every child in the congregation, its good to hear how precious this tree is. You've been a constant presence over the years, tending to that tree and propagating it – it's good to see you on a Sunday so we know who you are and what you do. You've been a faithful model of stewardship that we all can follow. Thank you for your time and expertise. You're welcome any time."

On September 14, 2007, Margery Daughtry, Editor-in-Chief, APS Press, wrote the following to Wade H. Elmer. "It was very exciting to receive my own copy of Mineral Nutrition and Plant Disease! I had enjoyed my pre-publication glimpses, but the book itself is even more impressive than I'd anticipated. You and your coeditors did a great job of finding authors with detailed expertise on the whole gamut of plant nutrition topics related to plant pathology – APS Press is going to find it very easy to sell this book. This is a very fine reference that will be appreciated for many years to come. … "

On September 17, 2007, Thomas Ebersold wrote the following to Dr. Sharon Douglas. "Thanks for the prompt and detailed reply. I have seen the damage in different areas along the red trail. I was in a section today off Mountain Road that has decent soil. The laurel looks like it has been dead for some time as evidenced by how easily I was able to break off or cut the dead shrubs. I know that the plants have also been affected by deer eating them. I was aware of the difficult winter we had as it impacted landscaping at my condominium. Thanks for connecting that weather to my mountain laurel question."

On September 21, 2007, Congresswoman Rosa L. DeLauro wrote the following to Dr. Kirby C. Stafford. "I just wanted to congratulate you on the wonderful article that appeared in the New York Times about the Station's work with Lyme Disease and the West Nile Virus. The work that is being done at the Station is making all the difference and we are proud that it calls New Haven home. I am so glad to know that the New York Times has taken an interest in your good work. You and your colleagues have always fought the good fight and I am proud to stand with you. I know we still have a lot of work to do and I am looking forward to continuing our efforts. Again, the article was terrific – congratulations!"

On October 1, 2007, James M. Thomas, Commissioner of the Connecticut Department of Emergency Management and Homeland Security wrote the following to Dr. Louis A. Magnarelli. "I am writing to express my thanks to you and your department for the prompt assistance you afforded us in testing our comfort care kits. I would also like to extend a special thank you to Dr. MaryJane Mattina for her assistance on this project. Her expertise and professionalism were invaluable to this process. The help and quick response of your department made it possible to ensure the safety of our citizens. As you know, armed with your results, all kits are being pulled from the cots, thus averting possible injury to over 10,000 residents. It is with this spirit of partnership that we will continue to do our best for all the citizens of Connecticut. Thank you again."

On October 6, 2007, Terry Williams wrote the following to Roslyn Selsky. "… I thoroughly enjoyed your presentation on the aquatic plants. I, and many others, were quite impressed. Those Latin words just rolled off your tongue so easily and you certainly knew what you were talking about. You did an excellent job and it was very, very interesting. The way you carried yourself and how you spoke made it such a calming, friendly atmosphere. Really great! You certainly gave a lot of us Beach Pond residents a lot to think about. We will be meeting together soon to draw up some plans of action. I am thankful we will have the opportunity to draw from your supervisor Gregg's expertise too when the need arises. All of us certainly appreciated your coming to Voluntown and taking the time out from your own personal life to address us; especially on a weekend. We are very grateful. … .") NOTE – A survey taken after this meeting gave "Excellent" reviews of the talk by Roslyn Selsky. Nine responses rated her talk excellent or better.)

On October 8, 2007, Connie Haney wrote the following to Gale Ridge. "Thank you so much for your e-mail. It is extremely helpful and the arborist who originally sent these photos to you on our behalf has come by and identified the problem as you reported. Thank you. It is so gratifying to know there is such wonderful help available."

On October 17, 2007, Robert Heffernan, Executive Director of the Connecticut Greenhouse Growers Association, wrote the following to Dr. Kimberly Stoner. "Thanks so much for speaking at our Pesticides and Roast Beef program! We're grateful for your personal energy and time to create and deliver your talk."

On October 18, 2008, Jo Sheldon of the East Windsor Garden Club wrote the following to Rose Hiskes. "Thank you so much for speaking to our East Windsor Garden Club on Tuesday night. It was such an enjoyable and informative talk. We really came away with a lot of good information and it was presented so well. Thanks for all you do!"

On October 30, 2007, Irving Macauley, Jr. wrote the following to Dr. Sandra L. Anagnostakis. "Just about all the chestnuts have fallen to the ground. Lots of them! Thank you for sending all that information on the early days of our chestnut trees. Very interesting. Our neighbor has one of these trees also. Just recently we had our trees pruned to avoid house roofs and gutters and also wires to the house. Every time old chestnut tree grows back and produces more chestnuts. Thanks again!"

In November, 2007, Dennis and Sally Kocyla of the Naugatuck Valley Audubon Society wrote the following to Greg Bugbee. "On behalf of the Naugatuck Valley Audubon Society, thank you for the wonderful program you gave on Aquatic Invasive Plants. Your slide show was great and your talk was very interesting. There was so much information we learned from your fascinating talk. Thank you for coming and for being our speaker."

On November 9, 2007, John A. Clements, Jr. wrote the following to Dr. Sharon Douglas. "Thanks so much for your time this morning … and of course all the help you have given me over the years. The state of CT is incredibly lucky to have someone of your caliber and intellect. I'll send the Eastern Hemlock sample up to the Station on Monday morning. … Thanks again – you're the best."

On November 9, 2007, Dr. George Whitney wrote the following to Dr. Kirby Stafford. "Both for your presentation for the Learning in Retirement group and again today for your efforts, thank you. Although I thought I was up on all your efforts, I have to admit I learned a lot and those attending both events were impressed as they should be. Again, thank you."

On November 9, 2007 Dr. George Whitney wrote the following to Dr. Wade Elmer. "Your part in the Learning in Retirement group lecture series was excellent. It's talks like yours that elevate the stature of the Station and all enjoyed it. Many thanks."

On November 12, 2007, Andrea Azarm, Chair of the Community Liaison Committee of the Backyard Beekeepers Association, wrote the following to Dr. Kirby Stafford. "We are writing to you on behalf of the Board of Directors of the Backyard Beekeepers Association to express our organization's appreciation for all that you and your staff did to prepare the Connecticut African Honey Bee Action Plan. You have our enthusiastic endorsement of the Plan. We hope that the State will continue to consider beekeeping's important contributions to Connecticut's agriculture and environmental health. The Backyard Beekeepers Association would like to continue its support of and dialogue with the Ag Station as the Plan evolves. As you may be aware, part of our organization's mission is "to educate and promote the benefits of beekeeping to the public." We plan to continue our education projects, outreach, and PR efforts to positively raise public awareness about honey bees. Our members are expected to employ best practices in beekeeping to reduce the likelihood of AHB arrival or establishment and to maintain generally healthy honey bee colonies in the state. Guidance from your office will always be appreciated. We suggest you include a provision in the Action Plan to encourage all state beekeeping organizations to teach best practices and to contribute to public relations efforts. The Backyard Beekeepers Association looks forward to continuing discourse with the State on beekeeping matters. We hope that you will call on us when you see a need."

In December, 2007, R. Hayes of the Federated Garden Clubs of Connecticut, Inc., wrote the following to Dr. Kimberly Stoner. "Thank you so much for teaching Gardening Study School again this year. …"

In December, 2007, Rod Hayes wrote the following to Dr. Sharon Douglas. "Thank you so much for teaching at Gardening Study School this year. It's so great to have the Best!"

On December 27, 2007, Mira Schachne wrote the following to Dr. Sharon Douglas. "Sincere congratulations and best wishes go to you – can't think of anyone nicer for it to happen to! On the other hand – how many more hours must you work? Best of luck.. Enjoy!"

On January 9, 2008, Michael D. Johnson, owner of Summer Hill Nursery, Inc., wrote the following to Dr. Sharon M. Douglas. "When you mentioned the other day that you were now head of the department, it really didn't sink into my head, which is rapidly turning to stone. Seeing the headline in the Experiment Station Associates Bulletin, I realize that CONGRATULATIONS are in order. You certainly have worked hard and deserve this position. … I thank you again for all the help you have given us in the past and what I'm afraid we are going to need in the future."

On January 11, 2008, Rollin M. Hickcox wrote the following to Dr. Sharon Douglas. "Please accept my thoughts to you on your appointment to head the Plant Pathology Department at the Station. Certainly well deserved, and I know you will keep up your very high professionalism in this capacity. My best to you."

On January 31, 2008, Kathy Litchfield, NOFA/Mass Organic Land Care Program Coordinator, wrote the following to Dr. Kimberly Stoner. "Thank you so much for speaking during the 7th annual NOFA Course in Organic Land Care in Leominster, MA! It is always a pleasure to work with you, and I so appreciate all of the important info you shared so expertly and enthusiastically with our 76 students!"

On January 31, 2008, Daryll C. Borst, Professor of Biology at Quinnipiac University, wrote the following to Peter W. Thiel. "… My training as a field ecologist means that I emphasize organisms more than molecular aspects of biology. Your talk provided external credibility to my organismal approach. I firmly believe that by providing practical information to my botany students, they will leave the course with more than just the standard content of a botany course. I was more pleased with your talk about your research on the effect of Fusarium on Spartina grass, which is causing Sudden Wetland Dieback. It dramatically showed how a group of organisms can dramatically affect the ecology of our coastal wetlands. Your comments on the possible role that the marine invertebrates might play in the Sudden Salt Marsh Dieback got the message across that field research can't ignore all of the possibilities that might be a factor in an ecological problem. Thank you again for your presentation to my botany class."

On January 31, 2008, Professor Daryll C. Borst of Quinnipiac University wrote the following to Dr. Robert E. Marra. "I would like to thank you for taking time to discuss your research on *Phytopthora ramorum* and Ramorum Blight, and the concerns about this pathogen for the Northeast. Your discussion on the history of *Phytopthora ramorum* and the importance of how it has spread to the nursery industry was most appropriate for my students. I am a firm believer that understanding the history of a scientific problem is crucial to its solution. Your discussion of how molecular biological procedures such as ELISA, have become critical tools in the

accurate, quick identification of the Ramorum Blight pathogen in quarantined nursery stock in Connecticut, was timely. Biology today emphasized molecular research, and, therefore, it has become my mission to expose my students to the world of organisms and how they relate to molecular biology. It is important that students learn that applied, practical research is just as important as pure research. Thank you again for your talk to my botany students."

On February 4, 2008, Pamela Roy, Secretary, Young Park Commission, wrote the following to Congresswoman Rosa DeLauro regarding the Station. "I am writing on behalf of the Young Park Commission in Branford. The Commission wishes to thank you for supporting The Connecticut Agricultural Experiment Station's Invasive Aquatic Plant Program (CAES IAPP). The YP Commission is responsible for 43 acres of beautiful open space which was donated to the town by the Young Family in 1971. Part of the property includes a pond commonly referred to as Young's Pond. We have concerns about invasive plants, herbicides, and the general health of the pond. CAES has agreed to survey Young's Pond and we look forward to learning more about "our" pond. The Young Park Commission depends on CAES to help us with many of the questions/problems we face in our stewardship. We are very grateful for their assistance. … ."

On February 7, 2008, Thomas Morehouse e-mailed the following to Dr. Richard Cowles. "Bravo. Your talk this morning was so refreshing. I've been attending the CLIR "retiree" lectures for five years. In those five years, your talk today was the best, bar none. Its been frustrating for me to arrive at a talk, and after 10 minutes the audience starts to lecture the presenter. The topic never returns to what was advertised. Seems to be a valid indicator of the hypothesis "retired professors never stop professing". Believe me, your handling of the questions (including mine on the "USDA Organic" label) is greatly appreciated. The talk on "organic vs conventional" was exactly that. Thank heaven. And it sure inspired may folks to continue their questioning after they left the building. … So, well done. And thanks."

On February 15, 2008, Paul Grimmeisen wrote the following to Dr. Jeffrey Ward. "Thank you for your informative lecture on deer control at the Pond House in Elizabeth Park. Our guests were extremely pleased with the material you provided them. Looking forward to working with you in the future."

In February, 2008, Dawn Kountz, Coordinator of the Talented and Gifted Program in the New Haven School System wrote the following to Roberta Ottenbreit. "As always I can't thank you enough for welcoming my students to the Experiment Station. Attached are first draft letters from the fourth grade students. I love to send letters because they are from the heart and comical at times. Thank you."

On February 21, 2008, Stephen Slipchinsky, Regional Market Supervisor at Foodshare, wrote the following to Dr. James LaMondia. "Thank you for your donation of 3,681 pounds of food to Foodshare in the year 2007. As we enter a new year filled with great uncertainty about the economy, we appreciate your generous support more than ever. All of us are concerned about rising costs, but thank you for remembering that it is harder on some people than others. With your help, Foodshare distributed a record 10.5 million pounds of food last year! With your help, Foodshare continues to provide families in need with tons of fresh fruit and vegetables and other

nutritious food every day. In these challenging times in America, your support means more than ever. Your gift to Foodshare provides not only food for a family; it is a beacon of hope for our hungry neighbors struggling with today's harsh economic realities. Thank you for caring"

On February 22, 2008, Barbara Washburn, Treasurer of the Mystic Garden Club, wrote the following to Dr. Jeffrey Ward. "We all loved your explanations on tree care and pruning. We tend to forget that big trees need attention, too, and we are fortunate to live in an area of woods. Thank you."

On February 27, 2008, Jeanette Barrows, Special Exhibit Chair for the Federated Garden Clubs of CT, Inc., wrote the following to Dr. Kirby Stafford. "Thank you for participating in our annual flower show and contributing to its success. The exhibits you provided added to the interest and excitement of our show. I hope by your participation with us, you were able to reach new audiences. You are all very special exhibiters indeed. I enjoyed working with each of you and the organizations you represent. I look forward to working with you again at next year's show."

In March, 2008, Ann and Tom Ball of the Torrington Community Garden wrote the following to Dr. Kimberly Stoner. "Just a short note to thank you for your presentation on pests and bugs to our Torrington Community Gardeners. Tom and I especially liked your thoughts on "mutual pest management". We've taken that approach to our small patch of lawn for some time and it is still green. The moles do a pretty good job on the grubs! So, many thanks for talking to us."

In March, 2008, Sandy Lewis wrote the following to Dr. Kirby Stafford. "Enclosed please find a small donation for the CT Agricultural Experiment Station. Greens Farms Garden Club is very grateful to you for taking time to come and educate us. The members found your presentation very informative and useful. I shall look forward to coming to New Haven for a visit – just waiting for the weather to improve a bit. Many thanks again."

On March 4, 2008, Sandi Wilson wrote the following to Dr. Richard Cowles. "Thank you so much for giving the presentation on weevils, woolly adelgids, and white grubs. The Master Gardeners loved it! They have been raving about how interesting it was and what a great presenter you are. We really appreciate you taking the time to speak with us, and we utilize your research all the time in our office!"

On March 8, 2008, Kathleen M. Johnson, District Conservationist at the Natural Resources Conservation Service, wrote the following to Dr. Kimberly Stoner. "Thank you very much for coming out on 3/4/08 to speak to the Torrington Community Gardeners. Your presentation was very interesting and informative. I was really impressed that everyone in the room ended up asking you a question about something that concerned them. Your time, knowledge, and enthusiasm are all greatly appreciated."

On March 12, 2008, Cynthia Cant, Program Chairman of the Garden Club of Orange, wrote the following to Dr. Kirby Stafford. "Ira Kettle came to a combined meeting of The Garden Club of

Orange and the Milford Garden Club on the 11th of March. He was not only very informative but delightfully interesting and humorous. We all learned much about the plight of the honey bee and were inspired to start our own hives. I intend to study the subject and hope to start a hive on my property."

On March 12, 2008, Pamela Kressmann, Acting Executive Director of the New Haven Land Trust, wrote the following to Dr. Kimberly Stoner. "We want to take this opportunity to extend our heartfelt thanks to you for offering your time to our Community Garden Program. Though the weather prevented many from attending, the group that was in attendance very much enjoyed your presentation. We hope you will participate with the Land Trust in the future; you have so much to offer to our gardeners. Is there a topic that you could present in the fall? We have better communications with our gardeners during the gardening season and I know many would attend. The Land Trust is fortunate in being able to feature educated speakers such as you to our local community. Education moves organizations forward and we at the trust are advancing our green footprint in this urban city. Many thanks."

On March 13, 2008, Sheryl Ellal, NOFA/RI OLC Course Coordinator, wrote the following to Dr. Kimberly Stoner. "Thank you so much for speaking at Rhode Island's first NOFA Course in Organic Land Care. Because of the participation of professionals like you, there are now 51 additional AOLCP's that have been provided with the basic understanding of organic land care, design and maintenance. Many of the students have followed up with phone calls to let us know how pleased they were with the instructors and course content. If you are interested in the results of the evaluations, please let me know and I will forward that information to you. … Thanks again for being part of the event."

On March 17, 2008, Edward DeNardis, Treasurer of the Bonsai Society of Greater New Haven, wrote the following to the Station. "Please accept this donation in thanks for the wonderful presentation at our monthly meeting by Claire E. Rutledge on March 11, 2008."

On March 17, 2008, Dick Tice of the Connecticut Grounds Keepers Assn. wrote the following to Dr. Sharon Douglas. "On behalf of the Connecticut Grounds Keepers Association, I would like to thank you for your participation in our 2008 Conference & Trade Show. You played a big role in the success of the event. Any comments that you have regarding the conference are welcome and we will use them in the planning of next year's conference. …"

On March 17, 2008, Dick Tice of the Connecticut Grounds Keepers Assn. wrote the following to Dr. Louis A. Magnarelli. "On behalf of the Connecticut Grounds Keepers Association, I would like to thank you and your people for your participation in our 2008 Conference & Trade Show. You played a big role in the success of the event. Any comments that you have regarding the conference are welcome and we will use them in the planning of next year's conference. …"

On March 18, 2008, Barbara Simmons, Program Coordinator for the Mansfield Garden Gate Club, wrote the following to Dr. Jeffrey Ward. "Thank you for presenting your program,"Strategies for Reducing Deer Browse Damage" to the Mansfield Garden Club last evening. You certainly are blessed with the great talent to provide an enjoyable and educational

program. It was very informative and there were several non-Garden Club people in attendance, an indication there are many in this area trying to solve their deer problems. Mother Nature did shine on us Monday, so the weather was not an issue and we were able to host your presentation. It's always good to find out about plants we can have in our gardens that have a better chance to survive "browsing". I'm sure many of our members will be at the nurseries looking for these plants. Your point about the fawns being more experimental with their diet has been our observation. It seems that when the same doe is around (we had a lame one with annual offspring for several years), the "odd" eating habits seem to be less. … Thank you again for your wonderful, informative presentation."

On March 24, 2008, Patrick Parker, PHC Program Director at SavATree wrote the following to Dr. Sharon M. Douglas. 'Thank you so much for speaking at our annual seminar. I am sorry that I did not get to sit in on your session but based on the feedback we received, everyone was very impressed and your handouts were a big hit. Thanks again and I look forward to working with you in the future."

On March 31, 2008, Sara Frischer wrote the following to Mary K. Inman. "Much thanks to you for all the information regarding Spring wheat. Our experiment is in progress."

In the Spring, Joe Maisano, Program Chairman for the River Garden Club, wrote the following to Dr. Sharon M. Douglas. "Thank you for your excellent presentation to the River Garden Club. Your comments will help us understand why diseases occurred on our vegetable plants. Hopefully this year conditions will be better. Thanks again."

On April 2, 2008, Kimberly J. Blake, Coordinator of Environmental Studies Career Seminar at Mitchell College, wrote the following to Rose Hiskes. "On behalf of the instructors coordinating and the students enrolled in ES 120, the Career Seminar course at Mitchell College, I wish to extend my gratitude for your presentation to us on February 20 at the college. The students appreciate receiving information about your particular career in the environmental field and the advice about the preparation both academic and personal, that you have offered them. The instructors are grateful for this as well and for your volunteering your time to share your insights with the class. Thank you very much and we hope to continue our relationship for future assistance as we develop our program in Environmental Studies here at Mitchell College."

On April 2, 2008, Laura Lenhard, Program Chair for the Fairfield County Horticultural Society, Inc., wrote the following to Rose Hiskes. "Thank you again for agreeing to speak to the Fairfield County Horticultural Society at our August 9th meeting. The meeting begins at 8:00p.m. and our speakers present at the beginning of the meeting. We meet at Earthplace, 10 Woodside Lane in Westport. … Thank you again, and I look forward to seeing you on August 9th."

On April 11, 2008, Senator Joan V. Hartley, Deputy President Pro Tempore, 15th District, wrote the following to Dr. Louis A. Magnarelli. "Thank you for your recent letter bringing my attention to the Connecticut Agricultural Experiment Station's assistance in developing Waterbury's efforts to establish community garden sites. It is always gratifying to see the development and expansion of such a successful project in the past come to fruition. The Fulton

Park Area as well as the other targeted locations for community garden sites are excellent locations and well situated to support this popular project. I thank you for your organizations' assistance in bringing these areas in Waterbury to a point where plantings can begin and more people can benefit from the gratification which gardening can bring on so many levels. I look forward to receiving positive news in regards to these projects' futures. Please contact me should I be able to offer any assistance along the way."

On April 11, 2008, Muriel Levine wrote the following to Mary K. Inman. "Thank you for the comprehensive and useful information. Now that I have the diagnosis from an arborist, and your helpful suggestion on the phone, plus this material, I can proceed accordingly. I wish I had known to consult with your facility years ago to avoid this problem."

On May 1, 2008, Michael Kijewski of Arboreta Landscapes wrote the following to Greg Bugbee. "We would like to thank you for the service you provide in soil testing and consultation. The service is of great value to our industry and we appreciate all of your expertise and knowledge which you give us. … ."

On May 5, 2008, Callie Leasure, Executive Assistant to the CEO of Gibson Guitar Corporation wrote the following to Tess Foley. "I am writing to you on behalf of Henry Juszkiewicz, Chairman & CEO of Gibson Guitar Corporation. He has received the posters you sent and was truly impressed. He asked me to have them framed and you will be glad to know, they are now hanging right outside of his office for everyone to see. He wanted me to thank you for sending these to him and for doing what you do. I am sending you a t-shirt and a copy of the Gibson 100 Years book. I know you will enjoy it and it will be informative to you. Thank you for your support and being a fan of Gibson!"

On May 6, 2008, Nancy Faesy of Wilton wrote the following to Dr. Louis A. Magnarelli regarding Ira Kettle. "Yesterday I had a scheduled visit from Ira Kettle, CT State Bee Inspector, to help me split a hive of bees. He was so helpful that I am compelled to write you to sing his praises and to tell you how important his job is and how necessary he is to the beekeepers of Connecticut. He also checks for diseases when he comes (and luckily found no mites or diseases), so he is an important resource to insure good pollination of Connecticut's plants and trees. Every once in a while I read of threats to the budget of CAES by our legislators. I cannot believe this when I realize what is at stake for the nurseries and farmers and growers of Connecticut. I use the "Ag Station" for soil testing for my vegetable garden, information about honeybees, and planting information. Last fall, a scientist from CAES and Ira Kettle came to take 100 honeybees and some comb to test for foulbrood. They were polite and interesting, answering any questions I had. Fortunately, the tests they ran showed no foulbrood. I compliment you on the work CAES does and thank you for the help from Ira Kettle."

On May 17, 2008, Louise Evans of the Down to Earth Garden club wrote the following to Rose Hiskes. "Thank you so much for your informative talk this past Wednesday. It was just what we all needed to know as we find pests and diseases of all kinds in our gardens. We appreciate your willingness to share preventive measures with us."

On May 20, 2008, Ann Astarita of the Wetlands Enforcement Office of the Town of Newtown, wrote the following to Roslyn Selsky. "Thank you for mentoring me through the process of the town's first aquatic invasives workshop. Thanks especially for being our featured speaker. You were both informative and engaging. It was great to meet you and share your enthusiasm for protecting our water resources. I believe strongly that environmental education encourages community awareness and acts as a catalyst for action and improvement. In fact, a workshop participant just came in today with a boat "clean-up" sign specific to the aquatic invasives found on Taunton Lake. Thank you! That would never have occurred if not for your direct involvement. Please know that your suggestions or ideas for improvement or follow-up are welcomed. Feel free to contact me at any time."

On May 28, 2008, Arthur Salman of the Greater Bridgeport Men's Garden Club wrote the following to Greg Bugbee. "Your presentation to our Greater Bridgeport Men's Garden Club on May 21st was excellent, covering wide-ranging garden topics. I thought the Q&A session went very well, too. We'd like to have you back to speak to us again, perhaps, some time during the next gardening season. Again, many thanks (and happy gardening)."

In June, 2008, Dr. Cowan of the UCONN College of Agriculture and Natural Resources, Department of Animal Science wrote the following to Dr. Kirby Stafford. "I just want to thank you for your participation in the 2008 Poultry Bio-security and Pest Management Workshop. Your presentation on flies and fly control was just what we needed. I think the program was great and I know that all who participated learned a lot this year. Thanks for contributing to the success of the program.

On June 9, 2008, Elinor Slomba. Harbor Program Coordinator for The Village at Mariner's Point, wrote the following to Dr. Robert Marra. "Many thanks for inviting residents of the Village at Mariner's Point to visit your facility. The group delighted in the scenic grounds and the attractive atrium in the Johnson/Horsfall Building and considered the talk you prepared for us especially worthwhile. You ably captured the attention of a group with diverse levels of memory impairment. I heard many positive comments on the way home, and the materials you provided will fuel future programs. We appreciate CAES including us among its stakeholders. The experience is one we hope to repeat in the future."

On June 10, 2008, Joe Mausare, Jr., Program Chairman of the River Garden Club, wrote the following to Rose Hiskes. "On behalf of the Heritage Village River Garden Club we would like to thank you for your excellent presentation on "What's Bugging Your Plants?" Your talk gave us a better understanding of insects and other problems that infest our gardens. …"

On June 18, 2008, Brett Schneiderman, ISA Certified Arborist for SavATree/SavaLawn wrote the following to Mary Inman. "Thank you for your assessment of the ornamental pines at the Keio Academy of New York. As always, we are able to count on a thorough assessment and recommendations from you and the Connecticut Agricultural Experiment Station. We appreciate the work that you do!"

SCIENTIFIC OFFICERSHIPS AND MEMBERSHIPS ON STATE, NATIONAL, OR REGIONAL COMMITTEES AND BOARDS

DEPARTMENT OF BIOCHEMISTRY AND GENETICS

NEIL MCHALE

- Chairman, Institutional Biosafety Committee

RICHARD PETERSON

- Vice President and voting delegate, Quinnipiac Chapter Sigma Xi
- Radiation Safety Officer

NEIL SCHULTES

- Steering Committee at Yale University for Bioethics section of the Institute for Social and Policy Studies
- Masters Research Committee for a student advised by Dr. George Mourad at the University of Indiana/Purdue
- Institutional Biosafety Committee
- Institutional Animal Care and Use Committee
- Station Health and Safety Committee
- Plant Science Day Committee
- Sigma Xi Membership Committee

DOUGLAS DINGMAN

- Institutional Biosafety Committee
- Station Health and Safety Committee

DEPARTMENT OF ENTOMOLOGY

ROSE HISKES

- Liason between Connecticut Agricultural Experiment Station and the Connecticut Nursery and Landscape Association's Accreditation Committee for the Discovery and Education Garden, Valley Lab, Windsor
- Member, Education Committee, Connecticut Tree Protective Association
- Member, Steering Committee, Connecticut Invasive Plant Working Group
- Member, Symposium Planning Committee, Connecticut Invasive Plant Working Group.

LOUIS A. MAGNARELLI

- Researchh Affiliate, Epidemiology and Pulic Health, Yale University School of Medicine
- Administrative Advisor, Multistate Research Project NE-1019 on nematodes

- Member, Legislative Invasive Plants Council
- Member, Legislative Wine Development Council
- Councilor, Connecticut Academy of Science and Engineering

CHRIS T. MAIER
- Curatorial Affiliate in Entomology, Peabody Museum of Natural History, Yale University
- Member, Advisory Committee, Cooperative Agricultural Pest Survey, USDA
- Member, Archives Committee, Connecticut Entomological Society
- Member, Connecticut Endangered Species Committee, Invertebrate Subcommittee
- Member, Program Committee, Connecticut Pomological Society
- Research Associate, Division of Plant Industry, Florida Department of Agriculture and Consumer Services

CLAIRE RUTLEDGE
- Entomological Society of America - Poster Judge at their Annual Meeting in San Diego December 10

KIM STONER
- Board of Directors, Northeast Organic Farming Association of Connecticut
- Chair of the Organic Land Care Committee, a joint project of the Connecticut
- and Massachusetts chapters of the Northeast Organic Farming Association
- Member, Technical Advisory Committee, Regional Research Project NE-9, Conservation and Utilization of Plant Genetic Resources
- President, Friends of Boulder Knoll

VICTORIA L. SMITH
- Northeast Area Association of State Foresters Firewood Working Group; member
- USDA-APHIS-CPHST National Plant Pathogen Laboratory Accreditation Program (NPPLAP); member
- USDA National Cooperative Agricultural Pest Survey; Eastern Region Ad Hoc Representative
- National Plant Board/PPQ *Phytophthora ramorum* Working Group; member
- Eastern Plant Board; member
- USDA-APHIS-PPQ Early Detection-Rapid Response Committee; member
- Sustainable Agriculture Research and Education (SARE) Program; Eastern Plant Board representative to the Administrative Council
- New England Wildflower Society, Connecticut Task Force; member
- Biotechnology Regulatory Services Course 201: An Advanced course on USDA-APHIS Biotechnology Regulatory Services Regulations and Processes; completed

DEPARTMENT OF FORESTRY AND HORTICULTURE

JOSEPH P. BARSKY

- Executive Committee, New England Society of American Foresters

MARTIN P. N. GENT

- Official representative, NE1017 Regional Research Committee.
- Steering Committee, New England Vegetable & Berry Growers Conference.
- Associate editor, Journal of Plant Nutrition.

ABIGAIL A. MAYNARD

- Ex-Officio Member, Connecticut Council on Soil and Water Conservation
- Member, State Technical Committee
- Editorial Board, Compost Science & Utilization
- Member, Solid Waste Advisory Committee of DEP

WILLIAM R. NAIL

- National Risk Management (Sustainable) Guidelines working group, National Viticulture Extension Leadership.
- Statistics and Protocol Subcommittee, NE-1020: Multi-State Evaluation of Winegrape Cultivars and Clones.
- CAES Representative, Connecticut State Advisory Committee for Agricultural Education.

MICHAEL R. SHORT

- Education Committee, Connecticut Nursery and Landscape Association

JEFFREY S. WARD

- Secretary, Connecticut Tree Protection Examination Board
- Executive Board Member, Connecticut Tree Protection Association
- Executive Board Member, Connecticut Urban Forest Council
- Research Chair, Connecticut Forestland Council
- Ex-Officio Member, Goodwin Scholarship Committee

SCOTT C. WILLIAMS

- Board Member, Connecticut Urban Forest Council
- Commissioner, Town of Guilford Inland Wetlands Commission
- Commissioner, Town of Guilford Land Acquisition Commission

DEPARTMENT OF PLANT PATHOLOGY AND ECOLOGY

SANDRA L. ANAGNOSTAKIS

- Current Treasurer and Life Member, Northern Nut Growers Association
- Member, Regional Research Project NE-1015, "Biological Improvement, Habitat Restoration, and Horticultural Development of Chestnut by Management of Populations, Pathogens, and Pests"
- Park Naturalist, Sleeping Giant Park Association
- International Registrar for Cultivars of Castanea, International Society for Horticultural Science

BOTOND BALOGH

- Member, Phyllosphere Microbiology Committee, The American Phytopathological Society

SHARON M. DOUGLAS

- Member, APS Foundation Board, American Phytopathological Society
- Member, USDA-APHIS-PPQ Cooperative Agricultural Pest Survey Committee (CAPS) for Connecticut
- Member, Institutional Biosafety Committee, The Connecticut Agricultural Experiment Station
- Member, Board of Directors, Connecticut Tree Protective Association

WADE H. ELMER

- Past President, Northeastern Division, The American Phytopathological Society, 2006-2007
- Chair, Nomination Committee, Northeastern Division, The American Phytopathological Society, 2006-2007
- Member, Program Committee, Connecticut Greenhouse Growers Association, 1988-present
- Member, Northeast Research, Extension and Academic Program Committee for Integrated Pest Management, 2006-present
- Member representative to the State Consulting Committee for Agricultural Education
- Ph.D. Committee Member of Anathep Pasura, Department of Plant Science, University of Connecticut, Storrs, CT
- Ph.D. Committee Member of Cheng Hua Huang, Department of Plant Pathology, University of Florida, Gainesville, FL

FRANCIS J. FERRANDINO

- Member, Epidemiology Committee, The American Phytopathological Society
- Chairman, Student Awards Committee, Northeastern Division, The American Phytopathological Society

ROBERT E. MARRA

- Member, Forest Pathology Committee, The American Phytopathological Society
- Member, Steering Committee, Connecticut Conference on Natural Resources
- Ph.D. Committee Member of Nicholas Brazee, Department of Plant Pathology, University of Massachusetts, Amherst

DEPARTMENT OF SOIL AND WATER

THEODORE G. ANDREADIS

- Lecturer in Epidemiology and Public Health, Yale University School of Medicine
- Adjunct Professor, Department of Pathobiology, University of Connecticut
- Member, Multi-State Research Project NE-507: Mosquitoes, Disease & Public Health
- Member, Multi-State Research Project S-1024: Discovery of Entomopathogens and Their Integration and Safety in Pest Management Systems"
- Member, Editorial Board, The Journal of Eukaryotic Microbiology
- Member, State of Connecticut Mosquito Management Program
- Member, Peabody Fellows Biodiversity and Human Health Program, Yale University

GREGORY J. BUGBEE

- Director, Clear Lake Improvement Association
- Member, Northeast Soil Testing Committee, NEC-67
- Member, Government Affairs Committee, New England Aquatic Plant Management Society

JOSEPH J. PIGNATELLO

- Adjunct Professor in Environmental Engineering, Department of Chemical Engineering, Yale University
- Associate Editor, Environmental Engineering Science.
- Member of W-82 Multi-State Project: Pesticides and Other Organics in Soil and Their Potential for Groundwater Contamination
- Chair, Division S-11 (Soils and Environmental Quality) Soil Science Society of America

ROSLYN SELSKY

- Member, Connecticut Geospatial Council

MICHAEL THOMAS

- Member, Endangered Species Advisory Committee for Insects and Arachnids, Connecticut Department of Environmental Protection
- Member, Technical Working Group, Connecticut State Grassland Habitat Conservation Initiative, Connecticut Department of Environmental Protection

CHARLES R. VOSSBRINCK

- Visiting Assistant Professor, Department of Pathology, Albert Einstein College of Medicine, Yeshiva University, Bronx, New York.
- Member, Multi-State Project S-1024: Discovery of Entomopathogens and Their Integration and Safety in Pest Management Systems

JASON C. WHITE

- Vice President, International Phytotechnology Society
- Managing Editor, International Journal of Phytoremediation.
- Member, Editorial Board, Environmental Pollution.
- Member, Editorial Board, Environmental Toxicology and Chemistry
- Member, Executive Committee, International Phytotechnologies Conference
- Member, Scientific Advisory Board, Association for Environmental Health and Sciences

VALLEY LABORATORY

JOHN F. AHRENS

- Advisor and Director, National Christmas Tree Growers Association
- Member, National IR-4 Committee (Interregional Committee No. 4) that prioritizes pesticide registration needs for ornamental crops.

CAROLE CHEAH

- Member of the International Organization of Biological Control
- Senior member of St.Hugh's College, University of Oxford, UK
- Senior Member of Wolfson College, University of Cambridge, UK
- Fellow of the Cambridge Philosophical Society, UK

RICHARD S. COWLES

- Japanese Beetle Harmonization Agreement Treatment Committee
- Treasurer, Connecticut Entomological Society

JAMES A. LAMONDIA

- Secretary/Treasurer, Northeast Division of American Phytopathological Society
- Senior Editor, Journal of Nematology
- Editor, Tomato & Potato Section; Biological and Cultural Tests for Control of Plant Diseases
- Ex-Officio Member, Connecticut Tree Protection Examining Board.
- Worker Protection Standards Trainer for the Valley Laboratory.
- North American Blue Mold Forecast Center State Coordinator
- Society of Nematologists Executive Board Member
- Society of Nematologists Extension Committee

DEWEI LI

- Board Member of the Analytic Accreditation Board of American Industry Hygiene Association (AIHA).

TODD L. MERVOSH

- Connecticut Invasive Plant Working Group – Member of Steering Committee & Symposium Planning Committee, Chair of Stewardship Committee.
- Northeastern Weed Science Society – Chair of Nominating Committee
- Weed Science Society of America – Member of Weed Alert Committee and Herbicides for Minor Uses Committee

THOMAS M. RATHIER

- Advisory Board for Community Gardens in Hartford, Knox Parks Foundation
- Advisory Board, Agri-Science, Bloomfield High School
- Member, Cooperative Agricultural Pest Survey Committee
- Science Liaison, Connecticut Christmas Tree Growers Association
- Member, Concentrated Animal Feeding Operation Committee, EPA
- Advisor, USDA Natural Resource Conservation Service.
- Member, Education Subcommittee, Connecticut Tree Protective Association

LECTURES, SEMINARS, AND INTERVIEWS

During the year, staff members present formal lectures and seminars to organized groups outside the Station. They also describe their research to organized groups visiting the Station and occasionally report on their research to elected officials. At other times, newspaper, radio, and TV reporters interview our staff. These occasions are listed below.

AHRENS, JOHN

- Presented information on Canaan fir tolerance to soil acidity and demonstrated shearing principles and techniques in white pine at a twilight meeting of the Connecticut Christmas Tree Growers' Association at the Valley Laboratory (63 attendees) *July 18, 2007*
- Answered questions on weed control at a twilight meeting of the Connecticut Christmas Tree Growers' Association in Mystic (50 attendees) *August 7*
- Presented a talk on "The Latest on Herbicides for Christmas Tree Plantings" at the combined meeting of the Maine Christmas Tree Growers and the National Christmas Tree Assn. in Bangor, ME (110 attendees) *August 17*
- Judged Christmas Trees at the Eastern States Exposition for the New England Christmas Tree Alliance in Springfield MA *September 9*
- Participated in the Nursery and Landscape Research Tour at the Valley Laboratory (45 attendees) *September 18*
- Presented talks on Herbicides for Christmas Tree Plantations and Weed Control Options for Seeded and Transplant Beds at the Annual Fall meeting of the New Hampshire/Vermont Christmas Tree Association (100 attendees) in Barton, VT *September 22*
- Presented two papers coauthored with Dr. Todd Mervosh, "Tolerance of Fraser Fir to Herbicides Applied Before and After Bud Break" and "Tolerances of Container-Grown Ornamentals to Experimental and Registered Herbicides" and spoke about "Application Strategies – Ornamental Herbicides" at the 62nd annual meeting of the Northeastern Weed Science in Philadelphia (200 attendees) *January 22, 20*08
- Participated in a workshop for nurserymen at the Ohio State University Short Course, speaking about "Weed Control in Containers" (40 attendees) and presented a talk on Application Strategies (150 attendees) *January 29-30*
- Presented a talk on Weed Management in Christmas tree plantations at New England Pest Control Short Course, Keene, NH (100 attendees) March 20
- Spoke about current herbicide practices at the 50th Anniversary meeting of the Massachusetts Christmas Tree Association in Hancock, MA (100 attendees) June 27

ANAGNOSTAKIS, SANDRA L.

- Participated in the Annual Meeting of the Mycological Society of America in Baton Rouge, LA *August 8-10, 2007*
- Gave two papers entitled "Identifying butternut" and "Nutrients in chestnuts" at the Annual Meeting of the Northern Nut Growers Association in Ottawa, Ontario, Canada (150 adult attendees) *August 11-15*
- With Pamela Sletten, led a tour and discussed their chestnut research at the Chestnut Plantation at Sleeping Giant State Park for members of the The American Chestnut Foundation (18 adult attendees) *August 25*

- Participated in the annual meeting of the Multistate Research Project NE-1015, "Biological Improvement, Habitat Restoration, and Horticultural Development of Chestnut by Management of Populations, Pathogens, and Pests" in Marion, VA (40 adult attendees) *September 6-8*
- Gave a talk on the "Parsons' Japan Chestnut at the first Congregational Church of Cheshire (28 adult attendees) *September 9*
- Gave two invited talks entitled "Breeding chestnut trees for resistance to gall wasp" and "The influence of the pollen parent on nutrients in chestnuts" at the International Workshop entitled "Chestnut Management in Mediterranean Countries: Problems and Prospects" held in Bursa, Turkey (120 adult attendees) *October 23-25*
- Gave a talk on "Breeding chestnut trees" to a botany class from Quinnipiac University at the Station (12 attendees) *November 5*
- Gave a talk entitled "A tree by any other name" to the Yale Forest Forum in New Haven (30 adult attendees) *December 6*
- Judged exhibits in the Edible Nut Division at the 2008 Pennsylvania Farm Show in Harrisburg, PA *January 4, 2008*
- Spoke about her chestnut and butternut research at the Forest Health Monitoring Workshop in Jones Auditorium (60 attendees) *February 21*
- Spoke about her chestnut research at a meeting of the Board of Directors of Friends of Boulder Knoll in Cheshire (7 adult attendees) *February 21*
- Gave a report as Park Naturalist on the chestnut trees in the park at the Annual Board of Directors meeting of the Sleeping Giant Park Association at Mory's in New Haven (20 adult attendees) *February 25*
- Spoke about chestnuts to visiting groups of students participating in the Education Connection, a regional educational service center based in Litchfield (2 adults and 14 students) *March 31*
- Participated in the Earth Day celebration at the Peabody Museum of Natural History in New Haven (150 adult and 200 youth attendees) *April 18*
- Participated in the Earth Day celebration at the University of Hartford in West Hartford (30 adult and 10 youth attendees) *April 19*
- Set up a display on Station research on chestnut at the Earth Day event at Sikorsky in Stratford (250 attendees) *May 1*
- Helped man the booth at the 2nd Annual Norwalk Tree Festival at Shady Beach in Norwalk (75 adult and 150 youth attendees) *May 3*
- Hosted the Annual Meeting of the Fagaceae Genetics project sponsored by NSF at Lockwood Farm and toured the chestnut plantings there between talks (20 attendees) *May 9-10*
- With Pamela Sletten, attended a grafting workshop sponsored by Michigan State University and the MSU Extension Program, Petoskey, Michigan *May 30-June 1*

ANDERSON, JOHN F.

- Spoke about the BSL-3 Laboratory to a group of graduate students from Southern Connecticut State University *July 6, 2007*
- Was interviewed about yellow jackets by Parisa Khakuei of the Norwich Bulletin *August 9*
- Gave a talk about West Nile virus and mosquitoes to the Northwest Mental Health Group in Torrington *August 16*
- Met with authorities of the New Haven Housing Authority about bed bugs *September 5*
- Gave a talk about West Nile virus and mosquitoes to the Northwest Mosquito Control Association in Whitefish, MT *October 11*
- Gave a talk about extrinsic incubation periods for horizontal and vertical transmission of West Nile virus at the annual meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA *November 6*

- Taught procedures for injection of spirochetes into nymphal ticks to graduate students and post doctoral scientists in the College of Veterinary Medicine, University of Maryland *December 3-5*
- Was interviewed about bed bugs by Erin Cox, Channel 8 News *January 24, 2008*
- Gave a talk entitled "Bed bugs, ticks, and mosquitoes and the diseases they transmit to CONN OSHA, Windsor *March 18*
- Gave a talk entitled "l04 years of public health in entomology at CAES", on Plant Science Day in the Spring, New Haven *April 24*
- Discussed the BSL-3 Laboratory with students from Bunnell High School of Stratford, New Haven *April 8*
- Gave a talk entitled "Biting insects and ticks associated with human pathogens in Connecticut", Hallmark, Inc., Enfield *June 4*

ANDREADIS, THEODORE G.

- Was interviewed about the first detection of West Nile virus infected mosquitoes in Manchester by Fran Schneido of CBS Radio NY and Metro News *July 6, 2007*
- Was interviewed about funding cuts by the CDC to the State Mosquito West Nile Virus Surveillance Program by Bill Hathaway of the Hartford Courant *July 9*
- Was interviewed about West Nile virus by Michael Dinan of the Greenwich Times *July 10*
- Was interviewed about the State Mosquito West Nile Virus Surveillance Program by the Weston Forum weekly newspaper *July 10*
- Was interviewed about impact of global warming on mosquito-borne diseases by Bob Miller of the News Times *July 11*
- Presented a lecture entitled "West Nile virus: an exotic emerging mosquito-borne disease in the western hemisphere" to a group of secondary school teachers from Connecticut as part of the "Peabody Fellows Program on Biodiversity and Vector-Borne Diseases (30 attendees) *July 11*
- Was interviewed about mosquitoes and the threat of West Nile virus by Gary Ginsberg of CTDPH Radio *July 14*
- Was interviewed about the effectiveness and safety of mosquito repellents by Tara Moncheck of WFSB TV3 *July 17*
- Was interviewed about the history of West Nile virus in mosquitoes and humans from 1999 to 2006 by Steven Busemeyer of the Hartford Courant *July 18*
- Was interviewed about the status and outlook for West Nile virus in Connecticut for the 2007 season by Bob Miller of the News Times *July 18*
- Was interviewed about mosquitoes and West Nile virus by Patrick Mousinack of Cablevision 12 Norwalk-WNV *July 20*
- Was interviewed about the status and outlook for West Nile virus in Connecticut for the 2007 season by Steve Kotchko of CT Public Radio *July 25*
- Was interviewed about the State Mosquito West Nile Virus Surveillance Program by Marietta Homayonpour of the Danbury News Times *July 27*
- Was interviewed about mosquitoes and West Nile virus by Ann DeMatteo, New Haven Register *August 1*
- Was interviewed about the first human cases of West Nile virus in Connecticut by Bob Miller of the Danbury News Times *August 3*
- Was interviewed about the first human cases of West Nile virus in Connecticut by Marc Sims of CT Public Radio *August 3*
- Was interviewed about the first human cases of West Nile virus in Connecticut by Judy Benson of The Day *August 3*
- Was interviewed about the first human cases of West Nile virus in Connecticut by Bill Hathaway of the Hartford Courant *August 3*

- Was interviewed about the first human cases of West Nile virus in Connecticut by Matt Dwyer of WTIC Radio *August 3*
- Was interviewed about the first human cases of West Nile virus in Connecticut by Marilynn Moss of the Greenwich Times *August 3*
- Was interviewed about the detection of West Nile virus in Stamford by Tony Savino of WGCH Radio Greenwich *August 8*
- Was interviewed about the detection of West Nile virus in Stamford by Sam Gingerella of WTIC Radio *August 8*
- Was interviewed about the human case of West Nile virus in New London by WTNH TV8 New Haven *August 8*
- Was interviewed about the detection of West Nile virus is Fairfield County by Steve Kovak of the Stamford Advocate *August 13*
- Was interviewed about the West Nile virus season in Connecticut by Jared Newman of the Wilton Villager *August 20*
- Was interviewed about the detection of West Nile virus in Greenwich by Meredith Blake of the Greenwich Times *August 21*
- Met with members of the State Mosquito Management Program to review details of the larvicide program for mosquito control directed by Governor Rell *August 21*
- Was interviewed about the status of West Nile virus in Connecticut by WSTC/WNLK Radio in Stamford *August 23*
- Was interviewed about human cases of West Nile virus in Connecticut by Gillian Ness, Cablevision News 12, Norwalk *August 24*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by WTIC radio *August 28*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by Steve Kotchko of CT Radio Network *August 28*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by Judy Bensen of the Day *August 28*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by Lisa Chamoff of The Advocate *August 28*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by Lauren Petty of NBC 30 *August 28*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by Mark Sims of Metro Radio, Hartford *August 29*
- Was interviewed about the finding of Eastern Equine Encephalitis in mosquitoes in Plainfield by Gillian Ness, Cablevision 12, Norwalk *August 29*
- Presented an invited seminar entitled "Host Feeding Patterns of Mosquito Vectors in the Northeastern United States and Their Role in Transmission of West Nile and Eastern Equine Encephalitis Viruses" at the University of Texas Medical Branch, Center for Tropical Diseases, Galveston, TX (50 attendees) *September 25*
- Participated as a member of the Supervisory Committee in the qualifying exam of Charles E. McGee, Ph.D. candidate in Experimental Pathology, University of Texas Medical Branch, Center for Tropical Diseases, Galveston, TX *September 26*
- Presented an overview of the Station's Mosquito Surveillance and Research Program to budget analysts from the State Department of Policy and Management *October 12*
- Was interviewed about the West Nile virus and mosquito season for 2007 by Marian Gail Brown of the Connecticut Post *October 16*
- Was interviewed about the West Nile virus and mosquito season for 2007 by Bob Miller of the News Times *October 16*

- Presented an overview of mosquito biology to a group of TAG students visiting the Station from the New Haven area *October 18*
- Was interviewed about the conclusion of the mosquito trapping and testing program for West Nile virus and eastern equine encephalitis by Matt Dwyer of WTIC Radio *October 31*
- Was interviewed about the conclusion of the mosquito trapping and testing program for West Nile virus and eastern equine encephalitis by Marc Sims of CT Radio Network *October 31*
- Was interviewed about the conclusion of the mosquito trapping and testing program for West Nile virus and eastern equine encephalitis by Metro News CT *October 31*
- Presented 4 poster presentations: "Isolations of Jamestown Canyon virus (Bunyaviridae: Orthobunyavirus) from field-collected mosquitoes (Diptera: Culicidae) in Connecticut, USA: a ten-year analysis", "Genetic relationships of Jamestown Canyon viruses (Bunyaviridae: Orthobunyavirus) infecting Connecticut mosquitoes (Diptera: Culicidae)" "Regional comparisons of the host feeding patterns of major vectors of West Nile and Eastern Equine Encephalitis viruses in the US" and "Effects of landscape patterns and bird community composition on West Nile virus transmission patterns in Connecticut" at the 56th Annual Meeting of The American Society of Tropical Medicine and Hygiene in Philadelphia, PA (over 2,000 attendees) *November 4-8*
- Presented an overview of the State Mosquito/Arbovirus Surveillance Program and West Nile virus to a group of 5 members of the Naugatuck Audubon Society *November 9*
- Presented an invited talk "Host feeding patterns of mosquito vectors in the northeastern US and their role in transmission of West Nile virus" at the Annual Meeting of the Northeastern Mosquito Control Association, held in Plymouth, MA (100 attendees) *December 3*
- Gave an oral presentation on West Nile virus and a tour of the Biosafety Level 3 and electron microscope laboratories to a group of 28 students from Branford Horizons Alternative High School as part of the NIH/NSF sponsored Peabody Fellows Program, Yale University (28 student attendees) *December 12*
- Gave an oral presentation on West Nile virus and a tour of the Biosafety Level 3 and electron microscope laboratories to a group of students from Waterbury High School as part of the NIH/NSF sponsored Peabody fellows program, Yale University (20 student attendees) *December 19*
- Gave an oral presentation on West Nile virus and a tour of the Biosafety Level 3 and electron microscope laboratories to a group of 24 students from Barnard Environmental Magnet School in New Haven as part of the NIH/NSF sponsored Peabody Fellows Program, Yale University (24 student attendees) *December 20*
- Presented an overview of current research and surveillance initiatives on mosquitoes and mosquito-borne diseases at CAES at the Annual Meeting of Multi-State Research Project, NE-507, Mosquitoes, Disease and Public Health held in Atlantic City, New Jersey *March 11*
- Presented a talk entitled "West Nile Virus: An Exotic Emerging Mosquito Borne Disease in the Western Hemisphere" at the Biodiversity Day event, "Backyard Bloodsuckers: Biodiversity Bites Back!" held at the Peabody Museum, Yale University (11 attendees) *April 17*
- Presented a talk entitled "Research and Surveillance Activities on Mosquitoes and Mosquito-Borne Diseases at the Connecticut Agricultural Experiment Station, Plant Science Day in the Spring, New Haven *April 24*
- Presented an overview of the Station's research and surveillance program on mosquitoes and arborviruses to the Vice President of Programs for the CT Science Center in Hartford *May 6*
- Was interviewed about the State Mosquito Trapping and Testing Program for West Nile and eastern equine encephalitis viruses by Marc Sims of CT Public Radio *June 13*
- Was interviewed about the State Mosquito Trapping and Testing Program for West Nile and eastern equine encephalitis viruses and the outlook for 2008 by Sam Gingerella, WTIC Radio in Farmington *June 19*

- Was interviewed about the season's first isolation of West Nile virus from mosquitoes collected on Barn Island in Stonington by Fran Schneido of CBS Radio, Marylynn Moss of the Norwich Bulletin and Metro News *June 20*
- Was interviewed about the season's first isolation of West Nile virus from mosquitoes, local mosquito abundance and the prognosis for 2008 by Bob Miller of the News Times in Danbury *June 23*
- Was interviewed about the season's first isolation of West Nile virus from mosquitoes collected on Barn Island in Stonington by Victor Zapana of the New Haven Register *June 25*

ARMSTRONG, PHILIP

- Presented an invited talk entitled "The Changing Landscape of Arboviruses in New England" at the Annual Conference of the Society for Vector Ecology, held in Springfield, IL *September 18, 2007*
- Presented 2 posters, "Genetic relationships of Jamestown Canyon viruses (Bunyaviridae: Orthobunyavirus) infecting Connecticut mosquitoes (Diptera:Culicidae)" and "Isolations of Jamestown Canyon virus (Bunyaviridae:Orthobunyavirus) from field-collected mosquitoes (Diptera:Culicidae) in Connecticut, USA: a ten-year analysis" at the 56th Annual Meeting of The American Society of Tropical Medicine and Hygiene in Philadelphia, PA (over 2,000 attendees) *November 4-8*
- Served as senior judge at the New Haven Science Fair *May 13-14, 2008*

ARSENAULT, TERRI

- Attended the regional meeting of the FDA Food Emergency Response Network (FERN) in Columbus, OH *August 26-29, 2007*
- Attended the meeting of the FDA FERN Cooperative Agreement Program (CAP) Laboratories and presented a summary of method improvements relative to toxins analyzed by gas chromatography in Davis, CA *April 22-24, 2008*

AYLOR, DONALD E.

- Gave a presentation entitled "Pollen-mediated gene flow" and was the Technical Co-chair and discussion leader at an EPA-sponsored Research Workshop on Gene Flow in the Environment in Arlington, VA (18 adults) *July 23-24, 2007*
- Gave a lecture entitled "The aerobiology of apple scab" in a graduate level course in Atmospheric Dispersion at The University of Connecticut, Storrs (7 attendees) *November 13*
- Gave a lecture entitled "Pollen-mediated gene flow in the environment" in a graduate level course in Atmospheric Dispersion at The University of Connecticut, Storrs (7 attendees) *November 15*
- Presented a talk entitled "A Lagrangian stochastic simulation model for evaluating cross fertilization in maize" at the American Meteorological Society's 28th Conference on Agricultural and Forest Meteorology in Orlando, FL 60 attendees) *April 28*

BALOGH, BOTOND

- Participated in the Annual Meeting of the Connecticut Pomological Society and discussed diseases of tree fruit with Connecticut growers in Glastonbury (65 attendees) *December 4, 2007*
- Participated in the Winter Meeting of the CNLA/CGGA at Naugatuck Valley Community College in Waterbury *January 16, 2008*
- Participated in the 86th Annual Meeting of the Connecticut Tree Protective Association at the Aqua Turf Club in Southington *January 17*
- Attended the Connecticut Vegetable & Small Fruit Growers Conference in Vernon *January 24*

- Participated in the Forest Health Monitoring Workshop in Jones Auditorium (60 attendees) *February 21*
- Participated in the 2008 Annual Meeting of the Northeast Plant Diagnostic Network in Chadds Ford, PA (24 attendees) *February 25-27*
- Gave a talk entitled "Biological control of plant pathogens" at the CT NOFA meeting on "Cultivating an Organic Connecticut": at Windsor High School in Windsor (8 attendees) *March 8*
- Participated in the Northeast Sustainable Agriculture Research and Education Grant Writing Workshop in Manchester, NH *May 9*
- Participated in the Connecticut Pomological Society Twilight Meeting at Hindinger Farm in Hamden *June 2*
- Participated in the UCONN Vegetable Growers Twilight Meeting at Cecarelli Farm in Northford *June 5*

BARSKY, JOSEPH P.

- Gave a presentation "Trees and You" to a kindergarten class at Bear Path Elementary School in Hamden (20 students) *October 17, 2007*
- Participated in a wildfire training session in Windsor Locks *December 4*
- Participated in a meeting of the Executive Committee of the New England Society of American Foresters in Concord, New Hampshire *December 12*
- Participated in the annual meeting of Connecticut Chapter – Society of American Foresters in Haddam *January 8, 2008*
- Participated in the Advanced Microsoft Excel Data and Functions Class at Manchester Community College *January 22*
- Participated in the New England Society of American Foresters Executive Committee Meeting in Concord, NH *January 24*
- Participated in the Forest Health Workshop *February 21*
- Participated in the New England Society of American Foresters Executive Committee Meeting in Saratoga, NY *February 26*
- Served as technical session moderator and CAES representative at a career fair during the New York/New England Society of American Foresters Annual Winter Meeting, held in Saratoga Springs, NY *February 27-29*
- Hosted a meeting of the Executive Committee, Connecticut Chapter Society of American Foresters at the Station *March 26*
- Participated in a seminar on Forest Decision Support Tools at the Yale Myers Forest, Union *April 4*
- With Dr. Scott Williams assisted DEP Forestry staff in a prescribed fire at Higganum Meadows Wildlife Management Area *April 8*
- Participated in the annual meeting of the Yankee Society of American Foresters in Enfield *April 17*
- Spoke on propane torch safety at the Japanese Barberry Control Workshop in North Branford (25 attendees) *May 3*
- Provided forestry updates at the Connecticut Society of American Foresters spring workshop in Naugatuck (32 attendees) *May 29*
- Spoke on "How trees grow" at Southington Nature Day (10 student and 20 adult participants) *June 5*

BERGER, WILLIAM

- Participated in the WIFSS/DHA course "Understanding the Dangers of Agroterrorism" at Southern CT State University *May 20, 2008*

BONITO, ROSE

- Set up and staffed a Station exhibit at Celebrating Agriculture: Woodstock Fairgrounds (700 visitors) *September 22, 2007*
- Staffed the Station exhibit booth in the Connecticut Building at the Eastern States Exposition (Big E) in Springfield, MA *September 27*
- Participated in the CT DEP statewide eagle count for the section of the Quinnipiac River covering the towns of New Haven, Hamden, and North Haven *January 11, 2008*
- Staffed the Station exhibit at the CT Flower and Garden Show, Hartford (25,000 visitors) *February 23 and 24*
- Set up and staffed a Station booth at the annual Fairfield Garden Expo (3,000 adults and children) *March 15&16*
- Coordinated and assembled display materials for and staffed the Station exhibit for the CPTV Family Science Expo at the CT Expo Center in Hartford (9,000 visitors) *April 24-26*
- Participated, with other Station staff members, in the Sikorsky Earth Day event in Stratford with an exhibit about the Station and its research (250 visitors) May 1

BUGBEE, GREGORY

- Spoke to students from Southern Connecticut State University about "Soil Testing and Invasive Aquatic Plants" (25 attendees) *July 7, 2007*
- Spoke to students from the "Talented and Gifted Program" of the New Haven School System on "Soil Testing and Invasive Aquatic Plants" (25 attendees) *July 13*
- Spoke at the annual Bashan Lake Association meeting in East Haddam on "Update on control of variable milfoil in Bashan Lake" (60 attendees) *July 21*
- Was interviewed about control of water chestnut in Long Meadow Lake by Mike Russo of the newspaper Voices *July 25*
- Was interviewed about using limestone to improve lawns by Pamela Weil of the Connecticut Gardener *August 17*
- Spoke on "The CAES Survey of Amos Lake and Options for Controlling Nuisance Vegetation" to the Amos Lake Association at the Preston Town Hall (30 attendees) *September 19*
- Presented a seminar on Turf Management to a class at Southern Connecticut State University *October 29*
- Spoke on Invasive Aquatic Plants in Connecticut to the Naugatuck Audubon Society at the Kellogg Environmental Center in Derby (10 attendees) *November 12*
- Spoke to two classes from Bunnell High School on Soil Testing and Invasive Aquatic Plants (30 attendees) *November 14*
- Was interviewed about Eurasian water milfoil in Lake Candlewood by Nancy Barnes of the New Milford Times *November 19*
- Taught a class on Lawn Care to the Federated Garden Club in Jones Auditorium (40 attendees) *November 28*
- Set up and staffed the CAES booth at the Connecticut Groundskeepers Conference in Hartford *January 31, 2008*
- Spoke to the Shelton Women's Garden Club on Container Gardening Indoors and Out held at the Shelton Public Library (50 attendees) *February 4*
- Presented a seminar on Soil Science for Arborists to approximately 30 people studying for their supervisory arborist's license at the Bartlett Arboretum in Stamford (30 attendees) *February 7*
- Gave a presentation entitled "Invasive Aquatic Plants in Lakes Candlewood, Lillinonah and Zoar" to the FirstLight and Power Lakes Technical Committee in Sherman, CT (8 attendees) *February 20*
- Spoke on "Lawn Care – The Rite of Spring" at a gardening seminar sponsored by The Community Evangelical Church in Glastonbury (30 attendees) *March 6*

- Presented a poster on the CAES Invasive Aquatic Plant Program at Agricultural Day at the Capitol in Hartford *March 19*
- Spoke on "Connecticut's Invasive Aquatic Plant Problem" at the 32nd Annual Meeting of the New England Association of Environmental Biologists" in Bartlett, New Hampshire (50 attendees) *March 27*
- Spoke on "Soil and Invasive Aquatic Plants" to high school students visiting as part of the Education Connection Program (30 attendees) *March 31*
- Spoke at the annual meeting of the Lake Forest Association, in Bridgeport, on the results of the CAES 2007 aquatic plant survey of Lake Forest (50 attendees) *April 4*
- Spoke on "Connecticut's Invasive Aquatic Plant Problem" to the Cheshire Garden Club (30 attendees) *April 7*
- Spoke on "Improving Soil in the Home Garden" at the Brass City Harvest in Waterbury *May 5*
- Was interviewed about soil improvement by Robin Robina of the Waterbury Republican *May 5*
- Spoke about soils to an 8th grade class at Old Lyme Middle School *May 15*
- Presented a poster on the CAES Invasive Aquatic Plant Program at the annual meeting of the Connecticut Federation of Lakes in East Hampton *May 16*
- Spoke on "Container Gardening Indoors and Out" at a meeting of the Greater Bridgeport Men's Garden Club in Stratford *May 22*

CHEAH, CAROLE

- Hosted a tour of the Kenneth White Insectary by visitors from OPM *July 20, 2007*
- Visited with officials at the New Jersey Department of Agriculture's Phillip Alampi Beneficial Insect Laboratory in Trenton, NH and held discussions on mile-a-minute biological control *September 13*
- Met with members of the Mad Gardeners' mile-a-minute eradication team with Dr. Todd Mervosh in New Milford *September 27*
- Was interviewed about hemlock woolly adelgid by Karen Brown of Public Radio of Western New England WFCR *December 7*
- Met with an MDC Forester to inspect hemlocks in New Hartford January 17, 2008
- Met and updated foresters from Great Mountain forest, Corp. on research on HWA in Norfolk January 17
- Presented a poster on biological control of Hemlock Woolly Adelgid and coauthored a presentation on developing diets for adelgid predators for the 4th Hemlock Woolly Adelgid symposium in Hartford *February 12-14*
- Hosted a tour of the Kenneth White Insectary at the Valley Laboratory, Windsor for Dr. And Mrs. Allen Cohen, Insect Diet and Rearing Research, LLC *February 14*
- Met with officials of the Natural Resources Protection Division of the Mashantucket Pequot Tribal Nation to tour and assess hemlock treatment sites *May 8*

COWLES, RICHARD

- Discussed insect and mite pests at a summer meeting of the Connecticut Christmas Tree Growers' Association at the Valley Laboratory (50 attendees) *July 10, 2007*
- Presented "Chemical Control of Hemlock Woolly Adelgid" in a Barn Exhibit at Plant Science Day *August 1*
- Gave the talk "Management of Christmas Tree Insect Pests" at an evening meeting of the CT Christmas Tree Growers, Mystic (55 attendees) *August 7*
- Gave the talk "Management of Christmas Tree Insect Pests" for the summer meeting of the Rhode Island Christmas Tree Growers, Coventry, RI (26 attendees) *August 25*
- Presented "Insect pest management in Christmas trees" to the MA Christmas Tree Growers' Association, Sterling, MA (60 attendees) *September 8*

- Discussed “Scale insects and their management” at the Nursery Tour, Valley Lab, (40 attendees) *September 18*
- Talked about “Scale management in Christmas trees” to the CT Christmas Tree Growers’ Association (81 attendees) *September 22*
- Presented the talk “Chemical Control of Hemlock Woolly Adelgid” at the 2007 Forest Health Cooperators Meeting for New England and New York in Rye, NH (20 attendees) *October 16*
- Presented “Scale insects and their management” for the Connecticut Grounds Keepers’ Association (40 attendees) *November 5*
- Lectured on the subject “Integrated pest management” to entomology students at Eastern CT State University (15 attendees) *November 30*
- Presented the talk “Biology and Management of White Grubs” at the LESCO Company winter educational seminar series, South Windsor (30 attendees) *January 9, 2008*
- Talked to the Connecticut Golf Course Superintendents Board of Directors, Berlin (12 attendees) *January 14*
- Presented “Annual Bluegrass Weevil: Can We Find the Kryptonite for Superweevils?” at the Connectiuct Golf Course Superintendents Winter Educational Meeting, Berlin (200 attendees) *January 15*
- Gave the talk “Introduction to Insects and Organic Management of Insect Pests of Trees and Shrubs” and “Organic Management of Turf Insect Pests” at the Massachusetts NOFA Organic Land Care Course, Leominster, MA (78 attendees) *January 22*
- Presented the talk “Organic Management of Turf Insect Pests” at the Connecticut NOFA Organic Land Care Course, New Haven (80 attendees) *January 28*
- Presented the talk “Biology and Management of Turf Insect Pests” a 2-hour course for the Connecticut Groundskeepers’ Association, Hartford (100 attendees) *January 30*
- Presented the talks “Organic Management of Turf Insect Pests” and “Biology and Management of White Grubs” for the CGKA, Hartford (80 attendees) *January 31*
- Presented “Best management practices for systemic chemical control of hemlock woolly adelgid in forests” at the Fourth Symposium on Hemlock Woolly Adelgid in the Eastern United States, Hartford (150 attendees) *February 13*
- Lectured on “Organic practices for managing turf insect pests” to the Rhode Island NOFA Organic Land Care Training Course, Narragansett, RI (60 attendees) *February 29*
- Presented the talk “Management of Armored Scales in Christmas Trees” at the annual meeting of the Connecticut Christmas Tree Growers’ Association, Middletown (40 attendees) *March 1*
- Presented the talk “The Other WWW: Weevils, White Grubs, and Woolly Adelgids” for the Fairfield County Master Gardeners’ continuing education class, Bethel (40 attendees) *March 4*
- Presented the talk “Know Your Pests – Part 1, Insect and Mite Life Cycles”, “Know Your Pests – Part II, Pests Feeding on Leaves” and “Know Your Pests – Part III, Insects Feeding on Shoots and Roots” and the parallel labs for Parts II and III, for the biennial Christmas Tree Growers’ Workshop, Keene, NH (75 attendees) *March 19-20*
- Was interviewed about black vine weevil biology and management by Willi Galloway, Organic Gardening Magazine *March 28*
- Discussed “Update on pyrethroid-resistant annual bluegrass weevils” at the Northeast Regional Hatch 1025 meeting (25 attendees) *April 2*
- Gave the talk “Management of Christmas Tree Insect Pests” at the annual meeting of the Massachusetts Christmas Tree Growers’ Association, Hancock, MA (120 attendees) *June 27*

DINGMAN, DOUGLAS

- Gave a report to a beekeeper on results of testing AFB isolates obtained from his honey bees for tetracycline resistance November 1, 2007

- In collaboration with Richard Cowles and The Watershed partnership, Inc. initiated work on locally produced milky spore pathogens to control white grubs in public playing fields *November 14*
- Participated in the Southern New England Beekeepers Assembly *November 17*
- Talked to students from the Gifted and Talented Program, New Haven School System, about research on foul-brood disease in honey bees *November 28*
- Participated in a meeting of the Programs Committee for the Quinnipiac Chapter of Sigma Xi *December 12*
- Participated in an all day beekeeping school sponsored by the CT Beekeeping Association *February 2, 2008*
- Hosted a visit by FFA teachers and gave them a tour of the Biochemistry Department and a description of research activities being performed in the department *February 29*
- Helped the Connecticut Tree Protection Association evaluate student essays/poems for the Arbor Day essay contest *April 2*
- Presented an impromptu talk on American foulbrood (AFB) in honey bees, research being conducted on the prevalence and distribution of AFB in Connecticut and current observations on the extent of AFB in Connecticut apiaries at the Connecticut Beekeepers Association Spring Meeting in New Haven *April 5*
- Demonstrated a bee hive in the CAES booth at the Norwalk Tree Festival *May 3*
- Participated in a meeting of the Programs Committee for the Quinnipiac Chapter of Sigma Xi *May 6*
- Was interviewed about work being performed at CAES and on specifics of his research project by Mara Dresner of Southington LIFE Publications *May 22*

DOUGLAS, SHARON M.

- Discussed the Plant Disease Information Office and how to integrate plant pathology into the high school curriculum with members of Dr. Jerry Frumento's graduate school class from Southern Connecticut State University (13 adult attendees) *July 6, 2007*
- Presented a talk on current diseases of Connecticut Christmas trees at the Summer Twilight Meeting of the Connecticut Christmas Tree Growers Association in Windsor (60 adults attended) *July 10*
- Welcomed and introduced a class of gifted middle school students to the Department of Plant Pathology and Ecology and discussed plant pathology's impact on daily life (20 youths and 2 adult attendees) *July 13*
- Was interviewed about "super" poison ivy in Connecticut and the impact of global warming on this troublesome weed by Amanda Cuda of the Connecticut Post *July 16*
- Gave two lectures entitled "How to kill a tree in ten easy steps, Part II" to arborists at the CTPA Summer Meeting at The Farmington Club; organized the CAES display booth and answered questions about tree health problems (800 adult attendees) *July 19*
- Was invited to appear on "Garden Talk with Len and Lisa" on WTIC AM-1080 to answer questions on diseases and to publicize Plant Science Day and the Experiment Station *July 28*
- Was interviewed about the fall foliage season for Connecticut by Amanda Cuda of the Connecticut Post *September 14*
- Gave a talk entitled "Highlights of the 2007 Season" at the Nursery and Landscape Tour at the Valley Laboratory in Windsor (45 adult attendees) *September 18*
- Gave a talk on "Current Diseases in Christmas trees" and answered questions about diseases at the Annual Fall Meeting of the Connecticut Christmas Tree Growers Association held at Hartikka Tree Farm in Voluntown (80 adult attendees) *September 22*
- Gave an invited talk entitled "How to recognize and manage diseases of propagation" at the Propagation Workshop, organized by CAES, UCONN, and CGGA/CNLA, in Jones Auditorium (85 adult attendees) *September 25*

- Gave a presentation on poisonous plants at the Madison Child Care Center in Madison (10 adults and 1 youth attended) *October 1*
- Gave a presentation on the Plant Disease Information Office to talented and gifted students from the New Haven School System and discussed plant pathology and how plants get sick (2 adult and 18 youth attendees) *October 16*
- Welcomed the participants of the Connecticut Greenhouse Growers Association's seminar on "Pesticides and Roast Beef" held in Jones Auditorium (55 adult attendees) *October 17*
- Welcomed attendees and introduced guest speaker Dr. Dale Bergdahl at the Lockwood Lecture entitled "Biology, ecology, epidemiology, and impact of butternut canker disease" in Jones Auditorium *October 31*
- Met with Dr. Dale Bergdahl, Lockwood Lecturer, to discuss the Experiment Station and the Department of Plant Pathology and Ecology *October 31*
- Participated in the Cooperative Agricultural Pest Survey Meeting and discussed the National Ramorum Blight Survey 2007 and the Chrysanthemum White Rust Survey 2007 at the Valley Laboratory (15 attendees) *November 2*
- Gave a talk about plant pathology and the role of the Plant Disease Information Office to members of the Naugatuck Valley Audubon Society in Jenkins Laboratory (8 attendees) *November 9*
- Gave an invited talk entitled "Greenhouse tomatoes: Disease identification and management" at the Greenhouse Tomato Conference in Sturbridge, MA (187 attendees) *November 13*
- Was interviewed about the poster presented at the American College of Allergy, Asthma, and Immunology Annual Meeting in November 2007 regarding Christmas trees and mold by Amanda Cuda of the Connecticut Post *November 19*
- Presented a lecture entitled "Understanding plant diseases" as part of the Garden Study School sponsored by the Federated Garden Clubs in Jones (45 adult attendees) *November 28*
- Was interviewed about the mold and Christmas tree issues by Rick Dungey of the National Christmas Tree Association *November 28*
- Participated in the Annual Meeting of the Connecticut Pomological Society and discussed diseases of tree fruit with Dr. Dan Cooley *UMASS) and Connecticut growers in Glastonbury (65 adult attendees) *December 4*
- Assisted the Connecticut Tree Protective Examining Board with oral examinations for the arborist exam in New Haven *December 12*
- Participated in the December meeting of the Connecticut Tree Protective Association Board of Directors at Aqua Turf in Plantsville, CT *December 12*
- Discussed disease problems in production with growers at the Winter Meeting of the CNLA/CGGA at the Naugatuck Valley Community College in Waterbury (800 attendees) *January 16, 2008*
- Organized the CAES booth at the Winter Meeting of the Connecticut Tree Protective Association at Aqua Turf in Southington (832 attendees) *January 17*
- Presented a lecture on "Understanding Plant Disease" as part of the NOFA Organic Land Care Study Course (80 adult attendees) *January 28*
- Participated in a committee meeting for the Director's Report *January 29*
- Gave an invited lecture entitled "Recognition and Management of Diseases of Perennials" at the 2008 Connecticut Turf and Landscape Conference sponsored by the Connecticut Grounds Keepers Association at the Connecticut Convention Center in Hartford (165 adult attendees) and answered questions from groundskeepers about diseases throughout the meeting (1,000 attendees) *January 31*
- Participated in a training session on "Sexual harassment for managers" in Hartford *February 4*
- Participated in a meeting of the CTPA Executive Board in Berlin (12 adult attendees) *February 12*
- Participated in the Forest Health Monitoring Workshop in Jones Auditorium (60 attendees) *February 21*

- Participated in the 2008 Annual Meeting of the Northeast plant Diagnostic Network in Chadds Ford, PA 24 attendees) *February 25-27*
- Was visited by a group of FFA high school teachers and discussed the contributions of the Department of Plant Pathology and Ecology to service and research (12 adult attendees) *February 29*
- Gave an invited lecture entitled "Highlights of the 2007 season – What to expect in 2008" at the SavATree Tree Health Care Conference in Southbury (85 attendees) *March 5*
- Participated in the March meeting of the CTPA Executive Board at the Station (12 attendees) *March 11*
- Assisted the Connecticut Tree Protective Examining Board with the oral exam for arborists at the Station *March 12*
- Participated in "Riders on the Storm" a CTPA Workshop on preparing trees and remediation of storm damage to trees, in Farmington (87 attendees) *March 26*
- Discussed plant pathology and its historical and present impact on daily life with students from the St. Francis children's Home (1 adult and 6 student attendees) April 7
- Discussed the role of the Plant Disease Information Office and plant pathology to students from Bunnell High School 2 adult and 14 student attendees) April 8
- Organized and participated in a round-table discussion on the impact of gas leaks on urban trees *April 16*
- Participated in the CTPA Climbing Competition held at Edgerton Park in New Haven *April 19*
- Participated in the CAES booth at the 2nd Annual Norwalk Tree Festival at Shady Beach in Norwalk (75 adult and 150 youth attendees) *May 3*
- Visited with the Vice President of Programs at the Connecticut Science Center to discuss ways the Experiment Station can contribute to and work with exhibits at the new center *May 6*
- Gave a presentation entitled "Identification and Management of Common Vegetable Diseases" to members of the Heritage Village River Garden Club and answered general questions on diseases of ornamentals in Southbury (78 attendees) *May 21*
- Was interviewed about the Station and being a plant pathologist by Mara Dresner of Life Publications *May 22*
- Was interviewed about last year's chrysanthemum white rust outbreak by Dr. Jane Trolinger, Chief Plant Pathologist at Yoder Brothers *May 22*
- Participated in the Connecticut Pomological Society Twilight Meeting and discussed diseases of tree fruit with growers at Hindinger Farm in Hamden (45 adult attendees) *June 2*
- Participated in the Connecticut Tree Protective Association (CTPA) Summer Meeting Planning Committee as a member in Southington *June 9*
- Assisted the Connecticut Tree Protection Examining Board with oral examinations for the arborist exam in New Haven *June 10*
- Participated in the Connecticut Cooperative Agricultural Pest Survey (CAPS) meeting and provided updates about Chrysanthemum White Rust and Ramorum Blight in Windsor *June 12*
- Met with the New State Forester and discussed the interaction between the Department of Plant Pathology and Ecology and DEP foresters in both research and service *June 17*
- Participated in the Board Meeting of the Connecticut Tree Protective Association in Farmington *June 19*

EITZER, BRIAN D.

- Presented a paper on the analysis of bee pollen at the Florida Pesticide Residue Workshop in St. Petersburg Beach, Florida *July 23-25, 2007*
- Participated in a meeting of the multi-state Hatch Project NC-508 – Sustainable Solutions to Problems Affecting Honey Bee Health, in Chicago, IL *August 13*
- Attended the 2007 FERN Regional Meeting in Columbus, OH *August 27-29*

- Was interviewed about the analytical methods used to test bee pollen for pesticides by Mike Mayko of the Connecticut Post *September 13*
- Participated in the Southern New England Beekeepers Assembly in New Haven *November 17*
- Participated in a meeting of the Connecticut Separation Science Council in Meriden *November 27*
- Presented a poster at the Connecticut Conference on Natural Resources, Storrs, CT *March 10, 2008*
- Answered questions about pesticides in pollen at the Connecticut Beekeepers Association meeting in New Haven *April 5*
- Presented a talk and a summary of pertinent laboratory work at the meeting of the FDA Food Emergency Response Network (FERN) Cooperative Agreement (CAP) Laboratories, Davis, CA *April 21-25*

ELMER, WADE H.

- Was interviewed about wetland dieback by Tim Stelloh of the Stamford Advocate *July 3, 2007*
- Gave a presentation on wetland dieback to middle school students (20 youth and 2 adult attendees) *July 13*
- Was interviewed about wetland dieback at Hammonasset State Park by Tim Stelloh of the Stamford Advocate *July 17*
- Was interviewed about wetland dieback by Tim Stelloh of the Stamford Advocate *July 25*
- Presented a poster entitled "Survey of *Fusarium* spp. associated with Spartina spp. from Atlantic states and their pathogenicity to *S. alterniflora*" at the Annual Meeting of the American Phytopathological Society held in San Diego, CA *July 27-31*
- Was interviewed about his research on sudden wetland dieback by Marci Gallow of Senator Joseph Lieberman's office in Washington, D.C. *August 7*
- Was interviewed about sudden wetland dieback at Cedar Beach on Long Island, New York by Rebecca Packard of the Suffolk County Times *August 7*
- Gave a talk entitled "Plant Parts and Their Diseases" to second-graders at Mile Creek School in Old Lyme (78 student and 7 adult attendees) *September 24*
- Moderated the morning session of the Propagation Workshop, organized by CAES, UCONN, and CGGS/CNLA, in Jones Auditorium (73 adult attendees) *September 25*
- Gave a lecture/lab on *Fusarium* to students in an Introductory Plant Pathology class at UCONN in Storrs (12 adult attendees) *October 3*
- Presented the talk "Use of a Pre-Plant Corm Treatment to Suppress *Fusarium* Corm Rot of Gladiolus" (40 adult attendees), chaired the Extension/Industry Meeting (25 adult attendees),coordinated the jeopardy games at the Wednesday Night Social, and made reports at the business meeting at the Annual meeting of the Northeastern Division of The American Phytopathological Society in Cape May, NJ *October 10-12*
- Moderated the Connecticut Greenhouse Growers Association's seminar on "Pesticides and Roast Beef" held in Jones Auditorium (55 adult attendees) *October 17*
- Gave a presentation on sudden wetland dieback to the Learning in Retirement group in Slate Board Room (9 attendees) *October 18*
- Presented the seminar "Incidence of plant pathogens in salt marshes affected by sudden wetland dieback" at the Biennial Meeting of the Estuarine Research Foundation in Providence, RI (60 attendees) *November 8*
- Gave presentations on "The role of earthworms in keeping plants healthy" and "Salt marsh vegetation dieback" to a group of talented and gifted students from the New Haven School System in the Plant Pathology greenhouse (3 adult and 25 youth attendees) *November 28*
- Presented a talk entitled "Using biofungicides for diseases in the greenhouse" at the Growing and Marketing Green Conference in Sturbridge, MA (35 adult attendees) *December 14*

- Hosted and moderated the 2008 UCONN-CAES Bedding Plant Meetings and presented a talk entitled "Emerging bedding plant diseases" in Jones Auditorium (21 attendees) *January 11, 2008*
- Participated in the Winter Meeting of the CNLA/CGGA at Naugatuck Valley Community College in Waterbury *January 16*
- Participated in the Connecticut Vegetable & Small Fruit Growers Conference in Vernon *January 24*
- Spoke abut "Emerging diseases of ornamentals in Connecticut" at the joint UCONN-CAES Bedding Plant Meetings in Tolland (23 attendees) *February 5*
- Gave a brief presentation on sudden vegetation dieback at a meeting with professor Ivan Valiela, his four graduate students and Dr. Frank Caruso in Woods Hole, MA *February 8*
- Gave a talk entitled "Why are the salt marshes dying?" and served on the panel at the Connecticut Audubon Society's 2008 Eagle Festival in Essex (125 adult and 25 youth attendees) *February 16*
- Spoke about "Emerging diseases of ornamentals in Connecticut" at the joint UCONN-CAES Bedding Plant Meetings in Torrington (26 attendees) *February 28*
- Spoke about "Fusarium disease management" and "Biological fungicides in the greenhouse" at the Society of American Florists' Crop Protection Symposium in Atlanta, GA (81 attendees) *February 29-March 1*
- Gave a talk entitled "Plant pathogens associated with Sudden Vegetation Dieback Along Connecticut Salt Marshes" as part of the Quinnipiac Sigma Xi Albert Notation Memorial Series Seminar at Quinnipiac University in Hamden (28 attendees) *March 4*
- Gave a talk entitled "Incidence and Characterization of Plant Pathogens in New England Salt Marshes Affected by Sudden Vegetation Dieback" at the 2nd Connecticut Conference on Natural Resources in Storrs (25 attendees) *March 11*
- Was interviewed about Fusarium wilt of basil by Ann McCormick of Organic Gardening Magazine *March 19*
- Spoke about Sudden Vegetation Dieback at Ag Day at the Capitol in Hartford (150 youth attendees) *March 19*
- Spoke about Fusarium disease and Sudden Vegetation Dieback to groups of students from Fairfield High School (4 adult and 24 student attendees) *March 27*
- Spoke about Fusarium diseases and Sudden Vegetation Dieback to visiting groups of students participating in the Education Connection, a Regional Educational Service Center based in Litchfield (2 adult and 14 student attendees *March 31*
- Demonstrated the flooded floor greenhouse to staff from SBIR National Program, University of Connecticut and a greenhouse grower from Yalesville at Lockwood Farm *April 11*
- Gave a greenhouse tour on sudden vegetation dieback during Plant Science Day in the Spring *April 24*
- Gave a presentation entitled "Taxonomy and phylogeny of pathogenic and nonpathogenic *Fusarium* species to *Spartina alterniflora*" at the Spring Meeting of the New England Estuarine Research Society in Portsmouth,NH *May 1-3*
- Presented two talks on "Plant parts and their diseases" to two preschool classes at First Church of Christ in Wethersfield (2 adult and 26 youth attendees) *May 7*
- Presented five talks on "Plant parts and their diseases" to five first grade classes at Doolittle School in Cheshire (5 adult and 81 youth attendees) *May 9*
- Participated in the UCONN Vegetable Growers Twilight Meeting at Cecarelli Farm in Northford *June 5*
- Moderated the Connecticut Greenhouse Growers Association meeting on "Energy in the Greenhouse" in Jones Auditorium (71 attendees) *June 17*
- Met with an agronomist from India at Lockwood Farm and discussed the research being done there *June 20*

FERRANDINO, FRANCIS J.

- Presented a talk entitled "The effect of host growth on the dynamics of plant disease epidemics" at the Annual Meeting of the Northeastern Division of The American Phytopathological Society in Cape May, NJ (40 adult attendees) *October 10-12, 2007*
- Gave a talk on "The effect of host growth on the dynamics of plant disease epidemics" to a Botany class from Quinnipiac University in Jenkins (12 attendees) *November 5*
- Spoke about powdery mildew on pumpkins and grapes to visiting groups of students participating in the Education Connection, a Regional Educational Service Center based in Litchfield (2 adults and 14 student attendees) *March 31*
- Gave a talk discussing the planned activities of the newly formed Southern New England Grape Information Network (SNEGIN) at the Connecticut Vineyard and Winery Association meeting held at the Valley Laboratory in Windsor *April 7*
- Participated in a Vineyard Twilight Meeting for New England Wine Grape Growers on "Early Season Management of Hybrid Grape Varieties" co-sponsored by UMASS Extension Fruit Program and the Massachusetts Farm Wineries & Growers Association at UMASS Cold Spring Orchard in Belchertown, MA *June 3*

FOLEY, TESS

- Participated in a fundraising seminar at the Foundation Center in New York City *July 25, 2007*
- Met with the President and CEO of The Community Foundation of Greater New Haven to present CAES research projects for funding consideration *August 2*
- Reported on the Farm Aid benefit concert in New York City to support family farms nationwide for Country Folks New England Farm Weekly newspaper *September 9*
- Met with the Community Foundation of Greater New Haven's Community Garden Project at their partner meeting *September 13*
- Participated in the New Haven Land Trust's 25th Anniversary Celebration in New Haven *October 9*
- Participated in the Fairfield County Farm Bureau annual meeting *October 16*
- Participated in Farm City held at the Jones Family Farm in Shelton *October 17*
- Presented a talk on fundraising and the CAES grants submission process in Jones Auditorium (30 attendees) *October 30*
- Hosted a workshop brainstorming session on the topic of "Strengthening Outreach for Grant Submissions" at the CAES (15 attendees) *November 13*
- Represented the Station at the Fairfield County Public Relations Association meeting: Corporate Responsibility Goes Green: Aspirations vs. Reality *March 21, 2008*
- Participated in talks with executives from the Propane Education Research Council to secure funding for Dr. Jeff Ward *March, 2008*
- Organized the Station's participation in the 2008 Sikorsky Earth Day event, Stratford (250 attendees) *May 1*
- Participated in an Awards Dinner for the "Celebrating National Chemistry Week Student Poster Contest" sponsored by the American Chemical Society in Jones Auditorium (100 attendees) *May 29*

GENT, MARTIN P.N.

- Participated in the CNLA Summer Meeting at Van Wilgen in North Branford *July 11, 2007*
- Met with Dr. Ratus Fischer of Fischer Ecoworks to discuss copper sterilization techniques for nutrient solutions *August 1*
- Discussed the effects of growth regulators on rhododendron with an official at Imperial Nurseries in Granby *September 21*
- Represented the Station at the opening ceremony of Pardee Greenhouse, East Rock Park, Hamden *September 27*

- Participated in the University of Massachusetts Plant Biology Symposium on Plant Biology and Bioenergy *October 13*
- Presented posters on "Modeling uptake and translocation of DDE in Curcurbita" and "A dynamic linear model of water content and movement in whole plants" at the American Society of Agronomy annual meeting in New Orleans, LA (3,000 attendees) *November 4-8*
- Gave a talk on "Nutrient and Water Management" at the Greenhouse tomato Conference in Sturbridge, MA (200 attendees) *November 13*
- Demonstrated the use of copper ionization unit to sterilize nutrient solutions in the Ebb and Flood greenhouse to officials from Fisher EcoWorks and Aqua-Hort from Denmark *November 27*
- Participated in a Steering Committee meeting of the New England Vegetable and Fruit Growers Conference in Manchester, NH *December 10*
- Moderated a session (150 attendees) and a grower-to-grower discussion (40 attendees) on "Season Extension" at the New England Vegetable and Fruit Growers Conference in Manchester, NH *December 11*
- Presented a talk "Using a forced air furnace to heat the soil under a greenhouse" at the New England Vegetable and Fruit Growers Conference in Manchester, NH (150 attendees) *December 11*
- Moderated a grower-to-grower discussion on "Greenhouse Tomato" at the New England Vegetable and Fruit Growers Conference in Manchester, NH (40 attendees) *December 12*
- Presented a poster on "Effect of Shade on Water and Nutrient Use in Greenhouse Tomato" at the Northeast Region American Society for Horticultural Science meeting at Rutgers University in New Brunswick, NJ (40 attendees) *January 2-5, 2008*
- Attended the Connecticut Greenhouse Growers Winter Symposium at Naugatuck Valley College *January 16*
- Participated in the Steering Committee meeting of the New England Vegetable and Fruit Growers Conference *January 22*
- Presented a seminar "Measurement and modeling of uptake and translocation in plants of a very hydrophobic chemical, p,p-dichlordiphenylethylene" to the Department of Plant, Soil, and Insect Sciences at the University of Massachusetts (30 attendees) *February 5*
- Presented a short talk to FFA teachers on research and outreach activities in the Department of Forestry ad Horticulture (12 attendees) *February 29*
- Discussed automation of hydroponic systems with a teacher from the Sound School and electricians of the New Haven Parks Department *March 12*
- Presented talks on "Effect of shade on greenhouse tomato" and "Effect of environment on composition of hydroponic lettuce" at the New England Vegetable and Fruit Cooperative Extension In-service meeting held in Newcastle, New Hampshire (15 extension agent attendees) *March 20-21*
- Gave a talk on ebb and flow watering of potted ornamental greenhouse plants to the Experiment Station Associates during their bus trip to Fort Griswold in New London and Pinchbeck Rose Growers in Guilford *May 15*
- Participated as official state representative to the NE-1017 Regional Research Committee meeting on "Developing and Integrating Components for Commercial Greenhouse Production Systems" at Cornell University, Ithaca, NY (20 scientists and extension attendees) *June 11-12*
- Gave a tour of the greenhouse facilities at CAES to an Extension specialist from Rutgers University, New Brunswick, NH who was visiting the Station *June 17*
- Showed a visitor from the John Barbara Foundation, Ellington, the hydroponics production of lettuce and tomato and discussed technology transfers for farmers in Africa *June 25*
- Showed visitors from Syndicate Sales, Inc., Kokomo, IN, the hydroponics production of lettuce and tomato and discussed possible collaboration to conduct field trials *June 26*

HISKES, ROSE

- Participated in the summer meeting of the Connecticut Nursery and Landscape Association *July 11, 2007*
- Staffed the Station Question and Answer Booth at the Connecticut Tree Protective Association's summer meeting in Farmington *July 19*
- Participated in a Connecticut Tree Protective Association meeting about putting the "Pesticide Guide Toward Integrated Pest Management" on the web in New Haven *July 25*
- Gave a talk on Butterfly Gardening at the Fairfield Horticultural Society in Westport *August 9*
- Gave a talk on Insects to the Garden Program at the Manson Youth Institute in Cheshire (25 attendees) *August 22*
- Along with Mr. Thomas Rathier and Dr. Claire Rutledge, organized and spoke at a seminar "IPM III: Managing the Root Environment"at Elizabeth Park in Hartford for the Connecticut Tree Protective Association (65 attendees) *September 13*
- Gave a tour of the Connecticut Nursery and Landscape Education Laboratory in Windsor *September 18*
- Staffed the Station booth at the Big E *September 27*
- Participated in the Connecticut Pest Control Association fall seminar in Meriden *September 28*
- Participated in a Connecticut Tree Protective Association Education Committee Meeting in New Haven *October 4*
- Gave a talk on houseplants to the North Haven Garden Club in North Haven (25 attendees) *October 11*
- Gave a talk on invasive plants to the East Windsor Garden Club in East Windsor (25 attendees) *October 16*
- Gave a talk on invasive plants to an ecology class at Asnuntuck Valley Community College in Enfield (15 attendees) *October 24*
- Participated in a Connecticut Agricultural Pest Survey committee meeting in Windsor *November 2*
- Participated in the Connecticut Invasive Plant Working Group symposium planning committee in Windsor *November 9*
- Assisted three Southern Connecticut University students and a Naugatuck Valley student with their research projects *December*
- Was interviewed about multicolored Asian lady beetles by Judy Benson of the New London Day *January 11, 2008*
- Gave a talk on 'Insect Pests of Tree & Shrubs' to a Lesco Seminar preparing landscapers for the Ornamentals & Turf Pesticide Exam in Norwalk (100 attendees) *January 15*
- Staffed a Cooperative Agricultural Pest Survey (CAPS) booth at the Connecticut Nursery and Landscape Association Winter Meeting in Waterbury (500 attendees) *January 16*
- Staffed the Station Question and Answer booth and set up a CAPS information table with Dr. Chris Maier at the Connecticut Tree Protective Association Winter Meeting in Southington (850 attendees) *January 17*
- Gave a talk on 'Houseplants' at the New England General Store in Farmington (25 attendees) *January 19*
- Participated in a Connecticut Invasive Plant Working Group symposium planning committee meeting in Windsor *January 22*
- Participated in a planning meeting for putting the 'Pesticide Guide Toward Integrated Pest Management for Connecticut Arborists' by Mr. Kenneth Welch and Mr. Timothy Abbey on the web at the Department of Information Technology offices in East Hartford *January 22*
- Gave a talk on "Preparation for a Career in Horticulture" at Mitchell College in New London (5 attendees) *February 20*

- Staffed the Station booth at the Connecticut Flower and Garden Show in Hartford (25,000 visitors) *February 21-22*
- Staffed the Connecticut Nursery and Landscape booth at the Connecticut Flower and Garden Show in Hartford *February 24*
- Participated in a Connecticut Invasive Plant Working Group symposium Planning Committee meeting in Windsor *February 27*
- Participated in a conference call of Eastern Region Cooperative Agricultural Pest Survey Coordinators *March 12*
- With Forest Service employees, staffed a Firewood Movement Education booth at the Northeast Campground owners Association Show in Springfield, MA *March 14*
- Gave a talk on insects to the kindergarten class of Calvin Hill School in New Haven *March 26*
- Staffed a Station booth at the Master Gardeners' Symposium in Manchester *March 29*
- Participated in the CAPS meeting at the Eastern Plant Board meeting in Charleston, WV *April 1-3*
- Gave the talk "Plants Out of Place" to the Branford Garden Club in Branford *April 14*
- Staffed a Station booth at the Peabody Museum's "Backyard Bloodsuckers" in New Haven *April 17*
- Participated in a planning meeting for putting the "Pesticide Guide Toward Integrated Pest Management for Connecticut Arborists" by Kenneth Welch and Timothy Abbey on the web at Department of Information Technology offices in Hartford *April 18*
- Gave a talk on "General Gardening and Seed Starting" for Earth Day at Bristol Meyers Squibb in Wallingford *April 23*
- Staffed the insect information table at the Station's Open House in New Haven *April 24*
- Participated in a Connecticut Invasive Plant Working Group Symposium Planning Committee meeting in Windsor *April 30*
- Gave a talk on "Don't Move Firewood" to the Connecticut Campground Owner's Association at Cabela's in East Hartford *May 13*
- Gave a talk on "Integrated Pest Management in the Home Landscape" to the Down to Earth Garden Club in South Windsor *May 14*
- Participated in a Connecticut Invasive Plant Working Group Symposium Planning Committee meeting in Windsor *May 19*
- Gave a talk about insects to 4th graders at Southington's Conservation Day in Southington (80 student attendees) *June 5*
- Chaired the State Cooperative Agricultural Pest Survey (CAPS) Committee meeting in Windsor *June 12*
- Gave a talk on "Pests of the Garden" to the Heritage Village River Garden Club in Southbury *June 18*
- Participated in a CAPS state survey coordinator conference call *June 27*

INMAN, MARY K.

- Gave a talk entitled "General care and diagnosis of common problems of houseplants" at the East Hampton Public Library as part of their "Take a Break" series of lunchtime seminars (15 attendees) *November 1, 2007*
- Participated in the CAES booth at the Winter Meeting of the Connecticut Tree Protective Association at the Aqua Turf Club in Southington (825 attendees) *January 17, 2008*

KETTLE, IRA

- Gave a bee presentation to students and staff at the John R. Manson Youth Institution in Cheshire (45 students and staff) *September 5, 2007*
- Presented a honey bee display at Family Day at Harkness Park, Waterford at which the Station was prominently promoted (1,463 attendees) *September 9*

- Gave a honey bee presentation to the Environmental Coalition Group of Milford (20 attendees) *September 20*
- Staffed the Station exhibit in the Connecticut Building at the Eastern States Exposition, Springfield, MA *September 26, 27*
- Gave two honey bee presentations for the second grade class of Savin Rock Community School in West Haven (22 attendees for planned presentation; 23 attendees for impromptu session on the playground where students asked questions as he was leaving) *October 15*
- Set up and manned a honey bee exhibit at Brookvale Fall Festival in Hamden (1200 attendees) *October 20*
- Set up and manned a honey bee exhibit at Norwalk Chapter of AARP (45 attendees) *October 25*
- Staffed the Station exhibit at the Connecticut Flower and Garden Show, Hartford (25,000 visitors) *February 21- 24, 2008*
- Presented a honey bee show and lecture with questions and answers following for the Orange Garden Club (75 attendees) *March 11*
- Set up and staffed a Station booth at the annual Fairfield Garden Expo (approximately 3,000 adults and children) *March 15-16*
- Presented a honey bee show and lecture with questions and answers following for the Park City Magnet School, Bridgeport (10 people) *March 25*
- Gave a bee presentation and lecture with questions and answers following for Junior Gardeners Program, lake Street School, Vernon (12 student and 12 adult attendees) *April 14*
- Staffed our Station exhibit at the CTPV Family Science Expo at the CT Expo Center in Hartford (9,000 attendees) *April 24-26*
- Set up and manned a honey bee exhibit at the Norwalk Tree Festival *May 3*
- Set up a bee display for Science Day at Locust Street School, Hartford (380 students, 48 teachers & aides (minority school)) *May 7*
- Gave a lecture on bees and displayed an observation hive at the Connecticut Fire Academy, Windsor Locks *June 4*
- Did bee class inspections for The Connecticut Beekeepers Association Annual Picnic (75 attendees) *June 14*

KROL, WALTER

- Spoke about Station research on Biodiesel to a group from SSCS (22 High School Teachers) *July 6, 2007*
- Presented an invited talk on “Pesticide Residues in Produce Sold in Connecticut: A Comparative Study of Present and QuECheERS Methodology at the Florida Pesticide Residue Workshop held in St. Petersberg Beach, Florida *July 22-25*
- Participated in a scientific evaluation of an aspectrics EP-NIR instrument for the evaluation of biodiesel fuel at The Connecticut Agricultural Experiment Station *August 24*
- Served as the Chairman of the New Haven Section of the American Chemical Society’s “National Chemistry Week” poster contest. A total of 386 posters were received from local schools. The posters were displayed and judged in Jones Auditorium at CAES during National Chemistry Week. *October 21-27*
- Presented a synopsis of biodiesel research to members of the Conoco-Phillips company who visited The Connecticut Agricultural Experiment Station *October 23*
- Served as coordinator for the New Haven Section of the ACS National Chemistry Week poster contest *November 1-30*
- Presented an educational discussion and demonstration entitled “Crops and Biofuels” to a group of individuals lead by George Whitney from the Institute for Learning in Retirement Inc. at Albertus Magnus College at CAES in New Haven (8 participants) *November 1*

- Was interviewed by the New Haven Register for an article on biodiesel *November 8*
- Presented a informal tour of Analytical Chemistry to a group of high school students (15 participants) *November 14*
- Participated in the Department of Homeland Security's Homeland Security Information Network for Food and Agriculture Webinar mediated by Peter Kyriacopoulos, Director of Public Policy, Association of Public Health Laboratories, Silver Spring, MD *November 14*
- Presented a two hour, hands on learning session on chromatography and the making of biodiesel fuel to students for the Connecticut Pre-engineering Program (20 participants) *November 17*
- Presented a talk entitled "Biodiesel Fuel from Connecicut Oilseed" to the Organics Recycling and Composting Subcommittee of the State Solid Waste Management Advisory Committee in the Phoenix auditorium at the State of Connecticut Department of Environmental Protection, Hartford *November 27*
- Participated in a webinar on FERN Elexnet Data Entry Training *January 18, 2008*
- Presided as Secretary at the New Haven Section, American Chemical Society, Executive Board Meeting *February 1*
- Participated in a conference call for the Florida Pesticide Residue Workshop (FPRW) and volunteered to become a member of the organizing committee for the 45th annual meeting to be held July 20-23, 2008 in St. Pete Beach, FL *February 28*
- Met with Ron Olsen from the Connecticut Department of Agriculture to discuss the biodiesel work done at CAES and supplied him with technical information on the work *March 5*
- Met with teachers from Amityville High School to discuss integrating a biodiesel program into the shop curriculum *March 14*
- Met with an official from the Connecticut Science Center and discussed the CAES biofuels and pesticide monitoring programs *May 6*
- Served as a special judge in the New Haven Science Fair held at Yale University Commons in Woolsey Hall *May 13-14*
- Presided as Secretary at the New Haven Section American Chemical Society Executive Board Meeting May 15
- Helped host an awards ceremony in Jones Auditorium for the winners from a poster contest for the American Chemical Society. Dr. Krol was presented with two separate ACS awards for his work in the New Haven Section *May 29*

LAMONDIA, JAMES A.

- Assisted with the Station booth at the summer meeting of the Connecticut Tree Protective Association in Farmington July 19, 2007
- Spoke about the Valley Laboratory, biodiesel research, and conducted a tour of field plots at the Valley Laboratory for visitors from the Office of Policy and Management and the Governor's energy office *July 20*
- Participated in the joint annual meeting of the American Phytopathological Society and Society of Nematologists in San Diego, CA where he presented a poster "The tobacco cyst nematode affects photosynthesis of shade grown cigar wrapper tobacco" (80 attendees) July *28-30*
- Was interviewed about the use of oilseed crops for biodiesel by Ann DeMatteo for the New Haven Register *August 1*
- Participated in a planning meeting for Arboriculture 101 in New Haven *August 8*
- Was interviewed about tobacco plant pathology research and tobacco culture by Quannah Leonard of the Waterbury Republican American *August 17*
- Was interviewed by Dr. Gary Ginsberg of "Greener Living with Dr. G" of WDRC Radio about IPM research of biodiesel crops *August 29*

- Was interviewed about differences between tobacco types and culture by Quannah Leonard of the Waterbury Republican American *August 31*
- Examined candidates for the Connecticut Arborist License and participate in the quarterly meeting of the Connecticut Tree Protection Examining Board in New Haven *September 11, 2007*
- Assisted with the Connecticut Tree Protective Association "Integrated Tree Health Workshop III: Managing the Root Environment" program by leading an outdoor laboratory tour group in Elizabeth Park, Hartford *September 13*
- Provided broadleaf and shade tobacco samples to Joseph FireCrow of the Northern Cheyenne Tribe for ceremonial purposes *September 14*
- Spoke about "Oilseed crops for biodiesel and Integrated Pest Management" during the Nursery and Landscape research tour held at the Valley Laboratory (45 attendees) *September 18*
- Conducted a day-long train-the-trainer NE-SARE Professional Development Program Workshop on "Diagnosis, Visual Assessment and Management of Plant-Parasitic Nematodes of Vegetables and Small Fruit in the Northeast" in Albany, NY *September 19*
- Conducted a day-long train-the-trainer NE-SARE Professional Development Program Workshop on "Diagnosis, Visual Assessment and Management of Plant-Parasitic Nematodes of Vegetables and Small Fruit in the Northeast" in Windsor, CT (15 attendees) *October 3*
- Hosted, chaired and spoke about research results at the annual meeting of the Northeast Regional Nematology Technical Committee (NE-1019) held in Mystic, CT (14 attendees) *October 4-5*
- Spoke about biodiesel and integrated pest management to the Middlesex County Farm Bureau in Durham (50 attendees) *October 8*
- Attended the Northeast Division Meeting of the American Phytopathological Society as Secretary Treasurer and to present the talk "Actigard increases fungicide efficacy against *Peronospora tabacina*, cause of tobacco blue mold" in Cape May, NJ *October 10-12*
- Participated in the meeting of the Connecticut Agricultural Information Council in Tolland *October 15*
- Was interviewed about Connecticut tobacco types and culture and the effects of disease and environment on yield and quality by Bruce Windel of the USDA Risk Management Agency based in Missouri *October 16*
- Presented a research report on biodiesel and IPM to the Station Board of Control in Windsor *October 17*
- Met with Dr. Ron Lacewell, Assistant Vice Chancellor at Texas A&M University in New Haven to discuss biofuels research *October 18*
- Spoke to Conoco-Philips representatives about Station biodiesel and IPM research and attended the Conoco-Philips Conversation on Energy town meeting held at the Omni Hotel in New Haven *October 23*
- Taught a class on tree diseases to students in the Connecticut Tree Protective Association's Arboriculture 101 class (42 attendees) *October 30*
- Presented a plant pathology lecture on nematology and laboratory on nematode identification at the University of Connecticut *November 1*
- Spoke to high school students from the Bloomfield Harris Agriscience Center about Station research and services and conducted a tour of the Valley Lab *November 21*
- Examined candidates for the Connecticut arborist license and participated in the quarterly meeting of the Connecticut Tree Protection Examining Board in New Haven *December 12*
- Participated in the winter meeting of the Connecticut Tree Protective Association in Southington *January 17, 2008*
- Participated in the meeting of the Connecticut Agricultural Information Council in Windsor *January 22*

- Spoke to students and parents about research and services conducted at The Connecticut Agricultural Experiment Station Valley Laboratory during the Windsor Schools Science exposition held at John F. Kennedy Elementary School in Windsor (150 students and parents) *January 25*
- Conducted a day-long train-the-trainer NE-SARE Professional Development Program Workshop on "Diagnosis, Visual Assessment and Management of Plant Parasitic Nematodes of Vegetables and Small Fruit in the Northeast" in Hershey, PA (12 attendees) *January 28*
- Was interviewed about biodiesel research in Connecticut by Linda Doty, Biodiesel Consultant in Tulsa OK *February 15*
- Spoke about research on management of tobacco pathogens including blue mold and tobacco mosaic virus and results of the breeding program for multiple pathogen resistance (110 attendees) *February 19*
- Participated in a biofuels symposim planning meeting as a part of the UConn Biofuels Consortium at Storrs *March 5*
- Taught a session on tree diseases as a part of Arboriculture 101 in New Haven (45 attendees) *March 5*
- Was interviewed about root-knot nematodes and wetland dieback by Joseph Ingoldsby for Leonardo Magazine (MIT Press) *March 6*
- Conducted a day-long train-the-trainer NE-SARE Professional Development Program Workshop on "Diagnosis, Visual Assessment and Management of Plant Parasitic Nematodes of Vegetables and Small Fruit in the Northeast" in Batavia, NY (26 participants) *March 10*
- Hosted a conference call of the Connecticut Agricultural Information Council to select the winner of the CT Outstanding Young Farmer Award *March 14*
- Spoke about "Plant Pathogens and Rose Diseases" at the American Rose Society Yankee District Spring Convention held in Mystic, CT (80 participants) *March 15*
- Met with the Executive Vice President of CT Biodiesel and representatives of the CT Biodiesel Association to discuss Management of Plant-Parasitic nematodes" to growers at the Cromwell Marriott (12 participants) *March 19*
- Conducted a day-long train-the-trainer NE-SARE Professional Development Program Workshop on "Diagnosis, Visual Assessment and Management of Plant-Parasitic Nematodes of Vegetables and Small Fruit in the Northeast" in Fairlee, VT (9 attendees) *March 20*
- Spoke about research and services at the Station and summer employment opportunities at the Central Connecticut State University Biology Department Career Fair (50 attendees) *March 28*
- Spoke about "Biodiesel Oilseed Crops" A Value-added Approach – Integrated Pest management" at the UConn Sustainable Energy Symposium held in Storrs (40 attendees) *March 31*
- Spoke about research on tobacco disease management and the breeding program for multiple pathogen resistance at the CPS Tobacco Growers meeting held in Windsor Locks (106 attendees) *April 17*
- Was interviewed about cranbe as a biodiesel feedstock and IPM research in Connecticut by Mark Peters of the Hartford Courant *April 18*
- Participated in a planning meeting of the Connecticut Agricultural Information Council in Windsor *April 21*
- Conducted a tour of the Valley Lab Farm and discussed research plots with UConn MS student Matt DeBacco and advisor Tom Morris *April 21*
- Participated in a planning meeting of the Executive Committee of the Northeast Division of the American Phytopathological Society in Newport, RI *April 25*
- Was interviewed about research projects and science careers by Pierce Martin for a High School Science Class Project at the Renbrook School *April 30*
- Was interviewed about biodiesel research in Connecticut by Bill Weir of the Hartford Courant *May 6*

- Was interviewed about the need for a SLN label for Manzate by Steven Kenyon of the Massachusetts Department of Agricultural Resources *May 6*
- Spoke about tobacco blue mold and testified about the need for a 24c registration for Manzate fungicide to the Pesticide Registration Subcommittee at the Massachusetts Department of Agricultural Resources in Boston *May 21*
- Met with scientists from the University of Massachusetts and UConn to set up a cooperative experiment at the Valley Laboratory *June 2*
- Participated in a meeting of the Connecticut Agricultural Information Council to select the winner of the Century Farm Award *June 5*
- Examined candidates for the Connecticut arborist license and participated in the quarterly meeting of the Connecticut Tree Protection Examining Board in New Haven *June 10*
- Participated in a planning meeting for the CTPA Arboriculture 101 class in New Haven *June 24*

LI, DEWEI

- Gave the presentation "Development of Biosystematics of Stachybotrys and Memnoniella" at Hubei Academy of Forestry Research, Wuhan China (56 attendees) *July 10, 2007*
- Gave the presentation "Airborne and Indoor Fungi" at Nanjing Forestry University, Nanjing, China (150 attendees) *July 21*
- Conducted collaborative research in Profesor Guihua Zhao's laboratory for 4 weeks at Jiangsu Polytechnic College of Agriculture and Forestry in China, *July and August*
- Participated in a board meeting of the Analytic Accreditation Board of American Industry Hygiene Association (AIHA) in Louisville, KY *October 20*
- Hosted visiting professor Guihua Zhao of the Jiangsu Polytechniic College of Agriculture and Forestry in China and conducted a collaborative research project "Biocontrol of Blue Staining Fungi of Lumber of *Populus* spp." *November 14 – December 4*
- Gave the presentation "Christmas Trees, Fungi/Molds, and Human Health" to the CT Christmas Tree Growers' Association at their annual meeting in Middletown (40 attendees) *March 1*

MAGNARELLI, LOUIS A.

- Was interviewed about invasive plants by Judy Moeckel of the Town Times *July 2, 2007*
- Welcomed 17 high school teachers who were visiting the Station *July 6*
- Was interviewed about Station history and research by Gerri Hirshey of the New York Times *July 11*
- Was interviewed about Plant Science Day and the Station by Nancy Cohen of NPR Public Radio *July 25*
- Was interviewed about Plant Science Day and Station research programs by Ray Andrewsen of WQUN Radio *July 26*
- Was interviewed about honey bees and Station research by Jared Newman of the Wilton Villager *July 27*
- Was interviewed about Station research and Plant Science Day by Brian Smith of WICC Radio in Bridgeport *July 31*
- Was interviewed about Station Research by Judy Moeckel of the News Times in Durham and Middlefield *August 1*
- Was interviewed about insects by Jim Shelton of the New Haven Register *August 13*
- Was interviewed about honey bees by Jared Newman of the Wilton Villager *August 22*
- Was interviewed about mosquitoes and encephalitis viruses by John Bergeson of the Connecticut Post *September 5*
- As Chairperson, conducted a meeting of the Legislative Invasive Plants Council *September 12*
- Participated in an Experiment Station Associates meeting and gave a report on Station research and other activities *September 13*

- Welcomed participants of the Regional Agriculture Summit in Jones Auditorium and gave a report on Station research *September 20*
- Participated in a meeting on the control of nematodes in Mystic, CT and gave a report on the federal USDA budget *October 4*
- As Chair, conducted a meeting of the Invasive Plants Council in Windsor *October 9*
- Spoke to a class of students enrolled at Albertus Magnus College in the Institute for Learning in Retirement (10 students) *October 11*
- Was interviewed about the Department of Environmental Protection's property in Griswold and the future plans for a Station research station by Megan Bard of the New London Day *October 29*
- As Chairperson, conducted a meeting of the Invasive Plants Council in Windsor *November 13*
- Greeted students and teachers from Bunnell High School (Stratford) before they toured the Station (18 students and 2 teachers) *November 14*
- Welcomed members of the Federated Garden Clubs in Jones Auditorium and gave a report on Station research (36 attendees) *November 27*
- Participated in the Legislative Invasive Plants Council meeting in Windsor and spoke about public input on invasive plants January 8
- Participated in a Commission of Human Rights and Opportunities meeting in Hartford and answered questions about the Station's Affirmative Action Plan *January 10*
- Welcomed 18 participants of the Greenhouse Growers meeting in Jones Auditorium (18 participants) *January 11*
- Participated in a New Haven County Farm Bureau meeting and spoke about Experiment Station research programs *January 15*
- Participated in an Experiment Station Associates business meeting and gave a report on Station activities (10 participants) *February 28*
- Welcomed a group from Future Farmers of America and gave a report on past and current research findings (83 student and 10 teacher participants) *February 29*
- Greeted 56 members of the Federated Garden Club in Jones Auditorium and gave a report on research programs at the Station (56 attendees) *March 25*
- Was interviewed about community gardens by Steve Grant of the Hartford Courant *March 25*
- Greeted 16 students and 4 teachers from Greenwich High School and gave an overview on Station research *March 27*
- Welcomed members of the Experiment Station Associates at their Annual Meeting held in Jones Auditorium and gave a report on research advancements *April 1*
- Welcomed students and teachers from Bunnell High School in Stratford (12 student and 2 teacher attendees) *April 8*
- Moderated the Station's Spring Open House held in Jones Auditorium (128 attendees) *April 24*
- Spoke about research programs at the Station to the Experiment Station Associates in New London (40 attendees) *May 15*
- Was interviewed about synthetic artificial turf by Abe Katz of the New Haven Register *May 16*
- Gave a report on Station research and other activities at the Experiment Station Associates Board meeting held at the Station *June 12*
- Was interviewed about crop research at the Station by Marion Gail Brown of the Connecticut Post *June 30*

MAIER, CHRIS T.

- Spoke about Station research on fruit at a meeting of the Program Committee of the Connecticut Pomological Society in Rocky Hill *August 16, 2007*
- Displayed insects captured in Arizona and New Mexico at a meeting of the Connecticut Entomological Society in Jones Auditorium *October 19*

- Spoke on disease and insect problems in fruit orchards at the New England, New York, and Canadian Fruit Pest Management Workshop in Burlington, VT *October 22*
- Gave a seminar on "Alien Insects Recently Discovered in Northeastern North America" at Central Connecticut State University, New Britain *October 29*
- Displayed flies on Connecticut's endangered species list at a meeting of the Connecticut entomological Society at the University of Connecticut, Storrs *November 16*
- Presented a poster (with Rose Bonito) on the history of the Connecticut Pomological Society at the Annual Meeting of the Society in Glastonbury *December 4*
- Presented a poster on "Flight Periods of Longhorned Beetles (Coleoptera: Cerambycidae) Estimated by Capturing Adults in Baited Lindgren Funnels in Connecticut Forests" while attending the Annual Meeting of the Entomological Society of America in San Diego, CA *December 11*
- Spoke about endangered insects at a meeting of the Invertebrate Subcommittee of Connecticut's Endangered Species Program at Yale University, New Haven *December 20*
- Discussed the decline in bees and rare species while visiting John Ascher at the American Museum of Natural History, New York, NY *January 7, 2008*
- Presented a poster on 'Something Old and Something New' at the Annual Meeting of the Connecticut Tree Protective Association in Southington *January 17*
- Was interviewed for an article to appear in the Connecticut Gardener by Pamela Weil *January 22*
- Spoke on "Guess Who's Coming to Dinner: An Update on Exotic Insects in the Northeast" at the Forest health Monitoring Workshop in Jones Auditorium *February 21*
- Presented exhibits on vernal pool animals and longorned beetles in Connecticut at the Annual Dinner Meeting of the Connecticut Pomological Society in Jones Auditorium *April 18*
- Spoke about surveys for exotic leafrollers that attack fruit trees at a twilight meeting of the Connecticut Pomological Society at Holmberg Orchards, Ledyard *April 29*
- Spoke about native and exotic apple pollinators at a twilight meeting of the Connectiuct Pomological Society at Hindinger Farms, Hamden *June 2*

MARKO, MICHELL

- Was invited to EnviroScience, Inc. in Stow, Ohio to discuss her research on the use of the milfoil weevil *E. lecontei* as a biological control and explore future collaborations *October 4-5, 2007*
- Attended the general meeting of the Connecticut Invasive Plant Working Group held at the Valley Laboratory *November 9*
- Was interviewed about Eurasian Watermilfoil in Candlewood Lake and the milfoil weevil by Nancy Barnes of the New Milford Times *November 16*
- Presented a talk entitled Status of the Milfoil Weevil in Connecticut Lakes at the 9th Annual Meeting of the Northeast Aquatic Plant Management Society held in West Dover, VT *January 15-16, 2008*

MARRA, ROBERT E.

- Met with an official at Hammonasset Beach State Park to discuss the widespread decline of Japanese pines *August 13, 2007*
- Was interviewed about edible fungi by Sarah Twombly of Esquire Magazine *August 21*
- Gave the talk "Amplified Fragment Length Polymorphic (AFLP) Markers for the Forest Fungal Pathogen, *Neonectria ditissima*" at the Annual Meeting of the Northeastern Division of The American Phytopathological Society in Cape May, NJ (40 adult attendees) *October 10-12*
- Gave a lecture on "Molecular biology in plant disease diagnostics" to a Botany class from Quinnipiac University in Jenkins Laboratory (12 attendees) *November 5*
- Spoke about plant pathology and plant disease diagnostics to two groups of high school students from Bunnell High School (2 adult and 24 youth attendees) *November 14*

- Gave two talks entitled "Molecular markers and what they can tell us about population structure in the tree pathogen, *Neonectria ditissima*" and "Have research findings on *Phytophthora ramorum* changed risk assessment for eastern forests?" at the Forest Health Monitoring Workshop in Jones Auditorium (60 adult attendees) *February 21, 2008*
- Gave an invited talk entitled "*Phytophthora ramorum*: History, biology, and risks associated with the Sudden Oak Death pathogen" at the 2008 Cranberry Research Symposium in North Dartmouth, MA (50 adult attendees) *February 26*
- Gave an invited talk about career options in ecology and evolution for the Wesleyan University "Biology and Molecular Biology and Biochemistry Graduate Career Retreat" at the Wadsworth Mansion at Long Hill Estate in Middletown (20 graduate student and 2 faculty attendees) *March 29*
- Participated with three other advisers in a graduate student's Advisory Committee meeting in the Department of Plant, Soil, and Insect Sciences at the University of Massachusetts at Amherst *May 30*
- Gave the talk "How plants grow" to residents from The Village at Mariner's Point, East Haven, (20 adult attendees) *June 4*

MATTINA, MARYJANE INCORVIA

- Attends monthly meetings hosted by Connecticut Department of Public Health for laboratories engaged in responding to chemical terrorist activities
- Was interviewed about experiments conducted in the analytical laboratories by Dr. Mehmet Isleyan and Dr. Saim Ozdemir, visiting scientists from Turkey (with assistance from Mr. William Berger) by Frank Luongo of the Westport News *July 9*
- Attended and spoke at the FDA FERN Northeast regional meeting in Columbus, OH *August 26-29*
- Hosted a tour of the Analytical Chemistry Department for Marcy Picano of the Office of Fiscal Analysis *October 1*
- Hosted a roundtable discussion with the staff of Analytical Chemistry and four visitors from ConocoPhillips and reported to them work being done on biofuels *October 23*
- Along with the staff of Analytical Chemistry gave a tour and discussed the work underway in the department with the Commissioner of Consumer Protection and his assistant *October 24*
- Met with visitors to the U.S. from Algeria and Senegal to discuss food safety *November 15*
- Spoke on "Two Years Later and Analytical Chemistry at the Connecticut Agricultural Experiment Station Keeps Getting Better" at the monthly meeting of the Naugatuck Valley Chapter of the American Society for Quality (25 attendees) *February 13, 2008*
- Spoke at the mentor appreciation dinner of the New Haven Public Schools Science Fair *April 10*
- Spoke at the press conference held at the Station on issues related to crumbs produced from used tires. Other speakers were Congresswoman Rosa DeLauro, Attorney General Richard Blumenthal, State Senator Ed Myer, and Nancy Alderman from Environment and Human Health, Inc. *April 28*
- Attended an EPA Region 1 meeting on counterterrorism issues in Lowell, MA *May 9-10*
- Attended several meetings of the New Haven chapter of the American Chemical Society and hosted a dinner and award ceremony held at the Station for students and their teachers *May 29*

MAYNARD, ABIGAIL A.

- Made suggestions on the tomato crop to Dean Larson on his farm in Brookfield *July 18, 2007*
- Discussed the utilization of compost and the new crops program on WTIC AM-1080 radio talk show "Garden Talk" (35,000 audience) *July 28*
- Discussed new crops with John Holbrook at his farm in Bethel *August 24*
- Judged fruits and vegetables at the North Haven Fair *September 6*
- Hosted the fifth grade class from Hamden Hall Country Day School at Lockwood Farm (32 students, 3 adults) *September 24*

- Participated in meetings of the State Solid Waste Management Advisory Committee and the Organics Recycling and Composting Subcommittee at CT-DEP in Hartford *September 25*
- Hosted the Pre-K and Kindergarten classes from Hamden Hall Country Day School at Lockwood Farm (38 students 8 adults) *September 26*
- Participated in the DEP Solid Waste Management Advisory Committee in Hartford *October 23*
- Participated in a meeting of the Organics Recycling and Composting Subcommittee in Hartford *October 23*
- Discussed new crops research at Henninger's Farm in Hamden *October 26*
- Reported on Station activities at a quarterly meeting in the Council on Soil and Water Conservation in Middletown (18 attendees) *November 1*
- Spoke to 10th graders at Hamden Hall Country Day School about a career in agricultural science (15 student, 2 teacher attendees) *November 8*
- Toured the Scotts composting and bagger facility in Lebanon with the Solid Waste Management Advisory Committee *November 14*
- Participated in DEP's Solid Waste Management Advisory Committee in Hartford *November 27*
- Participated in a meeting of the Organics Recycling and Composting Subcommittee in Hartford *November 27*
- Spoke to 11th graders at Hamden Hall Country Day School about a career in agricultural science (21 student, 2 teacher attendees) *November 29*
- Participated in the Pomological Society meeting in Glastonbury *December 3*
- Spoke on "New Crops Research" at a Hamden Hall Country Day School Biology Class (15 students, 1 adult) *January 10, 2008*
- Participated in a meeting of the DEP's Solid Waste Advisory Committee in Hartford *January 22*
- Participated in a meeting of the Composting and Organics Subcommittee in Hartford *January 22*
- Reported on Station activities at a quarterly meeting the Council on Soil and Water Conservation in Windsor (12 attendees) *January 24*
- Assisted with science fair projects at Hamden Hall Country Day School (32 children) *February 21*
- Participated in a meeting of the Solid Waste Advisory Committee in Hartford *February 26*
- Participated in a meeting of the Subcommittee on Compositing and Organics Recycling at DEP in Hartford *February 26*
- Participated in a meeting of the Solid Waste Advisory Committee in Hartford *March 25*
- Participated in a meeting of the subcommittee on Compositing and Organics Recycling at DEP in Hartford *March 25*
- Spoke about the New Crops Program to a group from Greenwich High School (15 students, 3 adults) *March 27*
- Spoke about gardening and the New Crops Program at the annual meeting of the Experiment Station Associates (50 attendees) *April 1*
- Spoke on the New Crops Program at the Cannon Grange in Wilton (10 adults and 1 child attendees) *April 3*
- Assisted upper grade school students at Hamden Hall Country Day School with their independent projects (24 students) *April 2 and 16*
- Spoke on the New Crops Program at the Station to high school students from Stratford (12 students, 3 adults) *April 8*
- Spoke on the New Crops Program at Oronoque Village in Stratford (18 adult and 1 child attendees) *April 24*
- Visited classes at Hamden Hall Country Day School and assisted in biology research projects (24 students, 1 teacher) *May 14*
- Discussed new crops with the owner of a farm in Bethel *June 13*

- Met with a visiting agronomist from India and discussed new crops and research at Lockwood Farm *June 20*
- Gave a tour of Lockwood Farm to the Outdoors Education Camp from Hamden Hall Country Day School (19 student and 2 adult participants) *June 23*
- Participated in a meeting of the Organics Recycling and Composting Subcommittee of the Solid Waste Advisory Committee at DEP *June 24*
- Reported on Station activities at a quarterly meeting of the Council on Soil and Water Conservation in Windsor *June 25*

MCHALE, NEIL A.

- Presented a lecture on "Evolution and Domestication of Crop Plants" at the Kellogg Environmental Center in Derby to the Naugatuck Valley Audubon Society *September 18, 2007*
- Presented a seminar entitled "Biofuels and Biofumigants: Green Technologies from the Mustard Family" at the Yale University seminar series on Alternative Paths to Agricultural Sustainability *November 8*
- Taught a mini course on "Breeding ornamental plants" for the Federated Garden Clubs of Connecticut *November 28*
- Met with officials from Wethersfield High School and the Wethersfield Chamber of Commerce to organize their Job Shadow Program (a one-day opportunity for students to obtain real-world job experience). *January 29, 2008*
- Hosted a Job Shadow student from Wethersfield High School with an interest in science *February 4*
- Presented a lecture on genetic research in plants to students from Springfield College, MA as part of their Plant Physiology class under Professor Charles Reddington (13 students) *March 3*
- Presented a seminar entitled "Biofuels and Biofumigants: Green Technology from the Mustard Family" to the Biology Department at Western CT State University, Danbury *March 26*
- Conducted a laboratory tour for students from Bunnell High School and spoke on applications of molecular genetics to agricultural plants *April 8*

MERVOSH, TODD L.

- Spoke about weed management for Christmas tree farms and presented an informational exhibit of weeds at the twilight meeting of the Connecticut Christmas Tree Growers' Association at the Valley Laboratory in Windsor (50 attendees) *July 10, 2007*
- Participated in a workshop on Japanese stiltgrass, mile-a-minute and other "early detection" invasive plant species for New England in West Springfield, MA *July 20*
- Spoke about weed management at a twilight meeting of the Connecticut Christmas Tree Growers' Association in Mystic (40 attendees) *August 7*
- Was interviewed by Matthew O'Rourke of the Waterbury Republican-American about the invasive mile-a-minute vine *August 23*
- Presented results from his experiment on control of mile-a-minute vine at a meeting of the Mile-A-Minute Task Force in New Milford (10 attendees) *October 5*
- Participated in the IR-4 Project's ornamental Horticulture Workshop in Cherry Hill, NJ *October 10-11*
- Spoke about management of invasive plants at a Massachusetts Professional Foresters' Association Conference in West Springfield, MA (100 attendees) *October 12*
- Participated in a steering committee meeting for the Connecticut Invasive Plant Working Group at the Valley Laboratory (12 attendees) *October 18*
- Participated in a symposium planning committee meeting for the Connecticut Invasive Plant Working Group at the Valley Laboratory (12 attendees) *December 12*

- Spoke about his research on “Tolerances of container-grown ornamentals to experimental and registered herbicides” at the annual meeting of the Northeastern Weed Science Society in Philadelphia, PA (35 attendees) *January 10, 2008*
- Spoke about weed management strategies for lawns and landscapes at a seminar organized by LESCO-John Deere in Meriden (80 attendees) *January 16*
- Participated in a meeting about mile-a-minute vine in New Milford (10 attendees) *January 18*
- Participated in a symposium planning committee meeting for the Connecticut Invasive Plant Working group at the Valley Laboratory (10 attendees) *January 22*
- Was interviewed by Pamela Weil of Connecticut Gardener to answer three questions submitted by readers about weeds *February 1*
- Attended the annual meeting of the Weed Science Society of America in Chicago, IL *February 4-7*
- Presented a talk on “Safety and efficacy of flumioxazin as a preemergence herbicide in nursery containers” (25 attendees) *February 5*
- Answered questions at the Connecticut Invasive Plant Working Group exhibit at the Connecticut Flower & Garden Show in Hartford *February 24*
- Participated in a symposium planning committee meeting for the Connecticut Invasive Plant Working Group in Windsor (12 attendees) *February 27*
- Participated in a meeting of the mile-a-minute vine task force in New Milford (8 attendees) *March 5*
- Met with production managers regarding weed control issues at Sunny Border Nursery in Berlin *March 12*
- Participated in a symposium planning committee meeting for the CT Invasive Plant Working Group at UConn-Storrs (9 attendees) *March 24*
- Spoke with members of the Avalonia Land Trust about control of invasive plants at Moore Woodlands in Mystic (6 attendees) *March 24*
- Helped conduct interviewes (as part of the Connecticut Nurserymen’s Foundation Scholarship Committee) of four high-school seniors and select the recipient of a CNF college scholarship *April 10*
- Spoke about “Invasive Plants in Connecticut: What they are, and why they are a problem” as part of a lecture series at the Bloomfield High School Agri-Science Center (20 student and 15 adult attendees) *April 11*
- Spoke about invasive plants in wetlands to environmental science students and instructors at Manchester Community College (25 student and 4 instructor attendees) *April 22*
- Presented a display of weeds and answered questions at the CAES Spring Open House in New Haven *April 24*
- Spoke about poison ivy and related plants at an employee safety meeting at Connecticut Light & Power in Cheshire (40 attendees) *April 25*
- Participated in a symposium planning committee meeting for the Connecticut Invasive Plant Working Group at the Valley Laboratory (10 attendees) *April 30*
- Hosted a student from Suffield High School at the Valley laboratory as part of a career mentor program May 8
- Spoke about invasive plants at a meeting of the Naugatuck Garden Club (55 attendees) May 15
- Participated in a symposium planning meeting for the Connecticut Invasive Plant Working Group at the Valley Laboratory (10 attendees) *May 19*
- Spoke about poison ivy and other toxic weeds at employee safety meetings for the Connecticut Light and Power Company in Torrington (35 attendees) *May 22*
- Spoke about poison ivy and other toxic weeds at employee safety meetings for Connecticut Light and Power Company in Waterbury (50 attendees) *May 30*
- Met with town officials in Watertown regarding control of Japanese knotweed along a town road (5 attendees) *June 3*

- Coordinated the planting of a community pumpkin patch at Hilltop Farm in Suffield (10 adult and 12 child attendees) *June 8*

MOLAEI, GOUDARZ

- Presented an invited seminar entitled "Global Warming and its Implication for Vector-borne Emerging infectious Diseases" at Sakarya University in Turkey *September 10, 2007*
- Presented 2 posters, "Regional comparisons of the host feeding patterns of major vectors of West Nile and Eastern Equine Encephalitis viruses in the US" and "Effects of landscape patterns and bird community composition on West Nile virus transmission patterns in Connecticut" at the 56th Annual Meeting of the American Society of Tropical Medicine and Hygiene in Philadelphia, PA (over 2,000 attendees) *November 4-8*

MUSANTE, CRAIG

- Participated in the FDA FERN Northeast regional meeting in Columbus, OH *August 26-29, 2007*
- Participated in the Trace elemental analysis seminar on ICP and ICP-MS and their environmental applications, presented by thermo-Fisher Scientific, New Haven *June 5, 2008*

NAIL, WILLIAM R.

- Participated in a meeting of the American Society of Enology and Viticulture – Eastern Section, in Lehigh Valley, PA *July 15-17, 2007*
- Participated in a meeting of grape researchers from the USDA-ARS, industry, and academia in Kennewick, WA *July 24-25*
- Participated in a board meeting of the National Grape and Wine Initiative in Kennewick, WA *July 26-27*
- Visited Richard and Al Rugerio at Paradise Hills Vineyard in Wallingford *August 7*
- Met with Jerry Servino at Servino Vineyards in Woodbridge *August 14*
- Visited Charlie Rosabianca and inspected his vineyard in Hamden *August 16*
- Participated in a meeting of the Connecticut Vineyard and Winery Association at the Valley Laboratory *September 10*
- Participated in a New England Grape Growers Workshop at Newport Vineyards, RI *September 11*
- Participated in a meeting of the State Advisory Committee for Agriculture Education at Rockville High School in Vernon *September 26*
- Participated in a meeting of the Connecticut Farm Wine Development Council at the Connecticut Department of Agriculture in Hartford *October 4*
- Met with Ann and Steve Sawyer to evaluate a potential vineyard site in Preston *November 13*
- Participated in the annual meeting of NE-1020: Multi-State Evaluation of Winegrape Cultivars and Clones in Austin, TX *November 7-8*
- Participated in a meeting of the State Advisory Committee for Agriculture Education at Southington Agriculture Science Center in Southington *November 28*
- Participated in a meeting of the Connecticut Vineyard and Winery Association at the Valley Laboratory *December 3*
- Spoke on "Critical Issues in Early Vineyard Establishment" at the 2007 New England Vegetable and Berry Conference in Manchester, NH (70 attendees0 *December 13*
- Spoke on "Trellis Construction for the Long Haul" at the 2007 New England Vegetable and Berry Conference in Manchester, NH (70 attendees) December 13
- Participated in a meeting of the Connecticut Farm Wine Development Council at the Connecticut Department of Agriculture *December 20*

- Participated in a meeting of the Connecticut Vineyard and Winery Association at the Valley Laboratory *January 7, 2008*
- Participated in a meeting of the Connecticut State Consulting Committee for Agriculture Education at the Glastonbury Agriculture Science Center *January 15*
- Participated in a grape IPM workshop at the New Haven County Extension Center in North Haven *January 18*
- Spoke on "Cultural Approaches to Disease Management" for a grower's workshop at Jonathan Edwards Winery in North Stonington (18 attendees) *January 29*
- Met with Jerry Savino of Savino Vineyards, Woodbridge, to discuss soil testing and fertilizer recommendations *February 21*
- Participated in a meeting of the Connecticut Vineyard and Winery Association at the Valley Laboratory *March 3*
- Participated in a meeting of the Connecticut Farm Wine Development Council at the Department of Agriculture *March 13*
- Participated in the National Viticulture Extension Educators Conference in Albuquerque, NM (22 attendees) *April 2-4*
- Participated in a meeting of the Connecticut Vineyard and Winery Association at the Valley Laboratory *April 7*
- Met with the owner of Savino vineyards in Woodbridge to discuss nutrient management and pest control *May 20*
- Participated in a grower meeting at the UMass Cold Spring Orchard Research and Education Center in Belchertown, MA *June 3*
- Participated in a meeting of the State Consulting Committee for Agricultural Education at the Pfizer Global Research and Development Groton Laboratories *June 6*
- Participated in the annual meeting of the American Society for Enology and Viticulture in Portland, OR *June 18-20*

PETERSON, RICHARD

- As Vice President, attended an executive committee meeting of the Quinnipiac Chapter of Sigma Xi *August 24, 2007*
- Participated on the Ph.D. Examination Committee for Mary Grace Gallinato of the Department of Chemistry at UCONN *August 30*
- With Neil Schultes, presented a poster entitled "psbS-The Coppertone Gene of Plants" and served as Quinnipiac Chapter delegates at the 118th annual Sigma Xi Conference in Orlando, FL *November 1-4*

PIGNATELLO, JOSEPH

- Judged an Area Exam (preliminary defense) as part of the Thesis Committee for Yale graduate student Janel Grebel *August 13, 2007*
- Presented an invited lecture entitled "Matrix Sorption-Desorption Within the context of bioavailability" at Helmholtz Center for Environmental Research UFZ, in Leipzig, Germany *September 22-27*
- Presented an invited talk as Plenary Session Keynote Speaker entitled "Sorption to Black Carbon:Mechanisms, Hysteresis and Attenuation by Humic substances at the Asian-Pacific International Conference on Pollutants Analysis and Control held in Beijing, China *October 10-15*
- Presented an invited seminar, Unraveling the Causes of Sorption Hysteresis in Soils" to the Environmental Sciences Department, Nanjing University, Nanjing, China *October 16*
- Presented an invited seminar "Unraveling the causes of sorption hysteresis in soils at the State Key Laboratory of Organic Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou, China *October 18*

- Gave a presentation on "The effect of halide concentrations on the advanced oxidation process treatment of membrane concentrates from municipal wastewater recycling for brackish water aquaculture" at the Annual Meeting of the Soil Science Society of America, held in New Orleans, LA (100 attendees) *November 4-8*
- Served as a judge for Best Presentation Award at the annual Robert M. Langor Graduate Symposium, Yale Chemical Engineering Department *December 14*
- Presented an invited paper entitled "Factors affecting the bioavailability of contaminants in soil and sediment", and presented a poster entitled "Coal tar PAHs in MGP site soils: bioavailability to indigenous microorganisms exceeds physical availability (Tenax method) after merely adding nutrients" at a workshop on Assessing Bioavailability as a Determinant of Pollutant Exposure, Superfund Basic Research Program, held in Tampa, FL *February 19-23, 2008*
- Presented the paper "Sorption Irreversibility of Hydrophobic Compounds in NOM Solids is Due to Inelastic Matrix Flexing" in a session on Long-Term and Non-Extractable Residue Formation of Organic Pollutants in Soils and Sediments at the SETAC Europe Annual Meeting held in Warsaw, Poland *May 24-30*

RANCIATO, JOHN

- Helped host the Annual Meeting of the Connecticut Community Gardeners Association (CCGA) *January 29, 2008*

RATHIER, THOMAS

- Organized the annual Christmas Tree Twilight Meeting at the Valley Lab and spoke about Cultural and Fertility Management (55 attendees) *July 10, 2007*
- Answered questions from arborists at the Experiment Station's booth at the Connecticut Tree Protective Association's annual summer meeting in Farmington *July 19*
- Answered questions from listeners on WTIC's radio program Garden Talk (35,000-40,000 listeners) *July 28*
- Organized a twilight meeting for the Connecticut Christmas Tree Growers Association and also spoke about cultural and disease management issues in Groton (50 attendees) *August 7*
- Organized (with Rose Hiskes and Claire Rutledge) a workshop on Integrated Tree Root Health Care for the Connecticut Tree Protective Association and also spoke about tree root health and demonstrated urban soil problems at Hartford's Elizabeth Park (70 attendees) *September 13*
- Organized the Valley Lab's annual Nursery and Landscape Research Tour and also spoke about conifer nutrition and nursery container physics (65 attendees) *September 18*
- Taught the Soil-Tree Relationships class for the Connecticut Tree Protective Association's Arboriculture 101 course in Jones Auditorium (45 attendees) *September 19*
- Organized the educational portion of the Connecticut Christmas Tree Growers Association's annual Fall Field Meeting and spoke about "Cultural and Fertility Management" in Voluntown (845 attendees) September 22
- Lectured on the nutrition of woody plants to an environmental science class at Asnuntuck Community College in Enfield (15 attendees) *September 26*
- Judged Christmas trees at the Durham Fair *September 27*
- Judged vegetables and fruit at the Northwest Park Country Fair in Windsor *September 29*
- Demonstrated and discussed tree diseases at Arboriculture 101's tree conditions lab in Jones auditorium (45 attendees) *November 7*
- Discussed effects of urban soil conditions on trees during a tree walk in Bushnell Park for forestry and arboriculture students attending the Tree Care Industry Association National Conference in Hartford (25 attendees) *November 9*

- Spoke on Healthy Garden Soils to the Windsor Garden Club at the Valley Lab (16 attendees) *November 12*
- Participated in a review session for Arboriculture 101 students in Jones Auditorium (45 attendees) *December 4*
- Discussed soil characteristics and answered called questions on WTIC Radio's Garden Talk program *January 12, 2008*
- Answered questions from arborists at the Experiment Station's booth at the Connecticut Tree Protective Association's winter meeting in Southington *January 17*
- Taught the Soil-Tree Relationships class for the Connecticut Tree Protective Association's Arboriculture 101 course in Jones Auditorium (45 attendees) January 30
- Organized the education portion of the Connecticut Christmas Tree Growers Association annual winter meeting and led the Question the Experts session in Middletown (70 attendees) *March 1*
- Presented a paper entitled Improvement in leaf quality of shade grown tobacco with supplemental applications of soluble N under plasticulture (co-author Merwin Brown) at the 34th National Agricultural Plastics Conference in Tampa, FL *March 8*
- Demonstrated and discussed tree diseases at Arboriculture 101's tree conditions lab in Jones Auditorium (45 attendees) *March 19*
- Discussed landscaping topics and answered questions from callers on WDRC's House Calls (8,000-10,000 listeners) *April 26*
- Spoke on "The Soil and Root Environment of Roses" to the Connecticut Rose Society at Hartford's Elizabeth Park in West Hartford (35 attendees) *May 4*
- Spoke on "Healthy Garden Soils" to the East Windsor Garden Club in East Windsor (25 attendees) *May 20*

RIDGE, GALE

- Was interviewed by the New York Times about Gypsy moth populations, their growth and declines in Connecticut *July 11, 2007*
- Lectured on Entomology and careers in the biological sciences to the New Haven gifted and talented youth groups *July 13*
- Was interviewed by the Norwich Bulletin Newspaper about the Cicada Killer wasp and elevated populations *August 9*
- Assisted Adam Knight Photography in photographing insects from the insect collection for magazine publications *September 9*
- Manned the Experiment Station booth in the Connecticut House at the Big-E in Springfield Massachusetts *September*
- Talked about insects and insect morphology at the Bunnell High School in Stratford *November 14*
- Discovered the Carex Mealybug, *Trionymus caricis* Cockerell killing bamboo in Connecticut; a new state record *November 16*
- Lectured on bed bugs and delusions of parasitosis at the winter conference of the Environmental Industry Council in Southington, Connecticut *November 21*
- Participated in the annual meeting of the Entomological Collections Network in San Diego, California *December 8-9*
- Attended the annual meeting of the Entomology Society of America in San Diego, California and presented a research poster on the Adult Heteropteran Thoracic Endoskeleton *December 10–13*
- Wrote lecture delivered by Dr. Claire Rutledge in her absence on bed bugs and delusory parasitosis at the Eastern Pest Control Operators conference at Foxwoods Casino, Connecticut *January 19, 2008*
- Presented a lecture entitled Changing the changed, a tale of our eastern forests; a talk for the forest health monitoring workshop on the ecology and human history of New England's forests *February 21*

- Presented a talk about insects and their strategies for survival to visiting high school students *February 29*
- Presented a talk on insect ecology and evolution to visiting honors students from Greenwich High School *March 27*
- Presented a talk on insect morphology and physiology to visiting students from the Litchfield school system *March 31*
- Presented a talk on insect morphology and ecology to the Girl Scouts of America *April 8*
- Defended her Ph.D. dissertation at the University of Connecticut. Lectured on the Adult Heteropteran Thoracic Endoskeleton (Insecta: Heteroptera) a Family-Level Study *April 9*
- Was interviewed on the insects of Springtime for the Stamford Advocate Newspaper *April 16*
- Presented a lunchtime seminar on the PhD thesis defense lecture for the staff at the Connecticut Agricultural Experiment Station *May 28*
- Was interviewed about bed bugs, the scourge of society for the Connecticut Post Newspaper *June 3*

ROBB, CHRISTINA

- Participated in a meeting at the Station between Conoco-Philips and Station staff on biofuels *October 23, 2007*
- Participated in a "Conversation About Energy" meeting with Conoco-Phillips *October 23*
- Presented a hands on learning session on chromatography and the making of biodiesel fuel in the Analytical Chemistry laboratory to 20 students from the Connecticut Pre-Engineering program (CPEP) *November 17*

RUTLEDGE, CLAIRE

- Presented a poster display entitled "Mating behavior of the Emerald Ash borer and two native con-geners' with co-author Juli Gould and gave an invited talk entitled 'Connections with plants: Lady beetle responses to crop characteristics' co-authored by Sanford Eigenbrode at the annual meeting of the Entomological Society of America *December 9-12*
- Presented a lecture written by Ms. Gale Ridge at the National Pest Management Association's Eastern Conference entitled 'Bed bugs, the Wraths in the Night and Delusory Parasitosis' at Foxwoods Casino and Resort in Ledyard *January 17, 2008*
- Gave a talk entitled "From big trees to bonsai" for the Leetes Island Garden Club in Branford (30 attendees) *March 12*
- Gave a class on "Insects and IPM in trees" for the Bartlett Arboretum Arboriculture Course in Stamford (29 attendees) *March 14*
- Gave a class on "Insects attacking trees" for the CTPA Arboriculture 101 course at the Jones Auditorium in New Haven (40 attendees) *March 20*
- Gave a talk "Mating behavior of Emerald Ash borer and two Native congeners" for the Forest health Workshop in Hartford (30 attendees) *March 21*

SANDREY, STEPHEN J.

- Set up and staffed a Station exhibit at the celebrating Agriculture, Woodstock Fairgrounds (700 visitors to our table) *September 22, 2007*
- Attended the CNLA Winter Workshop at Naugatuck Community College *January 16, 2008*
- Participated in Forest Health Monitoring Workshop in Jones Auditorium *February 21*
- Staffed the Station exhibit at the Connecticut Flower and Garden Show, Hartford *February 23*

SCHULTES, NEIL

- Gave a seminar at Yale entitled "Structure-function studies of the psbS protein in Arabidopsis and *Nicotiana benthamiana"* (15 attendees) *July 26, 2007*
- Met with a collaborator from the Boyce Thompson Institute in Ithaca, NY concerning their current research and manuscript preparation concerning analysis of the maize glycolate oxidase Ds insertion mutant *October 1*
- With Richard Peterson, presented a poster entitled "psbS-The Coppertone Gene of Plants" and served as Quinnipiac Chapter delegates at the 118th annual Sigma Xi Conference in Orlando, FL *November 1-4*
- Hosted a group from the Naugatuck Audubon Society on a tour of the Biochemistry & Genetics Department and spoke to them about his collaborative research with Dr. Richard Peterson *November 9*
- Gave a lecture on "The Genetic Modification of Plants in Agriculture" to the Gladiolus Society in Avon, CT *November 10*
- Hosted high school students from Bunnell High School in Stratford, CT for laboratory tours and discussed how plant genetic engineering is used to study photosynthesis (24 participants) *November 14, 2007*
- Hosted a high school student from Wethersfield High School as an all day job shadow for the school's Job Shadow Program *February 4*
- Presented a lecture and answer session to North Haven High School students on genetically modified organisms and food labeling (60 students) *February 13, 2008*
- Presented a lecture on genetic research in plants to students from Springfield College as part of their Plant Physiology class under Professor Charles Reddington (13 students) *March 3*
- Hosted high school students in Horticulture and Honors Science Research Classes from Greenwich High School for laboratory tours and discussed how plant genetic engineering is used to study photosynthesis (27 students) *March 27*
- Hosted students from St. Francis School in New Haven on a laboratory tour and demonstrated how transgenic plants are generated (7 students) *April 7*
- Hosted a tour of the Biochemistry Department for girl scouts from Guilford, CT, discussing how genetics is used in making different crop cultivars and participated in planting different basil varieties *April 14*
- Hosted laboratory tours of Biochemistry and Genetics labs for Plant Science Day in the Spring 2008 *April 24*

REEPS, ROSLYN

- Participated in discussions about the needs of Geographic Information Systems users in the state at the Connecticut Geospatial Council's Stakeholders' meeting at Eastern Connecticut State University *July 20, 2007*
- Participated in the Geospatial Council's monthly meeting and made a formal request for the Station to join the Council as a non-voting member *July 25*
- Represented the Station at the Connecticut Geospatial Council meeting held in Jones Auditorium *August 25*
- Participated in the Connecticut Geospatial Council Meeting as the Station's representative *September 12*
- Participated in a meeting of the Connecticut Arc User to User Group meeting to learn about remote sensing research opportunities *September 17*
- Led an invasive aquatic plant identification workshop for the residents of Beach Pond in Voluntown (20 attendees) *October 6*

- Presented the poster “Connecticut Invasive Aquatic Plant Maps” and a digital poster on the same topic at the Northeast Arc Users Group Conference held in Burlington, Vermont (500 attendees) *November 4-7*
- Presented a poster entitled “Connecticut Invasive Aquatic Plant Maps” and staffed a table on the CAES Invasive Aquatic Plant Program for GIS Day at the State Capitol (100 attendees) *November 14*
- Participated in the GIS Council Meeting as the CAES representative *November 14*
- Participated in the Connecticut Geospatial Council meeting held in East Hartford as the Station’s representative *December 12*
- Participated in a meeting of the Connecticut Geospatial Council as the Station’s representative and a meeting on RAMONA, a GIS inventory system, held at the Connecticut Department of Information Technology *January 23, 2008*
- Staffed a booth featuring information on the Station and the Invasive Aquatic Plant Program at the 2008 Connecticut Turf and Landscape Conference at the Connecticut Convention Center in Hartford *January 31*
- Presented two invasive aquatic plant identification workshops for 80 students and teachers at the Envirothon Aquatic workshop held at the Yale Peabody Museum *February 9*
- Presented results of surveys of Lakes Lillinonah and Zoar to six members of the Nuisance Plant Monitoring Committee for First Light Lakes in New Milford *February 20*
- Participated in the monthly meeting of the GIS Council held at DOIT in East Hartford *February 27*
- Presented a workshop entitled “The Identification of Invasive Aquatic Plants of Connecticut” at the Connecticut Conference on Natural Resources at The University of Connecticut at Storrs (50 attendees) *March 10*
- Presented a poster entitled “The Connecticut Agricultural Experiment Station Invasive Aquatic Plant Program to legislators, legislative staffers and the public at Agriculture Day at the Capitol in Hartford *March 19*
- Represented the Station at the Connecticut Geospatial Meeting at the Department of Information Technology in Hartford *March 26*
- Presented a talk entitled “Using Geospatial Technologies to Research Invasive Aquatic Plants in Connecticut” at the Northeast Association of Environmental Biologists Conference *March 27*
- Participated in the Connecticut Geospatial Council meeting as the Station’s representative held at the Department of Information Technology in East Hartford *April 23*
- Presented a poster entitled “The Connecticut Agricultural Experiment Station Invasive Aquatic Plant Program” and taught children and parents about invasive aquatic plants at Connecticut Public Television’s Family Science event held at the Connecticut Expo Center in Hartford *April 24-26*
- Presented a talk on the Connecticut Agricultural Experiment Station Invasive Aquatic Plant Program’s Invasive Aquatic Plant Identification Workshops to the Northeast Aquatic Nuisance Species Task Force held in Lake George, New York *May 7*
- Participated in the Northeast Aquatic Nuisance Species Task Force panel meeting where she informed the attendees about CAES IAPP and the Connecticut Invasive Aquatic Plant Survey results *May 8*
- Served as a judge at the 2008 Connecticut Envirothon for the current issue presentations on “Managing Recreational Impacts on Natural Resources” given by student participants held at Northwest Park in Windsor *May 15*
- Gave a presentation on possible future invasive aquatic plant species in Connecticut and invasive introduction prevention measures at the Connecticut Federation of Lakes in East Hampton *May 16*
- Gave a workshop co-sponsored by the Newtown Office of Wetlands Enforcement and the Lake Zoar Authority on the identification of Connecticut invasive aquatic plants and the results of the 2007 surveys of Lakes Lillinonah and Zoar in Newtown *May 18*

- Participated in the Connecticut Geospatial Council's meeting in East Hartford as the CAES representative *June 25*

SHEPARD, JOHN

- Presented a talk "Arbovirus Activity in Connecticut, 2007" at the Annual Meeting of the northeastern Mosquito Control Association, held in Plymouth, MA (100 attendees) *December 3, 2007*
- Spoke to students from Branford Horizons Alternative High School and provided hands on activities about mosquito biology and arbovirus surveillance as part of the NIH/NSF sponsored Peabody Fellows Program, Yale University (28 attendees) *December 12*
- Spoke to students from Waterbury High School and provided hands on activities about mosquito biology and arbovirus surveillance as part of the NIH/NSF sponsored Peabody Fellows Program, Yale University (20 participants) *December 19*
- Spoke to a group of students from Barnard Environmental Magnet School in New Haven and provided hands on activities about mosquito biology and arbovirus surveillance as part of the NIH/NSF sponsored Peabody fellows program, Yale University (24 participants) *December 20*
- Presented a display on West Nile Virus and Mosquito Biology at the Biodiversity Day event, "Backyard Bloodsuckers: Biodiversity Bites Back!" held at the Peabody Museum, Yale University (1,267 museum visitors) *April 17, 2008*
- Presented information and hands-on activities about mosquitoes, backyard insects and wildlife to an after-school group at Benjamin Jepson Interdistrict Magnet School in New Haven (20 students) *May 12*
- Spoke about insects and displayed specimens from the Station collection to Jamie Brocket's kindergarten and first grade classes at Benjamin Jepson Interdistrict Magnet School in New Haven (22 students) *June 16*

SHORT, MICHAEL

- Participated in an education Committee meeting of the Connecticut Nursery and Landscape Association in Berlin *July 27, 2007*
- Proctored the final exam of the CT Accredited Nursery Professional Course for the CT Nursery and Landscape Association *November 20 and 28*
- Participated in the CNLA and CGGA Winter Symposium in Waterbury *January 16, 2008*
- Participated in an Education Committee Meeting of the CNLA in East Haven *January 20*
- Participated in an Education Committee meeting of the CNLA in Cromwell *February 18*
- Participated in a CNLA Education Committee Meeting in Cromwell *March 6*

SLETTEN, PAMELA

- With Dr. Sandra Anagnostakis, participated in a grafting workshop sponsored by Michigan State University and the MSU Extension Program, Petoskey, Michigan *May 30-June 1*

SMITH, VICTORIA

- Participated in the Summer meeting of the Connecticut Nursery and Landscape Association held at VanWilgen's Garden Center in North Branford *July 11, 2007*
- Participated in the Summer Meeting of the Northeast Sustainable Agriculture, Research and Education Administrative Council, as the Eastern Plant Board Representative, held at Jiminy Peak Resort in Hancock, MA (25 attendees) *July 23-25*
- Participated in the National Plant Board Meeting, held in Honolulu, Hawaii, and in a meeting of the Eastern Plant Board *August 19-23*

- Participated in a meeting of the Northeast Forest Cooperators, sponsored by the USFS-Northeast Area Field Office, held in Portsmouth, NH at the Seacoast Science Center, with discussions on emerald ash borer, firewood regulations, and forest pest conditions in CT (30 participants) *October 16-17*
- Participated in a meeting of the North American Plant Protection Organization, as a representative of the Eastern Plant Board, held in St. John's, Newfoundland, Canada, at the Delta Hotel and Conference Center, with discussions on firewood regulations, chrysanthemum white rust, invasive species, quarantine regulations, and forest pests (200 participants) *October 22-26*
- Participated in the Winter Meeting of the National Cooperative Agricultural Pest Survey (CAPS) Committee, as a representative of the Eastern Plant Board, held at USDA-APHIS PPQ Regional Headquarters in Raleigh, NC (30 participants) *January 14-17, 2008*
- Was interviewed about recent chrysanthemum white rust outbreak by Pamela Weil of Connecticut Gardener *January 23*
- Participated in the Fourth Woolly Adelgid Symposium, Hartford, CT as a coordinator of the poster session, coordinator of Continuing Education Credits, and as part of the Local Arrangements Committee (150 participants) *February 11-14*
- Participated in a planning meeting for the Eastern Plant Board Annual Meeting, Manchester, NH (12 participants) *February 20*
- Coordinated the annual Forest Health Workshop in Jones Auditorium and presented a talk entitled "Field and Stream: the Search for *P. ramorum*" (60 participants) *February 21*
- Participated in a training session on Post Entry Quarantine, Lebanon, CT (25 participants) *February 25*
- Participated in a training session on aquatic sampling for *P. ramorum*, held via conference call (8 participants) *February 26*
- Participated in the winter meeting of the Northeast Sustainable Research and Education Administrative Council, as the representative of the Eastern Plant Board, Burlington, VT (40 participants) *February 27-29*
- Participated in a meeting of the Early Detection/Rapid Response working group, a cooperative effort of the Cooperative Agricultural Pest Survey and the US Forest Service Northeast Area Office, held at the Urban Forestry Center in Portsmouth, New Hampshire (35 participants) *March 11*
- Participated in the 83rd Annual Meeting of the Eastern Plant Board and as a member of the Planning Committee participated in discussions on Chrysanthemum White Rust, Firewood Regulations, and Quality Pests and Diseases, held in Charleston, WV (150 participants) *March 31-April 3*
- Participated in the East Coast Firewood Forum, sponsored by the US Forest Service, held in Whippany, NJ (70 participants) *April 15*
- Participated in an Agreements Workshop sponsored by the USDA-APHIS-PPQ Eastern Region, held in their offices in Wallingford, CT (12 participants) *April 16*
- Participated in an evening meeting of the CT Pomological Society held at Holmberg Orchards, Gales Ferry, CT (60 participants) *April 29*
- Participated in a workshop on the use of the Digital Aerial Sketch Mapper, sponsored by the Northeast Area Field Office of the US Forest Service, held at the Urban Forest Center, Portsmouth, NH (15 participants) *May 22*
- Discussed trapping for light brown apple moth with growers at a Twilight Meeting of the CT Pomological Society held at Hindinger Farms in Hamden (60 participants) *June 2*
- Presented reports on *Phytophthora ramorum* surveys, confirmed nursery work on *P. ramorum*, chrysanthemum white rust survey, and light brown apple moth trapping, at a meeting of the CT Cooperative Agricultural Pest Survey *June 12*

STAFFORD, KIRBY C., III

- Was interviewed about tick testing and Lyme disease statistics by Mark Walker of the Redding Pilot *July 2, 2007*
- Was interviewed about ticks, bees, and colony collapse disorder on the noon Talk of the Town program by Jerry Dukley of WICC-600 Radio *July 2*
- Spoke about activities in the Entomology Department and Lyme disease to SCSC Graduate Students touring the Station (20 attendees) *July 6*
- Participated in a meeting of the Northeast Regional Experiment Station Directors (NERA) in Providence, RI *July 9-10*
- Was interviewed about ticks, Lyme disease, and other research at the Station by Gerri Hirshey of the New York Times *July 11*
- Spoke on ticks and Lyme disease at the Yale Peabody Museum Fellows Summer Institute for secondary teachers (28 teachers with 1,044 students) *July 12*
- Was interviewed about bed bugs by Abram Katz of the New Haven Register *July 19*
- Along with Drs. Sharon Douglas, Abigail Maynard, and Mr. Thomas Rathier, spoke about bees, ticks, and Plant Science on "Garden Talk" WTIC-1080 Radio *July 28*
- Was interviewed about bees in Connecticut by Melinda Tubus, a freelance reporter *August 1*
- Was interviewed about ticks in shrubby environments by Steve Grant of the Hartford Courant *August 6*
- Was interviewed about studies supporting deer reduction for tick control by Tim Stelloh of the Stamford Advocate *August 16*
- Participated in a meeting with the First Selectman, Northeast District Department of Health, CT Department of Agriculture and Cooperative Extension about fly problems in Plainfield at the Plainfield Town Hall (7 attendees) *August 23*
- Was interviewed about colony collapse disorder by Jared Newman of the Wilton Villager *August 27*
- Was interviewed about Varroa mites by Jared Newman of the Wilton villager *August 29*
- Was interviewed about Varroa mites by Mike Mayko of the Connecticut Post and colony collapse disorder *September 4*
- Was visited by Ted Melnick, President of Norvozymes Biologicals, to discuss the fungus *Metarhizium anisopliae* for tick control *September 18*
- Welcomed the Federated Garden Club to the Station and provided a brief update on activities (200 attendees) *September 19*
- Welcomed the Connecticut Greenhouse Growers to the Station and provided a brief update on activities (80 attendees) *September 25*
- Was interviewed about adult deer tick activity by Michael Dinan of the Greenwich Times *October 2*
- Spoke on ticks and Lyme disease at the Station for the Institute for Learning in Retirement (12 attendees) *October 3*
- Along with Gale Ridge, spoke on activities of the Entomology Department and insects to a student group touring the Station (20 attendees) *October 16*
- Met with Dr. Ron Lacewell of Texas A&M University to discuss research collaborations *October 18*
- Participated in a meeting of the Connecticut Entomological Society *October 19*
- Was interviewed about adult deer tick activities by Bob Miller of the Danbury News Times *October 26*
- Participated in a flu pandemic communications planning session at the CT Department of Information Technology in East Hartford *November 1*
- Participated in a meeting of the Cooperative Agricultural Pest Survey at the Valley Laboratory *November 2*

- Spoke to members of the Naugatuck Valley Audubon Society touring the Station about activities in the Entomology Department (8 attendees) *November 9*
- Spoke on ticks and Lyme disease to students at Trinity College in Hartford *November 28*
- Was interviewed about tick studies in Fairfield County by the Fairfield County Municipal Deer Alliance and Eva Sapi, University of New Haven by Natasha Lee of the Fairfield Advocate *November 29*
- Was interviewed about the Fairfield County Municipal Deer Alliance by John Bergeson of the Connecticut Post *December 3*
- Spoke on "Ticks and Tick-borne Disease: An Update" at the annual meeting of the Northeastern Mosquito Control Association meeting in Plymouth, MA *December 4*
- Was interviewed about deer abundance and the impact of deer reductions on ticks and Lyme disease by George Krimsky of the Republic American *December 7*
- Spoke on tick control approach, including deer reduction, at the Lyme Disease Prevention Forum for the Public Health Committee at the Legislative Office Building, Hartford *December 18*
- Participated as administrative advisor in the technical meeting of Multi-State Project NE-1031 on potato breeding and variety development *January 7-8, 2008*
- Was interviewed about honey bees in Connecticut by Bill Weir of the Hartford Courant *January 11*
- Was interviewed about winter tick activity by Judy Benson of the New London Day *January 11*
- Was interviewed about deer control for Lyme disease by Noa Nguyen of the Greenwich Times *January 11*
- Participated in a Connecticut Nursery and Landscape Association Winter Meeting at Naugatuck Valley Community College in Waterbury *January 16*
- Participated in the Connecticut Tree Protection Association annual meeting in Plantsville *January 17*
- Spoke on Pest Management: Ticks and Lyme Disease at the Organic Land Care Course in Leominster, MA (75 attendees) *January 18*
- Was interviewed about deer management for tick control by Kathryn Boulton of the Litchfield County times *January 22*
- Was interviewed about Lyme Disease and case rates by Joy Ledwell of the Easton Courier *January 22*
- Was interviewed about Lyme disease and deer by Cindy Bishop, independent film producer *January 22*
- Was interviewed about deer management for tick control by Brigitte Ruthman of the Republic American *January 23*
- Spoke on Pest Management: Ticks and Lyme Disease at the Organic Land Care Course in the Jones Auditorium (90 attendees) *January 25*
- Welcomed the Connecticut Beekeepers Association and their bee school to the Station in Jones Auditorium (190 participants) *February 2*
- Was interviewed by Myrna E. Watanabe, writer for BioScience, about bee research activities and colony collapse disorder in Connecticut *February 2*
- Spoke on ticks and Lyme disease to the Green Farms Garden Club in Southport, CT (25 participants) *February 5*
- Attended the 4th Hemlock Woolly Adelgid Symposium in Hartford *February 12*
- Welcomed state foresters and staff from USDA-PPQ to our annual Forest Health Workshop in Jones Auditorium (40 participants) *February 21*
- Was interviewed by Bob Miller, Danbury News Times, about tick infection rates *February 25*
- Participated in a review of county Lyme disease education proposals at the Department of Public Health in Hartford (6 participants) *February 27*

- Spoke on ticks and Lyme disease in Weston for the Westport Weston Health District. The presentation was taped for airing on public access television and possible video streaming on the WWHD website *February 29*
- Was interviewed by Frank Juliano, Connecticut Post, about bees and colony collapse disorder *March 6*
- Was interviewed by Ali Fenwick, Stamford Advocate about tick infection rates and the municipal deer alliance tick study *March 6*
- Participated in a meeting of Northeastern Regional Association of Agricultural Experiment Station Directors in Baltimore, MD *March 24-25*
- Welcomed high school students from the Education Connection, Litchfield, to the Station in Jones Auditorium (66 attendees) *March 31*
- Spoke on the threats to honey bee health and research at the Station at the annual meeting of the Experiment Station Associates in Jones Auditorium (35 attendees) *April 1*
- Spoke to students from Saint Francis School touring the Station about activities in the Department of Entomology (10 attendees) *April 7*
- Spoke about activities in the Department of Entomology to students from Bunnell High School touring the Station (17 attendees) *April 8*
- Spoke on ticks and Lyme disease prevention at the annual meeting of the Eastern Connecticut Forest Landowners Association in Brooklyn, CT (52 attendees) *April 11*
- Participated in a Plant Protection and Quarantine (USDA-PPQ) Cooperative Agreement Training Session in Wallingford *April 16*
- Participated in the Connecticut Entomological Society meeting in Jones Auditorium *April 18*
- Participated in a Lyme disease seminar at the Yale Emerging Infections Program in New Haven *April 21*
- Was interviewed about Lyme disease incidence and infection rates by Jenny Cox of the Ridgefield Press *April 23*
- Spoke on ticks and Lyme disease at the Spring Open House in Jones Auditorium (128 attendees) *April 24*
- Spoke on tick management and tick-associated diseases at the Japanese Barberry Control Workshop at Lake Gaillard, CT (30 attendees) *May 3*
- Was interviewed about ticks by Abram Katz of the New Haven Register *May 14*
- Was interviewed about the emergence Brood 14 of the Periodical Cicada by Jane Tillman Irvins of WCBS Radio *May 20*
- Hosted and interviewed a candidate for the IPM Coordinator Position at the Valley Laboratory *May 22-23*
- Was interviewed about ticks received for testing by Jennifer Duval of the Connecticut Post *May 23*
- Was interviewed about ehrlichiosis in Connecticut by George Krinsky of the Republic American *May 27*
- Organized a Honey Bee Response Training Class and spoke on honey bees at the June Fire School operated by the Connecticut Fire Academy (5 attendees) *June 4*
- Spoke on management of flies and other pests at the North Atlantic Poultry Biosecurity and Pest Management Workshop at the University of Connecticut in Storrs *June 10*
- Spoke on the relationship between deer, ticks, and Lyme disease at the Westport Weston Health District for the WWHD Board and First Selectmen for Westport and for Weston *June 13*
- With Dr. Theodore Andreadis was interviewed about ticks, Lyme disease, mosquitoes, and West Nile virus by Sam Gingerella, WTIC Radio, Farmington *June 19*
- Participated in affirmativie action training in Hartford June 20

STILWELL, DAVID

- Coauthored the talk "Getting the Lead Out: A Joint Program to Identify and Remediate Lead and Other Heavy Metals in Connecticut Community Gardens" for the American Community Garden Association's 28th Annual Conference at Beantown Digs Community Gardens, Boston *August 9, 2007*
- Hosted the regular meeting of the Connecticut Community Gardens Association *November 15, 2007*
- With John Ranciato hosted the annual Meeting of the Connecticut Community Gardeners Association (CCGA) *January 29, 2008*
- Participated in the Trace Elemental Analysis Seminar on ICP and ICP-MS and their Environmental Applications, presented by thermo-Fisher Scientific in New Haven *June 5, 2008*

STONER, KIMBERLY

- Chaired a meeting of the Organic Land Care Committee of NOFA at the Valley Laboratory *July 10, 2007*
- Participated in a meeting of the Board of Directors of CT NOFA at Roby's Organic Farm in Berlin *July 15*
- Visited Andre Groszyk on his farm in Enfield to consult about Integrated Pest Management *July 26*
- Hosted a workshop on identifying Swede midge with Julie Callahan of Massachusetts and Lisa Tewksbury and Heather Faubert of Rhode Island *August 2*
- Visited the farm of Gordon Bednarz to do training in Integrated Pest Management, Glastonbury *August 6*
- Participated in the meeting of the Eastern Apicultural Society, Newark, Delaware *August 8-10*
- Presented the workshop "Biological Control: What's Worth the Money?" to an audience of 20 participants and participated as a representative of Connecticut in a meeting of the NOFA Interstate Council, NOFA Summer Conference, Hampshire College, Amherst, MA *August 12*
- Spoke on "Why Organic?" at the NOFA Organic Lawn and Turf Course, Marblehead, MA (70 attendees) *August 14*
- Spoke on "Why Organic?" at the NOFA Organic Lawn and Turf Course, Manchester, CT (75 attendees) *August 16*
- Participated in a meeting of the Board of Directors of CT NOFA, Berlin, CT *August 25*
- Chaired a meeting of the NOFA Organic Land Care Committee, at the Valley Laboratory, Windsor *September 11*
- Was interviewed about testing bee pollen for pesticides by Mike Mayco of the Connecticut Post *September 13*
- Gave a presentation with Dr. Brian Eitzer on how we are measuring pesticides in pollen collected by honey bees, and distributed a survey of beekeeper practices at the Back Yard Beekeepers Association, Weston *September 25*
- Participated in a meeting of the Board of Directors of CT NOFA at Roby's Organic Farm, Berlin *September 30*
- Met with Ted and Becky Jones of Jones Apiaries in Farmington to discuss proposed Station research on management of varroa mites in honey bees *October 2*
- Presided over the annual meeting of Friends of Boulder Knoll, a non-profit group in Cheshire whose mission is to educate the local community about responsible uses of open space (20 attendees) *October 4*
- Chaired a meeting of the Organic Land Care Committee of NOFA at the Valley Laboratory (10 attendees) *October 16*
- Presented a talk on "Management of Resistance to Pesticides" to the "Pesticides and Roast Beef" Conference in the Jones Auditorium (50 attendees) *October 17*

- Participated in a meeting of the Board of Directors of CT NOFA at Roby's Organic Farm in Berlin *October 21*
- Participated with Dr. Brian Eitzer in a nationwide meeting of honey bee researchers preparing a letter of intent to apply for a grant on Protection of Managed Bees *October 24-26*
- Spoke about the Organic Land Care Program at the CT NOFA Annual Meeting in Jones Auditorium (65 attendees) *November 3*
- Chaired a meeting of the Organic Land Care Committee at the Valley Laboratory (8 attendees) *November 14*
- Spoke about Experiment Station research on honey bees at the Southern New England Bee Assembly held at the Unitarian Society of New Haven (80 attendees) *November 17*
- With Bill Duesing of CT NOFA, taught a session of the Garden Study School on Organic Gardening with Vegetables and Herbs in Jones Auditorium (45 attendees) *November 27*
- Presented the Organic Land Care Program at the meeting of the Interstate Council of NOFA held in Old Chatham, New York (10 attendees) *November 29*
- Chaired the annual retreat of the Organic Land Care Committee of NOFA at Mercy Center in Madison (10 attendees) *December 1-2*
- Gave a presentation on "Strategies to Control Insects in Successive Plantings" at the New England Vegetable and Berry Growers Conference in Manchester, NH (150 attendees) *December 11*
- Participated in a meeting of the Organic Land Care Committee of NOFA to revise the *Standards for Organic Land Care* at Tower Hill Botanical Garden, Boylston, MA (7 attendees) *December 11*
- Participated in a retreat of the Board of Directors of CT NOFA, at Lockwood Farm *January 5, 2008*
- Participated in the joint meeting of the American Beekeeping Federation, the American Honey Producers Association, and the American Bee Research Conference; participated in the meeting of multi-state project NC508 Sustainable Solutions to Problems Affecting Honey Bee health, Sacramento, CA *January 8-12*
- Presented a talk "Threats to the Health of Bees" as part of the Environment and Conservation Forum at Heritage Village, Southbury (60 attendees) *January 16*
- Taught "Insect Management in Organic Land Care" at the Massachusetts NOFA Organic Land Care Accreditation Course, Leominster, MA (76 attendees) *January 18*
- Taught "Organic Land Care Principles" at the Connecticut NOFA Organic Land Care Accreditation Course, New Haven (90 participants) *January 23*
- Taught "Insect Management in Organic Land Care" at the Connecticut NOFA Organic Land Care Accreditation Course, New Haven (90 participants) *January 25*
- Hosted the Bee School of the CT Beekeeping Association in the Jones Auditorium, New Haven (170 attendees) *February 2*
- Organized the 3rd annual Community Farming Conference in cooperation with CT NOFA and moderated the forum for exchange among the community farming groups, and presented a workshop on using holistic management in community farms, Jones Auditorium, New Haven (60 attendees) *February 9*
- Along with Dr. Brian Eitzer, and Dr. Nick Calderone of Cornell University, was interviewed by a panel of participants from the Northeast Sustainable Agriculture Research and Education Program for a grant (3 participants) *February 13*
- Hosted the Getting Started in Organic Farming Conference with CT NOFA, Jones auditorium (25 people) *February 16*
- Participated in a meeting of the Board of Directors of CT NOFA at Roby's Organic Farm, Berlin (12 participants) *February 17*
- Chaired a meeting of the NOFA Organic Land Care Committee, at the Valley Laboratory in Windsor (5 attendees) *February 26*

- Presented the “Pest Management Overview” for the NOFA Organic Land Care Course in Narragansett, RI (56 participants) *February 29*
- Presented the talk “Managing Good Bugs and Bad Bugs in the Vegetable Garden” to community gardeners from the New Haven Land Trust at the New Haven Public Library (10 attendees) *March 1*
- Presented the talk “Managing Good Bugs and Bad Bugs in the Vegetable Garden” to a community garden group in Torrington, Natural Resources Conservation Service Office (30 attendees) *March 4*
- Visited David Zemelsky of Starlight Gardens in Durham to see if insects were responsible for poor spinach crop in his high tunnel *March 6*
- Gave two talks at the CT NOFA Cultivating an Organic Connecticut Conference, “Threats to Honey Bee Health” and “The Bugs They Are A-Changing” at Windsor High School (10 and 30 attendees) *March 8*
- Presented a poster with Dr. Brian Eitzer on “Honey Bee Exposure to Pesticides” at the Connecticut Conference on Natural Resources, University of Connecticut, Storrs *March 10*
- Chaired a meeting of the Organic Land Care Committee of NOFA, at the Valley Laboratory in Windsor (8 attendees) *March 11*
- Along with Ira Kettle, made a presentation to a class at the Park City Magnet School in Bridgeport on the biology of honey bees and current theories of Colony Collapse Disorder. Dr. Stoner and Mr. Kettle also reviewed a PowerPoint presentation the students were preparing for a competition at a national environmental symposium (10 attendees) *March 25*
- Spoke on “Measuring Pesticides in Pollen” at the Spring meeting of the Connecticut Beekeepers Association in Jones Auditorium (80 people) *April 5*
- Chaired a meeting of the Organic Land Care Committee at the Valley Laboratory (6 attendees) *April 8*
- Spoke to the Simsbury Garden Club on “Growing Fabulous Vegetable Gardens Organically” in Simsbury (80 attendees) *April 14*
- Participated in a meeting of the Board of Directors of CT NOFA, Tolland (13 attendees) *April 20*
- Consulted with Jeff Shwartz of the Back Yard Beekeepers Association on the design of a survey of their membership with the goal of determining current beekeeping practices and eventually investigating the relationship between practices and overwintering success of hives *April 21*
- Spoke to the Back Yard Beekeepers Association on “Measuring Pesticides in Pollen” and other Experiment Station research on bees, bee registration, and registration for notification of pesticide application, Weston (65 people) *April 29*
- Chaired a meeting of the Organic Land Care Committee at the Valley Laboratory, (8 attendees) *May 13*
- Participated in a meeting of the CT NOFA Board of Directors, Old Solar Farm, Oxford (12 attendees) *May 18*
- Was interviewed about community farming and a community farm in Cheshire started by the Friends of Boulder Knoll by Mike Puffer of the Waterbury Republican-American *May 21*
- Spoke on “Managing Open Space for a Changing World” about the importance of preserving and increasing local agriculture in view of climate change and rising fuel prices to the Cheshire-Wallingford Chapter of the League of Women Voters (50 attendees) *May 21*
- Was interviewed about the interest in community gardening, community farming, and local food in Connecticut by Brian Koenig of the Meriden Record-Journal *May 23*
- Was interviewed along with Ira Kettle, state bee inspector, about the current status of honey bees in Connecticut by Mike Sabo of the New Haven Advocate *May 29*
- Participated in a workshop of the Back Yard Beekeepers Association on preventing swarming and making splits, and met with the host, Win Baum, beekeeper, on research projects, Fairfield *June 21*
- Was interviewed about the current health of honey bees in Connecticut by Bill Leukhart of the Hartford Courant *June 25*

- Spoke on organic pest management at a twilight meeting at Fort Hill Farm, sponsored by the Natural Resources Conservation Service, the Northeast Regional IPM Program, and CT NOFA, New Milford (65 attendees) *June 30*

THIEL, PETER

- Gave a presentation entitled "Sudden wetland dieback" to a Botany class from Quinnipiac University in Jenkins (12 attendees) *November 5*

THOMAS, MICHAEL

- Spoke to students from Branford High School's Horizons Alternative High School program and provided hands on activities about mosquito biology and arbovirus surveillance as part of the NIH/NSF sponsored Peabody Fellows Program, Yale University (28 students) *December 12*
- Spoke to students from Waterbury High School and provided hands on activities about mosquito biology and arbovirus surveillance as part of the NIH/NSF sponsored Peabody Fellows program, Yale University (20 students) *December 19*
- Spoke to a group of students from Barnard Environmental Magnet School in New Haven and provided hands on activities about mosquito biology and arbovirus surveillance as part of the NIH/NSF sponsored Peabody Fellows Program, Yale University (24 students) *December 20*
- Presented information and hands-on activities about mosquitoes, backyard insects and wildlife to an after-school program at Benjamin Jepson Interdistrict Magnet School in New Haven (20 student attendees) *May 12*

TRENCHARD, PETER

- Participated in the CNLA winter Meeting at Naugatuck Valley Community College, Waterbury *January 16, 2008*
- Spoke about "Defoliating Insects and Forest Health: The View from Above" at the Forest Health Monitoring Workshop at CAES, New Haven *February 21*
- Staffed the Station exhibit at the CT Flower and Garden Show, Hartford *February 23*
- Reported on Connecticut's Nursery Inspection and Survey activities, presented a talk on Chrysanthemum White Rust in Connecticut and participated in a field trip to an Emerald Ash Borer infested area at the 34th annual meeting of the Eastern Chapter of the Horticultural Inspection Society in Charleston, West Virginia *March 31-April 3*
- Participated in a Digital Aerial Sketch Mapping Workshop at Northeast Urban Forestry Center, Portsmouth, New Hampshire *May 22*

VOSSBRINCK, CHARLES

- Presented a talk on Spiders to a 2nd grade class at the Savin Rock Elementary School in West Haven which included pictures, live and preserved specimens, stories and questions from the students (20 students) *December 3*
- Was a lead judge for the eighth grade life sciences category at the Connecticut Science Fair held at Quinnipiac University *March 12-13*

WARD, JEFFREY S.

- Participated in the Connecticut Urban Forest Council meeting in New Haven *July 18, 2007*
- Participated in the Connecticut Tree Protective Association annual meeting in Farmington *July 19*
- Spoke on "History of Connecticut's forests" to Hamden Rotary (12 attendees) *July 23*
- Served on Connecticut Department of Environmental Protection-Endangered Species Taxonomic Advisory Committee for Plants in Storrs, CT *July 24*

- Hosted an ICIS internship by Ms. Kimberly Bloom, a science teacher at Dag Hammarskjold Middle School in Wallingford *July 9-27*
- Presented an invited lecture "Dispersal of exotic species by white-tailed deeer in Connecticut" at the Mid-Atlantic Invasive Species Conference in Philadelphia (150 attendees) *August 15*
- Along with Ms. Joan Bravo, visited Christy Hass to discuss urban tree populations in New Haven *August 21*
- Visited Ed Vaughn, Warden, to examine declining basswood trees in Orange *August 21*
- Administered practical and oral examinations to arborist candidates for the Connecticut Tree Protection Examining Board *September 12*
- Participated in the Connecticut Tree Protective Association's Board of Directors' Meeting in New Haven *September 11*
- Spoke on "Tree Biology" for the Arboriculture 101 class sponsored by The Connecticut Tree Protective Association, Jones Auditorium (45 attendees) *September 12*
- Participated in the Connecticut Urban Forest Council Meeting in Middlefield *September 19*
- Participated in the Connecticut Tree Protective Association IPM III workshop in West Hartford *September 13*
- Along with Mr. Joseph P. Barsky and Mr. Scott C. Williams, provided a field tour of Japanese barberry control research to members of the Connecticut Chapter – The Nature Conservancy, Redding *September 21*
- Chaired a CTPA Education Committee meeting in New Haven *October 4*
- Spoke on Japanese barberry (*Berberis thunbergii* DC) control in southern New England at the Natural Areas Association's 34th Annual Conference in Cleveland, OH (50 attendees) *October 10*
- Moderated the session "The Role of Tree Wardens" at the Connecticut Urban Forest Council's 2007 Conference in Wallingford (70 attendees) *October 25*
- Spoke on "The History of Connecticut's Forest" for the Salem Land Trust in Salem (35 attendees) *October 25*
- Along with Scott C. Williams, spoke on "Deer Vehicle Collision Trends in Connecticut" at the Deer-Vehicle Crash Reduction Symposium in Schenectady, NY (24 attendees) *October 29*
- Was interviewed about fall leaf color by Bob Miller of the Danbury News Times *October 19*
- Along with Scott C. Williams, spoke on "Forestry and Wildlife" for students from the Coop High School, New Haven (11 participants) *November 1*
- Spoke on forestry and horticultural research for a tour for the Naugatuck Audubon Society (8 attendees) *November 9*
- Participated in the Connecticut Tree Protective Association, Board of Directors meeting in New Haven *November 11*
- Spoke on forestry and horticultural research for a group of students from Bunnell High School (24 participants) *November 14*
- Spoke on "Japanese barberry (*Berberis thunbergii*): control alternatives" at the CT Forest Conservation and forest Science forum in Storrs (60 attendees) *November 21*
- Spoke on "Japanese barberry (*Berberis thunbergii* DC) control in southern New England" for a seminar at Yale University (6 attendees) *December 4*
- Participated in a Connecticut Forestlands Council Meeting in Middlefield *December 11*
- Spoke on "Organic control of Japanese barberry" at a course for NOFA accredited professionals in Boylston, MA (80 attendees) *December 11*
- Participated in the Connecticut Tree Protective Association Board of Directors Meeting in Southington *December 12*
- Participated in the annual meeting of Connecticut Chapter-Society of American Foresters in Haddam *January 8, 2008*
- Participated in the Connecticut Urban Forest Council meeting in Middlefield *January 9*

- Spoke on “Tree Biology” for the Arboriculture 101 class sponsored by The Connecticut Tree Protective Association, Jones Auditorium (48 participants) *January 9*
- Provided a field demonstration of a propane torch for the New Hartford Conservation Commission (12 attendees) *January 12*
- Attended the 86th Annual Meeting of the Connecticut Tree Protective Association in Plainville *January 17*
- Spoke on “Homeowner tree and shrub care” for the Mystic Garden Club (50 attendees) *January 22*
- Presented an invited lecture on “Forest Restoration Strategies” at the Pennsylvania DCNR Winter Forest Management Meeting in State College, PA (250 attendees) *January 23*
- Spoke on “Dispersal of exotic species by white-tailed deer in Connecticut” Bowman’s Wildflower Preserve in New Hope, PA (50 attendees) *January 27*
- Was interviewed about leaf drop by Bryan Mandel of the Waterbury Republican *January 28*
- Spoke on “Our urban trees – what we have – what we could lose” at the 2008 Connecticut Turf and Landscape Conference (120 attendees) *January 31*
- Spoke on “Reducing browse damage in gardens” at the Friends of Elizabeth Park’s Garden Lecture Series in West Hartford (20 attendees) *February 7*
- Was an invited guest on WTIC AM-1080 radio talk show Garden Talk and gave advice on tree management (35,000 audience) *February 9*
- Gave keynote talk “The historical and future impacts of exotic insects and diseases on Connecticut’s forests” at the 4th Hemlock Woolly Adelgid symposium in Hartford (130 attendees) *February 12*
- Spoke on “Crop tree management – a new management paradigm” at the 13th annual Forest Health Monitoring Workshop in Jones Auditorium (24 attendees) *February 21*
- Spoke on “Flame technology to control invasive shrubs and trees” at the New York/New England Society of American Foresters meeting in Saratoga Springs, NY (125 attendees) *February 29*
- Along with Joseph P. Barsky attended CT-DEP workshop on forest practice ethics in Middlefield *March 4*
- Participated in a CTPA-Education Committee meeting in New Haven *March 6*
- Along with Joseph P. Barsky visited Centennial Forest Lands with staff from Aquarion Water Company and The Nature Conservancy to discuss barberry control measures *March 7*
- Participated in a Connecticut Forestlands Council Executive Board meeting in Middlefield *March 11*
- Was interviewed about forestry research by Melissa Nicefaro of the New Haven Magazine *March 11*
- Spoke on “Strategies for reducing deer browse damage” at the Mansfield Garden Gate Club (35 attendees) *March 17*
- Participated in the Connecticut Urban Forest Council meeting in Middlefield *March 19*
- Met with officials from the Knox Park Foundation, the City of Hartford, and the CT DEP to discuss urban trees in Hartford *March 20*
- Spoke on forestry and horticultural research for a tour of the Litchfield Education Connection students (48 attendees) *March 31*
- With Dr. Scott Williams, met with officials from The Nature Conservancy, Highstead Arboretum, and Aquarion Water Company in Redding to discuss Japanese barberry removal strategies and white-tailed deer research *April 2*
- Presented a paper “Crop tree release increases growth of red oak sawtimber in southern New England: 12 year results” at the Sixteenth Central Hardwood Forest Conference in Lafayette, IN (60 attendees) *April 9*
- Participated in the annual meeting of the Yankee Society of American Foresters, Enfield *April 17*
- Spoke on “Japanese barberry control” at the Japanese Barberry Control Workshop in North Branford (25 attendees) *May 3*
- Participated in the Connecticut Urban Forest Council meeting in Berlin, *May 28*

- Spoke on "Precommercial Crop Tree Release – A New Management Strategy" at the Connecticut Society of American Foresters spring workshop in Naugatuck (32 attendees) *May 29*
- Spoke on "Fruits of the Forest" at Southington Nature Day (140 student and 20 adult attendees) *June 5*
- Administered practical and oral examination to arborist candidates for the Connecticut Tree Protection Examining Board *June 10*
- Advised the Parks Coordinator of Schoolhouse Brook Park in Mansfield on barberry control *June 12*
- Provided a field tour of ongoing research sites for the CT State Forester *June 17*
- Spoke on "Japanese Barberry Control" at the Japanese Barberry Control Workshop in Exeter, RI (6 attendees) *June 21*
- Participated in Connecticut Forestlands Council meeting in Middlefield *June 24*
- Was interviewed about sycamores by John Burgeson of the Connecticut Post *June 30*

WHITE, JASON

- Participated in the 4th International Phytotechnology Conference in Denver, CO and served on the Organizing Committee *September 23-26, 2007*
- Chaired the Annual Editors Meeting for the International Journal of Phytoremediation held in Denver, CO *September 25*
- Chaired the Phytoremediation Session at the 23rd Annual International Conference on Soils, Sediments, and Water at the University of Massachusetts, Amherst *October 16*
- Met with Nancy Marek, a graduate student from Yale, to discuss her thesis project on Phytoremediation of Brownfield sites *November 29*
- Met with Nancy Marek, a master's candidate at Yale's School of Forestry and Environmental Studies, to discuss phytoremediation potential at Brownfield sites in New Haven *December 6*
- Met with Evelyn Silva, a graduate of Yale's School of Forestry and Environmental Studies, to discuss collaborative phytoremediation experiments *December 13*
- Chaired the Phytoremediaton Session at the 18th Annual West Coast Conference on Soils, Sediments, and Water in San Diego, CA and presented a talk entitled "Phytoremediation of Weathered Persistent Organic Pollutants: Mechanistic Studies and Field Application" *March 9-11*
- Visited Barnum Court in the City of Danbury to treat/destroy volunteers of genetically modified cottonwood plants that had been identified in the fall of 2007. A full site survey for additional volunteers was also conducted. The city health department and a representative of Applied Phytogenetics (the company holding the APHIS permit) were also present *April 30*
- Participated in an EPA-sponsored conference call regarding the upcoming 5th International Phytotechnologies Conference in China, co-sponsored by the International Phytotechnology Society *June 6*
- Met with an agronomist from India's National Agricultural Service at Lockwood Farm and gave him an overview of phytoremediation and invasive species research at CAES *June 20*

WILLIAMS, SCOTT C.

- Along with J. P. Barsky and Geoff Picard, gave a lecture and demonstration on small rodent capture, handling, and sera collection to the Wildlife Techniques Class in the Department of Natural Resources Management and Engineering at the University of Connecticut, Storrs (8 student attendees) *September 26, 2007*
- Led an interpretive hike on a future piece of Guilford Land Conservation Trust property (15 participants) *October 17*
- Gave a talk to students of the New Haven School System's Gifted and Talented Program on wildlife in Connecticut (14 students) *October 18*

- Along with Rollie Hannan, led a large animal capture demonstration for students of the Wildlife Sampling Techniques Class from the University of Connecticut, North Branford, CT (15 attendees) *November 7*
- Participated in a wildfire training session in Windsor Locks *December 4*
- Was interviewed about horses as dispersers of exotic seeds by Chrystal Haynes from WTNH Channel 8 *January 15, 2008*
- Spoke on "Impacts of Overabundant White-Tailed Deer on Forested Ecosystems" at the annual Recreation Permit Holders Meeting at the South Central Connecticut Regional Water Authority Headquarters in New Haven (45 attendees) *January 16*
- Was interviewed about the impacts of horses on trails, specifically soil disturbance and exotic seed dispersal by Rachel Scarborough King of the New Haven Register *January 21*
- Participated in the Advanced Microsoft Excel Data and Functions Class at Manchester Community College *January 22*
- Provided a field tour for Town of Guilford Environmental Planner to show her a properly constructed deer exclosure *February 15*
- Spoke on "Ticked off about Japanese barberry" at the 13th Annual Forest Health Monitoring Workshop in Jones Auditorium (24 attendees) *February 21*
- Assisted DEP furbearer biologists on a bear den site inspection in Barkhamsted *March 6*
- Attended the Connecticut Conference on Natural Resources at the University of Connecticut, Storrs *March 10*
- Attended the DEP fire shelter training course in Marlborough *March 19*
- Gave a talk to students and faculty of Greenwich High School about deer research at the Station (25 students) *March 27*
- Led Pine Brook School Middle School students on an interpretive hike and discussed Station research at South Central Connecticut Regional Water Authority's Lake Gaillard property, North Branford (20 students) *March 31*
- With Dr. Jeff Ward, met with officials from The Nature Conservancy, Highstead Arboretum, and Aquarion Water Company in Redding to discuss Japanese barberry removal strategies and white-tailed deer research *April 2*
- Along with Joseph Barsky assisted DEP Forestry staff in a prescribed fire at Higganum Meadows Wildlife Management Area *April 8*
- Successfully defended his Ph.D. dissertation "Effects of lethal management on behaviors, social networks, and movements of overabundant white-tailed deer" (20 attendees) *April 24*
- Presented research titled "Increased white-footed mouse and blacklegged tick abundances in Japanese barberry infestations" at the 64th Annual Northeast Fish and Wildlife Conference in Galloway, NJ (42 attendees) *April 30*
- Spoke on "Barberry Control, Mice, and ticks" at the Japanese Barberry Control Workshop in North Branford (25 attendees) *May 3*
- Conducted a botanical, wildlife, and habitat survey on a 48-acre parcel for the Guilford Land Conservation Trust *June 6*
- Conducted a wildlife and habitat survey on a 33 acre parcel of land for the Guilford Land Conservation Trust *June 10*
- Spoke on "Barberry, mice, and ticks" at the Japanese Barberry Control Workshop in Exeter, RI (6 attendees) *June 21*

ADVANCES IN KNOWLEDGE

DEPARTMENT OF ANALYTICAL CHEMISTRY

The format adopted in the previous year's Record will be continued in order to focus succinctly on the Department of Analytical Chemistry, and its work, over the twelve months from July 2007 through June 2008. Narratives will be brief and salient issues presented in bulleted outlines. Sources of more detailed information are provided, when available. Hopefully, this revised format will provide information more conveniently and, therefore, be of more use to the Record's readers.

FOCUS AREAS

Service, research, and outreach activities in the Department are conducted across three Focus Areas:

- Environmental Monitoring
- Food Safety
- Natural Products

Service and research activities in each focus area are often mutually complimentary.

SERVICE ACTIVITIES

Routine and non-routine analyses are conducted across a very wide range of sample matrices submitted to the Department of Analytical Chemistry by other departments at The Station, other State of Connecticut agencies, municipal agencies, police departments, non-profit groups, and Connecticut businesses, a list not intended to be all-inclusive.

Analyses on behalf of CONNECTICUT DEPARTMENT OF AGRICULTURE

1. Animal Feeds:

- Analysts: Craig Musante, Mamie Pyles, John Ranciato, David Stilwell
- Goal: assure products are in compliance with stated label guarantees
- Analyses which served as the rationale for Station's establishment in 1875
- Products for both household pets and commercial agricultural operations included
- Samples collected by inspectors from the Connecticut Department of Agriculture
- Analytical results reported to Connecticut Department of Agriculture, product manufacturer, product dealer
- 1 July 2007 to 30 June 2008 completed analysis of 181 samples for parameters such as protein, fat, moisture, and fiber. Deficient samples (based on analytical variations specified in the Official Publication of the Association of American Feed Control Officials) totaled 46 (25.4%).

2. Fertilizers:

- Craig Musante, Mamie Pyles, John Ranciato, David Stilwell
- Goal: assure products are in compliance with stated label guarantees
- Analyses serving as basis of Station's establishment in 1875
- Products for both residential and commercial agricultural operations included
- Samples collected by inspectors from the Connecticut Department of Agriculture
- Analytical results reported to Connecticut Department of Agriculture, product manufacturer, product dealer
- 1 July 2007 to 30 June 2008 completed analysis of 115 samples for macronutrients, such as nitrogen, available phosphoric acid, and potash, and for micronutrients, including but not limited to, boron, sulfur, cobalt, magnesium, and iron. Deficient samples (determined according to the investigational allowances outlined in the Official Publication of the Association of American Plant Food Control Officials) numbered 42 (35.6%).

IMPACT: Analytical Chemistry has an established reputation within the State of Connecticut, as well as among federal agencies such as the Food and Drug Administration, for accurate and rapid chemical analysis of products for and from agriculture. Our staff demonstrates on an on-going basis its capability to expand beyond routine service analyses and provide non-routine analyses of the broadest range of matrices for a wide spectrum of analytes, accomplished within severe time constraints.

Analyses on behalf of CONNECTICUT DEPARTMENT OF CONSUMER PROTECTION, FOOD and STANDARDS DIVISION

1. Pesticide residues in food:

- Analysts: Walter Krol, Brian Eitzer
- Goal: determine concentration of agrochemicals in fresh and processed foods from local, domestic, and imported sources offered for sale in Connecticut to assure compliance with established tolerances
- Market basket survey samples collected by Inspector Ellen Sloan of the Connecticut Department of Consumer Protection
- Results published in annual Station bulletin available by mail and at www.ct.gov/caes
- From 1 January through 31 December 2007, 198 samples of fresh (118; 59.6%) and processed (80; 40.4%) fruits (100), vegetables (87) and other (11 total: honey (5); grain (6)) samples were analyzed for pesticide residues
- Beginning 1 January 2007 all market basket samples were analyzed using the QuECHERS method, providing lower limits of detection and increased number of detectable agrochemicals. Please see the Record of the Year 2006-2007, the RESEARCH section below, and Station bulletins for details.
- Results: of 198 samples analyzed in 2007, 120 samples (60.6%) contained a total of 327 residues. The average residue found was 0.163 ppm, and the average number of pesticide residues found on each sample was 2.62 in 2007. The impact on the pesticide residue program of fully implementing QuECHERS in our laboratory is shown graphically in Figure 1 below. It

must be noted that since 2005 the average residue value determined has decreased by a factor of 10. During the same period the number of pesticide residues detected has more than doubled!

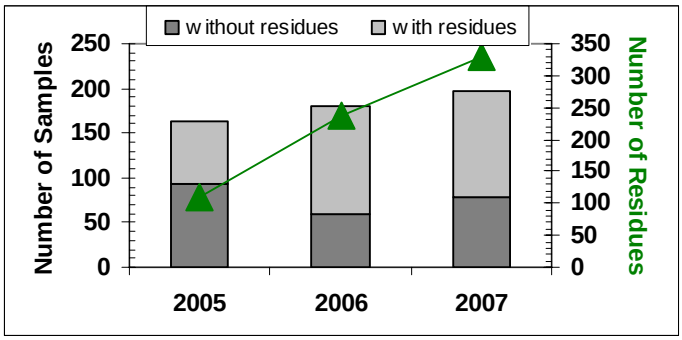


Figure 1.

- Data highlights: total of 45 different pesticide active ingredients were detected and quantitated. Of the 198 samples analyzed, 78 (39.4%) contained no detectable pesticide residues; 120 (60.6%) samples contained 327 pesticide residues. Of these 120 samples, six samples contained residues which had no tolerance on the commodities to which they were applied and were therefore violative.

2. Fat content in ground meat

- Analyst: Craig Musante
- Goal: ascertain that percentage fat is consistent with product label
- Comment: reinstitution in 2007 of testing program following hiatus of several years
- Since 1 July 2007 seven samples have been submitted and analyzed. Laboratory analysis for all products are consistent with label claims.

3. Miscellaneous samples

- Analyst: department staff
- From 1 July 2007 to 30 June 2008, 291 samples submitted for variety of analytical requests such as identification of foreign material, possible product adulteration or tampering. For some samples we rely on the expertise of Station staff in other departments.
- 16 samples of herbal supplements were analyzed for the presence of erectile dysfunction or other undeclared drugs

4. Adulteration of Toothpaste

- Analyst: Terri Arsenault
- Goal: to detect toothpaste adulterated with the toxic ingredients diethylene glycol (DG) and/or ethylene glycol (EG).
- It was found that toothpaste, particularly from China, may contain DG or EG as a sweetener rather than the non-toxic, but more expensive, ingredient of glycerine.
- 26 samples of imported toothpaste were submitted for determination of adulterants, ethylene glycol (EG) and diethylene glycol (DEG). Five of these samples were found to contain the adulterants, in one case at the level of 5%. Contaminated samples were removed from commerce.

Analyses on behalf of DEPARTMENT OF CONSUMER PROTECTION, LIQUOR CONTROL DIVISION

1. Beverages for ethanol content

- Analyst: John Ranciato
- Goal: provide % ethanol by volume for label registration and taxation purposes
- Analyzed 94 products such as beers, wines, liquors for ethanol
- Analyzed several herbal products for undeclared alcohol content

2. *Beverage authenticity*

- Analyst: Brian Eitzer
- Goal: Determine if products offered to customers at Connecticut establishments are authentic as to brand.
- Eleven alcoholic products examined for authenticity; of which 5 were determined to be unauthentic.

Analyses on behalf of CONNECTICUT DEPARTMENT OF CONSUMER PROTECTION, PRODUCT SAFETY DIVISION

1. Miscellaneous samples

- Analyst: department staff
- From 1 July 2007 to 30 June 2008 analyzed 88 samples such as pencils, toys, ceramic ware for lead content.
- Two of the toys that tested positive for Lead were recalled by the Consumer Product Safety Commission (CPSC). Please see http://www.cpsc.gov/cpscpub/prerel/prhtml08/08133.html

IMPACT: Once again our laboratory is acknowledged for its rapid and accurate response based on non-routine analyses. It is this quality which has been recognized by federal agencies and acknowledged through our receipt of the Cooperative Agreement. Response of the caliber which our chemists provide is critical in cases of intentional contamination or terrorist activities.

Analyses on behalf of DEPARTMENT OF ENVIRONMENTAL PROTECTION, WASTE MANAGEMENT BUREAU

1. PCBs (polychlorinated biphenyls) and pesticides

- Analysts: Brian Eitzer, William Berger, Terri Arsenault
- Goals: ascertain extent of PCB contamination associated with breached electrical transformers; ascertain pesticide concentration associated with misapplication or drift in support of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).
- Matrices include, but are not limited to soils, sediments, foliage, surface wipes, fabric, air
- From 1 July 2007 to 30 June 2008 total of 99 samples were analyzed of which 27 were PCB analyses
- Highlighted samples: In the fall of 2007, inspectors from DEP were notified of a greenhouse operation that was suspected of discharging water from an ebb and flow irrigation technique without appropriate permits. Seven samples of water and soil were delivered to our laboratory and found to contain eleven different insecticides and fungicides, included in the list of twenty-two known to have been used at the facility. In addition, elemental analysis revealed the water samples contained elevated levels of calcium, potassium, magnesium, and zinc, consistent with fertilizer.

IMPACT: Rapid and accurate reporting of polychlorinated biphenyls in the environment can be critical to clean-up and health issues. Our scientists have been able to provide analytical results to the appropriate staff at Connecticut Department of Environmental Protection to assure the safety of sites accessible to the public.

2. Analysis of polar pesticides

- Analyst: Christina Robb
- Goals: to develop capability to analyze for polar pesticides using LC-MS/MS.
- Background: Although our laboratory has had capacity to analyze for volatile pesticides using GC/MS for many years, analysis of extremely polar compounds has only been available since our acquisition of LC/MS capability. Polar compounds require specific sample preparation and chromatographic conditions to permit LC-MS/MS analysis and, therefore, are invariably single residue methods. Procedures have been developed and implemented in our laboratory to accomplish glyphosate determination in a variety of matrices. Please see Research Section below.
- 4 samples were analyzed for glyphosate using the new method.

Analyses on behalf of MUNICIPAL and FEDERAL AGENCIES

1. City of Groton Police Department

- Analyst: Brian Eitzer
- Seven samples related to potential pet poisoning submitted
- Determined that meat sample was adulterated with rodenticide
- Analytical data provided to Groton Police Department within one hour of sample delivery

2. Lead in toys for Department of Health, City of New Haven

- Analyst: Craig Musante
- Requested by New Haven Health Department to analyze 9 painted toys for lead content
- Using XRF technique each toy had tested positive for lead
- Using our laboratory's ICP instrumentation, no lead was detected in any toy

- Further side-by-side comparison of two techniques is warranted

3. Analysis of samples from Food Emergency Response Network (FERN)

- Analysts: Terri Arsenault, William Berger, Brian Eitzer, Craig Musante, Christina Robb
- Successfully analyzed a proficiency test sample of lettuce in May using the required FDA method by gas chromatography/mass spectrometry, identifying those samples containing toxins spiked into samples.
- Successfully participated in proficiency test using LC/MS/MS, GC/MS, ELISA and UV. A new style of proficiency test using two techniques, ELISA and LC-MS/MS were used to identify and quantitate α-amanitin.
- Successfully participated in cyanide proficiency test which required qualitative identification was further quantitated by us; using matrix based standards we obtained accurate results.
- Additional FERN-related information is provided in the RESEARCH section below.

Analyses on behalf of other STATION DEPARTMENTS

1. Community garden soils from Valley Laboratory, Soil&Water, and others

- Analysts: David Stilwell, Craig Musante, John Ranciato
- samples from different community garden sites across Connecticut analyzed for heavy metals
- See details in RESEARCH section

2. Analyses related to pollinator decline for Department of Entomology

- Analyst: Brian Eitzer
- Request from Dr. Kim Stoner in Entomology to determine concentrations of agrochemicals in pollen and wax to ascertain possible relationship to bee health.
- LC/MS methods developed for low level detection of pesticides. See Research section below.

3. Analyses of samples for nootkatone

- Analyst: Terri Arsenault for the Department of Entomology
- See Research/Natural products section below for details

ANALYSES OF CHECK SAMPLES

- Annual performance evaluation samples required by our certifying agency, Connecticut Department of Public Health.
- To replace the now inactive Southern States Check Sample program, enrolled in FAPAS to monitor the reliability of our analyses related to the market basket survey.
- Annual proficiency testing samples related to FERN work.

RESEARCH ACTIVITIES

Research projects in the Department of Analytical Chemistry include applied and fundamental studies. Research is often stimulated by our service work and in turn, research results often impact service activities.

I. FOOD SAFETY

- Project: *Comparison of two Methods for Determination of Pesticide Residues in Food*
- Investigators: Terri Arsenault, Brian Eitzer, Walter Krol
- Summary: Extensive comparison of previous extraction method, the VegPrep, with the Quick, Easy, Cheap, Effective, Rugged, Safe (QuEChERS) method. Fully updated and presented in Bulletin and graph in Figure 1.

- Project: *Improvement to FERN methods*
- Investigators: Terri Arsenault
- Summary: Integral to our Cooperative Agreement with the FDA is assessment of various FERN procedures for detecting toxins in foods. The current FERN method for examining food for potential toxins by gas chromatography/mass spectrometry involves a simple extraction of the matrix with acetonitrile followed by conventional hot splitless injection into a gas chromatograph. The method is intended to be applied to a large number of matrices and toxins, so it is deliberately both simple to perform and has no clean up of the extracts. However, during the course of matrix evaluations, the extracts were found to degrade the analytical column very quickly. By installing a Programmable Temperature Vaporization (PTV) inlet, and using the more modern technique of solvent vent injection, it was found that the degradation was minimized and the method was far more rugged. This work was presented at the FERN CAP meeting in April of 2008 as already mentioned.

- Project: *Electron Beam Irradiation for Improving the Safety of Fruits and Vegetables*
- Investigators: Alejandro Castillo and Luis Cisneros-Zevallos (Texas AgriLife Research, Texas A&M University), James Dickson (Iowa State University), MaryJane Incorvia Mattina (Connecticut Agricultural Experiment Station)
- Summary: While the application of Good Agricultural Practices (GAP) seems to be effective at preventing the introduction of bacterial pathogens in produce for most cases, other factors that are yet to be understood may favor the contamination in some instances. Therefore, contaminated fruits and vegetables may reach consumers and it will take time to understand the factors that promote the presence, spreading or magnification of pathogens in crops along the processing chain. This makes it necessary to count on a treatment that ensures the safety of fruits and vegetables to enable consumers to meet the government's nutrition goals that include increasing consumption of fresh fruits and vegetables. Electron beam (e-beam) irradiation can reduce or eliminate the pathogens, but may affect the quality of the product. To develop meaningful e-beam treatments it is imperative to determine the D-value of *Salmonella, E. coli* O157:H7 and hepatitis A virus (HAV), which are the 3 foodborne pathogens that most frequently are found to cause outbreaks of foodborne diseases linked to produce. It is also paramount to determine the maximum dose that each commodity can stand without physical damage. Secondarily, the effect of post-harvest irradiation of produce on the alteration, if any, of produce-borne agrochemicals is important in evaluating the consequences of e-beam irradiation of produce. Therefore, the objectives of this project are: to determine D-values for *Salmonella* and *Escherichia coli* O157:H7 on lettuce, spinach, fresh-cut cantaloupes, fresh-cut tomatoes, and of HAV on green onions and fresh strawberries; to determine the maximum dose of e-beam energy that can be irradiated onto each of these commodities without changes in firmness, color,

respiration rate, and overall microbiological counts; and to determine the effect of post-harvest e-beam irradiation on the molecular stability of produce-borne agrochemicals. For determining D-values, produce will be spiked with the selected pathogens and then subjected to e-beam irradiation at increasing doses. Plate counts will be conducted on samples of irradiated produce. HAV enumeration will be conducted using the Virus Plaque Assay. Non-inoculated batches of the same commodities will be irradiated at increasing doses up to 5 kGy and subjected to instrumental analysis including firmness, color and respiration rate tests, and microbiological analysis including aerobic plate counts, lactic acid bacteria and yeasts and molds counts. The final objective will be achieved by testing produce from crops that have field-incurred agrochemicals to determine the pre- and post-irradiation chemical signatures of these compounds using mass spectrometry interfaced to both gas and liquid chromatography. This study should permit collecting useful data for further development of strategies for reducing pathogens in fresh and fresh-cut produce after GAP and Good Manufacturing Practices are applied.

- Project : *Toxins through QuECHERS*
- Investigators: Walt Krol, Christina Robb, Brian Eitzer
- Summary: To assess if the standard QuECHERS sample preparation procedure can be used to analyze the toxins designated for LC/MS and GC/MS analysis by FERN using standard FDA methods. To date we have demonstrated that most of the toxins are amenable to extraction from distilled water and from two different matrices using the QuEChERS protocol. The QuEChERS method may prove to be an excellent confirmatory or screening method as part of the FERN repertoire.

- Project: *Issues Associated with Ortho-Phenyl Phenol in Paper Products in Contact with Food*
- Investigator: Walter Krol
- Summary: *ortho*-Phenyl phenol (OPP) and its sodium salt *ortho*-phenyl phenate are registered for use as a fungicide on 22 different crops including cherries, cucumbers, peaches and pears. Residues of OPP have been identified and quantitated in produce samples received from the Department of Consumer Protection (DCP) for many years. A rash of indiscriminant 'illegal' findings of OPP prompted us to search for a possible laboratory source of contamination. No such laboratory source was detected. It was eventually discovered that the white paper bags used to collect the produce samples contained OPP at a level of 73.7 ug/g. Brown paper bags used as a control were found to contain OPP at an even higher level of 340 ug/g, while the laboratory paper towels and gloves used during the analysis were not found to contain any OPP. An hypothesis was put forth that there is significant transfer of OPP from the paper to the produce contained within the bag. The inspector from the DCP was instructed NOT to use paper bags for the collection of samples owing to the potential for cross contamination.

To prove the validity of our cross contamination hypothesis, in the Spring of 2008, a transfer study was designed and undertaken to evaluate the transfer of OPP from brown paper lunch bags purchased from five separate sources. The majority of the bags were found to contain OPP. Strawberries obtained from a local pick your own farm were placed in the bags and refrigerated overnight. Following QuEChERS extraction and analysis, all the strawberries in the bags were found to contain OPP. In addition, the paper bags used to store the strawberries were found to contain pesticide residues found to be present on the strawberries. This work has

unequivocally demonstrated that physical contact between produce and the container in which it is stored results in transfer of pesticide residues.

- Project : *ELISA Screening*
- Investigators: Christina Robb and William Berger
- Summary: In the last year, ELISA has been used for ricin analysis and α-amanitin analysis. The ricin analysis has been expanded to include an intact ricin analysis from the FERN program. Our laboratory was selected to help assess the new methodology and perform intact ricin analysis in a variety of matrixes. α-Amanitin was analyzed as part of a proficiency test.

II. ENVIRONMENTAL MONITORING

- Project : *Analysis of Polar Pesticides*
- Investigators: Christina Robb
- Summary: To develop analytical capabilities to analyze polar pesticides by LC-MS/MS. *Glyphosate*: Direct analysis using a specialty porous graphite carbon stationary was compared to a derivitization procedure for glyphosate analysis. The derivitization procedure was determined to be more reproducible. The derivitization agent is FMOC. Derivitization conditions and sample clean up were determined and a rugged LC-MS/MS method developed. Due to the high amount of buffer necessary for the derivitization procedure, tuning the instrument on the derivitized compound proved difficult.
Paraquat/Diquat: LC-MS/MS method development for the analysis of paraquat/diquat is underway at this time. The two options for analyzing these compounds by LC-MS/MS are 1) using an ion-pair agent in the mobile phase and using a standard C18 stationary phase or 2) using a HILIC stationary phase. Currently, the HILIC stationary phase is being investigated.

- Project: *Mechanisms of Uptake by Terrestrial Plants of Legacy Pesticides from Soil*
- Investigators: MaryJane Incorvia Mattina, William Berger
- Introduction: This project illustrates the overlap of service and research activities in the Department of Analytical Chemistry. In 1990 samples from our market basket survey were found to contain chlordane residues, although the registration for this insecticide on food crops had long been terminated. Our research has shown that some agrochemicals have measured half-lives in soil of years, decades, and, unbelievably, centuries in some instances. Back in 1990 we noted that not all the crops from a Connecticut organic farm contained the residues, and this observation has sustained the line of inquiry that we have pursued over the years.
- What is unique about *C. pepo*? We are not the only laboratory to report that *Cucurbita pepo* plants (zucchini) have a remarkable ability to uptake highly weathered residues of organochlorine compounds, including chlordane, DDT, and dioxins, from soil. Data from grafting experiments in our latest publication (MaryJane Incorvia Mattina, William A. Berger, Brian D. Eitzer "Factors Affecting the Phytoaccumulation of Weathered, Soil-borne Organic Contaminants: Analyses at the ex Planta and in Planta sides of the plant root" *Plant and Soil* doi 10.1007/s11104-006-9182-4 (2007)) proves that root physiology is the foundation of C. pepo's unique phytoaccumulation properties.
- Laboratory methods to investigate *C. pepo* uptake of pollutants: Uptake by squash of organochlorine compounds must be opportunistic since there are no nutritional needs for these substances in the plant. We have hypothesized that these substances "piggyback" on genetically-

based root physiology evolved for moving nutrients from *ex planta* regions across the root barrier to *in planta* regions. Our experiments have eliminated root exudation of organic acids as one possible nutritional pathway. To study the possible role of boron pathways as an uptake route for the pollutants, we have developed a technique to grow *C. pepo* on glass beads to mimic soil conditions. Plants are grown on very low boron content ballatini in a nutritionally complete Hoagland's solution for 3 weeks. Then this solution is drained and for some plants is replaced by nutritionally complete Hoagland's spiked with technical chlordane and for other plants with Hoagland's lacking boron but spiked with technical chlordane. After 24 hours under these regimes, the plant shoot is severed and xylem sap is collected (see Figure 2). Collection over 4 or fewer hours produces xylem sap with a distinctly different component pattern from that of the technical chlordane originally spiked (see Figure 3). We are designing experiments to ascertain if there is a correlation between this pattern and the boron status of the plants.

Figure 2. Collecting xylem sap

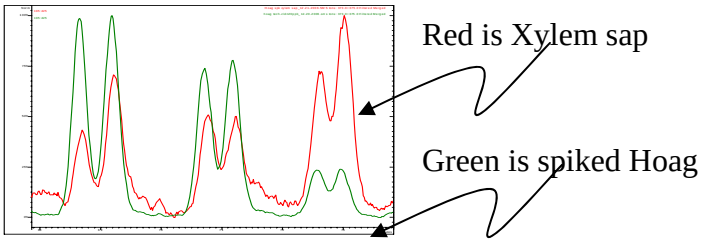


Figure 3. Comparison of in planta (red) with ex planta (green)

- Project: *Heavy Metals in Community Garden Soils*
- Investigators: David Stilwell, Craig Musante, John Ranciato
- We are conducting an ongoing program on the environmental impacts of lead (Pb) and other heavy metals in community garden soils and plants. Between 2004 and 2007, 174 soil samples collected from 25 gardens in 10 Connecticut cities and towns were analyzed for their heavy metal content. The results indicate that the levels of lead and arsenic in a number of community gardens exceed State guidelines. In eight gardens (32%) widespread contamination was found where the average lead (Pb) and or arsenic (As) levels exceeded State guidelines (400 mg/kg Pb, 10 mg/kg As). In 6 gardens (24%), sporadic contamination was indicated when one or more soil samples exceeded the Pb or As guidance level. In 11 gardens (44%), all of the soil samples were below 400 mg/kg Pb and 10 mg/kg As. Sampling of all community garden soils is recommended for lead and arsenic, and where warranted, remediation actions should be taken in order to decrease the potential lead and arsenic exposure among community gardeners.

- Project: *Heavy Metals in Plants from Community Gardens*
- Investigators: David Stilwell, Craig Musante, John Ranciato
- Though soil ingestion is expected to be the major source of exposure in contaminated gardens, consumption of plants grown in these soils is also important to consider. In this investigation, the heavy metal content in 10 community garden grown produce samples from 4

gardens, were compared to 18 store bought produce samples by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). The garden grown produce consisted of lettuce, broccoli, bell peppers, cilantro, collard and red cabbage. Soil samples from these gardens were also taken for analysis. The store bought produce included a variety of salad greens, cilantro, bell peppers, and collard greens. Comparison of the average amounts of the various heavy metals in store bought versus community garden produce showed that the only significant difference was in the lead content. The lead content (µg/kg) in all of the store-bought produce ranged from <10 to 94, and averaged 23±21, while it ranged from <10 to 2807 in the garden grown produce, averaging 505±205. Even though the lead was elevated in the garden produce, they were all below the international limits of 3000-8000 µg/kg. The cadmium levels in the plants exceeded foreign limits in both commercial and garden-grown cilantro, and in a commercial bell pepper. Thallium was only detected in high amounts in brassicaceae produce. The As, Cu, Cr, Ni, and Zn levels in all of the produce samples were within ranges which were not considered excessive. The heavy metal content was higher in the stem and leaf compared to the fruit or flower.

- Project: *Immobilization of Lead in Soil Using Phosphates*
- Investigators: David Stilwell, Craig Musante, John Ranciato
- The effectiveness of using phosphate-based compounds to immobilize lead (Pb) in soils is well established. This technique is based on the observation that insoluble Pb compounds are produced after adding phosphates. In this study, we used EPA method 1312, the Synthetic Precipitation Leaching Procedure (SPLP), to predict the relative effectiveness of three types of phosphate, ranging from soluble to highly insoluble (Sodium Dihydrogen Phosphate (NaP), Triple Super Phosphate (TSP) and Rock Phosphate (RP)) to bind lead in garden soils. Eight soil sets were used in this study. We found that even modestly contaminated garden soils (between 100-300 ppm Pb) can exceed the suggested SPLP limit for Pb (0.015 ppm). The threshold value calculated from a best fit linear relationship was 50 ppm. The average percent lead extracted was 0.7±0.4 from unamended soils, 0.3±0.1 in the RP amended soils at the 0.5% P level and 0.4±0.2 in the TSP amended soils at the 0.5% level. Thus, at the 0.5% amendment level for RP or TSP the lead extracted is reduced by roughly 50%. However, no benefit was found in reducing extractable Pb when using soluble phosphate in the form of NAP. The percent of P extracted from the soil with P treatment was quite significant in the TSP and NAP amended soils, ranging between 8% in 0.1% TSP to 16% in 0.1% NAP amended soils, and increasing to 15-35% in the 0.5% amended soils. Using no amendments or using RP as an amendment the % P extracted was around 1% or less. Clearly, using RP as an amendment was vastly superior to TSP and NAP in minimizing soluble P. However, the P levels in all of the SPLP extracts (unamended, RP, TSP and NAP) exceeded the USEPA 0.1 mg/l water quality criterion for total P in agricultural runoff discharging into streams. Use of RP as the P amendment was also superior to TSP and NAP in minimizing As extraction in As and Pb co-contaminated soils. In the context of potential runoff, this study suggests that RP performed best and should be the amendment of choice when developing remediation strategies to minimize both P and Pb in solution. Nonetheless, it is also clear that any action which reduces both the inflow of water into the soil and the direct runoff of water off the soil would reduce the amount of P and Pb in runoff feeding streams and lakes. An example of such remedial action would be to cover the soil with a geo-textile, followed by with 15-20 cm of mulch, which could be readily replenished as needed.

- Project : *Analysis of Pesticides in Honey Bee Pollen*
- Investigators: *Brian Eitzer and Kim Stoner (Dept. of Entomology)*
- Summary: This is a new project that was initiated during the past year in response to the recent dramatic losses of honey bee colonies from the newly described Colony Collapse Disorder. The fact is, that honey bees have been in decline for years. Stressors to honey bees include: poor nutrition, migratory stress, parasitic mites, hive beetles, bacterial and viral diseases, and the widespread use of pesticides. We are conducting research into how honey bees get exposed to pesticides through their foraging activities. A honey bee can travel up to two miles away from its hive as it collects pollen. It brings the pollen back to the hive for use as a food. During this time the honey bee can be exposed to any pesticides used in the residential or agricultural fields from which it collects. Although all pesticides can potentially stress the honey bees, there is a particular interest in a new class of pesticides know as the neonicotinoids, as one member of that class (imidacloprid) has shown significant honey bee toxicity and has been banned in several countries. Our first effort in this area is a study that is aimed at determining the current typical background exposure of honey bees to pesticides. We are collecting pollen from a set of honey bee hives that represent urban, suburban and rural locations. The pollen is brought to the laboratory where it is analyzed using a multi-pesticide screening technique that we have developed. The method is based on the QuECHERS procedures used in our fruits and vegetables residue work. The pollen extract is analyzed by liquid chromatography/mass spectrometry which has been shown to be both sensitive and selective. During the first year of this study we analyzed 110 pollens from six hives. There were 41 different pesticides or pesticide metabolites active ingredients observed in these samples. The concentrations of the pesticides were found to be highly variable. For example, in samples taken from the same hive the amount of imidacloprid went from 1 parts per billion (PPB) to 70 PPB then back to 1 ppb within a 1 week period. This would appear to indicate that this pesticide was used somewhere within the bees' 2 mile radius foraging area that week. A second study within this area is being initiated this year. We will examine how much of a systemic pesticide applied as a seed treatment prior to planting will be found in the pollen of the plant when it blooms. We will then compare the plant pollen with pollen collected by bees that are caged so that they can only forage from that field. We are also participating in a large multi-state, multi-institutional, research project on honey bee health that will be starting in the summer of 2008.

Figure 4. Honey bee collecting pollen

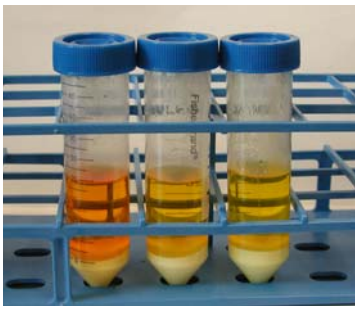


Figure 5. Pollen extracts ready for analysis

III. NATURAL PRODUCTS

- Project: *Analyses of Samples for Nootkatone*
- Analyst: Terri Arsenault, Drs. Kirby Stafford and Anuja Bharadwaj (Department of Entomology)
- The effectiveness of nootkatone, an essential oil of grapefruit and other plants, for control of the deer tick (Ixodes scapularis), the primary vector of a bacterial pathogen for Lyme disease, is being investigated.
- In year one (2008), applications were made at six different sites for two levels of active ingredient (twelve sites total) to track the degradation of nootkatone. Filter paper samples were laid prior to the application, then collected immediately and over a two to three week time period. The collection technique is presented in Figures 6 and 7.
- In year two, the goal is to develop a formulation that will be more persistent in the environment and thereby give better long-term control.

Figure 6. Method for field collection of applied nootkatone

Figure 7. Detail of collection device

PUBLIC OUTREACH

We assisted with a Yale graduate student's research project. Seven samples of water from Costa Rica were analyzed for pesticides. The only pesticide found was diethyltoluamide.

Telephone/internet inquiries: We receive frequent calls from the public requesting information on issues such as pesticides in food and in the environment, lead in paint, food, soils, and consumer products. In some instances we refer the caller to a more appropriate Station Department or State agency. We typically handle over 1000 such inquiries each year. As more persons gain access to the Internet, inquiries are coming from beyond Connecticut.

Station Bulletins: Station Bulletins are typically published annually by our Department. These bulletins are available in printed form and on the Station's web site. They are also available at libraries throughout Connecticut.

Fact Sheets: Listed on the Station's web site under "Publications" are several articles written for the general public regarding topics of timely and widespread interest. These are also available in printed format. Department members also cooperate with the Connecticut Department of Public Health in producing fact sheets published by them.

New Haven Sound School: Two members of our Department, Drs. David Stilwell and Brian Eitzer, serve on the advisory council of New Haven Public School's Sound School.

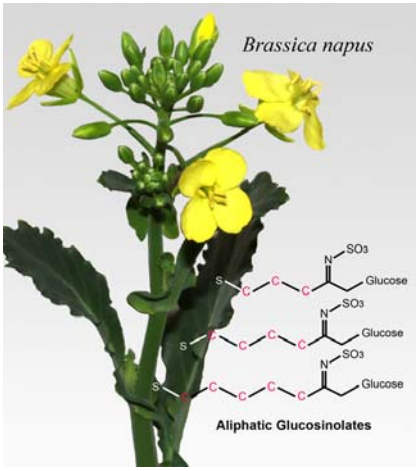
New Haven Public School Science Fair: This past year Walter Krol served as judge for this well established science fair.

MaryJane Incorvia Mattina designed and printed a Department of Analytical Chemistry brochure for distribution to visitors and others interested in a brief summary of our work.

DEPARTMENT OF BIOCHEMISTRY AND GENETICS

Genetic Manipulation of Glucosinolates in Brassica:

Dr. Neil McHale began work on genetic manipulation of glucosinolates in *Brassica napus* as a biological approach to suppression of soil-borne nematodes. The project is a collaboration with Dr. Ross Koning (Eastern CT State University), Dr. James LaMondia (Windsor Valley Lab), Dr. Christina Robb (Analytical Chemistry) with technical assistance from Regan Huntley.



Nematode control can be achieved through application of chemical fumigants to the soil, but these are restricted use pesticides with a variety of safety problems, both for farm workers and for residents of agricultural regions. Regulatory restrictions have prompted interest in sustainable methods of control, particularly those involving crop residues that break down to release nematicidal compounds in the soil. Plants in the mustard family are of particular interest because they produce a broad spectrum of nematicidal metabolites known as glucosinolates (GSLs). GSLs are derived from simple amino acids and by themselves have no biological activity, but when tissue is damaged by insect feeding, they come in contact with specialized enzymes called myrosinases that cleave the glucose moiety from the core molecule. This results in spontaneous rearrangements leading to formation of nitriles and isothiocyanates with biological activities against a range of pathogens and herbivores. Until now, the complexity of GSL profiles has precluded the assignment of biological activity to specific compounds, but the genes regulating nearly all aspects of GSL biosynthesis have now been identified in Arabidopsis, a closely related crucifer with a fully sequenced genome. These genes and their orthologs from Brassica are now available as experimental tools to address this question, and ultimately generate strains of B. napus with GSL profiles targeted to specific pests.

Two related transcription factors in the MYB family (MYB28, MYB51) have been identified as key regulators of aliphatic and indolic GSL biosynthesis in Arabidopsis. Our objective is to clone the orthologous genes from *B. napus* and generate transgenic strains where aliphatic and indolic GSL levels are elevated or repressed as experimental material for nematode suppression trials. Because aliphatic GSLs are most abundant and diverse, we are focusing first on genetic manipulation of this class, using transgenes that alter levels of MYB28 expression. Primers based on conserved regions of Arabidopsis MYB28 were used to amplify candidate cDNAs from the florets of the "Dwarf Essex" a high GSL/biennial strain of *B. napus*, and from "Sterling" a low GSL annual variety used for production of canola oil. Sequencing and mock translation of partial cDNA clones from both strains revealed an amino sequence with strong homology to MYB28 in Arabidopsis. New primers were designed for isolation of full length cDNA clones, and used to examine levels of MYB28 expression in the florets of "Dwarf Essex" and "Sterling" with a semi-quantitative RTPCR analysis (Fig. 1). Because canola varieties were bred for low GSL levels in seeds, our hypothesis was that "Sterling" would show lower levels of MYB 28 expression in florets, and this was in fact the case. MYB28 mRNA is detectable after 30 cycles of PCR amplification in "Essex" but not in "Sterling", and is at least 10-fold higher in "Essex" after 33 cycles. This confirms that MYB28 is a GSL regulator in Brassica, as in Arabidopsis, and suggests that breeding of low GSL canola oil varieties may have been accomplished through genetic repression of MYB28 expression in flowers and seeds.

Impact

Our immediate aim is to improve agricultural sustainability in the Northeast with a biological alternative to chemical pesticides. The stakeholders in this are the farmers, as costs associated with chemical fumigation can approach $500 per acre. Farm workers would also benefit immediately from reduced pesticide exposure. The broader impacts will extend well beyond this, however, to all U.S. citizens residing in proximity to agricultural operations. Non-chemical pest control strategies will be critical to maintenance of water quality and human health in these regions.

Protecting Honey Bee Hives from American Foulbrood Disease:

Dr. Douglas W. Dingman, assisted part-time by Cindy Musante, continued work on *Paenibacillus larvae* the causative agent of the disease American foulbrood (AFB) found in larvae of honeybeees (*Apis mellifera*). In collaboration with Mr. Ira Kettle (Connecticut state bee inspector) research to characterize the presence of AFB in Connecticut has been ongoing for one season. Bee samples were obtained from 35 apiaries comprising 96 beehives. Of these 96 beehives, 8 (8%) were visually diagnosed to have AFB. Using a microbiological assay, 41 other beehives (out of 73 hives tested) were found to have "sub-clinical" cases of AFB. At present, 67% of the beehives tested in Connecticut have AFB infections to varying degrees. This finding is in agreement with the findings of a national survey. In an assay to develop a simple identification procedure, 50 *P. larvae* isolates, obtained from these infected hives, were shown to have the same

ITS-PCR fingerprint. Genomic fingerprinting via PFGE has demonstrated three phylogenic types of *P. larvae* for 20 of the isolates tested. *P. larvae* type I was the most prevalent at 68%. Work to characterize this bacterium and produce a map showing geographical distribution of the disease and distribution of the various types of *P. larvae* is continuing. An investigation to develop a sanitation protocol for cleansing beehives of *P. larvae* spores has been initiated. Phase 1 of a 3-phase investigation has been completed and Phase 2 is nearing completion. In Phase 1, the sanitizing agent was shown to inactivate *P. larvae* spores in aqueous solutions within 20 minutes of exposure at the recommended concentration. In Phase 2, the effectiveness of the sanitizing agent to inactivate spores present on wooden supports and on beeswax surfaces is being tested. At present, inactivation has been found to be effective for the conditions tested. The start of Phase 3 will be dependent upon successful completion of Phase 2. In Phase 3, the effectiveness of the sanitizing agent will be examined under "real world" conditions and development of a standardized and simple protocol for use of the agent by beekeepers will be initiated.

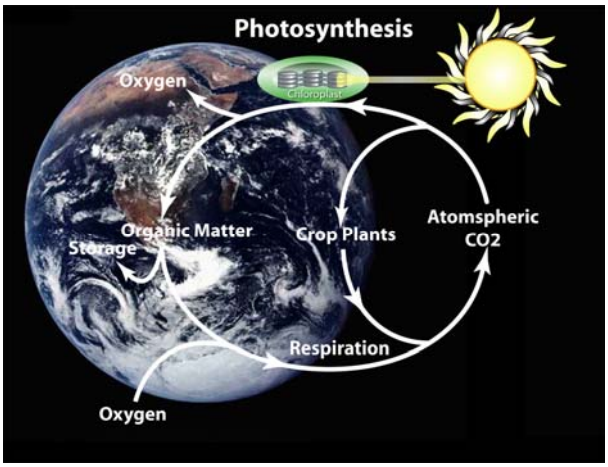
Genetic testing was also continued on insertional mutagenesis libraries of *Paenibacillus popilliae* and *Paenibacillus larvae*. These libraries provide a molecular tool for investigating and isolating genes of these two entomopathogens. Inverse PCR was demonstrated useful for screening of strains cataloged in the libraries and has helped extend sequences of several *P. popilliae* genes. Efforts to extend sequences of potential pathogenicity-associated genes are continuing. Collaborative research with Dr. Richard Cowles has been undertaken to compare locally isolated strains of *P. popilliae* to non-regional isolated strains for disease efficacy. In vivo production of spores is underway as the first step in this comparison. Development of a simple protocol to control infestations by use of locally obtained grubs that are identified as being naturally infected with *P. popilliae* is being considered.

Impact

American foulbrood is one of the most devastating diseases to beekeepers worldwide. This study will characterize the geographical distribution of this organism in Connecticut and has potential to develop a simple and effective sanitation procedure to minimize or eradicate the spores (i.e., disease) from infected hives. In July 2009, a new state law will restrict use of chemical pesticides on many public grounds. At present, there is no alternative to the use of chemical pesticides to control white grub infestations of turf. Biological control with *Paenibacillus popilliae* is environmentally sound. The main goal of this study is to improve the efficiency of *P. popilliae*.

Photo-Protective Mechanisms in Plants:

Dr. Richard Peterson and **Dr. Neil Schultes** continued their collaboration on light utilization and photo-protection in plants, with technical assistance from Carol Clark and Regan Huntley. Plant leaves are like solar panels, using solar energy for synthesis of carbohydrate from atmospheric carbon dioxide. Adverse environmental conditions, particularly water



deficit, result in physiological stress that diminishes photosynthesis and reduces the productivity of crop plants. When photosynthesis is curtailed, light is still absorbed, and now in excess, can lead to damage. Plants dissipate excess light predominantly through non-photochemical quenching (NPQ), a process mediated by the psbS protein, located in photosystem II (PSII) of the thylakoid membrane of the chloroplast. Our aim is to discern the mechanistic role of psbS in NPQ. Our approach is to undertake a structure-function analysis of psbS by generating site-directed mutations, introducing these altered genes into plants and measuring photosynthetic parameters.

Photoprotective Capacity in Relation to psbS Concentration :

The mechanism of action of psbS leading to expression of the rapid phase of NPQ (i.e., qE) remains a mystery. As a fundamental step toward understanding the role of psbS in qE, the relationship between *in vivo* psbS level and the amplitude of the qE phase were examined in normal and psbS overexpressor lines of Arabidopsis. Over a ten-fold variation in leaf psbS level we observed up to a nine-fold increase in qE. Leaf pigment analysis was crucial to interpretation of the qE-psbS relationships. Several interesting features of this relationship were evident: First, psbS levels in wild type leaves did not exceed a ratio of one molecule per active photosystem II center and qE levels showed no trend with variations in psbS concentration within this range. Secondly, deviation from an apparent linear dependence of qE on psbS level for the overexpressors was associated with low levels of zeaxanthin. Thirdly, a separate apparent cause of reduced qE capacity was a low ratio of antheraxanthin:zeaxanthin. These results will aid in interpreting the role of carotenoid excited states in the qE mechanism in collaboration with Dr. Harry Frank of the Department of Chemistry, University of Connecticut. Furthermore, this is an important step toward forming a basis for evaluating effects of discrete structural alterations to psbS.

We have re-evaluated the response to excess light by the psbS-deficient line of Arabidopsis, *Npq4-1*. This mutant is commonly assumed to lack photoprotective quenching. Nevertheless, we find that after prolonged illumination in bright light that light-dark changes in NPQ are about 50% of that observed in wild type leaves. We note that the kinetics on onset and relaxation of quenching are considerably slower in *Npq4-1*. These results are significant in that this psbS-deficient system offers a simplified alternative that may lack one or more distinct quenching processes present in wild-type material. Further experiments are planned to investigate the role of carotenoid composition and photosystem II antenna structure on this type of NPQ.

Site-Directed Mutation of psbS – Engineering Epitope Tags in psbS:

Through extensive searching of DNA databases, we were able to construct complete *psbS* unigene sequences representing 65 psbS genes from 44 plant species (Schultes and Peterson, 2007). An extensive phylogenetic analysis based upon these data revealed several conserved sites in the psbS protein as well as uncovering specific amino acid positions possibly linked to adaptive evolution. This analysis also revealed several potential positions in the highly conserved psbS protein that were variable and likely targets for inclusion of a short insertion of epitope sequences. A functional epitope tagged psbS molecule represents a valuable molecular tool for protein quantification, structure-function analysis and nearest neighbor studies. We have separately engineered a six-Histidine tag and a nine-amino acid HA tag at the N and C termini of

the mature psbS protein and within a hydrophilic stromal loop region. Transgenic Arabidopsis lines expressing the C terminal 6-His tag and N-terminal HA tag are available. Currently we are measuring the ability of these novel psbS-containing lines to perform qE portion of NPQ.

Altering Photosystem II Antennae Composition in Thylakoids

Seven different classes of light harvesting chlorophyll-b binding (Lhcb1-7) antenna proteins are associated with the photosystem II in thylakoids. Although much is known about their ability to absorb light, little is know about their direct role in NPQ. As primary gatherers of light energy it is likely that Lhcb proteins interact with psbS either directly or indirectly in a complex to dissipate excess light energy. We are genetically preparing Arabidopsis lines that contain specific Lhcb compositions and that will also have varied levels of psbS or epitope tagged psbS. These lines will be used for measuring qE portion of NPQ and other photosynthetic parameters. Arabidopsis lines containing homozygous T-DNA insertion knockout alleles of *Lhcb3* & *5*; *Lhcb3* & *6* and *Lhcb3* & *7* have been generated. Other combinations of Lhcb proteins will be generated through the use of virus-induced gene silencing technology. The Lhcb composition has a profound effect upon the structure of thylakoids. In turn, thylakoid geometry is likely to have profound effects upon NPQ and other aspects of photosynthesis including electron flow. The availability of these tailored lines will enable us to investigate different key aspects of photosynthetic light gathering.

Revealing the Site of Control of Electron Transport: Besides NPQ in the antenna system of PSII, a widely recognized control point for regulation of photosynthetic electron transport resides at the cytochrome b_6f complex situated between PSII and PSI. The rate of oxidation of plastoquinol by this complex is strongly dependent on the pH gradient across the thylakoid membrane. An alternative view holds that control actually occurs at the next step which is the oxidation of plastocyanin by the PSI reaction center. Our approach to resolving this issue is to measure the rate of PSI electron transport using *in vivo* transmittance changes at 810 nm as a function of plastocyanin concentration. In a related experiment, we have demonstrated that high qE values are attainable under ultralow illumination when CO_2 is omitted from the atmosphere. This exciting result sets the stage for measurement of rate of proton leakage across the thylakoid membrane for the intact leaf. These projects are being conducted in collaboration with Dr. Agu Laisk and colleagues at the University of Tartu, Estonia.

Impact

The main impact of this work will be development of crop plants able to withstand environmental stress. When water supply is limiting, the photosynthetic apparatus can be damaged irreparably by continuous exposure to sunlight. Genes under investigation here are critical to protecting plants from this damage. Our work has had a direct influence on the course of related ongoing work in the labs of Dr. Agu Laisk, Department of Cell and Molecular Biology, University of Tartu, Estonia and Dr. Harry Frank of the Department of Chemistry, University of Connecticut.

DEPARTMENT OF ENTOMOLOGY

The Department of Entomology is involved in a variety of service, research, pest surveillance, and regulatory activities. The primary service activities are provided through the Insect Inquiry Office. Staff in this office answer insect-related questions and identify insects and related arthropods for the public, government agencies, growers, and business organizations. All scientists provide information to citizens of Connecticut by answering telephone inquiries, making farm visits, participating in meetings of growers and other groups, and speaking on their research. Most of the research in the Department has a major applied aspect, addressing the integrated management of ticks; pests of field crops, trees, nurseries, and orchards, and wood-boring insects. Staff members also work closely with organic farmers and landscapers in Connecticut.

The Office of the State Entomologist at the Connecticut Agricultural Experiment Station, created by the Connecticut General Assembly in 1901, is part of the Department of Entomology with responsibility, in part, to ensure our nursery industry is free of plant pests and certify their products for shipment to other states and outside the United States. According to the latest census by the National Agricultural Statistics Survey, the Connecticut Green Industry (i.e., nursery, greenhouse, floriculture, sod, Christmas trees) is the largest agricultural business in Connecticut with a market value of $246 million in 2002. An economic survey by the New England Nursery Association indicated that sales by the Connecticut Green Industry surpassed $1.1 billion in 2005. In conjunction with regulatory activities, Department staff conducts a surveillance program in Connecticut for a variety of established pests like the gypsy moth and for exotic plant pests, some of regulatory concern, that represent a threat to our green industry, forests, and urban ornamental trees and shrubs. Surveillance for plant pests is performed in partnership with the United States Department of Agriculture through the Cooperative Agricultural Pest Survey (CAPS) program and the U.S. Forest Service. One example is the surveillance for Ramorum blight, a fungus-like pathogen that can affect many plants, but that can be particularly devastating to oaks. Other examples are the forest health surveys and statewide aerial survey for gypsy moth defoliation and a gypsy moth egg mass survey. The results of our plant and forest surveys may be found later in the Department's research activities along with summaries of our regulatory activities.

The staff of the Department of Entomology also takes the lead in providing extensive outreach activities for the Experiment Station by providing information to both children and adults about the Experiment Station's research at public events, health fairs, and agricultural fairs, such as the Eastern States Exposition (Big E) in Springfield, MA, the Connecticut Public Television Family Science Expo, Celebrating Agriculture, Yale Peabody Museum's Biodiversity Day, Sikorsky Aircraft's Earth Day, and the Connecticut Flower and Garden Show. Honey bees, butterflies, wood-boring beetles and/or ticks continue to be popular exhibits at these events.

Visitors view the butterfly display at the Connecticut Flower and Garden Show (Photo by Rose Bonito) Feb.2008

SERVICE ACTIVITIES

Insect Inquiry Office: **Dr. Gale Ridge**, **Rose Hiskes**, **Rose Bonito**, and **Marisa Gillio** answered questions from the public. The insect inquiry office in its present form has provided services for over 40 years. Insect identification services date back to the earliest days of the institution starting with the first Annual Report of the Connecticut Agricultural Experiment Station published in 1877. The station announced that is was offering to "identify useful or injurious insect…..and to give useful information on the various subjects of Agricultural Science for the use and advantage of the citizens of Connecticut".

Left: Marisa Gillio, Dr. Gale E. Ridge, and Rose Hiskes (L to R) answer inquiries and identify samples in the insect inquiry office. Right: The insect inquiry office receives student tours to explain the functions of the office, research in the department, and career opportunities in Entomology.

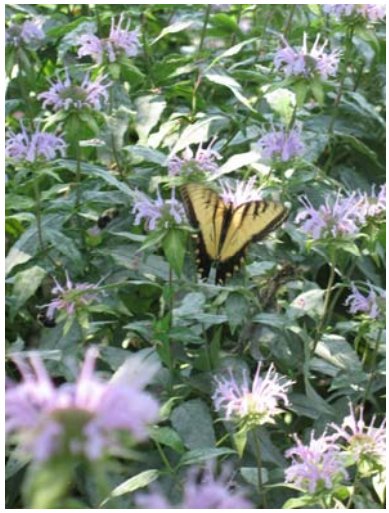
Between July 31, 2007 and June 30, 2008 the insect inquiry office served 6,030 people with identification of over 750 different insect, arachnid, animal species, and diseases. Most of the inquiries were from visitors (49.7% of total) to the office followed by telephone calls (40.3%), mail (8.8%), and e-mail (1.2%). Questions were related to food (9%), pests of humans or a person's dwellings (32%), or natural resources (59%). While termite inquiries dropped dramatically and requests for information on other household insect pests, such as pantry pests, wasps, carpenter ants, and carpenter bees also declined, household pests still remained the leading pests of concern. Human bed bug inquiries have continued to increase in number and are one of the most important insects of household concern. Delusory parasitosis remained a leading inquiry, because many cases were physician referred. Boxwood leafminer, two-spotted spider mite in the northern half of the state, and pine bark adelgid inquiries were also elevated. Ticks, primarily the blacklegged tick *Ixodes scapularis*, had the highest number of specimens submitted for identification (3,113 and not included in the previous totals). Most ticks are processed in a different laboratory at the Experiment Station, but many specimens were submitted through the insect inquiry office. The office served private citizens, pest control operators, the real estate

industry, nurseries, land care businesses, arborists, health departments, other medical professionals, museums, municipalities, libraries, state government, and the news media.

Several new fact sheets were produced by **Dr. Gale E. Ridge** on bed bugs, carpenter ants, and the cat flea. A new service for Spanish speakers has been very popular. The bed bug fact sheet has been translated into Spanish and portions of the tick management handbook have been translated into Spanish, as well. Gale also helped illustrate a new Fly Management Handbook by **Dr. Kirby Stafford**. **Rose Hiskes** answered 2,179 of the inquiries from pest control operators, nursery growers, and the public and prepared fact sheets on the orange-striped oakworm, the lily leaf beetle, and winter moth.

Impact: Stakeholder concerns about a variety of insects, spiders, other arthropods, animals and diseases were addressed. Proper identification provided residents with guidelines for control if necessary and so reduced stakeholder concerns. Information was provided on integrated pest management avoiding chemical control where possible. Correct identification also provided an opportunity for interception of exotic pests into the state of Connecticut.

Bird and Butterfly Garden: The Bird and Butterfly Garden is a partnership of the Federated Garden Club of Connecticut, the Spring Glen Garden Club of Hamden, and The Connecticut Agricultural Experiment Station. Maintenance and improvements to the garden are done by farm manager **Richard Cecarelli** and his staff. **Rose Bonito**, **Jeff Fengler**, **Rose Hiskes**, and **Vickie Bomba-Lewandowski** are involved with the garden as is the Spring Glen Garden Club which provides monthly care by its members. The garden is open to the public Monday-Friday 8:30am-4:00pm, it is closed on the weekends and state holidays. The garden creates several favorable habitats for our native birds, butterflies, and pollinating insects and helps us determine which plants may work best in Southern Connecticut gardens. Plants are labeled for easy identification. The Bird & Butterfly Garden at Lockwood Farm is listed in the Nature Conservancy Open Days Directory for New England.



Young and old enjoy strolling in the Bird and Butterfly Garden. The *Echinacea purpurea* Purple coneflower is being investigated by this young child. An Eastern Tiger Swallowtail enjoys *Monarda fistulosa,* Lavender Bee Balm (Photos by Rose Bonito).

Rose Bonito, **Jeffrey Fengler**, and **Michael Thomas** observed 16 different butterfly species, 2 species of moth, 20 species of birds, 3 species of dragonflies, and 1 Eastern Cottontail rabbit and 1 White-tailed Deer in the garden on Plant Science Day August 1, 2007.

Butterflies, moths, birds and dragonflies observed on Plant Science Day, August 1, 2007.

Butterflies	*Birds*	***Dragonflies***
Cabbage White	Eastern Bluebird	12-spotted Skimmer
Orange Sulphur	Canada Goose	Black Saddlebags
Clouded Sulphur	Killdeer	Widow Skimmer
Monarch	Barn Swallow	
Northern Broken Dash	Cedar Waxwing	
American Lady	American Robin	
Eastern Tiger Swallowtail	BlueJay	
Common Sootywing	Song Sparrow	
Pearl Crescent	Red-tailed Hawk	
Tawny-edged Skipper	Mourning Dove	
Peck's Skipper	European Starling	
Question Mark	Northern Mockingbird	
Great Spangled Fritillary	American Goldfinch	
Silver-spotted Skipper	House Finch	
Red Admiral	Northern Cardinal	
Spicebush Swallowtail	Tree Swallow	
	Gray Catbird	
Moths	Turkey Vulture	
Hummingbird Clearwing	House Sparrow	
Bumblebee Clearwing	Red-winged Blackbird	

Sponsored Meetings and Conferences: **Rose Hiskes** is the state survey coordinator for the federally supported Cooperative Agricultural Pest Survey (CAPS) program. The State CAPS Committee met at the Valley Laboratory of The Connecticut Agricultural Experiment Station on June 12. This committee is charged with protecting Connecticut's agricultural commodities and natural environment from exotic insects, weeds and diseases. Twelve people, representing foresters, diagnosticians, Connecticut Agricultural Experiment Station staff, Cooperative Extension staff, and USDA PPQ staff attended the meeting to discuss possible surveys for the state for 2009.

Phytophthora ramorum remains a major concern because the biggest agricultural commodity in our state is the nursery and landscape industry. Also of concern are the wood-boring beetles that threaten trees in our state: the emerald ash borer and the Asian longhorned beetle.

Dr. Kimberly Stoner organized several farming oriented conferences; the Community Farming Conference, Getting Started in Organic Farming Conference, and IPM for Organic Vegetable Farms.

Community Farming Conference (February 9, 2008, Jones Auditorium, New Haven). This event for community groups across the state that are developing or have community farms drew 60 people from 11 community farming groups. The keynote speaker was Bryan O'Hara of Tobacco Road Farm, Lebanon, CT who spoke on "Farming for Survival." Other speakers were Brianne Casadei of Terra Firma Farm, Stonington, CT, on the role of animals on an educational farm; Mark Palladino, of Bristol's Farm, Canton, CT, about how he works with elementary school groups,; and Jiff Martin, of the Working Lands Alliance, on how community groups can work with the farmers and officials of their town to make their town more "farm friendly." This conference was organized with assistance from CT NOFA and Bill Duesing.

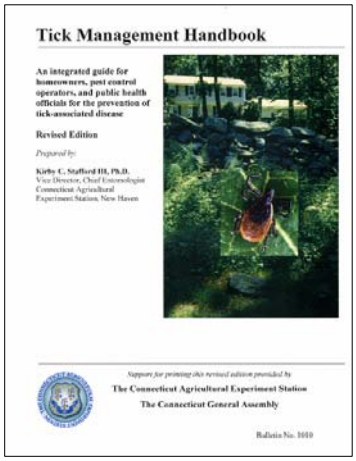
Getting Started in Organic Farming Conference (February 16, 2008, Jones Auditorium, New Haven). This event for beginning farmers or farmers who want to transition to organic practices was attended by 28 people. Ryan Voiland of Red Fire Farm in Massachusetts was the keynote speaker, with a presentation entitled, "From Backyard Garden to Full Scale Farm." Other speakers were Bill Duesing, of CT NOFA, on soil health; Rob Durgy, of the University of Connecticut, on organic weed management; and Don Franczyk, of Baystate Organic Certification, on the process of certification as an organic farm.

IPM for Organic Vegetable Farms (June 30, 2008, Fort Hill Farm, New Milford, CT). Over 60 people attended this on-farm workshop, where **Dr. Stoner** spoke on organic insect management and distributed resource materials on organic vegetable farming, soil building, cover crops, and organic disease management, and Paul Bucciaglia, the farmer at Fort Hill, led a tour of his farm emphasizing his cover cropping and weed management practices. Sponsors included - Fort Hill Farm, Northeastern IPM Center's Vegetable Working Group, CT NOFA, CT Agricultural Experiment Station, and the Natural Resources Conservation Service. Funding for this event was provided by the Northeast IPM Vegetable Working Group and the Connecticut Department of Agriculture's Ag Viability Grant Program.

RESEARCH ACTIVITES

Community Program for the Prevention of Lyme Disease: **Dr. Kirby Stafford and Dr. Anuja Bharadwaj's** 4-year project, funded by the Centers for Disease Control and Prevention (CDC), ended in March 2008. The research focus in the last full tick season of the project (summer 2007) was larger scale field trials of the entomopathogenic fungus *Metarhizium anisopliae* Strain 52 for the control of the blacklegged tick, *Ixodes scapularis* (commonly known as the deer tick) as reported last year. This tick is the vector for the Lyme disease spirochete (*Borrelia burgdorferi*), the protozoan that causes human babesiosis (*Babesia microti*), and the agent of human granulocytic anaplasmosis (*Anaplasma phagocytophilum*). The majority of Lyme disease cases (75%) are acquired in the residential landscape, primarily through the nymphal stage of *I. scapularis* and, therefore, our studies have been and continue to be conducted primarily at home sites.

Natural Products and Entomopathogenic Fungi for Tick Control: Application was made to CDC in late fall 2007 for funding a new project evaluating natural products for tick control. **Dr. Kirby Stafford** and **Dr. Anuja Bharadwaj**, Department of Entomology, The Connecticut Agricultural Experiment Station, were awarded the CDC cooperative agreement, which began April 1, 2008. The purpose of this new project is to evaluate natural products, particularly a compound from Alaska yellow cedar (and other sources) called nootkatone for the control of *I. scapularis*. Another objective is to develop new extended duration formulations of the compound to improve efficacy in the field. The formulation work will be done in cooperation with Dr. Robert Behle at the USDA-Agricultural Research Service laboratory in Peoria, Illinois. In addition, work with the fungus *M. anisopliae* will continue under this project. We also will examine the possible use of the two materials together as part of an integrated tick management program. A new revised edition of the Tick Management Handbook was printed (7,500 copies) with the support of the Connecticut Office of Policy and Management and the Connecticut General Assembly this past year. It also is available on the Experiment Station's website.


Tick Management Handbook

An integrated guide for homeowners, pest control operators, and public health officials for the prevention of tick-associated disease

Revised Edition

Prepared by:

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Vice Director, Chief Entomologist
Connecticut Agricultural Experiment Station, New Haven

Support for printing this revised edition provided by
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Bulletin No. 1010

Dr. Anuja Bharadwaj began studies on the survival and efficacy against *I. scapularis* and of the fungus *Metarhizium anisopliae* Strain 52 (Met52) with Dr. Stafford in 2004 and experimental trials continued through 2008 with the assistance of **Heidi Stuber** and summer workers **Lindsley Colligan** and **Katherine Dugas**. The fungus is now being developed commercially in an oil-based emulsifiable concentrate (EC) the control of grubs and ticks under the label Tick-Ex (Novozymes Biologicals, Inc., Salem, VA). Nootkatone is a component of the essential oil from the heartwood of Alaska yellow cedar, *Chamaecyparis nootaktensis*, which has much greater activity against *I. scapularis* than the oil itself. Nootkatone is repellent and kills ticks at a very low concentration (0.003%), but a higher rate (1-2%) appears necessary in the field. The compound is available as a synthetic and an extract from grapefruit. In June 2008, a field trial with 1.3% nootkatone was conducted at home sites in Salisbury, Canaan, and Cornwall. We were also interested in determining if the fungus could compliment the nootkatone for tick control. A mixture of 0.1% nootkatone was tank mixed with Tick-Ex at a rate of 2.6 fl. oz. per 1000 square feet and applied at 5 sites. A total of 12 sites were sprayed, while 11 other sites (residences) served as control areas where no application was made. Ticks were collected at all sites through a summer to evaluate activity. Nootkatone was effective for control of nymphal *I. scapularis*. With a high rate (1.3%) of nootkatone, 100% control was achieved after three days of application. Nootkatone combined with fungus brought 76% control in tick populations after three days of spray. Nootkatone appears to lack a long-lasting effect in the field as the percent control declined to only 68% within 12 days. Evaluation of nootkatone residues was conducted in cooperation with the Department of Analytical Chemistry. The filter papers caged in chicken wire/ mesh were spread at the time of application at the treatment sites to be recovered at set intervals of time. The analysis was done by gas chromatograph/mass spectrometry (GC/MS) techniques. The preliminary data also show that nootkatone degrades rapidly and penetration of leaf litter appears important. Work is being done on developing new extended duration formulations of Nootkatone to improve efficacy in the field.

Impact: Results of the field experiment show that nootkatone has a potential to be developed as a natural tick control product. Work needs to be done to devise an extended release formulation for nootkatone so that it can last longer in the field to control ticks.

West Nile Virus Antibodies: **Dr. Louis A. Magnarelli**, **Dr. John F. Anderson**, Dr. Sandra L. Bushmich (UConn, Storrs), Dr. Michel Ledizet (L^2 Diagnostics), and Dr. Raymond A. Koski (L^2 Diagnostics), assisted by **Tia Blevins**, **Bonnie Hamid**, and Dr. Nathalie Bonafe (L^2 Diagnostics), continued their studies on detecting antibodies to the West Nile virus in vaccinated and naturally exposed horses. Results of a newly developed enzyme-linked immunosorbent assay (ELISA) were compared with those of a plaque reduction neutralization assay (PRNT). The latter is considered the "gold standard" method for laboratory diagnosis of encephalitis virus infections. Earlier work showed that results of both tests were highly concordant (91% agreement). More recent studies indicated little or no cross-reactivity of antibodies to *Borrelia burgdorferi* (the bacterial agent for Lyme disease) or of antibodies to *Anaplasma phagocytophilum* (the bacterial agent for granulocytic anaplasmosis) in tests for West Nile virus. Four horse sera from undiagnosed, ill animals in 1995-1996 reacted positively in an ELISA for West Nile virus antibodies but were negative by a PRNT. It was originally thought that these horses might have been exposed to the West Nile virus or a closely related virus before the first documented outbreak of West Nile virus infection documented in Connecticut and Bronx, New York during 1999. Specificity tests, conducted in two independent laboratories (The Connecticut Agricultural Experiment Station and New York State Department of Health in Albany), revealed non-specific binding of antibodies (false positive reactions) for these four sera in the ELISA. In general, prevalence of false positive reactions was infrequent, and together with PRNT, the ELISA was judged to be suitable for prescreening large numbers of horse sera.

Impact: The newly developed ELISA is being used experimentally to test horse sera for West Nile virus antibodies. The methods are being modified to detect antibodies to other encephalitis viruses in mammals.

Vectors for West Nile Virus: **Dr. John F. Anderson's** current research is focused on control of vectors of West Nile virus (WNV), the extrinsic incubation periods for horizontal and vertical transmission of WNV by various species of mosquitoes, and the control of bed bugs using insecticides and trapping. He currently is evaluating EPA registered and commercially available biological insecticides that can be used for the control of larval mosquitoes in catch basins. *Culex pipiens pipiens* and *Culex restuans*, which are naturally infected with WNV, develop in relatively large numbers in catch basins. Experiments are being carried out in Stratford, CT. One product showing initial promise is VectoMax^{TM} WSP, which contains the bacteria *Bacillus sphaericus* and *Bacillus thuringiensis*, subspecies *Israelensis*.

Culex pipiens pipiens L., infected *per os* from a membrane feeder, transmitted West Nile virus at 26^{o} C horizontally during feeding to hamsters and suckling mice and vertically to F1 progeny during egg deposition. Horizontal transmission rates increased with extrinsic incubation with 75 to 100% of the females transmitting on days 16 through 25 post-infection (pi). No females deposited eggs infected with WNV following the first blood meal on 3-8 days. Females vertically transmitted WNV during egg laying following their second, third, and fourth blood meals on days 13 to 33 pi. The sequence of horizontal and vertical transmission was determined. Females may transmit WNV (1) horizontally to a host during feeding and subsequently vertically to her offspring during egg laying, (2) vertically to her offspring during oviposition without prior horizontal transmission to a host, and (3) horizontally to a host

without vertically transmitting the virus. These two means of transmission by *Cx. p. pipiens* contribute to the relatively high minimum infection rates that are reached in late summer and to the survival of virus during winter and initiation of amplification in the spring in the northeastern United States. We are currently studying extrinsic incubation periods for WNV in *Aedes vexans, Culex salinarius, and Aedes sticticus,* relatively common species in Connecticut that have been found naturally infected with WNV.

Bed Bug Monitoring: Bed bugs, *Cimex lectularius*, are becoming increasingly abundant in Connecticut. We have tested a pit-fall trap for capturing bed bugs. This trap emits CO_2, heat, and various chemicals such as 1-octn-3-ol and short-chain fatty acids, such proprionic, butyric, and valeric acids mixed with L-lactic acid as attractants. We captured more than 9,000 bed bugs in a vacant apartment during a one month trapping period. The trap was manufactured by BioSensory, a Connecticut company located in Putnam. In addition, we have established laboratory colonies of bed bugs from New Haven and East Hartford as well as a colony of bat bugs, *Cimex adjunctus* from Southbury. We have begun testing the effectiveness of various EPA-registered insecticides for control of bed bugs.

Impact: New methods for monitoring and control of mosquitoes and bed bugs will reduce the risk for West Nile virus and the burden bed bugs pose on people, particularly in public housing.

Surveys for Invasive Foreign Insects: In 2007, **Dr. Chris Maier** and his summer assistants, **Evelyn Silva** and **Justin Beaty**, conducted USDA-funded surveys to determine if the apple tree tortrix (*Archips podana*), the summer fruit tortrix (*Adoxophyes orana*), and the sirex wood wasp (*Sirex noctilio*) were established in Connecticut. The tortrix moths, which are fruit pests as caterpillars, were not captured in pheromone traps deployed in Hartford and Litchfield Counties. The wood wasp, which, along with its symbiotic fungus, has killed hard pine trees in several eastern states, also was not discovered in the surveys in Fairfield, Hartford, and Litchfield Counties, where Lindgren funnel traps baited with ethyl alcohol and alpha-pinene (the scent of pine) were deployed. Based on the absence of these insects in traps, fruitgrowers and foresters in Connecticut presently do not have to worry about these destructive foreign pests.

Dr. Chris Maier examines a Lindgren funnel trap that was used to capture longhorned beetles and wood wasps.

In 2007 and 2008, **Dr. Maier**, assisted by **Tracy Zarrillo**, **Morgan Lowry**, and **Rebecca Tellar**, found many new sites where alien insects were established. In particular, they determined that four leaf-cutter bees (*Anthidium manicatum, Anthidium oblongatum*, *Megachile sculpturalis* (see picture below), and *Osmia cornifrons*) are widespread in southern New England. Distributional and flower-visiting records for these bees may assist in determining their impact upon native bees and their usefulness as pollinators of agricultural crops. Dr. Maier also obtained new distributional records for other non-native insects, including the oak-bush cricket (*Meconema thalassinum*), an herbivorous ladybird beetle (*Subcoccinella vigintiquatuorpunctata*), the lily leaf beetle (*Lilioceris lilii*), a honeysuckle-boring beetle (*Agrilus cyanescens*), and the spruce needleminer (*Batrachedra pinicolella*).

In another study, Dr. Maier and his assistants documented that the European barberry fruit fly (*Rhagoletis meigenii*), a near relative of the destructive apple maggot fly, occurs wherever its hosts grow in Connecticut. Its larvae, or maggots, infest fruits of European and Japanese barberries, two invasive shrubs. Based on trapping with yellow sticky panels in 2007, they determined that the adult flight period extends from late June to the end of July. This fly may have potential as a biological control agent.

The giant resin bee, *Megachile sculpturalis* , a species introduced from Asia.

Longhorned Beetles in Southern New England: The discovery of the Asian longhorned beetle (*Anoplophora glabripennis*) and the small Japanese cedar longhorned beetle (*Callidiellum rufipenne*) in live trees in the upper Northeast has focused attention on longhorned beetles (Coleoptera: Cerambycidae) and their impact. Between 1998 and 2007, **Dr. Maier** and his assistants determined the host range of eight native and two exotic longhorned beetles that infest landscape plants in the Cupressaceae by rearing 5,806 adults of 10 species from the wood of four native and six introduced cupressaceous plants. The small Japanese cedar longhorned beetle, a pest in Connecticut, had the broadest host range, developing in nine woody species.

Current investigations are designed to ascertain the distribution, the larval and adult food habits, and the adult flight period of common longhorns whose larvae bore into plants in southern New England. Dr. Maier has estimated that about 225 species of longhorned beetles could reside in Connecticut. By combining data from trapping, rearing, and museum collections, they have documented the presence of 187 species (83% of the potential total) in the state. In all, Dr. Maier and his assistants have reared 60 species from dead wood collected in New England, and examined the adult seasonal activity of 80 species. They are developing a database, which now has over 5,800 entries with biological data. The fundamental information derived from this comprehensive study should help to determine where borers occur, what types of wood are at risk of attack, and when the adults are active.

Pesticides in Pollen: **Dr. Kimberly Stoner**, with assistance from **Nate Brettschneider**, and in collaboration with **Dr. Brian Eitzer** of the Analytical Chemistry Department and **Ira Kettle**, the state bee inspector, has been collecting pollen from honey bee hives in four locations across Connecticut. Dr. Eitzer is analyzing the pollen to determine levels of pesticide contamination. This research begins to address the concerns of beekeepers that changing patterns of pesticide use, including systemic insecticides that may contaminate nectar and pollen, are playing a role in the long-term decline of honey bees and other pollinators.

Pollen collected from a honey bee hive using a special pollen trap.

Caterpillars in Cole Crops on Organic Farms in Eastern Connecticut: As part of a project funded by the Northeast Sustainable Agriculture Research and Education Program, **Dr. Stoner**, with assistance from **Nate Brettschneider** and **Tracy Zarrillo**, has been collecting caterpillars from crops in the cabbage family from the field

and rearing them out to determine levels of naturally occurring parasitism. She has also been putting out sentinel populations of cross-striped cabbageworm, reared in the laboratory, to measure the rate of parasitism of this species through the year. The cross-striped cabbageworm, *Evergestis rimosalis*, is a relatively new species in Connecticut, spreading to our state from the southeastern U.S. in the late 1990's. Dr. Stoner's work shows that at least one key natural enemy of this pest, the parastic wasp *Cotesia orbenae*, has spread to Connecticut along with its host caterpillar.

Small Japanese Cedar Beetle: **Dr. Claire Rutledge** continued her investigation of two aspects of *C. rufipenne*'s chemical ecology in collaboration with Dr. Lawrence Hanks of the University of Illinois, Urbana-Champaign and Dr. Jocelyn Millar of the University of California, Riverside and their students. *Callidiellum rufipenne* is native to eastern Asia and was discovered in live arborvitae in Connecticut in 1998 by Gale Ridge, Carol Lemmon and Dr. Chris Maier. The borer has since established in the southern half of Connecticut. *C. rufipenne* is found most frequently on plants in the families Cupressaceae and Taxodiaceae. Males recognize females by means of a contact pheromone in the female's epicuticle. We have identified the contact pheromone as the branched, saturated hydrocarbon 5,17 - dimethylnonacosane. We also continued work on the function of the male-produced volatile pheromone. It appears to be a short-range aggregation pheromone which could potentially be exploited as a monitoring tool.

Mate guarding by *C. rufipenne*

Bronze Birch Borer: Bronze Birch Borer, *Agrilus anxious* Glory, a native insect, requires stressed living trees to develop, and thus frequently attack birches in landscape and nursery settings. The beetles cause considerable aesthetic and financial damage to homeowners and nurserymen in Connecticut. In addition, the beetle is a con-gener of the invasive pest the Emerald Ash Borer, *A. planipennis* Fairmaire and information about the natural enemies, ecology and host location behavior of BBB could potentially be exploited to help control EAB. Results from summer 2004 suggested that borers can discriminate between stressed and healthy trees. **Dr. Rutledge** began to sample and analyze the air surrounding healthy and stressed birches in cooperation with Dr. L. Hanks of the University of Illinois and **Terri Arsenault** of the Department of Analytical Chemistry to attempt to isolate the attractive compounds. Another project comparing the mating behavior of BBB, EAB and Two-lined Chestnut Borer, *A. bilineatus* (Weber), another native con-gener, is being done in collaboration with Juli Gould of USDA APHIS and Melody Keena USDA FS. The mating behavior of EAB is very similar to both BBB and TLCB except that EAB mates for 1 hour and BBB and TLCB mate for only 5 minutes. While the significance of this fact is still unknown, it suggests differences in the ecology of the beetles which may be exploitable for control measures.

Mordellidae Attraction to Methyl Salicylate – Published this past year, large numbers of the tumbling flower beetle, *Falsomordellistena bihamata* (Melsheimer), were found in 2004 and 2005 on traps baited with sweet birch oil, whereas significantly fewer individuals were found on control traps. In both years, peak captures were at 680 degree days$_{10}$C. Trapping was conducted in Naugatuck State Forest in Naugatuck, CT. Little is known about the ecology and biology of

the tumbling flower beetles (Coleoptera: Mordellidae), and the larval food plant for this species is not known. Thus, we cannot say why the beetle is attracted to sweet birch oil. Sweet birch oil is ~99.8% methyl salicylate (MeSA). MeSA is found constitutively in large quantities in some plants, but it is also an important signal in, and product of, plant stress-response pathways. MeSA has been found to attract both herbivores that need stressed plants as food and natural enemies of herbivores in stressed plants. To our knowledge, this is the first report of mass trapping of a tumbling flower beetle.

Emerald Ash Borer – In collaboration with the CAPS program of USDA APHIS, **Dr. Rutledge** with the assistance of **Mioara Scott** is conducting a survey for Emerald Ash Borer, *A. planipennis* Fairmaire. Twenty traps specifically designed to attract EAB, purple panel traps baited with manuka oil, have been deployed throughout the state focusing on vulnerable areas such as ports, importers and campgrounds. To date no beetles have been found.

Emerald Ash Borer mating (photo by C. Rutledge).

NURSERY AND PLANT INSPECTION ACTIVITIES

Plant inspection and regulatory services are coordinated and conducted by State Entomologist **Dr. Kirby Stafford**, Deputy State Entomologist **Dr. Victoria Smith**, Plant Inspectors **Peter Trenchard**, **Stephen Sandrey**, **Jeffrey Fengler**, **Tia Blevins**, and Apiary Inspector **Ira Kettle**.

Nursery Inspection and Certification: Three-hundred and sixteen nurseries were certified to conduct intra- and interstate business. There were 748 nursery inspections during the growing season. Eight-thousand, seven-hundred and four acres of nursery stock were examined as well as plants growing under 32,753,879-sq. ft. of greenhouse space. The majority of plants were grown in hoop houses (28,408,300 sq. ft.), followed by plastic greenhouses (2,642,447 sq. ft.) and glass greenhouses (1,703,100 sq. ft.).

Nursery Insects: The most abundant pests found in nurseries were lacebug on *Pieris, Rhododendron* and *Azalea*, mites on various trees and shrubs, black vine weevil *(Otiorhynchus sulcatus*) on *Taxus*, aphids on various trees and shrubs, Rhododendron leafminer on *Rhododendron* and Arborvitae leafminer on *Thuja.*

Nursery Dealer Permits: Nursery dealer permits were issued to 181 firms. One-hundred and fifty-five of these companies operate individual outlets. The remaining businesses have more than one outlet each. In total, there were 552 outlets.

Phytosanitary Certificates: Three-hundred and sixty-three phytosanitary inspection certificates were issued covering the shipment of the following plant materials to destinations outside the United States:

Plants	Number
Apples (Cartons)	11,700
Bulbs & Tubers (Dahlia, Lilium, Gladiolas)	1,170
Chinese tree peonies (plants)	2
Greenhouse plants	831
Nursery stock (containers)	255,039
(bare root plants)	6
Orchids (plants & flasks)	4,872
Perennials (bare root plants)	3,460
(plants)	21,900
Seeds (cartons & bags)	80
Tobacco (bales, boxes, bundles & cartons)	128,415

Japanese Beetle Certification: We observed treatments of 262,823 plants at one nursery and issued phytosanitary certificates to comply with states that quarantine nursery stock from Connecticut because of the Japanese beetle, *Popillia japonica*. One nursery, which met the containerized nursery stock accreditation program requirements of the United States Japanese Beetle Harmonization Plan, shipped 2,500 plants to other states in 2007. Three nurseries met other requirements of the United States Japanese Beetle Harmonization Plan and shipped 2,282 plants to states that quarantine plants from Connecticut.

Japanese Beetle Certification to Canada: Twelve Connecticut nurseries, which met the inspection requirements of the US/Canada Japanese Beetle Harmonization Plan, shipped 294,231 plants to Canada in 2007.

Insect and Environmental Problems: We assisted nurseries and private citizens with the following problems in 2007:

1. Inspected an arborvitae hedge for a homeowner who suspected *Callidiellum rufipenne*, Small Japanese Cedar Longhorned Beetle. Beetle activity was confirmed.
2. Inspected firewood for a homeowner for insect activity.
3. Responded to a call about feral honey bee activity in a tree on a state right of way.

Special Inspections: Twenty inspections were made for 208 individual plants and bulbs to assist homeowners moving out of state. Two tobacco growers had 123.5 acres inspected for the aerial application of pesticides. Eighteen post-entry inspections were carried out on 24,650 plants at 4 locations. At two sites, 1,822 plants were released from quarantine. Two-hundred and nine inspections were made to assist nurseries moving the following plants interstate:

Plants	Number
Perennials (plants)	262,823
Nursery stock (containers)	2,500
(bare root plants)	1,759
(B & B)	1,710
Corn seed (pounds)	50
Geraniums	2,493
Greenhouse plants	523
Hemlock logs (Board feet)	60,000

INSECT AND DISEASE SURVEYS

In cooperation with federal agencies such as USDA-APHIS-Plant Protection and Quarantine and USDA-Forest Service, we conduct surveys for a number of exotic pests that may threaten the health and productivity of Connecticut agriculture and forests. These efforts are directed for early detection of introduced pests and diseases, which would facilitate rapid eradication and clean-up. Asian longhorned beetle, Emerald ash borer (mentioned earlier), Sirex wood wasp, Chrysanthemum white rust, daylily rust, and Ramorum leaf blight are just some of the insects or diseases that we survey for.

Forest Health Monitoring: During the summer of 2007, we examined 51 permanent, one-acre forest plots that were established to monitor forest health in Connecticut. These plots are located on state, Nature Conservancy, and municipal water company properties. We considered 25 pathogens for monitoring and determined which trees served as host plants. Within each plot, 20 to 30 trees were tagged for long-term studies. We evaluated signs of defoliation and disease, such as dead tree branches, limbs and crowns. Descriptions and determinations are designed to reflect increasing damage or tree decline. We measure the trees at Diameter at Breast Height (DBH) as an additional way to monitor their health. We will continue to use these plots to monitor the forests over several years to assess whether our state forests remain healthy or are declining. In addition, we conduct aerial surveys for damage due to gypsy moth, orange-striped oakworm, forest tent caterpillar, and anthracnose disease. In general, our forests remain healthy.

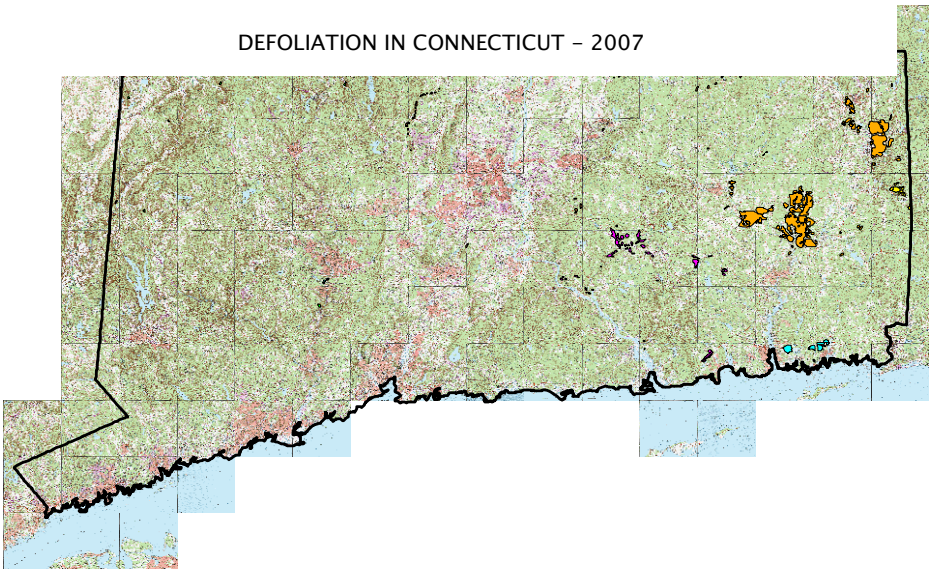
Gypsy Moth: Our annual aerial survey for gypsy moth defoliation was conducted by **Dr. Smith**, **Peter Trenchard**, and **Tia Blevins** in July-August 2007 and covered 1.8 million acres of urban/suburban forest in all eight Connecticut counties. Gypsy moth defoliation of 3,203.57 acres was found in four counties (see Table). This was substantially less than the previous year when 251,946 acres in five counties were defoliated.

County	Total Acres
Hartford	737.57
Middlesex	268.50
New London	1687.80
Tolland	509.70
Total	3,203.57

In November and December, a gypsy moth egg mass survey was conducted in 80-95% favorable host sites on a 7 -mile grid (102 sites) throughout Connecticut. At six sites, egg masses were found in low numbers that may indicate a build up in population.

*Orange-Striped Oakwor*m: The Orange-striped oakworm, *Anisota senatoria*, is a native moth that ranges from eastern Canada southward to Georgia. It is a common pest of oak species in Connecticut. Occasionally, local infestations occur when oaks have been stressed by other factors such as drought or gypsy moths. Serious defoliation can occur when this happens. The moths lay up to 500 eggs on the undersides of an oak leaves in early summer and are attracted to artificial light. The caterpillars feed on the foliage, and then they burrow into the soil and build an earthen cell, where it pupates and passes the winter. On September 18, 26, & October 1, 2007, a statewide aerial survey was conducted for orange-striped oakworm defoliation. Defoliation was found in Windham County (13,955.10 acres) and in New London County (8090.70 acres). Total acres defoliated were 22,045.80.

Forest Tent Caterpillar: The Forest tent caterpillar, *Malacosoma disstria,* is a native insect found throughout the range of hardwood forests in North America. It is more abundantly distributed in eastern North America, but is also common in western areas that have large stands of aspen. At times, this insect can be a damaging defoliator of trees. Trees that are defoliated often flush a new, smaller set of leaves in July. While forest tent caterpillar does not typically cause mortality to host trees, mortality can occur when populations interact with other disturbances, such as drought or insect outbreaks. Forest tent caterpillar larvae use silk to form trails and to create pads on host trees where they congregate and rest. During 2007, an outbreak of Forest tent caterpillar resulted in the defoliation of 27.6 acres in Litchfield County and 1010.7 acres in Windham County. A total of 1037.7 acres were defoliated.



Gypsy Moth – RED
Tent Caterpillar – YELLOW
Orange Striped Oakworm – ORANGE
Drought Damage – BROWN
Forest Hemlock Woolly Adelgid – GREEN
Unknown – BLUE

Asian longhorned beetle, *Anoplophora glabripennis*, first discovered to be attacking trees in August of 1996 in New York, has spread to within 25 miles of Greenwich in southwestern Connecticut. There is risk for beetle entry in ports because of the transportation of solid wood packing material on ships coming from areas of the world where this beetle is found. We, therefore, concentrated additional survey efforts in Connecticut in the areas of Bridgeport, Groton, New Haven and New London as well as their surrounding parks that contain a high percentage of maple, a favorite food source of the Asian longhorned beetle. All surveys and identifications, thus far, were negative. We also inspected trees for 1 homeowner in 2007.

Asian Longhorned Beetle Survey 2007

County	# Inspections	# Trees Inspected	# Infested Trees
Fairfield	5	307	0
Middlesex	1	20	0
Hartford	1	1	0
New Haven	10	1,280	0
New London	19	1,475	0
Totals	36	3,083	0

Hemlock Woolly Adelgid: The hemlock woolly adelgid, *Adelges tsugae*, remains an important pest of hemlock in Connecticut, spreading northward since its coastal detection in 1985 and infesting all 169 towns in the state. During 2007, we required all hemlock nursery stock that was being shipped out of Connecticut to be treated for Hemlock woolly adelgid. Two nurseries shipped hemlock trees out of state. Our inspectors observed treatments and issued phytosanitary certificates to cover 1,710 plants in these shipments. We also certified 60,000 board feet of hemlock logs that were shipped to states with a quarantine.

Pine Shoot Beetle: During February, 2007, Lindgren Funnel traps were set up for Pine shoot beetle. Fifty traps were set up statewide and were monitored at two week intervals through mid-May. One adult Pine shoot beetle was found in the Town of Thompson in Windham County. All of Connecticut has been added to the national Pine shoot beetle quarantine because of the presence of Pine shoot beetle in Massachusetts and Connecticut.

County	Traps Set for Pine shoot beetle	Pine shoot beetles caught in traps
Fairfield	17	0
Hartford	1	0
Litchfield	18	0
Tolland	5	0
Windham	10	0

Ramorum Leaf Blight: Ramorum Leaf Blight is a serious plant disease that attacks many types of plants and trees common to Connecticut. It is currently known to occur in the Pacific Northwest on oaks, azaleas, big leaf maples, huckleberry, California bay laurel, camellia, myrtles, honeysuckle, Pacific madrone, Douglas fir, rhododendrons, and viburnum. It does not affect humans and is not a food safety concern. Sudden oak death is caused by a pathogen called *Phytophthora ramorum*. The pathogen is not a fungus or a bacterium, but a member of a unique group of organisms called Oomycetes. Oomycetes share some characteristics of fungi but are biologically different. As part of the *P. ramorum* National Nursery Survey, we inspected 23 nurseries during the 2007. During this survey so far, 35,500 plants have been inspected and 222 samples from symptomatic plants were submitted for lab analysis. All samples were cultured and tested by ELISA; DNA from ELISA-positive samples was tested by nested PCR in the CAES NPPLAP Certified Lab. One garden center that had a positive plant in 2006 was included in the survey as part of the Confirmed Nursery Protocol. All samples from the nurseries as well as samples from the garden center were negative for *P.*

Rhododendron showing symptoms of infection with *P. ramorum* (photo V. Smith).

ramorum. The garden center will be under the CNP until 2008.

An aquatic survey was done in conjunction with the US Forest Service. Two streams were chosen for baiting: one near a location where positive plants were found in 2004 and buried in 2005, and one not near any potential sources of *P. ramorum* contamination. Streams were baited with rhododendron leaves during May through September 2007; the baiting period was about 2 weeks each month. Leaf baits were submitted for testing to labs in Mississippi and at Cornell University. All leaf baits were negative for *P. ramorum*.

Warehouse Survey for Wood Boring Insects: In early 2007, we conducted a trapping survey of 15 Connecticut warehouses in 5 counties to detect the possible presence of exotic wood boring insects. Lindgren funnel traps, with a chemical lure, were placed in the warehouses and checked bi-weekly for insect activity. No exotic insects were found.

Daylily Rust: A rust fungus (*Puccinia hemerocallidis)* was found on daylilies in a southeastern U.S. nursery for the first time in the summer of 2000. It was found in Connecticut in 2001 and 2002 on daylilies owned by private citizens. It is now confirmed to occur in three counties. During 2007, we surveyed daylilies in nurseries and garden centers for signs of this rust. One hundred inspections were carried out on 616,605 plants. No signs of *Puccinia hemerocallidis* were found

Chrysanthemum White Rust: During 2007, we continued to survey for *Chrysanthemum* white rust disease, caused by the fungus, *Puccinia horiana*. We inspected 2,048,997 chrysanthemums raised by 310 growers and dealers for the presence of chrysanthemum white rust.

On September 11, 2007 we were informed of a possible infestation of Chrysanthemum white rust at a grower in Hartford County. On September 13 *Chrysanthemum* white rust was confirmed at the nursery. Following the initial find, two more nurseries (one in Fairfield County and one in New Haven County) were confirmed positive during inspections by Connecticut Agricultural Experiment Station inspectors.

Chrysanthemums showing symptoms of infection with *P. horiana* (photo V. Smith).

At each site where *Chrysanthemum* white rust was confirmed, all host material was inspected for any symptoms and suspect plants were sampled for confirmation of *Puccinia horiana*. Once plants were confirmed to have *Chrysanthemum* white rust disease, all plants of that variety were disposed of by either deep burial on site, or incineration at an approved facility. Once the disposition of the infected material was complete, the remaining host material was treated with a fungicide. After treatment, host plants were inspected again, treated with a fungicide 5-7 days after the initial treatment and then inspected a third time. Once this protocol was completed, the host material was released by the USDA.

Results of Confirmed Nursery Inspections

County of Confirmed Nursery	Number of plants inspected	Number of plants destroyed	Method of destruction
Hartford	4,000	368	Deep burial
Fairfield	1,860	1,480	Incineration
New Haven	3,200	291	Deep burial
Totals	9,060	2,139	

As we were completing the treatments on the confirmed nurseries, *Chrysanthemum* white rust was confirmed at a large *Chrysanthemum* supplier in New Jersey. Trace forwards showed that *Chrysanthemum* plants had been shipped to 13 locations in Connecticut. At all of these locations, which were large retail stores, host material was inspected and *Chrysanthemum* white rust was confirmed at 7 of these locations. An additional large retail store that was not on the trace forward list, but also received plants from the New Jersey supplier was also found to have *Chrysanthemum* white rust infected plants. All host material at each location was destroyed.

County	Plants confirmed with CWR	Number of plants destroyed	Method of destruction
Fairfield	352	425	Incineration
Middlesex	31	687	Incineration
Litchfield	59	59	Incineration
New Haven	42	2,325	Incineration
New London	35	418	Incineration
Total	519	3,914	

Apiary Certification and Inspection: Three-hundred and thirty-two beekeepers registered 2,628 colonies in 2007. **Ira Kettle**, our bee inspector, opened and inspected 605 colonies in areas known to have foulbrood disease. American foulbrood was found in 7 colonies. These colonies were destroyed.

County	Colonies Inspected	American Foulbrood Positive
Windham	129	
New London	161	
New Haven	86	2
Hartford	73	1
Middlesex	49	
Litchfield	27	
Fairfield	52	4
Tolland	28	
Totals	605	7

Varroa mites were present in all colonies, treated or untreated. Varroa mites are now established statewide in Connecticut. During 2007, 400 honey bees from 2 apiaries in the towns of Ledyard and Wilton were examined in the laboratory for the tracheal mite, *Acarapis woodi*. There were no positives for tracheal mites.

DEPARTMENT OF FORESTRY AND HORTICULTURE

Agriculture in Connecticut has seen vast changes in recent decades. Tobacco and dairy farming, once the largest agricultural industries, have diversified with vegetables, nursery stock and Christmas trees. Concurrently, the marketing of produce has shifted from wholesale contracts with local supermarkets to direct retail sales. There are approximately 560 farms which offer a variety of fruits, vegetables, bedding plants, and Christmas trees at roadside stands and sales rooms. About 120 of these are open all year. Nearly 30% of these farms offer pick-your-own fruit and vegetables to reduce the cost of harvest labor. These savings are passed on to the consumer. There were 82 farmers' markets attended by 230 farmers in 2006 compared to 22 markets in 1986.

As the popularity of farmers' markets in Connecticut have surged, so too has the need for growers to find a diversity of high-value niche crops. Consumers used to a wide variety of fruits and vegetables in large supermarkets are demanding a greater diversity of ethnic and specialty crops at farmers' markets and roadside stands. Since 1983, The Connecticut Agricultural Experiment Station has been investigating specialty crops to provide new opportunities for Connecticut's farmers. Cultivars of over 30 fruits and vegetables have been field-tested resulting in 36 publications. The crops studied include globe artichoke, Belgian endive, radicchio, pak choi, specialty melons, sweet potato, okra, and Chinese cabbage. Crops that were chosen have a high market value and an existing or expanding market that would readily accommodate these commodities.

Calabaza – Selection for Early Maturity: Calabaza squash, also known as tropical pumpkin, is mostly grown in tropical and semi-tropical climates. Calabaza is highly prized by consumers of Hispanic origin. It was identified by the Connecticut Department of Agriculture as one of the most sought-after vegetables at Connecticut's 88 farmers' markets. **Drs. Abigail A. Maynard** and **David E. Hill** are developing a cultivar that produces fruit on shorter vines by saving seeds from plants that have produced fruit within 2 feet of the plant. These seeds are planted at Lockwood Farm and Windsor and selections are again made. Fruit that mature on short vines is appealing to northern growers because the majority of fruit can mature before frost. Fruit that form on longer vines do not always reach maturity. Last year, 84% of the plants at Lockwood Farm produced fruit within 2 feet of the plant compared to 67% of the plants at Windsor. Selections will continue for several more years.

Specialty Fruit Variety Trials: As wholesale marketing of major tree fruits becomes unprofitable, many Connecticut growers are turning to retail sales of their fruit. For a retail operation to be successful, there must be a diversity of products. Thus, many growers are interested in adding minor specialty fruits to their operations. In response to this grower interest, **Dr. Maynard** in 2001 expanded the New Crops Program at the Station to include fruits. This trial, also repeated at the Valley Laboratory in Windsor, includes 12 cultivar/rootstock combinations of Japanese plum.

Impact: The greatest yields were from Shiro (45.0 lb/tree) and Obilnaja (33.5 lb/tree). At a retail price of $1.99/lb, a planting of 242 Shiro trees per acre would yield a potential crop value of $21,670/acre. Long-term benefits include diversification and greater profits for fruit growers.

At the request of fruit growers, 306 beach plum seedlings were planted in 2003 at the Station's two experimental research farms. These seedlings were raised at Cornell University from seeds collected from 35 sites from Maine to Delaware.

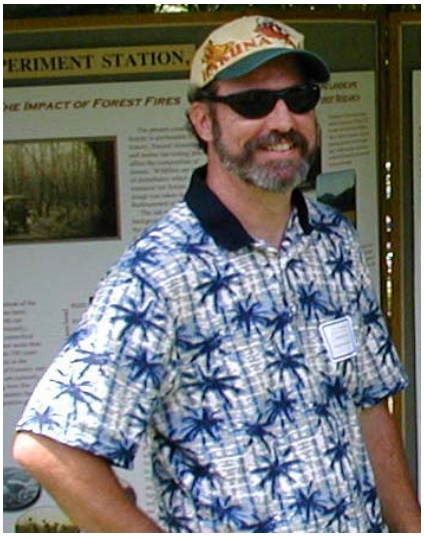
Impact: In 2007, heavy yielding plants produced as much as 36 lb/plant. At a retail price of $2.00/lb, there is an expected crop value of $52,270/acre. The immediate impact is that growers at two of Connecticut's largest farms are now growing beach plums, which can be made into a premium jam which sells for $6.40 for an 8 ounce jar. Long-term benefits include diversification and greater profits for fruit growers.

Personal-sized Watermelons Trials: The newest melons on the marketplace are seedless miniature "personal" watermelons, weighing 3-7 pounds each. Personal-sized watermelons offer an attractive alternative for small families or for consumers that have limited refrigerator space. Beside the smaller size, they also have a thinner rind, which reduces waste. In addition, researchers have found that lycopene and beta-carotene contents are abundant in personal-sized watermelons. Lycopene, an antioxidant, has been linked to the possible prevention of cancer and heart disease.

In 2007, **Dr. Maynard** evaluated the effect of black plastic mulch on the yield and size distribution of the cultivar Vanessa at Windsor and Mt. Carmel. Unlike larger watermelons, personal-sized watermelons are sold by the melon, not by the pound. Therefore, estimated yields were measured in number of fruit per acre. At both sites, there was a greater number of fruit per acre from plots amended with black plastic. This was primarily due to a greater average number of fruit per plant from plots amended with black plastic. The percentages of fruit in the 3-7 lb range from both treatments were virtually the same. Research will continue with evaluations of additional varieties and various cultural methods.

Impact: At Mt. Carmel, plastic amended plots produced an average of 4,535 more personal-sized watermelons per acre compared to unamended plots. At $4.99 retail price/fruit, the grower would potentially gross over $22,600 more per acre with black plastic mulch compared to no mulch. The long-term benefits include additional revenue for farmers and providing a product that has growing consumer demand. In addition, there may be health benefits for those who consume watermelon.

Garlic Trials: Garlic, a bulbous plant closely related to the onion, has a wide number of market niches and is used in great quantities for cooking. Consumption of garlic in the U.S. has risen from 0.5 pound per person in 1985 to 3.1 pounds per person in 1999. To meet that demand, acreage devoted to the production of garlic rose from 16,000 acres to 41,000 acres, a 156% increase. No other vegetable, including popular vegetables like onions, broccoli, and carrots, has exhibited such strong sustained growth. One factor contributing to this strong surge in use is the rising popularity of ethnic foods and proliferation of ethnic restaurants. In addition, there have been numerous news releases describing the health benefits of garlic.



Impact: Silver White had the greatest yields (1960 lbs/acre) and Romanian Red averaged 1851 lbs/acre. At a retail price of $2.50/lb, there is a potential crop value of $4,270/acre in Connecticut. The long-term benefits include additional revenue for farmers, especially those who attend farmers markets in urban areas.

Chinese Cabbage Trials: Local supermarkets have reported increased sales of Chinese vegetables. These sales coincide with the influx of immigrants from the Far East. Vegetables are staples in oriental cuisine and stir-fry cooking has become increasingly popular in the kitchen. In 1988-1989,

we tested 26 cultivars of Chinese cabbage at Lockwood Farm and Windsor. Most of these cultivars are no longer available and, since that time, new cultivars have been developed that are more disease resistant and produce higher quality heads. In 2007, 12 cultivars of Chinese cabbage were evaluated in spring and fall at Windsor and Lockwood Farm.

Impact: In spring, the cultivars Taranko (19.4 T/A) and Yuki (18.9 T/A) had the greatest yields. In fall, Apollo (17.8 T/A) and Mirako (17.3 T/A) had the greatest yields. At a retail price of $0.99/lb, there is a potential crop value of $38,400/acre. High yields of a quality product will benefit local growers and consumers by providing revenue for farmers, a nutritious food for consumers, and preservation of farmland.

Many municipalities in Connecticut with leaf collection programs in the fall are turning to farmers to dispose of their leaves. However, not all farmers have extra land to set aside for a standard composting operation. Instead, they layer undecomposed leaves on their fields and simply plow them under. This is called sheet composting. Nitrogen deficiency can be a problem in these soils because microorganisms involved in leaf decomposition use nitrogen more efficiently than plants. There is some question whether the differences in the rates of decomposition between oak and maple leaves would lead to differences in plant response when these leaves are used in a sheet composting operation. This is also a situation that confronts many home gardeners who have a predominance of oaks in their backyards.

Sheet Composting of Oak and Maple Leaves: To help answer this question, **Dr. Abigail A. Maynard** conducted a sheet composting experiment in which plots were amended with either all oak or all maple leaves. Undecomposed leaves were layered about 6 inches thick in the falls of 1994-2006 and incorporated into the soil by rototilling. Yields of lettuce, peppers, rutabaga, and leeks were compared to yields from the control plots where no leaves were added. All plots received the same amount of 10-10-10 fertilizer applied at the recommended rate for vegetable production (1300 lbs/A). In 2007, lettuce yields were virtually the same for all the treatments with heads averaging 1.5 lbs from plots amended with either oak or maple leaves compared to 1.4 lbs from the control plots. The plots amended with oak leaves averaged the greatest pepper yields (6.8 lbs/plant) compared to plots amended with maple leaves (6.0 lbs/plant) or the unamended control (5.6 lbs/plant). Plots amended with maple leaves averaged the greatest leek yields (9.3 oz/plant) compared to (7.6 lbs/plot) or oak leaves (6.1 lbs/plot). It appears that applications of oak or maple leaves are not very deleterious to vegetable production but the experiment will be continued to determine the effect of repeated applications of oak or maple leaves.

Heirloom Tomato Trials: Interest and sales of heirloom tomatoes have increased dramatically in the past 10 years. More and more consumers are willing to forego appearance for that real old-fashioned tomato taste. Knowledge of high-yielding cultivars and cultural details would benefit growers, especially those who serve inner city consumers who purchase these vegetables at local farmers markets throughout the Northeast. However, growing heirloom tomatoes can be a challenge. Heirlooms tend to have poor disease resistance and have lower yields when to compared to hybrid tomatoes. They are also more susceptible to cracking due to their tender

skin. In 2007, **Dr. Abigail A. Maynard** evaluated ten cultivars of early maturing ethnic heirloom tomatoes for yield and quality at Windsor and Mt. Carmel.

Impact: Yields of Thessaloniki and Bloody Butcher were greatest (17 and 13 lbs/plant, respectively) with Stupice averaging 12 lbs/plant. At a retail price of $1.99/lb, there is a potential crop value of over $122,000/A. The long-term benefits include an additional product and revenue for growers who attend farmers markets or have their own roadside stands.

Potted plants can be watered by sub-irrigation or ebb and flood watering, whereby water is supplied through the base of the pot by flooding the bench or floor on which the pots sit. Ebb and flood watering combats the waste of water and fertilizer in traditional overhead watering systems used in greenhouses for production of potted ornamental plants. All of the water that is not taken up by plants is recycled to a reservoir for use in the next watering cycle.

Effect of Recycling Compared to Discharge of Nutrient Solution Used to Produce Greenhouse Tomato: In 2006 and 2007, **Dr. Martin P.N. Gent** compared two systems for growing greenhouse tomato in rock wool medium supplied with a complete nutrient solution. In one system, all solution drained from the plants was recycled to water the plants again. In the other, all solution drained from the plants was discarded. There was a difference in the drained solutions that was most obvious after one month of recycling. Typically, the transition from vegetative to fruit growth, which coincides with warm season, resulted in over-supply of nitrate, potassium and other nutrients. It took a longer time to return the solution to an optimal composition with recycled compared to discharged solution. There was little effect on composition of tomato fruit, despite sometimes large differences in composition of nutrient solution. Total yield, fruit size and frequency of defects of the fruit varied among the three cultivars used in these trials, and the cultivars tended to differ in response to recycling. Re-selection of cultivars may be necessary if recycling becomes required or a more popular option for greenhouse tomato production.

Recycling nutrient solution, or reuse of solution after it has once been used to water plants, has become the preferred legislative solution to prevent ground water pollution due to the use of fertilizer in intensive agricultural production. Subtle and gradual changes in nutrient solutions could ultimately have deleterious effects on plant growth, product quality, and the dietary value of vegetables. We found that these changes do not necessarily lead to lower yield or deleterious changes in composition of vegetables.

Impact: There are many growers in Connecticut who use greenhouses to grow plants in pots or troughs filled with artificial medium using a regular supply of nutrient solution to promote rapid growth of the plants. While there are more than 50 growers who use greenhouses to grow tomatoes for direct retail to consumers from farm stands, none of them recycle used nutrient solution. Adoption of this new technology will enhance water quality by reducing the quantity of nutrients that reach our aquifers.

Winegrape growers and Farm Wineries face several challenges. Farm Wineries are required to grow a minimum of 25% of the fruit in their total output, but are having trouble meeting this standard. Consecutive very cold winters in 2003 and 2004 resulted in significant plant loss on less cold hardy cultivars, and have driven up prices for purchasing Connecticut and out-of-state fruit. Little information is available to growers regarding cultural information for growing more cold-hardy and disease resistant hybrid cultivars in the state. Disease management is critical during the growing season due to Connecticut's warm, humid summers. The industry requires increased production via better management practices in existing vineyards and improved variety selection in newly planted vineyards.

Winegrapes: Studies were initiated by **Dr. William R. Nail** in 2004-2008 to help determine cultural practices for growing high quality winegrapes profitably in Connecticut. The wine grape industry in Connecticut is rapidly expanding. The first Farm Winery in the state opened in 1979, and there are currently 22 wineries with a Farm or Commercial Winery license, with 2 or 3 more scheduled to open in the foreseeable future. The existence of these wineries adds substantially to local economies, as local restaurants, hotels, and other establishments receive increased business due to their proximity. The Connecticut Wine Trail brochure, published by the Connecticut Vineyard and Winery Association, is the most popular brochure in Department of Tourism travel offices.

*Cultural practices in Vitis vinifera***: Dr. Nail** established a planting of 288 Pinot Gris vines at Lockwood Farm in summer 2004. Two different rootstocks were used: 3309C, the most commonly planted rootstock, and 101-14, which may tend to ripen fruit earlier and have better tolerance to severe winter freezes. The first full crop was harvested in 2007, and cultural experiments will be initiated to determine better strategies for optimum yield and fruit quality.

Impact: Vines grafted to 101-14 rootstock had 32% less mortality due to winter freeze damage than those grafted to 3309C. Planting vines on rootstocks more resistant to winter damage can result in savings of $7.40 for each year of lost production per vine, plus $3.50 replacement cost plus labor involved in removing diseased vines and replanting. Vines will

be monitored for several years to observe incidence and severity of crown gall, whose symptoms sometimes do not appear until one to two years after a significant freeze event.

Cultural methods for reducing cluster compactness: Harvest rots are a major problem if climactic conditions are favorable for disease development between veraison and harvest. Based on field tests, the increased susceptibility of tight-clustered cultivars and clones is a result of cluster compactness rather than being genetic in nature. Reducing photosynthesis by leaf removal at bloom has been shown to reduce fruit set, resulting in looser clusters. However, since the leaves are permanently removed, this reduction in photosynthesis can have negative consequences for bud fruitfulness in the subsequent growing season. Studies with the herbicide Terbacil have shown that by temporarily reducing photosynthesis, fruit set can be reduced with no long-term negative consequences. Terbacil is not labeled for such a use, and if it were, it is extremely unlikely that a grower would confidently apply an herbicide to their crop. JMS Stylet oil is labeled for use on grapes as a fungicide and insecticide, and is used by many growers, especially organic ones. It has been shown to slightly reduce photosynthesis, but can result in lower fruit soluble solids if over applied.

Dr. Nail applied JMS Stylet oil at trace bloom in 2006 through 2008 to selected Pinot Gris vines. Single leaf photosynthesis measurements were made before and after application. Flower primordia on clusters opposite measured leaves were counted. Photosynthesis was reduced by an average of 18% the day after oil application compared to vines sprayed with water only, and fruit set on treated vines was reduced by an average of 20%. The experiment will be continued through pruning in spring of 2009 to ensure that there are no negative effects of this practice.

Effects of graft union height: Freeze damage to grafted grapevines frequently occurs at the graft union, which is typically very close to the ground. Crown gall frequently occurs on freeze-damaged vines, although symptoms may not appear for one or two years after the freeze event. Elevating the height of the graft union may result in less injury. Chardonnay clone 96 budwood was grafted onto 3309C rootstock at standard height and 26 inches higher in 2006, and the vines were transplanted in spring 2007 to vineyards at Lockwood Farm and Westport, Massachusetts. Vines will be evaluated for vine performance, winter survival, and crown gall incidence and severity in subsequent years.

Impact: Vines with crown gall typically require replacement. Vines requiring replacement result in average losses of $7.40 per year for three years due to crop loss, $3.50 for replacement vines, plus labor in removing infected vines and replanting. High-grafted vines may result in significant reduction in such losses, which would be approximately $2,070 plus labor per acre for each 10% of vine mortality. Funding for this project was obtained from the Viticulture Consortium East for 2006 and 2008.

Grapevines in most older vineyards in Connecticut are planted on six foot spacing and trained to a vertically shoot positioned system. This has generally worked well for most vinifera cultivars and some hybrids. Recently released hybrid cultivars that are rapidly finding favor frequently have different growth habits that make them unsuitable for this traditional spacing and training.

Within-row spacing of grapevines in the vineyard is one of the most critical decisions to be made at planting. Too close spacing results in excessive competition and excessive vegetative growth, leading to reduced yields of poor quality fruit. Spacing that is too far apart results in unproductive utilization of valuable vineyard space. The choice of spacing is permanent; however, errors made at planting can sometimes be partially remedied by dividing the canopy to accommodate vine growth. Divided canopies can increase yield per foot of row length, but are more difficult and labor-intensive to establish and maintain.

To evaluate spacing and training systems for new cultivars, **Dr. William R. Nail** established a new planting of the hybrid cultivars St. Croix, Cayuga White, and Traminette in May, 2005 at a private grower's vineyard in Wallingford. St. Croix and Cayuga White are among the most widely planted red and white cultivars, respectively, in the state, and Traminette is a relatively new release from the Cornell breeding program which shows much promise. Hybrid cultivars have different growth habits and management issues than vinifera cultivars, which may involve fundamental issues both before and after planting. Plants of all three cultivars were planted at 6 and 8 foot spacings, and will be grown on different training systems: low wire, Vertically Shoot Positioned (VSP), Hudson River Umbrella (HRU), Geneva Double Curtain (GDC), and a vertically divided canopy system such as Scott Henry. Those on 6 foot spacing will also be pruned to both cane and cordon systems.

Impact: The results of this study will allow both new and existing growers to help maximize their production, as well as possibly demonstrating that some systems are not efficient in Connecticut.

Pruning systems: Most grapevines in Connecticut have traditionally been cane-pruned. Cane pruning requires skilled labor, which is increasingly in short supply. Spur pruning to a cordon system requires less skilled labor and lends itself to mechanization. A planting of Seyval Blanc, Chambourcin, Villard Blanc, and Villard Noir at Lockwood Farm was rejuvenated in 2004, and vines were either cordon or cane pruned in 2005 through 2008 to compare the relative efficiencies of these pruning methods. Yield and fruit quality parameters were determined beginning in the 2005 harvest season at Lockwood Farm.

Impact: Cordon pruning is a viable alternative to the cane pruning method used in most Connecticut vineyards. Skilled labor costs, essential to cane pruning, are approximately 30% higher than unskilled labor costs. Of equal importance is the increasing unavailability of skilled labor. Vines will be monitored through the 2008 growing season to determine if there are differences in long-term vegetative or fruit quality parameters that may influence a grower's decision.

Cultivar and clonal evaluation: Beginning in 2004**, Dr. William R. Nail** has evaluated previously established experimental plots at Lockwood Farm, the Valley Laboratory, and two private grower's vineyards. The planting at Lockwood Farm contains only hybrid cultivars. One private vineyard was established to compare the *Vitis vinifera* cultivars Cabernet Franc, Merlot, and Cabernet Sauvignon. The plots at the Valley Laboratory and the second private vineyard compared different *V. vinifera* and hybrid cultivars. Data from these vineyards will continue to be collected through the 2008 growing season at Lockwood Farm and the private vineyard in Shelton. In each year, Riesling fruit was considerably less mature at harvest than any other white variety, indicating the need to harvest it later than other cultivars or, if all cultivars are treated the same, to consider not planting it.

Dr. Nail established new cultivar trials at Lockwood Farm and the Valley Laboratory in spring, 2008 to compare new cultivars of *V. vinifera* and hybrids to more established cultivars. There are 15 hybrid cultivars and 9 vinifera cultivars in the trial at Lockwood Farm, and 7 hybrid cultivars at the Valley Laboratory. This study is coordinated with researchers from other states throughout the country as NE-1020: Multi-State Evaluation of Winegrape Cultivars and Clones. This project should help answer the questions "What are the criteria for selecting a particular variety?" and "What cultivar(s) is (are) most suited to my situation?"

Cabernet Sauvignon has displayed high vine mortality and poor fruit quality due to lack of maturity. Growers have generally agreed that this cultivar is unsuitable for Connecticut conditions, and no significant new plantings are being established. Cabernet Franc and Merlot both produced good quality fruit, although yields in Merlot were slightly lower (4.2 vs. 4.0 tons/acre, respectively). While there have sometimes been differences among clone and rootstock performance, growing season effects are greater. At the Valley Laboratory and at the second private vineyard, white hybrid cultivars slightly outyielded most white vinifera cultivars, at 5.5 vs. 4.7 tons/acre There were no significant differences between hybrid and vinifera red cultivars.

Impact: The research suggests that vinifera cultivars are a viable option for vineyards not susceptible to winter freeze damage, as prices for vinifera average $1,380/ton vs $700/ton for hybrids.

Connecticut's landscape is a quilt of forests, farms, towns, and cities. Scientists in the Department of Forestry and Horticulture are studying the factors that influence both forest and farm productivity, including novel specialty crops, and the effect of the growing deer population on natural and managed landscapes. Connecticut has a strong link to the forest. Approximately 60% of Connecticut's land area is classified as forest. In addition to valuable non-commodity amenities (watershed protection, wildlife habitat, passive recreation), the forests are a valuable part of the local economy. Connecticut has a $500 million wood product industry of 350 firms that provide employment to 3,600 loggers, millworkers, and others.

Crop-tree management: Black birch (*Betula lenta* L.) has become an increasingly important component of northeastern forests in recent decades. **Dr. Jeffrey S. Ward** continued a study of crop tree management for black birch begun in 1996-1997. This was a cooperative study with CT DEP-Division of Forestry, Northeast Utilities, Regional Water Authority, and the Metropolitan District Commission. Plots were established in five stands to examine diameter and volume growth response of black birch to crop-tree release. The stands were from 20-99 years-old, and mean crop-tree diameters ranged from 4.8 to 13.8 inches. Growth of crop-trees was monitored for eight years. Over the eight-year period, diameter and volume growth of completely released poles (4.6-10.5 inches diameter) was twice that of unreleased poles. Increased growth was noted the first year after release and showed no indication of decreasing after eight years. Release did not affect diameter growth of small sawtimber crop-trees (10.6-13.5 inches diameter) until the third year after release. However, after eight years, diameter and volume growth was nearly forty percent greater than for unreleased trees. Release had negligible effect on diameter and volume growth of medium sawtimber crop-trees (> 13.5 inches diameter).

Impact: Initiating crop-tree management in young stands of black birch poles (mean diameter of upper canopy trees of 4.5 inches) would reduce by nearly 50% the time required to grow those trees to diameters of 13.5 inches., i.e., harvested volume could be nearly doubled with intensive management. The current high demand for firewood has made this management practice commercially feasible and was therefore highlighted at a field meeting in spring 2008 attended by professional foresters from Connecticut, Rhode Island, Massachusetts, and New York whose agencies collectively manage over 500,000 acres.

Two major threats to natural preserves and managed forests are exotic plant species and browsing by overabundant white-tailed deer (*Odocoileus virginianus*). While Japanese barberry

(*Berberis thunbergii* DC) has been widely reported in the popular literature to "displace" native plants, few studies directly examined the influence of alien invasive shrubs on native communities. There have been no studies to determine if native species were displaced by the invasive species, or conversely, if another factor (e.g., deer browse) removed the native species and invasive species exploited the open habitat.

Deer Repellent Study: **Dr. Jeffrey S. Ward** and **Dr. Scott C. Williams** continued a deer repellent trial that was begun in spring 2006 at two different sites within Connecticut. Deer repellents are most often strong and/or foul-smelling agents that are applied directly to plants in an attempt to prevent deer from browsing and ultimately damaging them. Repellents work in different ways: some make the animal nauseous, others taste very hot or bitter, while others are supposed to invoke fear. Ten different repellent formulations are being tested: Chew Nott®, Deer Away®, Big Game Repellent®, Plantskydd®, Bobbex®, Liquid Fence®, Deer Solution®, Hinder®, Repellex® systemic tablets, and coyote urine. Other repellent trials have been completed, but none as extensive with such a varied array of repellent types. At both sites, Windsor and Woodbridge, 144 yews (*Taxus*) were planted in 2006. Twelve yews at each site received one of twelve treatments (the ten different repellents, a fence, and untreated control). Manufactures instructions for repellent application are being followed. The yews have been harvested, stripped of their needles, stems cut up, and dried in a large oven in order to attain accurate dry weight biomass. Preliminary analyses indicate that there are differences in the effectiveness of the twelve different treatments.

Impact: Deer browsing costs the Connecticut nursery industry $3-4 million annually in direct damages, control measures, and lost sales. Several products appear effective and their use could decrease annual deer browse damage by $300,000 or more.

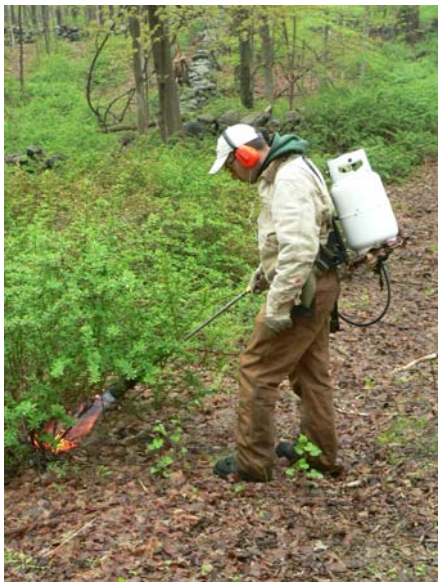
Japanese barberry control: Japanese barberry has spread beyond manicured landscapes and is naturalized in at least twenty-four eastern states. Throughout the region, especially where white-tailed deer populations are high, dense barberry stands develop in the forest understory. These dense barberry stands are associated with a paucity of both tree regeneration and herbaceous plants. Barberry may alter nitrogen cycling and thereby affect soil biota. A Maine study found black-legged tick (*Ixodes scapularis*) populations were twice as high under barberry as in adjacent forests. As black-legged ticks are associated with several diseases including Lyme disease, human granulocytic anaplasmosis, and human babesiosis, extensive barberry infestations may have an indirect, adverse effect on human health.

Drs. Jeffrey S. Ward and Scott C. Williams continued their studies of alternative methods to control Japanese barberry begun in 2006. This research both evaluated the effectiveness and relative costs among treatment combinations to control Japanese barberry, and by monitoring

individual clumps across a range of size classes, assessed whether treatment prescriptions are dependent on clump size.

Two study areas were established on a Regional Water Authority (RWA) watershed in North Branford, CT. Two study areas were established on the Centennial Watershed State Forest in Redding, CT that is jointly managed by the Connecticut Department of Environmental Protection, The Nature Conservancy, and the Aquarion Water Company of Connecticut. One study area was established on The Nature Conservancy lands in Salisbury, CT. The sixth study area was established in Storrs, CT on the University of Connecticut Experiment Forest. All study areas have extensive stands of mature Japanese barberry.

The three initial treatments to reduce the size of the established barberry clumps in spring 2007 were: prescribed burning, mechanical mowing with a drum chopper, and mechanical mowing with a brush saw. Barberry clumps missed by the drum chopper (adjacent to trees, stone walls, or large rocks) were cut with a brush saw.



The second, follow-up treatments for the sprouts that developed after the initial treatments in July 2007 included: foliar application of herbicide (triclopyr and glyphosate), directed flame (propane torch), and no follow-up treatment (control). Each follow-up treatment was applied over each initial treatment, i.e., separate sections of drum chopped areas were treated with triclopyr, glyphosate, propane torch, or left untreated. Per company policy, herbicides were not tested at RWA. Therefore, these follow-up treatments were used at RWA: directed flame (propane torch) during initial spring flush (late May), directed flame after initial flush completed (early July), directed flame during initial spring flush and again in late July.

All initial treatments were equally effective in reducing clump size. Mortality differed among follow-up treatments: untreated controls (14%), directed flame (40%), and herbicide (93%). Surviving clumps having no follow-up treatment recovered to half of their original size by the end of the growing season. Size of surviving clumps did not differ among the other follow-up treatments and averaged 20% of the original size. Excellent control of Japanese barberry can be achieved using either propane torches or herbicides. Propane torches provide an organic alternative where in parks, nature preserves, or forests where herbicide use is restricted and where barberry infestations are still light.

Impact: Developing cost-effective method of controlling Japanese barberry will allow large land owners to maximize the area treated each year. This research is partly funded by Regional Water Authority, Aquarion Water Company, and The Nature Conservancy. They collectively manage over 50,000 acres that include extensive areas of barberry.

Propane torches have been purchased to control barberry on lands managed by Connecticut DEP-Wildlife Division (22,000 acres), Colebrook Land Conservancy (566 acres), Northern Connecticut Land Trust (435 acres), New Hartford Conservation Commission (171 acres), and numerous private forest owners. Requests for information about this technique also have been received from the USDA Forest Service (Pennsylvania and New Hampshire), NRCS (Connecticut and Rhode Island), New York City – DEP Bureau of Water Supply, Moosehorn National Wildlife Refuge (Maine), Anacostia Watershed Society (Maryland), private natural resource managers, and the general public.

Deer Browse Exclosure Study: One method to study the impact of deer on natural ecosystems is to compare growth rates and species diversity of vegetation protected from white-tailed deer browse to unprotected plots. **Dr. Scott C. Williams** is collecting vegetation data within sixteen deer exclosures and sixteen adjacent control plots throughout the state. Deer exclosures prevent deer from accessing vegetation within. Growth rates and species diversity of enclosed vegetation are compared with that of an adjacent control plot, where deer have access to vegetation. The project is a collaborative effort with The Nature Conservancy to maintain and sample twelve deer exclosures, four each at Burnham Brook Preserve in East Haddam, the Bingham Easement also in East Haddam, and Devil's Den Preserve in Weston. We are also including four of our own exclosures on South Central Connecticut Regional Water Authority property in North Branford. Data analysis for fall 2005, spring 2006, fall 2006, spring 2007, fall 2007, and spring 2008 sampling periods indicate that herbaceous cover within exclosures is greater than control plots. Density of tree seedlings at least two feet tall is twice as high within exclosures compared to control plots. All locations will be resampled for both woody and herbaceous vegetation in late summer 2008. Results from this study will reveal plant species composition and growth rates in the absence of deer.

Impact: Overabundant white-tailed deer are negatively impacting forest health by altering species composition due to selective and over-browsing habits. Over time, this process will significantly reduce stand and land values of forestlands in Connecticut.

Interaction of Deer Browse and Barberry Infestations: The Japanese barberry (*Berberis thunbergii*) control study provided the unique opportunity to superimpose, at minimal expense, a study examining the separate and interactive effects of deer browsing and alien invasive species on native herbaceous vegetation and tree regeneration. At the North Branford, Redding, and Storrs study areas, **Dr. Williams** and **Dr. Jeffrey S. Ward** erected deer exclosures in May 2007 on plots that were treated with the Fecon mower, plots treated with the Fecon mower with propane torch follow-up, and on plots where the barberry was not treated. Each of the three treatments have an adjacent unfenced plot. For each treatment (total of six), regeneration and herbaceous vegetation was sampled using ten 4-m^2 circular plots inside and outside the exclosures (sixty plots total) in spring 2008. Vegetation will be continually sampled in early spring and late summer for multiple growing seasons. This study will determine whether it is white-tailed deer, Japanese barberry, both, or neither limiting native species regeneration throughout Connecticut.

Impact: Both Japanese barberry and white-tailed deer are invasive species that have detrimental impacts on Connecticut's native forested ecosystems. A better understanding

of the interaction between the two species can be used to promote improved forest health throughout the State.

Japanese Barberry Infestations as a Refuge for Blacklegged Ticks and White-Footed Mice: A Maine study found that blacklegged tick (*Ixodes scapularis*) populations were twice as abundant in barberry infestations as adjacent forests. **Drs. Williams** and **Ward** also suspected that barberry infestations would harbor increased abundances of white-footed mice (*Peromyscus leucopus*) due to protection from both terrestrial and avian predators. Because white-footed mice are the primary reservoir for *Borrelia burgdorferi*, the causal agent of Lyme disease in humans, there is the possibility that ticks found in barberry infestations would have higher infection rates. To investigate these hypotheses, mouse trapping grids (20 stations) were established each in areas of no barberry, areas where barberry was controlled, and areas of full barberry (60 total) at each of three locations throughout Connecticut (North Branford, Redding, and Storrs). All locations were trapped five times in summer 2007 resulting in 269 captures of 149 unique mice over 900 trap nights.

The same areas were also sampled for adult and nymphal ticks in the fall of 2007 and spring/early summer of 2008 using standard flagging techniques. Thus far, mouse abundances appear to be nearly the same in each of the three treatment areas, but mean larval ticks/mouse were higher in full barberry infestations (≈ 12 ticks/mouse) than in controlled barberry (≈ 10 ticks/mouse) or areas of no barberry (≈ 7 ticks/mouse). Adult tick densities were also highly correlated with Japanese barberry abundance. Blood samples taken from mice are currently being analyzed in **Dr. Louis A. Magnarelli's** serology laboratory for the presence of antibodies to *B. burgdorferi* as well as *Babesia microti*, the causal agent of human babesiosis and *Anaplasma phagocytophilum*, the causal agent of human granulocytic anaplasmosis. Ticks gathered from plots are currently being tested for the presence of *B. burgdorferi*. Mouse trapping and tick sampling efforts will continue for several more years to monitor long-term effects as generational turnover will result in a more accurate determination of the full effects of controlling Japanese barberry. A manuscript summarizing this research will be completed by fall 2008.

Impact: Japanese barberry is an exotic invasive plant that overwhelms the forest shrub layer and virtually eliminates other native plants. In addition, it harbors increased abundances of blacklegged ticks and diseases that can be transmitted to humans. Managing barberry infestations can improve the health of forests and the public citizens of the State of Connecticut.

GRANTS AND CONTRACTS OFFICE

The Grants and Fundraising Office, established in January 2007, was established to support Station scientists in seeking additional funding from government and foundation sources. Tess Foley is the Grants and Contracts Manager. In this capacity, Ms. Foley assists Station scientists to identify, prepare, and submit grant submissions for government, corporate, and private

foundations. She also works to establish strong relationships with corporate and private foundations on behalf of the Station.

In the first 8 months of 2008, Ms. Foley has assisted Station scientists in preparing and submitting 65 grant proposals. Station scientists from all departments are participating in the grant solicitation process.

During the past year, Station scientists have successfully received grant funding from the United States Department of Agriculture (USDA) and the Connecticut Department of Agriculture, Connecticut Department of Environmental Protection; Connecticut Sea Grant Program; U.S. Forest Service; U.S. Environmental Protection Agency; Centers for Disease Control and Prevention; Cooperative State Research, Education and Extension Service (CSREES); National Research Initiative; Texas A&M University; Propane Education Research Council; Sun Grant Initiative; First Light Power Resources; Project Apis m.; Webster Bank, Bashan Lake Association, and EnviroScience, Inc. Collectively, this grant funding totals over $959,275 received for Station research projects.

Additionally, the Station's grants office is developing relationships with significant companies and organizations including Webster Bank, First Light Power Resources, Sikorsky Aircraft Corporation, Community Foundation of Greater New Haven, and General Electric.

Through these new relationships, Station scientists have participated in corporate-sponsored events in Connecticut including Sikorsky Aircraft Corporation's Earth Day Event; General Electric's Employee Safety Day; Fairfield County Public Relations Association "Corporate Responsibility Goes Green"; and an informational direct mailing to Connecticut farmers with the Produce for Better Health Foundation.

The Station's newly founded non-profit 501(c)(3) organization, The Connecticut Agricultural Experiment Station Research Foundation, is in operation, providing Station scientists with the ability to seek funding from corporate and private foundations. This new CAES Research Foundation has successfully received funding from the Propane Education Research Council of $30,000 in support of Dr. Jeff Ward's work on Japanese barberry control; and from Webster Bank of $1,000 in support of the CAES Food Donation Program that contributes fresh fruit and vegetables to Connecticut's leading food banks. The CAES Research Foundation looks forward to continuing to develop strong relationships with individual donors and corporate and philanthropic foundations.

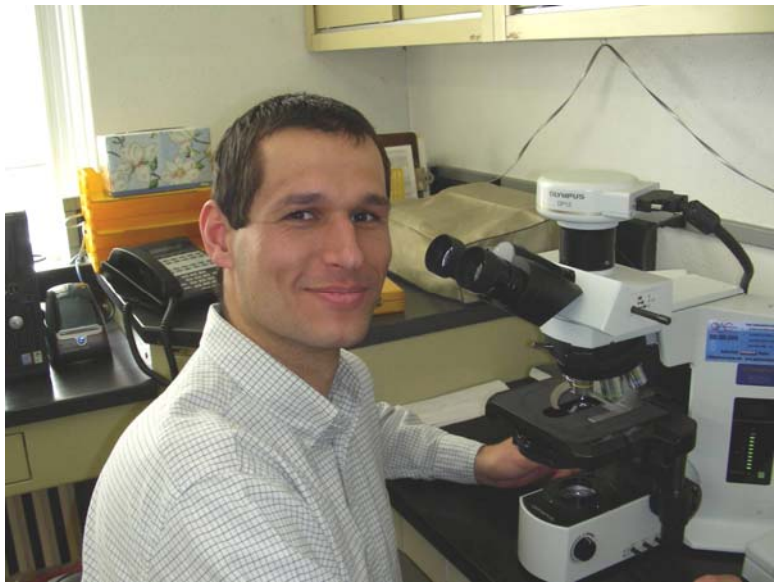
DEPARTMENT OF PLANT PATHOLOGY AND ECOLOGY

The Department of Plant Pathology and Ecology conducts research on the biology and ecology of plant pathogens and interactions between plants, pathogens, and the environment. Staff members also diagnose plant health problems for our stakeholders. Our mission is to

manage plant health problems using innovative methods to protect the environment, ensure a safe food supply, and maintain a healthy landscape for Connecticut.

Scientists in the Department of Plant Pathology and Ecology are involved in both service and research activities**.** Our service efforts focus on the diagnosis of plant health problems for all Connecticut residents, including homeowners, plant care professionals (e.g., arborists, landscapers, garden centers), and commercial growers (e.g., greenhouse, vegetable, nursery, orchard, and vineyard crops). We work closely with professionals and homeowners to develop disease management programs that require minimal use of pesticides and are compatible with the environment. The Department of Plant Pathology and Ecology has an active outreach program, which offers numerous fact sheets, web-based information, workshops, and presentations for grower groups, garden and horticultural clubs, special interest groups, and students. Our research efforts include original, basic investigations in many areas of plant pathology including the ecology and genetics of plant pathogens, new and emerging diseases, and models for predicting the spread of plant pathogens. These studies focus on, but are not limited to, the needs of Connecticut stakeholders.

In December 2007, **Dr. Botond Balogh** joined the department as the plant pathologist responsible for the Plant Disease Information Office. His expertise in bacteriology and biological control using bacteriophages will enhance the department's capabilities in working with this important group of pathogens.



Dr. Botond Balogh at the microscope in the laboratory of the Plant Disease Information Office.

RESEARCH ACTIVITIES

Sudden Vegetation Dieback

In the summer and fall of 2002, large areas of emergent vegetation at several sites along Long Island Sound were observed dead. The loss was mostly restricted to *Spartina alterniflora*

along creek banks in the low marsh. The phenomenon is called Sudden Vegetation Dieback (SVD), formerly called Sudden Wetland Dieback. **Dr. Wade Elmer** has been investigating SVD and has conducted surveys along Long Island Sound salt marshes. In 2007, he found that *S. alterniflora* plants in SVD sites had a higher incidence of *Fusarium* spp. colonizing the leaves, stems, and roots than plants from healthy marshes. Initial surveys in 2008 have confirmed these findings.

To assess the role of Fusarium pathogens in SVD, over 200 isolates of *Fusarium* spp. were collected from plants in SVD sites from Maine to Virginia and placed in storage. Over 100 isolates were tested for pathogenicity by wound-inoculating stems of *S. alterniflora* and measuring the resulting lesions. The isolates were divided into two groups based on their pathogenicity (lesion length) and morphology (spore shape and ontogeny). In collaboration with **Dr. Marra**, 22 pathogenic isolates and 18 nonpathogenic isolates were analyzed phylogenetically by aligning partial sequences in the translation elongation factor 1-alpha, calmodulin, and beta-tubulin genes. With each gene sequence, pathogens clustered together with minimal diversity suggesting they may compose one closely related species complex. Nonpathogens also clustered together with minimal genetic variation. A blast query to the NCBI database did not match either of these species, suggesting a formal description of these two species is warranted.

Wade Elmer sampling *Spartina alterniflora* along creek banks exhibiting Sudden Vegetation Dieback (SVD).

Several stress studies were established in the greenhouse to determine the role of drought, normal irrigation, or flooding on *Fusarium* spp. infection of *S. alterniflora.* There was no interaction between the irrigation treatments and Fusarium inoculation, but inoculation consistently reduced plant growth and increased the percentage of root lesions. Plants placed under drought conditions suffered the most and the majority of the ones that were inoculated with Fusarium had died. When *S. alterniflora* plants were irrigated with increasing saline treatments (0, 0.5X, X, or 2X [where X = 35 ppt NaCl or 55 ds/m]), there was little effect of Fusarium on plant health, but the high rates of salinity were toxic. These findings support the observation that drought may be the predisposing stressor in SVD. Future studies will examine the interaction of drought and salinity on Fusarium infection.

***Impact*:** Loss of wetland flora like *Spartina* has drastic implications for coastal ecology and marine life, shellfish industries, and property values. These findings suggest that *Fusarium* spp. could be contributing to SVD by limiting plant growth and vigor during periods of drought.

Biocontrol with earthworms

Earthworm densities have been regarded as reliable indicators of soil health, but their role in suppression of plant disease has not received much attention. **Dr. Elmer** conducted a series of greenhouse studies where soils infested with soilborne pathogens were augmented with earthworms (*Lumbricus terrestris)* and then planted with susceptible asparagus, eggplants, and tomatoes. In each host-disease system, earthworm activity was associated with 60-80% more growth and 50-70% less disease. Soil dilutions on selective media revealed that densities of fluorescent pseudomonads and filamentous actinomycetes were consistently higher in rhizosphere soils augmented with earthworms.

For the third year, Dr. Elmer has conducted field studies with eggplants grown in soil infested with *Verticillium dahliae*. In two of the three years, eggplant yields were increased in plots augmented with earthworms. In all three years, disease severity was reduced in plots where earthworms were added. We hypothesized that disease suppression was a result of biological activity, but cannot exclude the role of increased fertility.

Impact: These studies suggest that strategies to increase earthworm densities in soil will improve soil health and suppress soilborne diseases.

Fusarium ecology on corn stubble

A long-term study on the incidence of *Fusarium graminearum*, a fungus that produces carcinogenic mycotoxins in grain, was continued by **Dr. Elmer** in 2007-2008. Assays were done in collaboration with Drs. Kerry O'Donnell and Todd Ward of the NCAUR of USDA ARS in Peoria. They found that a unique chemotype of the fungus called 3-ADON was found in Connecticut cornfields in 18, 21, and 19% of the isolates for 2004, 2005, and 2006, respectively. The 3-ADON chemotype produces a more toxic mycotoxin than the more common chemotype called 15-ADON. In 2007, the percentage of 3-ADON chemotypes dropped to only 1.6%. It is not known if this represents a sampling error or if the reduction is an indication of the inability of this chemotype to survive in Connecticut's cornfields. To address this, over 440 pieces of corn stubble were assayed in 2008 from three cornfields in northeastern Connecticut. Over 80 colonies of *F. graminearum* were recovered, which represented 31, 16, and 15% of the total colonies from each of the three sampled fields, respectively. In cooperation with **Dr. Marra**, every isolate will be assayed using PCR to determine its chemotype and to gain a more accurate estimation of the incidence of the 3-ADON chemotype.

Impact: Understanding the incidence and relative distribution of the 3-ADON isolates of *Fusarium graminearum* will assist us in predicting whether or not this more toxic chemotype is increasing in Connecticut.

Ornamental disease research

Fusarium corm rot of gladiolus

Fusarium corm rot of gladiolus is caused by *Fusarium oxysporum* f. sp. *gladioli* and is the most destructive root disease of gladiolus. Previous research by **Dr. Elmer** found that a 20 min soak of corms in 50 ppm of Actigard 50 WP (a.i. acibenzolar-s-methyl) provided season-long suppression of Fusarium corm rot. In addition, we tested a nonpathogenic *Fusarium oxysporum* strain called CS-20 as a corm soak. We found that the CS-20 strains provided the same level of protection as Actigard 50 WP. The study is currently being repeated.

***Impact*:** Because Fusarium corm rot is extremely difficult to control, the strategy of soaking corms for 20 min with Actigard 50 WP may provide an economically efficient management tool resulting in minimal chemical contact and reduced exposure to the environment. Furthermore, the development of a nonpathogenic strain of *F. oxysporum* may provide another tool for fighting Fusarium corm rot on gladiolus.

Demonstration of the ability of nonpathogenic *Fusarium oxysporum* strain CS-20 to suppress Fusarium corm rot of gladiolus (plant on left) when compared with the control (plant on right).

Fusarium wilt of *Coreopsis verticillata*

In the summer of 2006, Fusarium wilt of *Coreopsis verticillata* cv. Moonbeam was first reported by **Dr. Elmer** and colleagues at Cornell University, Pennsylvania State University, and Purdue University. The causal agent was identified as *F. oxysporum*. Given the recent appearance of this serious disease and the potential for widespread distribution via the horticultural trade, we investigated the host range of the pathogen. No wilt symptoms or reductions in dry weight were observed in 3 cultivars of aster, 8 cultivars of chrysanthemum, and one cultivar of echinacea when compared to controls in greenhouse tests. Similarly, no symptoms were observed on ageratum, basil, eggplant, gomphrena, scabiosa, or snapdragon. In contrast, symptoms of stunting, wilt, and vascular discoloration were observed only on *C. verticillata* and *C. lanceolata.* Other strains of *F. oxysporum* that were pathogenic on other asters, such as China aster, chrysanthemum, and dianthus, were avirulent on coreopsis. To assess the level of genetic diversity in the pathogen, the tef-α gene genealogy from 17 *F.*

oxysporum isolates was developed including isolates from other *formae speciales* of *F. oxysporum*. All of the coreopsis isolates were closely related and placed in a single distinct group within Clade 2 of the *F. oxysporum* species complex, indicating that host specialization might have occurred from a single ancestor.

***Impact*:** Because of the popularity of this coreopsis cultivar, this disease has the potential to cause significant economic loss in nurseries and landscape businesses. Careful surveillance of imported coreopsis plants is warranted. These data also suggest that a *forma specialis* designation may be applicable to this pathogen. We have proposed the pathogen be called *F. oxysporum* f. sp. *coreopsii*.

Neonectria Canker caused by *Neonectria ditissima (prev. N. galligena)*

Dr. Robert Marra's research on Perennial Canker (also known as Neonectria canker) focuses on the ecology and genetics of the fungal pathogen, *Neonectria ditissima*, with the goal of gaining a fuller understanding of the life history, evolution, and population dynamics of the organism and its interactions with its hosts, particularly black birch (*Betula lenta*). Fundamental knowledge of the natural history of *N. ditissima* is lacking, yet is an essential prerequisite to the development of an effective control strategy for Perennial Canker. To that end, Dr. Marra's research program has developed field techniques and laboratory tools necessary to undertake a study of this organism and the disease it causes, focusing particularly on the use of classical and molecular genetics to elucidate mating structure and the ecology of spore dispersal. Cultures obtained from infected bark and wood from various parts of Connecticut and the eastern United States have been grown to pure culture and analyzed microscopically for key morphological features. DNA obtained from cultures is being analyzed using genetic markers in order to determine (1) if fruiting bodies are the result of outcrossing or self-fertilization, and (2) if outcrossed, the extent to which they are inbred or outbred. Understanding this aspect of the mating system will shed light on the fungus' dispersal patterns, a critical precedent to the development of a biocontrol program.

N. ditissima often causes multiple cankers on black birch, running the length of the stem.

Perithecia, the fruiting bodies of *N. ditissima*, are visible near canker margins on black birch bark.

Two categories of molecular genetic markers are now being used in the laboratory. Amplified Fragment Length Polymorphism (AFLP) markers have the advantage of revealing an abundance of polymorphic sites in DNA with relatively small effort. Two sets of AFLP primers have already identified approximately 60 markers that are highly polymorphic. AFLP markers have the disadvantages of being dominant (polymorphisms are scored as presence versus absence) and anonymous (they cannot be studied or treated individually, and determining their location in the genome is not trivial). Nonetheless, they permit testing hypotheses at a gross scale, and help direct research using more labor-intensive markers such as microsatellites, which constitute the second type of marker developed in Dr. Marra's lab, and which were the focus of marker development over the past year. Microsatellites are chains of repeating DNA motifs (e.g., acgacgacgacgacg) found throughout the genomes of most eukaryotes; variation in the number of motif repeats at a microsatellite locus underlies the length differences among alleles.

Unlike AFLPs, microsatellites are always codominant – i.e., each allele is uniquely identified by its length – and their location in the genome is anchored by unique DNA sequences flanking them. Dr. Marra, with the assistance of **Mr. Jason Corwin**, has succeeded in identifying 14 microsatellite loci that are polymorphic and informative; 11 of these have been demonstrated to be polymorphic within a single Connecticut population sample of 38 isolates, from West Rock Ridge State Park (WRRSP). The number of alleles at each locus segregating among the WRRSP isolates ranged from 2 to 12.

During the course of isolating and analyzing isolates from WRRSP, Dr. Marra identified two *Neonectria* species, *N. discophora* and *N. coronata*. Although both are considered tropical species, *N. discophora* has been identified previously, albeit rarely, in the United States, whereas the identification of *N. coronata* in Connecticut represents the first report of this fungus outside the tropics.

Impact: Due to its increasing abundance in Connecticut, black birch is a tree of growing importance and concern. Although trees infected with Perennial Canker can persist for decades, the extensive scarring caused by the cankers renders them of little value for lumber or veneer. Our efforts to more fully understand the biology and natural history of *N. ditissima* will contribute to the identification and utilization of control strategies.

***Ramorum Blight*/Phytophthora ramorum**

Drs. Marra and **Douglas** have been supervising the implementation of USDA-mandated assays for detection of *Phytophthora ramorum* on nursery material shipped from California, Oregon, or Washington. Nursery surveys are conducted in cooperation with **Dr. Victoria Smith** and state inspectors. These assays have been carried out principally by technician **Jason Corwin**. The process begins with a serological test called ELISA (enzyme-linked immunosorbent assay), which detects all *Phytophthora* species. If a sample tests positive by ELISA, DNA is extracted from it and then analyzed for *P. ramorum*-specific nucleotide sequences using nested PCR assays.

The new Molecular Plant Diagnostics Laboratory was given Provisional Approval Status for *P. ramorum* by APHIS-PPQ and, in February of 2008, Mr. Corwin was certified in the 2008 Proficiency Testing Program for conventional and realtime PCR.

***Impact*:** *Phytophthora ramorum* is a pathogen of regulatory importance and a growing concern in Connecticut because of the numerous species of plants and trees common in Connecticut that are known or suspected hosts. Much of this concern centers on the potential impact of this disease on Connecticut's significant nursery industry (over $1 billion in annual production) and on our forests and landscapes, which also contribute significantly to the state's economy. Given that the eastern United States, including Connecticut, is considered at high risk for *P. ramorum*, based on host distribution and climate, concern over the possible accidental introduction of the pathogen into the environment is warranted. Additionally, the molecular diagnostic techniques being used and under development at the Station will continue to enhance the disease diagnostics services provided to Connecticut's stakeholders.

Pestalotiopsis from tree peonies

Dr. Marra has isolated the ascomycete, *Pestalotiopsis paeoniicola*, from a tree peony obtained from a Connecticut grower. Dr. Marra was assisted by **Dr. DeWei Li** in the identification of this species, a pathogen of tree peony that has never been reported outside of China. Drs. Marra and Li have confirmed both the identity and pathogenicity of the isolate through the completion of Koch's Postulates.

Integrated Pest Management for Wine Grapes in New England

The vineyard industry in southern New England has doubled in the last seven years. In 2008, there will be about 750 acres planted to wine grapes on 80-85 farms throughout Connecticut, Massachusetts, and Rhode Island. There are 63 commercial wineries with projected 2008 annual sales of $17-$20 million, which produce about three quarters of a million gallons of wine. Wine trails in southern New England connect many of the wineries and have been successful in increasing cultural diversity by infusing much-needed money into many rural communities. In some cases, vineyards provide an alternative, direct-sales opportunity for existing farms, while in others the vineyards represent new agricultural enterprises.

Wine grapes face a daunting array of fungal diseases, which, left unchecked, can significantly reduce the economic value of the crop. Each year, the likelihood of spread and infection by all grape pathogens within a vineyard are strongly dependent on local weather conditions. This includes powdery mildew. For this reason, **Dr. Francis J. Ferrandino**, together with collaborators from the University of Massachusetts, University of Connecticut, and University of Rhode Island, have been awarded a Northeast IPM research/extension grant entitled: "Combining a disease and weather monitoring network with measurements of inoculum potential for disease forecasting in vineyard IPM for southern New England." This joint research-extension project focuses on improving control of vineyard diseases and reducing pesticide inputs. This will be accomplished by providing growers with disease support information on the risk of infection of disease in real time via the Internet. The system will use weather-based disease-risk models. We will establish weather monitoring stations in research and commercial vineyards throughout southern New England. These stations will be connected through cellular modems to a central location. Initial inoculum levels will be directly assayed at test vineyards and the survival and maturation of the overwintering stage pathogens will be evaluated. In addition, inoculum potential will be evaluated each week using potted trap plants and mechanical spore samplers to determine the concentration of airborne inoculum. As follows are highlights of this research initiative:

- Dr. Ferrandino will initiate studies on the use of weather stations to monitor and validate models for powdery mildew and other common diseases of grape.
- Dr. Ferrandino is continuing to evaluate extraction techniques for estimating overwintering inoculum of grape powdery mildew on vine bark and shed leaves.
- Dr. Ferrandino will establish sampling protocols to estimate phenological development of grape vines, and, concurrently, disease incidence and severity.
- Dr. Ferrandino has established three 0.25-acre research vineyards located in Windsor, Hamden, and Voluntown, CT. Weather stations will be placed at each of these locations.

Dr. Ferrandino pruning newly planted grapes at the Valley Laboratory in Windsor.

Preliminary results from data collected at the Valley Laboratory in Windsor, CT have indicated the importance of evaluating primary inoculum levels and stage of development for grape powdery mildew. Throughout the month of May 2008, existing disease risk models predicted favorable conditions for the spread of this disease and, therefore, suggested the use of fungicide sprays. However, direct examination of overwintering spore-bearing structures extracted from bark, canes, and buds showed that the spores were not mature until the first week of June 2008, considerably later than the model predicted. If this information had been passed on to growers, it would have eliminated the necessity of the two foliar sprays that had been recommended by the existing weather model.

Impact: The timely dissemination of inoculum development information to growers will eliminate unnecessary foliar sprays.

Symptoms of powdery mildew on a grape cluster close to harvest.

Use of nonparametric statistics to describe distributions of plant disease and insect populations

Dr. Ferrandino has been studying the effect of spatially and temporally aggregated plant disease data on the accuracy of disease assessment by sampling. The experimental result is a highly skewed distribution, dominated by a few "hot spots" with an abundance of leaves that have no disease. Dr. Ferrandino is continuing his investigation of the problems involved in estimating levels of plant disease. These include a re-examination of the *pros* and *cons* involved in the use of the Horsfall-Barratt disease rating scheme (with T. Gottwald and C. Bock of the USDA Florida), a mathematical investigation into the ramifications of spatial aggregation on the accuracy of sampling schemes, and the application of these methods to precision agriculture (with **Dr. Donald E. Aylor**).

Since this sampling problem is much more general than plant disease epidemiology, Dr. Ferrandino has been collaborating with **Dr. John F. Anderson** on analysis of bedbug populations. Dr. Ferrandino is applying his understanding of skewed data to the analysis of bedbug population data obtained from overnight trap catches from various locations within infested buildings.

Impact: Appropriate analysis of aggregated data provides additional information impossible to obtain by employing conventional parametric statistics.

Environmentally-friendly control of powdery mildew on landscape plants

Dr. Ferrandino is continuing his investigation of the efficacy of environmentally-friendly controls for powdery mildew. The alternatives to conventional chemical controls include sprays of cow's milk, compost tea, horticultural oil, and potassium bicarbonate products. To test the efficacy of these "environmentally-friendly" sprays, **Dr. Ferrandino** has established a long-term "landscape" plot at Lockwood Farm that includes woody ornamentals and perennials (e.g., lilac, deciduous azalea, bee balm, phlox, and peony) and annuals (zinnia and verbena)—plants that are susceptible to powdery mildew and are commonly planted in the Connecticut landscape.

Dr. Ferrandino is collaborating with Matthew DeBacco, a master's student from the University of Connecticut, who is studying the efficacy of compost tea-based foliar sprays for the control of powdery mildew on cucurbits. Experimental plots in this study are located at Storrs, Windsor, and Hamden, CT.

Impact: The use of efficacious, environmentally-friendly foliar sprays to control powdery mildew will reduce the chemical load on the environment. This is especially valuable around the home.

Studying plant disease epidemics

Dr. Ferrandino has been studying plant disease epidemics involving the Septoria-Tomato and the Powdery Mildew-Pumpkin pathosystems for the past 20 years. Both of these disease-host complexes involve very strong juvenile tolerance to disease--young leaves are less likely to become infected than mature leaves. In addition, both of these host plants go through very rapid mid-season growth spurts during which leaf area increases by a factor of 10 over a 5-6 week period (usually from mid July to late August). As a consequence of this rapid vegetative phase of growth, host plants are composed of a dynamic mixture of leaves of both varying age and susceptibility to disease.

Tomato plot at Lockwood Farm used to study a developing epidemic of Septoria leaf spot.

Since 1989, Dr. Ferrandino has planted 180- to 200-ft-long, north-south rows of tomatoes at Lockwood Farm in order to study this phenomenon. These plantings were inoculated at the southern end with *Septoria lycopersici* and the resulting epidemic was monitored. Plant leaf area

was estimated weekly and the growing tips were tagged weekly in order to correlate the age of leaves with disease evaluations. Results indicate that leaves younger than 17 days old were immune to infection by Septoria. In addition, leaves older than 40 days had very few recent infections. This suggests a "window" of age-based susceptibility within a tomato canopy.

Impact: The incorporation of age-dependent susceptibility of foliage to disease will improve current epidemic models.

Chestnut Breeding for Orchard and Timber Trees

Dr. Sandra Anagnostakis is continuing her chestnut research to develop timber and orchard trees resistant to diseases. This year, she has made further selections from the timber chestnut hybrids planted in Windsor. These 10-year-old trees show good disease resistance and are now producing seed. She is cooperating with a nursery in Georgia that has planted 3,000 of these seed for us. The trees from this planting will be returned to Connecticut in 2009 and planted in forest plots. Seed collected in 2005 from the Windsor trees was grown in the same nursery and 82 of the trees sent back to us in 2007 were planted in empty spaces in the Windsor plot. Hybrid seedlings from this batch have also been sent to Alabama for a Forest Service project on survival of chestnuts in areas with Phytophthora root rot (360 seedlings), were planted in the Farmington Town Forest (30 seedlings), in the Goodwin State Forest (100 seedlings), and in private land in Sharon (50 seedlings).

Anagnostakis with chestnuts selected for timber quality and newly planted seedlings at the planting in Windsor, CT.

Dr. Anagnostakis has also made selections of orchard trees from hand-pollinated chestnut crosses that were harvested in the fall of 2007. These included 272 nuts from orchard trees for

nutrient analysis, 190 nuts from American chestnuts (*Castanea dentata*) for nutrient analysis and disease tests, 218 nuts from dwarf orchard trees to a cooperator in Georgia, and 309 nuts from a Chinese X Chinese cross (*C. mollissima*) for the Genetics of the Fagaceae project (planted in the greenhouse in February 2008 and transplanted to Lockwood Farm in late May 2008). In addition, 135 nuts from two hybrid X hybrid crosses for the Genetics of the Fagaceae project were planted in the greenhouse in February 2008 and transplanted in Virginia in May 2008.

The U.S. Office of Surface Mining has shown significant interest in utilizing chestnut as a species for mine site reclamation. While progress with the traditional breeding efforts has been remarkable, the obstacles are many. This undertaking will be advanced by the addition of the genomic component to the project with trees provided by Dr. Anagnostakis, which will result in a genetic map for chestnut (www.fagaceae.org). This genomic approach should lead to the identification of resistance genes and technology facilitating the rapid screening of chestnut progeny that possess genes imparting resistance to blight and other pests and pathogens.

The project to study Ozark chinquapins (*C. ozarkensis*) for their resistance to Oriental Chestnut Gall Wasp resulted in 143 open-pollinated seed and 253 seed from hand pollinations with Henry Chinese chinquapin (*C. henryi*) as the male parent. Seedlings grown in the greenhouse will be sent to North Carolina to our Forest Service cooperator or planted by cooperators in Connecticut.

We received 103 chestnuts from Eastern Turkey from six native chestnut sites for disease resistance testing. These have been planted in the greenhouse and will be transplanted to Lockwood Farm in June. European chestnut trees (*C. sativa*) are very similar to American chestnuts, but not as winter hardy. We plan to compare the two species, which has never been carefully done.

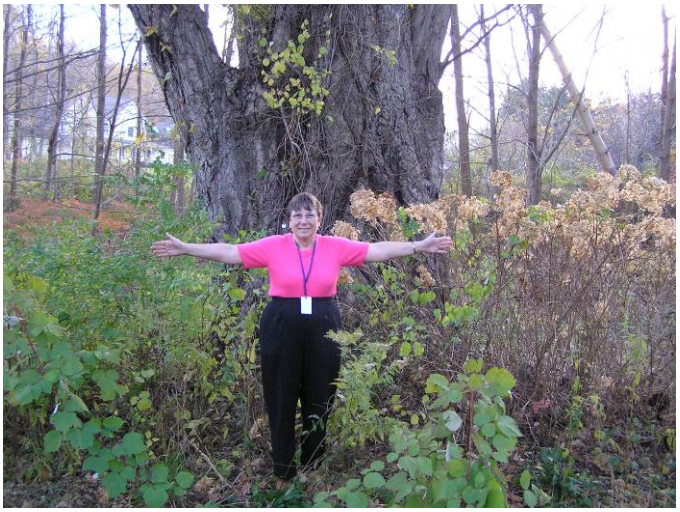
Impact: The overall impact of the project will be to further progress toward restoration of American chestnut as a tree in North American forests and to support the utilization of chestnut as a specialty nut crop for the American marketplace.

Butternut Trees in Connecticut

Butternut trees have long provided a favored wood for carvers and builders. They also occupy a significant place in Native American culture as a source of food and dye materials. Butternut populations are declining throughout their native range, due to an exotic fungus *Sirococcus clavigignenti-juglandacearum,* which causes lethal cankers**. Dr. Anagnostakis** planted butternut seedlings (*Juglans cinerea*), Japanese walnut seedlings (*J. ailantifolia*), and hybrids of the two species this year at Lockwood Farm. These seedlings will be inoculated in the fall with two strains of the butternut pathogen in order to assess resistance. She is working with two native populations of butternut in the south in order to look for disease resistance at the lower end of the native range of this species. This is part of a cooperative project that includes the University of Tennessee, Notre Dame University in Indiana, and the Experiment Station.

Impact: The information on growth and disease resistance of butternut trees resulting from this project will provide fundamental knowledge that will give us a better understanding as to whether butternuts respond in the same way to disease throughout their natural range and enable

the development of a butternut project for the curriculum of the Cherokee Central Schools Board in North Carolina.



Anagnostakis with a hybrid butternut tree (Japanese walnut X butternut) that was formerly the "National Champion Butternut."

Noteworthy Diseases

Two rust diseases were of particular concern this season, Chrysanthemum white rust and Repeating spruce needle rust. Chrysanthemum white rust was confirmed for the first time in Connecticut in September 2007. Infected plants were initially found in a garden center during a routine inspection by an Experiment Station nursery inspector. Additional infections were subsequently found in nurseries and garden centers by Station inspectors. The disease was identified by **Dr. Sharon Douglas** and confirmed by the National mycologists at the USDA-APHIS-PPQ National Mycology Laboratory in Beltsville, MD. Chrysanthemum white rust (CWR) is caused by *Puccinia horiana*, an autoecious rust. This fungus is an obligate pathogen that infects 12 species of chrysanthemum, including garden mums, pot mums, and Nippon daisies. CWR was first described in Japan and China in 1895 and was confined to China and Japan until the 1960's. However, with increased international movement of plant material, it is now established in Europe, Africa, Australia, Central America, South America, and the Far East. Sporadic outbreaks have been reported in Canada and the United States but they have all been successfully eradicated. CWR is a pest of quarantine significance in the United States.

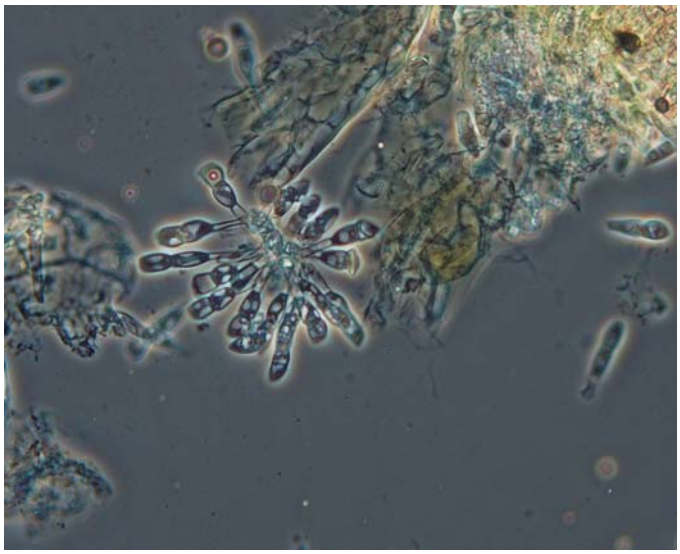
Symptoms of CWR first appear as chlorotic spots on upper leaf surfaces that may be sunken and necrotic. These are followed by the development of distinctive and diagnostic raised, pinkish to white pustules on lower leaf surfaces. Many pustules can develop on each leaf. Symptomatic leaves dry up and persist on the stems. Diagnosis can be difficult since infected plants may not show any symptoms during hot or dry conditions, but when the weather turns cool and wet, symptoms develop. Once plants are infected, the pathogen's mycelium can spread throughout the plant and the disease becomes systemic. Severe outbreaks of CWR may result in total crop loss.

CWR is usually introduced on infected plant material although it can be spread by splashing water from overhead irrigation or rainfall. Spores can travel ¼ mile under conditions of high humidity or during rain storms. Spores can also be spread on leaf debris, contaminated equipment, clothes, and shoes--spores can live for up to 8 weeks on contaminated objects. Since

this pathogen is new to Connecticut, information about its ability to survive winter conditions is not known. However, in areas of the U.S. where CWR has become established on hardy mums planted outdoors, it has been found to overwinter--overwintering of the fungus requires some green tissues that survive in protected parts of a plant during the winter.

Symptoms of Chrysanthemum white rust (CWR) on chrysanthemums in the 'Gretchen' series. Note white rust pustules on lower surfaces of leaves.

Close-up of CWR pustules illustrating the distinctive pinkish, waxy pustules.



Photomicrograph depicting teliospores of *Puccinia horiana*.

Plants that tested positive for CWR in this outbreak include several 'Gretchen' cultivars ('Bold,' 'Flashy,' and 'Sunny'), as well as many cultivars not in the 'Gretchen' series ('Dark Veria,' 'Debonair,' 'Ashley,' 'Vicki,' 'Okra,' 'Cesaro,' 'Gold Finch Yellow,' 'Canelli,' 'Galatino,' and 'Flamingo Pink'). Infected chrysanthemums not identified by cultivar were also found in combination pots of mums and ornamental grasses. CWR was confirmed in three Connecticut counties: Fairfield, New Haven, and Hartford.

Because CWR is a regulated pest of quarantine significance, steps were taken by state and federal regulators to remove and destroy infected plants from the confirmed sites in compliance with the CWR Eradication Protocol established by the USDA-APHIS-PPQ. Additional inspections at nurseries and garden centers in Connecticut were also completed**.**

Repeating spruce needle rust, caused by the fungus *Chrysomyxa weirii,* was widespread and severe throughout the state. This disease is also commonly known as Weir's rust and autoecious spruce needle rust. Although in past years this disease had been predominately a Christmas tree plantation problem, this season it was diagnosed with great frequency in many settings including Christmas tree plantations, production nurseries, and landscape plantings. Hosts of the pathogen include white, black, and Colorado spruce, but the latter is the most susceptible. This rust was first described in Connecticut in 1996 but was probably present in the state for several years prior to its initial detection. Although at least ten other needle rust fungi (*Chrysomyxa* spp.) have been reported on spruce in the United States, until 1996, only the needle rusts caused by *C. ledi* and *C. ledicola* had been of concern for Christmas tree growers in Connecticut. Unfortunately, the rust caused by *C. weirii* represents a particular challenge for growers, landscapers, and arborists since unlike the other needle rusts, it is autoecious and does not require any additional hosts in order to complete its life cycle. *C. weirii* has also been reported in Pennsylvania, Vermont, New York, and New Hampshire and appears to be on the increase throughout the Northeast.

Diagnostic rust symptoms on first-year needles in spring, before new growth has emerged.

Rust spores produced in pustules are blown by wind and splashed by rain onto newly emerging needles.

Close-up of diagnostic rust pustule.

Infected trees are rarely killed, but the primary damage results in extensive needle discoloration and drop, which disfigures landscape trees and reduces the marketability of infected trees in production nurseries and Christmas tree plantations. Symptoms first appear as yellow spots or flecks on needles in late winter and early spring. These spots eventually develop into pustules or blisters (telia) and burst open to reveal masses of yellow-orange spores (teliospores). The teliospores then produce another type of spore (basidospores), which are readily blown by wind and splashed by rain onto needles of the same tree or onto those of adjacent trees. Infection occurs when needles first emerge and are tender and immature. The following spring, yellow spots and blisters develop on the infected needles and the disease cycle starts again. Blisters of *C. weirii* can appear on both first- and second-year needles and heavily

infected trees can appear distinctively yellow-orange from a distance. Autoecious spruce needle rust can be distinguished from the heteroecious rusts by the timing of symptoms. Symptoms of the former are evident in late winter and early spring whereas the latter develop in mid to late summer. However, accurate diagnosis still requires microscopic examination since symptoms may easily be confused with those caused by other needle rusts. As with most diseases that are not fatal but result in needle drop, repeated defoliation may retard growth and reduce marketability.

Disease Survey

Dr. Douglas, Dr. Balogh, and **Department Scientists** assisted **Ms. Inman,** in diagnosing a wide range of plant health problems for homeowners, commercial growers, plant care professionals, and government, state, and cooperative extension personnel during the past year. Fungal and bacterial diseases were prevalent on many hosts.

Herbaceous and Woody Ornamentals: A wide range of diseases was identified on perennials this season. Some hosts and diseases were chrysanthemum white rust, pachysandra with Volutella blight, rose with black spot, juniper with Phomopsis and Kabatina tip blight, hollyhock with hollyhock rust, and witch hazel and holly with Phyllosticta leaf spot. Diplodia blight was identified on a wide variety of coniferous hosts including Austrian, white, Scots, and Mugho pines. Eastern white pine with Canavirgella needlecast, Colorado spruce with Cytospora canker, Douglas-fir with Rhabdocline needlecast, and spruce with Chrysomyxa rust. Anthracnose diseases were identified on a wide range of broadleaf trees including oak, maple, and sycamore. There was an epidemic of Verticillium wilt in Japanese and Norway maples. Winter injury and brown rot caused tip dieback in ornamental cherry and prune species. Rust diseases affected crabapple and serviceberry.

Symptoms of Diplodia blight on pine. Infected new shoots are stunted and killed before they elongate. Black fruiting structures of the fungus emerge at the base of symptomatic needles. These produce spores of the fungus that infect newly emerging needles in the spring.

Tree and small fruit: Apples were mostly affected by cedar-apple rust and apple scab diseases in the spring and summer. Fire blight, a serious bacterial disease of apple and pear, which was detected in Connecticut orchards in 2006 and 2007, was not detected in spring 2008. Stone fruits including peaches, plums, and cherries were affected by leaf curl and brown rot. Additionally, a

number of prunes were diagnosed with black knot. On grapes, black rot, powdery mildew, and downy mildew were problematic on numerous backyard and commercial plantings.

Symptoms of cedar-apple rust. This fungus overwinters on eastern red cedar as inconspicuous brown galls that develop into distinctive gelatinous, orange structures in spring (left). Spores produced in these orange masses infect newly emerging apple or crabapple leaves in their vicinity. These infections result in diagnostic yellow-orange spots (right).

Vegetables: Noteworthy outbreaks of Septoria leaf spot and blossom-end rot on tomato were reported. Bacterial spot was diagnosed on pepper.

Turf: Red thread continued to be one of the most prevalent lawn diseases in 2008. By summer, however, summer patch became the most frequently reported issue, reaching epidemic proportions. Additionally, slime molds, non-parasitic but rather conspicuous relatives of fungi, were reported in home lawns.

On turf, the presence of a slime mold gives the grass a bluish-gray to purple-brown appearance from a distance. Upon close inspection, individual grass blades are covered by the purple-brown mass of the slime mold.

Weeds: Predominant weeds in turf were nutsedge, crabgrass, ground ivy, pokeweed, and clover. Bentgrass was also frequently identified as a common “grassy” weed in many home lawns.

Identification and control of true, running bamboo, Japanese knotweed, and garlic mustard (plants that often become invasive) continued to be significant problems for many Connecticut landowners. Poison ivy remained a key plant of great public concern.

Impact: Information on the diseases that occur on plants in Connecticut landscapes, natural woodlots, and forests each year helps to monitor and assess the impact of these problems on the overall health of plants in the state. This information also assists in detecting new diseases or in identifying potentially important emerging diseases on specific plants, which can then be monitored in the years that follow.

SERVICE ACTIVITIES

Members of the Department of Plant Pathology and Ecology are involved in a wide range of service and public outreach activities. Some of these services involve presentations, publications, tours of facilities, and interviews, in addition to being conducted in cooperation with other state agencies.

Seed Testing: In cooperation with the Connecticut Department of Agriculture, Bureau of Regulation and Inspection

Every year, inspectors from the Bureau of Regulation and Inspection of the Connecticut Department of Agriculture collect official samples of vegetable, crop, and lawn seeds for analysis. Samples are submitted to The Connecticut Agricultural Experiment Station since it is the official seed testing laboratory for Connecticut. The Department of Plant Pathology and Ecology performs the germination and purity analyses that are required for compliance with the Connecticut Seed Law Regulations and the Federal Seed Act. In 2008, 327 vegetable and 13 lawn seeds were submitted to **Dr. Douglas** for testing. With assistance from **Ms. Inman,** technician, all seeds are germinated following strict protocols designated by the Association of Official Seed Analysts (AOSA). Seedlings are carefully examined, since they must appear "normal" (i.e., free from decay, have well-developed primary root systems, have well-developed and intact hypocotyls and/or epicotyls, and have healthy cotyledons).

During 2008, two vegetable seed samples did not meet germination claims. They were not retested because of insufficient numbers of seeds. Of the 13 lawn seed samples tested, five met label claims for both purity and germination. Seven samples passed label claims for germination but did not meet claims for purity. One passed label claims for purity but did not meet claims for germination. Another component of the analysis is examination for prohibited noxious weed seeds. None of these samples contained weed contaminants in 2008. A Station bulletin reports the findings of each year's results.

Impact: Results of seed tests conducted by Station staff are reported to the Seed Control Official of the CT Department of Agriculture who has the authority to stop the sale of products that do not meet label claims or contain noxious weeds. In the short term, this program protects state residents from purchasing inferior seed and ensures that seeds comply with the Connecticut Seed Law Regulations and the Federal Seed Act. The long-term benefit of the seed testing program minimizes the inadvertent introduction of noxious weed seeds that could potentially impact crops of economic importance and the state's ecosystem.

Samples for Analytical Chemistry and the Connecticut Department of Consumer Protection

During the year, **Dr. Douglas** and **Ms. Inman** examined 28 samples from the Connecticut Department of Consumer Protection at the request of the Department of Analytical Chemistry of the Experiment Station.

Samples for 2008 National Nursery Survey for Phytophthora ramorum

Connecticut participates in a survey of nurseries to assess the presence of the Ramorum Blight (Sudden Oak Death) pathogen, *Phytophthora ramorum*, in our state. The objective is to survey nurseries at risk of harboring or distributing *P. ramorum*-infected plants. **Drs. Douglas** and **Marra** supervise the USDA-mandated assays for testing, which are conducted by **Jason Corwin** (technician). During the past year, **Dr. Victoria Smith** (Deputy State Entomologist) supervised the collection of 297 samples by CAES nursery inspectors and USDA-APHIS-PPQ personnel. Samples were then tested for *P. ramorum*. No samples tested positive in the 2008 survey.

Samples for Chrysanthemum White Rust

In Fall 2007, there was an unexpected outbreak of Chrysanthemum white rust, a quarantine significant pest. This resulted in a cooperative effort between the Experiment Station and USDA-APHIS-PPQ. **Dr. Douglas** examined samples collected by CAES nursery inspectors and USDA-APHIS-PPQ personnel under the supervision of **Dr. Smith**. Over 5,900 chrysanthemum plants were inspected throughout the state.

Citizen Inquiries

Plant Disease Information Office

Dr. Douglas, Dr. Balogh, and **Department Scientists**, assisted by **Ms. Inman**, answered 5,399 inquiries about plant health from Connecticut citizens. Although the majority of inquiries were on ornamentals, trees, and shrubs (65%), other categories, such as food crops (17%) and turfgrasses (4%), were also well represented. A high percentage of inquiries fell into the miscellaneous category (14%), which included plant identification and poison ivy control and identification. Although the majority of inquiries were from Connecticut homeowners (65%), the number of the inquiries from commercial growers and plant care professionals (29%) showed a marked increase. Inquiries from cooperative extension, health, news, and agricultural personnel (6%) remained consistent with previous years. A further breakdown of inquiries showed that 45% of the samples came in by phone, 14% came in by mail, 3% came as email (Connecticut only), and 38% were brought in person. This year, the number of samples handled by the PDIO (52%) exceeded the number of phone calls (48%) for the first time since accurate recordkeeping was initiated. Over 710 letters and numerous email messages with attached files of fact sheets were sent from the PDIO. Many citizens opted to download fact sheets posted on the CAES website in lieu of letters since this gave them instant access to the information of concern. Most of the miscellaneous questions were concerned with identification, human toxicity, and control of poison ivy and other poisonous plants, identification of various plants and weeds, mushroom identification for health officials, and information about pesticides and their relationships to health and environmental concerns.

Additional inquiries

Dr. Anagnostakis answered 509 questions and made 27 site visits**. Dr. Elmer** made 12 site visits and answered 11 questions. **Dr. Ferrandino** made 4 site visits and answered 10 questions, and **Dr. Marra** made 2 site visits and answered 4 questions from stakeholders.

Impact: During 2008, around 6,000 Connecticut residents had plant disease problems accurately diagnosed by members of the Department of Plant Pathology and Ecology. In many cases, the plant health problems diagnosed did not require fungicides for control, contrary to the initial perception that fungicides would be required. Staff worked closely to educate professionals and homeowners to develop disease management programs that were compatible with the environment that incorporated cultural practices, sanitation, and genetic resistance prior to pesticide use. Accurate diagnosis of plant health problems, educated citizenry, and implementation of integrated disease management strategies reduce pesticides introduced into the environment and water of Connecticut.

Awards

Sandra Anagnostakis received an official citation as one of the finalists in the *2007 Connecticut Technology Women of Innovation Award.*

Wade Elmer was awarded the Quinnipiac Sigma Xi chapter Certificate of Appreciation Award for his presentation at the Albert Notation Memorial Series Seminar on March 4, 2008.

Meetings Sponsored by the Department of Plant Pathology and Ecology

September 25, 2007: Sharon Douglas co-organized the meeting entitled "Propagation Education." The meeting was co-sponsored by the Station, UCONN, and the Connecticut Greenhouse Growers Association in Jones Auditorium. Eighty-five growers attended the meeting.

October 17, 2007: Wade Elmer served as the Station liaison to the Connecticut Greenhouse Growers Association Fall meeting "Pesticides and Roast Beef" held in Jones Auditorium. There were 30 growers present. He moderated the meeting. Ron LaFrazier prepared the auditorium.

January 24, 2008, February 5, 2008, February 28, 2008: Wade Elmer co-sponsored three Bedding Plant Meetings with Ms. Leanne Pundt and Dr. Richard McAvoy of the University of Connecticut. Topics covered included: Emerging issues in greenhouse disease management; Pesticide use: protecting yourself, your families and your workers; Update on Nutrition; Plant Growth Regulators and other Production Tips; and Update on Managing Insects and Mites; Focusing on Biological and Biorational Approaches. On January 24, the meeting was in Jones Auditorium, on February 5, the meeting was held at the Tolland Cooperative Extension Center in Vernon, CT, and on February 28, the meeting was held at the University of Connecticut, Torrington campus, in Torrington, CT. In total, 69 growers attended. Of those, 100% rated the program as useful to very useful, and 60% stated that they thought they would benefit economically as a result of this program. Ron LaFrazier prepared Jones Auditorium.

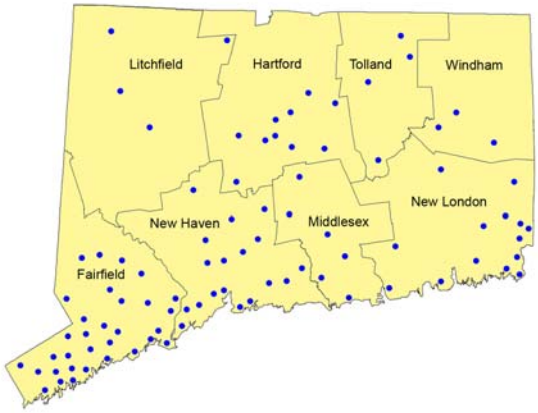
June 17, 2008: Wade Elmer served as the Station liaison to the Connecticut Greenhouse Growers Association special meeting entitled "Energy in the greenhouse" held in Jones Auditorium. There were 69 growers present. Dr. Elmer moderated the meeting. Ron LaFrazier and Peter Thiel prepared the auditorium.

Conference Organizing

Dr. Marra continued to serve on the Steering Committee for the Connecticut Conference on Natural Resources in 2008. This year, the Conference was held on Monday, March 10, 2008, at the University of Connecticut, Storrs. The conference was attended by 250 people, including six scientists from CAES who presented talks, posters, and one workshop at the Conference.

DEPARTMENT OF SOIL AND WATER

Mosquito Trapping and Testing Program.



Mosquito surveillance for West Nile virus (WNV) and Eastern Equine Encephalitis (EEE) continues to be integral to the public health response to these mosquito-transmitted viruses in Connecticut. The objectives of the surveillance program are to provide: 1) early evidence of local virus activity; 2) information on the abundance, distribution, identity and infection rates of potential mosquito vectors and; 3) information that is used to assess the threat of WNV and EEE to the public and guide the implementation of mosquito control measures.

The Connecticut Agricultural Experiment Station is responsible for conducting all mosquito trapping and testing activities. The program is conducted by Dr. Theodore Andreadis and Dr. Philip Armstrong, assisted by John Shepard, Michael Thomas, and Shannon Finan. Mosquito trapping is conducted at 91 permanent trapping stations that are located in 72 municipalities throughout the state.

In 2007, mosquito trapping was conducted from June 4 to October 25. Traps were set and attended by Station staff every 10 days at each site on a regular rotation. Two trap types were used at all trapping stations – a CO2-baited CDC Light Trap, designed to trap host-seeking adult female mosquitoes (all species), and a Gravid Mosquito Trap, designed to trap previously blood-fed adult female mosquitoes (principally *Culex* and container breeding *Ochlerotatus* species). Elevated CO^2-baited CDC Light Traps, placed approximately 7 m in the tree canopy, were additionally used at 12 sites in southern Fairfield and New Haven Counties. Mosquitoes were transported alive to the laboratory each morning where they were identified to species. Mosquitoes were grouped (pooled) according to species, collecting site, and date and frozen at –80^{o}C. A maximum of 50 female mosquitoes were included in each pool. Aliquots of each

mosquito pool were inoculated into Vero cell cultures for detection of WNV and other mosquito-borne arboviruses of public health importance. Virus isolates from mosquito pools were tested for WNV, EEE, Jamestown Canyon (JC), Cache Valley (CV), Trivittatus (TVT), Highlands J (HJ), and LaCrosse (LAC), and Potosi (POTV) viruses. Isolated viruses were identified by Real Time (TaqMan) polymerase chain reaction (PCR) or standard RT-PCR using virus-specific primers. All of the virus isolation work was conducted in a certified Bio-Safety Level 3 laboratory at the Experiment Station. Weekly test results were reported to the CDC electronically via ArboNet and to the DPH for dissemination to other state agencies, local health departments, the media, and neighboring states.

During 2007, a total of 157,476 mosquitoes (11,233 pools) representing 35 species were trapped and tested. A total of 69 isolations of WNV were made from 5 mosquito species (*Culex pipiens* = 65, *Culex restuans* = 1, *Culex salinarius* = 1, *Ochlerotatus canadensis* = 1, and *Ochlerotatus taeniorhynchus* = 1), collected at 18 sites in 15 towns in 3, counties: Fairfield (Bridgeport, Danbury, Darien, Greenwich, Norwalk, Stamford, Stratford, Westport), Hartford (Glastonbury, Hartford, Manchester, Newington), New Haven (Bethany, New Haven, West Haven). The first positive mosquitoes were collected on June 27, and the last on October 3. Four human cases were reported by the Connecticut Department of Public Health: residents of Cheshire, Darien, Hartford, and Woodbridge.

Five isolations of EEE virus were made from 3 mosquito species (*Culiseta melanura* = 3, *Aedes cinerus* = 1, and *Coquilletidia perturbans* = 1) collected in 2 towns, Ledyard and Plainfield in New London and Widham counties.

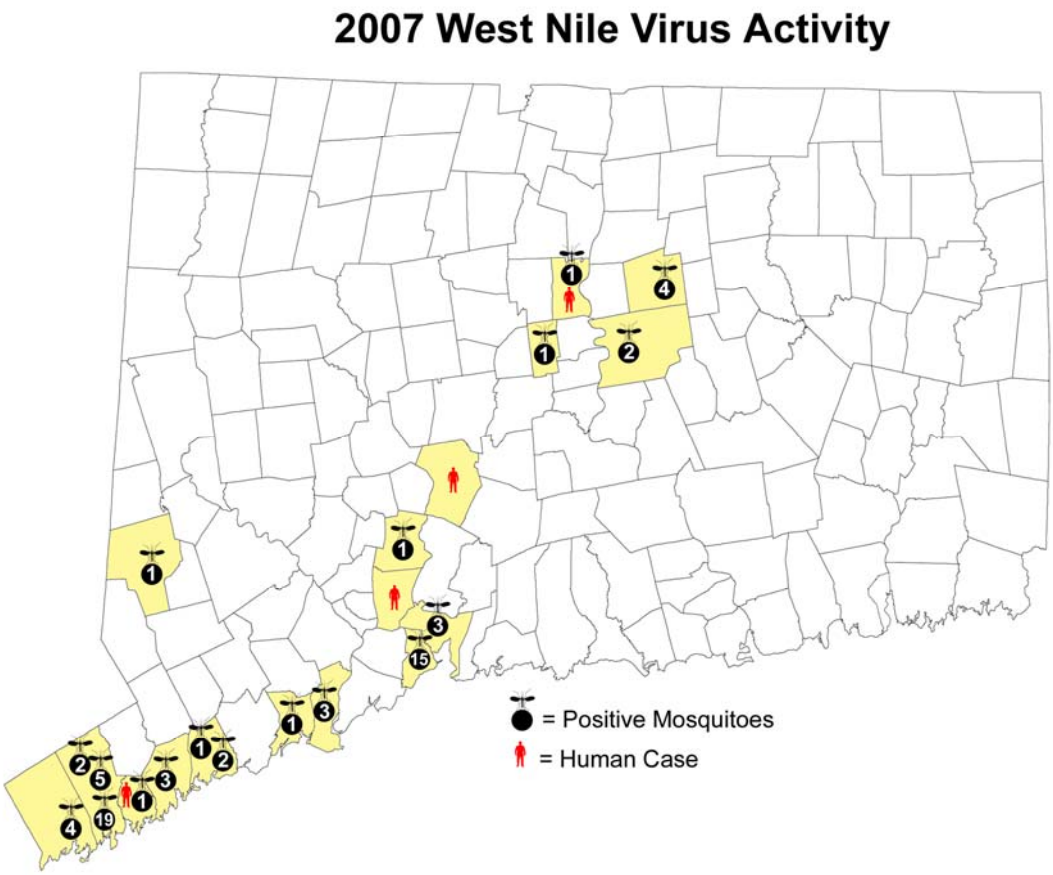
In addition to WNV and EEE, 2 other mosquito-borne viruses were isolated: HJ = 2 and JC = 42.

MOSQUITO SPECIES TRAPPED AND TESTED FOR ARBOVIRUSES IN CONNECTICUT, 2007

Mosquito Species	**# Mosquitoes**	**# Pools**	**Virus**						
			CV	**EEE**	**HJ**	**JC**	**POT**	**TVT**	**WN**
Aedes cinereus	8,651	702							
Ae. vexans	7,297	693				1			
Anopheles barberi	5	5							
An. crucians	12	12							
An. punctipennis	1,065	390							
An. quadrimaculatus	318	128							
An. walkeri	859	143							
Coquillettidia perturbans	26,819	1,063		1		5			
Culex pipiens	37,021	1,809							65
Cx. restuans	5,831	919							1
Cx. salinarius	13,660	763				2			11

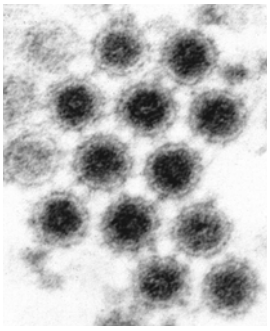
Cx. territans	52	44							
Culiseta melanura	4,974	547		3	2				
Cs. minnesotae	16	11							
Cs. morsitans	76	30							
Ochlerotatus abserratus	2,978	154				5			
Oc. aurifer	1,426	131				5			
Oc. canadensis	17,938	758		1		16			1
Oc. cantator	3,241	250				3			
Oc. communis	30	2							
Oc. excrucians	387	80				2			
Oc. fitchii	1	1							
Oc. grossbecki	5	5							
Oc. japonicus	1,814	665							
Oc. sollicitans	907	63							
Oc. sticticus	1,970	159				2			
Oc. stimulans	1,706	242							
Oc. taeniorhynchus	6,619	195				1			1
Oc. thibaulti	6,723	233							
Oc. triseriatus	1,376	362							
Oc. trivittatus	1,050	159							
Orthopodomyia signifera	1	1							
Psorophora ferox	330	90							
Uranotaenia sapphirina	2,317	1							
TOTAL	157,476	11,233		**5**	**2**	**42**			**69**

CV = Cache Valley, **EEE** = Eastern Equine Encephalitis, **HJ** = Highlands J, **JC** = Jamestown Canyon, **POT** = Potosi, **TVT** = Trivittatus, **WN** = West Nile



Impact. Mosquitoes were collected at 91 trap sites, located in 72 municipalities, in Connecticut. Following identification, the insects were processed for virus isolations and identified using molecular methods to analyze RNA. During 2007, 157,476 mosquitoes were tested for virus. There were 69 isolations of WNV and 5 isolations of EEE virus. There were 4 human cases in the state linked to WNV infection. News releases included information on how residents could protect themselves from mosquito bites, such as the use of repellents. The information contained in the news releases had an immediate impact because many residents did take the suggested precautions. The long-term benefits include a healthy human population and a well-informed public concerning the potential risks of mosquito bites.

Mosquito Arbovirus Studies.



Epidemics and epizootics of eastern equine encephalitis virus (EEEV), observed by an electron microscope (photo), occur sporadically in temperate regions where transmission is seasonal from late summer to early fall. These outbreaks may derive from virus that overwinters locally or perhaps, results from reintroduction of virus from other sites. To evaluate these possibilities, Drs. Armstrong, Andreadis, and Anderson compared the phylogenetic relationships of EEEV isolates obtained from mosquitoes collected during statewide

arbovirus surveillance in Connecticut, in addition to isolates from concurrent outbreaks in southern New Hampshire and upstate New York. In Connecticut, viral isolates grouped into temporally discrete clades by year of isolation or over two years of sampling. Two or more clades arose in 2000, 2001, 2003, 2004, and 2006, possibly the result of separate introduction events into the state, whereas viruses from upstate New York and New Hampshire segregated into single clades that persisted for two or more years. New Hampshire viruses shared recent common ancestry to those isolated in Connecticut suggesting viral dispersal among these regions. These results provide evidence for independent episodes of EEEV overwintering in northern foci. Moreover, our study finds regional differences in the population dynamics of EEEV from northeastern US. The population from upstate New York was genetically homogenous from 2003-2007, whereas viruses sampled from Connecticut were more genetically diverse and subject to high rates of population turnover, implying increased movement of new strains into this region.

Impact. Current studies on the genetic relationships of mosquito-borne viruses will enable us to track the origin and spread of viral strains involved in disease outbreaks and to identify variants associated with different ecological niches and/or disease outcomes. This information may ultimately be used to improve surveillance and intervention strategies against these viruses.

Introduction of the Asian Tiger Mosquito in Connecticut

The Asian tiger mosquito, *Aedes albopictus* is presently recognized as the most invasive mosquito in the world having spread from its native range in Southeast Asia to at least 36 countries over the last three decades. This has occurred primarily through the worldwide trade in used tires and more recently via containerized shipments of infested ornamental "lucky bamboo" plants. In the United States, established populations of this species have been reported from 866 counties in 26 states in the eastern half of the country extending from southern Florida and Texas, to Chicago, Illinois the northernmost infestation. In the northeast, *Ae. albopictus* has invaded much of New Jersey, portions of southern Pennsylvania, and the New York City metropolitan area. However, while a few individuals have been occasionally collected in surveillance activities in the neighboring New England states, no established infestations have been identified in this region.

In July 2006, an introduction of *Ae. albopictus* was documented for the first time at a commercial tire recycling plant in northeastern Connecticut. The introduction likely occurred via transport of infested tires originating from northern New Jersey or metropolitan NYC. Upon this discovery, field and laboratory investigations were initiated by Dr. Theodore Andreadis assisted by Michael Thomas and John Shepard to determine seasonal establishment and overwintering success by assessing adult biting and oviposition activity in the surrounding woodlands. The first adult female was collected in a CO_2-baited Mosquito Magnet® Liberty trap within the confines of the tire plant during the week of July 28. Additional females were collected intermittently thereafter through October 16. Host-seeking female *Ae. albopictus* attempting to alight on human subjects

and larvae hatching from eggs collected in ovitraps placed in the woodlands surrounding the tire plant, were detected weekly from August 21 through October 2 denoting seasonal establishment in the immediate woodlands. However, no larvae of *Ae. albopictus* were recovered from eggs collected in ovitraps that were placed in the surrounding woodlands or in traps placed 1 to 1.6 km away, nor were any host seeking females detected by human subjects the following season (July to October 2007), indicating that the species did not survive winter conditions to enable successful regeneration. The failure of *Ae. albopictus* to overwinter and establish itself in the forested woodlands following several weeks of seasonal breeding and oviposition during the summer and early fall were most likely due to winter egg mortality, interspecific competition from *Ochlerotatus triseriatus* and *Ochlerotatus japonicus* and/or other ecological barriers.

Impact. Permanent establishment of this invasive mosquito in New England is unlikely despite the recurring importation of infested used tires into recycling facilities. However, continued monitoring of such facilities for potential re-invasion is warranted especially in urban/suburban environs where global warming and milder winter temperatures may provide more suitable conditions in the future for colonization.

Mosquito Genetic Studies

In the northeastern United States, *Culex pipiens* has been implicated as the primary vector of West Nile virus (WNV). The *Culex pipiens* complex exists in two forms that exhibit substantially different behavioral and physiological characteristics but are morphologically indistinguishable. *Culex pipiens* f. pipiens generally develop in aboveground environments, mate while swarming in open areas, undergo obligatory winter diapause, and require a blood meal to develop eggs. *Culex pipiens* f. molestus in contrast, inhabit subterranean environments especially in urban areas, mate in confined spaces, remain active throughout the winter, and produce their first batch of eggs without a blood meal. Local studies on the host feeding preferences of aboveground populations presumed to be *Cx. pipiens* f. pipiens, have shown that this form has a very strong preference for avian hosts with occasional feeding on mammals including humans. Studies in Europe, however, have demonstrated that the molestus form feeds readily on mammals and is an aggressive human biter. Definitive knowledge of the biting behavior of North American populations of *Cx. pipiens* f. molestus is lacking. The two forms generally are reproductively isolated in nature but have been reported to occasionally hybridize in urban areas during the late summer producing hybrid females that feed indiscriminately on avian or mammalian hosts. The extent and distribution of hybrid populations of *Cx. pipiens* in the northeastern United States is unclear and there is a need to more fully characterize the genetic structure of natural populations of this mosquito vector both spatially and temporally in order to better interpret epidemiological studies.

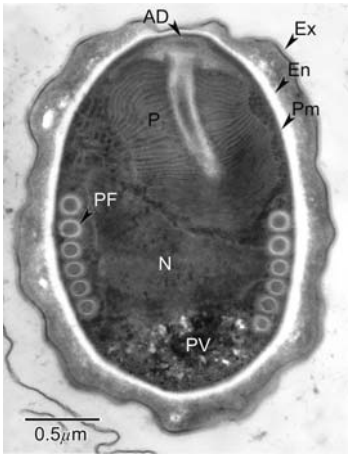
Dr. Shoaming Huang, Dr. Goudarz Molaei and Dr. Theodore Andreadis designed a study to examine the genetic structure of urban and rural populations of *Cx. pipiens* f. pipiens and compare them to *Cx. pipiens* f. molestus in the northeastern United States. They utilized a set of

twelve microsatellite DNA markers to analyze populations from five urban/suburban and three rural locations in Connecticut, and urban locales from Trenton, New Jersey, New York City, New York and Cambridge, Massachusetts.

The mean numbers of alleles per locus for the aboveground *Cx. pipiens* f. pipiens populations ranged from 11.5 ± 2.34 to 13.17 ± 2.42 and were not significantly different. In contrast, below ground populations of *Cx. pipiens* f. molestus collected from New York City had greatly reduced allelic diversities with an average of 4.42 ± 1.22 alleles per locus, which was significantly lower than that of any of the *Cx. pipiens* f. pipiens populations analyzed. We did not detect significant genetic differences between urban and rural populations of *Cx. pipiens* f. pipiens from Connecticut nor did we observe temporal genetic changes. However, in a comparative analysis with populations of neighboring states, New Jersey, New York and Massachusetts, genetic variations associated with geographic distance were identified. In the analyses of Bayesian clustering and PCA, we identified two clusters separating *Cx. pipiens* f. molestus from *Cx. pipiens* f. pipiens populations, indicating that *Cx. pipiens* f. molestus was genetically distinct from any of the *Cx. pipiens* f. pipiens populations examined during this study.

Impact. These population genetic studies provide vital information for evaluating the respective role members of the *Cx. pipiens* species complex play in enzootic and epidemic transmission of WNV and other arboviruses in various regions in the US.

New Parasite of Mosquitoes Discovered

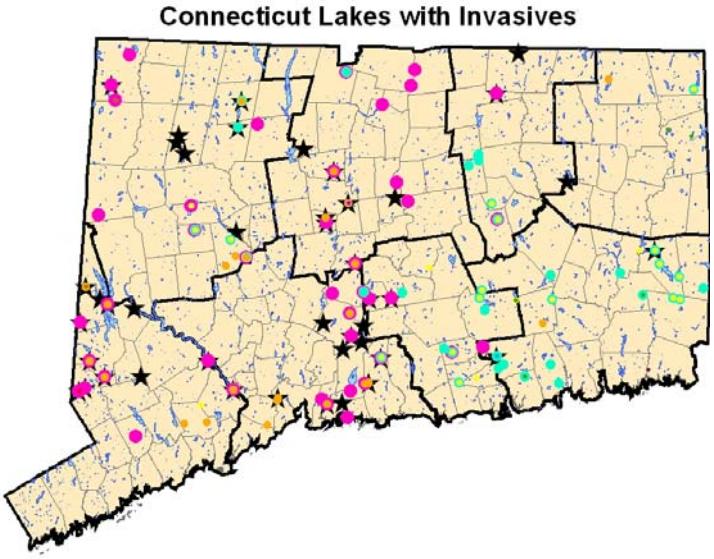


Microsporidia are among the largest and most diverse group of parasitic microorganisms which infect mosquito populations in nature. At present, approximately 150 different species representing 23 genera have been described and attempts have been made to utilize these parasites as biological control agents. While conducting a survey of temporary vernal pool habitats in the Tomsk region of Siberia in Russia, several larvae of the mosquito, *Ochlerotatus caspius* were discovered with patent infections of a novel microsporidium by a Russian scientist, Dr. Anastasia Simakova. Samples were sent to Dr. Theodore Andreadis and Dr. Charles Vossbrinck for molecular analysis and based on ultrastructural morphology, developmental characteristics, and comparative sequence analyses of the small subunit (SSU) ribosomal DNA (rDNA), a new genus and species of Microsporidia, *Andreanna caspii* was described. Parasite development occurs in fat body tissue and infected larvae appear swollen with dull white masses within the thorax and abdomen. Meronts have diplokaryotic nuclei and are delineated by a simple plasmalemma contiguous with the host cell cytoplasm. Merogony occurs by synchronous binary division followed by cytokinesis. Diplokaryotic sporonts undergo meiosis and synchronous nuclear division forming sporogonial plasmodia with two, four and eight nuclei enclosed within a persistent sporophorous vesicle. Cytokinesis of sporogonial plasmodia results in the formation of eight uninucleate spores. The episporontal space of early sporonts is filled with a homogeneous accumulation of electron dense granular inclusions and ovoid vesicles of various dimensions, transforming into an interwoven matrix during the initial phase of

sporogenesis. Spores are oval, uninucleate and measure 4.8 µm × 3.1 µm. The spore wall is 260 µm thick with an irregular exospore consisting of two layers and a thinner endospore. The anchoring disc is well developed and is contiguous with a lamellar polaroplast that occupies the anterior third of the spore and possess more narrow lamellae on the posterior end. The polar filament is gradually tapered and arranged in a single row consisting of six coils ranging. The posterior vacuole is moderately sized and filled with a matrix of moderate electron density. Phylogenetic analysis of SSU rDNA from *A. caspii* and 30 other species of microsporidia including 11 genera parasitic in mosquitoes using maximum parsimony, neighbor joining and maximum likelihood methods showed *A. caspii* to be a sister group to the clade containing all of the *Amblyospora* species, including *Culicospora, Edhazardia* and *Intrapredatorus*, as well as *Culicosporella* and *Hyalinocysta* thus providing strong support for establishment of *Andreanna* as a separate genus.

Invasive Aquatic Weeds in Connecticut lakes

Surveillance and Monitoring Program: A fifth full season of monitoring and surveillance for invasive aquatic weeds in CT lakes was completed in 2007 by Gregory Bugbee, Roslyn Selsky and Dr. Jason White. A total of 133 lakes have been mapped for aquatic vegetation; 7 in this last year. These 133 lakes now have GPS-based bathymetric vegetation maps created and digitized. In addition, GPS-derived transects have been established within each lake or pond. These transects will serve as a diagnostic assessment tool to track changes in aquatic species abundance and distribution over time. Monitoring results show that more the 60% of the water bodies have been invaded by a non-native aquatic plant and many have multiple invasive species present. The most commonly found invasive plants were curly leaf pondweed *(Potamogeton crispus),* Eurasian watermilfoil (*Myriophyllum spicatum*), variable watermilfoil (*Myriophyllum heterophyllum*), fanwort *(Cabomba caroliniana*), and minor naiad (*Najas minor*). Less commonly found were mudmat *(Glossistigma cleistanthum),* water hyacinth *(Eichornia crassipes)* and water shamrock *(Marsilea quadroflia).* Samples of all species from all surveyed lakes are being archived in the herbarium collection at The Connecticut Agricultural Experiment Station. A new initiative began this year to investigate the use aerial images as a surveillance tool. Aerial photographs were obtained for three of the State's largest lakes (Candlewood, Lillinonah and Zoar) from the United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP). Although actual shoreline conditions are easily visible, accurate analysis and monitoring of submersed aquatic vegetation will require the use of specialized computer software; these applications are currently being evaluated. All information is currently being



incorporated into the Invasive Aquatic Plant Program website as part of the Experiment Station's web page.

Impact. The monitoring and surveillance program has scientifically confirmed anecdotal and historical data; clearly invasive aquatic plant species are both present and problematic in a large number of CT water bodies.

Surveillance of Invasive Plants in Lakes Used for Hydroelectric Generation:

Connecticut has several hydroelectric plants that rely on the release of lake water to power generators. The Federal Energy Regulatory Commission (FERC) has required FirstLightPower Resources, who owns the hydroelectric plants on Lake Candlewood, Lillinonah and Zoar, to provide surveys of the lakes for invasive plants on an annual basis. A grant was provided the CAES Invasive Aquatic Plant Program (IAPP) to perform the surveys during the summer of 2007. The number of plant species found in Lakes Candlewood, Lillinonah and Zoar are quite similar. Candlewood Lake has 16 species, Lake Lillinonah has 15 species and Lake Zoar has 18 species. These species richness values are average for CT lakes and ponds which range from a low of 2 to a high of 28. The invasive plants *M. spicatum* and *N. minor* are the most frequently occurring species in all three lakes. *P. crispus* also occurs in all three lakes but was probably not completely accounted for as it senesced during the survey. A small population of the invasive *M. quadrifolia* was located in Lake Zoar. Invasive species accounted for more than two-thirds of the plant occurrences in each lake. Annual surveys of Candlewood, Lillinonah and Zoar require need a considerable commitment. Two teams of experienced CAES IAPP surveyors headed by Mr. Bugbee and Ms. Selsky required 25 days or 700 worker hours to complete the task. Surveys using remote sensing with aerial imagery could reduce this time if the imagery could be satifactorally correlated with in-lake surveys. CAES IAPP has sponsored a flyover of the lakes in 2008 to obtain four band images with one meter resolution. These images will be correlated to the 2008 in-lake surveys. If remote sensing is determined to adequately delineate areas of invasive plants, CAES IAPP and others will have a powerful tool for rapid large-scale assessment of invasive aquatic plants

Impact. Lakes Candlewood, Lillinonah and Zoar are heavily infested with invasive aquatic plants. Monitoring and control is necessary to protect the hydro-generating capabilities of these lakes.

Control with herbicides. A central goal of the program has been to investigate novel methods of chemical control to restore native plant communities to aquatic ecosystems as they existed prior to invasion by non-native species. Current research projects that are summarized below:

Bashan Lake, East Haddam, CT.

Water milfoil is an invasive aquatic plant that can restrict the recreational use of lakes and eliminate desirable native aquatic plants. Since 1994, the Station has been monitoring the milfoil problem in Bashan Lake, East Haddam. The Connecticut Department of Environmental Protection (CTDEP), the town of East Haddam and the Bashan Lake Association have supplied the Station grants to study the use of the herbicide 2, 4-D for controlling the milfoil. Greg Bugbee and Dr. Jason White have met with lake association, CTDEP and town officials to educate the public on the project and obtain the necessary permits. From 2000 - 2007 areas of Bashan Lake were treated with 2, 4-D (2, 4-D ester). Although control was generally very good regrowth occurred in some areas and new areas of milfoil were found particularly in water from 10 – 20 feet deep. Recent tests discovered that late summer applications of 2, 4-D is as effective as the traditional spring treatments and the rate can be reduced from 200 lbs/acre to 75 – 100 lbs/acre. Areas treated with 2, 4-D usually stay nearly milfoil free for at least two years. Reinfestation is thought to occur either by uncontrolled remnants of previous plants or rooting of plant fragments from untreated portions of the lake. Underwater video equipment linked to a global positioning system (GPS) has allowed CAES to accurately document large areas of milfoil that were previously unknown. This milfoil could be the source of plant fragments. In September 2007 2, 4-D was applied to 20 acres of milfoil that occurred sporadically throughout the lake. Although the need for yearly follow-up applications of herbicide has not been eliminated Bashan Lake is now largely free of nuisance variable milfoil and lake users and government officials have noted the drastic improvement since CAES began the control program. Nearby groundwater wells are tested and no 2, 4-D has been found.

Impact.: Development of effective herbicide treatments for variable milfoil can limit it's spread. Fall applications of 2,4-D have been found to be highly desirable because exposure by stakeholders is limited, the milfoil is highly susceptible and toxicity to native species is low. Nearby wells are not affected.

Biological control of Eurasian milfoil, sago pondweed, curly leaf pondweed and coontail with triploid grass carp in Grannis Lake, East Haven CT.

The effectiveness of the aquatic herbicides fluridone and Diquat in controlling Eurasian milfoil, sago pondweed, curly leaf pondweed and coontail were tested in Grannis Lake from 2005 -2006. The lake was surveyed for aquatic vegetation prior to treatment and again each spring thereafter.

North/South transects were made at 100 feet intervals using GPS. Vegetation samples were obtained every 50 ft., identified, judged for abundance and then brought back to the lab to obtain dry weight. Control was limited to the year of application. To provide longer term control. In 2006, CAES began investigating the possibility of introducing plant eating fish called grass carp (*Ctenopharyngoden idella*) into Grannis Lake. CAES helped the Grannis Lake Owners Association procure a CT DEP permit to allow the introduction. With CAES assistance, a screen was designed and placed in the

lakes outlet stream to prevent the fish from escaping. In September 2007, 300 twelve inch triploid grass carp were introduced into the lake. Three 1m X 3m screen exclosures were placed in random locations to determine the defense in plant growth where the fish are not allowed to feed. Normally, many years are needed for the grass carp to grow large enough to consume enough vegetation to provide noticeable control. The yearly surveys will continue to further track the effects of the fish. Water samples are periodically tested for temperature, dissolved oxygen, pH, alkalinity, conductivity, and phosphorus.

Impact. This experiment will provide much needed information on the effectiveness of grass carp on controlling nuisance aquatic plants and the potential negative effects on desirable native vegetation.

Crystal Lake- Middletown, CT.

Mr. Bugbee and Dr. White tested the effectiveness of an early spring application of the aquatic herbicide diquat to control curly leaf pondweed in Crystal Lake. This weed has a unique life cycle that causes it to grow rapidly in early spring, produce a reproductive structure called a turion in late spring and then die back by mid summer. The theory behind this experiment was that controlling the pondweed prior to turion production would eliminated the weed the first year and by limiting it's reproductive capacity reduced it the following year. CAES assisted the Town of Middletown in procuring a CTDEP permit to apply the herbicide with the proviso that a state listed species (*Potamogeton vaseyi*) present in two locations was protected with curtain like limno-barriers. CAES located the sites with GPS and, in late April 2007, directed the placement of the limnobarrier by a private contractor. After determining existing vegetation on georeferenced transects, CAES applied the diquat on April 30. At this time curly leaf pondweed had not yet grown near the surface and had not yet produced turions. A survey performed one week later found near 100 percent control of the pondweed and associated Eurasian water milfoil. A follow-up survey in September found the beginnings of regrowth of the curly leaf pondweed but no Eurasian water milfoil. A survey, by CT DEP officials, found *P. vaseyi* both inside and outside the limno-barrier areas. This indicates the early season application of Diquat did not harm the state listed plant and in the future the barriers may be unnecessary. The spring 2008 survey found regrowth of curly leaf pondweed similar to the before treatment level but no regrowth of Eurasian water milfoil. Turions in the sediment from previous years are likely the cause and multiple year treatments may be necessary to deplete them.

Impact. These experiments provide information on the effectiveness of chemically controlling invasive species while simultaneously protecting threatened plants.

Integrated pest management.

The first part of a two-year study on the potential development of an insect-based integrated pest management approach for invasive aquatic plants was completed by Dr. Michele Marko and Dr. Jason White. The overall goal of this research is to reduce the use of aquatic herbicides by validating the efficacy of an integrated biological (insect) and chemical control technique to manage the invasive aquatic plant Eurasian watermilfoil (*Myriophyllum spicatum*). In this first year, field based-tank studies were used to quantify *M. spicatum* control with the following techniques applied *separately*: the herbicides 2,4-dichlorophenoxyacetic acid (2,4-D) or fluridone at the recommended application rate, or the insect herbivore *Euhrychiopsis lecontei* (the milfoil weevil). These data are a prerequisite to the 2008 field experiments that involve reducing the overall pesticide application rate while simultaneously integrating the milfoil weevil. Sixteen 387-liter tanks were established in a randomized block design. Each tank was amended with thirty plastic pots containing approximately 400 g of a sediment/loam media. Water was then slowly added to the tanks and twenty centimeter stems of Eurasian milfoil (*M. spicatum*) were added to the pots; four individual plants per pot. The four treatments included control, Navigate™ (2,4-D), Sonar™ (fluridone), and the milfoil weevil (*E. lecontei*). The two aquatic herbicides were added at the manufacturer's recommended application rates; the weevils were acquired from existing cultures in our greenhouse and were added to achieve a final density of 1-2 weevils per stem. In the control tanks, the average wet root and shoot mass per plant increased by three-fold during the experiment, indicating successful establishment and robust vegetation growth. All three treatments dramatically reduced milfoil biomass. In the Navigate treatment, the plant biomass declined rapidly over the first 2-3 weeks, with nearly 100% control by week 4. Milfoil control by fluridone and the weevils was approximately 80% after 2.5 months. We are currently determining the efficacy of milfoil control by reduced pesticide levels with simultaneous integrated weevil inoculations.

Impact. Successful development of a biological control technology or an integrated chemical/biological strategy will increase the tool box of options for lake managers and may result in dramatically reduced levels of chemicals being introduced as part of management efforts.

Biological control: Field introduction of the milfoil weevil, Euhrychiopsis lecontei.

Dr. Michelle Marko participated in separate field stocking experiments of the milfoil weevil in both Indian and Candlewood lakes. The weevils were introduced by a commercial vendor while CAES scientists conducted milfoil and weevil surveys before and after introduction of the insect. Multi-year monitoring efforts are planned at both lakes.

Drs. Vossbrinck and Marko have additionally begun a project to design microsatellite markers for *E. lecontei*, which feeds on Eurasian and northern watermilfoil. They hope to be able to distinguish among populations of *E. lecontei* by comparing the DNA microsatellite marker data with that of geographic location and host preference

Molecular biology studies of aquatic plants. Efforts to create a molecular database of aquatic plant species found in CT waters have continued by Dr. Charles Vossbrinck, assisted by Kirsten Deeds. He has developed procedures for the isolation of DNA from phylogenetically diverse groups of aquatic plants. Using the isolated DNA, three genes (small ribosomal subunit, internal transcribed spacer ribosomal DNA, intergenic spacer) from each plant have been amplified and sequenced. DNA from one gene has been isolated from 56 plant species while DNA from 3 genes has been isolated for 41 species. We are in the process of creating an on-line database on the CAES website and have submitted 130 sequences to GenBank (http://www.ncbi.nlm.nih.gov/Genbank/index.html). Dr. Vossbrinck has discovered that for certain species, interference by other plant constituents makes DNA extraction difficult. Consequently, he has developed novel methods using cesium chloride/ethidium bromide density gradients and ultracentrifugation to effectively isolate and purify DNA bands. He is also experimenting with alternative iodinated compounds (Iodixionol and Optiprep).

Separately, we are currently developing several molecular projects to assess the degree of hybridization among different invasive species. The process of hybridization is of interest phylogenetically but may also have significant implications for control and management efforts. In one such collaborative project with Dr. Ryan Thum of Grand Valley State University (Michigan), we have recently observed that four separate lineages of variable milfoil (*Myriophyllum heterophyllum*) exist in CT waters, as compared to New Hampshire where only a single lineage is present. We have collected *M. heterophylum* samples from up to five separate locations within eighteen CT Lakes. These samples have been sent to Dr. Thum so as to further characterize the distribution of the four different lineages within the state. We have also collected water quality data (alkalinity, nutrients, pH, and conductivity) at each sampling location and will determine the relationship between these lake water characteristics and the distribution of the various milfoil lineages.

Impact. The successful implementation of a molecular-based identification system will significantly increase the accuracy of vegetation surveys in CT Lakes. Also, knowledge on the extent of hybridization among aquatic plant species and of population-level differences among biological control agents is of significant scientific and practical interest.

Outreach. Given the magnitude of invasion by non-native aquatic plants, we are making significant efforts to engage citizens, lake associations, and other stakeholders as part of this project. CAES scientists have organized many workshops on the identification of invasive aquatic plants and spoke to numerous lake associations on management techniques. We have assembled numerous publications that are freely available in hard copy or electronically. Lastly, a web site has been constructed that details all specifics of the CAES Invasive Aquatic Plant Program, including a full description of the research goals and a complete presentation of the project results (http://www.ct.gov/caes/). Included are all publications in downloadable PDF formats, as well as the digitized interactive maps of all surveyed lakes. CAES scientists have

also given presentations to professional organizations such as the Northeast Aquatic Plant Management Society (NEAPMS), the Connecticut Conference on Natural Resources (CCNR), the Northeast Association of Environmental Biologists (NEAEB), and the Northeast Aquatic Nuisance Species Task Force (NEANS), Connecticut Federation of Lakes (CFL), and Northeast Arc Users Group (NEARC).

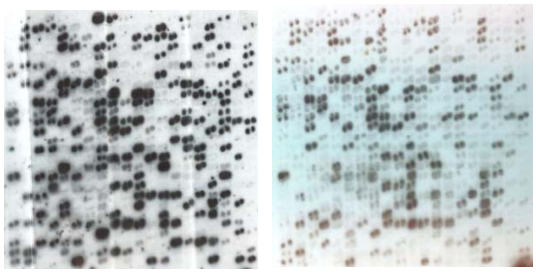
Impact. Successfully educating and engaging stake holders is critical to the success of CAES efforts at managing invasive aquatic plants in CT waters.

Phytoremediation of Persistent Organic Pollutants.

Studies were conducted in an ongoing investigation of the potential of certain vegetation to remove moderately low levels of persistent organic pollutants from soil and other media. Previous data had indicated that *Cucurbita pepo* ssp *pepo* (zucchini) cultivars seemed to have remarkable abilities to phytoextract the weathered residues but that significant crop variability may exist down to the subspecies level. Studies were conducted under this line of investigation in the past year.

In field experiments at Lockwood farm, six different cultivars of *C. pepo* were grown in soil containing weathered DDE at levels of 50-300 ng/g. Three of the cultivars (Goldrush, Raven, Costata Romanesco) were from the subspecies *pepo* and have been previously shown to accumulate significant amounts of weathered DDE in the roots and stems. The other three cultivars (Zephyr, Yellow Crook, Starship) were from the subspecies *ovifera* and have been previously shown to accumulate negligible amounts of weathered DDE. The goal of the 2007 field season was two-fold; to again demonstrate the DDE uptake abilities of these cultivars and also to create all possible crosses between the different DDE accumulating and non-accumulating cucurbit cultivars. Manual pollination of female flowers began in the middle of the growing season. By destructive harvest in mid-August, hybrid fruit had been obtained from all 18 possible crosses. Over the fall and winter, viable seeds were harvested from the hybrid fruit and were prepared for planting. Preliminary data indicate that the six cucurbit cultivars accumulated similar contaminant levels to that observed in previous years. The current 2008 field season will investigate the DDE accumulating ability of these F1 hybrids.

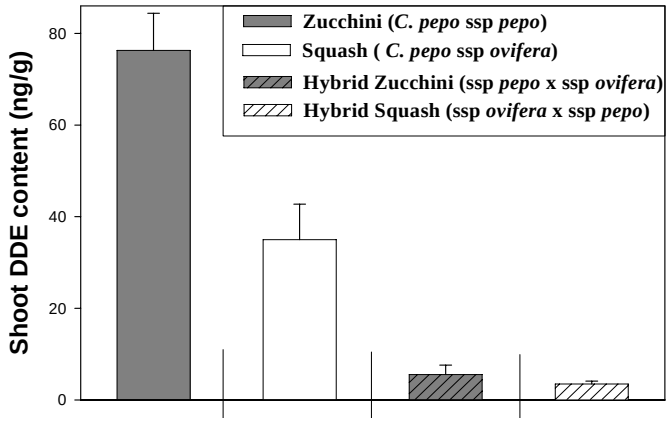
Impact. The ability to accumulate and translocate weathered DDE is a unique ability restricted to *C. pepo* ssp *pepo*. Following the DDE accumulating abilities of F1-F3 hybrids of accumulating and non-accumulating *C. pepo* will make it possible to determine the underlying molecular basis for this unique ability.



In collaborative experiments with Dr. Om Parkash of the University of Massachusetts, DDE-accumulating and non-accumulating cucurbit cultivars were grown in hydroponic solutions that contained the contaminant at levels just under water solubility. After 4 weeks, the tissues (roots, shoots) were frozen in liquid nitrogen and shipped to UMass for a differential mRNA substraction analysis. A colony array method for screening the differentially expressed subtracted cDNAs from *C. pepo* ssp *pepo* stem and root tissues exposed to DDE but absent in DDE-exposed *C. pepo* ssp *ovifera*. In this experiment, we used DDE-induced cDNA from *C. pepo* ssp *pepo* as "tester" while the reference cDNAs from the DDE-induced *C. pepo* ssp *ovifera* set as "driver." As shown the figure below, the subtracted cDNAs that were differentially expressed were hybridized strongly to the forward subtracted probes (A). Initially, we picked 24 cDNA clones, which were present in "tester" population from *C. pepo* ssp *pepo* stems and absent in "driver" cDNAs set from *C. pepo* ssp *ovifera* stem tissues. We have sequenced these differently expressed cDNA clones. A BLAST search against plant gene database showed the sequence homology with 'Phloem Protein 1 (PP1)' from *Cucurbita maxima* and many 'novel' genes with unknown function. The PP1 protein is suspected to be involved in long distance transport of solutes, other metabolites. We are in the process of confirming the differential regulation of the putative PP1 and other 'novel' genes from *C. pepo* ssp *pepo* and *C. pepo* ssp *ovifera* stem and root tissues exposed to DDE.

Impact. The ability to accumulate and translocate weathered DDE is a unique ability restricted to *C. pepo* ssp *pepo*. Isolation of the molecular/genetic controls of this system will enable a full characterization of the remedial potential of this species, as well as potential transfer of the genes to plants perhaps more effective and amenable to field scale phytoremediation.

In collaborative experiments with Dr. Jason Kelsey of Muhlenberg College, small pot experiments were conducted on some of the F1 hybrids isolated during the 2007 field season at Lockwood farm (2A above). As can be seen in Figure 3, the shoot DDE content of the two parent cucurbits differed significantly. Interestingly, both F1 hybrids (the accumulating zucchini crossed with the non-accumulating squash and vice versa) had little ability to accumulate the contaminant. Additional studies are being done currently.



Impact. The ability to accumulate and translocate weathered DDE is a unique ability restricted to *C. pepo* ssp *pepo*. Following the DDE accumulating abilities of F1-F3 hybrids of accumulating and non-accumulating *C. pepo* will make it possible to determine the underlying molecular basis for this unique ability.

Mechanism of Sorption Hysteresis of Organic Compounds to Soil Natural Organic Matter (NOM).

Hysteresis, a frequently observed phenomenon in sorption studies of organic compounds, is inconsistent with the key assumption of sorption reversibility in most transport and bioavailability models for these compounds, and therefore compels a study of its underlying causes. Radiolabeled 1,4-dichlorobenzene (^{14}C-DCB) isotope tracer exchange was carried out at select points along the isotherms of 1,4-dichlorobenzene (DCB) in a brown coal and a peat soil, holding total DCB concentration constant. Tracer exchange was performed by Dr. Joseph Pignatello in both the forward (sorption) and reverse (desorption) directions at the bulk sorption points and in the desorption direction at the corresponding bulk desorption point. Bulk DCB isotherms showed concentration-dependent hysteresis. However, tracer re-equilibration in all cases was consistent with free exchange between sorbed and aqueous-phase molecules. These results rule out common experimental artifacts and demonstrate that sorption of bulk DCB is truly hysteretic (irreversible). The differences in rates between bulk and tracer sorption and desorption are consistent with the coupling of bulk DCB diffusion to other processes that retard equilibration, which we assign to matrix swelling /shrinking. Hysteresis is attributed to matrix deformation—specifically, to inelastic expansion and creation of voids accommodating sorbate molecules in the matrix leading to enhanced affinity in the desorption step. Comparing the results to previous results for naphthalene (NAPH) in the coal, we find that irreversible effects are similar for DCB and NAPH in the coal, but differ for DCB between the two sorbents. An explanation based on the different physical properties of these sorbents is provided. Solid-phase extraction of equilibrated DCB with Tenax® revealed a highly desorption-resistant fraction. While too small to account for the observed hysteresis, this fraction may represent molecules that become trapped as the matrix collapses and simultaneously stiffens during abrupt desorption.

The results confirm and broaden previous findings that hysteresis in NOM can be due to true causes that can only be explained by the creation of metastable states with lifetimes longer than diffusion and that arise in response to sorbate loading. The results also support our previous conclusion that this metastability arises from irreversible matrix swelling due to the stiff-chain (glassy) nature of NOM. We have found that these irreversible effects are similar for two nonpolar aromatic molecules of similar size; that they depend on concentration; and that this concentration dependence is different in the two sorbents studied. More definitive conclusions about the influence of molecular and sorbent structure must await further studies. Lastly, the results show generation of a small, highly desorption-resistant fraction that appears when the concentration gradient is abruptly steepened, but it is premature to conclude that it is permanently "trapped."

Impact. Although it is not yet possible to generalize to all soils, the findings of this study suggest sorption will often be irreversible in the sense that it follows different microscopic pathways in the forward and reverse directions. This has important implications for solute transport and bioavailability of pollutants in the environment. It further suggests that relaxation kinetics may have to be considered in solute transport models.

Photochemical Bleaching of Marine Dissolved Organic Matter.

(Dr. Pignatello in collaboration with William Mitch of Yale University). The fate of dissolved natural organic matter (DOM) in seawater has important implications for the planetary carbon cycle and oceanic biological productivity. Little is known quantitatively about how marine DOM is transformed and degraded. Proposed processes include enzymatic (microbial), direct photochemical bleaching, and secondary reactions of DOM with photolytically-generated inorganic free radicals such as hydroxyl, carbonate, and halogen radicals (halogen atoms or dihalogen anion radicals). Preliminary experiments on UV-visible irradiated samples show that halide ions accelerate photobleaching of marine DOM and may affect the pathway. Rate studies show photobleaching in synthetic seawater to be a two-stage (fast-slow) process and to be faster than up to two times faster than photobleaching in synthetic seawater when perchlorate ion (assumed inert) is substituted for halide. Irradiation carried out in the presence of free radical trapping agents seem to rule out a major role for free radicals, although a minor role is still possible. Fluorescence excitation-emission mapping indicates that halide ions influence the intermediate products of DOM photobleaching.
Impact. While more study is obviously needed, these results show that direct photobleaching may be a major pathway for abiotic processing of DOM in seawater and sea spray, and that chloride ion effects both the rate and pathway of photobleaching.

Effect of Cu(II) on the Sorption of 2,4,6-Trichlorophenol onto Multi-Walled Carbon Nanotubes.

(In collaboration with Xiao-quan Shan, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing). Carbon nanotubes (CNTs) are being developed for use in many technological applications and consumer products, and the ultimate release of some fraction of the produced CNTs into the environment is assumed. Some studies indicate penetration of CNTs into biomembranes and exertion of toxic effects on organisms ranging from bacteria to animals. Carbon nanotubes are strong adsorbents of hydrophobic pollutants especially aromatic compounds. In this role, they may influence the behavior of pollutants in soils and sediments and/or may serve to carry adsorbed environment pollutants into cells. Although several studies have examined adsorption of individual compounds to CNTs, little is known about how organic compounds adsorb to CNTs in the presence of natural substances such as humic substances and metal ions. We studied the adsorption of 2,4,6-trichlorophenol (TCP) on multi-walled CNTs (MWCNTs) at pH 4 in the presence and absence of Cu^{2+} as an example of a divalent transition metal cation in the environment. Sorption of TCP alone was nonlinear, reversible and positively correlated with surface area. The isotherms of TCP were best fit by a dual-Langmuir model indicating weaker and stronger domains. Nitric acid oxidation treatment increased surface area and introduced hydrophilic carboxylic and hydroxylic groups on the defect sites of MWCNTs. Increasing surface area increased the sorption of TCP and Cu^{2+} individually. Carboxylic and hydroxylic groups facilitated surface complexation of Cu^{2+}, which was verified by X-ray absorption spectroscopy, while they diminished the sorption of TCP. Copper suppressed the sorption of TCP, primarily in the weaker domain, while TCP had little influence on Cu^{2+} sorption. It is postulated that the stronger domain of TCP is the graphene surface and the weaker domain is the pore spaces between non-exfoliated tube bundles where

condensation of TCP takes place. As condensation progresses, TCP-CNT interactions compete with CNT-CNT interactions, causing the bundles to swell slightly and facilitating further condensation. Copper competes by cross-linking –OH and $–CO_2H$ functional groups on defect sites of adjacent tubes, creating a more tightly-knit bundle and suppressing condensation of TCP. *Impact.* This is a novel mechanism that will help researchers interpret and predict sorption and desorption of aromatic pollutants in the environment and in biological fluids.

Soil Testing

Testing soil samples for fertility and suggesting methods for growing better plants are a continuing service for citizens of Connecticut. At the laboratory in New Haven, Mr. Bugbee tested 5291 samples and answered 2012 inquiries.

Impact. The soil testing services and recommendations made by The Connecticut Agricultural Experiment Station reduce unnecessary fertilizer treatments to lawns and nursery stock throughout the state. This provides direct economic and environmental benefit to the suburban community by reducing nitrogen runoff into soil and water.

VALLEY LABORATORY

The Valley Laboratory is a multidisciplinary department where scientists conduct research on insects, diseases, soil nutrition, mycology, integrated pest management and weeds of concern to commercial agriculture and homeowners in Connecticut. The Valley Laboratory was originally established by the Board of Control in Windsor in 1921 to conduct tobacco research. While research on shade and broadleaf tobacco continues today, the mission of the department has greatly expanded to reflect the diverse agriculture present in the state. In addition to research, Valley Laboratory scientists and staff diagnose insect and plant health problems, test soils for fertility and structural analyses, conduct outreach to growers and homeowners by speaking to professional and community groups, host informational meetings, and assist students.

Dr. John Ahrens was honored at a celebration of his 50th anniversary at the Valley Laboratory

RESEARCH ACTIVITIES

Activities on the farm: There were a total of 50 experimental plots during the past year at the Windsor farm. Six Windsor-based scientists had 30 of these plots; nine New Haven-based scientists and a University of Connecticut graduate student were using the remaining 20 plots. Valley Laboratory scientists also conducted experiments in many plots off site, such as in growers' fields and state forests. Farm Manager James Preste kept the farm and his equipment ready and in excellent shape. With the help of John Duclos and Jason Flynn, Jim expertly maintained the many field plots and addressed the specific needs of each scientist. He and his summer assistants did an outstanding job maintaining the extensive ornamental garden in cooperation with the Connecticut Nursery and Landscape Association. Mr. Preste and Dr. LaMondia coordinated the Valley Laboratory effort to comply with EPA Worker Protection Standards for Agricultural Pesticides and organized and conducted training sessions for the staff.

Project: Biological Control of Hemlock Woolly Adelgid

Eastern hemlock, *Tsuga canadensis*, is an important native conifer climax species which provides essential wildlife habitat and cover. Hemlocks also protect watersheds and maintain critical cool stream temperatures for native trout species. In the garden landscape, it is a popular tree and a common component in Connecticut's state parks and forests. Since 1985, eastern

hemlocks in Connecticut have been under attack by the non-native hemlock woolly adelgid, *Adelges tsugae,* an accidental introduction from southern Japan. Biological control using imported predators of the adelgid is a major long-term strategy for reducing the impact and spread of HWA in our eastern forests.

Field Research:

In Connecticut, research, release and evaluations of an imported tiny ladybeetle, *Sasajiscymnus tsugae,* from southern Japan to prey on HWA have been ongoing for 14 years. Over 176,000 *S. tsugae* have been released in 26 Connecticut forests and parks since 1995. Dr. Cheah maintains an experimental *S. tsugae* colony with lines originating from the first shipments from Osaka, Japan in 1994 and 1995 and a new line from a different location, Kobe, Japan, obtained in 2006. Dr. Cheah has also been collecting annual data on hemlock health and adelgid population trends from 16 established release sites and other research plots throughout the state. In April-early May 2008, Dr. Cheah collected adelgid-infested foliage from 16 plots throughout the state and determined the average winter mortality of HWA per hemlock site. The data is used to generate information on the overall condition of the state's hemlocks and predict levels of HWA in different regions of the state. Dr. Cheah is also investigating the effect of Connecticut winters on laboratory-reared *S. tsugae* in winter survival studies in field cages. *S. tsugae* colonies in the USA were established from collections from Osaka, Japan where average monthly temperatures from December through February range from 4.7 - 7 ºC, approximately equivalent to USDA Plant Hardiness Zone 8. Hence, overwintering ability in northeastern USA is of concern.

Results:

- Annual assessments of winter mortality of adelgid in Connecticut since 2000 have been significantly correlated to minimum winter temperatures. HWA winter mortality reaches 90% or more when minimum daily winter temperatures fall below -20.5 to -23.3 ºC (-5 to -10 ºF).
- Winters with extreme minimum temperatures of ≤ -18 ºC (0 ºF) appear to severely reduce winter survival of laboratory-reared adult *S. tsugae.* Survival of overwintered adults in field cages was <5% in such regions. In 2008, these results indicate that severe winters or winters with extreme fluctuations of daily temperatures can result in high winter mortality of introduced predators.
- Milder winters lead to resurgence of HWA in subsequent springs and summers. The winter of 2008 was the mild overall and mortality of HWA in the coldest northern stands only averaged 40% while that in the Connecticut River Valley, central and southern sites experienced negligible mortality of 13-14%.
- However, the majority of hemlocks in established *S. tsugae* release sites (87%) continue to maintain healthy growing crowns and negligible tree mortality, in spite of being infested with HWA for over 7-13 years. These release sites are in all types of hemlock habitats state wide in all three climatic regions, and range from marginal growing sites on rocky ridge tops to more moisture retaining soils.

- In 2007, average foliage transparency (a measure of the fullness and vigor of the tree's crown) in 14 established release sites was 22, which compared favorably to uninfested baseline sites with an average foliage transparency of 23, indicating considerable crown recovery in previously heavily infested sites. Only two sites with very droughty soils and heavy initial infestations have shown significant decline in 2007. In 14/16 older release sites, the annual crown health has improved significantly since the release of *S. tsugae*.
- Mean 2007 crown levels of HWA was estimated at 30% in the 14 sites which showed hemlock recovery. In 2007, HWA resurgence was recorded in 30% of sites, especially east of the Connecticut River. Although assessments are incomplete at this time, indications are that there is heavy resurgence of HWA in those sites in 2008.

Impact: Releases of *S. tsugae* into previously heavily infested stands in Connecticut, in conjunction with weather events such as the impact of recent severe winters and wet, cool growing seasons, have continued to preserve and save Connecticut's natural hemlock stands, which were previously in decline. This continued recovery of previously declining hemlock stands in Connecticut is the first to be documented in eastern states that have been infested with HWA since the early 1990s and continued in 2007. Based on this research, *S. tsugae* is being commercially reared and released in multiple states.

Laboratory Research:

Current laboratory studies, in collaboration with Dr. Allen Cohen of Insect Diet and Rearing Research, LLC , is aimed at the development of an artificial diet and/or supplement to augment and improve the mass-rearing of adelgid predators for implementation in infested forests. Dr. Cheah and Dr. Cohen developed an innovative diet delivery system using hemlock foliage which was important in presenting the diet in a natural and readily acceptable environment for eliciting all stages of predator feeding.

- An improved artificial diet developed in 2007 by Dr. Cohen sustained high adult *S. tsugae* survival without access to adelgids for >5 months at 20º C. Adults remained healthy and active throughout the period while fed exclusively on the egg-based diet.
- Females fed on diet only were reproductive and able to mate readily with adelgid-fed colony males after 5 months.
- Diet-fed adults were able to feed normally on return to HWA
- While there was minimal oviposition on diet only, a majority of diet-fed females readily oviposited within the first week of return to adelgid-infested hemlock.
- Larvae also fed readily on the improved diet and survived for several weeks but were unable to molt

Sasajiscymnus tsugae feeding on artificial diet placed on hemlock

Impacts:

- *S. tsugae* is the most widely reared and released predator of HWA in Connecticut forests. Extensive releases of *S. tsugae* have been implemented in the most important hemlock stands in Connecticut's state forests and parks in efforts to protect native hemlocks
- Hemlock stands where the beetle has been released and established continue to exhibit sustained crown recovery with little or no tree mortality, dispensing with the potential costs of tree removal of hazard or dying trees and preserving the quality of recreational use for Connecticut's citizens
- Progress in the development of an artificial dietary supplement which aided adult and larval survival of *S. tsugae* will be now extended to other HWA predator species. A dietary supplement developed by Dr. Cohen and Dr. Cheah will now be able to improve survival and storage of mass-reared adelgid predators during shortages of prey material

Diet development for biological controls of invasive weeds

Mile-a-minute weed, *Polygonum perfoliatum*, originated from Asia and was first discovered in eastern U.S. in the 1930s and is classified as a noxious weed in Connecticut. It currently infests 9 eastern states and was first recorded in Connecticut in 1997 where it now infests portions of Fairfield and Litchfield counties. This rapidly growing prickly and prolific vine is annual in its northern range but quickly forms dense thickets which displace native vegetation and reduces plant diversity. An introduced weevil, *Rhinoncomimus latipes*, has been successfully reared and released for control of this invasive species in the Mid-Atlantic states.

However, weevil rearing is dependent on greenhouse propagation of the vine and the development of an artificial diet for mass rearing would be beneficial in improving efficiency and space required for mass production. Dr. Cheah is collaborating with Dr. Allen Cohen in a new project on the development of an artificial diet for *R. latipes* in cooperation with the Phillip Allampi Beneficial Insect Laboratory, New Jersey Department of Agriculture, Trenton, NJ.

Results:

- Dr. Cheah and Dr. Cohen have developed several base nutritional diets and extracts (solid and liquid) from mile-a-minute weeds (stems, leaves and combinations of stems and leaves) which elicit *R. latipes* feeding

- Several of the best-performing diets have kept the larvae alive for 2-4 days. With no feeding, larvae will not last outside of their host plant for more than 24-30 hours. Progress has also been made with eliminating mold development on the larval diets.

Impact: Connecticut is now an active participant in the increasingly important arena of biological control research of invasive weeds.

Chemical control of HWA

Dr. Cowles has continued to improve the understanding of chemical control of hemlock woolly adelgid with systemic insecticides. Starting with work initiated in 1999, he has found that imidacloprid (1) is slow-acting, requiring 2 years to observe the full treatment effect, (2) is much more effective as a soil application, rather than through trunk injection, (3) can provide up to 7 years of suppression of adelgid populations when applied to the soil, and (4) the tree diameter influences the effectiveness of the treatment. A field dose-response experiment conducted in Pennsylvania was very useful at determining the minimum effective dosage required for treating hemlocks of different trunk diameters. The relationship appears to be directly related to the water utilization by the tree, rather than to the biomass of the aboveground living tissue. This knowledge will allow fine-tuning of the dosage to treat trees, thereby minimizing the total amount of insecticide applied in the environment. Analysis of samples collected from hemlock trees treated over the past 8 years has revealed that the long-term effects from a soil application are mostly due to conversion of the imidacloprid active ingredient into its olefin metabolite, which is known to be about ten times as active as the parent compound. The olefin metabolite increases in concentration over two years, and then remains stable for approximately four additional years, while the imidacloprid concentrations peak in the second year after soil treatment. A field trial in the autumn of 2007 demonstrated that a new systemic insecticide, dinotefuran, is very rapidly mobilized following application to either the soil near the base of the trunk, or as a spray on the lower 4 feet of bark on the trunk itself. Adelgids nearest the tip of new growth died within approximately two weeks of insecticide application; those feeding at the base of new growth or on the previous year's growth died in about 1 or 2 months, respectively. This insecticide and application method may provide a valuable tool for saving trees in the southern Appalachian Mountains. There has been rapid expansion of hemlock

woolly adelgid populations there, which threatens to kill hemlocks there quickly because their warmer winters permit most of the adelgids to survive. Combined use of dinotefuran and imidacloprid appears to be one option for saving trees: dinotefuran acts quickly and degrades to inactive products in the foliage, whereas imidacloprid requires more time to reach toxic concentrations, and yet will provide several years of insecticidal benefit.

***Impact*:** A slow-release tablet formulation (CoreTect®) tested in Pennsylvania forests by Dr. Cowles received a Section 18 registration for use in the southern Appalachians where a higher per-acre dosage is currently used to protect dense hemlock stands. Economic impacts are difficult to estimate, but the SLN label in 5 states allows effective treatment of forest trees to maintain important environmental habitats and avoid millions of dollars in removal of hazard trees in recreational areas. In northern forests and landscapes, use of soil-applied imidacloprid has become the standard practice for arborists and homeowners for suppression of adelgid populations.

Diseased and healthy (resistant) sibling strawberry lines

***Strawberry root pest management*:**

Black vine weevil and black root rot are vexing soil-dwelling pests of perennial strawberry plantings. Dr. Cowles worked with Dr. LaMondia to identify cultivars of strawberries with resistance or tolerance to these two pests. Strawberry growers can now choose among several pest-tolerant cultivars when replanting their fields. Dr. Cowles has also used the most pest-tolerant cultivars as parents in a breeding program for further improvement. He has developed screening methods to evaluate seedling performance against these pests, resulting in several advanced selections that may be suitable for further propagation and release as new cultivars.

Annual bluegrass weevil is a pest specific to intensively managed golf course turf. Three years ago, golf course superintendents in the greater Hartford area and near New York City noted

that insecticides that they had been using to control annual bluegrass weevils were no longer effective. In a team effort including turf entomologists from 6 other states, Dr. Cowles has determined that these weevils have evolved resistance to pyrethroid insecticides. A simple test kit has been distributed to extension entomologists, USGA representatives and superintendents to determine the pyrethroid resistance status of weevils throughout the northeast and mid-Atlantic states. Resistant populations have now also been identified in eastern Pennsylvania. Collaboration with Darryl Ramoutar, a Ph.D. student at University of Rhode Island, has revealed that the pyrethroid resistance probably evolves through the following stages: simultaneous elevation in cytochrome P450-mediated monooxygenases and glutathione transferases, followed by continued increases in those enzymes' activity and increases in the activity of carboxyesterases. These enzyme families work in concert to detoxify the pyrethroids, thereby reducing the probability that the insecticide molecule can reach its target site, the voltage gated sodium channel of nerve axons. The activity of each class of detoxification enzymes is revealed by blocking their activity with insecticide synergists: piperonyl butoxide, DEM and DEF, respectively. The synergist ratio, which is the ratio of the LD50 of the population in the absence of synergist to the result in the presence of a synergist, can be used to model resistance. The product of the three synergist ratios is proportional to the log of the LD50 values for each of the populations tested in Connecticut, representing a 200-fold range in LD50 values.

***Impact*:** A deeper understanding of the pharmacology and toxicology of these pesticides and synergists that may be used in the field provides the basis for delaying or circumventing insecticide resistance. Dr Cowles developed a diagnostic assay to detect pyrethroid resistance in annual blue grass weevils that is being used in seven states.

Indoor Fungi Studies:

Dr. DeWei Li conducted research on indoor molds of human health concern, fungal succession on building materials, and infiltration of mushroom spores from outdoors into residences.

***Airborne fungi*:**

Dr. Li continues to collect air samples both indoors and outdoors in Avon on a weekly basis. This long-term study started in fall 2004 to characterize the airborne fungal concentration and compositions (types of fungi) in Connecticut, to assist establishing the baseline of exposure of residents/occupants to airborne fungi in CT, and to determine seasonal and diurnal patterns of airborne fungi, and at the same time to determine the relationship of airborne indoor fungi with outdoor ones. The samples are under ongoing analysis.

***Impact*:** Dr. Li assisted the Connecticut Health Department with interpretation of a CDC NIOSH report on a mold-contaminated state building in Hartford. His assistance should help reduce human exposure to environmental molds.

***Fungal succession on building materials*:**

Dr. Li continues working on the project of fungal succession on drywall with water damage at different levels. The data showed that fungal population composition is positively related to the level and duration of water damage. With time, the infested areas continue to

enlarge significantly, and fungal biodiversity has increased also. Fungal compositions and populations showed a succession pattern. Water-loving fungi, such as *Stachybotrys chartarum*, *Chaetomium globosum* and *Ulocladium* spp., appeared after long-term water damage and their colonies increased with time.

***Impact*:** The data indicated that severity of water damage has effects on the fungal composition on the wall units. Fungal species composition evolved on the wall units with the duration of water damage. More water-loving fungi appear under long-term water damage. These data are critical to Indoor Air Quality professionals, certified industrial hygienists, and public health professionals for determining the time line of water damage.

Stachybotrys and *Memnoniella* biosystematics study: Specimens of *Stachybotrys* and *Menoniella* were borrowed on loan from herbaria: in addition to BPI (USA), DAOM (Canada), IMI (UK), and CUP (Cornell University), more type specimens were borrowed from PDD (New Zealand, and Thailand for the study of biosystematics. Six isolates and three isolates of each species were purchased from UAMH (University of Alberta) and ATCC (American Type Culture Collection), respectively. All specimens and isolates were examined morphologically. DNA of five isolates was sequenced in collaboration with Robert Marra. ITS1 and ITS2 sequence data of 2 isolates from UAMH showed that they are *Stachybotrys eucylindrospora*. However, their conidial morphological characters indicate that they might be a different taxon.

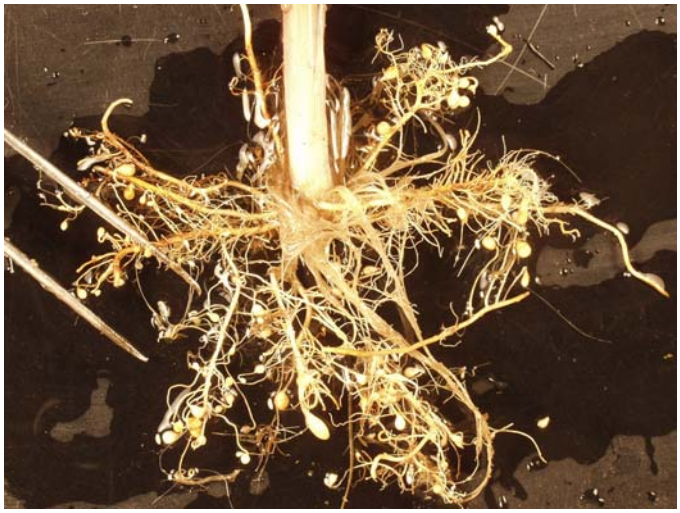
Impact: The newly described species, *S. eucylindrospora,* is new to science. In addition, the study demonstrated the importance of working with type specimens for either classic fungal taxonomy or biosystematics research. Fungal taxonomists will change behavior from the examination of local specimens to examining herbarium specimens, especially type specimens, to correctly evaluate fungal taxa. The results also raise the question whether ITS1 and ITS2 are sufficient for studying fungi at species level, as currently believed, and the use of ITS1 and ITS2 for fungal phylogenetic studies should be re-evaluated.

Metarhiziopsis microspora, a new pathogen of hemlock scale

Fungal biodiversity study in Connecticut:

Dr. De-Wei Li and his colleagues are collecting fungal specimens from various locations in CT. One specimen collected in the woods on CAES Valley Lab property is an undescribed species. It was named as *Goidanichiella cylindrospora* in a paper which will be published in Mycotaxon this summer. Dr. R. Cowles collected a specimen from the elongated hemlock scale, which is another undescribed species. In a collaboration of R. Cowles, C. R. Vossbrinck, and Dr. Li, the fungus was described as a new genus and a new species (*Metarhiziopsis microspora*). This fungus is a pathogen of the elongated hemlock scale. Two more undescribed species are under study. These undescribed species are new to science. Clearly, the bio-resources in CT are not fully studied. Fungal biodiversity is closely related to plants and their habitats. Any change in environment, climate, and vegetation may have significant effects on fungi and lead to disappearance of some fungi. We have good inventories of plants and animals in CT, but not that of fungi. It has been nearly one century since the last fungal survey in CT, it is the time to conduct a thorough fungal biodiversity study in CT before it is too late for conserving endangered fungal species.

Impact: *Metarhiziopsis microspora* could be a potential new biocontrol agent for the elongated hemlock scale. Other new species, as yet undiscovered, may be present in CT and may have utility as biocontrol agents or be useful for other purposes.



Root tip galls on salt marsh cordgrass caused by the root-knot nematode *Meloidogyne spartinae*

Salt Marsh Decline*:*

Sudden Wetland Dieback (SWD) has recently come to the attention of scientists in New England. It consists of the rapid disappearance of salt marsh *Spartina alterniflora* grass, resulting in barren mudflat that is often recognizable by remnant peat. SWD has occurred from Louisiana to Maine affecting low and high marsh sites. In New England, SWD was first

reported along the south shore of Cape Cod in 2002 where approximately 12% of emergent marsh has been converted to mudflats. SWD sites along the tidal rivers draining into Connecticut's Long Island Sound were reported in 2003. Subsequently, dieback sites have been found in all coastal New England states. Drs. LaMondia and Elmer discovered that a plant parasitic root-knot nematode, *Meloidogyne spartinae,* was associated with declining *Spartina* plants in SWD sites, but absent from sites where no SWD occurred. This nematode has been reported from other sites along the Atlantic, but this was the first report from New England. We determined that the nematode reproduced on *Spartina alterniflora* but not other salt marsh grasses such as *S. patens*, *S. cynosuroides*, *Distichlus spicata*, or *Juncus gerardii*. We sampled plants along transects in the low marsh from mean low tide to mean high tide and determined that nematode populations increased with distance from mean low tide and were greatest at mean high tide where *Spartina* may be in decline.. We also recovered *M. spartinae* for the first time from short form *S. alterniflora* plants in the high marsh above the mean high tide level. A survey of healthy and SWD sites in CT and MA was initiated and controlled interaction experiments conducted to determine if the nematode is associated with SWD sites or with other pathogens.

Impact: These results, in combination with studies of pathogenic *Fusarium* species by Dr. Elmer, may determine whether pathogens play a role in the decline of this important and productive habitat.

Biodiesel oilseed crops

Recently there has been increased interest in the United States in the development of alternative energy sources and fuels. The Connecticut Legislature has requested that The Station investigate oilseed crops for biodiesel fuels. To this end, Dr. LaMondia is evaluating alternative fuel oilseed crops either as main season summer crops or as winter cover crops with spring seed harvest. Biodiesel is an alternative, renewable fuel from vegetable oils pressed from oilseed crops. Biodiesel fuels can be used for transportation, as a source of home heating oil, or for electrical generation. The oilseed crops used for producing biodiesel are typically soybean or canola (also called rapeseed), *Brassica napus*. These crops are not high value and may not compare well with many higher-value crops grown in Connecticut. National average yields and price per acre (as reported by the National Agricultural Statistics Service) for canola and soybean for 2006 are about $150 for canola and $375 per acre for soybean. Therefore, there would likely need to be other reasons for growing these crops in addition to value as an oilseed feedstock. Dr. LaMondia is conducting research on the use of oilseed plants in integrated pest management. For example, canola/rapeseed oilseed crops may manage plant parasitic nematodes in soil. *Brassica* plants such as canola or rapeseed produce glucosinolates that hydrolyze to breakdown products such as isothiocyanates, cyanates and nitriles that may be toxic to certain nematode and fungal plant pathogens. Isothiocyanate is one of the active ingredients of soil fumigants. The use of plants or plant products incorporated into soil to deliver these breakdown products to control pests is termed biofumigation. Soybeans do not produce compounds for biofumigation, but have value in IPM as they can be grown as summer rotation crops, increase soil nitrogen levels, and manage weeds. Soybeans can be grown without fertilizers, compete well with weeds and allow use of herbicides with different activities. Soybean and *Brassica* meals have value as

organic fertilizers. About one million pounds of organic meal-based fertilizers (primarily cottonseed meal) are used each year in the Connecticut River Valley. Some growers are now producing and using their own soybeans as fertilizer supplements.

During 2006, Dr. LaMondia determined crop yields of both soybean and canola/rapeseed in field plots at the Lockwood and Windsor farms. The small plot yields compared well with national average yields. In 2007, different canola and rapeseed cultivars, as well as yellow and oriental mustards were grown to produce meals with different types and amounts of glucosinolates. The effect of six *Brassica* seed meal amendments on the viability of northern root-knot nematode (*Meloidogyne hapla*) juveniles was determined in laboratory bioassays. Seed meals from four *Brassica napus* cultivars, one *B. juncea* cv and one *Sinapis alba* cv were evaluated at rates of 0, 1, 2, and 4 mg per cm^3 soil. Root-knot nematode control differed between seed meals and nematode control ranged from 6 to 93%. In other experiments, seed meals were heated to denature the plant enzymes that break down glucosinolates to the active chemicals or not treated, and then enzyme was added to bioassay vials or not. The heat treatment did not affect results; however, the addition of enzyme to soil resulted in a significant increase in nematode control. These results indicate that certain de-oiled seed meals were more effective against root-knot nematodes and that while not necessary for activity, the addition of myrosinase enzymes to bioassay soils resulted in an increase in nematode control. Future research in cooperation with the Departments of Analytical Chemistry and Biochemistry and Genetics will seek to identify and over-express the responsible glucosinolate compounds.

Impact: These crops may maintain soil quality, protect farm sustainability by adding integrated pest management tools to manage weeds, pathogens and pests, and additionally reduce soil, groundwater and air pollution by decreasing the use of soil-applied pesticides such as fumigants to control plant pests.

Combining Canola oilseed plots for biodiesel production

Blue-mold resistant broadleaf tobacco plots at the Valley Laboratory

Tobacco pathology

A number of diseases can cause serious losses to the cigar wrapper tobacco types grown in the Connecticut River Valley and are being held in check by multiple approaches, but Dr. LaMondia's research is emphasizing breeding for plant resistance to pathogens. The breeding program seeks to develop resistance to the tobacco pathogens: *Fusarium oxysporum* (causing Fusarium wilt); *Globodera tabacum tabacum* (the tobacco cyst nematode); tobacco mosaic virus, and *Peronospora tabacina* (blue mold) for both shade and broadleaf types. The development and deployment of resistant plants is the most effective, economical and environmentally safe means of managing disease.

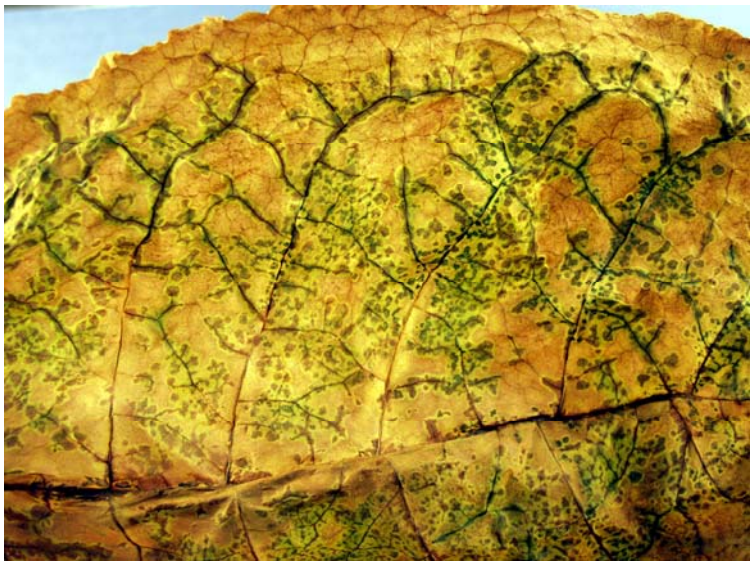
Sporulating Tobacco Blue Mold caused by *Peronospora tabacina*

Blue mold has been a recurring problem in Connecticut from 1997 through 2007, causing losses up to the tens of millions of dollars annually. Grower education about spray timing and coverage has greatly reduced blue mold severity in recent years. Tobacco lines with resistance to blue mold were collected from different sources, crossed to CT types, selected over ten generations and evaluated under field conditions in Windsor. Blue mold incidence was compared between a susceptible commercial cultivar with and without fungicides and resistant lines. Healthy leaves harvested over the length of the epidemic were nearly double for resistant lines grown without fungicide application compared to susceptible plants with commercial standard fungicides applied. The average numbers of lesions per leaf, lesion size, and number of spores produced per cm^2 reduced for resistant lines. Advanced F1 male-sterile hybrid broadleaf and shade disease-resistant lines were distributed to growers for commercial evaluation during the 2007 season. The lines appeared to have potential for commercial production, so seed of the best two lines was increased and will be tested again in 2008.

Fusarium wilt increased in severity during the 1980's and early 1990's, causing up to 20% crop losses on broadleaf tobacco. The development and release of wilt-resistant broadleaf cultivars has avoided at least $5 million per year in losses due to this disease each year since 1992. Production of CAES wilt-resistant cultivars has reduced the spread of the pathogen and kept infested fields in production without soil fumigation. All advanced shade and broadleaf lines under development continue to be screened in the field for high levels of wilt resistance. In the past year we demonstrated that Fusarium can be seed-borne and spread through plant propagation, explaining the speed of spread and extent of infested fields throughout the valley.


The tobacco cyst nematode on roots and stunting symptoms in the field

The tobacco cyst nematode (TCN) increases Fusarium wilt of broadleaf tobacco and reduces shade tobacco growth and leaf yield (losses of up to 15%). Single-gene resistance to *G. t. tabacum* has been transferred to shade and broadleaf tobaccos using both a pedigree breeding program with repeated backcrossing to Connecticut types as well as a bulk system of modified single seed descent. Tobacco cyst nematode shade tobacco lines are being crossed with blue mold-resistant parents to select for resistance to both pathogens. In field evaluations, these resistant lines reduced tobacco cyst nematode populations by 60 to 80%, similar to the effects of soil fumigation with a broad spectrum nematicide. The deployment of TCN-resistant cultivars would reduce human health risks, reduce environmental exposure to large amounts of fumigant nematicides and be more effective than soil fumigation while eliminating fumigation costs of approximately $500 per acre. In cooperation with researchers from Virginia and North Carolina, Dr. LaMondia determined that gene(s) from *Nicotiana plumbaginifolia* (Ph_p gene) that conferred resistance to race 0 of *Phytophthora nicotianae* also reduced cyst nematodes. These results indicate a close linkage or association between a likely single, dominant gene (Ph_p) for resistance to *P. nicotianae* and suppressed reproduction by the cyst nematodes *G. t. solanacearum* and *G. t. tabacum*. This gene or linked genes may result in an additional control of the cyst nematode and aid in understanding pleiotropic resistance to multiple pathogens.



Tobacco leaf with green spot caused by Tobacco mosaic virus

From 2002 to 2007, tobacco mosaic virus (TMV) infection resulted in significant commercial losses ($3 to $5 million) due to green spot development on TMV-susceptible shade and broadleaf tobacco. Our research demonstrated the association of green spot with TMV, and determined that plant resistance was the single most important factor for reducing green spot. All new shade and broadleaf lines being produced are selected for single dominant gene resistance to TMV.

Impact: The development and deployment of pathogen-resistant lines or cultivars will greatly reduce grower dependence on pesticides and allow effective disease management with reduced costs, reduced environmental contamination and reduced grower exposure to health risks. Fusarium wilt resistance has avoided about $75 million in losses over the last 15 years while keeping fields in agriculture and maintaining open space. Blue mold resistance would reduce the number of fungicide applications required at about $50 per acre per application. Tobacco cyst nematode resistance will eliminate the need for soil fumigation at $400 to $500 per acre per year.

Weed research:

Dr. Todd Mervosh conducts research on weed management in a variety of crop systems and at non-agricultural sites. In the past year, his projects included weed control experiments in ornamental plants grown in containers, Christmas trees, and pumpkins. These experiments were conducted at the CAES Valley Laboratory in Windsor and/or in growers' fields or nurseries. Dr. John Ahrens is a research partner in some experiments involving ornamentals and Christmas trees. In addition, Dr. Mervosh has projects underway to find effective and environmentally sound methods to control the following non-native invasive plants in natural areas or minimally managed habitats: common reed (phragmites), pale swallowwort, giant hogweed and Japanese stiltgrass.

Nursery ornamental weed control:

Drs. Mervosh and Ahrens conduct research as part of the USDA's IR-4 Ornamental Horticulture Program to evaluate tolerances of woody ornamental plants to herbicides that are not currently registered for use on these plants. According to the IR-4 protocol, herbicide treatments were applied over the top of plants at up to four times the labeled dosage, and all treatments were applied again 8 weeks later. In this way, plant tolerances are tested under a worst-case scenario for potential plant injury. If specific ornamental plants are highly tolerant of a herbicide tested, the IR-4 program will submit this information to the EPA and to the herbicide manufacturer, who will consider additions to the herbicide label. The eventual result is that nurseries will have more weed control options for the wide variety of plants they grow.

Based on IR-4 protocols, we conducted an experiment to evaluate tolerances of four woody plants to herbicides considered for possible ornamental use registrations. Plant injury was evaluated periodically on juniper, emerald green arborvitae, spirea and doublefile viburnum for up to 8 weeks after treatment applications. Sprayable treatments consisted of dimethenamid-p 5.9EC [BAS 656h] and mesotrione 4SC. Granular treatments consisted of pendimethalin plus dimethenamid-p 1.75G [BAS 659h], prodiamine plus sulfentrazone 0.3G [F-6875], and

flumioxazin 0.25G [BroadStar] as a standard. All herbicides were applied over the top of actively growing plants.

In summary, all four container-grown shrubs in this experiment were susceptible to mesotrione sprays, whereas these species were quite tolerant of the other herbicide treatments.

Dr. Mervosh also conducted experiments at the Valley Laboratory in 2007 to evaluate several experimental granular formulations of the preemergence herbicides flumioxazin (BroadStar) and dimethenamid (FreeHand) for weed prevention and safety to several ornamental species grown in containers. The composition of inert ingredients in the granules controls the release rate of active ingredient (the herbicide) from the granules, thus affecting the herbicidal efficacy of each formulation.

Impact: Flumioxazin has been recently registered for ornamentals, based in part on data from Connecticut.

Field-grown Ornamentals:

Drs. Mervosh and Ahrens conduct experiments each year to evaluate newly registered and experimental herbicides for efficacy and safety to woody ornamentals and conifers grown for Christmas trees. A preliminary experiment in 2007 revealed that fraser firs were quite tolerant to the new herbicide mesotrione (registered for use in corn and turfgrasses). Mesotrione is derived from a natural chemical produced by the bottlebrush shrub, and it was approved quickly by the U.S. EPA as a "reduced risk pesticide." Drs. Mervosh and Ahrens have initiated a large experiment at the Valley Lab to further investigate the herbicidal efficacy and safety of mesotrione and other new herbicides in plots containing ten different conifer species grown as nursery stock and/or Christmas trees, including spruce, fir, pine, arborvitae, yew and juniper species. Plants were transplanted into the field in April, and herbicide treatments were applied over the top of plants prior to or following emergence of weeds. Early evaluations indicate that mesotrione provides excellent control of the weeds present, and eight of the ten conifer species appear to be highly tolerant of mesotrione. This research will likely help lead to a registration for mesotrione use in conifer plantings. Mesotrione would be a more environmentally sound weed control option than some of the herbicides currently used in conifer fields.

Invasive Plant Management:

Pale Swallowwort:

At the request of conservation officials at the Silvio Conte National Fish & Wildlife Refuge (U.S. Fish & Wildlife Service), Dr. Mervosh initiated an experiment in May 2007 to evaluate several treatments for control of pale swallowwort (*Cynanchum rossicum*), a non-native invasive plant, along the slopes of Mt. Tom near Holyoke, MA. Pale swallowwort is an herbaceous perennial vine in the milkweed family. The goal is to develop an ecologically sound control strategy to prevent pale swallowwort from overtaking small populations of rare native plants on the slopes. Various herbicide treatments were applied in June and/or August 2007, and plots have been evaluated several times in 2007 and 2008. Final evaluations of pale

swallowwort population density, vigor, pod production and presence of other plant species will be done in August 2008.

Impact: Conclusions from this study will be used by the U.S. Fish & Wildlife Service and other government agencies in developing management plans for pale swallowwort on their lands.

Mile-a-Minute Weed:

Fruit of Mile-a-minute weed (*Persicaria perfoliata*)

Mile-a-minute weed (*Persicaria perfoliata*) is a fast-growing annual vine with sharp barbs on its stems. It is a recent invader in Connecticut, and so far has only been found in relatively small infestations in the southwest corner and a few other sites in the western half of the state. At the request of Mad Gardeners Inc., a gardening and conservation group based in western CT, Dr. Mervosh initiated an experiment in the spring of 2007 on a New Milford property that has had a sizeable infestation of mile-a-minute since 2005. Treatments included various herbicides (preemergence and/or postemergence), periodic mowing, repeated tillage, a 4" layer of coarse mulch, and landscape fabric. With the exception of the mulch layer, the non-chemical treatments were effective at controlling mile-a-minute but most of these treatments are primarily useful for small infestations. Application of a selective herbicide may be necessary for larger infestations. Pre-emergence treatments of pendimethalin or oxyfluorfen prevented mile-a-minute seedlings, an early post-emergence application of imazapic provided season-long control, and an application of triclopyr prior to fruit formation was effective. Other herbicide treatments were either ineffective or not selective enough.

Impact: Results of this experiment will be used to develop plans for controlling mile-a-minute where it exists, and preventing this invasive plant from spreading.

Giant Hogweed:

Dr. Mervosh has been involved for several years in a state-wide program designed to locate and eradicate giant hogweed (*Heracleum mantegazzianum*), a large perennial in the parsnip family. Giant hogweed is also listed as a federal noxious weed because of the human health risk it poses; exposure to its sap can cause severe skin burns or eye damage. He helps identify plants reported to be giant hogweed. Many reported plants are actually cow parsnip, a native plant closely related to giant hogweed, or other species that are similar in appearance.

Impact: Dr. Mervosh provides education about control information for the landowner, or with permission of the property owner, eradicates the giant hogweed plants with directed sprays of triclopyr herbicide, reducing potential health impacts to CT citizens.

Japanese Stiltgrass:

Japanese stiltgrass (*Microstegium vimineum*) is a relatively new invasive plant in Connecticut, primarily in floodplain and in the understory of forests. This non-native annual grass spreads rapidly and forms dense stands that crowd out native plants and suppress regeneration of tree seedlings. Along with Dr. Jeffrey Ward and his research group, Dr. Mervosh recently initiated an extensive study of non-chemical and herbicide-based treatments for management of Japanese stiltgrass in a woodland along the Connecticut River in East Haddam, CT. The study will continue until the fall of 2009. The parcels of land are owned by the East Haddam Land Trust and The Nature Conservancy, and the CT Department of Environmental Protection will provide funding for the project. The objective of this study is to identify at least one non-chemical and at least one herbicide-based control method that will provide excellent control of Japanese stiltgrass at reasonable cost with minimal harm to native vegetation. This information will be highly useful for the DEP, The Nature Conservancy, land trusts and other organizations that need to develop management plans for Japanese stiltgrass.

Christmas Trees

In an experiment begun in 2001 in fertile soil at the Valley Laboratory, Mr. Rathier is finding that Fraser fir Christmas trees that have never been fertilized differ very little in size and visual quality when compared to fertilized trees. While natural fertilities of other soils may not be as great as those at the Valley Lab, these results suggest that many growers could at least reduce their fertilizer use without affecting their yield or tree quality. Results of this experiment could impact the industry by helping growers realize the fertility values of their soils, possibly reducing fertilizer expenses and nutrient loss to surface and ground water.

In another experiment begun in 2001 at the Valley Lab, Mr. Rathier has found that neither Christmas tree transplant survival nor subsequent growth and quality is improved by biostimulants, mycorrhizal fungi and planting gels sold as soil amendments for use at planting.

Grading bare-root transplants by genetically related root volume however did reveal that transplants with greater volumes grow faster than those with smaller volumes, gaining a year or more before harvest. A similar experiment conducted by Mr. Rathier and Dr. Cowles revealed that root volume differences induced mechanically (by white grub injury) resulted in similar growth differences. These results could impact the industry by eliminating expensive amendments at planting and zone planting by root grade to allow for quicker rotations.

The impact of transplant survival experiments should be to help growers optimize survival and avoid costly replanting and losing time in production areas.

Tobacco nutrition

One shade tobacco grower in the valley is growing the crop under plasticulture (e.g. plastic film mulch for weed control and leaching management and drip irrigation for water and nutrient management). This method is appropriate for Connecticut tobacco but is complicated by the fact that the quality of our crops is linked to the traditional use of natural sources of nitrogen such as cottonseed meal or castor pomace. Conventional culture allows for the application of these meal types of fertilizers prior to planting and in side-dressings throughout the first 30 days after transplant in the field. Formation of raised beds and installation of the drip irrigation and plastic mulch limit the use of meals to the preplant period only. Determining how much meal to add in advance and its rate of mineralization under the plastic is a significant challenge. Additionally, amounts and timing of supplemental nitrogen applied through the drip irrigation needs to be determined. This study will continue for a few more years to work out all the possible variations of preplant and supplemental nitrogen and their affects on yield and quality. The major impact of this experiment will be to help growers reduce losses of nitrate nitrogen and other solutes to ground water, reduce fertilizer costs and improve the ability to grow a uniform crop.

SERVICE ACTIVITIES

Requests for information:

A total of 7,952 inquiries were answered at the Valley Laboratory during the past year. The majority of these queries (70%) were answered by both Mr. Thomas Rathier (4,832), and Mr. John Winiarski (838) in the inquiry office, and by Drs. LaMondia (12%), and Mervosh (7%). About 68% of the requests for information were from the public sector; the remainder was from commercial growers and pest control operators. Inquiries by subject category were as follows: arthropod pests (33%); plant diseases (10%); general horticultural information (28%); soil fertility and water issues (16%); pesticide use (8%); weed control (3%); and mammals, birds and reptiles (2%).

Continuing concern among tobacco growers over tobacco mosaic virus and the blue mold epidemic in the Connecticut River Valley spawned a large number of inquiries to Dr. James LaMondia and Thomas Rathier. Dr. LaMondia initiated and maintained the Connecticut River Valley Blue Mold Web Site to keep tobacco growers current with the progress of the disease in North America, and the potential exposure and management options in the Valley. He also

assisted with a Section 18 registration for Quadris and Manzate fungicides for control of blue mold in shade tobacco.

Inquiry office perspective: Commercial agriculture:

Mr. Rathier made 60 field visits to commercial and municipal fields, nurseries, greenhouses, Christmas tree farms, forests and private landscapes to diagnose complex problems firsthand. Some problems were solved during the visits but many required taking plant and soil samples for laboratory analyses and subsequent reports to the growers. Most inquiries from commercial agriculture came during grower visits to the diagnostic lab or during phone calls. Many diagnoses were centered on plant responses to weather conditions. The 2007 growing season started with frequent cool, very wet conditions in May and early June which got most annual crops off to very slow start. From mid June though mid October, a prolonged, progressive drought dominated growing conditions. Moderate amounts of rainfall throughout the fall helped some woody plants recover but drought related problems were reported throughout the year. Winter temperatures were moderate but several frosts and freezes in early to mid spring resulted in losses to fruit crops and early planted field crops.

Newly planted and mature Christmas trees, a crop that rarely receives irrigation, suffered significant drought-related losses with newly planted young trees dying outright and larger trees losing needles and new growth. White pine weevil, Pales weevil, spruce spider mites and elongate hemlock scale and cryptomeria scale were the insect pests most often reported. Needle diseases (Rhabdocline and Rhizosphaera needlecasts and spruce needle rust were the most reported problems.

Winter injuries were observed on overwintering woody plants in production with desiccation injuries occurring on broadleaf evergreens and conifers. Woody and herbaceous plants growing in containers outdoors in many nurseries experienced problems resulting from irrigation water shortages that limited leaching capabilities resulting in elevated soluble salt levels in potting media. Freeze and frost injuries and subsequent bacterial or fungal blights and leaf spots resulted in significant losses, especially in lilacs and rhododendrons. Continued cool and wet conditions in the spring of 2008 hampered nutrient release from slow release fertilizers resulting in some off-color new growth.

Greenhouse growers experienced a bright though difficult to heat late winter season and continued bright conditions resulted in fewer root diseases such as Pythium and foliar diseases, especially Botrytis blight. The marketing season for bedding plants was marred by a few rainy, cold weekends which limited sales.

Golf courses and turf farms experienced drought-related problems during summer and fall 2007, demanding aggressive irrigation strategies but foliar and root diseases were quite limited. Forage crops grew slowly during the drought and most growers were hampered by rains with the hay harvest on time in June 2008. Silage crop harvests were reduced in 2007 due to drought conditions.

Small fruit harvests were average during the 2007 season if irrigation was available. Spring 2008 saw frost damage to strawberries but difficult conditions for harvesting and yields were average. Tree fruits experienced an average harvest in 2007 with few foliar diseases. Pollination in the spring of 2008 was limited in some areas due to cool, cloudy weather.

Vegetable growers experienced good harvests in 2007 as long as irrigation was available. Bacterial spot and wilt diseases were less of a problem for peppers and tomatoes. Growers using plasticulture or row covers saw fewer problems despite a colder than normal start. The planting season in 2007 was plagued by prolonged by cold, wet soil conditions. Many growers had to replant fields.

Tobacco acreages did well in 2007 if irrigation was available and leaf quality and yields were the best in several years, especially for broadleaf tobacco. Blue mold appeared in only a few isolated spots throughout the Connecticut River Valley with nearly no effect on yields thanks to greater attention to fungicide spray coverage and the widespread use of the fungicides Acrobat or Forum. Ordinary insect problems, such as budworms and aphids were present in many fields. The transplant production season in spring 2007, as was the case in the three previous seasons, was hampered by significant periods of cool, dark conditions, which limited rapid growth in the greenhouse. Also present in spring 2007 was black root rot (*Thielaviopsis basicola*) and root rots caused by *Pythium* and *Rhioctonia* resulting in substantial losses of transplants. Presently, no fungicide is registered for management of this disease but growers can successfully use cultural methods to manage the disease.

COMMERCIAL AND HOME LANDSCAPES

As with commercial agriculture, weather conditions throughout the bulk of 2007 started out cool and moist but quickly progressed to drought conditions. Drought injury to woody landscape plants became obvious even during the winter with injuries to broadleaf and needled evergreens and freeze injuries to mature wood were seen as spring 2008 unfolded. Arborvitae was the top problem plant with many reasons for browned foliage. Vascular wilts, most commonly caused by Verticillium, were diagnosed in many different woody plants but most commonly in maples. More than likely the infections were made worse by the droughty conditions in this and previous seasons.

Home landscapers reported significant difficulties with transplanted trees and shrubs, due mostly to the lack of proper care. Transplant shock or failure remains the single most important cause of losses in landscapes. In some cases, field dug shrubs and trees did not have enough roots to support the transplant and soil conditions did not allow timely growth of new roots. Container-grown plants may have had too many roots that didn't allow the plant to grow new roots until too late. The highly porous conditions of container growing media create conditions where root growth dominates the space within the container and the plants do well while under daily irrigation. But once that root ball is placed in a typical landscape soil, its needs are no longer met. The plant lives on the carbohydrate reserves in the roots and stems and often do not grow new roots. Landscapers and homeowners need to take better care to prevent or limit this condition. Home landscapers with frequent irrigation habits also reported many cases of slime

molds growing on mulches, especially wood chips or locally produced bark mulch that contained large amounts of wood. The presence of wood in the mulch allows the mold fungi to grow more rapidly and the moist conditions of regular irrigation created the ideal environment for growth. Artillery fungus that "shoots" spore cases towards light colors such as structures and vehicles, also grow well in these conditions and was widely reported. Also a result of previous dark, moist growing seasons, algae and lichens were reported on a variety of surfaces including trees, paved areas, bare soil, roofs and siding.

Hemlock woolly adelgid has rebounded quite successfully in 2007-2008 after three difficult winters in a row. Cool moist conditions in the spring 2007 growing season and a moderate winter of 2007-2008 allowed many hemlocks to recover and grow more vigorously. Also plaguing hemlocks and other conifers were elongate hemlock scale and spruce spider mites.

Gypsy moths were not as widespread in most areas around the state, the result of wet conditions in June 2007. Sprays were typically not needed but homeowners and landscapers are being cautioned to scout for egg masses in the coming winter and to be prepared to spray next year. Spring 2008 conditions favored the return of natural controls. Also observed in the spring of 2008 were forest tent caterpillars. Orange striped oakworms were reported in Eastern Connecticut. Other arthropods of note throughout 2007 were white pine weevil and Pales weevil. Hard pines were once again infested with European sawflies, tip moths and pine shoot moths. Leafhoppers, lace bugs, arborvitae leaf miners were more plentiful and significant defoliation by assorted caterpillars and sawflies was observed on deciduous and evergreen plants. Also noticed were azalea bark scale, cottony camellia scale, assorted lecanium scales and white prunicola scale. Hibiscus sawfly and lily leaf beetle, both newcomers to Connecticut continued to establish populations in Connecticut. Viburnum aphids and assorted eriophyid mites were more numerous in the spring of 2007.

Diseases were less plentiful in 2007, but spring 2008 saw a return of foliar disorders such as leaf spots, blights and anthracnose. Anthracnoses have been widespread and especially problematic to sycamores, oaks, maples and birches. Cedar apple rust and other gymnosporangium rusts were quite common on many crabapples, hawthorn and shadbush. Stress-related cankers were reported on many trees, especially ornamental cherries, maples and beeches. Powdery mildew was a problem on many different broadleaf trees and shrubs as well as herbaceous plants. Conifers were plagued by needlecasts, needle rusts, and tip blights.

Home lawns experienced dryer conditions throughout the summer of 2007 that resulted in fewer diseases but more substantial losses due to drought. Disease pressure was much lower on high maintenance lawns, but summer patch, dollar spot, leaf spots, Pythium and red thread were all observed. Large numbers of scarab beetles adults were reported in the spring of 2007 and white grub injury was widespread in droughty lawns. Chinch bugs were a problem also. Bluegrass billbug outbreaks have been observed on a few occasions and only on sodded areas. Ground ivy, violets, corn speedwell and yellow nutsedge were the most important weeds in lawns. Poor crabgrass management was a common observation due mostly to home landscapers applying pre-emergent controls too early in the season followed by heavy rains and cool conditions. Crabgrass germinated late in most lawns and management compounds were below

the seed by then. Moss colonization of poor turf areas received plenty of attention from homeowners, as well.

Management strategies offered for all pests include cultural and sanitary approaches as the primary effort with low impact pesticides as a second effort, and lastly, stronger pesticides when other approaches do not succeed.

Wildlife and Structural Pests

Animal problems were numerous throughout the year with most inquiries concerning squirrels, chipmunks, moles, voles, rabbits, woodchucks, skunks and snakes.

Insects that bother humans were of concern to many homeowners. Mosquito problems were reduced in the spring of 2007 due to reduced rainfall. Many ticks were submitted for identification. All black legged ticks were forwarded to the lab in New Haven for spirochete analysis. Wasps, especially German yellow jackets and solitary ground bees were bothersome to many. Ground dwelling bees have been increasing in numbers in recent years causing problems for home landscapes in the spring but perhaps filling a niche for pollination needs. An interesting observation is an increase in oil or blister beetles in the genus Meloe in the fall. Some of these beetles are predaceous on ground bees.

Among arthropods found inside structures, carpenter ants, termites, black and varied carpet beetles, ground beetles, grass carrier wasps, cigarette beetles, larder beetles, acorn weevils, sawtoothed grain beetle, confused flour beetles and spiders received the most attention. Also noted were multicolored Asian lady beetles, squash bugs, western conifer seed bugs, boxelder bugs, clover mites, assorted food infesting beetles, ground beetles, rove beetles, Indian meal moths and centipedes and millipedes. A continued trend of bed bugs being submitted in greater numbers continued in the past year.

Where management strategies for indoor and other structural pests were necessary, most homeowners chose baiting and/or sanitation rather than pesticide use.

Soil testing:

A total of 5,086 soil tests were expertly performed by Mr. John Winiarski during the past year. About 65% were performed for commercial growers, 30% for homeowners, 3% for municipalities, and the remainder for Station research. Of the 3,294 commercial samples submitted, 55% were for landscapers; 22% for tobacco growers; 8 % for vegetable growers, 5% for nursery growers; 2% for golf course superintendents; 2% for Christmas tree growers; 2% for fruit growers, and the remainder for others.

Gordon S. Taylor Conference Room:

Many agricultural organizations used the conference room at the Valley Laboratory regularly for their meetings. During the past year, 28 different groups used the room on 93 occasions. Our most frequent users were the Connecticut Farmland Trust, Farm Wine Council, the CT Wine Association, Connecticut Rhododendron Society, Connecticut Chapter of the National Organic Farmers Association, Connecticut Department of Environmental Protection, Connecticut Farm Fresh, Connecticut Greenhouse Grower's Association, Connecticut Nursery and Landscape Association, and Connecticut Invasive Plants Workgroup. Jane Morrison scheduled the appointments and James Preste arranged the furniture for scheduled meetings and ensured that the room was available after hours.

BULLETINS OF THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION PUBLISHED DURING 2007-2008

1009 Seed Germination and Purity Analysis – 2007. 13 pages. Sharon M. Douglas and Mary K. Inman. (2007)

1010 Tick Management Handbook. An integrated Guide for Homeowners, Pest Control Operators, and Public Health Officials for the Prevention of Tick-Associated Disease. Revised edition. 79 pages. Kirby C. Stafford, III. (2007)

1011 Quandaries of Forest Area, Volume, Biomass and Carbon Explored with the Forest Identity. 13 pages. Paul E. Waggoner, Jesse H. Ausubel. (2007)

1012 Pesticide Residues in Produce Sold in Connecticut 2006 With A Comparison of Two Sample Preparation Methods. 12 pages. Walter J. Krol, Brian D. Eitzer, Terri Arsenault, and MaryJane Incorvia Mattina. (2007)

1013 Fly Management Handbook. A Guide to Biology, Dispersal, and Management of the House Fly and Related Flies for Farmers, Municipalities, and Public Health Officials. 37 pages. Kirby C. Stafford, III. (2008).

SCIENTIFIC JOURNAL ARTICLES PUBLISHED BY OUR STAFF DURING 2007-2008

DEPARTMENT OF ANALYTICAL CHEMISTRY

Mattina, M. J. I, W. A. Berger and B. D. Eitzer. 2007 Factors affecting the phytoaccumulation of weathered, soil-borne organic contaminants: analyses at the *ex Planta* and *in Planta* sides of the plant root. *Plant and Soil*: **291(1)** 143-154.

Eitzer, B. D. 2007. "Analysis of Neonicotinoid Pesticides in Bee Pollen by LC/MS/MS," presented at the 44th Florida Pesticide Residue Workshop, July 22-25, 2007 in St. Pete Beach, FL

Eitzer, B. D. and K. A. STONER. 2008. "Honey Bee Exposure to Pesticides," presented at the 2nd Connecticut Conference on Natural Resources, March 10, 2008 in Storrs, CT

Eitzer, B. D. 2008. "Use of Ion Trap LC/MS at The Connecticut Agricultural Experiment Station" presented at the Food Emergency Response Network CAP Analysts Meeting April 21-25, 2008 in Davis, CA

Krol, W. J. 2007. "Pesticide Residues in Produce Sold in Connecticut: A Comparative Study of Present and QuEChERS Methodology," presented at the Florida Pesticide Residue Workshop held July 22-25, 2007 in St. Pete Beach, FL

Riggs, A. G., D. M. Borth, D. G. Tutty, W. S. Wu. Collaborators: B. Barclay, N. Betrand, A. Burns, P. Cassidy, J. Cobra, W. Krol, R. LaForge, T. Phillips, L. Podhorniak, D. Rains, J. Rose, C. Simmons, S. Summer. 2008. "Determination of Hydrazine in Maleic Hydrazide Technical and Pesticide Formulations by Gas Chromatography: Collaborative Study. Journal of AOAC Int., 91(1), 5-12

DEPARTMENT OF BIOCHEMISTRY AND GENETICS

Dingman, Douglas. 2008. Geographical Distribution of Milky disease Bacteria in the Eastern United States Based on Phylogeny. 97:171-181.

DEPARTMENT OF ENTOMOLOGY

Anderson, J. F., A. J. Main, F. J. Ferrandino, and T. G. Andreadis. 2007. Nocturnal activity of mosquitoes (Diptera: Culicidae) in a West Nile virus focus in Connecticut. J. Med. Entomol. 44:1102-1108

Anderson, J. F. and L. A. Magnarelli. 2008. Biology of ticks. Infect Dis. Clin. N. Amer. 22:195-215.

Anderson, J. F., A. J. Main, K. Delroux, and E. Fikrig. 2008. Extrinsic incubation periods for horizontal and vertical transmission of West Nile virus by *Culex pipiens pipiens* (Diptera: Culicidae. J. Med. Entomol. 45: 445-451.

Bai, F, T. Town, D. Pradhan, J. Cox, Ashish, M. Ledizet, J. F. Anderson, R. A. Flavell, J. K. Krueger, R. A. Koski, and E. Fikrig. 2007. Antiviral peptides targeting the West Nile virus envelope protein. J. Virol. 81: 2047-2055.

Kong, K-F., X. Wang, J. F. Anderson, E. Fikrig, R. R. Montgomery. West Nile virus attenuates activation of primary human macrophages. Viral Immunology 21:78-82.

Li, X., Pal, U., Ramamoorthi, N., Liu, X., Desrosiers, D. C., Eggers, C. H., Anderson, J. F. , Radolf, J. D., and Fikrig, E. 2007. The Lyme disease agent *Borrelia burgdorferi* requires BB)690. Dps homologue, to persist with ticks. Mol. Microbiol 63: 694-710.

Li, X., G. Neelakanta, X. Liu, D. S. Beck, F. S. Kantor, D. Fish, J. F. Anderson, and E. Fikrig. The role of outer surface protein D in the *Borrelia burgdorferi* life cycle. Infect Immun. 75:4237-4244.

Li, X., Pal, U., Ramamoorthi, N., Liu, X., Desrosiers, D. C., Eggers, C. H., Anderson, J. F., Radolf, J. D., and Fikrig, E. 2007. The Lyme disease agent *Borrelia burgdorferi* requires BB0690, Dps homologue, to persist with ticks. Mol. Microbiol 63: 694-710.

Maier, C. T. 2007. Distribution and hosts of *Callidiellum rufipenne* (Coleoptera: Cerambycidae), an Asian cedar borer established in the eastern United States. J. Econ. Entomol. 100:1291-1297.

Maier, C. T. 2007. Wood boring beetles threaten Connecticut forests. NRC Connections (Newletter of the Natural Resources Council of Connecticut). Winter 2007:2.

Maier, C. T. 2008. Emergence, trapping, and seasonal abundance of adult Cerambycidae (Coleoptera) associated with Cupressaceae in Connecticut. J. Econ. Entomol. 101:430-437.

Narasimhan, S., K. DePonte, N. Marcantonio, X. Liang, T. E. Royce, K. F. Nelson, C. Booth, B. Koski, J. F. Anderson, F. Kantor, and E. Fikrig. 2007. Immunity against *Ixodes scapularis* salivary proteins expressed within 24 h of attachment thwarts tick feeding and impairs *Borrelia* transmission. Plos PLoSONE@plos.org. 2 (5):e451

Pal, U., J. Dai, G. Neelakanta, P. Luo, M. Kumar, P. Wang, J. F. Anderson, and E. Fikrig. 2008. A differential role for BB036 in the persistence of *Borrelia burgdorferi* in mice and ticks. J. Infect. Dis. 197:148-155.

Ridge, G. E. 2008. Adult Heteropteran Thoracic Endoskeleton (Insecta: Hemiptera) A Family-Level Study. Thesis. 950pp.

Ridge, G. 2008. A homeowner's guide to the human bed bug *Cimex lecturlaris* L., *C. Hemipterus* Fbr. (Cimicidae; Heteroptera). Translated into Spanish and Manderin. Station Fact Sheet.

Ridge, G. 2008. Carpenter ants (Camponotus sp.) Station Fact Sheet.

Ridge, G. 2008. Cat flea (*Ctenocephalides felis* (Bouche)) revision. Station Fact Sheet.

Rutledge, C.E., D.K Young. 2007. First report of an attractant for a tumbling flower beetle (Coleoptera: Mordellidae). Environ. Entomol. 36(4):894-898 (referenced in The IPM Practitioner, Monitoring the Field of Pest Management 26(5/6):15).

Smith, Victoria L., Forest Health Outlook for 2008; printed in the Connecticut Arborist, volume XIX, number 1, page 1.

Stoner, K. A. 2007. Strategies to control insects in successive plantings in high tunnels. Proceedings of the New England Vegetable and Fruit Conference. Online at: http://www.newenglandvfc.org/proceedings.htm.

Stafford, K. C. 2007. Tick Management Handbook: An integrated guide for homeowners, pest control operators, and public health officials for the prevention of tick-associated disease, 2nd edition. New Haven, CT: The Connecticut Agricultural Experiment Station, Bull. No. 1010.

Stafford, K. C. 2008. Fly Management Handbook: A guide to biology, dispersal, and managment of the house fly and related flies for farmers, municipalities, and public health officials. New Haven, CT: The Connecticut Agricultural Experiment Station, Bull. No. 1013 (illustration and text on cluster flies contributed by Gale Ridge).

Stoner, K. A. 2008. What is the effect of imidacloprid on bees? Connecticut Gardener, January, 2008.

Stoner, K. A. 2008. A community farm in every town. Gleanings, CT NOFA.

DEPARTMENT OF FORESTRY AND HORTICULTURE

Gent, M. P. N., J. C. White, B. D. Eitzer, M. J. I. Mattina. 2007. Modeling the difference among cucurbita in uptake and translocation of *p,p*'-dichlorophenyl-1,1-dichloroethylene. Environ. Toxicol. Chem. 26:2476-2485.

Gent, M. P. N., J. C. White, Z. D. Parrish, M. Iseleyen, B. D. Eitzer, M. J. I. Mattina. 2007. Uptake and translocation of *p,p'*-dichlorodiphenyldichloroethylene supplied in hydroponics solution to Cucurbita. Environ. Toxicol. Chem. 26:2467-2475.

Gent, M. P. N. 2007. Using forced air heat to warm the soil. Proceedings New England Vegetable and Fruit Conference, Manchester NH, p 97-100.

Gent, M. P. N. 2008. Effect of degree and duration of shade on quality of greenhouse tomato. (Abstract) NE regional ASHS meeting, New Brunswick NJ, January 2008. HortScience 43(3):591

Maynard, A. A. 2007. Heirloom tomato trials - 2004-2006. Connecticut Agricultural Experiment Station Bulletin 1008, May, 2007. 11 pp.

Maynard, A. A. 2008. Experiment Station investigates new specialty crops: heirloom tomatoes. Connecticut Weekly Agricultural Report. Vol. LXXXVIII No. 4. January 23, 2008 pp 1 and 3.

Maynard, A. A. 2008. Planning your garden. Station Fact Sheet.

Maynard, A. A. 2008. Planting your garden. Station Fact Sheet.

Maynard, A. A. 2008. Mulches. Station Fact Sheet.

Maynard, A. A. and D. E. Hill. 2008. How to grow globe artichokes in Connecticut. Station Fact Sheet.

Nail, W. R. 2007. Trellis construction for the long haul. P. 283-286. *In* Proceedings of the 2007 New England Vegetable and Berry Conference. 309p.

Nail, W. R. 2007. Critical issues in early vineyard establishment. P. 268-272. *In* Proceedings of the 2007 New England Vegetable and Berry Conference. 309p.

Ward, J. S., and T. Mervosh. 2008. Reducing browse damage on eastern white pine (*Pinus strobus*) in southern New England, USA. Forest Ecology and Management 255(5-6): 1559-1567.

Ward, J. S. 2008. Crop-tree release increase growth of red oak sawtimber: 12 year results. P.457-465 *In* Proceedings 16th Central Hardwood Conference. USDA Forest Service General Technical Report NRS-P-24. 595 p. [CD-ROM].

Ward, J. S. 2007. Crop-tree release increase growth of black birch in southern New England. Northern Journal of Applied Forestry. 24(2): 117-122.

Ward, J. S. 2007. Defoliation and oak mortality in southern New England. P.214-221 *In* Proceedings 15th Central Hardwood Conference. USDA Forest Service General Technical Bulletin SRS–101. 770p. [CD-ROM].

Williams, S. C., J. S. Ward, and U. Ramakrishnan. 2008. Endozoochory by white-tailed deer (*Odocoileus virginianus*) across a suburban/woodland interface. Forest Ecology and Management 255: 940–947.

DeNicola, A. J. and S. C. Williams. 2008. Sharpshooting suburban white-tailed deer reduces deer-vehicle collisions. Human-Wildlife Conflicts 2:28-33.

Williams, S. C. and J. S. Ward. 2008. Increased white-footed mouse and blacklegged tick abundances in Japanese barberry infestations (Abstract). 64th Annual Northeast Fish and Wildlife Conference. Galloway, NJ. April 28-30th.

DEPARTMENT OF PLANT PATHOLOGY AND ECOLOGY

Anagnostakis, S. L. 2007. Effect of shade on growth of seedling American chestnut trees. Northern Journal of Applied Forestry 24(4):317-318.

Balogh, B., B. I. Canteros, R. E. Stall, and J. B. Jones. 2008. Control of citrus canker and citrus bacterial spot with bacteriophages. Plant Disease 92:1048-1052.

Boehm, M. T., D. E. Aylor, and E. J. Shields. 2008. Maize pollen dispersal under convective conditions. Journal of Applied Meteorology and Climatology 47:291-307.

Datnoff, L. E., W. H. Elmer, and D. N. Huber, eds. 2007. *Mineral Nutrition and Plant Disease.* APS Press, St. Paul, MN.

Douglas, S. M. and M. K. Inman. 2007. Seed germination and purity analysis – 2007. Connecticut Agricultural Experiment Station Bulletin 1009, 13 pages.

Elmer, W. H. 2007. Chlorine and Plant Disease. Pages 189-202, In: *Mineral Nutrition and Plant Disease.* Eds. Datnoff, L. E., Elmer, W. H. and Huber, D. N. 2007 APS Press. St. Paul, MN.

Elmer, W. H. 2007. Survey of *Fusarium* spp. associated with *Spartina* spp. from Atlantic states and their pathogenicity to *S. alterniflora*. (Abstr.) Phytopathology 97:S32.

Elmer, W. H., C. L. Robertson, S. Useman, R. L. Schneider, and K. O'Donnell. 2007. *Fusarium* species associated with declining *Spartina* spp. in areas affected by sudden wetland dieback. (Abstr.) Phytopathology 97:S178.

Elmer, W. H. 2008. Biological and biorational fungicides. Nursery Management & Production (NMPRO) 24(8):63-66

Elmer, W. H. 2008. Biological fungicides. In: Proceedings of the Society of American Florists 24th Annual Conference on Pest and Disease Management in Ornamentals, C. Y. Warfield and R. A. Cloyd (editors), 28 Feb-1 Mar 2008, Atlanta, GA, pages 66-71.

Elmer, W. H. 2008. Cultural and microbiological treatments to overcome the replant problem in asparagus. Acta Horticulturae 776:145-152.

Elmer, W. H. 2008. Does applying salt (NaCl) increase spear earliness? Acta Horticulturae 776:69-74.

Elmer, W. H. 2008. Fighting Fusarium on cut flowers. Association of Specialty Cut Flower Growers Quarterly Newsletter 20(2):26-28.

Elmer, W. H. 2008. Management of Fusarium diseases. In: Proceedings of the Society of American Florists 24th Annual Conference on Pest and Disease Management in Ornamentals, C. Y. Warfield and R. A. Cloyd (editors), 28 Feb-1 Mar 2008, Atlanta, GA, pages 88-89.

Elmer, W. H. 2008. Preventing the spread of Fusarium wilt of *Hiemalis begonias* in the greenhouse. Crop Protection 27:1078-1083.

Elmer, W. H. 2008. Use of a pre-plant corm treatment to suppress Fusarium corm rot of gladiolus. (Abstr.) Phytopathology 98:S207.

Elmer, W. H., S. F. Covert, and K. O'Donnell. 2007. Investigations of an outbreak of Fusarium foot and fruit rot of pumpkins within the United States. Plant Disease 89:1142-1146.

Elmer, W. H., M. Daughtrey, K. Rane, and M. M. Jimenez-Gasco. 2007. First report of Fusarium wilt of *Coreopsis verticillata* 'Moonbeam' caused by *Fusarium oxysporum* in a Midwestern nursery. (Abstr.) Plant Disease 91:1519.

Elmer, W. H., M. M. Jimenez-Gasco, and M. L. Daughtrey. 2008. The pathogenicity and phylogeny of *Fusarium oxysporum* isolates on *Coreopsis verticillata* 'Moonbeam.' (Abstr.) Phytopathology 98:S51.

Elmer, W. H. and R. E. Marra. 2008. Taxonomy and phylogeny of pathogenic and nonpathogenic *Fusarium* spp. to *Spartina alterniflora*. In: Proceedings of the Biannual Meeting of the New England Estuarine Research Society, 1-3 May 2008, Portsmouth, NH, page 9.

Elmer, W., R. McGovern, and D. Geiser. 2008. Fusarium wilt of China asters. Special Research Report #124 - Integrated Management of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-124/

Elmer, W., R. McGovern, and D. Geiser. 2008. Management of Fusarium corm rot of gladiolus. Special Research Report #125 - Integrated Management of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-125/

Elmer, W., R. McGovern, and D. Geiser. 2008. Management of Fusarium wilt of *Hiemalis begonias*. Special Research Report #126 - Integrated Management of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-126/

Elmer, W. H., J. A. LaMondia, C. L. Robertson, S. Useman, R. L. Schneider, K. O'Donnell, R. Marra, and F. L. Caruso. 2007. Incidence of plant pathogens in salt marshes affected by sudden wetland dieback. Pg. 57. In: Proceedings of the Biennial Meeting of the Estuarine Research Foundation, 4-8 November 2007, Providence, RI.

Elmer, W. H., J. A. LaMondia, R. Marra, and F. Caruso. 2008. Incidence and characterization of plant pathogens in New England salt marshes affected by sudden vegetation dieback. Proceedings of the Connecticut Conference on natural Resources.

Ferrandino, F. J. 2008. Effect of crop growth and canopy filtration on the dynamics of plant disease epidemics spread by aerially dispersed spores. Phytopathology 98:492-503.

Geiser, D. M., F. A. Nalim, R. J. McGovern, and W. H. Elmer. 2008. Molecular identification of fusarial floricultural pathogens. Special Research Report #128, Integrated Management

of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-128/

Gilbert, M. L., C. R. Semer IV, A. G. Bisson, R. J. McGovern, W. H. Elmer, and D. M. Geiser. 2008. Evaluation of chemical disinfestation of styrofoam. Special Research Report #127, Integrated Management of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-127

Gilbert, M. L., C. R. Semer IV, R. J. McGovern, W. H. Elmer, and D. M. Geiser. 2008. Sensitivity of *Fusarium oxysporum* from ornamentals to selected fungicides. Special Research Report #129, Integrated Management of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-129-sensitivity-of-fusarium-oxysporum-from-ornamentals-to-selected-fungicides/

Jones, J. B., L. E. Jackson, B. Balogh, A. Obradovic, F. B. Iriarte, and M. T. Momol. 2007. Bacteriophages for plant disease control. Annual Review of Phytopathology 45:7.1-7.18.

McGovern, R. J., R. Singh, L. R. Myers, W. H. Elmer, and D. M. Geiser. 2008. Evaluation of fungicide combinations for reduction of *Fusarium solani* infection of caladium tubers. Special Research Report #123 - Integrated Management of Fusarium in Florists' Crops. http://endowment.org/archives/2008/04/special-research-report-123

DEPARTMENT OF SOIL AND WATER

Andreadis, T. G., J. F. Anderson, P. M. Armstrong, and A. J. Main. 2008. Isolations of Jamestown Canyon virus (Bunyaviridae: *Orthobunyavirus*) from field-collected mosquitoes (Diptera: Culicidae) in Connecticut, USA: a ten-year analysis, 1997 - 2006. *Vector-Borne and Zoonotic Dis.* 8:175-188.

Armstrong, P. M. and T. G. Andreadis. 2007. Genetic relationships of Jamestown Canyon virus strains infecting mosquitoes collected in Connecticut, USA. *Am. J. Trop. Med. Hyg.* 77:1157-1162.

Armstrong, P. M., T. G. Andreadis, J. F. Anderson, J. W. Stull, and C. N. Mores. 2008. Tracking eastern equine encephalitis virus perpetuation in northeastern U.S. by phylogenetic analysis. *Am. J. Trop. Med. Hyg.* 79:291-296.

Brown, H. E., M. A. Diuk-Wasser, T. G. Andreadis, and D. Fish D. 2008. Remotely-sensed vegetation indices identify mosquito clusters of West Nile virus vectors in an urban landscape in the northeastern US. *Vector-Borne Zoonotic Dis*. 8:197-206.

Bugbee, G. J., R. Selsky, and J. C. White. 2008. Control of variable watermilfoil in Bashan Lake 2007. CAES Technical Report for town of East Haddam and Bashan Lake Association.

Bugbee, G. J., R. Selsky, and M. Marko, 2007 Invasive aquatic plants in Lakes Candlewood, Lillinonah and Zoar. Technical Report to FirstLight Power Resources. 101 pp.

Capers, R. S., R. Selsky, G. J. Bugbee, J. C. and White. 2007. Aquatic plant community invasibility and scale dependent patterns in native, invasive species richness. *Ecology* 88:3135-3143.

Collins, C., J. C. White, and S. Rock. 2007. Plant uptake of organic chemicals: Current developments and recommendations for future research. *Environ. Tox. Chem.* 12:2465-2466.

Huang, S., D. Sun, and L. B. Brattsten. 2008. Novel cytochrome P450s, CYP6BB1 and CYP6P10, from the salt marsh mosquito, *Aedes sollicitans* (Walker) (Diptera: Culicidae). *Arch. Insect Biochem. Physiol.* 67:139-154.

Linthicum, K. J., A. Anyamba, S. C. Britch, J. P. Chretien, R. L. Erickson, J. Small, C. J. Tucker, K. E. Bennett, R. T. Mayer, E. E. Schmidtmann, T. G. Andreadis, J. F**.** Anderson, W. C. Wilson, J. E. Freier, A. M. James, R. S. Miller, B. S. Drolet, S. N. Miller, C. A. Tedrow, C. L. Bailey, D. A. Strickman, D. R. Barnard, G. G. Clark, and L. Zou. 2007. A Rift Valley fever risk surveillance system for Africa using remotely sensed data: potential for use on other continents. *Vet. Ital.* 43:663-674

Vossbrinck, C. R. and T. G. Andreadis. 2007. The phylogenetic position of *Ovavesicula popilliae* (Microsporidia) and its relationship to *Antonospora* and *Paranosema* based on small subunit rDNA analysis. *J. Invertebr. Pathol.* 96: 270-273.

White, J. C. 2008. Phytoremediation: The use of plants to remove persistent organic pollutants (POPs) from soil. Connecticut Weekly Agricultural Report, March 5th issue, Connecticut Department of Agriculture, Hartford, CT.

VALLEY LABORATORY

Ahrens J. F. and M. Newton. 2007. Benefits of the Triazine Herbicides in the Production of Ornamentals and Conifer Trees. Book Chapter 13 in The Triazine Herbicides. Elsevier Science Publishers pps. 225-234.

Ahrens, J. F. and T. L. Mervosh. 2008. Tolerance of fraser fir to herbicides applied before and after bud break. Proceedings, Northeastern Weed Science Society 62:81.

Ahrens, J. F. 2008. Wouldn't it be loverly if weeds were not a problem for Christmas tree growers? The Real Tree Line. Connecticut Christmas Tree Growers Assoc. Magazine 48(1) 14-15.

Ahrens, J. F. and M. Patmos. 2008. New England Guide to Chemical Weed and Brush Control in Christmas Trees. Cooperative Bulletin with UNH – 14 pages.

Cowles, R. S. 2007. New insights into biology and management of annual bluegrass weevil. Connecticut Clippings 41(4): 10 – 11.

Gugino, B. K., G.S. Abawi, J.A. LaMondia, and D.A. Neher. 2008. Train-the-trainer workshops as a platform for disseminating applied nematological research to vegetable and small fruit stakeholders in the Northeast. Phytopathology 98(6):S63 http://www.apsnet.org/meetings/2008/abstracts/a08ma306.htm.

Halbrendt, J. M., J. A. LaMondia, and I. A. Zasada. 2008. Evaluation of millet and rapeseed as rotation or green manure crops to control nematodes in orchard replant sites. Proceedings of the Fifth International Congress of Nematology.

Halbrendt, J. M., I. A. Zasada and J. A. LaMondia. 2008. Evaluation of Canadian Forage Pearl Millet as a rotation or green manure crop to control lesion and dagger nematodes. Pennsylvania Fruit News 87(1):39-42.

LaMondia, J. A. 2008. Early crop root destruction for management of tobacco cyst nematodes. Journal of Nematology 40(1):26-29.

LaMondia, J. A. 2008. The association of tobacco mosaic virus with green spot of cured tobacco leaves. Plant Disease 92:37-41.

LaMondia, J. A. 2008. Connecticut River Valley Blue Mold Web Page. CAES. URL:http://www.ctvalleytobacco.org

LaMondia, J. A. and J. M. Halbrendt. 2008. The effects of Brassica seed meal amendments on *Meloidogyne hapla* viability in laboratory bioassays. Proceedings of the Third International Biofumigation Symposium.

LaMondia, J. A. 2008. Actigard increases fungicide efficacy against *Peronospora tabacina*, cause of tobacco blue mold. Phytopathology 98(6):S207 http://www.apsnet.org/meetings/div/ne07abs.asp

Li, D-W, R. S. Cowles, and C. R. Vossbrinck. 2008. *Metarhiziopsis microspora* gen. et sp. nov. associated with the elongated hemlock scale. Mycologia 100: 460-466.

Li, D. W. and C. Yang. 2008. Spore counting. In "Recognition, Evaluation & Control of Indoor Mold" AIHA Green Book.

Li, D. W. and G. H. Zhao. 2007. *Goidanichiella cylindrospora* sp. nov. from Connecticut, USA. Mycotaxon 101: 41-45.

Li, X., R. S. Cowles, E. A. Cowles, R. Gaugler, and D. Cox-Foster. 2007. Relationship between the successful infection by entomopathogenic nematodes and the host immune response. International Journal for Parasitology 37: 365 – 374.

Mervosh, T. L. and J. F. Ahrens. 2008. Safety and efficacy of flumioxazin as a preemergence herbicide in nursery containers. Weed Science Society of America Abstracts, Vol. 48 [online access only (www.wssa.net)].

Mervosh, T. L. and J. F. Ahrens. 2008. Tolerance of container-grown ornamentals to experimental and registered herbicides. Proceedings, Northeastern Weed Science Society 62:82.

Rathier, T. 2007. Cultural and Pest Management Update. Real Tree Line 47(3):6-7.

Rathier, T. 2007. Cultural and Pest Management Update. Real Tree Line 47(4):6-7.

Rathier, T. 2008. Cultural and Pest Management Update. Real Tree Line 48(1):6-7.

Rathier, T. 2008. Cultural and Pest Management Update. Real Tree Line 48(2):6-7.

Rathier, T. and M. Brown. 2008. Improvement in leaf quality of shade grown tobacco with supplemental soluble N applications under plasticulture. Proceedings 34th National Agricultural Plastics Congress.

Zhao G.H. and Li D.W. 2007. Biology of lignicolous fungi: cell biology and morphology. Journal of Jiangsu Polytechnic College of Agriculture and Forestry 2007 (2): 40-42.

Zhao G.H. and Li D.W. 2007. First Report of *Memnoniella echinata* from *Pinus thunbergii*. Journal of West China Forestry Science 36(3): 78-79.