Bulletin 349 March, 1933

CONNECTICUT STATE ENTOMOLOGIST
THIRTY-SECOND REPORT
1932

W. E. BRITTON, PH.D.
State Entomologist

Connecticut
Agricultural Experiment Station
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CONNECTICUT STATE ENTOMOLOGIST

THIRTY-SECOND REPORT

1932

W. E. Britton

ENTOMOLOGICAL FEATURES OF 1932

The winter of 1931-32 was rather mild. Temperatures were not very low and snowfall was not heavy or frequent. Cool weather in May and June retarded the germination of seeds and many fields of high temperature crops like corn and beans had to be planted over. The failure was doubtless due to the fact that under such conditions the seeds usually become infested with seed corn maggot, which soon destroys the starch and protein, so that the seeds cannot form plants. Rainfall in June, July, and August was considerably below normal and certain crops in some localities were severely injured. Precipitation was normal in September, but unusually heavy in October.

Some of the principal features of the season in the insect world were the severe injury throughout the state by the Mexican bean beetle and the gladiolus thrips. The elm leaf beetle was prevalent, but somewhat less destructive than in 1931. The Oriental fruit moth was less prevalent than in 1931, and the white apple leafhopper was very abundant. No particular spread of the satin moth was recorded. Certain oak trees in Brooklyn and Killingly were stripped by gipsy moth caterpillars. The Japanese beetle has increased in abundance and was found this season for the first time in Bristol, East Hartford, Hamden, Milford, Mystic, Shelton, Waterbury and West Haven. The European corn borer has also increased in abundance generally and may soon be expected to injure the corn crop in all sections of the state. The eastern tent caterpillar was more prevalent than in 1931 and is on the increase.

The following pages contain an insect pest survey of the season, arranged in brief form to save space and expense in printing. The more important matters are treated in greater detail in the separate articles and notes appearing elsewhere in this report.

INSECT RECORD FOR 1932

Fruit Insects

Name	Locality, host, date and remarks
Aegeria exitiosa, peach borer.	Foxon, Jan. 23; Bridgeport, June 22. Work apparent in peach orchards, Sept. 24.
Agrilus ruficollis, red-necked cane borer.	Bristol, April 26; Waterbury, Oct. 3. Tunneling in raspberry canes.
Alsophila pometaria, fall canker worm.	North Haven, June 15. Had injured apple foliage severely.
Anuraphis roseus, rosy apple aphid.	Eggs scarce in spring; abundant June 10, Wallingford; June 23, New Haven County.
Aphis pomi, green apple aphid.	Eggs scarce in spring, abundant in July, Litchfield County.
Archips rosana, rose leaf folder.	New Haven, June 4. Feeding on apple.
Aspidiotus perniciosus, San José scale.	Norwichtown, Jan. 21; Windsor, April 22; on apple, New Haven, March 14; on Japanese cherry, Southington, May 21; also on currant.
Cacoecia argyrospila, fruit tree leaf roller.	Wallingford, June 10. Had injured one apple orchard.
Carpocapsa pomonella, codling moth.	East Haddam, Dec. 15; Branford, Oct. 24. Present in usual abundance.
Ceresa bubalus, Buffalo tree hopper.	Kensington, April 20; Newington, June 17. Egg scars on apple twigs.
Conotrachelus nenuphar, plum curculio.	Plantsville, Dec. 24, June 21; Bridgeport, Trumbull, June 22; Milford, July 1. Injured apple, cherry, peach and plum.
Eriophyes pyri, pear leaf blister mite.	Old Lyme, May 20; Torrington, Aug. 30. Both on pear.
Eriosoma lanigera, woolly apple aphid.	Norwichtown, Jan. 21, on apple.
Erythraspides pygmaea, grape sawfly.	Sharon, July 18. Larvae feeding on grape foliage.
Euphoria fulgida, a green beetle.	Bethany, May 31, on pear.
Euphoria inda, bumble flower beetle.	New Haven, April 30; Melrose, May 2; New Britain, May 26; Bethany, May 31. All adults, last two on pear.
Gracilaria elotella, apple bark miner.	Windsor, April 22. Tunnels in bark of apple twigs.
Grapholitha molesta, Oriental fruit moth.	Less destructive than in 1931. More prevalent in northeastern portion of the state.
Hemerocampa leucostigma, white-marked tussock moth.	Egg-mass, Kensington, Nov. 28.
Hyalopterus arundinis, mealy plum aphid.	Plantsville, June 21, on plum.
Hyphantria cunea, fall webworm.	Prevalent in northern portion of the state; less abundant than in 1931.
Lagoa crispata, crinkled flannel moth.	New Canaan, Sept. 10; larva devouring apple foliage.
Lasioptera vitis, tomato grapevine gall.	Yalesville, June 9, on grape.
Lepidosaphes ulmi, oyster-shell scale.	Norwichtown, Jan. 21, on apple.

Fruit Insects—*(Continued)*

Name	Locality, host, date and remarks
Lygidea mendax, apple red bug.	Plantsville, June 21; Observed on apple. Not generally prevalent in 1932.
Macrodactylus subspinosus, rose chafer.	Very abundant and injured peach fruit in Farmington, Hamden and Glastonbury.
Malacosoma americana, eastern tent caterpillar.	Observed as more prevalent than in 1931.
Oecanthus nigricornis, tree cricket.	Bristol, April 26. Eggs in raspberry canes.
Oxyptilus periscelidactylus, grape plume moth.	Bridgeport, June 1. Webbed grape leaves.
Paratetranychus pilosus, European red mite.	Eggs on apple trees, New Haven, Dec. 17. Scarce in some orchards, normal in others. Kept down by natural enemies in August.
Pelidnota punctata, spotted grapevine beetle.	Woodstock, July 28, on grape. Less abundant than in 1931.
Phylloxera vitifoliae, grape phylloxera.	Bridgeport, Aug. 2; Elmwood, Aug. 18.
Pomphopaea sayi, Say's blister beetle.	Danbury, June 27, injuring cherry; Litchfield, June 28.
Psyllia pyricola, pear psylla.	Present but less abundant than in 1931.
Rhagoletis pomonella, apple maggot.	East Haddam, Dec. 15; Hamden, Nov. 2; Naugatuck, July 12, Oct. 15; Newtown, Sept. 19; Plantsville, Dec. 24. Very prevalent.
Scolytus rugulosus, shot-hole borer.	Plainville, June 17; New Canaan, Aug. 22. Both tunneling in apple twigs.
Sibine stimulea, saddle-back caterpillar.	West Haven, Sept. 16. Feeding upon apple foliage.
Sminthurus hortensis, garden springtail.	Southington, June 11. Injured strawberry plants.
Sphecodina abbottii, Abbot sphinx.	New Haven, June 30. Larva feeding on grapevine.
Syntomaspis druparum, apple seed chalcid.	In crabapple, Storrs, Aug. 31.
Trialeurodes packardi, strawberry whitefly.	Cheshire, June 5, on strawberry.
Typhlocyba pomaria, white apple leafhopper.	Eggs, Branford, Mar. 9; Hamden, May 26; Wallingford, May 25. Very abundant throughout the state.
Zeuzera pyrina, leopard moth.	Essex, July 13; Bristol, Oct. 4; New Haven, February. Larva tunneling in apple wood.

Vegetable Insects

Adelphocoris rapidus, a plant bug. Glastonbury, on corn, July 11.

Agriotes mancus, wheat wireworm. Litchfield, in corn, June 25.

Anasa tristis, squash bug. Present in usual abundance throughout the state.

Anuraphis brassicae, cabbage aphid. Waterford, July 18.

Anuraphis maidi-radicis, corn root aphid. Hartford, on squash, June 30.

Aphrastes taeniatus, a snout beetle. Bethel, on corn, June 23.

Chelymorpha cassidea, Argus tortoise beetle. Windsor, on sweet potato, Aug. 6.

Vegetable Insects—*(Continued)*

Name — Locality, host, date and remarks

Crambus caliginosellus, corn root webworm. Guilford, larva in corn, June 17; Glastonbury, in corn, July 11.

Crioceris asparagi, asparagus beetle. Prevalent throughout the state.

Deloyala clavata, clavate tortoise beetle. Westbrook, on tomato, June 30; Cheshire, on potato, June 6. Very abundant.

Diabrotica vittata, striped cucumber beetle. Prevalent throughout the state.

Empoasca fabae, potato leafhopper. New Britain, on potato, Aug. 27; rather scarce on potato; Hamden, July, nymphs injured lima beans.

Epicauta marginata, margined blister beetle. Guilford, July 29; West Haven, July 30; Wethersfield, on tomato, Aug. 3; Bethany, on potato, Aug. 5; Stafford Springs, on beet, Aug. 19. Unusually abundant.

Epilachna borealis, squash lady beetle. Old Lyme, adults, July 1.

Epilachna corrupta, Mexican bean beetle. Bridgeport, adults, June 9, 22, adult and pupa, Aug. 2; Plantsville, adults, June 9; Pequabuck, adults, June 13; Old Lyme, adults, July 1; New Haven, larvae and pupae, July 12, 15, adults, Aug. 12; West Haven, larva and adult, Sept. 6. Destructive throughout the state.

Epitrix cucumeris, potato flea beetle. Prevalent June 18 in Mystic, Broad Brook, East Hartford, Preston, South Windsor and Wapping on potato and beans, 25 to 50 beetles per plant. Adults emerging, Hamden, July 22.

Epitrix parvula, tobacco flea beetle. Windsor, Aug. 20. First record for Connecticut.

Frankliniella fusca, tobacco thrips. Windsor, July 15; also West Granby, East Hartford, and Manchester. More abundant than for the past three years.

Heliothis obsoleta, corn ear worm. Hamden, July 15; Saugatuck, Sept. 21; West Hartland, Sept. 25. Abundant and destructive throughout the state.

Heliothis virescens, tobacco budworm. Windsor, July 5; also Avon, and East Hartford.

Hylemyia brassicae, cabbage maggot. New Haven, June 6; Windsor, June 3; very abundant. Eggs laid a week later than usual.

Hylemyia cilicrura, seed corn maggot. Naugatuck, in corn, June 13; Waterbury, in beans, June 21.

Lema trilineata, three-lined potato beetle. Hamden, June 6; Windsor, July 1, more abundant than Colorado beetle. Unusually abundant in southern portion of state.

Leptinotarsa decemlineata, Colorado potato beetle. Old Lyme, July 1. Abundant in southern part of state.

Lygus pratensis, tarnished plant bug. Glastonbury, on corn, July 11.

Melittia satyriniformis, squash borer. New Haven, larva, July 16; East Haven, Aug. 8.

Pachystethus lucicola, light-loving grapevine beetle. Bethel, on corn, June 23. Less abundant than in 1931.

Papaipema nitela, stalk borer. Rocky Hill, in corn, June 24; Litchfield, larvae, July 18.

Vegetable Insects—*(Continued)*

Name — Locality, host, date and remarks

Pheletes ectypus, eastern field wireworm. Windsor. Injury to tobacco plants in June.

Phlegethontius quinquemaculata, tobacco worm. Windsor. Usual injury to tobacco in the tobacco-growing district.

Phlegethontius sexta, tomato worm. Hartford, adult, July 6. Also on tobacco in the tobacco district.

Phytonomus rumicis, sorrel weevil. Milford, on cultivated sorrel or sour grass, June 11. Seven acres grown for seed, severely injured.

Pyrausta nubilalis, European corn borer. Glastonbury, July 11; Clinton, larva, July 15; Hamden, larva, July 15. Now present throughout the state and caused damage in some localities.

Sibine stimulea, saddle-back caterpillar. Brookfield, on corn, Oct. 13.

Thrips sp. (unidentified). Waterford, nymphs on peas, July 5.

Uranotes melinus, hair-streak butterfly. Bridgeport, larva on lima beans, Sept. 12.

Shade and Forest Tree Insects

Adelges abietis, spruce gall aphid. On Norway spruce, Stony Creek, Apr. 13; Stamford, Apr. 22; Hamden, May 24; East River, May 25; East Haven, June 4; New Haven, June 20; Woodbridge, Oct. 18.

Adelges floccus, on Norway spruce, Southington, Oct. 19.

Adelges pinicorticis, pine bark aphid. On white pine, Guilford, Apr. 21; South Manchester, May 23, June 13.

Aegeria tibialis, a clear wing moth. Larva in poplar, Fairfield, June 21.

Agrilus otiosus, hickory agrilus. Stamford, Sept. 23.

Alsophila pometaria, fall canker worm. On elm, Hamden, May 24.

Anisandrus pyri, a bark beetle. In Norway maple, Manchester, July 8.

Aphid, (Unidentified). Nymphs on spruce, *Picea orientalis,* Cos Cob, June 21.

Argyresthia thuiella, arborvitae leaf miner Glastonbury, May 6; Branford, May 13; Southington, May 21; Meriden, June 2; East Haven, June 4.

Basilona imperialis, imperial moth. Larva on white pine, New Canaan, Oct. 4.

Cerura cinerea, a Notodontid moth. Larvae on willow, Guilford, Aug. 10.

Chalepus dorsalis, locust leaf miner. Broad Brook, June 3; Portland, Aug. 19.

Chionaspis pinifoliae, pine leaf scale. On white pine, Salisbury, Nov. 25; South Manchester, May 23; Sharon, Sept. 7; on red pine, Southington, Apr. 21; Plainville, May 17; on mugho pine, Essex, Mar. 16; Southington, May 21; Litchfield, June 13; Watertown, Oct. 15; on Scotch pine, South Manchester, May 23; on Japanese red pine, Branford, Nov. 3; on hemlock, Hamden, Aug. 31.

Citheronia regalis, regal moth. Larva on English walnut, Shelton, Sept. 2.

Coleophora laricella, larch case bearer. South Manchester, May 23.

Shade and Forest Tree Insects—*(Continued)*

Name — Locality, host, date and remarks

Colopha ulmicola, elm cockscomb gall. Litchfield, July 12.

Conophthorus coniperda, white pine cone beetle. Danbury, Sept. 23.

Conotrachelus juglandis, walnut curculio. On butternut, Deep River, May 20.

Corythucha arcuata, oak lacebug. Bristol, July 7; on white oak, Cobalt, July 22; New Haven, Aug. 6.

Corythucha ciliata, sycamore lacebug. Old Lyme, Apr. 22.

Corythucha ulmi, elm lacebug. Kent, Canaan, Aug. 13; Manchester, Sept. 1.

Cryptorhynchus lapathi, willow and poplar curculio. In willow, Middletown, Aug. 8, Hamden, Sept. 6.

Cyllene caryae, hickory borer. In fuel wood, New Haven, Feb. 16, 18; Bristol, Mar. 14; Waterbury, Mar. 21; West Haven, Mar. 22; Danbury, Apr. 4; Hartford, Apr. 6, 20.

Cyllene robiniae, locust borer. Broad Brook, June 3; North Haven, July 12. Killing trees at Wilton, Sept. 15.

Dasyneura communis, gouty vein gall. On sugar maple, Manchester, June 23.

Diapheromera femorata, walkingstick. New Haven, Aug. 31; West Haven, Sept. 9; Bethel, Sept. 23; Bethany, Oct. 29.

Diaspis carueli, juniper scale. Meriden, June 2; Stratford, June 6, Sept. 14; New Haven, July 23, Aug. 5; South Norwalk, Sept. 3; Hamden, Sept. 8.

Dilachnus strobi, white pine aphid. Niantic, May 11.

Dilachnus sp., an aphid. On red pine, New Preston, June 1, Aug. 8.

Eriophyes abnormis, a mite gall. On linden, Hartford, June 27, 30.

Eriophyes sp., a mite gall. On pin oak, Litchfield, June 3; on oak, Bantam, June 6.

Eriophyes sp., a mite gall. On willow, Waterbury, Aug. 3.

Eucosma gloriola, white pine tip moth. Stamford, July 25; Easton and Windsor, Aug. 22.

Euphoria inda, bumble flower beetle. On elm, Hamden, May 25.

Euvanessa antiopa, spiny elm caterpillar. Larvae on willow, New Haven, June 16.

Fenusa pumila, birch leaf miner. Stonington, June 27. Infests gray and white birch throughout the state.

Galerucella luteola, elm leaf beetle. Adults, Clinton, May 6; Middletown, May 14; Moodus, May 17; riddled leaves, Litchfield, June 30; larvae, Norfolk, Aug. 1; Waterbury, Aug. 16; New York, N. Y., Aug. 18. Severe injury occurred in Branford, Guilford, Madison, Old Lyme, Old Saybrook and Mystic. Less destructive than in 1931.

Gelechia abietisella, hemlock webworm. On hemlock and spruce, Cos Cob, Apr. 22.

Gillettea cooleyi, blue spruce gall aphid. Southington, Nov. 16; Southbury, May 24; New Haven, July 7.

Glycobius speciosus, maple borer. Norfolk, July 27.

Gossyparia spuria, European elm scale. Bridgeport, June 1; New Haven, June 13.

Shade and Forest Tree Insects—*(Continued)*

Name — Locality, host, date and remarks

Hemerocampa leucostigma, white-marked tussock moth. Egg-clusters on walnut, Orange, Mar. 31.

Hypermallus villosus, twig pruner. In oak, Fairfield, June 21; Pelham Manor, N. Y., June 22; Bridgeport, June 24 (2); Bristol, July 7; New Haven, July 12, Aug. 3; Somers, July 20; Greenwich, July 21; Vernon, July 23; Stamford, July 25; Middletown, July 26; Hartford, Aug. 1; Old Lyme, Aug. 13; Hamden, Oct. 14; in Norway maple, Bridgeport, July 11. Unusually abundant.

Hyphantria cunea, fall webworm. Common in northern portion of state but less so than in 1931.

Ips grandicollis, a bark beetle. Simsbury, Aug. 23. Killed several pine trees.

Itycorsia sp., a sawfly. Pupa on red pine, North Granby, Apr. 28.

Lepidosaphes ulmi, oyster-shell scale. On mountain ash, East Haven, Aug. 19.

Leucaspis japonica, a Japanese scale. On maple and cornus, New Haven, May 13. Rather common in southwestern Connecticut.

Lithocolletis hamadryadella, white oak leaf miner. New Haven, Oct. 4; Stamford, Oct. 22.

Longistigma caryae, a large twig aphid. On linden, Waterville, June 3.

Melanoxantherium smithiae, a brown twig aphid. On willow, Litchfield, July 27.

Neoclytus acuminatus, a long-horned beetle. Hartford, Mar. 14.

Neodiprion lecontei, red-headed pine sawfly. On red pine, Killingworth, Aug. 1; Bridgewater, Sept. 13.

Neodiprion pinetum, a sawfly. On white and Scotch pine, Southbury, July 25.

Neolecanium cornuparvum, magnolia scale. Woodmont, Aug. 2.

Ormenis pruinosa, mealy flata. On hawthorn, Ansonia, July 22; on mountain ash, West Haven, July 30.

Pachypsylla celtidis-mamma, hackberry nipple gall. Bethel, June 5.

Paralechia pinifoliella, pine leaf miner. In pitch pine, Westfield, Mass., June 18.

Paratetranychus ununguis, spruce mite. On spruce, Stony Creek, Apr. 13; East Haven, June 4; South Manchester, Oct. 26; on hemlock, Cos Cob, June 13; Greenwich, June 29, July 1; Norfolk, July 11.

Pemphigus populicaulis, poplar petiole gall. Woodstock, June 23.

Pemphigus ulmifusus, elm pouch gall. On slippery elm, Chester, June 20.

Phenacoccus acericola, woolly maple leaf scale. On sugar maple, Windsor, Dec. 8; Manchester, July 25.

Phenacoccus serratus, a woolly scale. Egg-sacs on beech, New Haven, Dec. 28, Apr. 22.

Philosamia cynthia, cynthia moth. Cocoons on ailanthus, New Haven, Mar. 10, 24, May 27.

Phloeosinus dentatus, red cedar bark beetle. In Chinese juniper, Cos Cob, June 21.

Shade and Forest Tree Insects—*(Continued)*

Name — Locality, host, date and remarks

Phyllaphis fagi, beech leaf aphid. On purple beech, South Manchester, May 23.

Phyllocoptes aceris-crumena, maple spindle gall. Danbury, June 20.

Phyllocoptes quadripes, maple bladder gall. On silver maple, Hamden, May 25; Bristol, June 3; Milford, June 15; Devon, Torrington, June 19; Chester, June 20.

Phylloxera caryaecaulis, hickory stem gall aphid. Middlebury, June 7; Bloomfield, June 21; Bridgeport, June 24; Clinton, June 27.

Phylloxera sp., (Unidentified). On hickory, Waterbury, June 22.

Phymatodes variabilis, a long-horned beetle. Hartford, Apr. 4; Hamden, June 8, 9; West Cornwall, June 28.

Pissodes strobi, white pine weevil. Roxbury, Dec. 31; New London, Apr. 12; Southington, Apr. 30; Stamford, July 28. Prevalent throughout the state.

Plagiodera versicolora, imported willow leaf beetle. Norwich, May 17; West Haven, May 26; Westport, July 7; East Haven, July 13; Waterbury, Aug 3. Occurs throughout the state on smooth-leaved willows.

Porthetria dispar, gipsy moth. Occurs in eastern two-thirds of the state. Some trees defoliated in Brooklyn.

Prionus laticollis, broad-horned prionus. Adults, Bridgeport, July 23; Southbury, July 25; Hamden, July 30; Gildersleeve, Sept. 9; Ridgefield, Sept. 20; western Conn., Sept. 29.

Priophilus acericaulis, maple leaf stem borer. South Manchester, June 6.

Prociphilus imbricator, woolly beech aphid. Old Greenwich, Sept. 9.

Prociphilus tessellatus, woolly alder aphid. On silver maple, Nichols, July 7.

Pseudococcus sp., mealybug. On catalpa, Hartford, Nov. 25.

Pulvinaria vitis, cottony maple scale. On maple, South Norwalk, Apr. 12.

Recurvaria dorsivittella, a leaf miner in sweet gum. Darien, Aug. 13.

Rhyacionia buoliana, European pine shoot moth. In red pine, Guilford, Natchaug, Scotland, Nov. 7; New Haven, Apr. 25; Hamden, May 7; Westport, May 10; Meriden, June 2; Branford, June 7; Cos Cob, June 13; Ansonia, Aug. 25; in Scotch pine, New Haven, June 2; Harrison, N. Y., June 6; Hamden, May 7, June 13; in bull pine, New Haven, June 15; in mugho pine, Hamden, Sept. 20.

Rhyacionia comstockiana, pitch twig borer. In red pine, Baltic, Nov. 7.

Rhyacionia rigidana, pitch pine shoot moth. In red pine, New London, Apr. 12; various plantations, Apr. 22.

Saperda candida, round-headed apple borer. In mountain ash, Waterbury, Aug. 11.

Saperda tridentata, elm borer. In elm, South Manchester, Sept. 23.

Squirrels. Severed elm twigs, Haddam, South Manchester, June 6; Austrian pine twigs, New Haven, Apr. 18.

Stilpnotia salicis, satin moth. Occurs in eastern three-fifths of the state.

Tetralopha robustella (?), a lepidopteron. On red pine, Putnam, Dec. 8; Rockville, Feb. 15; Burlington, Mar. 12; on Scotch pine, Wallingford, Dec. 21; Hamden, Sept. 20.

Shade and Forest Tree Insects—*(Continued)*

Name — Locality, host, date and remarks

Tetranychus bicolor, oak mite. On chestnut, Norwalk, Oct. 6.

Thecodiplosis liriodendri, tulip tree spot gall. Naugatuck, Aug. 11.

Thelia bimaculata, a tree hopper. On locust, North Haven, July 12.

Tortrix quercifoliana, oak leaf roller. Thomaston, July 8. Several trees had been stripped.

Zeuzera pyrina, leopard moth. Larva in silver maple, Bristol, May 20; in elm, Hamden, May 25, Manchester, Sept. 1; in maple, Milford, Sept. 20; in Norway maple, East Haven, Aug. 23.

Insects of Ornamental Shrubs and Vines

Brachyrhinus sulcatus, black vine weevil. Injuring Taxus, New Haven, May 6, June 8; Woodmont, May 7; Waterbury, May 19; Middlebury, June 16, July 5; in lawn, West Haven, May 25.

Chionaspis euonymi, Euonymus scale. On bittersweet, New Haven, Mar. 10; on Euonymus, New Haven, May 2; East River, May 25; Branford, Aug. 8; Bridgeport, Sept. 8; Norwich, Sept. 30.

Corythucha marmorata, golden-rod lacebug. On chrysanthemum, New Haven, Aug. 24.

Dichomeris marginellus, juniper webworm. Westbrook, May 16, 20; Woodbridge, May 16, Oct. 18; West Hartford, May 23; New Haven, June 7; Norwich, June 15; Woodbury, N. J., June 15.

Enchenopa binotata, two-spotted tree hopper. On bittersweet, Danielson, Nov. 2; on honeysuckle, Yalesville, Sept. 13.

Epargyreus tityrus, silver spotted skipper. Larvae on wistaria, New Haven, Aug. 5; Winsted, Sept. 1.

Laertias philenor, pipe vine caterpillar. On Dutchman's pipe vine, New Haven, July 11, 12, Aug. 6; Hamden, July 30; Canaan, Aug. 17.

Lepidosaphes ulmi, oyster-shell scale. On lilac, Waterbury, July 13; Meriden, Oct. 25.

Leafhopper injury. On rose, Hamden, June 4.

Leaf roller injury. On rose, South Manchester, May 13.

Macremphytus sp., a sawfly. Larvae on cornus, Bridgeport, Sept. 20.

Monarthropalpus buxi, boxwood leaf miner. New Haven, June 9.

Nodonota puncticollis, rose leaf beetle. Abundant throughout New Haven County, June 20.

Oberea myops, a long-horned beetle. Larvae boring in stem of mountain laurel, New Haven, Aug. 19.

Omphalocera dentosa, barberry webworm. Larvae on Japanese barberry, Branford, Aug. 30.

Phobetron pithecium, hag moth. Larva on rose, Cos Cob, Sept. 26.

Pseudocneorrhinus setosus, a Japanese weevil. On barberry, California privet and hemlock, West Haven, June 8.

Pseudococcus citri, citrus mealybug. On *Euonymus radicans,* Hartford, Oct. 13; on citrus, Manchester, Sept. 3.

Psyllia buxi, boxwood psyllid. New Haven, June 9.

Insects of Ornamental Shrubs and Vines—*(Continued)*

Name — Locality, host, date and remarks

Rhynchites bicolor, rose curculio. Danbury, July 2. Common on *Rosa rugosa* throughout the state.

Scale on Azalea, (Unidentified). Darien, June 21.

Sphinx chersis, a sphinx caterpillar. On lilac, West Haven, July 19.

Stephanitis rhododendri, rhododendron lacebug. New Haven, Dec. 28; Redding, Mar. 3; Ridgefield, Mar. 22; Port Chester, N. Y., Apr. 12.

Strigoderma arboricola, a Scarabaeid beetle. On rose, Greenwich, June 29.

Tenuipalpus bioculatus, privet mite. On privet hedges, Greenwich, June 24.

Tetranychus telarius, common red spider. On *Azalea indica,* New Haven, Dec. 28; on chrysanthemum, Bristol, Oct. 13.

Trichius piger, a Scarabaeid beetle. On rose, West Haven, June 30.

Insects of Flowers and Greenhouse Plants

Calomycterus setarius, a Japanese weevil. On iris, Lakeville, July 27.

Catocola sp., underwing moth. Larva on begonia, Hamden, Aug. 3.

Chauliognathus pennsylvanicus, soldier beetle. On aster, calendula, marigold, Orange, Sept. 1.

Chionaspis euonymi, Euonymus scale. On *Pachysandra terminalis,* Old Greenwich, Aug. 13.

Climbing cutworms. On sweet peas, Milford, May 11; on petunia, Bloomfield, July 21.

Corythucha marmorata, golden-rod lacebug. On aster, Bristol, May 20.

Cosmopepla bimaculata, a sucking bug. On columbine, East Haven, June 27; on snapdragon, Hamden, June 27.

Deloyala clavata, clavate tortoise beetle. On Chinese lantern, Berlin, June 16.

Diestrammena marmorata, a cave cricket. In greenhouse, Norwalk, Feb. 24.

Empoasca fabae, potato leafhopper. On dahlia, Hamden, July 19.

Epicauta marginata, margined blister beetle. On clematis, Darien, Aug. 12.

Eriococcus araucariae, Norfolk Island palm scale. On Araucaria, Cos Cob, Sept. 26.

Frankliniella tritici, grain thrips. On calla lily, Westport, Jan. 8.

Lema trilineata, three-lined potato beetle. On Chinese lantern, Berlin, June 16.

Lygaeus kalmii, a sucking bug. On foxglove, Darien, Aug. 8.

Macrosiphum gei, potato aphid. On iris, Hamden, May 25.

Metriona bicolor, a tortoise beetle. On phlox, New Haven, Aug. 1.

Mononychus vulpeculus, iris curculio. In iris, Southbury, June 1.

Papilio cresphontes, orange dog. Larva on gas plant, *Dictamnus fraxinella,* New Canaan, Sept. 21.

Phlyctaenia rubigalis, greenhouse leaf tier. Injuring pansy, forget-me-not, Westport, Jan. 28; geranium, Clintonville, Feb. 4.

Poecilocapsus lineatus, four-lined plant bug. On coreopsis, Hamden, June 20; on Achillea, hibiscus and sunflower, West Haven, June 23; on lupine, New Haven, June 27.

Popillia japonica, Japanese beetle. Adults injuring canna flowers, Hamden, July 31; also Bridgeport, Aug. 23.

Insects of Soil and Lawn—*(Continued)*

Name	Locality, host, date and remarks
Phyllophaga sp., white grubs.	Larvae in soil, Foxon, May 16; Woodbridge, Sept. 21; New Haven, Oct. 1.
Popillia japonica, Japanese beetle.	Adults, Hamden, July 31; Bridgeport, Aug. 23; also in traps in Hamden, New Haven, Shelton and Waterbury.
Sawfly, (Unidentified).	Larvae feeding on lawn grass, East Granby, June 16.
Serica sp. A Scarabaeid beetle.	Larvae in soil, Foxon, May 16; New Haven, Oct. 1.
Sphecius speciosus, cicada killer.	Adults, Hartford, July 27; New Haven, Sept. 7. Nesting in lawns.

Household and Stored Grain Insects

Acanthoscelides obtectus, bean weevil.	Infesting beans, New Haven, Aug. 23; Stonington, Oct. 13.
Anthrenus scrophulariae, carpet beetle.	Adults, Hamden, Mar. 26, Apr. 4.
Anthrenus sp., (Unidentified).	Larva in wool clothing, New Haven, Feb 23.
Attagenus piceus, black carpet beetle.	Adult in carpet, New Haven, June 1; larva in rug, Old Mystic, Mar. 19; larvae, pupae and adults in tobacco seed, Tariffville, Mar. 28; larvae, Hartford, May 3; New Haven, May 13; adult, Hamden, May 14; larvae, New London, June 1; adult, New Haven, June 1, 24.
Blattella germanica, German cockroach.	In house, Milford, Feb. 16, New Haven, Mar. 9.
Brachyrhinus ovatus, strawberry crown girdler.	In house, Moosup, Feb. 4. Considered a household pest.
Bryobia praetiosa, clover mite.	Swarming in house, Middlebury, May 31.
Calomycterus setarius, a Japanese weevil.	Abundant in house, Lakeville, Jan. 8.
Camponotus pennsylvanicus herculaneus, carpenter ant.	In house, New Haven, May 16; Leete's Island, Aug. 13; Bolton Notch, Sept. 1.
Cimex lectularius, bed bug.	In house, Clinton, May 6.
Clothes moths.	Adults, Milford, June 8; New Haven, July 6.
Ctenocephalides canis, dog flea.	In house, Elmwood, Sept. 17; Madison, Oct. 13; Ansonia, Dec. 17.
Dermestid beetle, (Unidentified).	Larva in stored seed, New Haven, Jan. 1.
Gryllus domesticus, house cricket.	In house, Bridgeport, Sept. 8.
Lepisma sp., silverfish.	In house, East Hartford, July 11; Hamden, Mar. 26; Bridgeport, Oct. 29. Specimens unfit for identification.
Musca domestica, house fly.	Larvae developing in clothing, Mansfield, Aug. 11.
Nyctibora sp., an exotic cockroach.	Nymph in house, Sharon, Apr. 14.
Oryzaephilus surinamensis, saw-toothed grain beetle.	Adult, Hartford, Nov. 3.
Polistes pallipes, common wasp.	In house, Clinton, May 6.
Reticulitermes flavipes, white ants.	In house, New Haven, Jan. 13, Mar. 5; Union, Nov. 27; South Manchester, Apr. 21; Branford, Mar. 4.

Household and Stored Grain Insects—*(Continued)*

Name — Locality, host, date and remarks

Scutigera forceps, house centipede. In house, New Haven, June 14, 15.

Tribolium confusum, confused flour beetle. Infesting grain, New Haven, Jan. 1.

Beneficial Insects

Adalia frigida, a lady beetle. In house, Clinton, May 6.

Anatis quindecempunctata, 15-spotted lady beetle. Adult on rose, East Haven, July 13; adult, Waterbury, July 19.

Ceratomegilla fuscilabris, spotted lady beetle. Adults, Portland, May 4; Wilton, May 11; Westbrook, June 30.

Coccinella transversoguttata, a lady beetle. Adults on conifers, Hamden, June 23.

Hippodamia convergens, convergent lady beetle. Adults on conifers, Hamden, June 23; Old Lyme, July 1.

Hippodamia tredecempunctata, 13-spotted lady beetle. Old Lyme, July 1.

Lady beetle, (Unidentified). Larva on rose infested with aphids, Hamden, June 10; pupa on maple, Manchester, June 23.

Tenodera sinensis, Chinese praying mantid. New Haven, Aug. 27; Sept. 12; also from Glastonbury.

Miscellaneous Insects

Aëdes sollicitans, salt marsh mosquito. Adult, New Haven, June 30.

Alaus oculatus, eyed elater. Adults, Waterbury, June 10; Glastonbury, June 22; New Haven, West Haven, June 23.

Chrysochus auratus, green-gold leaf beetle. Waterbury, July 16; Bethel, Aug. 13. Mistaken for Japanese beetle.

Colias eurytheme, orange sulfur butterfly. North Branford, July 24; Nichols, Oct. 4; New Haven, Nov. 4. Very abundant locally throughout the state.

Conwentzia hageni, a small Neuropteroid. Cocoons on Retinospora, Wapping, Apr. 27.

Corydalis cornuta, hellgrammite. Adult, Burlington, July 16.

Dermacentor variabilis, American dog tick. On dog, Wethersfield, Aug. 30.

Lucilia sericata, a scavenger fly. Larvae in lawn, New Haven, July 12; larvae under rugs in new house, New Haven, Oct. 7.

Samia cecropia, cecropia moth. Adult, Devon, July 8.

Tropaea luna, luna moth. Adult, New Haven, July 5.

NEW QUARTERS

On completion of the new fireproof Jenkins Laboratory, late in July the Department of Entomology moved into its new quarters in the east end on the second floor, where we have eight offices and laboratories containing 2,654 square feet of floor space with dark room and storage in addition. The library and insect collection

are in the southeast corner room, which is about 20 by 34 feet in size. In the basement the Department has seven rooms containing 1,319 square feet. Five of these rooms are used for the rearing of parasites, one is an insecticide laboratory, and the other is for storage. There is also ample storage space on the third floor. Altogether, the new quarters give more than twice the amount of floor space afforded by the former quarters. Notwithstanding the increase in space, one of the greatest gains is the larger number of laboratories where research work can be conducted in comparative freedom from disturbance and interruption.

CONFERENCE OF CONNECTICUT ENTOMOLOGISTS

The ninth conference of entomologists working in Connecticut was held in the Assembly Room of the Agricultural Station, October 28, 1932. Dr. W. E. Britton was elected chairman and 65 were present. Luncheon was served at the Station. Dr. W. C. O'Kane and Charles Rufus Harte were unable to be present. In other respects the following program was carried out:

Greeting, Director William L. Slate, New Haven.

Entomological Features of the Season of 1932, Dr. W. E. Britton, New Haven

Mexican Bean Beetle Studies in 1932, Neely Turner, New Haven

Notes on Shade Tree Insects, Dr. E. P. Felt, Stamford

Present Status of the Japanese Beetle in the United States, L. H. Worthley, South Norwalk

The Gipsy Moth and the Satin Moth in 1932, A. F. Burgess, Greenfield, Mass.

Ecological Studies in Relation to the Distribution of Economic Pests, Prof. Harvey L. Sweetman, Amherst, Mass.

Observations on Entomologists and Other Plant Pests, Dr. G. P. Clinton, New Haven

Inspection of New Quarters, Department of Entomology

Studies on the European Pine Shoot Moth, Dr. R. B. Friend, New Haven

Seasonal Life History of the White Apple Leafhopper, J. F. Townsend, New Haven

Round Table Discussion on Collecting Coleoptera, M. P. Zappe, New Haven, Dr. Wm. C. Woods, Kent, Henry H. Townshend, New Haven

Notes on Butterflies in 1932, Charles Rufus Harte, New Haven

Macrocentrus and Fruit Moth Production, Dr. Philip Garman, New Haven

Observations on the Biology of Trichogramma, J. C. Schread, New Haven

Some Probable New Developments in Insecticides, Dr. W. C. O'Kane, Durham, N. H.

Notes on the Gladiolus Thrips, B. H. Walden, New Haven

INSPECTION OF NURSERIES IN 1932

W. E. Britton and M. P. Zappe

The inspection of nurseries was commenced June 27. In this work Mr. Zappe was assisted by A. F. Clark, W. T. Rowe and R. J. Walker until August 31, and then in special cases by E. M. Stoddard, R. C. Botsford, Neely Turner, G. H. Plumb, and W. E. Britton. Most of the larger nurseries had been inspected by September 1, and Mr. Zappe completed the work by the first of October except for a few new nurseries that registered after that date.

On the whole the nurseries were not in quite as good condition as in 1931 and 1930. On account of the depression and lessened demand for nursery stock, less care had been given the nurseries and weeds were more prominent.

In 24 nurseries no pests were found. Altogether, about 128 different insect pests and 68 different plant diseases were found in nurseries. It is inadvisable to mention all of the pests in this Report, but some of the more important and persistent pests with the number of nurseries infested by each for the past 10 years are given in the following table:

Ten-Year Record of Certain Nursery Pests

	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Oyster-shell scale....	42	44	38	39	45	57	78	86	73	68
San José scale.....	20	32	32	19	16	30	22	8	11	10
Spruce gall aphids[1]...	28	40	27	42	82	120	147	99	124	141
White pine weevil....	17	5	5	8	17	19	37	66	74	70
Poplar canker.....	34	25	34	32	39	35	37	35	23	40
Pine blister rust.....	6	8	7	9	9	5	7	7	13	12
Nurseries uninfested.	32	33	34	46	37	18	13	18	32	24
Number of nurseries	106	116	151	162	191	228	266	302	327	351

It should be understood that the seeming increase in some of these pests may be due to the increase in the number of nurseries, and although the number of infested nurseries has increased the percentage actually may be less.

Number and Size of Nurseries

There has been a constant increase in the number of nurseries in Connecticut, as the preceding table shows. In 1932, the list contains 351 names, an increase of 24 over 1931. A classification on account of size may be indicated as follows:

Area	Number	Percentage
50 acres or more	21	6
10 acres to 50 acres	37	10
5 acres to 10 acres	36	10
2 acres to 5 acres	81	24
1 acre or less	176	50
	351	100

[1] Includes both *Adelges abietis* and *Gillettea cooleyi*.

Of the 351 nurseries, 13 new ones registered and were inspected before the spring shipping season and again in the fall. Four firms holding certificates in 1931 failed to register before July 1 and, as provided by Section 2127 of the General Statutes, were required to pay the costs of inspection. Consequently, the sum of $20 was collected from them and turned over to the Treasurer of the Station on December 15, to be deposited with the State Treasurer.

The area of Connecticut nurseries in 1932 is 4490 acres, an increase of 492 acres over 1931. Altogether 41 new names have been added and 16 have discontinued business during the year. Fifteen nurseries on last year's list are now included under different firm names. The nursery firms granted certificates in 1932 are as follows:

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932

Name of firm	Address	Acreage	Certificate date	Certificate number
Abeling, R. W.	Torrington	1	Sept. 15	1961
Adamec, George	Foxon	1	Oct. 1	2018
Albrecht's Nursery	Shelton	1	Sept. 30	2007
Aldrich, Edward	Guilford	1	Aug. 30	1874
Aldrich, Inie E.	Thomaston	2	Aug. 5	1791
Allara, Emanuel	Hamden	1	Nov. 17	2064
Allen, Henry L.	Pawcatuck	1	Aug. 12	1820
Amelunxen & DeWyn	Yalesville	4	Aug. 13	1825
Andover Gardens	Andover	1	Aug. 12	1805
Anstett, Louis	Norfolk	1	Sept. 15	1958
Artistree Nursery	Branford	3	Oct. 3	2020
Austin, M. E.	Clinton	1	July 30	1777
Barnes Bros. Nursery Co., Inc.	Yalesville	200	Sept. 1	1876
Barnes Eastern Nurseries	Wallingford	15	Sept. 23	1998
Bartolotta, S.	Cromwell	1	July 27	1759
Barton Nursery	Hamden	1	Sept. 8	1917
Beattie, W. H.	New Haven	1	Sept. 6	1910
Beaudry-Wood	Ridgefield	1	Aug. 5	1793
Bedford Gardens	Plainville	1	Sept. 2	1901
Belltown Nurseries	Stamford	4	Sept. 15	1955
Benbow, Abram	Norfolk	1	July 28	1762
Beran, Florist	New London	1	Aug. 15	1828
Berkshire Gate Nursery	Danbury	1	Sept. 8	1919
Bertana, Louis	Glenbrook	2	Sept. 8	1916
Bertolf Bros., Inc.	Greenwich	40	Sept. 1	1889
Blue Hills Nurseries	Hartford	18	Sept. 6	1909
Boggini, Louis	South Manchester	1	Aug. 17	1838
Bollerer, Frederick G.	West Haven	1	Sept. 20	1985
Bonnie Brook Gardens	Rowayton	2	July 30	1775
Booy, H. W.	Yalesville	4	July 27	1755
Brainard Nursery & Seed Co.	Thompsonville	20	July 28	1765
Braley & Co., S. A.	Burnside	1	Aug. 12	1803
Brandriff's	Branford	1	Oct. 14	2033
Branford Nurseries	Branford	6	Sept. 21	1996
Brass, Philip H. (2)	South Coventry	1	Aug. 12	1807

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—(*Continued*)

Name of firm	Address	Acreage	Certificate date	Certificate number
Bretschneider, A.	Danielson	1	Aug. 18	1846
Bridgeport Hydraulic Co.	Bridgeport	50	Sept. 30	2013
Brimfield Gardens	Wethersfield	8	Sept. 10	1933
Bristol Nurseries, Inc.	Bristol	55	July 16	1737
Brooklawn Conservatories, Inc.	Bridgeport	1	Nov. 1	2045
Brooklawn Nursery	Bridgeport	2	Sept. 23	1997
Brouwer's Nurseries	New London	20	Aug. 30	1871
Brouwer's Nursery, Peter (2)	New London	1	Sept. 3	1904
Bruce Nurseries	Danielson	1	Nov. 3	2050
Bulpitt, Henry F.	Darien	4	Aug. 16	1831
Bunting's Nurseries, Inc.[1]	New London	4	Sept. 1	1885
Bureau of Trees	New Haven	6	Sept. 20	1981
Burke the Florist	Rockville	1	Aug. 1	1771
Burr & Co., C. R.	Manchester	500	Aug. 6	1795
Burr, Morris L.	Westport	1	Sept. 3	1905
Burroughs' Nursery	Deep River	1	July 30	1776
Burwell, E. E.	New Haven	1	Oct. 1	2019
Byram Evergreen Nursery	East Port Chester		Nov. 1	2046
Candee Nursery, Hollis S.	Hartford	7	Nov. 9	2060
Cant, Alexander	Springdale	1	Sept. 13	1950
Cardarelli, E. J.	Cromwell		Aug. 19	1849
Carey, Alice L.	Cheshire	1	Aug. 25	1856
Carlson, John B.	Newington	1	Sept. 15	1964
Cascio, Peter	West Hartford	3	Sept. 20	1992
Case, Mrs. Louis L.	Simsbury	1	Sept. 2	1903
Cherry Hill Nursery Co., The	Rockfall	50	Nov. 21	2065
Chesman, Joseph (2)	Foxon	1	Oct. 14	2032
Chiapperini, Michele	Groton	1	Aug. 12	1822
Chippendale Nurseries, Inc.	Old Lyme	2	Aug. 12	1821
City Line Florist	Bridgeport	1	Sept. 9	1931
Clark, Raymond H.	Milford	1	July 15	1732
Cleary, Arthur L.	Bethel	1	Aug. 19	1848
Clinton Nurseries	Clinton	95	Sept. 20	1988
Clyne Nursery Co.	Waterbury	6	Nov. 4	2052
Cobb, Levi S.	Fairfield	1	Sept. 9	1928
Conine Nursery Co.	Stratford	75	July 25	1748
Conn. Agr. Coll. (Prof. S. P. Hollister)	Storrs		Aug. 17	1836
Conn. Agr. Expt. Sta. (W. O. Filley, Forester)	New Haven	3	Oct. 20	2041
Conn. Forestry Dept.	Hartford	6	Sept. 16	1959
Conn. Forestry Nurseries	Deep River	20	Nov. 26	2066
Conn. State Highway Dept.	Hartford	13	Sept. 30	2012
Conn. Valley Nurseries	Manchester	17	July 20	1744
Corrigan's West Haven Nurseries	West Haven		Sept. 20	1982
Couture, E. R	Westport		Sept. 20	1989
Cragholme Nurseries, Inc.	Greenwich		Sept. 14	1956
Cromie, G. A.	New Haven		Sept. 16	1970

[1] Home address, Selbyville, Del.

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—(*Continued*)

Name of firm	Address	Acreage	Certificate date	Certificate number
Cronamere Alpine Nurseries	Greens Farms	1	Sept. 23	1999
Culver, W. B.	Suffield	1	July 19	1743
Curtiss, C. F.	Plantsville	2	Dec. 1	2069
Daisy Hill Gardens (2)	Derby	1	July 15	1735
Dallas, Inc., Alexander	Waterbury	2	Sept. 20	1991
Damen, Peter J.	Foxon	2	Oct. 17	2036
Darien Nurseries	Darien	6	Aug. 17	1834
Dawson, Wm. A.	Willimantic	2	Sept. 1	1890
Dearden Bros.	East Hartford	1	July 20	1745
DeCerbo, Meyer E.	Woodmont	1	Sept. 30	2008
Deepstrom, Leon E.	Bridgeport	2	Dec. 5	2071
DeMars, F. H.	Winsted	1	Sept. 24	2001
Dewey, V. E. (2)	Groton	2	Nov. 29	2068
Dietrich Nursery	Greenwich	8	Sept. 10	1934
Di Giandomenico, Raffe	Middletown	1	July 30	1773
Dingwall, Joseph N.	New Haven	1	Sept. 30	2006
Doebeli, Charles A.	Bridgeport	1	Sept. 1	1892
Dondi, A.	Hamden	1	Aug. 31	1879
Dowd, Inc., F. C.	Madison	1	Aug. 10	1801
Dunlap's Hydrangea Nursery	Cromwell	3	July 27	1760
Dunn, James F.	Stamford	3	Sept. 11	1940
Eager, E. M.	Bridgeport	1	Sept. 1	1893
East Haven Nursery	East Haven	1	Oct. 1	2017
East Rock Nursery Co.	New Haven	1	Oct. 10	2025
Edendale Gardens	Winsted	1	Oct. 25	2043
Edgewood Nurseries	New Haven	1	Jan. 12	1713
Eddy, S. W.	Avon	2	Apr. 14	1721
Eell's Sons	Manchester	1	Aug. 29	1868
Elfgren & Sons, I. P.	East Killingly	2	Aug. 29	1866
Ellington Evergreen Nurseries	Ellington	2	July 19	1740
Elm City Nurseries	New Haven	106	Aug. 29	1865
Elmgren, C. J.	Cromwell	1	Sept. 13	1949
Elm Grove Cemetery Association	Mystic	1	Aug. 29	1858
Evergreen Nursery Co.	Wilton	25	July 21	1747
Eyeberse's Nursery	Norwich	1	Aug. 12	1809
Farmington Valley Nursery	Avon	5	Sept. 2	1898
Fletcher, Walter G.	Guilford	15	Sept. 18	1978
Flower City Rose Co.	Manchester	20	July 15	1728
Follett Nursery	Westport	3	Oct. 19	2040
Ford, George R.	Farmington	10	Nov. 5	2055
Fraser's Nurseries & Dahlia Gardens	Willimantic	3	Aug. 31	1878
Galligan, Clarence W.	New Haven	1	Oct. 14	2031
Gallup, Amos M.	Pawcatuck	1	Aug. 12	1819
Gardner's Nurseries	Rocky Hill	250	July 19	1742
Gates, Jr., Harry D.	Devon	1	Sept. 1	1886
Geduldig's Nurseries	Norwich	6	Sept. 2	1899
Giant Valley Nursery	Mount Carmel	1	Aug. 2	1784
Gilbert, Henry G.	Danielson	2	Aug. 12	1804

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—*Continued*)

Name of firm	Address	Acreage	Certificate date	Certificate number
Glastonbury Gardens	Glastonbury	3	Aug. 17	1841
Glen Terrace Nurseries	Hamden	40	Aug. 13	1823
Godfrey's Stratfield Nurseries	Bridgeport	40	Dec. 6	2072
Golden Hill Nurseries	Shelton	3	Oct. 3	2022
Goodwin Nurseries	Bloomfield	7	July 28	1764
Goshen Nurseries	Goshen	5	Sept. 15	1960
Griffin & Schmidt	West Hartford	3	Nov. 4	2053
Griswold, George	Old Lyme	1	Aug. 18	1847
Gunn, Mrs. Charles	Kent	1	Aug. 16	1829
Haas, Florist, E.	Devon	1	July 15	1731
Hall, Henry A. L.	West Haven	1	Sept. 20	1983
Hamden Nursery	Hamden	1	Sept. 10	1932
Hammonassett Gardens	Madison	4	Aug. 30	1875
Hansen, Peter	Fairfield	5	July 30	1774
Happy Days Nursery	Norwalk	10	Oct. 15	2035
Harrington, Walter P.	Granby	1	Aug. 17	1844
Hawes, Frank M.	West Hartford	1	July 25	1749
Hearn, Thomas H.	Washington	3	Oct. 1	2016
Heath & Co.	Manchester	10	July 19	1739
Hendrix, Mrs. Edwin A	New Milford	1	Sept. 13	1952
Henninger, Christ.	New Britain	1	Aug. 31	1882
Hillcrest Gardens	Woodbridge	3	July 15	1733
Hilliard, H. J.	Sound View	1	Aug. 12	1837
Hinckley Hill Nursery	Stonington	1	Aug. 12	1818
Hiti Nurseries	Pomfret Center	11	Aug. 16	1830
Hofman, Henry	Cromwell	1	July 26	1754
Holcomb, Ernest L.	Granby	1	Aug. 16	1832
Holcomb, H. Parks	Winsted	4	Sept. 30	2010
Holcomb, Irving	Granby	1	Aug. 1	1772
Holdridge & Son, S. E.	Norwich	5	Aug. 12	1812
Horan, James F.	Hartford	2	Sept. 7	1914
Horan & Son, James	Bridgeport	1	Sept. 9	1929
Houston's Nurseries	Mansfield Depot	15	Oct. 1	2015
Hoyt, Charles E.	Danbury	20	Aug. 6	1798
Hoyt's Sons Co., Inc., Stephen	New Canaan	500	July 16	1736
Intravaia & Sons, J.	Middletown	1	Sept. 7	1915
Jennings, George S.	Southport	2	Sept. 21	1993
Johnson's Nursery	South Meriden	1	Sept. 15	1963
Johnson, Tom	Stratford	1	Sept. 2	1897
Judd, T. H.	Danbury	1	Dec. 6	2073
Kelley & Son, James J.	New Canaan	6	Aug. 22	1852
Keystone Nurseries	Danbury	1	Sept. 8	1922
Knapps Perennial Gardens	Plainville	1	Sept. 2	1902
Kosty's Perennial Garden Nurseries	Rockville	3	Nov. 2	2047
Langstroth Conifer Nursery	Danbury	10	Sept. 20	1990
Laviola Nursery	New Haven	1	Nov. 2	2048
Lawrence Greenhouses	Branford	1	Sept. 19	1979
Leghorn's Evergreen Nurseries	Cromwell	20	July 26	

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—(*Continued*)

Name of firm	Address	Acreage	Certificate date	Certificate number
Lewis & Valentine, Inc.	Darien	9	Aug. 15	1826
Loring Nursery Co., The Robert	Yalesville	5	Aug. 9	1799
Luckner, Jr., Wm.	Stepney	1	Sept. 10	1937
Lynch, Mrs. John H.	Ridgefield	5	Sept. 11	1939
Main, Walter G.	North Stonington	1	Aug. 12	1816
Mallett, George A.	Bridgeport	5	Sept. 1	1936
Maplehurst Flower Gardens	Fairfield	1	Sept. 3	1907
Maplewood Nursery Co.	Norwich	3	Dec. 7	2074
Marigold Farm Nursery	New Canaan	15	July 29	1767
Mason, Warren S.	Farmington	1	Oct. 27	2044
Mather Homestead	Darien	1	Sept. 16	1972
Mayapple Nursery	Stamford	1	Nov. 5	2057
McCarthy, John P.	Danbury	1	Sept. 8	1923
McConville, John	Manchester	2	July 19	1741
Meachen, Henrietta S	Stratford	1	Sept. 2	1895
Meier, Adolf R.	West Hartford	1	Nov. 3	2049
Mellville Nursery (2)	Bridgeport	1	Sept. 9	1927
Merwin Lane Nursery	East Norwalk	3	Aug. 5	1794
Meyer, Carl H. H.	Riverside	10	Aug. 13	1824
Meyer, Ludwig	Bridgeport	4	Sept. 20	1987
Middeleer Nurseries, Inc.	Darien	28	Aug. 30	1877
Midvale Nursery	Manchester	1	Sept. 20	1986
Milford Nursery	Milford	2	Aug. 4	1790
Miliano, S.	Woodmont		Sept. 11	1943
Millane Nurseries & Tree Experts Co.	Cromwell	35	Aug. 10	1802
Mill River Nursery	Fairfield	10	July 26	1750
Millstone Garden	Terryville	1	Sept. 21	1994
Milton Flower Farm	Litchfield	1	Sept. 16	1966
Minge, G. H.	Rocky Hill	1	Sept. 11	1941
Montgomery Evergreen Nursery, Inc.	Cos Cob	5	Aug. 29	1869
Moraio Bros.	Stamford	5	Sept. 17	1975
Morgan, Wm. F.	North Stonington	2	Aug. 12	1817
Mountain Farm Nursery	West Hartford	2	Sept. 11	1942
Mountain Grove Cemetery Association	Bridgeport	1	Sept. 9	1925
Mount Airy Gardens	Stamford	1	Nov. 7	2058
Mount Carmel Nursery	Mount Carmel	1	Aug. 10	1800
New Britain Board of Water Commissioners	New Britain	50	Sept. 6	1912
Newell Nurseries, The	Bloomfield	5	Nov. 12	2062
New England Nurseries	New Canaan	1	Aug. 29	1864
New Haven Park Commission	New Haven	10	Oct. 6	2023
Newington Gardens & Nurseries	Newington	1	Sept. 14	1953
New London Cemetery Association	New London	1	Sept. 24	2005
New London County Nurseries	New London	5	Aug. 29	1859
Newton, Edwin (2)	West Granby	1	Aug. 22	1851

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—(*Continued*)

Name of firm	Address	Acreage	Certificate date	Certificate number
New York, New Haven & Hartford R. R. Co.	Bridgeport	6	Aug. 29	1862
Nicholson & Thurston	Litchfield	1	Sept. 16	1925
North Avenue Nursery	Bridgeport	1	Sept. 13	1951
North-Eastern Forestry Co.	Cheshire	96	Aug. 6	1797
North Greenwich Nursery	Greenwich	1	Sept. 9	1926
Norwood Nursery	Hamden	1	Oct. 20	2042
Nyveldt, Albert	New London	1	Aug. 12	1811
Oakland Nurseries	Manchester	20	Aug. 6	1796
Oakwood Novelty Gardens	East Hartford	1	Aug. 2	1783
Oldfield Nursery	Stratford	1	Sept. 24	2003
Old House Gardens, The	Yalesville	1	Aug. 17	1833
Old Orchard Nursery	Norwalk	2	Aug. 2	1785
Ostergren, Herbert	Cromwell	2	July 27	1758
Outpost Farm & Nursery Corporation	Ridgefield	400	Aug. 29	1867
Ouwerkerk, D. K.	Yalesville	10	Aug. 1	1780
Ox Yoke Farm Nurseries	Bridgeport	1	Oct. 3	2021
Parfitt, Mary T.	New Milford	1	Sept. 8	1924
Park Gardens	Bridgeport	1	Sept. 14	1957
Park Place Nurseries	Marion	2	Sept. 24	2004
Paton, Wm. D.	Mount Carmel	2	Nov. 4	2054
Patrick, Charles	Bridgeport	2	Sept. 21	1995
Patterson, John	Old Saybrook	2	Aug. 17	1835
Peatt, Wm. T.	Ridgefield	2	Aug. 15	1827
Pedersen, Anthon	Stamford	3	Sept. 14	1954
Peschko, Robert	Danbury	1	Sept. 12	1947
Pestretto, Frank	West Hartford	1	Sept. 19	1980
Pestretto, Salvatore	West Hartford	1	Nov. 3	2051
Pflomm, Charles W.	Bridgeport	1	Sept. 9	1930
Phelps & V. T. Hammer Co., The J. W.	Branford	3	Sept. 12	1946
Piemontese, Dominick	Foxon	1	Oct. 6	2024
Pierson, Inc., A. N.	Cromwell	250	Aug. 1	1779
Pinchbeck Bros., Inc.	Ridgefield	15	Sept. 16	1968
Pinecrest Gardens (2)	Wapping	1	July 20	1746
Pine Plains Greenhouse, Inc.	Norwich	1	Oct. 11	2026
Polish Orphanage Farm	New Britain	1	Sept. 17	1973
Pomeroy Blue Spruce Gardens	New Milford	5	Sept. 8	1921
Powers, R. J.	Noroton	1	Sept. 3	1908
Pratt, Jr., George D.	Bridgewater	3	Oct. 19	2039
Prospect Nurseries, Inc.	Cromwell	25	Aug. 5	1792
Quinebaug Forestry Co. (2)	Union	2	July 16	1738
Rabinak, Louis	Deep River	2	Aug. 1	1781
Race Brook Gardens, Inc.	Orange	1	July 15	1734
Reliable Nursery, The (2)	East Hartford	2	Aug. 17	1840
Rengerman's Garden	Granby	1	Aug. 17	1843
Reynold's Farm	South Norwalk	1	July 29	1768
Richmond, Gordon L.	New Milford	8	Sept. 8	1920

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—(*Continued*)

Name of firm	Address	Acreage	Certificate date	Certificate number
Rockfall Nursery Co.	Rockfall	110	Aug. 4	1789
Rose Hill Nursery	Gildersleeve	3	Aug. 17	1842
Rosery Rest, The	Bridgeport	5	Sept. 1	1887
Sachem Forest Landscape Service	New Haven	1	Aug. 31	1881
Sage, Hollister	North Woodbury	1	Sept. 2	1900
Sandelli's Greenhouse	New Britain	1	Aug. 31	1884
Sasco Hill Evergreen Nursery	Southport	1	Aug. 1	1782
Saxe and Floto	Waterbury	1	Aug. 25	1855
Scarano Nursery, Alphonso	Groton	1	Aug. 19	1850
Schaeffer Bros.	Norwich	4	Aug. 12	1810
Schleichert Nursery	Bridgeport	1	Sept. 1	1891
Schneider, Godfrey	West Haven	1	Sept. 20	1984
Schulze, Charles T.	Bethel	3	Nov. 5	2056
Scott's Nurseries	Bloomfield	10	Nov. 14	2063
Selleck, Joel F.	Bridgeport	1	Oct. 13	2029
Seltsam's Pequonnock Gardens	Bridgeport	1	Aug. 3	1786
Seymour's Hemlock Nursery	Riverton	1	Oct. 1	2014
Sharon Valley Nursery	Sharon	1	July 28	1763
Sierman, Inc., C. H.	Hartford	8	Aug. 27	1857
Silver City Nursery	Meriden	2	July 27	1761
Silver Lane Nursery Co.	Burnside	1	Aug. 17	1845
Silvermine Nurseries	Norwalk	1	Sept. 3	1906
Simonsen, H. C.	Plainville	3	Aug. 31	1883
Sloan, E. H. & W. S.	New Canaan	1	Aug. 29	1870
Smith & Son, Edward A.	Mystic	1	Aug. 12	1813
Soltes Nursery, M. J.	Shelton	2	Sept. 10	1938
Southport Nursery	Southport	27	July 27	1756
South Wilton Nurseries	South Wilton	5	Aug. 1	1770
Spencer, W. L. L.	Columbia	1	Aug. 12	1808
Spring Nurseries	Bristol	3	Sept. 19	1976
Stack, Garrett M.	Guilford	1	Aug. 30	1873
Stack, Jr., Thomas M.	Brookfield	1	Oct. 18	2037
Stack, Sr., Thomas M.	New Milford	2	Sept. 17	1974
Stafford Conservatories	Stafford Springs	2	Nov. 29	2067
Stalzer & Son, John	Brooklyn	1	Aug. 12	1806
Stannard, E. H.	Wilton	2	Sept. 23	2000
State Street Nursery	New Haven	2	July 27	1757
Steck, Jr., Inc., Charles A.	Bethel	4	Nov. 8	2059
Steck & Sons, Inc., C. A.	Newtown	10	Nov. 10	2061
Steck, Sarah B.	Bethel	1	Aug. 30	1872
Stratford Rose Nurseries	Stratford	1	Sept. 2	1894
Strayer, Paul B. (2)	Stratford	1	Sept. 2	1896
Sunridge Nurseries	Greenwich	50	Sept. 12	1948
Sunrise Nursery (2)	Darien	1	July 30	1778
Thomas & Sons, Inc., W. D.	Hamden	1	Sept. 6	1911
Torchi, Nazareno	Woodmont	1	Sept. 12	1945
Torizzo, P. A.	West Hartford	1	Aug. 29	1861
Triangle Nursery	Yalesville	1	Aug. 4	1788
Tryon, George W.	North Stonington	1	Aug. 12	1815

CONNECTICUT NURSERY FIRMS CERTIFIED IN 1932—(*Concluded*)

Name of firm	Address	Acreage	Certificate date	Certificate number
Valley View Nursery	Southington	1	Sept. 24	2002
Van der Bom, F.	Bethel	5	Sept. 8	1918
Vanderbrook & Son, C. L.	Manchester	50	July 26	1751
Van Wilgen Nurseries	Branford	15	Dec. 2	2070
Van Wilgen, William	Branford	1	Sept. 16	1971
Vasileff, Nicholas	Greenwich	4	Sept. 19	1977
Verkade's Nurseries	New London	60	Sept. 1	1888
Vernick Nurseries	Bridgeport	2	Sept. 7	1913
Wallace Nursery	Wallingford	9	Aug. 22	1853
Wallingford Nurseries	Wallingford	75	Oct. 13	2028
Waltermire, Wm. H.	Guilford	1	Aug. 31	1880
Ward & Son, J. F.	Windsor	1	July 15	1729
Water Bureau, Metropolitan District Commission of Hartford County	Hartford	50	Oct. 13	2030
Watrous, Arthur J.	Meriden	1	Sept. 15	1962
Weinberger, Wm.	Ridgefield	2	Aug. 29	1863
Westerly Nursery	Pawcatuck	1	Aug. 29	1860
Westville Nurseries, Inc.	New Haven	3	Oct. 18	2038
Wethersfield Nursery	Wethersfield	2	Sept. 10	1935
Wheeler, Charles B.	Stonington	1	Aug. 12	1814
White Elm Nurseries	Talcottville	1	Aug. 17	1839
Whittemore Co., J. H.	Naugatuck	3	Sept. 16	1967
Wild's Nursery, Henry	Greenwich and Norwalk	30	Aug. 25	1854
Wilmaco Gardens	Manchester	5	July 29	1769
Wilridge Nurseries	Ridgefield	3	July 28	1766
Wilson, M. L.	Litchfield	2	Sept. 30	2011
Wilson & Co., C. E.	Manchester	130	July 26	1752
Woodbridge Nursery Co.	New Haven	4	Oct. 14	2034
Woodmont Gardens	Woodmont	1	Sept. 11	1944
Woodruff, C. V.	Orange	2	July 15	1730
Woodside Nurseries (2)	Darien	2	Aug. 4	1787
Wyllie, David	Whitneyville	1	Sept. 30	2009
Yale University Forest School Nursery	New Haven	1	Oct. 11	2027
Yale University Landscape Department	New Haven	5	Sept. 16	1969
Young's Nurseries	Wilton	1	May 14	1727
Zack Co., H. J.	Deep River	10	Dec. 20	2075
		4490		

The cost of inspecting these nurseries in 1932 was approximately $2,500.

Other Kinds of Certificates Issued

During the year covered by this Report, 134 duplicate certificates were issued to Connecticut nurserymen for filing in other states. Altogether 224 dealer's permits were issued to registered dealers who do not grow their own stock. The number of shipper's per-

mits issued to nurserymen in other states who wish to ship stock into Connecticut was 254. The number of shipments of parcels of nursery stock inspected and certified for individuals was 227. Narcissus bulbs grown in Connecticut must be inspected twice in order to comply with the requirements of Federal Quarantine No. 62, before they can be shipped into other states. The first inspection is made in the field in May when the plants are in flower, and the second after the bulbs are dug for shipment; 134,000 bulbs were given the field inspection and 25,000 inspected just before shipment and 28 certificates issued. There has been a decrease in the number of shipments of mountain laurel and other decorative material, and 79 certificates were issued during the year. Various special certificates to the number of 168 were issued during the season. Certain shipments of shelled corn and other seeds were examined and 1105 certificates issued. Currants, gooseberries and five-leaf pines to be planted in the state without violating Federal Quarantine No. 63 must have control area permits on account of the white pine blister rust. During the year 281 such control area permits were issued.

INSPECTION OF IMPORTED NURSERY STOCK

W. E. Britton and M. P. Zappe

A smaller quantity of nursery stock entered Connecticut from foreign countries in 1932, than in 1931 or for several years. Practically all of the material was rose stocks for propagation. It enters the United States under specifications and permits of the Federal Bureau of Plant Quarantine. At ports of entry it is released for transit to its destination, where it is examined by state inspectors.

The imported nursery stock entering Connecticut in 1931-1932 was inspected by Mr. Zappe and consisted of 14 shipments containing 123 cases and 945,979 plants.

The rose stock was all imported by three firms of commercial growers. One firm had six shipments, containing 838,975 plants; the second had six shipments containing 97,000 plants; and the third had one shipment containing 10,000 plants. The other shipment contained four apple trees for the Agricultural College. The kinds of stock were as follows:

Kinds of Stock Imported

Rosa manetti	875,000
Rosa odorata	70,975
Apple	4
	945,979

Of this material, 12 shipments containing 935,975 plants came from Holland, one shipment of 10,000 plants came from England, and the one shipment of four apple trees came from Canada.

The time required to examine this material was equivalent to one man working 15 days and this time together with the cost of travel, 1,095 miles, and other necessary expenses amounted to about $201.15.

In addition to the material inspected and mentioned above, there were 16 shipments containing 14,204 plants of new varieties, and 13 shipments containing approximately 83 pounds of tree seeds that were not inspected in Connecticut because all plants had been inspected and the seeds fumigated at Washington, D. C. Reports of the 14 shipments inspected were sent to the Federal Bureau of Plant Quarantine.

Results of Inspection

Of the 14 shipments inspected, six shipments, or 44 per cent, were infested with insects or plant diseases, as follows:

INSECTS

Emphytus cinctus Linn. on manetti rose.....5 shipments

PLANT DISEASES

Crown gall on manetti rose.....2 shipments

INSPECTION OF APIARIES, 1932

W. E. Britton

In 1932 a larger number of apiaries and colonies were inspected than ever before. The work was done, as in former years, by H. W. Coley, of Westport, and A. W. Yates, of Hartford. These inspections in 1932 required 190 man days, and together with traveling expenses cost $2,229.67. Altogether, 1,397 apiaries containing 11,459 colonies were inspected in 1932, as against 1,232 apiaries, containing 10,678 colonies, inspected in 1931. These apiaries averaged 8.2 colonies each in 1932, and 8.66 each in 1931.

The following table shows the number of apiaries and colonies inspected, the average number of colonies per apiary, and the average cost of inspecting each apiary and colony for each year since the inspection was begun in 1910.

Twenty-Three Year Record of Apiary Inspection in Connecticut

Year	Number apiaries	Number colonies	Average No. colonies per apiary	Average cost of inspection Per apiary	Per colony
1910	208	1,595	7.6	$2.40	.28
1911	162	1,571	9.7	1.99	.21
1912	153	1,431	9.3	1.96	.21
1913	189	1,500	7.9	1.63	.21
1914	463	3,882	8.38	1.62	.19
1915	494	4,241	8.58	1.51	.175
1916	467	3,898	8.34	1.61	.19
1917	473	4,506	9.52	1.58	.166
1918	395	3,047	7.8	1.97	.25
1919	723	6,070	11.2	2.45	.29
1920	762	4,797	6.5	2.565	.41
1921	751	6,972	9.2	2.638	.24
1922	797	8,007	10.04	2.60	.257
1923	725	6,802	9.38	2.55	.27
1924	953	8,929	9.4	2.42	.25
1925	766	8,257	10.7	2.45	.22
1926	814	7,923	9.7	2.35	.24
1927	803	8,133	10.1	2.37	.234
1928	852	8,023	9.41	2.12	.225
1929	990	9,559	9.55	2.19	.227
1930	1,059	10,335	9.76	2.01	.206
1931	1,232	10,678	8.66	1.83	.212
1932	1,397	11,459	8.2	1.60	.195

In 1932, apiaries were inspected in 149 towns as against 157 towns in 1931, and 154 towns in 1930. Inspections were made in 1932 in the following 12 towns not visited in 1931:

Middlesex County—Killingworth and Middlefield; Litchfield County—Cornwall, Kent, Plymouth and Warren; New London County—East Lyme; New Haven County—Beacon Falls, Derby and Southbury; Hartford County—Windsor Locks; Fairfield County—Ridgefield.

On the other hand, in the following 19 towns visited in 1931, no inspections were made in 1932:

Fairfield County—Weston; New Haven County—North Haven and West Haven; Tolland County—Tolland and Willington; Windham County—Ashford, Brooklyn, Canterbury, Chaplin, Eastford, Hampton, Killingly, Plainfield, Pomfret, Putnam, Scotland, Sterling, Thompson and Woodstock. In Windham County only one town was inspected, namely, that of Windham.

There were no apiaries infested with European foul brood, but there were 50 apiaries infested with American foul brood.

In 1932, American foul brood was discovered in the following 37 towns:

Fairfield County—Bethel, Bridgeport, Greenwich, Norwalk, Redding, Stamford; New Haven County—Ansonia, Cheshire, Meriden, North Branford, Seymour, Waterbury; Middlesex County—Clinton, Essex, Middletown; New London County—Bozrah, Colchester, East Lyme, Lebanon, Ledyard, Norwich; Litchfield County—Goshen, Litchfield, North Canaan, Thomaston, Torrington, Watertown, Cornwall, Plymouth; Hartford County—Berlin, Bristol, East Hartford, Glastonbury, Manchester, Wethersfield; Tolland County—Mansfield; Windham County—Windham.

Statistics of Inspection

The statistics of apiary inspection by towns and counties are given on the following pages, with summary on page 398.

INSPECTION OF APIARIES, 1932

Town	Apiaries Inspected	Apiaries Diseased	Colonies Inspected	Colonies Diseased	American Foul brood
Fairfield County					
Bethel	17	2	108	2	2
Bridgeport	6	1	52	4	4
Brookfield	2	0	12	0	0
Danbury	22	0	154	0	0
Darien	3	0	77	0	0
Easton	3	0	71	0	0
Fairfield	5	0	55	0	0
Greenwich	37	3	283	4	4
Monroe	9	0	124	0	0
New Canaan	3	0	59	0	0
New Fairfield	11	0	74	0	0
Newtown	6	0	73	0	0
Norwalk	5	1	56	2	2
Redding	16	4	163	10	10
Ridgefield	5	0	53	0	0
Shelton[1]	5	0	32	0	0
Sherman	9	0	92	0	0
Stamford	3	2	23	8	8
Stratford	6	0	32	0	0
Trumbull	16	0	89	0	0
Westport	3	0	17	0	0
Wilton	14	0	133	0	0
	209	13	1,832	30	30

[1] One apiary inspected twice.

Town	Apiaries Inspected	Apiaries Diseased	Colonies Inspected	Colonies Diseased	American Foul brood
New Haven County					
Ansonia	10	1	42	1	1
Beacon Falls	1	0	28	0	0
Bethany	3	0	21	0	0
Branford	3	0	9	0	0
Cheshire	7	1	34	1	1
Derby	3	0	13	0	0
East Haven	4	0	28	0	0
Guilford	7	0	71	0	0
Hamden	18	0	108	0	0
Madison	2	0	13	0	0
Meriden	13	1	139	1	1
Middlebury	7	0	94	0	0
Milford	1	0	2	0	0
Naugatuck	9	1	71	1	1
New Haven	2	0	11	0	0
North Branford	4	1	58	1	1
Orange	4	0	74	0	0
Oxford	5	0	39	0	0
Prospect	4	0	23	0	0
Seymour	3	1	17	1	1
Southbury	5	0	61	0	0
Wallingford	7	0	240	0	0
Waterbury	14	2	76	2	2
Wolcott	4	0	20	0	0
Woodbridge	4	0	51	0	0
	144	8	1,343	8	8
Middlesex County					
Chester	6	0	39	0	0
Clinton	2	1	23	1	1
Cromwell	12	0	64	0	0
Durham	1	0	75	0	0
East Haddam	19	0	177	0	0
East Hampton	11	0	138	0	0
Essex	8	1	42	1	
Haddam	4	0	56	0	
Killingworth	9	0	29	0	0
Middlefield	5	0	120	0	0
Middletown	7	2	52	2	2
Old Saybrook	10	0	88	0	0
Portland	8	0	82	0	0
Saybrook	7	0	27	0	0
Westbrook	1	0	7	0	0
	110	4	1,019	4	4
New London County					
Bozrah	2	1	74	2	2
Colchester	18	0	258	0	0
East Lyme	5	1	49	4	4
Franklin	2	0	23	0	0
Griswold	6	0	106	0	0
Groton	8	0	134	0	0
Lebanon	12	1	186	1	1

Town	Apiaries Inspected	Apiaries Diseased	Colonies Inspected	Colonies Diseased	American Foul brood
New London County—(*Continued*)					
Ledyard	4	1	22	1	1
Lisbon	2	0	28	0	0
Lyme	5	0	147	0	0
Montville	15	0	129	0	0
New London	2	0	17	0	0
No. Stonington	4	0	43	0	0
Norwich	12	2	558	3	3
Old Lyme	3	0	106	0	0
Preston	5	0	72	0	0
Salem	3	0	20	0	0
Sprague	1	0	14	0	0
Stonington	14	0	72	0	0
Voluntown	2	0	22	0	0
Waterford	6	0	57	0	0
	131	6	2,137	11	11
Litchfield County					
Barkhamsted	9	0	32	0	0
Bethlehem	13	0	94	0	0
Bridgewater	6	0	97	0	0
Canaan	3	0	28	0	0
Colebrook	8	0	35	0	0
Cornwall	6	1	40	5	5
Goshen	8	1	77	2	2
Harwinton	10	0	33	0	0
Kent	8	0	163	0	0
Litchfield	22	2	161	4	4
Morris	9	0	40	0	0
New Hartford	20	0	76	0	0
New Milford	18	0	173	0	0
Norfolk	11	0	42	0	0
North Canaan	7	1	91	1	1
Plymouth	12	1	64	1	1
Roxbury	3	0	10	0	0
Salisbury	14	0	108	0	0
Sharon	18	0	271	0	0
Thomaston	13	2	78	3	3
Torrington	21	1	109	2	2
Warren	1	0	10	0	0
Washington	11		53	0	0
Watertown	17	2	83	2	2
Winchester	14	0	75	0	0
Woodbury	10	0	89	0	0
	292	11	2,132	20	20
Hartford County					
Avon	13	0	36	0	0
Berlin	19	1	110	4	4
Bloomfield	11	0	183	0	0
Bristol	18	1	103	1	1
Burlington	12	0	51	0	0
Canton	16	0	99	0	0
			32	0	0

Town	Apiaries Inspected	Apiaries Diseased	Colonies Inspected	Colonies Diseased	American Foul brood
Hartford County—(*Continued*)					
East Hartford[1]	17	1	77	1	0
East Windsor	15	0	110	0	0
Enfield	11	0	84	0	0
Farmington	16	0	75	0	0
Glastonbury	24	1	130	1	1
Granby	8	0	92	0	0
Hartford	2	0	8	0	0
Hartland	1	0	77	0	0
Manchester	17	1	93	2	2
Marlborough	2	0	50	0	0
New Britain	24	0	124	0	0
Newington	17	0	70	0	0
Plainville	11	0	44	0	0
Rocky Hill	4	0	43	0	0
Simsbury	11	0	61	0	0
Southington	18	0	105	0	0
South Windsor	11	0	44	0	0
Suffield	18	0	129	0	0
West Hartford	12	0	53	0	0
Wethersfield	17	1	92	1	1
Windsor	22	0	179	0	0
Windsor Locks	1	0	10	0	0
	377	6	2,364	10	9
Tolland County					
Andover	4	0	6	0	0
Bolton	2	0	5	0	0
Columbia	10	0	60	0	0
Coventry	16	0	91	0	0
Ellington	10	0	77	0	0
Hebron	8	0	56	0	0
Mansfield	26	3	82	4	4
Somers	11	0	55	0	0
Stafford	11	0	42	0	0
Union	2	0	5	0	0
Vernon	17	0	88	0	0
	117	3	567	4	4
Windham County					
Windham[1]	17	1	65	1	0

SUMMARY

County	Number towns	Apiaries Inspected	Apiaries Diseased	Colonies Inspected	Colonies Diseased	American Foul brood
Fairfield	22	209	13	1,832	30	30
New Haven	25	144	8	1,343	8	8
Middlesex	15	110	4	1,019	4	4
New London	20	131	6	2,137	11	11
Litchfield[1]	26	292	11	2,132	20	20
Hartford	29	377	6	2,364	10	9
Tolland	11	117	3	567	4	4
Windham[1]	1	17	1	65	1	0
	149	1,397	52	11,459	88	86

[1] One apiary with one colony bee paralysis.

	Number apiaries	Number colonies
Inspected	1,397	11,459
Infested with American foul brood	50	86
Colonies treated		42
Colonies destroyed		44
Percentage infested	.0035	.00074
Infested with bee paralysis	2	2
Average number of colonies per apiary		8.2
Cost of inspection	$2,229.67	
Average cost per apiary	1.60	
Average cost per colony		$ .195

Financial Statement

Receipts

Appropriation year ending June 30, 1932	$2,500.00

Expenditures

Personal services	$1,080.00
Travel	1,315.70
Printing	42.50
Total	$2,438.20
Balance on hand June 30, 1932	61.80
Grand total	$2,500.00

Registration of Bees

Section 2129 of the General Statutes requires that each beekeeper shall register his bees on or before October 1, of each year with the town clerk of the town in which the bees are kept, and that each town clerk on or before December 1, shall report to the State Entomologist whether or not any bees have been registered, and if so, to send a list of the names and number of colonies of each. In 1932, 1,397 apiaries containing 11,459 colonies were inspected. There were registered 836 apiaries and 6,458 colonies in 1932, and after checking the registrations and inspections and deducting duplications the following figures were obtained:

	Apiaries	Colonies
Inspected	1,397	11,459
Registered but not inspected	385	1,780
	1,782	13,239

REPORT ON GIPSY MOTH CONTROL IN CONNECTICUT IN 1932

W. E. Britton and John T. Ashworth

This work has been carried on in about the same manner as in former years. Funds have not been adequate to cover all infested towns, and it has been necessary to direct the scouting efforts toward those areas from which, on account of abundance of the pest, or their situation, there is the greatest danger of spread. An attempt has been made to cover all towns every two years, but it has even been impossible to carry out this plan regarding certain towns,

Figure 106. Oak tree in Brooklyn stripped by gipsy moth caterpillars. Photographed July 13.

and in 1932 a few oak trees were stripped in Brooklyn, Killingly and Plainfield, as are shown in Figure 106.

Apparently there has been no extensive wind-spread and all egg-clusters discovered have been creosoted. It may be noted that only 41 towns were covered as against 72 towns in the preceding year. This is due to the fact that several important woodland infestations needed attention. The Federal scouts did much woodland scouting but their efforts were confined to eight towns in the northwestern corner of the state. The state men also had several woodland colonies to cover, and consequently could not do so much roadside scouting or cover so many towns as they might have done otherwise. Nevertheless, in these 41 towns, 146 infestations were dis-

covered, 14,479 egg-clusters were creosoted, and 34 of the most important colonies were sprayed; 75,335 pounds or 37.6 tons of lead arsenate were used in this work. In addition to these figures, 524 larvae and pupae were killed by the scouts, and 1,629 miles of roadside and 7,706 acres of woodland were scouted.

New Equipment and Replacements

The horse-drawn power sprayer purchased in 1915 was turned in toward a new Fitzhenry-Guptill Model V-Special power sprayer on a Ford "improved four" truck. This outfit has a 300-gallon

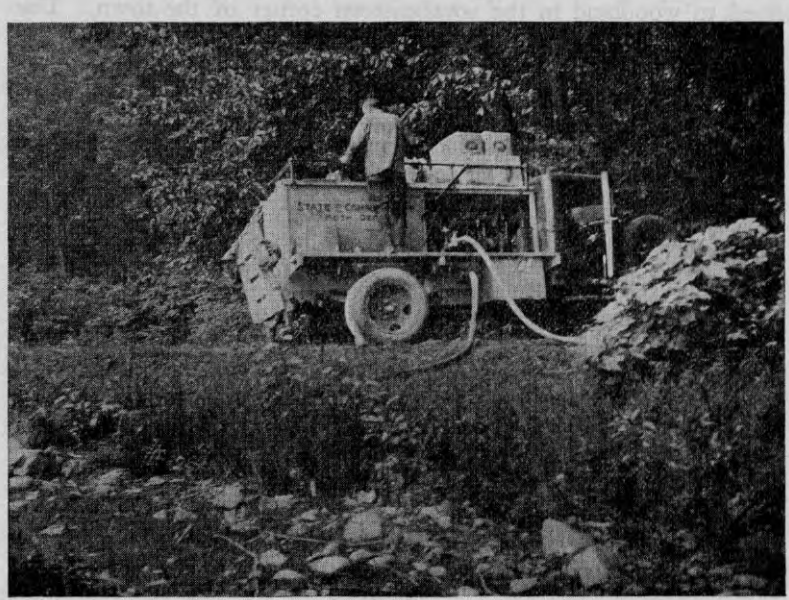

FIGURE 107. New automobile truck power sprayer for gipsy moth work. Photographed in West Hartford, June 21.

steel tank divided into two compartments. It is therefore possible to fill one compartment while emptying the other. This outfit is much lighter than the Netco sprayers and can be used in some situations where the heavier machines are impracticable. As new hose was needed, 2,500 feet of 1-inch 8-ply Government type rubber covered spray hose, and 50 feet of 2½-inch suction hose were purchased. Emergency kits were purchased and each truck supplied with one. The usual number of small tools have been broken or lost and have been replaced. The truck is shown in Figure 107.

Results of Scouting for Gipsy Moth

Windham County

27 infestations 1,010 egg-clusters

When the men returned from vacation, one crew was sent to the northeastern corner of the state where, on account of lack of funds, no solid scouting had been done for three years. The men worked in Windham County during August with the following results: In Sterling, 18 infestations containing 630 egg-clusters were discovered; in Plainfield, 8 infestations containing 345 egg-clusters; in Woodstock, one infestation containing 35 egg-clusters. Only a small amount of work was done in Woodstock, and this was confined to woodland in the southeastern corner of the town. The results of this scouting show that infestations are building up in this corner of the state and unless adequate funds are soon provided to do close scouting, there will probably be considerable damage. In July, 1932, it was discovered that certain oak trees in Brooklyn and Killingly had been entirely or partially defoliated by gipsy moth caterpillars. One of these trees is shown in Figure 106.

New London County

17 infestations 3,031 egg-clusters

Only two towns, New London and Colchester, were scouted this year in New London County. This work was commenced in New London in August, and 8 infestations containing altogther 185 egg-clusters, were found; 107 egg-clusters were discovered at the corner of Montauk and Pequot Avenues, on property owned by W. Clark.

In Colchester the scouts discovered in woodland 9 colonies containing 2,846 egg-clusters. Several were rather large colonies and all were in the eastern portion of the town. Altogether, 600 acres of woodland were scouted. No spraying was done in New London County, because when the spraying had been completed in the territory to the westward, it was too late to spray as the larvae were practically through feeding.

Tolland County

57 infestations 4,414 egg-clusters

Scouting work was done in five towns in Tolland County. In Mansfield and Willington it was confined to larval scouting and checking on former infestations. In Mansfield two infestations and three single egg-clusters were found containing altogether 39 egg-clusters.

In Willington the scouts discovered seven infestations containing 373 egg-clusters, all in the northern portion of the town near the boundary of Stafford.

A complete scouting was given the town of Ellington, resulting in the discovery of 25 infestations containing 1,284 egg-clusters, mostly in the eastern portion of the town between the towns of Tolland and Stafford. Four of these colonies were in woodland and contained more than 100 egg-clusters each.

Somers was completely scouted, revealing 23 infestations containing 2,718 egg-clusters. All except two of the infestations were in the northern half of the town along the Massachusetts border. Both the others were south of the state road; one, the largest in the town, contained 1,007 egg-clusters, on a white oak tree owned by B. F. Pinney; the other contained 581 egg-clusters, on oak, apple and willow trees on land owned by George Webster.

Vernon was also completely scouted and no traces of the gipsy moth were discovered.

Middlesex County

1 infestation 20 egg-clusters

The towns of Cromwell, East Hampton, Middletown and Portland were completely scouted without finding any traces of the gipsy moth. Middlefield was scouted in February, only around last year's infestations, and no re-infestations were discovered. Haddam also was scouted around the old infestations only. Altogether, 22 acres of woodland were thoroughly examined, resulting in a find of one colony of 20 egg-clusters. This colony was sprayed early in June by state men, and 100 pounds of lead arsenate were applied.

Hartford County

24 infestations 5,290 egg-clusters

Work was done in 15 towns in Hartford County, including 1,096 acres of woodland in addition to the usual roadside scouting. In the northeast corner of Farmington was discovered a large woodland colony that extended across the border into West Hartford, and down the east side of the mountain almost to the West Hartford reservoirs. Altogether, 970 acres were scouted in this region, and 724 egg-clusters were found and creosoted. In June this infestation was sprayed with 3.75 tons of lead arsenate by state men.

In Berlin, two small colonies containing 24 egg-clusters were discovered. Both were sprayed by state men.

In East Granby four infestations were revealed, containing 158 egg-clusters. The largest contained 104 egg-clusters, and this and another small colony were sprayed.

Work in East Windsor disclosed one small infestation of seven egg-clusters, that was later sprayed.

In Glastonbury, two small colonies in an apple orchard contained 40 egg-clusters. These trees had been sprayed by the owner.

In New Britain three colonies having altogether 48 egg-clusters were discovered. Two of them were sprayed.

In the southwest corner of Newington one small colony of 11 egg-clusters was handled by an application of "Tanglefoot" to the trees, accompanied by frequent inspection to kill the caterpillars, but none were found.

In Suffield four small infestations containing 47 egg-clusters were sprayed by state men.

In scouting Wethersfield, it was found that the old colony on the river bank had not been eradicated. The land was flooded last year so that our men could not complete their work. Altogether, 4,213 egg-clusters were found and creosoted while scouting about 10 acres of woodland. During the winter a large proportion of the tall poplar and maple trees were cut and sawed into lumber. The other trees will soon be cut so that the infestation can be more easily eradicated.

A small amount of woodland scouting was done in Granby and Southington. No infestations were found in Southington, but a colony of 14 egg-clusters was discovered in Granby, where further work was discontinued because the spraying season had arrived.

The towns of East Hartford, Enfield, and Manchester (in part) were also scouted and no trace of the gipsy moth found.

New Haven County

The only work done in New Haven County consisted of thoroughly scouting 91 acres of woodland around the old infestation in Wallingford, by Federal men. No gipsy moth egg-clusters were found.

Litchfield County

20 infestations 714 egg-clusters

State men scouted Colebrook and discovered two small colonies having 27 egg-clusters, both of which were later sprayed. Eight other towns in the county were scouted by Federal men, and 6,417 acres of woodland were covered. In Canaan there were seven infestations containing 407 egg-clusters. In North Canaan there was one colony of 12 egg-clusters, and in Norfolk, one of 13 egg-clusters. There were two of 26 egg-clusters in Salisbury, and seven infestations of 229 egg-clusters in Warren. In Cornwall, Kent, and Washington no gipsy moth egg-clusters were found. Of the 20 infestations discovered in the towns mentioned above, 19 were sprayed in summer, with approximately 33 tons of lead arsenate.

Fairfield County

No work was done in Fairfield County.

STATISTICS OF INFESTATIONS, 1931–1932

Towns	Infestations found	Egg-clusters creosoted	Colonies sprayed	Poison used (lbs.)	Larvae and pupae killed	Roadside scouted (miles)	Woodland scouted (acres)
Windham County:							
Plainfield[1]	8	345	0	0	159	0	6
Sterling[1]	18	630	0	0	72	0	12
Woodstock[1]	1	35	0	0	0	0	2
	27	1,010	0	0	231	0	20
New London County:							
New London[1]	8	185	0	0	0	0	5
Colchester	9	2,846	0	0	0	101	0
	17	3,031	0	0	0	101	5
Tolland County:							
Ellington	25	1,284	0	0	0	89	19
Mansfield[1]	2	39	0	0	0	0	0
Somers	23	2,718	0	0	0	62	22
Vernon	0	0	0	0	0	51	0
Willington[1]	7	373	0	0	0	0	10
	57	4,414	0	0	0	202	51
Middlesex County:							
Cromwell	0	0	0	0	0	47	0
East Hampton	0	0	0	0	0	164	0
Haddam[1]	1	20	1	100	0	5	22
Middlefield[1]	0	0	0	0	0	0	4
Middletown	0	0	0	0	0	152	0
Portland	0	0	0	0	0	68	0
	1	20	1	100	0	436	26
Hartford County:							
Berlin	2	24	2	110	0	80	10
East Granby	4	158	2	1,070	146	39	71
East Hartford	0	0	0	0	0	50	0
East Windsor	1	7	1	5	0	71	0
Enfield	0	0	0	0	0	91	0
Farmington	2	544	2	1,960	0	71	0
Glastonbury	2	40	0	0	0	98	0
Granby[1]	1	14	0	0	0	0	2
Manchester[3]	0	0	0	0	0	19	0
New Britain	3	48	2	520	0	117	0
Newington	1	11	0	0	0	47	0
Southington[1]	0	0	0	0	0	0	3
Suffield	4	47	2	185	8	91	30
West Hartford	3	184	3	5,565	0	106	970
Wethersfield	1	4,213	0	0	139	0	10
	24	5,290	14	9,415	293	880	1,096
New Haven County:							
Wallingford[2]	0	0	0	0	0	0	91

[1] Scouted around old infestations.
[2] Scouted by Federal men.
[3] Town not completely scouted.

Towns	Infestations found	Egg-clusters creosoted	Colonies sprayed	Poison used (lbs.)	Larvae and pupae killed	Roadside scouted (miles)	Woodland scouted (acres)
Litchfield County:							
Canaan[1]	7	407	6	24,843	0	2	1,759
Colebrook	2	27	2	45	0	0	461
Cornwall[1]	0	0	0	0	0	0	501
Kent[1]	0	0	0	0	0	0	2
Norfolk[1]	1	13	1	1,135	0	0	291
North Canaan[1]	1	12	1	660	0	0	72
Salisbury[1]	2	26	2	6,740	0	1	1,612
Warren[1]	7	229	7	32,397	0	7	1,515
Washington[1]	0	0	0	0	0	0	204
	20	714	19	65,820	0	10	6,417

Fairfield County:

No scouting done in Fairfield County

SUMMARY OF STATISTICS

County	Towns covered	Infestations found	Egg-clusters creosoted	Colonies sprayed	Poison used (pounds)	Larvae and pupae killed	Roadside scouted (miles)	Woodland scouted (acres)
Windham	3	25	1,010	0	0	231	0	20
New London	2	17	3,031	0	0	0	101	5
Tolland	5	57	4,414	0	0	0	202	51
Middlesex	6	1	20	1	100	0	436	26
Hartford	15	24	5,290	14	9,415	293	880	1,096
New Haven	1	0	0	0	0	0	0	91
Litchfield	9	20	714	19	65,820	0	10	6,417
	41	146	14,479	34	75,335	524	1,629	7,706

Financial Statement

Receipts

Appropriation for year ending June 30, 1932	$50,000.00

Expenditures

Salaries		$4,840.00
Labor		38,293.26
Stationery and office supplies		33.72
Sundry supplies		
Insecticides	$1,247.40	
Small hardware	5.78	
Auto oil	61.13	1,314.31
Communication service, telephone		55.40
Travel expenses		
Outlying investigations	328.86	
Gasoline	1,115.68	1,444.54

[1] Scouted by Federal men.

Express		4.69
Heat, light, water and power		
Fuel, coal	91.75	
Light, electricity	21.80	113.55
Tools, machinery and appliances		
Other equipment	2,132.57	
Auto repairs	203.08	
Other equipment repairs	47.50	2,383.15
Rent of office, storehouse and auto storage		524.25
Contingent		
Insurance	477.80	
Medical	26.00	503.80
Scientific supplies, chemicals		26.25
Loss of cattle		150.00
Miscellaneous		22.36
Total		$49,709.28
Balance on hand June 30, 1932		290.72
		$50,000.00

There has been no change during the season in the gipsy moth quarantine affecting Connecticut.

Parasites

Material was gathered by state men in Putnam and Thompson, where little control work has been done for several years, and sent to the Gipsy Moth Laboratory at Melrose Highlands, Mass., in order to learn something about the status of parasites and natural enemies. The material from both Putnam and Thompson gave a goodly percentage of *Compsilura concinnata* and *Sturmia scutellata.* From the egg-clusters collected in Thompson there was also recovered a low percentage of *Anastatus disparis,* formerly known as *A. bifasciatus.*

Of the parasites mentioned above, *Anastatus disparis* is a minute four-winged parasite of the Hymenopterous family Eupelmidae, and *Compsilura concinnata* and *Sturmia scutellata* are both two-winged flies of the Dipterous family Tachinidae. It is encouraging to learn that these insects are effective allies in the control of the gipsy moth.

EUROPEAN CORN BORER CONTROL, 1932

W. E. Britton, M. P. Zappe and J. P. Johnson

The results of scouting in 1931 by Federal men showed that the two-generation European corn borer, *Pyrausta nubilalis* Hubn., had spread into Litchfield County to such an extent that it seemed

best to extend the quarantine over the entire state, and the scouting was discontinued before all towns had been visited. The pest was actually found in the following 16 towns in Litchfield County:

Canaan	Plymouth
Colebrook	Roxbury
Cornwall	Salisbury
Goshen	Sharon
Kent	Thomaston
New Milford	Washington
Norfolk	Watertown
North Canaan	Winchester

Quarantine

On account of the large number and scattered position of the towns recently found infested, Federal Quarantine No. 43 was revised to include the entire State of Connecticut, effective February 5, 1932. A public hearing was held at this Station on February 4, after due notice, and State Quarantine Order No. 31, effective February 10, 1932, was issued as follows:

QUARANTINE ORDER NO. 31

CONCERNING THE EUROPEAN CORN BORER

The fact has been determined that additional towns in Fairfield, Litchfield and New Haven Counties are now infested with the European corn borer, *Pyrausta nubilalis;* that Federal Quarantine No. 43 has recently been revised to include the entire State of Connecticut in the two-generation quarantined area, effective February 5, 1932; that a public hearing was held at the Connecticut Agricultural Experiment Station, New Haven, at two o'clock in the afternoon of February 4, 1932, after due notice as provided in Section 2124 of the General Statutes.

Now, therefore, I, William L. Slate, Director of the Connecticut Agricultural Experiment Station, under authority conferred by Section 2124, General Statutes, do hereby proclaim the entire state to be under quarantine on account of the two-generation European corn borer to conform with the provisions of Federal Quarantine No. 43 as revised and effective February 5, 1932. The provisions of Quarantine Order No. 28 covering the one-generation corn borer in the towns of Canaan, Cornwall, Goshen, Kent, North Canaan, Salisbury and Sharon are hereby repealed. All shipments going from Connecticut out of the quarantined area are subject to the regulations of Federal Quarantine No. 43 as revised and effective February 5, 1932.

This order shall become effective February 10, 1932.

W. L. SLATE
Director.

WILBUR L. CROSS,
Governor.

Federal Quarantine No. 43 was revoked July 15, 1932, but the state quarantine remains.

Enforcing the Compulsory Clean-up

Section 2125, General Statutes of Connecticut, requires that all cornstalks, corn stubble, and weed stems shall be disposed of not later than April 10 of each year, either by feeding to livestock, burning, or plowing under to a depth of 6 inches, provided the Director of this Station has issued an order to that effect. Inasmuch as such an order was issued, on Monday, April 11, 13 men started work. On the following day nine more were sent into the field. One of these men was provided and paid by the United States Department of Agriculture. That Department also furnished the state with automobiles, one for each man, so that they could travel about the territory assigned them.

The work began in the four southern counties of the state, and when these were completed the men moved into the four northern counties. Each man was assigned several towns in which he was to look for cornstalks and debris. This might harbor larvae of the European corn borer and thus be a potential source of infestation to the new corn and truck crops which would soon be planted. Wherever the men found such material they stopped and warned the owner of the danger of injury by this insect, and issued him a card with written instructions telling him the best methods of disposing of this material and allowing him a few more days to complete this work. When it had been done, the owner or tenant of the land was required to mail the return portion of the card back to the Station. There were many reasons given for not having the work done at the proper time. In some cases the land was too wet to plow, or the machinery was broken, or the horses were unable to work. If the cards were not returned when due, the farm inspectors again visited the farms to find out why. In many cases the cornstalks and debris had been disposed of, but cards had been lost, mislaid, or gone astray in the mails. In general, the farmers realized the damage the European corn borer could do to their crops and were willing to cooperate in its destruction. Altogether 3,750 cards were issued, and 3,604, or about 96.1 per cent, were returned to this office. There were 146 farmers who failed to report and these were visited again, either by the farm inspectors or by the supervisors. Throughout the entire state only seven refused to clean up their premises and were summoned into court. Most of these were fined, assessed costs, and ordered by the court to clean up their fields.

This clean-up was enforced only in the rural districts and no attempt was made to include small backyard gardens in the cities and villages. Most of the small backyard gardeners take enough pride in their gardens to see that they are properly cleaned up each spring.

In several cases farms were in bankruptcy or foreclosure proceedings; then it was necessary to see that others did the actual

clean-up work. Occasionally on tenanted farms the tenants moved away and left behind their cornstalks and debris. In such cases the owner was held responsible for the condition of the farm.

Most of the inspections were completed about the middle of May, but one man was employed a little later to check up on some of the farmers who had not yet reported their work completed. The cost to the state for this work amounted to $4,331.17.

Census of European Corn Borer Infestation in Connecticut, 1932

The European corn borer survey was made this year in order to obtain figures in comparison with those of the survey of 1931. However, finances did not allow a survey as extensive as that of the preceding year, so the work was performed in a few towns wherein the corn borer was first established, together with a certain few towns in which the seed corn industry is centered.

This survey was made in September and followed the procedure practiced in 1931, with the exception that only 100 stalks instead of 250 stalks in each field were checked in order to obtain the percentage of stalks infested. Each town was divided into quarter sections. Five fields, four of which were selected as near the center of each quarter section as possible, together with a fifth field located in the center of the town, were surveyed to obtain the average population of the corn borer infestation. Each field was divided in a similar manner and 20 stalks in each quarter section, together with 20 stalks in the center of the field, totaling 100 in all, were examined for infestation. Two stalks were selected at random from the infested stalks in each section as well as the center of the field. These stalks, totaling 10 in all for each field, were carefully slivered to obtain the average percentage of borers in each infested stalk.

A table will be found below giving figures of the survey obtained this year in comparison with those obtained in the year 1931. It will be noted that in each town except New London[1] the percentage of infestation (meaning percentage stalk infestation) has increased over that of the year 1931. It will also be noted in each town except Waterford and Orange[2] that the number of borers in an infested plant has decreased over that of the year 1931.

The comparative figures indicate a considerable reduction in the number of borers to the acre in Groton, Montville and Stonington, while there was a marked increase in Orange and Waterford. Furthermore, the results obtained in 1932 show a large number of borers to the acre in Glastonbury and Wethersfield. The other statistics denote that there has been little change in the situation in Ledyard and Milford. Apparently the data disclose that the infestation of the European corn borer was reduced or not mate-

[1] Only one backyard was surveyed in New London.

[2] Due to the lateness in the season, it was impossible to make the survey as complete as desired in 1931.

rially changed over that of the preceding year in the majority of the towns. This was due in all probability to the inaugurated clean-up measures, general seasonal conditions, or both.

The highest number of borers to a single plant was 53, found in Wethersfield.

STATISTICS OF INFESTATION OF EUROPEAN CORN BORER IN CORN IN 1932 AS COMPARED WITH 1931

Towns	Acres surveyed	Percentage of infestation	Average No. borers to the infested plant	Borers in 100 plants field run	[1] Borers to the acre
Hartford County					
Glastonbury	6.6	42.40	5.47	231.93	44,994
Wethersfield	12.71	47.40	8.60	407.64	79,082
New Haven County					
Milford:					
1932	16.88	35.40	1.58	55.93	10,850
1931	14.26	24.00	3.00	72.00	13,967
Orange:					
1932	14.38	20.80	2.04	42.43	8,231
1931	2.33	4.88	1.74	8.49	1,643
Woodbridge	9.00	7.60	1.87	14.21	2,757
New London County					
Groton:					
1932	2.91	75.60	3.76	284.26	55,146
1931	2.39	62.32	7.14	444.96	85,883
Ledyard:					
1932	3.06	37.00	2.08	76.96	14,930
1931	6.00	26.96	2.64	68.48	13,308
Montville:					
1932	2.82	24.80	1.60	39.68	7,698
1931	6.5	17.52	3.58	62.72	12,158
New London:					
1932	1 back yard	60.00	2.60	156.00	30,264
1931	1.04	69.84	7.50	523.80	101,738
Stonington:					
1932	4.09	46.80	2.28	106.70	20,700
1931	6.57	44.08	5.48	241.56	46,841
Waterford:					
1932	4.85	63.00	3.08	194.04	37,644
1931	8.18	35.04	2.82	98.81	19,185
Total acreage	124.57				

THE JAPANESE BEETLE IN CONNECTICUT IN 1932

W. E. BRITTON AND J. P. JOHNSON

The control work against the Japanese beetle has continued in immediate charge of Mr. Johnson, in cooperation with the United States Bureau of Plant Quarantine. On August 2, his office was moved from 22 Elizabeth Street, South Norwalk, to the Station in New Haven.

[1] Average based on 19,400 plants to the acre.

Scouting for Beetles

Scouting activities were started on July 18, when 37 men reported at Bridgeport for training and instruction. Two days later three others arrived, making 40 altogether. An illustrated lecture on the Japanese beetle was given these men in the Central High School, which was followed by intensive instruction on scouting procedure, making out field reports and actual methods practiced in the field. This school of instruction lasted three days. Then the foremen visited the South Norwalk office to obtain automobiles and crew assignments.

These men were divided into 10 crews of four each, seven crews to scout classified nursery and greenhouse establishments, and three to determine the spread and abundance of beetles in the areas previously known to be infested. Two crews were assigned to Hartford and Tolland Counties with headquarters in Hartford, one crew for nursery and greenhouse scouting and the other to determine spread and abundance in the old infestations. A crew to scout both nurseries and greenhouses was assigned each to Norwich, Shelton and South Norwalk, and two crews were placed in New Haven. An itinerary was arranged for two additional crews that were kept moving from place to place to determine the abundance and spread of the Japanese beetle at the several infestations not covered by the Hartford crew.

The state was divided into inspection districts and any crew working in a district was placed under the immediate supervision of the district inspector, who arranged the itinerary of each crew so as to obtain the maximum amount of scouting and information desired concerning each of the classified nurseries and greenhouses. For example, the distance scouted was not less than 500 feet nor more than 1,000 feet around each nursery or greenhouse. If the area around a large nursery were too great to cover in a day, the district inspector divided it so that certain portions could be examined on alternate visits. Itineraries were arranged so that each nursery and greenhouse was scouted at least twice a week.

The crews scouting for abundance and spread of beetles in 1932, covered the following 46 villages and cities:

Bethel
Bristol
Brooklyn
Canaan
Centerbrook
Central Village
Colchester
Danielson
East Hampton
East Hartford
Enfield
Essex
Falls Village
Glastonbury
Greenwich
Lakeville
Litchfield
Lyme
Manchester
Middletown
Moodus
Mystic
Naugatuck
New Britain
Newtown
Niantic
Norfolk
Norwich
New Milford
Old Lyme
Old Saybrook
Portland
Putnam
Sharon
Stafford Springs
Stamford
Stonington
Thomaston
Torrington
Vernon
Watertown
Westbrook
West Hartford
Windsor
Windsor Locks
Winsted

The roadsides along the Boston Post Road between Clinton and Stonington were also scouted.

The localities, and number of beetles found in each, in this field scouting were as follows:

Locality	Date	Number beetles
Branford	July 29-30	14
Bristol	July 28-August 1	17
East Hartford	August 9-12	9
Greenwich	July 25, August 25-26	76
Groton	August 18	1
Milford	August 20	4
Mystic	July 21-25, August 18	60
New Britain	July 27	6
Norwich	August 22	15
Old Saybrook	August 20	8
Ridgefield	August 4	15
Stamford	August 22-26	220
		445

The total number of classified nurseries in Connecticut is 143. Some establishments have both nursery and greenhouse. There were 143 nurseries and 65 greenhouses scouted, which represented 171 separate establishments. As each was examined several times during the season, altogether there were 799 nursery and 362 greenhouse scoutings. The first beetle found was in Hartford June 30 and the last beetle in Hartford September 30.

Trapping

The Station purchased 300 Japanese beetle traps and placed them in the environs of New Haven, Shelton, and Waterbury, and some Federal traps were used in Hartford. Beetles were caught in these traps as follows:

Locality	Date	Number beetles
Hamden	July 21-August 30	27
Hartford	June 30-September 30	1,665
New Haven	August 6-October 20	17
New Haven (Westville section)	July 16-August 29	4
Shelton	July 13-September 3	9
Waterbury	July 11-August 31	104
West Haven	August 8-27	1
		1,827

Number of cities and villages in which beetles were found	18
Total number of beetles caught in traps	1,827
Total number of beetles found by scouts	445
Total	2,272

The Japanese beetle was found in 1932, for the first time, in Bristol, East Hartford, Hamden, Milford, Mystic, Shelton, Waterbury, and West Haven.

Quarantine

Federal Quarantine No. 48 as revised and effective January 1, 1932, was extended to include all of Rhode Island, and portions of Massachusetts and New York. Moreover, the former two-zone system was abolished and the entire State of Connecticut was in the quarantined area. Consequently all interstate shipments were subject to the regulations of the Federal quarantine; there was no further real need of a state quarantine, and Quarantine Order No. 30, repealing the state quarantine on Japanese beetle, was issued to become effective February 10, 1932.

Inspection and Certification of Farm Products

In 1932, certain farm products including corn, beans, bananas, apples, peaches, and berries were inspected and certified for shipment according to the Federal quarantine regulations from June 15 to September 17. On cut flowers the regulations continued until October 15. No inspection platforms were needed or employed in 1932. It was possible for the district inspectors and their nursery and greenhouse scouting crews to handle all of the market and field inspections, except in Hartford where one additional inspector was employed for a brief period. No Japanese beetles were found in any of these products. The quantity of each product inspected and certified is shown in the following table:

Product	Number packages
Corn (bags)	4,470
Beans (baskets)	8,355
Bananas (bunches)	6,293
Apples (boxes and baskets)	2,986
Peaches (baskets)	7,286
Berries (crates)	145
Cut flowers (cartons)	990
Total	30,525

The total number of plants certified for shipment into other states and foreign countries was 2,620,153. The number of certificates issued is shown in the following table:

Kind of certificate	Farm produce	Cut flowers	Nursery and ornamental stock	Sand	Peat	Total
A	100	154	1,019			1,273
A (blanks)	30	121	52,789			52,940
B	487	421	4,822	21[1]	1[2]	5,752
Total	617	696	58,630	21	1	59,965

[1] Four car loads, and additional smaller lots containing 22,127 lbs.
[2] One shipment of 300 lbs.

The infestations in Bridgeport, Hartford, New London, Stamford and Willimantic have been increasing since the infestations were first discovered. Soil treatment was made for the control of the Japanese beetle in the soil stages in Hartford, New London, and Willimantic in 1929, 1930, and 1931. This work had the effect of retarding the rapid increase of the insect. However, because of changes in the area under quarantine and the lack of funds, it was necessary to discontinue this work. In the infestations in Bridgeport and Stamford, no soil treatment was performed and the pest increased to such an extent that damage to grapevines, flower gardens and some of the small shrubs has been noted. This was exceptionally true in the City of Bridgeport during the last year.

No soil treatment was given in 1932, and no road patrols were maintained within the state.

SPREAD OF THE SATIN MOTH

W. E. Britton

In the Report of this Station for 1931, page 565, mention was made of the spread of the satin moth. During 1931 the pest was found to be present in 24 additional towns in Hartford, New Haven, Litchfield and Fairfield counties. Consequently, Federal Quarantine No. 53 was revised to include these infested towns, and became effective December 1, 1932. Later, the state quarantine was revised and became effective February 10, 1932.

The area from which shipments of poplar and willow trees is prohibited is shown in Figure 108.

The quarantine order is as follows:

QUARANTINE ORDER NO. 32
CONCERNING THE SATIN MOTH

The fact has been determined that additional towns have become infested with the satin moth since Quarantine Order No. 29 was issued and that Federal Quarantine No. 53, recently revised and effective December 1, 1931, takes in these additional infested towns; also that a public hearing was held at the Connecticut Agricultural Experiment Station, New Haven, at two o'clock in the afternoon of February 4, 1932, after due notice as provided in Section 2124 of the General Statutes.

Now, therefore, I, William L. Slate, Director of the Connecticut Agricultural Experiment Station, under authority conferred by Section 2124, General Statutes, do hereby proclaim that the following 24 towns be placed under quarantine: Bridgeport and Stratford, in Fairfield County; Harwinton, New Hartford, Plymouth, Thomaston, Torrington and Watertown in Litchfield County; Ansonia, Derby and Seymour in New Haven County; Avon, Bloomfield, Bristol, Burlington, Canton, East Granby, Granby, Plainville, Simsbury, Southington, Windsor, Windsor Locks and Wolcott in Hartford County. The provisions of Federal Quarantine No. 53, as revised and effective December 1, 1931, are hereby adopted as regulations of this

quarantine order and prohibit the shipment of poplar and willow trees or any parts thereof capable of propagation from points within the quarantined area to points outside thereof.

This order shall become effective February 10, 1932.

W. L. SLATE,
Director.

WILBUR L. CROSS,
Governor.

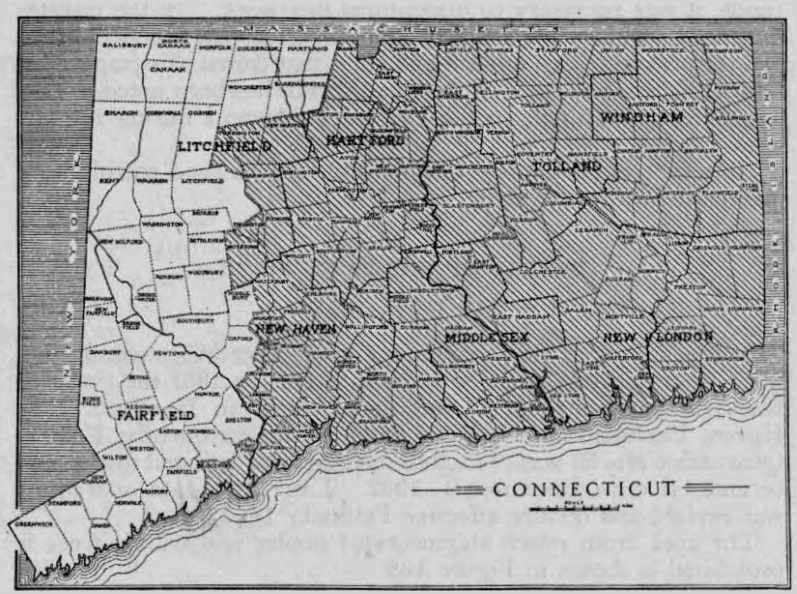

FIGURE 108. Map of Connecticut showing area quarantined on account of the satin moth.

STUDIES ON THE IMPORTED CURRANT WORM

B. H. WALDEN

The imported currant worm or sawfly, *Pteronidea ribesii* Scop., is an European species, described by Scopoli in 1763.[1] It was discovered in the western part of New York State about 1857 and according to Fitch,[2] the first definite record of its occurrence in this country was published in the Rural New-Yorker for July 24, 1858.

The insect was supposed to have been brought into this country on gooseberry bushes imported from Europe by a Rochester nursery, but it was present in other localities for two or three years before being found on the nursery grounds. Walsh and Riley[3]

[1] Entomologica Carniolica, p. 280. 1763.
[2] Twelfth Rept. Insects of N. Y., pp. 909-932. 1867.
[3] American Entomologist 2: 15-20. 1869.

state that it was found in Erie, Pa., either in 1860 or 1861. It was reported from Onondago County, N. Y., in the American Agriculturalist, May, 1865, page 141, with a statement that it had been observed there for about three years. The insect was found in Canada about the time it was discovered at Rochester, or possibly before. Before 1870 it had been found in Maine, Vermont, Michigan, and Illinois. Within a few years the insect had spread over the eastern United States and Canada, wherever currants and gooseberries were grown. The currant worm occurred in such numbers that it often defoliated the bushes before the owner discovered the infestation. Where the plants were defoliated for two or three years in succession, they were greatly weakened and even killed in many cases.

Notes on the imported currant worm by Walsh[1] in 1866 and an article by Fitch in 1867[2] give many of the facts regarding the habits and life history of this insect.

The number of larval instars apparently was not determined by either of these writers, and in the many articles regarding the currant worm which have appeared since then, no definite information regarding the larval instars has been found.

The following observations have been made especially to determine this point.

Life History

The dates at which the various stages of the imported currant worm occur, depend upon the earliness of the season, and the condition of the foliage of the host plant is a fair index as to when the insect may appear in the field. See Figure 109.

Adults emerge from the ground in the spring soon after the new growth starts on currants and gooseberries, and are ready to lay eggs about the time that the leaves are unfolded one-half to three-fourths of an inch. As certain varieties of gooseberries put out leaves somewhat earlier than currants, eggs are usually first observed on these plants.

The earliest date at which eggs have been found in the field is on April 16, and eggs of the first brood have been observed as late as May 25. These hatch in 8 to 10 days, and the young larvae soon begin to feed, making small round holes through the leaves, as shown in Figure 112. These perforated leaves are quite characteristic and are often the first indication to the grower that the bushes are infested. As the larvae increase in size, they feed in from the edge of the leaf, often leaving only the petiole. The larvae feed from 15 to 20 days and molt five times before pupating, if females, or four times if males.

[1] Practical Entomologist, 1: 78, 120-125. 1866.
[2] Twelfth Rept. Insects of N. Y., pp. 909-932. 1867.

There is much overlapping of the various stages. During the last week of May, eggs of the first brood and all larval instars have been found together on the same plant. When through feeding, they crawl down to the ground and spin cocoons under leaves and rubbish at the surface, or go into the soil from one-half inch to two inches if it is not too hard. Occasionally the cocoons are fastened to the bark of the bush some distance from the ground.

From 10 to 12 days are passed in the cocoon, after which the adults emerge, mate and lay eggs for the second brood. The adults of the second brood have been observed in the field from June 5 to

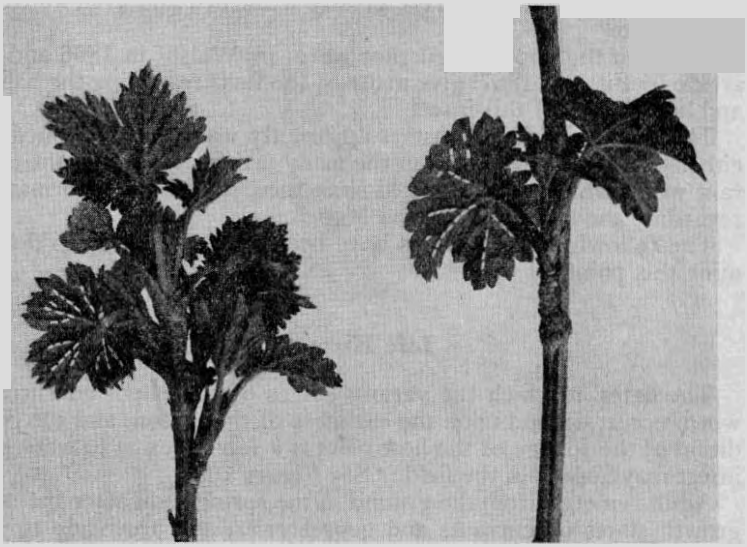

FIGURE 109. Currant leaves with eggs of the imported currant worm, showing the development of the leaves at the time the eggs are laid. Natural size.

July 18 and the eggs are usually the most abundant during the last week in June.

Full-grown larvae of the second brood have been found from July 17 to August 25. These larvae make their cocoons as does the first brood, but remain in the cocoons all winter and do not pupate until from one to two weeks before the adults emerge the following spring.

While the different stages of the imported currant sawfly, as well as the two broods, overlap, there has been no indication of a complete third brood in Connecticut during the seasons in which the insect has been under observation.

Habits

Egg Laying

Adults have been observed in the field about a week before any eggs have been found on the leaves. In breeding cages, however, females that emerged from the cocoons between 5 P. M. and 7 A. M. have started to deposit eggs within 30 minutes after they have been placed on foliage. When males were introduced, the pairs soon mated and the females began egg laying in about the same length of time as the unmated females. The eggs are normally laid on the under side of the leaf in longitudinal rows along the mid-rib and principal veins as shown in Figure 110. The eggs are not

FIGURE 110. Eggs on leaf. Twice enlarged.

inserted in slits in the plant tissues as is done by many of the sawflies. The ovipositor of the currant sawfly does not have well developed serrations or "sawteeth" on the edges, but the females roughen the tissues of the leaf vein before the eggs are glued in place. The number of eggs to the leaf may vary from less than 10, to 50 or more. Fifty-four eggs have been found on one leaf in a cage where the female had the choice of several leaves. On the other hand one female has been observed to deposit eggs on five different leaves.

The number of eggs deposited by seven females during given periods of time is as follows:

Time	No. eggs	Average per hour
3 hours	53	17.66
3 "	46	15.33
3 "	33	11
2½ "	22	8.88
1 "	24	24
1 "	17	17
¾ "	23	30.64

The majority of females in cages deposited their eggs within two days, but one female was observed to deposit over a period of five days. The largest number of eggs deposited by one female

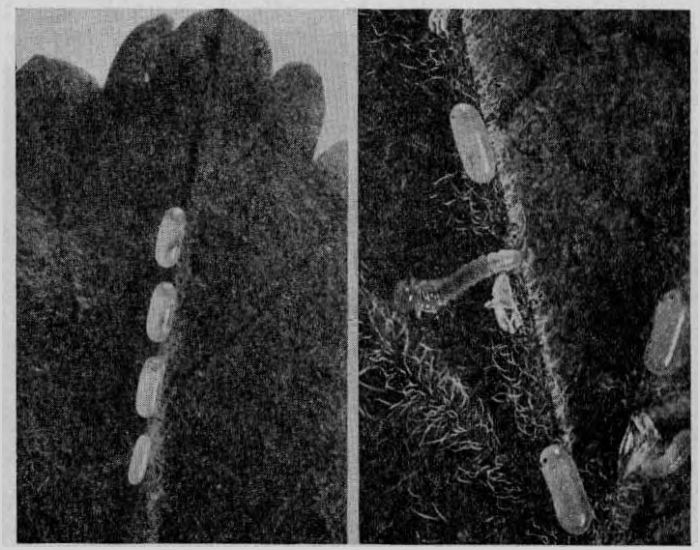

FIGURE 111. At left, eggs with embryo showing through shell, three days before hatching. Enlarged six times. At right, newly hatched larva, eggs showing eye spot. Enlarged 10 times.

was 151, the smallest 55, and the average for 10 individuals was 87.9.

The egg is cylindrical in shape with rounded ends, and the surface is smooth, shiny, and nearly transparent when first deposited. After a few days the egg becomes clouded with greenish white. At first the length is from 1.03 to 1.05 mm. long and .35 mm. in diameter. Before hatching the size increases to about 1.3 mm. in length and .46 mm. in diameter. About three days before hatching the embryo can be observed through the transparent shell and later the "dark brown eye spots" appear and a darkening of the tips of the mandibles can be seen, as shown in Figure 111.

Hatching

The eggs hatch in 9 to 12 days with an average of 10 days. There appears to be no definite manner in which the larva emerges from the egg. When ready to hatch, the embryo can be observed through the shell. It is doubled over with the anal portion beneath, and at the same end of the egg as the head. The embryo works the head and thorax up and down and appears to force both ends apart. This stretches and wrinkles the shell until it splits open. One egg split lengthwise over the thorax. After the front end of the larva was free as far as the third pair of legs, it moved the front

FIGURE 112. Larvae and characteristic feeding holes 24 hours after hatching. Twice enlarged.

end around at right angles to the axis of the egg and after several minutes was able to draw out the remainder of the body. Another egg shell gave away at the front end and the larva simply crawled out. In both cases it took about 30 minutes from the time that the movement was first observed for the larva to emerge.

The larvae crawl a short distance from the egg shell and soon elevate the rear end in a characteristic sawfly attitude. About one hour after emerging, larvae have been observed feeding on leaf hairs. Twenty-four hours after the larvae have hatched, holes through the leaves from 1 to 2 mm. in diameter have been found. See Figure 112.

As soon as the hole is enlarged sufficiently, the larva crawls into it, straddles the edge with the front legs, curves the abdomen to the shape of the opening and feeds in this position. This is the characteristic feeding position throughout the larval stage, although the abdomen is often elevated or swung around to rest on the flat surface of the leaf.

The young larvae feed together on the leaf where the eggs are laid, but after this is nearly eaten they separate in moving to other leaves and as they increase in size become more and more scattered over the plant.

Number of Instars

The number of instars of the imported currant worm is not mentioned in any of the published accounts of this insect that I have seen. It is difficult to determine this point from observing the larvae in cages. In many cases the cast skin is not found after the larva has molted. The size is not a clear indication of a particular instar as the larva increases in size during the instar and appears in many cases to be as large just before molting as it is immediately after. The color and markings of the different stages are similar, the color becoming somewhat darker and the markings slightly more prominent in older larvae, although a freshly molted larva may be pale and the markings somewhat indistinct. The head capsule, however, shows an increase in size only after the larva has molted, and by measuring the width of the head capsule the particular instar can be readily determined. The number of larval instars depends upon whether the larvae develop into females or males. Those that are predestined to produce females molt or shed their skins five times before pupating. As the last stage is considered the prepupal, it can be stated that there are five larval instars and a prepupal stage. The larvae that are to develop into males have only four instars besides the prepupal stage. The average widths of the head capsules of the different instars, measured dorsally, are as follows:

Instar	Width	
	Females	Males
1	.46 mm.	.46
2	.69 mm.	.69
3	.92 mm.	.92
4	1.38 mm.	1.38
5	1.72 mm.	1.72
6	1.86 mm.	

Description of Larva

The newly hatched larva averages 2 mm. in length. Width of head .42 mm., width of thorax .27 mm., width of anal segment .21 mm.

The color is greenish white, nearly transparent. The head is amber color with brown "eye spots." The mandibles are yellowish

brown and the tarsal claws tipped with brown. When the larva begins to feed, the green of the food can be seen in the digestive tract. With some individuals the typical markings of the later stages can be seen as faint bluish gray spots, in others these spots are not so readily seen until after the first molt.

When a larva is ready to cast its skin, it attaches itself to the leaf or petiole by the anal prolegs and hangs with the head down. The skin splits longitudinally back of the head and the larva pushes the thorax out through the opening and then gradually withdraws the head from the old capsule. After the head and thorax are free,

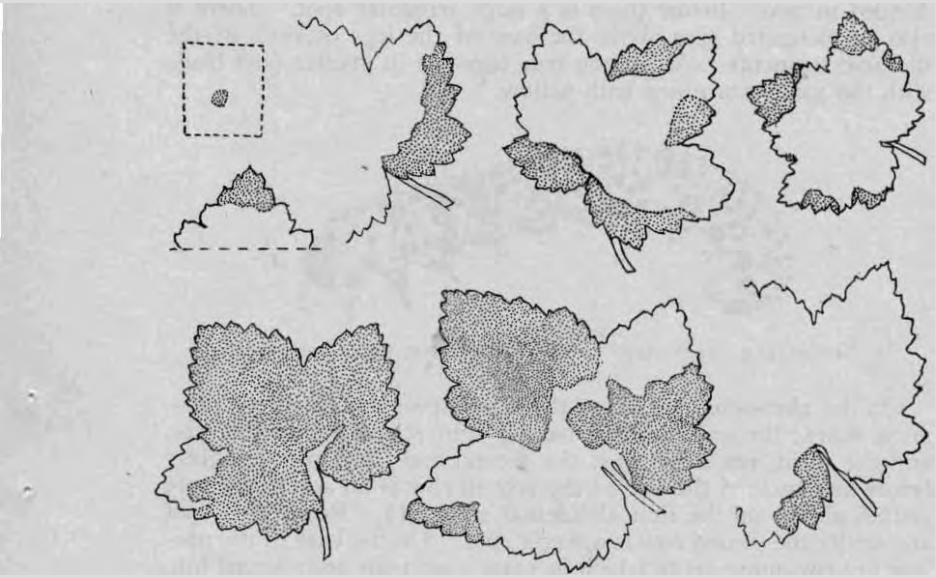

FIGURE 113. Amount of feeding by one larva on seven different leaves during its entire larval development, shown by the shaded areas. Somewhat reduced.

the old skin is pushed backwards until the larva is able to crawl out, leaving the cast skin hanging in place.

From observations of the different larval stages in breeding cages, more than 75 per cent of the injury to the food plant is done in the last two stages. In Figure 113, is shown the amount of leaf surface consumed by one larva under observation. The area eaten by the larva was approximately 5.9 square inches.

Full-grown Larva

Length 16-20 mm., width 2.75 mm. The head is black, with many black bristles, and the body bluish green with yellow on the thorax and next to the last segment. The surface of the body is

shiny with a glassy appearance, and is dotted with black tubercles, each bearing one or more stiff black bristles. The arrangement of the tubercles or spots is as follows:

Two large transverse spots on the dorsal surface of the first thoracic segment near the posterior margin, a vertical lateral pair of smaller spots near the anterior margin. The second and third thoracic segments each with an anterior pair of transverse dorsal spots. A posterior transverse row of six spots, two of which are dorsal and two occurring on either side. In front of these two lateral spots is a large vertical elongate spot which is occasionally divided in two. Below these is a large irregular spot. There is also an elongated spot above the base of the legs on each of the thoracic segments. All of the true legs are in greater part black with the joints margined with yellow.

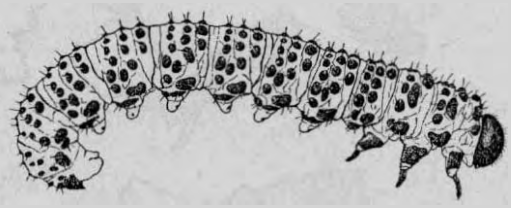

FIGURE 114. Last stage larva. About four times enlarged

On the abdominal segments the black spots are in three transverse rows; the anterior row having four spots, the second, six, and the third, ten. Between the second and third rows, slightly below and back of the end of the second row is an additional spot (often absent on the first abdominal segment). Below this spot and under the second row is a larger spot. On the base of the prolegs are two more spots which in some specimens are merged into a single elongated spot.

The tip of the anal segment is truncate with a pair of black triangular horn-like processes separated about .5 mm. at the tips. A large, somewhat triangular patch of black extends from the tip of the segment nearly to the base, on either side of which are 6-8 black spots, which are often more or less confluent, or merged with the large central area. See Figures 114 and 115.

Prepupa

After the larvae are fully grown and have finished feeding, they molt for the last time and appear entirely different from the previous larval stages. In place of the black head and the characteristic black markings, the color is pale green with the thoracic segments and the next to last abdominal segment, yellow. See Figure 115. The insect is somewhat sluggish and does not feed in this

stage. After 6 to 10 hours the prepupa crawls down the stem and spins its cocoon. With the first brood the insect remains in the cocoon 10 to 12 days during which time it pupates and the adult emerges. The prepupa of the second brood remains in the cocoon over winter and pupates about a week before the adult emerges. In breeding cages, prepupae of the first brood occasionally remain in the cocoons until the following spring before pupating. No data regarding this have been obtained in the field.

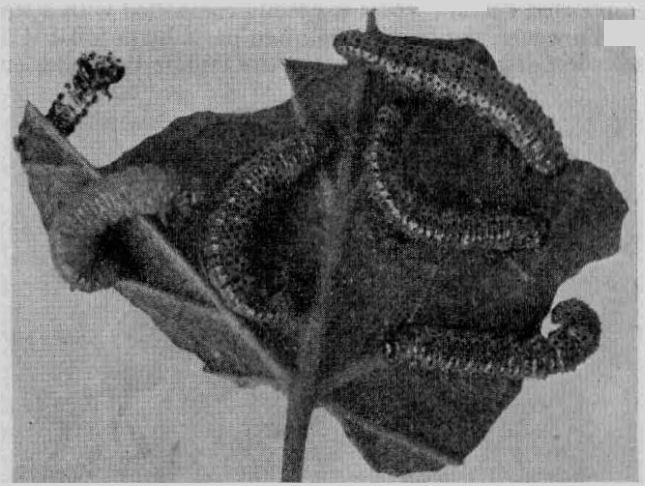

FIGURE 115. Mature larvae with one prepupa and a cast skin at left. Twice enlarged.

Cocoon

The cocoon is elongate oval in shape, of a tough parchment-like material; rough and of a light yellow-brown color on the outside, smooth and darker colored inside. The cocoon darkens with age. Those that are made in the ground are covered with particles of soil, while the ones that occur under leaves and rubbish usually have particles of leaves or other material adhering to the surface. See Figure 116.

Pupa

The pupa is 7 to 8 mm. in length, greenish white in color with light yellow on the thorax and tip of the abdomen. The head is bent slightly forward with the appendages free, but bent close to the body. The pupa is capable of moving the abdomen within the cocoon.

Adult

The female is about 8 mm. long with a wing spread of 18 to 20 mm., the head and thorax above black, and the abdomen deep yellow.

The male is somewhat smaller and more slender than the female, and the abdomen, black except the tip.

Control

The imported currant worm is readily controlled with a stomach poison. However, the bushes are often partially defoliated before the insects are discovered. The eggs are laid on the under surface

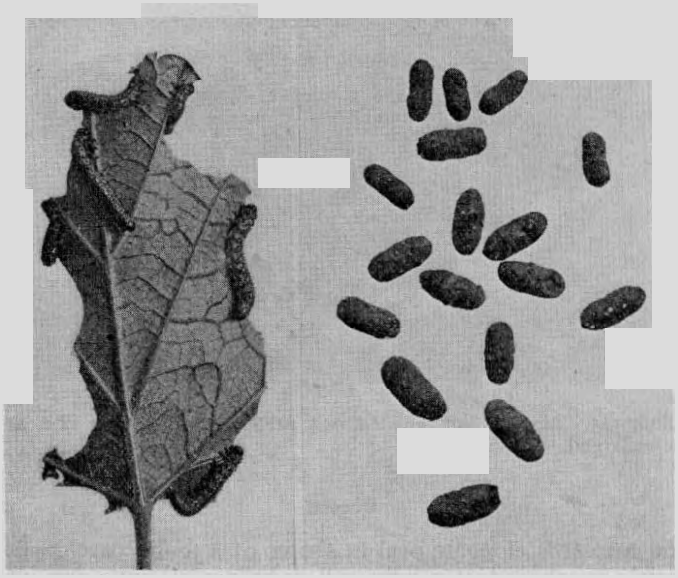

FIGURE 116. Larvae at left; cocoons at right. Natural size.

of the leaves, usually low down on the plant, and the larvae when small are inconspicuous and may be hidden by the leaves on the twigs above where they start feeding.

In the spring when the leaves are from one-half to three-fourths of an inch in diameter, the plants should be examined for eggs. As soon as they begin to hatch, which is indicated by small holes in the leaves, as is shown in Figure 112, the plants should be sprayed with lead arsenate at the rate of 1½ pounds to 50 gallons of water, or 1 ounce to 2 gallons where only a few bushes are to be sprayed. Any of the dusts containing lead arsenate may be used if more

convenient. Usually one treatment will hold the currant worm in check. In case of a heavy infestation it may be necessary to give a second application to cover the new growth that develops following the first treatment. If the treatment has been delayed until the fruit is one-half to two-thirds grown, fresh hellebore or pyrethrum should be used instead of an arsenical. Although these materials readily kill the worms, lead arsenate is preferable early in the season, as it sticks better on the foliage and remains effective for a longer time.

REPORT ON ORIENTAL FRUIT MOTH PARASITE WORK

PHILIP GARMAN

The Oriental fruit moth continued to do damage in some orchards in 1932, though on the whole the infestation throughout the state was less than in 1931. The number of parasites supplied to growers during the past three years is given in Table 1. These consisted mainly of *Macrocentrus ancylivorus* Roh., *Trichogramma minutum* and *Trichogramma pretiosa*. Only one liberation of any other species was made in this period.

TABLE 1. THREE-YEAR RECORD OF PARASITES SHIPPED TO GROWERS

Season	Number Trichogramma shipped	Number Macrocentrus shipped	Number shipments	Number growers supplied
1930	6,540,000	11,600	159	142
1931	11,337,000	10,736	282	167
1932	18,000,000	9,500	172	157
Total	35,877,000	31,836	613	233[1]

[1] Represents total growers supplied. Not the sum of figures in last column.

We continued to breed Macrocentrus in the laboratory and greenhouse as mentioned in Bulletin 338, p. 569, and secured for liberation about 7,500 by this means. Winter losses were again very high although various preventive measures were taken. This year we obtained more than 1,500,000 fruit moth eggs from our stock moths, the greatest number being 234,000 in June when a large number of moths were available.

Field experiments on the effect of sulfur upon Trichogramma parasitism continued to indicate that heavy applications shortly after liberation decidedly affect the amount of parasitism. Light applications did not affect the degree of natural parasitism in one field test, since both treated and untreated areas were nearly the same. Laboratory tests also continued to show that sulfur has a

deleterious action on the amount of parasitism. Talc dust was even more injurious than sulfur dust.

Macrocentrus adults confined with trees dusted lightly with sulfur did not live as long as those confined with undusted trees. Lime dust and talc dust had no effect in reducing the length of life. Although the effect of a commercial lime-lead-arsenate-oil dust is doubtful, in most of our experiments a slight reduction in longevity was noted. All trees treated with sulfur were dusted very lightly and the coating of sulfur particles was almost invisible.

Field work consisted of liberation of a million and a quarter laboratory-reared Trichogramma in the orchard of the Connecticut Agricultural College at Storrs. Here the infestation was particularly severe and as far as could be determined by field collections, no larval or pupal parasites were present. Trichogramma were placed in the trees every two weeks throughout the summer, and most of the liberations alternated with sulfur sprays applied by the Horticulture Department. The degree of parasitism last year (1932) was much higher than the average, but was apparently insufficient to prevent an infestation of about 50 per cent developing in fruit that ripened during Elberta harvest. Another orchard a mile distant had about the same amount of egg parasitism although no liberations were made there. The owner, however, did not make any sulfur applications during the summer, and only the early sprays were applied.

Observations indicated that high parasitism by Macrocentrus and moderate Trichogramma parasitism, resulted in an infestation much reduced from last year's in the Bishop orchard in Cheshire, and a continued very low infestation in the Pero orchard near Manchester.

The largest infestations in commercial orchards in the state were in the Glastonbury district, and in Tolland County. Parasites have been sent and liberated in these localities for the last three years and a more intensive program of study and liberation is planned for next year, 1933.

It also continues to be evident that orchards that are over-vegetative are frequently more heavily infested, especially if larval and other parasites are not present. It appears advisable, therefore, to reduce fertilizer applications where these conditions prevail and to avoid other operations, such as excessive cultivation in wet weather, or heavy pruning, that tend to produce rank twig growth that is favorable to development of fruit moth larvae.

Notes on the Control of Oriental Fruit Moth and Quince Curculio in Quinces

Spraying experiments for control of the fruit moth in quinces were continued with a view to controlling both quince curculio and Oriental fruit moth. Frequent applications of lead arsenate and

a special spreader and sticker were made following the schedule below.

May 27, lead arsenate, lime sulfur, and nicotine sulfate.
June 10, lead arsenate, lime sulfur, nicotine sulfate and spreader.
July 2, lead arsenate (1-50) and spreader (½ lb.—50 gals.).
July 12, lead arsenate (1-50) and spreader (½ lb.—50 gals.).
Aug. 1, lead arsenate (1-50) and spreader (½ lb.—50 gals.).
Sept. 1, lead arsenate (1-50) without spreader.

Jarring records indicated that the quince curculio appeared in 1932 during the last week in June (23rd) and continued until September. In fact more beetles were obtained from the trees September 1 than at any other period. Following is a brief summary of the results obtained from counts after the fruit was harvested. All quinces were cut open and examined carefully.

TABLE 2. RECORDS OF SPRAYED AND UNTREATED QUINCES

	Total fruits	Oriental fruit moth, per cent infested	Oriental fruit moth larvae per 100 fruits	Deformed by curculio	Uninfested per cent
Sprayed	490	57	48	28	26
Untreated	335	39	41	65	9

It is evident from these data that the spray program controlled the quince curculio fairly well, but had no effect on the Oriental fruit moth. It will apparently require a combination of our 1931 and 1932 programs to give the best results, but from a practical standpoint a reduction in the number of applications appears desirable.

SEASONAL LIFE HISTORY OF THE WHITE APPLE LEAFHOPPER[1] AND EXPERIMENTS IN ITS CONTROL

PHILIP GARMAN AND J. F. TOWNSEND

In 1932 extensive field counts were made to determine several points bearing on seasonal history and control of the white apple leafhopper. The seasonal history data are shown graphically in Figure 117. At Mount Carmel, the first nymphs appeared early in May and reached a peak of emergence about May 30, shortly before the 7-day spray. Emergence was not complete until the middle of June. Adults began to appear shortly after the 7-day spray, continuing until the middle of July with the peak reached between June 15 and 20. Egg deposition determined by exposure of potted seedlings to adults confined in cages, continued from June 18 to August 13, with a peak falling about July 7.

Second brood nymphs began to emerge August 6, reached a peak August 31, and continued until September 24. Adult emergence followed through September and into October and they continued

[1] *Typhlocyba pomaria* McAtee.

to live until November. Egg deposition occurs in late September and October.

The greatest damage to trees this year appears to have been due to leaf stippling. Most of the fruit spotting was washed off by heavy rains in late September. Severe leaf damage was experienced in various orchards and failure to control the insect satisfactorily was reported by several orchardists. Consequently, control experiments on the late brood were continued with some interesting results.

Sprays of nicotine and soap or other combinations were shown to have some residual effect, due to killing eggs within the leaves or

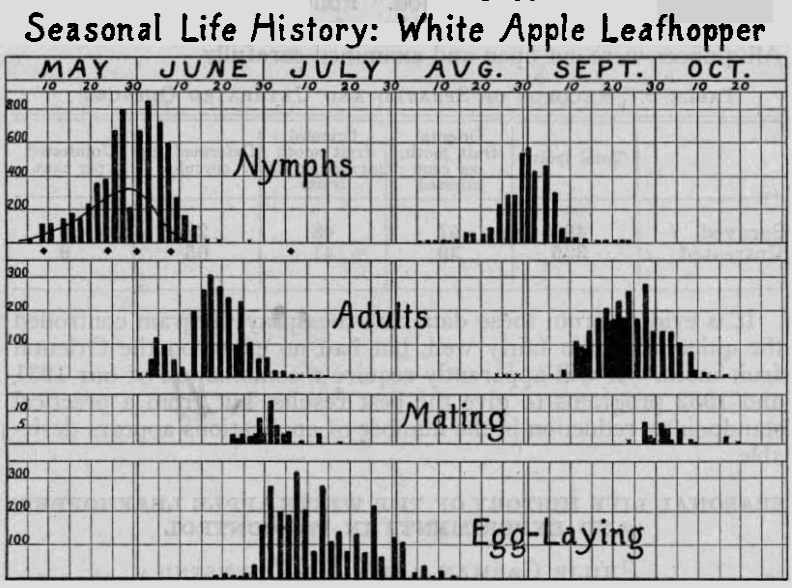

FIGURE 117. Chart showing seasonal life history of white apple leafhopper. Section labeled *Nymphs* refers to numbers emerging on marked branches in the orchard at Mount Carmel. Diamonds below represent spray dates beginning with the pink spray. Calyx spray applied about June 25. *Adults* refers to adult emergence on marked branches. *Mating* shows abundance of this activity during the summer. *Egg-laying* represents records from adults collected in the orchard and confined on potted seedling apple trees.

to killing nymphs after hatching and feeding on sprayed foliage. Results of spraying marked branches with 1 per cent oil and 1-1600 nicotine sulfate are shown in Table 3. Many more nymphs hatched from unsprayed than from sprayed branches.

Nymph counts made on trees remaining unsprayed throughout the season compared with those receiving complete sprays showed a much greater development on trees receiving early sprays, either with or without nicotine sulfate. It is apparent that some enemies

of the leafhopper are killed by orchard sprays, especially since *Aphelopus* sp. and *Anagrus armatus,* the two species most prevalent, are very delicate.

Comparison of nicotine sulfate, 1 pint to 100 gallons of water (Table 5), and the same with 3 pounds soap added, showed no significant difference in field counts. It is possible that greater differences would occur at lower dilutions of nicotine sulfate although when used at ¾ pints per 100 gallons the kill was not as good as when used at the rate of 1 pint per 100. It is necessary to spray the lower surfaces of the leaves to kill the greatest number of nymphs.

Difficulties of the grower to control this insect appeared to lie this year (1) in migration of hoppers from neighboring orchards, and (2) delayed emergence of the first brood. In addition, partial control of the first brood may result in a larger second brood, especially where the whole orchard is not treated for leafhoppers as in our Mount Carmel plots. If this occurs, and the later brood threatens to do damage, sprays applied near the first of September will afford relief.

In small-scale field experiments anabasine sulfate gave quite as good kill of leafhopper nymphs, as nicotine sulfate when used at the same dilution.

The parasites *Aphelopus* sp. and *Anagrus armatus* Ash. were found again in 1932. *Anagrus armatus* was recovered from leaves collected in Woodstock, Wallingford, Storrs, and Mount Carmel, and appears to be fairly well distributed in the state.

TABLE 3. EFFECT OF SPRAY ON EMERGENCE OF NYMPHS, 1932

Dates	Tree No. 1		Tree No. 2	
	Sprayed branch, number nymphs	Unsprayed branch number nymphs	Sprayed branch number nymphs	Unsprayed branch, number nymphs
Sept. 2[1]	22	27	59	27
3	6	25	14	17
5	7	45	9	26
6	12	12	2	9
8	2	10	4	6
9	4	4	3	3
10	3	0	0	0
12	1	0	2	2
14	1	2	3	1
17	1	0	1	0
19	0	0	0	0
21	0	2	0	0
23	0	0	0	0
Total nymphs removed after spray	37	100	67	64
Relation to count of Sept. 2	168%	370%	113%	237%

[1] Count just before spray application.

TABLE 4. NYMPH POPULATION ON SPRAYED AND UNSPRAYED TREES, 1932

Treatment	June 8, Number per 100 leaves	Aug. 31, Sept. 1, Number per 100 leaves	Sept. 19, Number per 100 leaves
Check, unsprayed trees	172	103	86
Fungicide, lead ars., and nicotine sulfate spray	14	182	428
Fungicide and lead ars., but without nicotine sulfate spray	51	247	608

TABLE 5. LEAFHOPPER CONTROL, 1932

Treatment	Tree No.	Nymphs: Number per 100 leaves September 8	Nymphs: Number per 100 leaves September 10	Estimated reduction, per cent
Nicotine sulfate, 1 pt.	1	289	36	87.6
Water, 100 gallons	2	250	15	94.0
Nicotine sulfate, ¾ pt.				
Soap, 3 pounds	3	235	10	95.8
Water, 100 gallons	4	166	45	72.9
Nicotine sulfate, 1 pt.	5	357	33	90.8
Soap, 3 pounds	6	175	10	94.3
Water, 100 gallons	7	199	44	77.9
Nicotine sulfate, 1 pt.	9	219	31	85.9
Water, 100 gallons	10	359	36	90.0
Nicotine sulfate, ¾ pt.				
Soap, 3 pounds	11	243	39	84.0
Water, 100 gallons	12	159	36	77.4
Nicotine sulfate, 1 qt.	13	282	57	79.8
Soap 3 pounds	14	438	19	95.7
Water, 100 gallons	15	217	23	89.5
Check[1] no spray	8	79	66	16.5
	16	85	81	5.0
Average of 1 pint nicotine sulfate without soap				89.4
Average of ¾ pint nicotine sulfate plus 3 pounds soap				83.8
Average of 1 pint nicotine sulfate plus 3 pounds soap				88.1
Average of 1 quart nicotine sulfate plus 3 pounds soap				89.5

[1] Check trees had no spray throughout the season. Other trees had early sprays in June. Trees sprayed with nicotine combinations as given, September 9.

NOTES ON THE COMPARATIVE TOXICITY OF ANABASINE SULFATE AND NICOTINE SULFATE FOR APHIS AND LEAFHOPPERS

PHILIP GARMAN

In 1932, we received from an importing company in New York a small quantity of anabasine sulfate, reported to be the extract and sulfate of a weed, *Anabasis aphylla* L., that grows in Asia and northern Africa. This material contains anabasine or neonicotine, together with other products (Smith, 1931). Tests in control of the green peach aphis, *Myzus persicae* Sulz., gave a good clean-up with dilutions of 1 to 500, 1 to 1,000, and a fair clean-up at 1 to 2,000 without spreader, under greenhouse conditions. Following these tests, on June 7 several large spiraea bushes heavily infested with aphids, probably *Aphis spiraecola* Patch, were sprayed with the same material diluted 1 to 1,600. At the time of application, the temperature was 50° F. Examination the following day showed an almost complete elimination of the aphids. There was no mortality of aphids left without treatment on spiraea bushes a short distance away. No injury to foliage resulted from the treatment.

In a comparison of the material with nicotine sulfate later in the summer anabasine sulfate gave as good a kill of leafhopper nymphs, *Typhlocyba pomaria* McAtee, as the former. Both materials were used at the same dilution. There was no injury to apple foliage from the application of anabasine sulfate.

It was then decided to make a comparison of nicotine sulfate and anabasine sulfate under more closely controlled conditions, and tests were run on *Aphis rumicis* Linn. The aphids were sprayed at 10 pounds per square inch pressure, using a number 29 DeVilbiss atomizer nozzle placed 9 inches from the leaves to be sprayed. The aphids were reared on nasturtium leaves in the greenhouse. No spreader was used with either insecticide. Unsprayed lots were kept in each test, and figures giving the percentage killed make allowance for the mortality in check lots.

TABLE 6. TOXICITY OF ANABASINE SULFATE AND NICOTINE SULFATE FOR *Aphis rumicis*

Material	Dilution by volume	Number of tests	Per cent killed
Anabasine sulfate	1– 8,000	6	85
" "	1–15,000	15	54
	1–20,000	4	44
Nicotine sulfate	1– 1,000	6	68
" "	1– 3,000	11	51
	1– 4,000	6	43

It will be seen from the table that the sample of anabasine sulfate used was about five times as toxic for *Aphis rumicis* as the nicotine sulfate when diluted by volume. The nicotine sulfate was from a hitherto unopened can obtained in 1932.

No recommendations can be made at this time regarding the material because of the limited supply available for tests, but it is hoped that manufacturers will continue to be interested in the production of this promising new insecticide.

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INJURY BY A WEEVIL FROM THE ORIENT

Pseudocneorrhinus setosus Roelofs

W. E. BRITTON

On July 20, 1920, Mr. Zappe and Mr. Walden, when inspecting nursery stock in Westville, New Haven, collected some curious, stout, brown weevils that were unfamiliar to them and new to the Station collection. More material was gathered July 26-30, 1921, and June 24, July 21 and 27, 1922, in the same locality. In 1923, collecting in this vicinity failed to produce any specimens of this weevil. In order to obtain an identification, specimens were sent to H. C. Fall, Tyngsboro, Mass., who replied that it was unfamiliar to him and had probably been introduced from some other country. On May 15, 1922, I took some specimens to the United States National Museum, Washington, D. C., and E. A. Schwarz informed me that the species was not represented in the National Museum, and that to identify it might be difficult and take considerable time. On May 28, 1923, Mr. Zappe took some specimens to the American Museum of Natural History in New York City, and left them with A. J. Mutchler, who said that he would show them to C. W. Leng and possibly between them they might be able to establish the identity of the species. Not succeeding, Mr. Mutchler afterward sent the material to Dr. G. A. K. Marshall, at the British Museum, London, who replied in part as follows:

"The insect is, as your information suggested, a Japanese species, *Pseudocneorrhinus setosus* Roelofs. I am not aware, however, that anything has been recorded with regard to its habits or life history. I trust that it has not yet established itself in the United States."

A brief note was published[1] regarding the occurrence of the species in this country. At the time the beetles were collected, Mr.

[1] Conn. Agr. Expt. Sta., Bul. 256: 313. 1924.

Zappe endeavored to discover their food plants, but the only kind of plant upon which he found them feeding was the beggar tick or bur marigold, *Bidens* sp. So far we have been unable to obtain any information about the immature stages of this insect, and until the present season we have found no records of its injury to cultivated plants.

On June 8, 1932, we received from 117 Center Street, West Haven, 11 adults of this species with a letter stating that the beetles had injured barberry and evergreens. I called at the premises and

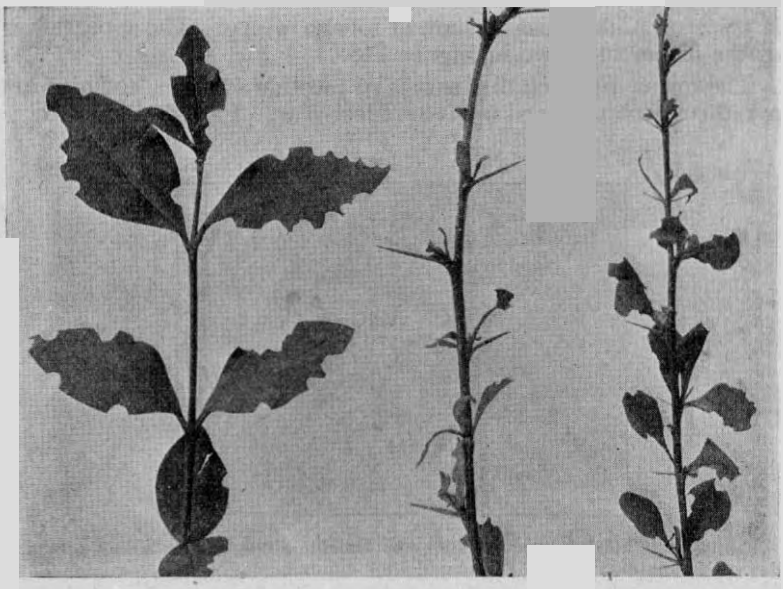

FIGURE 118. California privet and Japanese barberry twigs showing injury by a weevil from the Orient, *Pseudocneorrhinus setosus*. Somewhat reduced.

collected 17 or 18 beetles from Japanese barberry and hemlock, but on account of the cool weather they were said to be much less numerous than they had been two days before. The plants injured on this place were Japanese barberry, California privet, hemlock, and lilac. The hemlock trees were planted in a corner by the front porch, and had been brought from a nursery in Westville some 10 years ago, and undoubtedly were the source of the infestation. Two of the original hemlocks had died and some smaller ones had been planted to replace them. The weevils had severely injured

the trees by eating off the new and tender growth, and there were some severed tips on the ground due to their ravages.

Japanese barberry was planted in front of the hemlocks, and extended as a foundation planting in a row along the east side of the house and at the rear. The tender barberry leaves had been partially eaten, and the owner reported that last year (1931) the plants were completely stripped. He intended to remove them but did not do so, and in the spring the plants put out leaves, so he allowed them to remain. A hedge, perhaps 50 feet in length, of California privet, extended from the front toward the rear on the east side of the lot. Many of the leaves were notched by the feeding of the beetles, and this hedge was said to have been badly riddled last year. A lilac close by showed foliage injury. The appearance of the injury is shown in Figure 118.

The owner reported that sprays of nicotine solution, and also of pyrethrum soap, proved ineffective last year. I advised the owner

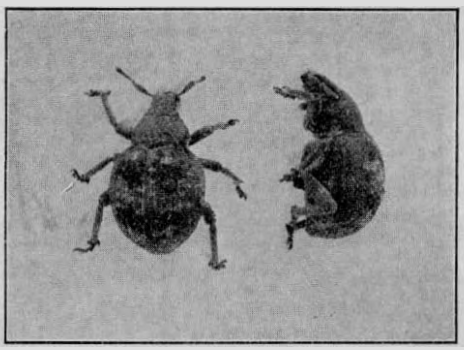

FIGURE 119. Adult weevil from the Orient, *Pseudocneorrhinus setosus*, dorsal and lateral views. Enlarged four times.

to spray heavily with lead arsenate and caseinate spreader, but do not know if the recommendations were followed.

Mr. Walden examined the beetles to ascertain if they are able to fly. He reported that the wing-covers are fused together and that he could not lift them without tearing the specimens to pieces. So apparently they have no wings, and are unable to fly, a fact that will hinder a rapid dissemination of the species.

This beetle is about one-fifth of an inch in length, and one-eighth of an inch in lateral thickness. In color it varies from light to darker brown; the wing-covers are striated with faint whitish lines showing in the grooves, and bear whitish spots on the apical half and are more or less mottled with transverse bands of dark brown or black. This beetle is shown in Figure 119.

A note recording definite injury by this insect was published.[1] Mr. Zappe visited the place in West Haven on June 11, and collected a large number of beetles. He also found beetles feeding on a privet hedge across the street, and collected them by sweeping with an insect net over weeds that looked like *Bidens* and *Erigeron*, growing in the vicinity. On September 14, Mr. Zappe made another visit and found a few beetles which he brought to the laboratory and placed in a breeding cage. Most of these were yet living on December 15. He also dug in many places in the soil around the plants in search of larvae, but found none.

About September 14 Mr. Zappe also visited several places in Westville, where the insect was first discovered. He inspected barberry, privet and hemlock, but no injury was detected and no beetles found. Sweeping over weed areas failed to produce beetles and no plants of *Bidens* were noticed.

A LEAF MINER OF RED CEDAR AND ARBORVITAE

Argyresthia freyella Walsingham

W. E. Britton

On April 20, there were received at the Station some red cedar twigs that had been sent to the Japanese beetle office at South Norwalk from Southampton, Long Island, New York. The cedar leaves had been mined and the injury resembled that caused by the arborvitae leaf miner, *Argyresthia thuiella* Pack., in arborvitae, except that this insect, instead of pupating within the mines as does *A. thuiella,* made gray cocoons on the outside of the leaves.

Adults were reared and sent to the United States National Museum, where the insect was identified by Mr. Busck as *Argyresthia freyella* Walsingham.

On May 13, cocoons of this same insect were received from Branford on arborvitae infested with *A. thuiella.* Many adults of the latter species emerged.

The cocoons of *Argyresthia freyella* are gray in color and are fastened sidewise to the leaves or twigs and resemble miniature cocoons of the cecropia moth. Each cocoon is about three-sixteenths of an inch in length and tapers to a point at both ends as shown in Figure 120.

This insect is a small moth belonging to the family Yponomeutidae. The wings are "golden yellow mottled with silvery white," and the wing expanse is about one-third of an inch.

This species was described from Texas in 1891. It has also been identified as *abdominalis,* but according to Busck it is distinct from *abdominalis* Zeller of Europe which, so far as is known, does not

[1] Jour. Econ. Ent., 25: p. 931. 1932.

occur in the United States. The National Museum contains a goodly series, reared from *Juniperus* received from Missouri.

This is the first time that we have observed this insect in Connecticut.

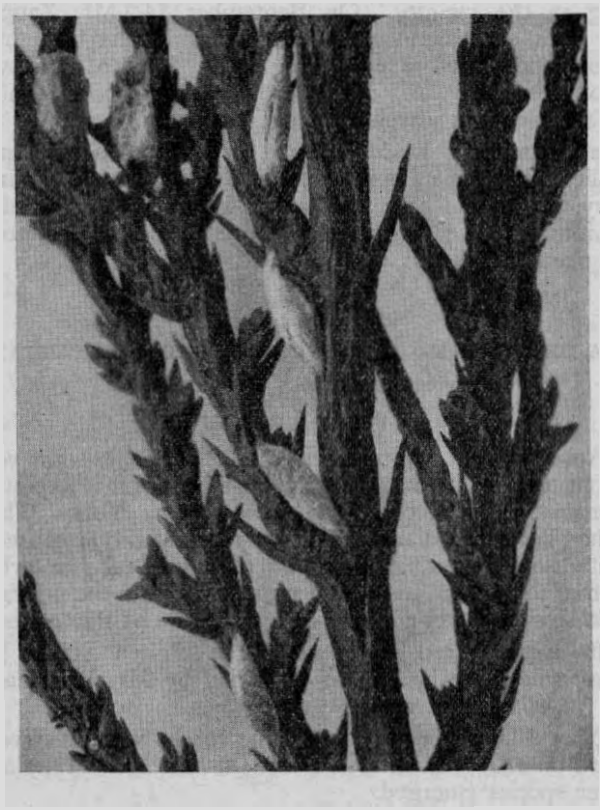

FIGURE 120. Cocoons of *Argyresthia freyella* on red cedar. Enlarged four times.

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MOSQUITO CONTROL IN CONNECTICUT, 1932

R. C. Botsford

Regular maintenance work was started on April 4, and in order that early mosquito breeding in the salt marshes be reduced to a minimum, workable tide gates were replaced and put in order, culverts cleaned, and all main drainage outlets repaired. It was also possible, by the use of labor of several seasons' experience, to work over certain parts of the ditched areas that require immediate attention early in the season.

The working crews were reduced to a total of 10 men, but with this reduction it was possible to patrol and clean ditches on all areas except in the Eastern District where ditched areas were recently extended. This season was favorable to mosquito control on the salt marsh, on account of rainfall remaining below normal throughout the critical breeding season.

Mosquito breeding occurred in New Haven at Middletown Avenue due to lack of tide circulation in 10 ditches. Oiling was necessary. Breeding also occurred in Madison at Hogshead Point, but this was eliminated by extra ditching.

The tide gates at the Guilford slip, which had been in service many years, were replaced with new lumber throughout and the stone abutments rebuilt. The labor and material for the gates were supplied by the local dike association. At Great Harbor, Guilford, the tide gate frame was weakened by storms and temporary timber braces were put in place until such time as the structure could be replaced. The tide gates on Sybil Creek, Branford, had rotted away in places and leaked so that the marsh back of Hotchkiss Grove could not be drained. These were replaced and painted with creosote.

Some complaints were received in regard to the ditching and draining of salt marshes in relation to the scarcity of wild fowl. Through the efforts of the Barn Island Gun Club of Stonington, a field trip was arranged by Arthur L. Clark, Superintendent of the Connecticut Fish and Game Commission, to investigate this problem. Mr. Uhler, representing the Federal Game Commission, the local County Game Wardens, and others were present. Several places along the Connecticut shore, both ditched and unditched, were visited. There was no evidence that food of wild fowl had been destroyed or affected by drainage, but it seemed possible that before the large pools and sheets of water were drained, they had been attractive to migratory birds as a resting place. As an experiment, boards were made to close all ditches draining two large pools on the Barn Island Gun Club lease. These boards were put in place about four weeks before the duck season opened and the pools flooded as normal. The boards will be removed before the next mosquito breeding season to drain the areas.

In Fairfield, Stratford, Bridgeport, and Saybrook, local labor drawn from the unemployed was used for ditching and oiling. In Saybrook and Stratford large salt marsh mosquito breeding areas were permanently drained. In the town of Groton funds had been raised locally, sufficient to ditch all salt marsh areas. The work was done under contract by John F. Ross and was supervised by the Connecticut Agricultural Experiment Station. Notices were sent to all salt marsh owners on February 9, and the ditching began on April 15, 1932. The work was completed about June 1, 1932, at the cost of $4,018.92.

It is hoped that all newly-ditched areas may be accepted and maintained by this Station in order that the work may not deteriorate. General maintenance ceased on October 1, or about one month earlier than usual, as an economy measure.

The season's work was very satisfactory as to accomplishment and only a few complaints were received from the communities where maintenance work had been thorough.

A New Jersey light trap to make night collections was purchased and put in use this season. A report of this work has been compiled by Neely Turner.

STATUS OF CONNECTICUT SALT MARSH AREAS, 1932

Town	Salt marsh acres	Salt marsh ditched	Maintained by state	Total cost of ditching	Labor, cost maintenance 1932	Labor, cost to complete ditching
Greenwich	200	200	none	$22,000.00	.....	.....
Stamford	300	300	300	3,245.80	$124.14	.....
Darien	300	300	none	3,800.00	.....	.....
Norwalk	600	600	600	7,500.00	269.53	.....
Westport	400	400	400	5,913.82	340.70	.....
Fairfield	1,200	1,200	1,200	8,400.00	337.82	.....
Bridgeport	173	.....	.....	.....	.....	$3,000.00
Stratford	1,315	600	.....	.....	.....	10,000.00
Milford	630	.....	.....	.....	.....	9,500.00
West Haven	463	222	222	.....	292.73	3,500.00
New Haven	750	750	675	12,000.00	355.81	750.00
Hamden	571	571	571	5,410.19	53.28	.....
North Haven	310	.....	.....	.....	.....	3,100.00
East Haven	545	300	300	3,747.52	138.54	1,300.00
Branford	895	895	895	.....	986.77	.....
Guilford	1,085	1,085	1,085	20,000.00	801.54	.....
Madison	1,315	1,315	1,315	.....	577.11	.....
Clinton	785	677	500	10,000.00	106.35	2,000.00
Westbrook	500	500	500	7,428.14	313.15	.....
Old Saybrook	1,373	509	509	4,000.00	226.50	10,000.00
Lyme	493	.....	.....	.....	.....	7,500.00
Old Lyme	1,393	1,393	1,393	12,717.06	636.21	.....
East Lyme	424	130	130	1,480.60	.....	4,000.00
Waterford	204	.....	.....	.....	.....	3,500.00
New London	34	.....	.....	.....	.....	500.00
Groton	304	304	304	4,018.92	53.51	.....
Stonington	641	641	641	7,514.35	635.60	.....
Totals	17,203	12,892	11,540	$139,176.40	$6,247.19	$58,650.00

In New Canaan, mosquito control work and investigations were carried on by E. C. Rae, who for two seasons assisted Raymond F. Hart. The following is a brief resumé of the report Mr. Rae submitted to the Station.

Outside of the most densely populated districts, the most important mosquito breeding places were swamps, ponds and streams. Of the total of 95 such breeding places listed, Anopheles larvae were found in 63. In such proportions a serious malaria epidemic could readily develop.

In the more densely populated districts, over 150 backyard receptacle breeding places were discovered; also stream pollution was responsible for a large part of the mosquito nuisance. These two conditions are the results of carelessness and indifference, and are the most difficult to eliminate.

The sewage filter beds, once the great source of the house mosquito, were well operated and mosquito breeding there stopped. Other breeding places were treated either by drainage, by the introduction of surface feeding fishes, or by spraying with fuel oil or pyrethrum larvicide, as best suited the problem. Observations on the results of these treatments were made at regular intervals.

TESTS OF MOSQUITO LIGHT TRAPS AND LARVICIDES IN 1932

NEELY TURNER

Light Traps

The New Jersey light trap was used to make collections at two locations in Hamden during the summer of 1932. The first of these was in Whitneyville at a location near Lake Whitney. In all cases the trap was run from dusk until 9 o'clock, Eastern Standard Time. The other location was in Spring Glen on a lot bordering water company property. The results of the trapping are given in Table 8.

These results show that *Aëdes sylvestris* was by far the most abundant species in Whitneyville and *Taeniorhynchus perturbans* the most abundant in Spring Glen. *Aëdes sollicitans* appeared in small numbers at both locations. It is probable that this species was even more of a factor than the trap results indicate, because it was extremely annoying during many days of the season. Dr. Headlee has placed a standard of 24 mosquitoes caught in a night as indicating sufficient abundance to cause annoyance to residents. This number was reached on only one occasion during the season.

In general, the results of the season's trapping in Hamden showed: (1) Fresh-water species were much more abundant than salt-water during the trapping hours, (2) species breeding in wood-

lands were more abundant than those breeding in tin cans and other receptacles, and (3) mosquitoes occurred in troublesome numbers (according to Dr. Headlee's standard) only once during the season. Four species new to Connecticut were taken in the trap: *Anopheles walkeri* Theobald, *Anopheles crucians* Weidemann, *Uranotaenia sapphirina* Osten Sacken, and *Culex apicalis* Adams. The last species is not known to attack man.

These results are of sufficient interest to justify a continuation of light trapping in order to obtain more information regarding the fresh-water breeding problem.

Other Collections

During the season larvae were collected for larvicidal tests and adults reared to determine the species involved. A summary of these rearings is as follows:

Aëdes cantator. Collected April 28 and 30 at Saybrook, breeding in a large shallow pool in enormous numbers. Emerged May 5, 6, 7, 9, and 10.

Collected from salt marsh pools in Stratford April 26. Emerged May 4 and 5. Breeding in large numbers.

Collected from small salt marsh pools in Milford, April 26. Emerged May 6.

Collected in ditches in New Haven, April 28. Emerged May 6, 7, 8, 9 and 10.

Collected in ditches in East Haven, May 16. Emerged May 18, 20 and 25.

Collected in ditches in West Haven, August 10. Emerged August 11. (1 female.)

Collected in Darien, May 21. Emerged May 26.

Aëdes sollicitans. Collected in ditches in West Haven August 10. Emerged August 11 and 12.

Collected in Madison. Emerged June 25.

Collected in Darien, May 21. Emerged May 24 and 25.

Aëdes taeniorhynchus. Collected in ditches in West Haven, August 10. Emerged August 17. (1 female.)

Collected in pools in Darien, May 21. Emerged May 25. (1 male, 2 females.)

Aëdes canadensis. Collected in woodland pools in Orange, May 6 and 9. Emerged May 9 to 13.

Collected in pool near dump in Bridgeport, May 18. Emerged May 20, 21 and 25. (2males, 2 females.)

Aëdes fitchii. Collected in woodland pool in Orange, May 9. Emerged May 13. (1 female.) Associated with the following:

Aëdes excrucians. Collected in woodland pool in Orange, May 9. Emerged May 13. (2 males, 2 females.) Associated with *A. canadensis* and *A. fitchii.*

Collected in pool near dump in Bridgeport, May 18. Emerged May 20, 21, and 25. (7 males, 1 female.) Associated with *A. fitchii.*

Culex territans. Collected in sewage-polluted salt marsh ditch in West Haven, August 10. Emerged August 17. (1 female.)

Collected in dump pool in Milford, July 6 and August 10. Emerged July 7 and August 12. (4 females.)

Collected in tin cans in Shelton, August 18. Emerged August 19. (2 males.)

Culex pipiens. Collected in sewage-polluted salt marsh ditch in West Haven August 10. Emerged August 12, 17 and 20.

Collected in dump pool in Milford, July 6 and August 10. Emerged July 7 and August 12.

Collected in tin cans in Shelton, August 18. Emerged August 19 and 20.

Culex salinarius. From Milford dump pool, August 10. (1 female.)

Anopheles quadrimaculatus. Collected from pond in Shelton, August 18. Emerged August 19, 21, 24, 25 and 26. (4 males, 4 females.)

COLLECTIONS OF ADULTS

Aëdes cantator. New Haven, May 21. L. M. Brautlecht.
New Haven, June 6. R. C. Botsford.
Aëdes sollicitans. New Haven, June 6. R. C. Botsford.
Aëdes fitchii. West Hartford, June 21. B. H. Walden.
Aëdes stimulans. West Hartford, June 21. B. H. Walden.
Culex pipiens. New Haven, November 11. N. Turner.
Culex territans. Shelton, November 14. J. P. Johnson.
Culex salinarius. Shelton, November 14. J. P. Johnson.
Taeniorhynchus perturbans. Portland, June 24. N. Turner.
Anopheles quadrimaculatus. Hamden, August 21. N. Turner.
Aëdes species. Union, June 24. N. Turner.

Following a call from Shelton concerning a mosquito nuisance, large numbers of *Culex* larvae were found breeding in tin cans on the premises. A large pond nearby contained many cast skins of *Anopheles* larvae, and *Anopheles quadrimaculatus* was reared from larvae and pupae.

Larvicides

There is definite need for a mosquito larvicide that contains no oil, for use in controlling fresh-water mosquitoes. Oil is effective in most cases, but is unsightly on the water and on vegetation growing in and near pools. Oil is destructive to birds as well. The development of the pyrethrum oil emulsion in New Jersey is a step in the right direction, but does not solve the problem. We need a non-petroleum material that is not toxic to fish or birds, but will kill mosquito larvae.

In 1931 preliminary tests showed that the use of rotenone with fuel oil was not as effective as pyrethrum. Rotenone in suspension was also lower in toxicity than anticipated. Moreover, rotenone is known to be highly toxic to fish and therefore was dropped from consideration.

Marcovitch published a brief note stating that naphthalene was highly toxic to mosquito larvae. Therefore, early tests included fuel oil containing crude naphthalene oil, a very cheap source of naphthalene. Five per cent naphthalene oil with 95 per cent fuel oil gave excellent results in laboratory tests. A 2.5 per cent solution of flake naphthalene in fuel oil emulsified and applied diluted 1-15 was not effective.

Flake naphthalene gave excellent promise when dusted on the surface of water. This material killed slowly and the larvae

showed no signs of agitation. One-fourth gram of flake naphthalene was effective on an area of about 50 square inches. The success of laboratory tests led to a field test at Cornfield Point, Saybrook, on April 23. About 6,000 square feet were treated with 10 pounds of flake naphthalene. The material was applied only on the pools. Larvae of *Aëdes cantator* were present in large numbers. Very little or no effect was noted two days later. Subsequent laboratory tests indicated that air movement was responsible for this failure. When the material was applied on pans in the laboratory, larvae were easily killed, but a fan causing slight air movement prevented this effect. Apparently the larvae were killed by using air containing vaporized naphthalene. Since it would be almost impossible to confine gas to the surface of the water, flake naphthalene must be dropped from consideration.

Paradichlorobenzene was as effective as naphthalene, but would be open to the same objections as naphthalene.

Pure pyrethrum powder at the rate of 1 gram to 3 square feet was highly effective in the laboratory. In the field, results were poor, due to trouble in getting the pyrethrum to settle on the water.

At the suggestion of R. A. McCormick, Red Arrow was used at 1-250,000, 1-500,000 and 1-1,000,000. On *Culex pipiens* larvae these dilutions were effective, especially the 1-250,000 trial. On large larvae of *Aëdes sollicitans* the 1-500,000 dilution was only partially effective and 1-1,000,000 was almost ineffective in 24 hours.

These studies indicate that only one thing tried seems worthy of further consideration. Pyrethrum dust might be satisfactory if a method of application could be devised. Red Arrow might do for small pools, and deserves further consideration, although it might be toxic to fish.

TABLE 8. STATISTICS OF MOSQUITO TRAP COLLECTIONS, WHITNEYVILLE

Species	June	July			August						September			Total
	30	8	9	10	23	24	25	26	30	31	1	2	5	
Aëdes sylvestris		2			3	6	14	23	7	6	2	13	4	80
Taeniorhynchus perturbans		3		1										4
Culex pipiens							1	3	4			4		12
Culex territans					1		1	3	1			3	2	11
Culex salinarius					1							1		2
Culex apicalis								1	1					2
Anopheles crucians							1							1
Aëdes sollicitans	3	4		1		1			1					10
Unrecognizable												2		2
Total	3	9	0	2	5	7	17	30	14	6	2	23	6	124

SPRING GLEN

Species	July			August						September			Total
	11	12	13	1	2	4	7						
Aëdes sylvestris	..	1	..	3	..	..	..	..	..	..	..	..	4
Taeniorhynchus perturbans	11	6	2	1	2	..	..	..	..	..	..	..	22
Culex pipiens	..	1	..	..	..	..	..	..	..	..	..	..	1
Aëdes sollicitans	..	..	..	2	..	..	1	..	..	..	..	..	3
Uranotaenia sapphirina	..	..	..	2	..	..	..	..	..	..	..	..	2
Anopheles walkeri	..	3	..	..	..	..	..	..	..	..	..	..	3
Anopheles quadrimaculatus	..	..	..	..	..	1	..	..	..	..	..	..	1
Total	11	11	2	8	2	1	1			..	..	..	36

MISCELLANEOUS INSECT NOTES

Tobacco flea beetle. The tobacco flea beetle, *Epitrix parvula* Fabr., was reported by Donald S. Lacroix, as occurring in small numbers on shade-grown tobacco at the Tobacco Sub-Station in Windsor. Heretofore in miscellaneous collecting in the tobacco fields of Connecticut, this insect has not been taken. Most of the flea beetle injury on tobacco has been caused by the potato or cucumber flea beetle, *Epitrix cucumeris* Harr. [W. E. Britton]

An unusual spider. The minute Opilionid of the family Nemastomatidae, *Crosbicus dasycnemus* (Crosby) was collected in leaf mold along with a colony of white ants, *Reticulitermes flavipes* Koll., in the oak barrens between North Haven and Northford. It is known only from a few localities in the North Central States and New York, and this is the first record from New England. It is closely related to the harvest spiders. [A. P. Jacot]

Spread of Asiatic beetle. The Asiatic beetle, *Anomala orientalis* Waterh., that for several years has injured lawns in the Westville section of New Haven and in a portion of West Haven, now appears at several points outside of the known infested area. During the season this pest was found to be present in Bridgeport, Greenwich, Hamden and Waterbury, as well as several points in New Haven and West Haven outside the quarantined area. [W. E. Britton]

Chinese mantid more common. The Chinese praying mantid, *Tenodera sinensis* Sauss., a beneficial insect mentioned in the Report of this Station for 1931, page 597, and illustrated on Plate 16, was even more abundant in 1932 than in 1931. Several specimens were found in New Haven and brought or reported to the Station between August 27 and September 12. Professor J. A. Manter, of the Connecticut Agricultural College, Storrs, reports that a specimen was sent to the college from Glastonbury.

[W. E. Britton]

Neuropteroid cocoons on Retinospora. On a visit to a large nursery in Manchester, April 29, we were asked to examine a plantation of *Retinospora filifera* at Wapping, as there were many curious white cocoons on the leaflets. The manager feared that a new pest had arrived that might injure the plants. We visited the place and collected material and brought it to the laboratory. The silvery white cocoons were about one-eighth of an inch long and about half that in thickness. One is shown in Figure 121. We opened a few and found that each contained a small Neuropteroid insect. Apparently they were nearly ready to emerge, and did emerge in a few days. The insect was identified by Nathan Banks as *Conwentzia hageni* Banks. This insect is beneficial rather than harmful because the larvae feed upon mites, newly-hatched aphids, and other small insects. [W. E. Britton]

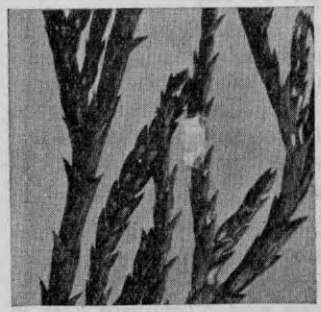

FIGURE 121. Cocoon of Neuropteroid insect, *Conwentzia hageni*. Twice enlarged.

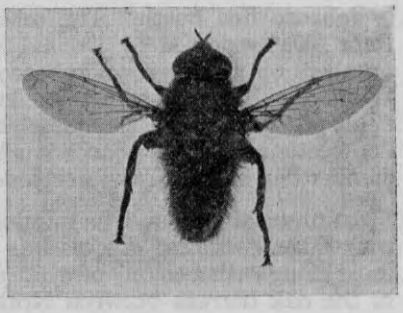

FIGURE 122. Adult of the Narcissus bulb fly, *Merodon equestris*. Twice enlarged.

Soldier beetle, *Chauliognathus pennsylvanicus* DeG. This insect was responsible for considerable injury to aster, calendula, and marigold in Orange. In answer to a telephone call, Mr. Johnson visited the place September 1 and brought back specimens of the beetles. Another telephone call from Woodbridge, September 4, reported similar injury to aster and from the verbal description, it was apparently the same species. The beetle is about half an inch in length, upper surface light brown or tan with the apical half of each wing-cover black except the margin, and with a black spot in the center of the thorax. Body and wing-covers are soft like other species of the family Lampyridae to which it belongs. This beetle is very common on the flowers of golden-rod late in the season, but it seldom injures cultivated plants in Connecticut. It can doubtless be controlled by an application of lead arsenate and perhaps also nicotine. [W. E. Britton]

Defoliation by oak leaf rollers. In June I received a report to the effect that oak trees along the road between Thomaston and Northfield had been stripped, and was asked what insect was responsible. Of course we feared that it might be gipsy moth caterpillars, and promised that the next time any member of the Department traveled near that vicinity we would have him investigate and report. Mr. Johnson and I had occasion to visit Litchfield on July 8, and on our return we drove over this road and inspected the injured trees. Several black and possibly some scarlet oak trees had been partially or wholly defoliated a month or so before our visit and new leaves had formed. No insects were found but some partially eaten leaves were rolled at the margins indicating it to be the work of leaf rollers, *Tortrix* sp. The white oaks had not been injured. [W. E. Britton]

Seventeen-year locust or periodical cicada. The seventeen-year locust or periodical cicada, *Magicicada* (*Tibicina*) *septendecim* Linn., appeared at a few places in the state in 1932. This is probably Brood VII. Mr. Zappe and Mr. Plumb heard the noise made by the males in the region at the north end of Lake Gaillard in North Branford on June 20, and one adult was collected. The region was again visited June 23 by Messrs. Plumb, Turner, and Zappe and several specimens were collected. The cicadas were in woodland where the older trees were from 30 to 50 feet tall with younger growth 10 to 20 feet and undergrowth of blackberry briars, smilax and other bushes. They could not find any particular place where the adults were abundant. Apparently it was a light infestation that did not cover more than half a square mile. Mr. Plumb also collected an adult near the Bradley and Hubbard Reservoir, in Meriden, northeast of the city. [W. E. Britton]

Abundance of orange sulfur butterfly. The orange sulfur butterfly *Colias* (*Eurymus*) *eurytheme* Boisdv., has formerly been prevalent in the southern Atlantic and middle western states. Occasionally it has strayed into Connecticut and we have several records of captures along the coast during the past 30 years. In October, 1931, Charles Rufus Harte, of New Haven, first collected this butterfly in Berlin. In 1932, he caught it in Berlin, Cheshire, Goshen, Hamden, Milldale, New Haven, New London, Plainville, Plantsville, Saybrook and West Haven. The writer collected a male in North Branford, July 24, and J. P. Johnson took a female in Nichols, October 4. J. C. Schread captured a female specimen in New Haven, November 4. Like the yellow sulfur, *Colias philodice* Godt., the larvae feed upon clover and alfalfa, and the butterflies of both species are usually common around fields of clover and alfalfa. In some cases in 1932 the orange sulfur seemed to be as common as the yellow sulfur. [W. E. Britton]

Another Japanese weevil pest, *Calomycterus setarius* Roelofs. This weevil was first reported in this country from Yonkers, N. Y., in August, 1929, by A. J. Mutchler of the American Museum of Natural History. On January 8, 1932, specimens were received from Lakeville, Conn., where the adults were reported as numerous in a house. In correspondence, the owner was requested to notify this office when they appeared abundantly in the field the next summer. Consequently, Mr. Zappe visited the place July 28, 1932,

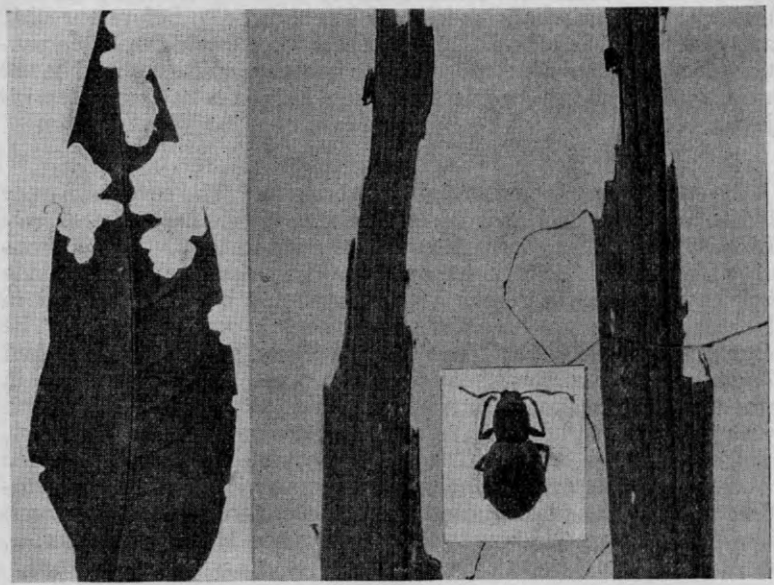

FIGURE 123. A new Japanese weevil, *Calomycterus setarius* (insert, adult, four times enlarged) and leaves of phlox and iris injured by it. Natural size.

and found the weevils in moderate numbers feeding upon iris near the house in a hot sunny spot. Iris plants shaded by privet hedge were injured most, and away from the house, plants were untouched. The cellar hatchway at the southwest corner of the house was covered with beetles. Vegetable plants had not been eaten, but an occasional beetle was found on Swiss chard. The food plants were iris, bindweed and smartweed, *Polygonum* sp. This weevil is about one-sixth of an inch in length and is uniform pearl gray in color. It is shown in Figure 123. Its status as a pest is unknown.

[W. E. Britton]

Studies on the potato flea beetle. In insectary studies, eggs of the potato flea beetle, *Epitrix cucumeris* Harris, hatched in from 5 to 9 days, the majority hatching in 6 or 7 days. The larval period

varied from 22 to 62 days, the larger number requiring 33 to 42 days. The pupal period varied from 6 to 9 days. The total developmental period required from 38 to 81 days, with the majority of individuals requiring 41 to 55 days. Over-wintering adults appeared on potatoes during the last week in May. Emergence of adults of the 1932 generation began July 8 and continued until September. There was no indication of a second generation in Connecticut. In a field test, lead arsenate at the rate of 3 pounds to 100 gallons of water plus 1 pint of fish oil gave the best control. Bordeaux mixture (4-4-50) was second, and the use of calcium arsenate and barium fluosilicate produced no increase in yield as compared with unsprayed plots. Both calcium arsenate and barium fluosilicate were used at the rate of 3 pounds to 100 gallons of water with 1 pint of fish oil. [Neely Turner]

Narcissus bulb fly. The narcissus bulb fly, *Merodon equestris* Fabr., and at least one of its varieties, occurs in Connecticut. It is a pest of nearly all varieties of narcissus, including daffodils, jonquils, paper whites, Chinese narcissus and amaryllis. The adult fly is covered with a dense golden, orange, or brown pubescence and in flight somewhat resembles a bumblebee. It is shown in Figure 122. The female lays eggs on the plant or bulb and the maggot infests the bulb, which often decays. The presence of the maggot is difficult to detect, but soft bulbs should be suspected. The maggot is gray and between one-half and three-fourths of an inch in length. The flies appear in May and June and the eggs hatch in 10 to 14 days. The larval period requires about 290 days, and the pupal period varies from 30 to 60 days, according to temperature. There is one generation each year. Flies were collected in my own garden in June of 1929, 1931, and 1932. Maggots in dry bulbs may be killed by vapor heat treatment for 2 hours at 111°. F. In plantations the only remedy is to destroy infested plants.

[W. E. Britton]

Orchard insecticide tests, 1932. Tests of some of the newer insecticides and fungicides in comparison with standard lime-sulfur, both liquid and dry, were carried on at the Station Farm at Mount Carmel, as in former years, in coöperation with the Botany Department. In 1932, five spray formulas were used as follows: Liquid lime-sulfur; dry lime-sulfur (both at standard strengths); lead-lime-fish oil, using 3 pounds of lead arsenate, 10 pounds of hydrated lime, and 1 quart of fish oil to 100 gallons of spray; Kolofog, 8 pounds, lead arsenate 3 pounds to 100 gallons of spray; flotation sulfur (paste form) 10 pounds, lead arsenate 3 pounds, 100 gallons of spray; one plot was left unsprayed. All plots were sprayed five times: Pink, calyx, seven-day, two weeks and one later spray. McIntosh trees in these plots received one additional spray, the prepink, for control of scab. All materials tested gave satisfactory control of insect pests and fungous diseases. The hardest

pests to control in this orchard are curculio and apple scab. Lead, lime and fish oil gave a little better control of curculio than other treatments, but also produced a little more apple scab so that it was not entirely satisfactory on scab-susceptible varieties such as McIntosh. For other varieties it was very good. [M. P. Zappe]

A leaf miner of morning-glory. Certain varieties of morning-glory belonging to the genera *Ipomoea* and *Convolvulus* are sometimes injured by a small moth of the family Lyonetiidae, *Bedellia somulentella* Zell., the larvae of which are miners in the leaves.

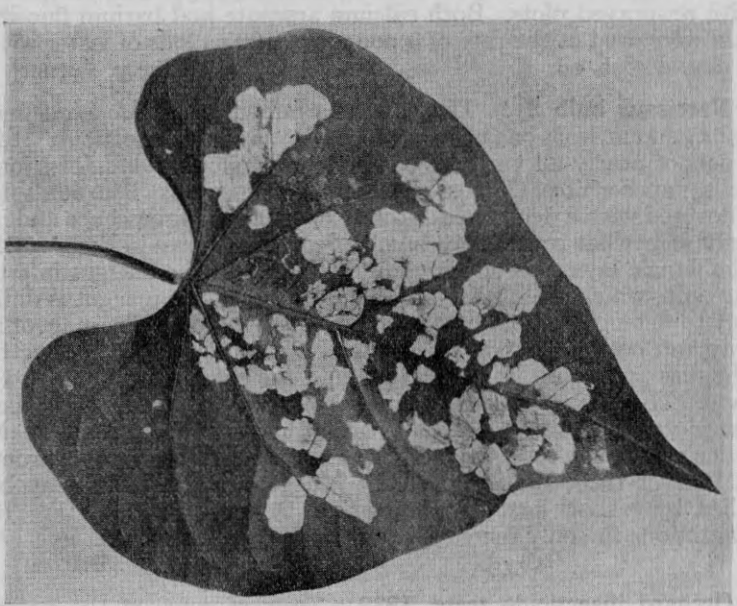

FIGURE 124. Morning-glory leaf injured by leaf miner, *Bedellia somulentella*. Natural size.

Probably the eggs are laid upon the leaves. Each young larva makes a serpentine mine that increases in size as the larva becomes older and larger. It then leaves the mine and enters the leaf at a new place and thereafter makes a blotch mine. Frequently there are several mines in a leaf and a large proportion of the leaf tissue is destroyed. The epidermis over the mines soon becomes transparent and later falls away altogether, leaving holes in the leaf. Only a few weeks are required for larval development, when the larva emerges from the mine, transforms to the pupa stage and suspends its slender angular cocoon from the under side of the leaf by a few silken threads. In a few days the small gray moth emerges.

It has a wing expanse of nearly half an inch, and in color the wings are pearl gray with narrow wavy front margins. In 1931, morning-glory plants in the writer's garden were infested by this leaf miner and many of the leaves disfigured. In 1932 no leaves were injured. Injured leaves and cocoons are shown natural size in Figure 124. According to Clemens[1] there are two generations each year. This leaf miner is parasitized by a small ichneumonid, *Apanteles bedelliae* Vier[2]. [W. E. Britton]

Buildings injured by white ants or termites. On November 27, 1931, and again on February 29, 1932, Mr. Zappe visited the public library in Union where the woodwork and particularly the ash

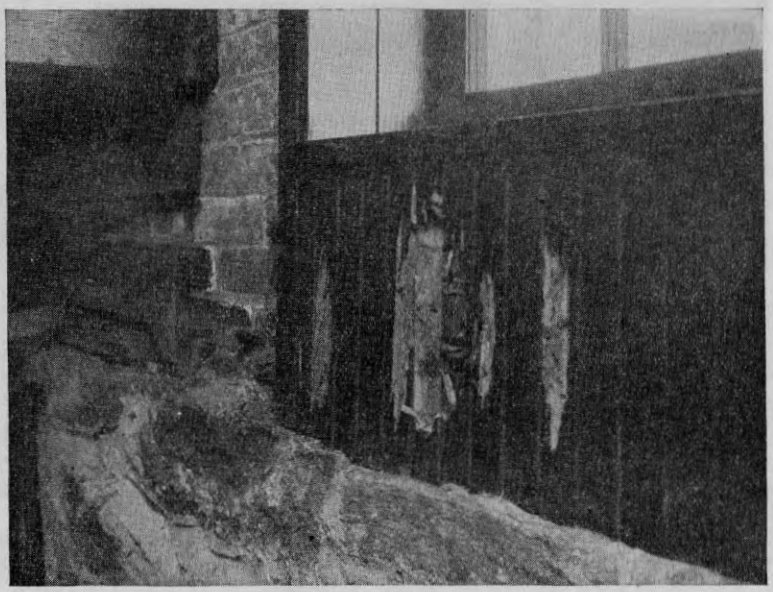

FIGURE 125. View near basement stairway of the Union Town Library, showing damage to the wainscotting by white ants.

trim had been damaged by termites, as shown in Figures 125 and 126. Old logs in the cellar were badly eaten and were probably the source of infestation. Mr. Zappe advised that the building be fumigated. On account of the damage it was necessary to replace a considerable portion of the wainscotting, especially around the stairs. Mr. Zappe also visited a residence in New Haven, January

[1] Clemens, B. Proc. Ent. Soc. of Phila., 1: 147. 1863.
Clemens, B. The Tineina of North America, 189. 1872.
[2] Muesebeck, C. F. W. A revision of the North American species of Ichneumon-Flies belonging to the Genus Apanteles. Proc. U. S. Nat. Mus., 58: 550. 1920.

13, where termites had damaged some of the woodwork and had made tunnels extending upward from the cellar. The owner planned to have a carpenter remove some of the trim, and then have the house fumigated. Probably the termites entered the house in cord wood stored in the cellar. On March 4, Dr. Friend was called to examine a house in Branford, that had been damaged by termites. About one-third of all the floor joists and posts were replaced with creosoted timbers on masonry foundation. Colonies of termites were found in the middle of timbers under the floor some 8 feet distant from the outside wall.

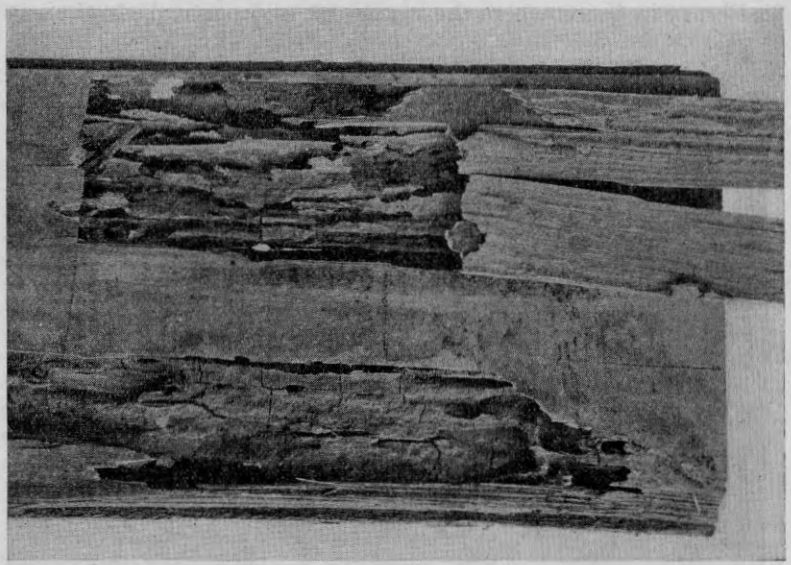

FIGURE 126. A near view of the back side of one of the sheathing boards of the Union Town Library, damaged by white ants.

On April 21, Mr. Zappe examined two houses, one an old homestead, in South Manchester, where termites had caused severe damage. In one of these houses, the old homestead, many of the structural and floor timbers had been eaten and were in a dangerously weakened condition. Floor boards and door sills had also been tunneled. Apparently this house had been infested for a number of years and was in bad condition. The other house, about 300 yards away, was infested only on the east side and by removing the infested boards and timbers the infestation could be eradicated at moderate expense. The insect responsible in each of these cases was the common white ant, *Reticulitermes flavipes* Koll.

[W. E. Britton]

External injury to peaches in northern Connecticut. Extensive damage to peaches at harvest was seen in several large orchards in different parts of the state. The most serious cases were in Hartford County, although some were seen in other sections. The true cause or causes of the injury, which is shown in Figure 127, is questionable because of the fact that no observations were made at the time when the insects were at work. In all probability there were several pests that each contributed a share of the injury. Four different ones may be mentioned, namely, rose chafers, *Macrodactylus subspinosus;* plum curculio, *Conotrachelus nenuphar;* Oriental fruit moth, *Grapholitha molesta,* and plant bugs, *Lygus* spp. Plant bug work was conspicuous in one large orchard in Farmington. There were also some fruit moth scars and much

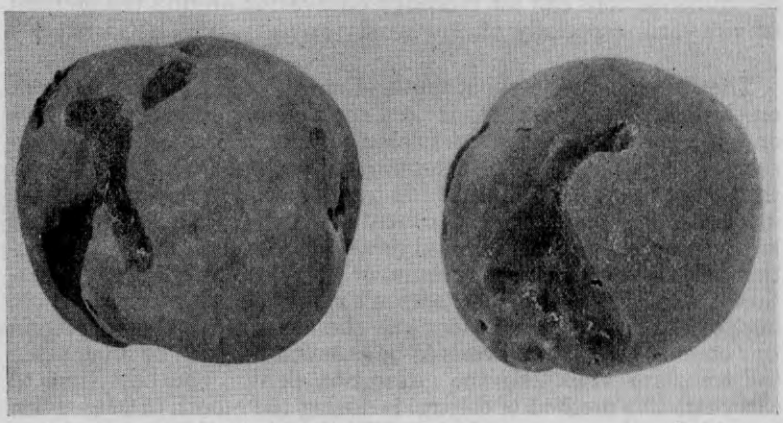

FIGURE 127. Peaches from Glastonbury injured by rose chafer during the growing season. Somewhat reduced.

injury of a more extensive nature that was attributed to the rose chafer and plum curculio. The majority of the work, however, appeared to be that of the rose chafer. In Glastonbury a similar condition was found, but in Cheshire much less of it. Here the main damage seemed to be that of the plum curculio. Trouble of a similar nature has been reported from various sections of Connecticut and we know that there was a very heavy infestation of rose chafer in Massachusetts and northern Connecticut in 1932. Complaints were received by Dr. Britton from several localities. One factor that seems to eliminate the Oriental fruit moth is that orchards having the heavier infestations of fruit moth larvae had less injury of this type than others. Typical plant bug work was not present in many orchards so that the two most probable sources of trouble remaining are the rose chafer and plum curculio. As will be seen from Figure 127 the scars were frequently very large or

much larger than the average made by curculio. We, therefore, believe that a large part of it was due to rose chafer feeding in June. Likewise plant bug work does not occur very far from fence rows or woodland bordering an orchard, whereas this injury was well distributed.

The only sprays that can be used safely on peaches for combating the rose chafer are sulfur sprays such as dry-mix or colloidal sulfur. Dry mix used in June when the beetles are most abundant is reported to be successful in New Jersey.[1] It is important to keep the fruit well covered during the period when they are most active. The general recommendations for grapes, which may also be severely injured, consist of spraying with lead arsenate and cheap molasses, using 2 pounds of arsenate and 2 gallons of cheap molasses to every 100 gallons of water. In addition, the general recommendations call for thorough cultivation around the orchard or vineyard, especially on low sandy areas. [Philip Garman]

The European pine shoot moth. During the last year the work on the shoot moth project has been confined to control experiments on five blocks of red pine forest plantings in the state, field investigations to determine the extent to which the insect has spread throughout Connecticut, and life cycle and control studies in the insectary. The control experiments in the red pine plantations have consisted in removing and destroying infested tips. A reduction of up to 80 per cent in number of tips infested has been attained in some cases by one season's work. This looks promising, but is not considered sufficient and the areas will be treated again this coming year. Such work to be practicable must be done when the trees are small and the infestation light. The best time to carry out this method of control is during the month of May when larval injury is most conspicuous. The field investigations to determine extent of spread show that about one-third (3,000 acres) of the red pine plantations in the state are infested, and that about one-fifth of this infested area is severely injured. Most of the infested plantations are in New Haven, Fairfield and Litchfield Counties. The life cycle has been satisfactorily determined. The adults emerge during June and early July, the peak of emergence occurring about June 25. Eggs are laid singly on the needles and the twigs close to the tip, and they hatch in about 10 days. The larvae bore into the needle bases at first and then feed on the buds. Hibernation takes place in the larval stage and feeding is resumed with the advent of warm weather in the spring. Pupation takes place in the new shoots in May and June, and the pupal period is about 18 days in length. Laboratory experiments indicate that a spray mixture of 2 gallons of a light summer miscible oil, 3 pounds of lead arsenate, and 98 gallons of water, offers considerable promise as a control measure on ornamental trees if properly ap-

[1] Headlee, T. J. Ann. Rep. N. J. Agr. Exp. Station, 1921-1922: 432.

plied. Eight species of native insect parasites were reared from field collected material. One of these is an egg parasite and the others attack the larvae. These investigations are being conducted jointly by the Departments of Forestry and Entomology.

[R. B. Friend]

Mexican bean beetle investigations. During the 1932 season special attention was paid to the relation of cultural practices to control of the Mexican bean beetle. In a study of the effect of various spacings of bean plants in the row on bean beetle injury, it was found that the injury was more severe on plants spaced 2 inches apart than on those spaced 4, 6, and 8 inches apart. This was due to the fact that more eggs to the plant were deposited on beans planted 2 inches apart. Moreover, in spite of thorough hand spraying, pods from plants 2 inches apart were heavily damaged by the bean beetle. Although the 2 inch spacings produced the largest total yield, the yield of uninjured pods was much greater on the 4, 6, and 8 inch spacings.

In order to determine the effect of date of planting on bean beetle injury, beans were planted every 10 days from May 2 to July 21, inclusive. Half of these plantings were sprayed and half left unsprayed. All sprayed plots yielded a larger crop than the corresponding unsprayed plots. However, beans planted before May 15 or between June 1 and 11 produced a fair crop without spray applications. Plantings made before June 1 required two sprays, applied on June 7 and 21. Plantings made June 1 and 15 required one spray on July 1. Plantings made between June 15 and July 5 required two sprays on July 29 and August 9. Plantings made after July 5 required two sprays on August 9 and 23. Pods that matured during the last week in July and the first two weeks in August were heavily injured by adult bean beetles, in spite of thorough spraying which was done before the pods formed. Tests of insecticides showed that the dilutions of magnesium arsenate as a spray (3 pounds to 100 gallons of water with 2 pounds casein-lime mixture) or as a dust (1 pound to 5 pounds hydrated lime) and the dilution of 1 pound barium fluosilicate with 5 pounds of hydrated lime as a dust were highly satisfactory when applied properly. A copper-calcium arsenate dust containing monohydrated copper sulfate 19 per cent, calcium arsenate 17 per cent, and lime 64 per cent, was found to be very effective in controlling the bean beetle. A brief report of these investigations has been published in Circular 88 of this Station.

[Neely Turner and R. B. Friend]

Injury to sorrel by an European weevil. In response to a telephone call on June 11, Mr. Johnson and Mr. Zappe visited a seed farm in Milford where seven acres of sour grass or sorrel, were being grown for seed. The sorrel had been quite severely injured by larvae that fed upon the blossom stalks, often eating the flowers,

seeds, leaves and stems. Of the total area of seven acres, about one and one-half acres of sorrel was severely infested. All stages of the insect were present and the seeds were nearly mature. An application of lead arsenate was recommended. Material was gathered and brought to the Station and adults were soon reared. They proved to be *Phytonomus rumicis* Linn. Mr. Zappe collected a specimen of this weevil in Greenwich, June 6, 1928, and several specimens on dock in Darien, May 21, 1930. The Greenwich specimen was identified by Allan S. Nicolay of New York, who pronounced it the true *Phytonomus rumicis* of Europe, only recently

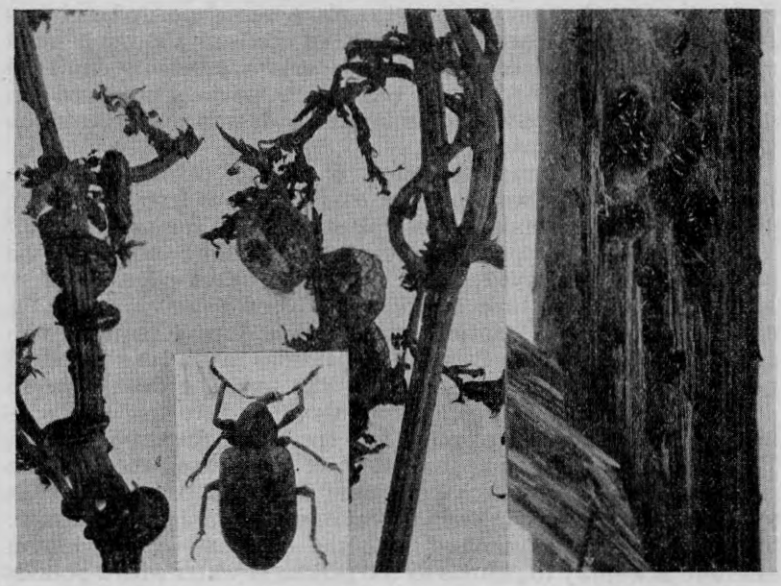

FIGURE 128. Eggs, larvae, and cocoons of the sorrel weevil, *Phytonomus rumicis*. Twice enlarged. Insert, adult. Enlarged four times.

discovered to be present in the United States. The Darien material was identified as the same species by L. L. Buchanan of the United States National Museum.

The larvae, when full-grown, are about half an inch in length, dark grayish green in color, with a lighter median line, and more or less speckled with minute whitish dots. The under side is yellowish with a prominent lighter stripe including the spiracles. The cocoons are fastened to the host plant and are broadly oval, transparent netted cases one-fourth of an inch in length, similar to those of the clover weevil, *Hypera punctata*. The pupa can be seen through the netted covering. The adult is about one-fourth of

an inch in length, general color brown, varying from light reddish brown to dark grayish brown. Two dark dorsal stripes extend lengthwise over the thorax onto the base of the wing-covers. Wing-covers mottled and peppered with black, and light and dark brown. Light patches usually occur just beyond the middle of the wing-covers. Front of proboscis dark. Under side of body and legs medium olive brown. The appearance of adults, cocoons, larvae and eggs is shown in Figure 128. The owners dusted the plants with lead arsenate, but many of the larvae were nearly mature and had ceased feeding, so were not killed. The seed crop was also nearly mature and was soon harvested. As the field produced more seed than was needed, the injury by this insect was not deemed important. [W. E. Britton]

The gladiolus thrips. The gladiolus thrips during 1932 caused serious injury to this popular flower in all sections of the state. Indications are that this insect did not live out-of-doors the past winter in Connecticut. If further observations verify this fact, it probably means that the only way the thrips will be carried over from one season to another in this latitude is on the corms in storage. In several instances the past spring where the corms were treated to kill the thrips and planted early, as soon as danger from heavy frosts was over, most of the plants flowered before they were injured by migrations of this pest from other plantings. The thrips increase rapidly in the cellar where the temperature is 60° F. or higher, and the corms may be seriously injured before spring. They can be killed on the corms and the most convenient material for the grower with less than 10,000 corms, and who stores them in his house cellar, is flake naphthalene. This material is of the same composition as moth balls but comes in thin flakes. It is sold in pound packages at many retail drug stores, often under a trade name, one of which is "White Tar." Flake naphthalene is sold in bulk by some dealers in insecticides. The corms should be cured as usual, at least a month, and cleaned. It does not appear to be necessary to peel them. The corms are then placed in tight paper bags and the flake naphthalene scattered among them at the rate of one ounce to each one hundred corms (1 pound to 1,600 corms). The bags are closed tightly. Folding the tops over and fastening with paper clips is convenient. Where the temperature of the cellar is 60° F. or higher, the bags should be kept closed for two to three weeks. Where the temperature is lower, they should be closed longer.

Controlling the thrips on the plants is difficult because of the fact that many of the thrips are concealed within the leaf sheath, which encircles the stem or inside of the flower bud out of the reach of any spray. For the small grower who does not have a spray outfit that maintains plenty of pressure and which is equipped with a good agitator, it is advisable to plant early, using corms that have

been treated, so as to obtain most of the flowers before the plants become infested with thrips migrating from other fields.

Certain growers, where there is an available water supply under pressure, have reported success in keeping the thrips under control by applying a driving spray of water to the plants every other day. Others have obtained good blooms by spraying once a week, from the time that the plants are 4 to 6 inches high until the blossom spikes appear, with a strong contact spray or with one to which has been added a stomach poison. Contact dusts have been used with success in certain cases. If the plants are badly infested at the time the blossom buds begin to open, it is too late to prevent injury to the flowers with any treatment. [B. H. Walden]

PUBLICATIONS OF THE ENTOMOLOGICAL DEPARTMENT, 1932

W. E. Britton

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Quarantine Restrictions Affecting Shipments of Connecticut Plants, 1932. Circ. 85, 9 pp., 5 figs. June 15, 1932.

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The House Fly as a Carrier of Disease Germs and How Controlled. 14 pp., 4 figs. Third revised edition. State Dept. of Health. February, 1932.

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Quarantines. Conn. Veg. News, p. 4. July, 1932.

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How Should the Grower Expect to Control Apple Leafhopper. Proc. 41st Ann. Meeting, Conn. Pomol. Soc., p. 38. April, 1932.

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Die Forstinsekten Mitteleuropas, by K. Escherich (Review) Jour. Econ. Ent., 25, p. 420. April, 1932.
Die Tierische Schadlings des Ackerbanes, by Sophie Rostrup and Mathias Thomsen. (Review) Jour. Econ. Ent., 25, p. 149. February, 1932.
The Pickle Worm. Conn. Veg. News, p. 2. July, 1932.
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The Mexican Bean Beetle in Connecticut. Jour. Econ. Ent., 25, p. 617. June, 1932.
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M. P. ZAPPE

Control of Curculio and "Side Worms". Proc. 41st Ann. Meeting, Conn. Pomol. Soc., p. 21. April, 1932.

J. C. SCHREAD

Behavior of Trichogramma in Field Liberations. Jour. Econ. Ent., 25, p. 370, 1 fig. April, 1932.

D. S. LACROIX

Tobacco Insects in 1931, in Bul. 335, pp. 261-268, figs. 28-31. May, 1932.

SUMMARY OF OFFICE AND INSPECTION WORK

Insects received for identification	719
Nurseries inspected	371
Regular nursery certificates issued (351 nurseries)	364
Duplicate nursery certificates for filing in other states	134
Miscellaneous certificates and special permits granted	168
Nursery dealer's permits issued	224
Shipper's permits issued to nurserymen in other states	254
Certification and inspection	
Parcels of nursery stock	227
Shipments of mountain laurel and other decorative material	79
Narcissus bulbs (in field 134,000) for sale (28 certificates)	25,000
Packages of shelled corn and other seeds	1,105
Blister rust control area permits issued	281
Japanese beetle certificates issued for the shipment of nursery and floral stock and farm products	31,478
Asiatic beetle certificates issued for the movement of soil and plants	2,588
Orchards and gardens examined	211
Shipments of imported nursery stock inspected	14
Cases inspected	123
Plants inspected	945,979
Shipments infested (44 per cent)	6
Reports to Federal Bureau of Plant Quarantine	14
Apiaries inspected	1,397
Colonies inspected	11,459
Infested with American foul brood (86 colonies)	50
Infested with European foul brood	0
Towns covered by gipsy moth scouts	41
Infestations found	146
Egg-clusters creosoted	14,479
Infestations sprayed	34
Lead arsenate used (pounds)	75,335
Miles of roadside scouted	1,629
Acres of woodland scouted	7,706
Letters written[1]	4,495
Circular letters issued	973
Packages sent by mail and express	218
Bulletins and circulars mailed on request or to answer inquiries	3,622
Lectures and addresses at meetings	61

[1] Including 598 written from the Japanese beetle office, and 93 from the Danielson office.

FINANCIAL STATEMENT

The report of the receipts and expenditures of the State Entomologist (Insect Pest Appropriation) for the year ending June 30, 1932, may be found in the Report of the Treasurer, on the first few pages of the 56th Report of this Station for 1932.

ILLUSTRATIONS

Figure 117 was prepared by J. F. Townsend; all others are by B. H. Walden. Because of the elimination of coated paper for plates to reduce the expense of publication, these illustrations do not exhibit the usual standard of excellence.

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