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Connecticut Agricultural Experiment Station

CONTROL OF INSECTS ON TOBACCO

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The outbreak of aphids which began in 1946 and increased in 1947 continued during 1948. In general, the infestation was not as severe as in 1947, but enough aphids were present to require treatment of almost all shade tobacco. Furthermore, the infestation appeared earlier than in previous years, and for the first time seed beds were found infested. This seed bed infestation apparently originated on infested weeds growing near by.

Several tests of materials for control of aphids were carried out in 1948. Additional information is available from workers in other states. There is still insufficient information to justify "recommendations" tested by time for control of aphids. It is possible, however, to summarize the known facts and to make suggestions for materials and combinations of materials for control of aphids, as well as other pests of tobacco.

Results of Tests in Connecticut

Preliminary tests of dusts were made in June in an infested seed bed. The results showed that 1 per cent parathion dust was by far the most effective material, followed rather closely by 1.5 per cent gamma benzene hexachloride. Ten per cent chlorinated camphene dust was next in order, but it had very little residual action. Ten per cent DDT dust was only slightly less effective, and it had an excellent residual action.

A test of the preventive value of DDT was made by applying a 10 per cent dust on uninfested plants in a portion of a plant bed. Two weeks later only 4 per cent of the dusted plants were infested by aphids, while 88 per cent of untreated plants had aphids on them.

Large-scale tests were made in cooperation with tobacco growers. Application by aircraft of about ½ pound gamma benzene hexachloride as a wettable powder in 3½ gallons of water gave about 85 per cent control of aphids on test plants under tents. These were small potted plants, which were set on the ground between the rows of growing tobacco; since benzene hexachloride is intended as a preventive spray, this degree of control was relatively good.

Similar application of parathion at the rate of about .2 pound per acre in the form of both wettable powder and emulsion gave a very high degree of control, estimated at greater than 95 per cent.

Application of .2 pound parathion per acre as a wettable powder in 7½ gallons of water by means of a large mist blower killed all of the aphids hit by the spray. The test was conducted in small fields of Havana seed tobacco. The only surviving aphids were on plants not reached by the spray. This mist blower had an effective swath of about 100 feet.

Use of tetraethyl pyrophosphate and hexaethyl tetraphosphate dusts by growers showed that these materials were very effective in killing aphids. These compounds approach the toxicity of parathion at the time of application, but lose toxicity very rapidly in the presence of moisture. Residues are usually non-toxic and non-poisonous within a matter of hours. Residues of parathion, on the other hand, remain toxic for several days.

Suggestions for Aphid Control in 1949

On the basis of the tests described above, and the preliminary recommendations of the Tobacco Insect Conference, the following information on materials available and schedule of treatment has been prepared.

Gamma benzene hexachloride, available as dust, wettable powder and possibly emulsion as well, has been used as a preventive treatment for aphids. Emulsions should be formulated with a solvent which is not injurious to tobacco. Even this purified form has a distinctive odor but apparently it has not imparted an undesirable flavor to tobacco. In the quantities used it should control flea beetles. The dosages suggested are about ½ pound of the gamma benzene hexachloride per acre as a spray, and 10 to 15 pounds of 1½ per cent gamma benzene hexachloride dust. This material has been suggested as an alternate for parathion, if undesirable residues of parathion are detected on tobacco.

Tetraethyl pyrophosphate is a highly poisonous organic compound which is very toxic to aphids. It is the toxic chemical in hexaethyl tetraphosphate. It loses toxicity very rapidly in the presence of moisture and is, therefore, effective for only a short period of time. Any residues left on the plants after 48 hours are non-toxic. Tetraethyl pyrophosphate is not very effective in controlling flea beetles, but should be toxic to thrips.

This material, usually sold as TEPP or HETP, is generally used as a spray. It has been difficult to formulate in dusts, and even the dusts available now must be used within a fixed period after mixing or they are ineffective. This property is of advantage, however, for treatment of tobacco just before priming.

Parathion is also a phosphate compound but is much more stable than tetraethyl pyrophosphate. It should be available as a dust, wettable powder or emulsion (with a special solvent not toxic to tobacco). It has been very effective as a 1 per cent dust at 10 to 15 pounds per acre and as a spray at the rate of .2 pounds per acre of parathion. Residues are relatively stable for a period of several days.

Parathion is not a highly effective insecticide for controlling flea beetles as compared with DDT or rotenone. It should be highly effective for controlling thrips.

DDT dusts and spray powders can be used on tobacco as a preventive treatment for aphids. Commercial DDT emulsions sometimes contain solvents which may injure growing tobacco. DDT is especially useful in the early season as a control for flea beetles at the rate of ½ to 1 pound of DDT per acre in sprays or 5 to 10 pounds of 10 per cent DDT dust.

Suggested Schedules of Treatment

Seed Bed

One application of parathion 15 per cent wettable powder at the rate of ½ to 1 pound in 100 gallons may be sprayed on the seed bed at least a week or 10 days before the first plants are to be removed. If an infestation develops in the seed bed during the planting season, additional treatments can be made as needed. Parathion is compatible with the fungicides ordinarily used.

One per cent parathion dust may be substituted for the spray if desired.

Field Treatments

Young plants may be dusted with 10 per cent DDT at the rate of 5 to 10 pounds per acre for control of flea beetles. If the plants were free of aphids when set, this dust should help prevent aphid infestation. A dust containing both 1 per cent parathion and 10 per cent DDT has been suggested for control of both aphids and flea beetles. This is an effective mixture, but the parathion is unnecessary unless aphids are present when the treatment is made.

Rotenone dust may be used for control of flea beetles, but it has not provided adequate control of aphids.

Aphid infestations on large plants may be treated by about .2 pound parathion per acre in the form of wettable powder or special emulsion by means of a mist blower or aircraft.

Large plants can be dusted as necessary with DDT for flea beetles by means of aircraft or mist blower.

Gamma benzene hexachloride may be used in either dusts or sprays for control of flea beetles and as a preventive for aphids.

Tetraethyl pyrophosphate sprays or dusts may be used as alternates for parathion, particularly after priming has started.

Note

Parathion and tetraethyl pyrophosphate are poisonous to humans and can be absorbed through the skin. Therefore, every reasonable precaution should be taken in handling the concentrated materials. A respirator should be worn by the men weighing or measuring the materials. Exposure of the

skin may be prevented by use of proper clothing and gloves. The emulsion form can penetrate skin more readily than dusts or wettable powders, and every precaution should be taken to keep the stock emulsion from the skin. There appears to be little danger of trouble from diluted sprays or dusts unless the operator is exposed continuously for many days.

Residues of parathion may persist on plants for 10 days or 2 weeks. There is insufficient information, however, to determine whether or not these residues are at all harmful.

Wireworms

Chlordan applied to the soil early in the spring at the rate of 2½ pounds per acre has given good control of wireworms and thus far has caused no off-taste of tobacco grown on treated soil. Benzene hexachloride has been equally effective, but has caused serious off-flavor of potatoes and other vegetables grown in treated soil. For this reason, benzene hexachloride should be avoided as a soil treatment for wireworms.

Early spring treatments appear to be more effective than late fall applications. This may be explained by the fact that wireworms are usually active near the surface of the soil in the spring. In the fall, they may not be so active, and may, therefore, escape the treatment until the following spring.

The use of liquid soil fumigants for control of wireworms has been considered too expensive by many growers. Control of nematodes by soil fumigants has been demonstrated. Soil affected both by nematodes and wireworms can certainly be fumigated to advantage. Special machines constructed to inject the fumigant about 6 to 8 inches in the soil are required. The injection tubes should be 12 to 15 inches apart and of a type that allows the soil to cover the fumigant. The soil should be prepared for fumigation by working it into condition for planting. All of the fumigants available are very toxic to plants, and for this reason it is necessary to delay planting from 10 to 14 days after treatment.

Fumigation has been most effective when soil temperatures were 60°F. or higher. It was not very effective when the soil temperature was below 50°F. As far as nematodes are concerned, either fall or spring treatment seems to be satisfactory. Less is known about wireworms, but it is doubtful that a fumigation would succeed if the wireworms were deep in the soil.

The two most popular fumigants have been ethylene dibromide and dichloropropane-dichloropropene mixture. Since the formulations of various distributors may vary in content of the fumigants, the directions on the package should be followed in determining dosage.

Fumigants appear to have no effect on the quality or flavor of tobacco or vegetables grown in treated soil.