Cotton leafperforator:

At Tempe and Phoenix in 1978, significant differences in cotton leafperforator "horseshoes" (CLP) per gram of leaf tissue were observed in two tests. The combinations normal leaf shape, normal bract shape, hairy leaf, and normal leaf shape, frego-bract, hairy leaf had more CLP than the combinations normal leaf shape, normal bract shape, Smooth-leaf, and Okra-leaf, frego-bract, Smooth-leaf. Four primitive race stocks, (T-86 mut DPL, T-218, T-570, and T-1125), had fewer CLP than the 'Deltapine 16' check. No other cultivar, breeding stock, or primitive race stock had fewer CLP than both the Deltapine and Stoneville check cultivars. ('Stoneville 256', however, had fewer CLP than Deltapine 61), Pima S-5, sprayed with carbaryl/kelthane for pink bollworm and spider mite control, had significantly more CLP than unsprayed Pima S-5. Sprayed Deltapine 61 and AET-5... had slightly, but not significantly more, CLP than their unsprayed counterparts.

Cotton Insects Investigations
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Dosage-Mortality Studies of Synthetic Pyrethroids and O-P Insecticides on the Tobacco Budworm

Dosage-mortality lines were established for methyl parathion, Bolstar, and 3 synthetic pyrethroids against larvae of the tobacco budworm, Heliothis virescens (F.).

Procedures:

Tobacco budworm cultures were established in the laboratory during the latter part of the growing season in 1976, 1977 and 1978. Newly-hatched larvae were introduced into 8 oz. cups at the rate of 40 larvae/container and held at a temperature of 30°C. After a feeding period of 5-7 days, larvae were transferred to individual 1 oz. media-filled cups for insecticide treatments. Insecticide applications and mortality counts were made by the standard test method for determining resistance in Heliothis spp. Insecticides employed in one or more of the tests were technical grades of methyl parathion, Bolstar, Pydrin, Pounce and Ambush. Mortality counts were made at 24, 48 and 72 hr. The 48 hr count was used to compute the LD_{50}'s.

Results:

Levels of tolerance to methyl parathion have increased since 1972. All 3 pyrethroids were more effective than methyl parathion, but decreased susceptibility to these pyrethroids was indicated where insects already possessed high levels of tolerance to methyl parathion. Additionally, the LD_{50}'s to the pyrethroids increased significantly from 1977 to 1978.

Effects of Molasses or Toxaphene on Residual Life and Efficacy of Methyl Parathion on Cotton

Methyl parathion residues on cotton can be protected and their efficacy against Heliothis virescens substantially extended by application at dusk in preference to dawn. Adding molasses or toxaphene to methyl parathion sprays further extends its residual life with both dusk and dawn applications. Although H. virescens is highly resistant to methyl parathion in most areas of the state, the extension of the effective life of other insecticides with dusk applications should occur in a similar manner.

Laboratory and Field Studies on the Tobacco Budworm

1. Biology:

A laboratory study was conducted to determine the effects of temperature on rate of development, longevity and fecundity of Heliothis virescens. Temperatures studied were 15°, 20°, 25°, 30° and 35°C. Of particular concern in this and related studies was the effect of high temperatures, such as 35°C, on egg fertility. Purportedly, the tobacco budworm would be of little consequence during mid-summer because of sterility. Moths originating from the 35°C rearing chamber did, in fact, lay sterile eggs. However, those originating from a lower temperature but held at 35°C for hatching resulted in approximately a 50% hatch.

Field studies in June, July and August, 1978, verified that tobacco budworm moths can deposit fertile eggs during the hottest time of the year. Moths were caged within the plant canopy throughout the summer and, although percent egg hatch fluctuated widely, egg hatch as high as 93% was obtained. Some moths failed to oviposit at all but a majority did with a maximum of 1,568 eggs from one female.

Diapause is an essential part of this insect's biology which must be understood. Studies were initiated in late 1977 and are continuing. Preliminary information indicates that diapause incidence is highest in mid- to late-October, declining after this period. Termination of diapause, once conditions are permissive, appears to be fairly rapid.

2. Control:

Small-plot field trials were conducted in 1978 to determine effectiveness of various insecticides against both the egg and early-larval stages of the tobacco budworm. Insecticides were applied with a two-row sprayer, using 3 nozzles per row. Treated terminals were pulled at periodic intervals after treatment and placed in micro-cages for bio-assaying against the tobacco budworm. When ovicidal effects were to be determined, small segments of tobacco budworm egg sheets from a laboratory culture were clipped to the plant terminal prior to spraying. They were then returned to the laboratory to determine per cent hatch.

In the Mesa test, Dipel and the Dipel/Pounce combination gave the best results. Good mortality was achieved when 1st-instar larvae were placed on terminals treated two days prior to larval placement. Effectiveness of the Dipel/Pounce combination appeared to decrease when the rate of Pounce was reduced to 0.025 lb/A.or less. The highest percent mortality occurred in the 1st 24 hours of the Pounce treatments and between 24 and 48 hours in Dipel treatments. Both Dipel and Pounce (0.5 and 0.1 lb/A., resp.) showed some degree of control on 3rd-instar larvae.

Lannate and Vydate showed some potential as ovicides; however, results were erratic. BAAM and NC 6897 gave poor results.

At Tucson, Dipel, at both 0.25 and 0.5 lb/A., gave good results against 1st-instar larvae. The combination of BAAM/Dipel, at 3 oz + 4 oz/A., also gave good results. Two new synthetic pyrethroids, Zn 3209 and Zn 3210, at 0.1 and 0.2 lb/A., showed good results.

Although Dipel had no direct effect upon treated eggs, about 50% or more of the larvae hatching from Dipel-treated eggs died soon after hatching. Apparently, a sufficient amount of the Dipel was ingested to cause mortality when the larvae chewed out of the egg shell.

Even though BAAM proved to be only fair against the tobacco budworm, it gave excellent results against the cotton leafperforator.