

75-80% of the pink bollworms in squares and blooms over a 13-day period. However, the length of the ovipositor indicates that the female will only be effective against pink bollworms in squares and blooms.

Anaphes oviventatus (Crosby and Leonard), an egg parasite of lygus bugs, common in alfalfa fields in Arizona but not in cotton fields, is easily reared on any of several host eggs including Spissistilus festinus (Say). Newly emerged females contain an average of about 50 eggs. Unfertilized females produce male offspring, and fertilized females produce offspring of both sexes. Although the females parasitize eggs of Lygus hesperus (Knight), they parasitize fewer as the age of the host eggs increase. One parasite develops from each host egg.

In laboratory and cage studies with Geocoris punctipes (Say), predation by G. punctipes was extremely difficult to assess. However, when G. punctipes were applied in cages at the rate of 100/sq. ft., populations of aphids, nymphal lygus bugs, and Spissistilus festinus were reduced somewhat. Animal food is essential to the development of the G. punctipes, but they also utilize plant food. These predators are apparently more omnivorous than was previously believed and their predaceous activities may be opportunistic in nature. However, when large numbers were placed together in small containers, no cannibalism resulted. Therefore, with suitable conditions, large numbers of G. punctipes may be reared in a small space.

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EVALUATION AND AUGMENTATION OF BIOLOGICAL CONTROL AGENTS TO REPLACE OR SUPPLEMENT THE USE OF PESTICIDES

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Objectives

- A. To assess the influence of environmental factors, both natural and artificial, on the effectiveness of parasites, predators, and pathogens in suppressing pests.
- B. To determine the differential effects of selected insecticides on the internal parasites of lepidopterous larvae.

Summary of Progress

Topical applications of Sevin® on salt-marsh caterpillar larvae--averaging slightly over 600 mg. per larva--resulted in an LD₅₀ of approximately 700 ug per larva. This depended somewhat upon the location from which the colony was established. However, more data are needed to determine the variability in susceptibility to Sevin of salt-marsh larvae collected from different areas.

Salt-marsh caterpillar larvae collected at Coolidge, Arizona, were used to establish the colony for the parasitization test. A sublethal dose of Sevin was ascertained to be 300 µg for larvae from this colony. However, the dosage used in determining the differential susceptibility of parasite and host to Sevin was further reduced to 100 µg. per larva. Salt-marsh larvae containing three age groups of parasites--those having just entered the host, those which were in the host one day, and those in the host two days--were treated topically with the 100 µg dosage of Sevin.

The results indicated that Exorista mella larvae are killed to an appreciable extent only when the application is made within the first day of parasite hatch and entry. Comparably-parasitized larvae treated only with acetone yielded parasite puparia and adults, indicating no detrimental effects on the parasite larvae from the acetone treatment. These data strongly indicate that the insecticide, at this dosage, had little effect on the parasite when applied one or more days after parasite entry into the host.

The influence of Sevin on parasite larvae when the hosts fed on treated cotton leaves was difficult to ascertain because of the cessation of host feeding on treated foliage. Nonparasitized host larvae, feeding on cotton leaf discs treated with a sublethal dosage of Sevin, died within 6 to 21 days. Larvae tended to lose at least two-thirds of their body weight while consuming relatively little of the food available. Host larvae exposed to leaf discs treated with 100 µg of Sevin within two days after parasite entry fed very little and yielded few parasites. However, where host larvae were placed on similarly-treated leaf discs four-six days before parasite hatch occurred, but subsequently moved to untreated cotton after 72 hours, yielded a high percentage of parasite return. This indicates that cessation of host-feeding may be more detrimental to the parasite than is the insecticide.

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BIOLOGY AND CONTROL OF INSECTS AFFECTING COTTON IN ARIZONA

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Objectives

- A. To study the field ecology of important cotton pests.
- B. To conduct field experiments with insecticides for the purpose of developing practical and effective cotton insect control programs.