

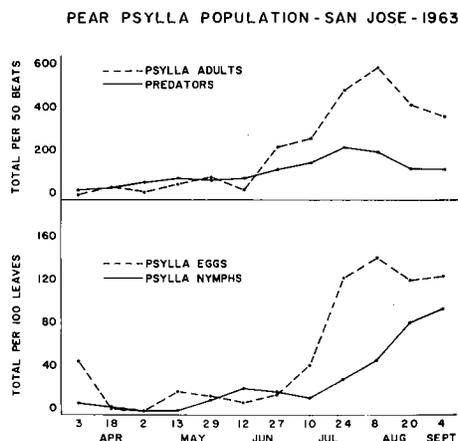
Effects of Predators on Control of Pear Psylla

HAROLD F. MADSEN • TIM T. Y. WONG



The encyrtid wasp, in center (and cover photo), has parasitized pear psylla nymphs seen on leaf by inserting eggs into their bodies. The hatching larva of the parasite consumes the inside of the nymph and emerges.

STUDIES HAVE BEEN conducted for the past two seasons on the action of predators against the pear psylla. Most of the work has been done at the University of California Deciduous Fruit Station, San Jose, on a block of pears that has been left untreated. The trees at this orchard had received all cultural requirements except the application of pesticides. The orchard suffered heavily from pear psylla attack from 1959 through 1961. In 1962 predators (anthocorid bugs and lacewings) brought the pear psylla population to a low level. The trees (Winter Nellis on Old Home-Farmingdale rootstock) responded by growing vigorously, whereas in previous seasons, growth had nearly ceased and the foliage was yellow and sparse. Studies were continued in 1963 to determine if the predators would continue to regulate the pear psylla population.



Graph 1. Pear psylla and predator population levels through the 1963 growing season at San Jose.

The adult psylla and the predator population was determined by beating, using a rubber covered stick and an 18 x 18 inch beating tray. The psylla nymphs and eggs were counted by means of leaf samples.

Adult samples showed an overwintering pear psylla population of 2 to 3 per beat from January through March. Adult *Anthocoris antevolens* White were also present throughout the winter months. The first psylla eggs were found near the fruit spurs on February 4 and gradually increased in numbers as the season pro-

gressed. The adult population dropped abruptly in early March, probably due to mortality of the overwintered psyllids.

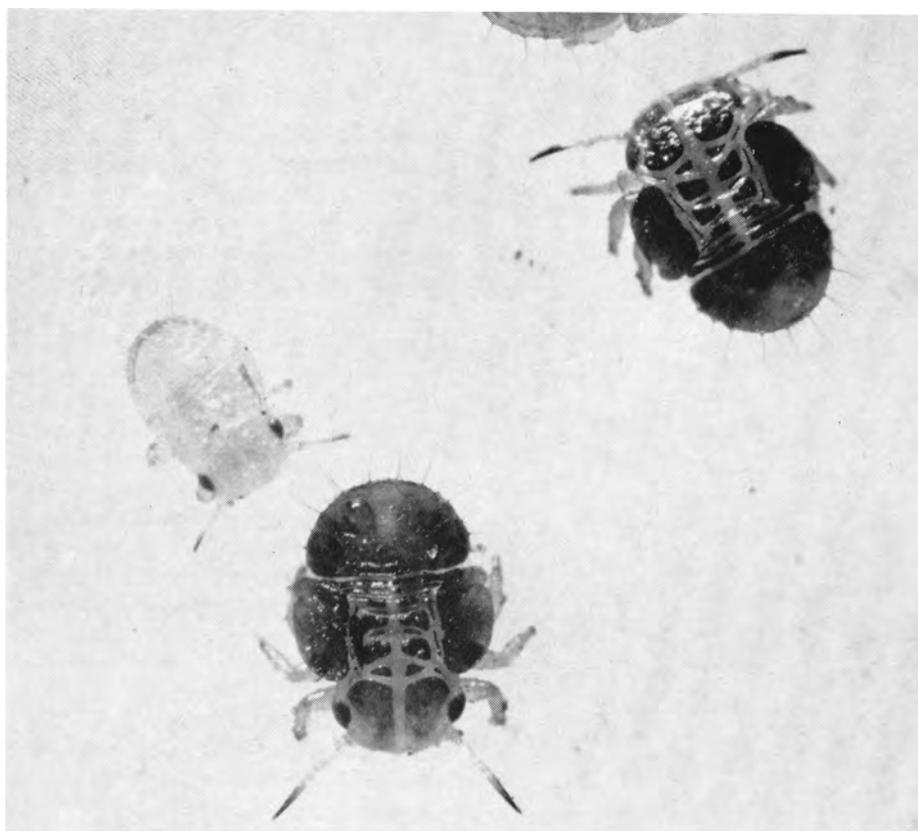
The population of both the pear psylla and predators was followed throughout the season and the data obtained are illustrated in graph 1. The data show that the pear psylla was held at a relatively low level throughout the season. The nymphal counts did not reach an average of one per leaf, and caused no significant damage to the trees. Some honeydew was present, but not enough to affect the fruit, and tree growth was normal. The adults showed a steady increase until August, but the predators were apparently able to keep the nymphal population low by feeding upon the eggs and immature stages.

The anthocorid previously mentioned was the most abundant predator, but lacewings (*Chrysopa plorobunda* Fitch, and *Hemerobius angustus* (Banks)), were also numerous, especially in June, and July. A parasite (*Trechnites insidiosus* (Crawford)), was also found, but counts indicated that only a very few nymphs were parasitized. The data on this parasite, over two seasons, indicates that it may influence pear psylla numbers but that it is far less effective than the predators.

Although the action of natural enemies in this orchard was effective in controlling the pear psylla, it was practical only because the orchard was unsprayed. As a result, the fruit was attacked by codling moth, and over 70% was infested. The materials in current use for codling moth control are toxic to the predators, so the usefulness of natural enemies is dependent upon either finding another means of controlling the codling moth or using a highly specific insecticide. Since little information is available upon specific compounds, it was decided to evaluate two materials which might meet the require-

The pear psylla predator, *Anthocoris antevolens* or pirate bug, pictured to left (and cover photo inset) punctures pear psylla eggs (seen in photo to right), or nymphs, with its beak and feeds directly on either.





Pear psylla pictured above (mature nymphs are dark, young are transparent), proven to play a part in the pear decline disease, are vulnerable to attacks by predators and parasites described in this report.

August there was no difference in the pear psylla counts on the sprayed and unsprayed plots. Predator action was concluded to be as effective as two sprays of either Phosphamidon or Perthane in controlling pear psylla.

Codling moth counts from the plots at harvest did not indicate outstanding control with either material, although Phosphamidon reduced the number of infested fruit to 22.3% as compared with 77.8% in the unsprayed plot. There was little difference between the Perthane-sprayed fruit and the unsprayed.

Although both compounds gave pear psylla control, neither fills the requirements desired as they were not very effective against codling moth and were toxic to anthocorids and lacewings. It will be necessary to continue to search for specific materials that will control codling moth without adversely affecting the natural enemies of the pear psylla.

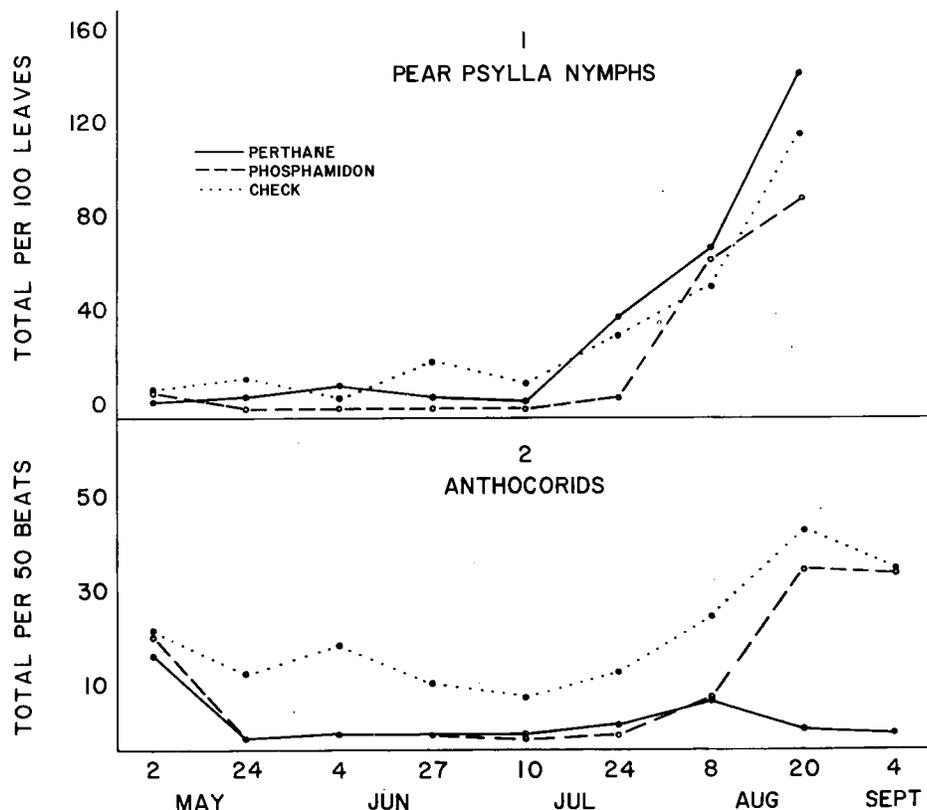
Harold F. Madsen is Associate Entomologist, and Tim T. Y. Wong is Laboratory Technician II, Department of Entomology, University of California, Berkeley.

ments. One was Perthane, a chlorinated hydrocarbon of low mammalian toxicity, which was reported to be effective against pear psylla. The other was Phosphamidon, a systemic organic phosphate which has a limited surface residue.

The materials were applied to one section of the orchard used for the natural population studies. The plots consisted of nine trees with three replications in a randomized block design. The treatments were timed to the codling moth flights using a black light trap as a means of determining when adults were active. Two sprays were applied, one on May 2 and the other June 12 using a conventional power sprayer.

Pear psylla and predator counts were made at biweekly intervals using the same method as previously described. The results, illustrated in graph 2, show both Phosphamidon and Perthane controlled the pear psylla but were also toxic to the anthocorids. When the nymphal population was examined there was little difference between Perthane and the unsprayed check. This indicates Perthane was controlling the pear psylla, since the predator count was very low on Perthane-treated trees. Phosphamidon showed similar effects although predators were able to re-establish themselves late in the season. By

1963 EFFECT OF INSECTICIDES ON PEAR PSYLLA AND PREDATORS



Graph 2. Pear psylla and predator counts through the season as affected by insecticide applications.