



Pea Aphid Outbreaks Associated with Spraying for the Alfalfa Weevil in Utah

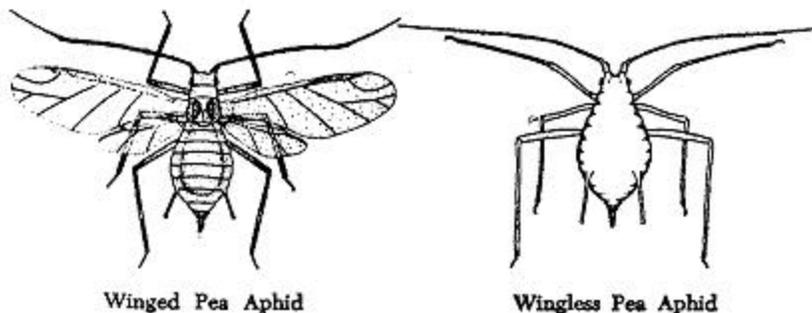
Fact Sheet No. 85

April 1993

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A central concept of modern insect pest management is that growers should spray their crops with insecticides only when necessary (that is, only when these pests threaten to cause significant economic damage). "Insurance sprays" made without regard to the numbers of pest insects actually present in a crop are strongly advised against. Such indiscriminate spraying can lead to many difficulties. The development of pest resistance and environmental contamination are two well-known problems that often follow overuse of insecticides.

Somewhat less well-known, but also of great concern, are secondary pest outbreaks. These occur when application of insecticide to control one insect pest leads to high numbers of other pest species and associated loss in crop yield. In many cases it appears that these secondary pest outbreaks occur because non-target, beneficial insects (predators and parasites) are killed in large numbers along with the target pest when an insecticide is applied. Research that we recently completed in cooperation with alfalfa growers in Sevier County indicates that the potential for secondary pest outbreaks of pea aphids during the second crop of hay in Utah increases when growers spray for the alfalfa weevil during the first crop.



The pea aphid is a familiar pest in Utah alfalfa fields. But because most alfalfa varieties grown in the state have been bred for pea aphid tolerance (resistance), growers generally do not need to spray for this insect. In fact, the pea aphid at low to moderate densities in alfalfa may be beneficial to the state's agriculture generally. Large numbers of predatory insects

reproduce and multiply in alfalfa by feeding on the pea aphid. Later they often migrate to other crops to attack more serious insect pests such as the Russian wheat aphid. At times, however, pea aphids reproduce fast enough to "escape" control by predators and become extremely numerous, arresting alfalfa growth and/or causing noticeable wilting. Growers are then forced to spray to avert economic damage. Our research indicates that the potential for this to occur increases following application of insecticide for the alfalfa weevil.



alfalfa weevil

In 1991, we worked with growers in the Sevier Valley to assess the effects on other insects, of spraying for the alfalfa weevil. We censused nine fields for insects during the growing season. Five of the nine fields were sprayed (with furadan, dimethoate, and/or parathion) in early June, while the other four fields were not sprayed during the first crop; all nine fields were first cut in mid-June. We sampled these fields in early July by taking 10 widely spaced sweeps with a large net to collect pea aphids, and 200 sweeps to collect predatory insects and spiders. Our results were very striking: significantly more pea aphids occurred in fields that had been sprayed a month earlier than in fields that had not been sprayed (Figure 1).

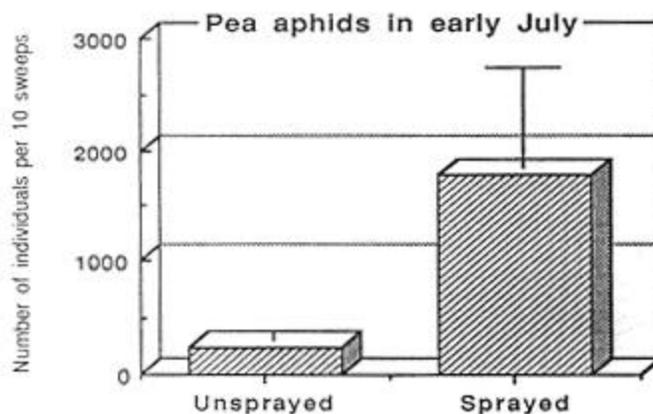


Figure 1. The average number of pea aphids collected in 10 sweeps with a net in early July 1991 was much greater in alfalfa fields in Sevier Valley that had been sprayed a month earlier to control alfalfa weevils than in unsprayed fields. (Note: the vertical lines in the figure represent the standard error, a statistical measure of variation from field to field, and are included for professional pest managers consulting this fact sheet.)

Large numbers of predators undoubtedly were killed by spraying, and indeed we found that numbers of spiders were still significantly lower in previously sprayed than unsprayed fields

in early July. Other predators such as lady beetles had recolonized sprayed fields in substantial numbers by early July but the number of predators relative to the number of aphids present was still very low in sprayed versus unsprayed fields (Figure 2). Thus, predators had much less potential to check the further growth of pea aphid populations in fields that had previously been sprayed than in unsprayed fields.

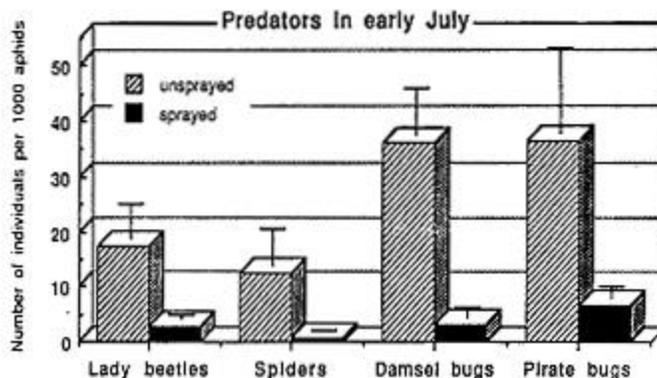


Figure 2. Relatively few predators, in comparison to pea aphids, occurred in early July 1991 in Sevier Valley alfalfa fields that had been sprayed a month earlier to control alfalfa weevils than in unsprayed fields. This is illustrated here by showing the numbers of aphid predators (lady beetles, spiders, damsel bugs, and minute pirate bugs) per 1000 pea aphids collected with a sweep net. (Note: the vertical lines in the figure are as explained in Figure 1.)

Fortunately, in 1991 the fields with high aphid populations were cut before these populations grew large enough to seriously threaten the crop. Nevertheless, our observations reinforce the importance of spraying only when necessary, as recommended in USU Cooperative Extension Entomology Fact Sheet No. 58, ("The alfalfa weevil in Utah"), and not as an "insurance policy" for the alfalfa weevil.

Acknowledgments

We thank Chad Anderson, Russell Christensen, Gary Cowley, Thomas Jensen, and Theron, Scott, and Wayne Mills for allowing us to sample their fields. We also thank K. Bailey, G. Bills, C. Keyes, and N. Youssef for their assistance in collecting and processing samples.

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