Aphid Parasites Established

natural enemies of spotted alfalfa aphid brought from Middle East expected to be established throughout the state in 1958

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Three imported species of wasps—*Praon palitans* Muesebeck, *Trioxys utilis* Muesebeck and *Aphelinus semiflavus* Howard—parasites of the spotted alfalfa aphid, are abundant in southern California and are becoming established in northern California.

Surveys made in the fall of 1957 indicate that *Praon* is found in most central valley counties from Tehama south, *Aphelinus* from Yolo County south, and *Trioxys* has been recovered as far north as Yolo County.

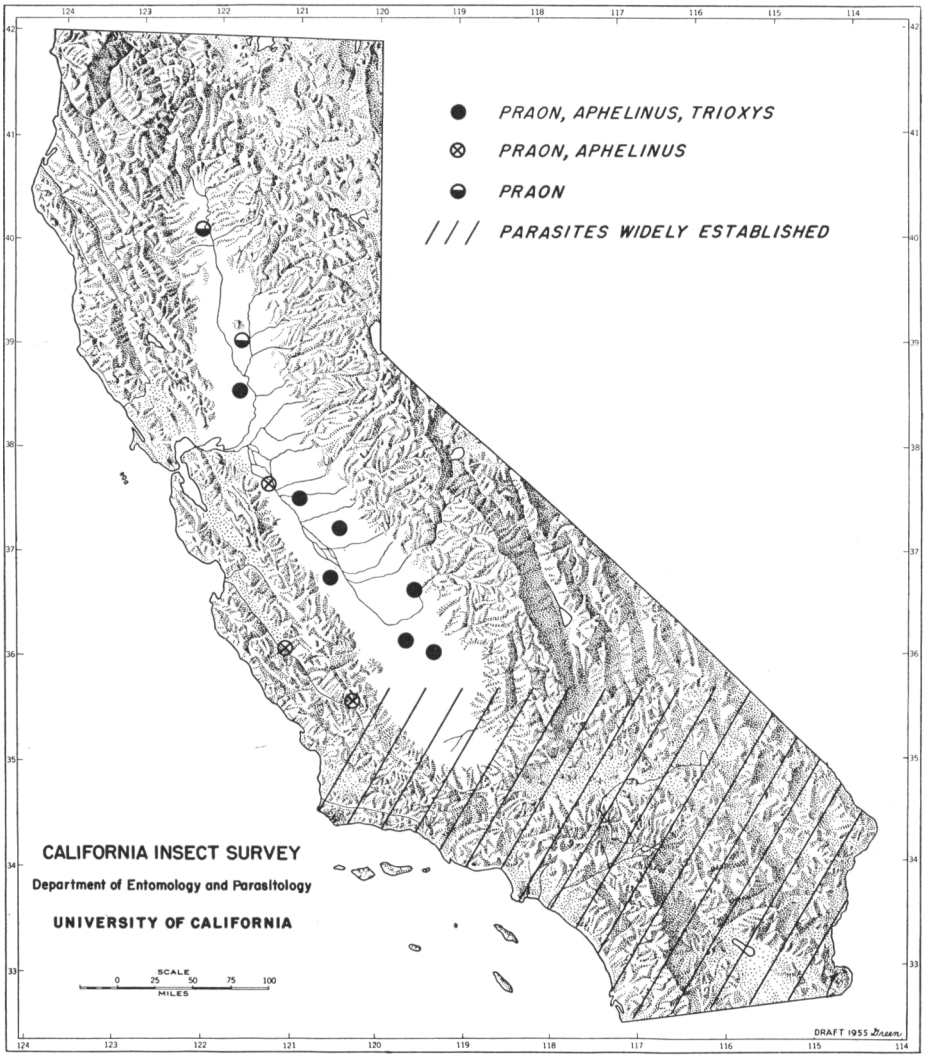
Both *Praon* and *Aphelinus* are well established from Stanislaus County south and are present in the Salinas Valley. *Trioxys* is still rather localized at several release points in the San Joaquin and Sacramento valleys.

During 1956 about 900,000 of the three parasitic wasps were reared in the insectary and released in experimental plots in northern California. Surveys made in the spring of 1957 indicated that *Aphelinus* had become established in eight release fields located in the San Joaquin and Salinas valleys. In the spring survey, *Praon* and *Trioxys* were not found. However, from the number of *Praon* found later in the summer at several release sites in the central valley, it was evident that the small releases of 1956 were successful in establishing the species.

The method of disseminating the parasites from insectary-reared material was modified in the spring of 1957 to insure further takes over wider areas. Massive colonizations were made by collecting the wasps directly from the fields wherever the parasites were abundant. The majority of the parasites were obtained from Kern County by means of a large mechanical collector mounted on a truck.

The number of machine-collected wasps was estimated at 6,645,000. These, plus 234,000 insectary-reared parasites were liberated during 1957 in selected alfalfa experimental plots scattered strategically in the San Joaquin, Sacramento, and Salinas valleys. Subsequent recoveries of at least one species were made in nearly every location where the parasites had been released.

Distribution by counties of the imported parasites of the spotted alfalfa aphid in northern California on October 15, 1957.



Dispersal

The parasite *Praon palitans* is the most widespread species, because—in addition to their own dispersion—they can be carried in flight by parasitized winged aphids. During the late summer of 1957, *Praon* appeared commonly in alfalfa fields from Stanislaus County south. To the north its distribution was spotty, but by the summer of 1958 it is expected to be present in all alfalfa producing areas.

The *Praon* parasitized aphid is rather conspicuous, for it usually migrates to the upper surface of the alfalfa leaf. At this site the mature parasite larva eats its way out through the under surface of the aphid and spins a silken tent under the aphid from which the wasp finally emerges.

Trioxys utilis is still restricted pretty much to the vicinity of the release areas although one recovery has been made about a mile from the original release site in Stanislaus County. The parasitized aphid is grayish-tan when it has become mummified and is usually found on the under surface of alfalfa leaves. This parasite does not form an external cocoon but emerges directly from the aphid mummy.

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This may be due to the fact that magnesium levels are low, as are sodium. There is a tendency for a reciprocal relationship between these two elements and potassium. At Davis, for example, the magnesium content has been found to be 2–3 times as high as in the Kern County experimental plots, and the potassium content is much lower.

The leaf analyses provided an obvious explanation of the failure of the trees to respond to nitrogen. The analyses also pointed up the difficulty of getting absorption of phosphorus and potassium—even with heavy applications on a light soil—and emphasized the importance of time of sampling in the interpretation of leaf analyses.

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ters and berries of vines sprayed with the gibberellin at 5 ppm were larger than those of unsprayed and ungirdled vines, but smaller than those of the unsprayed but girdled vines. Very large clusters and berries resulted from treatment with the compound at 20 ppm and 50 ppm. The percentage of total soluble solids was lowest and the percentage of acid highest in the fruit sprayed with the compound at 50 ppm.

Zinfandel

Grape varieties with compact clusters are undesirable because rot is likely to develop in them. If the cluster parts could be lengthened, such clusters would be loosened and the tendency to rot reduced. Shoots of Zinfandel, a variety with very compact clusters, were sprayed with gibberellin at 0, 1, 10, 100, or 1,000 ppm on April 7 when the shoots were 2″–3″ long. Canes were removed and fruit harvested on September 23. The shoots and their internodes were elongated in proportion to the concentration of compound used. When measured on July 15, the shoots sprayed with the compound at 1,000 ppm were twice as long as the untreated shoots.

The length of cluster parts was increased in proportion to the concentration of the gibberellin used. The compound at 10 ppm resulted in the production of rather loose clusters as a result of the elongation of cluster parts. Very loose clusters resulted from application of the compound at 100 ppm, but there were many shot berries. At 1,000 ppm the clusters were virtually destroyed. In this treatment ovaries still adhered to the greatly elongated pedicels, but the cluster framework was cracked and quite brittle. Above 1 ppm the average weight per cluster and berry usually decreased with increasing concentrations of the compound, probably because the number of small shot berries increased.

There was no definite trend in the percentage of total soluble solids or acid. However, treatments at later dates hastened coloration and maturation.

Data at Harvests for Black Corinth and Thompson Seedless Grapes

Treatment, concentration gibberellin ppm	Av. wt./ cluster gm	Av. wt./ berry gm	Total soluble solids %	Acid %
Black Corinth				
0 not girdled	59.8	0.14	27.7	0.85
5 not girdled	122.0	0.47	23.2	0.85
20 not girdled	215.9	0.65	23.5	0.89
0 girdled	131.7	0.35	24.1	1.02
Thompson Seedless				
0 not girdled	0.66	1.59	22.4	0.79
5 not girdled	0.95	1.91	23.2	0.73
20 not girdled	1.46	2.71	18.9	0.83
50 not girdled	2.15	3.15	17.6	0.94
0 girdled	1.10	2.26	23.0	0.74

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RED MITE

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ated for mite control in an orchard with a history of mite resistance to parathion and malathion. Although the sprays were applied for aphid control, mite counts were taken at intervals throughout the season. All materials were applied with conventional ground equipment and orchard guns, at an average of 350 gallons per acre.

A definite mite resistance to parathion and malathion was observed in past seasons and in 1957 Diazinon did not hold the mites in check. The trees in the test plot showed severe mite injury to the leaves. Thimet, at two dosages, Nialate, and Guthion gave what could be considered commercial control in spite of the phosphate resistance present. However, in the previous season, Thimet gave such good control in this orchard that only a few mites could be found on the treated trees. In the 1957 season, although commercial control was obtained, the plots were close to treatment levels. Guthion and Nialate had not been used previously in this orchard.

Thiodan—the only nonphosphate compound used in these trials—had little or no acaricidal effect.

The results of these tests indicate that even though resistance to one or more phosphate chemicals may be present, it is possible to obtain spider mite control for at least a season or so with other phosphate materials. How long the materials will continue to be effective is a matter of conjecture.

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Gordon Morehead, Sacramento County, Jim DeTar, Solano County, Dick Bethell, El Dorado County, Russell Gripp, Lake County, and Bruce Bearden, Mendocino County; Farm Advisors, University of California, cooperated in trials with Bartlett pears.

PARASITES

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Aphelinus semiflavus adults began to appear commonly in the San Joaquin and Salinas valleys in the fall of 1957. The shiny black aphid mummy is quite distinct, but it is not conspicuous because it is found usually on the under surface of the lower leaves.

In addition to the three imported parasites, over 8,000 individuals of several aphid feeding predators imported from India have been released in northern California. Among these predators are three ladybeetles—*Coccinella septempunctata* Linn.; *Adonia variegata* Goeze; and *Scymnus nubilus* Mulsant. Also from India a green lacewing—*Chrysopa carnes* St.—has been released against the spotted alfalfa aphid. None of these predators had been recovered by November 1957. One of the difficulties in establishing the predators is the effective competition of native natural enemies of the spotted alfalfa aphid in the spring and fall.

Because the three wasp parasites overwintered successfully in the San Joaquin Valley and *Praon* survived the winter as far north as Tehama County, it is expected that they will be widely distributed throughout the state in 1958, and become abundant enough to contribute significantly to the natural control of the spotted alfalfa aphid in northern California as they have done in southern California.

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