

Black Scale on Olives

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THE EGGS OF THE BLACK SCALES, *Saissetia oleae* (Bern.), hatch in spring and summer and the young crawl from the twigs to the leaves, where they settle and feed.

In autumn the scales migrate to the twigs. In the early spring they grow

many eggs but it was estimated that only 15% had hatched. On August 15, 1947, leaf samples were collected and 400 from each plot were considered. The results are given in table 1. A DDT-kerosene spray is included for comparison.

TABLE 1—Results of Sprays to Control Black Scale on Olives

| Treatment per 100 gallons, July 2, 1947 | Per cent scale leaves with no live scale, August 15, 1947 |
|---|---|
| Parathion 15% wettable, 1 lb. | 71.5 |
| Parathion 15% wettable, 1 lb.; di 2 ethyl hexyl phthalate, 1 qt. | 88.8 |
| Parathion 15% wettable, 2 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 94.0 |
| DDT 50% wettable, 1½ lbs.; kerosene, 2 gals. | 89.0 |
| Untreated | 0.0 |

TABLE 2—Results of Parathion Sprays to Control Black Scale on Olives

| Treatment per 100 gallons, September 4, 1947 | Average number live adult scale per tree per 5 minute search |
|---|--|
| Parathion 15% wettable, 2 lbs. | 46.0 |
| Parathion 15% wettable, 4 lbs. | 8.0 |
| Parathion 15% wettable, 2 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 12.5 |
| Parathion 15% wettable, 4 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 2.0 |
| Untreated | 122.5 |

rapidly, turn dark, shining brown to black, harden, and begin to lay great quantities of eggs which remain beneath the large, nearly hemispherical, hollow bodies. As the scale approach the egg-laying stage they become gray and the body becomes thicker. This is the "rubber stage" and one in which the scale is difficult to control. While this life history as briefly outlined here, is general in the interior sections of California, the rate of development of the black scale in olive orchards varies from year to year and from orchard to orchard even within the same county. Thus, an inspection to determine the stage of the scale should be made of every orchard where control measures are being contemplated.

The feeding of the scale on the leaves may so weaken the tree that many leaves drop and the next season's crop is reduced. The sticky liquid that the scale produce and the black fungus that grows on this liquid cause much difficulty in harvesting, handling, and processing.

On July 2, 1947, experimental sprays were applied to plots of 16 trees each using a power sprayer at 500 pounds pressure. The trees were small Sevillano olives in an orchard near Corning. At the time of application the scale had laid a great

On September 4, 1947, Sevillano trees were sprayed with parathion. By the time the plots were examined on October 23, it appeared that predators had killed most of the black scale. Only live adult female scales could be readily found on either sprayed or unsprayed trees. On this date a five minute per tree search was made for the presence of live adult scale. The results are summarized in table 2.

Parathion sprays were applied to Manzanillo olive trees near Madera on November 12, 1947. A power sprayer at 500 pounds pressure was used. On January 8, 1948 twig samples were collected and ten leaves from each twig were examined. The terminal 18 inches of wood of each twig were also examined. In making counts the live scale were classified into three groups, i.e., prerubber stages, rubber stages, and black adults. The results are given in table 3.

Sevillano olives near Orland were sprayed on November 24, 1947. At this time an examination of 650 scale showed that 55.2% were in prerubber stages, 10.2% in the "rubber" stage, and 34.6% were adult females. On January 19, twigs were collected and the terminal 18 inches of wood were examined. Ten leaves from each twig were also examined. The results are summarized in table 4.

From the results of the various tests it would appear that parathion applied in July just as hatching of black scale eggs was well started gave control either by killing the eggs and crawlers under the old female bodies or persisting long

TABLE 3—Results of Sprays to Control Black Scale on Olives Near Madera

| Treatment per 100 gallons November 12, 1947 | Number live scale per 20 twigs and 200 leaves | | |
|---|---|--------|--------------|
| | Prerubber | Rubber | Black Adults |
| Parathion 15% wettable, 3 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 48 | 1 | 6 |
| Parathion 15% wettable, 4 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 7 | 4 | 29 |
| Parathion 15% wettable, 7 lbs. | 57 | 14 | 0 |
| DDT 50% wettable, 1½ lbs.; kerosene, 2 gals. | 21 | 1 | 8 |

TABLE 4—Results of Sprays to Control Black Scale on Olives Near Orland

| Treatment per 100 gallons November 24, 1947 | Number live scale per 20 twigs and 200 leaves | | |
|--|---|--------|--------------|
| | Prerubber | Rubber | Black adults |
| Parathion 15% wettable, 2 lbs. | 78 | 50 | 198 |
| Parathion 15% wettable, 4 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 5 | 4 | 82 |
| Parathion 15% wettable, 6 lbs.; di 2 ethyl hexyl phthalate, 1 qt. | 10 | 6 | 184 |
| Parathion 15% wettable, 4 lbs.; di 2 ethyl hexyl phthalate, 1 qt.; kerosene, 2 gals. | 41 | 27 | 223 |
| DDT 50% wettable, 1½ lbs.; kerosene, 2 gals. | 1 | 9 | 198 |
| Untreated | 652 | 374 | 273 |