# Soft Scales Infesting Walnut

## chemical control required when natural mortality factors are disturbed by treatments directed against other insect pests

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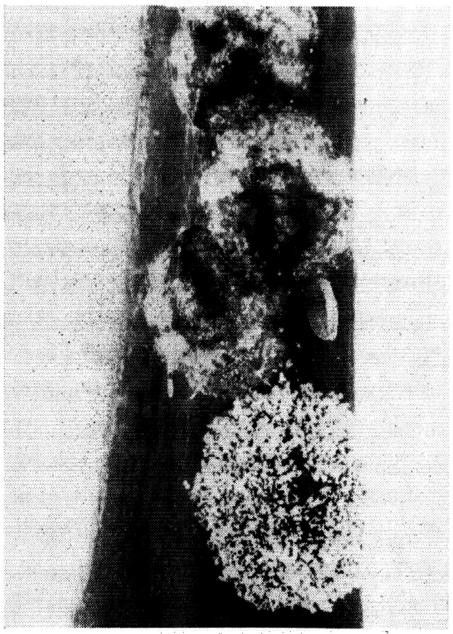
**Four species** of soft scales—a complex of two species of frosted scale, European fruit lecanium, and the calico scale—can inflict serious damage on walnuts unless controlled, either by natural factors or through the use of insecticides.

Practically all the trouble with soft scales on walnut has developed since the advent of DDT and other newer insecticides which have interfered with the effective action of natural enemies.

Often all four species occur together but the frosted scale probably is the most abundant. Each species has only one generation a year. The eggs are laid in April and early May and hatch from May through June. The number of eggs laid by each female probably averages well in excess of 2,000 and highly destructive populations can develop rapidly when conditions are favorable for their activity. However, natural mortality is high and where natural factors have no interference they usually hold the scale population below an economic level. Parasites and birds are particularly important but studies have shown that from the time of hatching until the scales reach maturity there is a high mortality for reasons other than natural enemies. Probably more than half of the young individuals die shortly after hatching because they fail to settle in suitable localities although scales are capable of free movement except in the latter part of their life. When the developing scales move to twig growth in the fall the chance for survival is greatly reduced unless they settle on the twigs of the current season. The older the bark the greater the mortality. Even on new bark the mortality may be high under crowded conditions.

Three specimens of European fruit lecanium showing the wool-like wax covering and a specimen of the frosted scale complex, as they appear in April.



Treatments with insecticides for the control of soft scales are not necessary unless there is evidence that natural factors will not reduce the population below a destructive level. When treatments are made, the materials must be applied thoroughly—because of the high reproductive potential of the scales—to reduce the scale population to an exceedingly low level. This is especially true if the insect control program is one which has strong tendencies toward inducing an increase in the scale population.

DDT probably has been the greatest offender among the insecticides but others have contributed to the problem. Systox has been responsible for serious increases in scale populations, particularly where it was used in combination with DDT. OMPA has exerted a suppressive action on the frosted scale, and the European fruit lecanium, but definitely tends to stimulate an increase in the calico scale population.

A test plot at Linden received DDT, BHC and Systox in the pest control program. Back on November 23, 1956, the average number of frosted scales and European fruit lecanium individuals per 2″ of twig growth was 111. On that date the plot was treated with parathion and oil—one of the most effective treatments—and nearly all the scales were killed. A survey conducted on April 12, 1957 showed that the frosted scale population, per 2″ of twig growth, had been reduced to 0.016 individual and the European fruit lecanium to 0.012. Yet on December 3, 1958 another survey showed the average number of frosted scales and European fruit lecanium individuals per 2″ of twig growth to be 131. The resurgence in the population was most rapid and reached a destructive level within two years after the population was reduced to an extremely low level.

There are two periods when soft scales can best be controlled. The first is in the summer when the eggs have all hatched and the second in the winter.

Summer control treatments—applied in July and August—of parathion 25% wettable powder, at 2–3 pounds, plus three fourths gallon of summer oil emulsion per acre and applied with an air carrier sprayer, in from 100 to 200 gallons of water have given effective control. Malathion, 25% wettable powder at six pounds per acre has given promising results. Trithion at 1.0 pound—one quart four pound emulsion—per acre has exerted a good suppressing action. Ethion and Guthion—not yet released for use on walnuts—show considerable merit with ethion, at the present time, the more outstanding.

Winter control treatments should be limited to the dormant period. Best results have been obtained with parathion-oil treatments—parathion 25% wettable powder at five pounds plus 2–4 gallons of oil emulsion per acre—applied with an air carrier sprayer in from 100 to 200 gallons of water from mid-December through February. In the full dormant season a dormant oil can be used, but at

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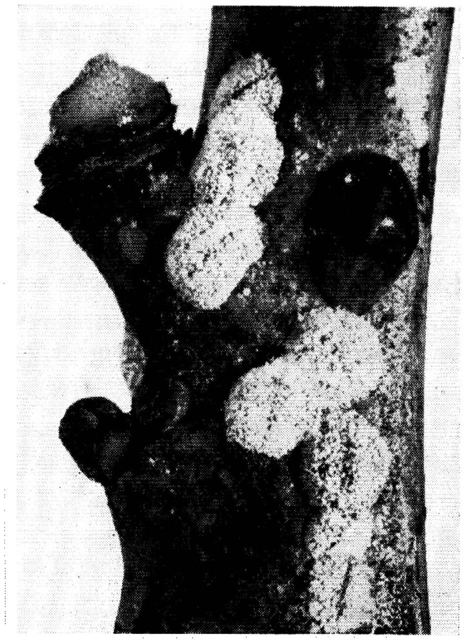
Frosted scales and European fruit lecanium as they appear in late March and early April. The naked specimen is the European fruit lecanium.



# Chemicals on Weeds in Onions

## selective herbicides tested for economical control of common broad-leaved weeds and for effects on commercial onion crop

Delbert Purnell, Thomas M. Little, and C. Allen Shadbolt

**Trials** conducted in commercial onion fields in San Bernardino County indicate that weed competition can be reduced materially by the use of selective herbicides.

Severe weed competition early in the growth of onion plants reduces yields and—because hand weeding is a major cost in producing an onion crop—heavy weed populations tend to reduce returns to the grower.

Field tests conducted in 1957, on both direct seeded and on transplant onions, involved the use of two commonly used herbicides, potassium cyanate and dinitro selective.

The potassium cyanate was applied at rates of 6, 12, 18 and 24 pounds per acre in 50 gallons of water. The best weed control with no damage to the onions was obtained at the 18-pound rate, although this is somewhat higher than the usual application.

A single rate of six quarts of dinitro selective in 60 gallons of water per acre gave good weed control, but there was some burning of the onion foliage.

A further test was conducted in 1958 to determine the effectiveness of some of the newer herbicides not heretofore used commercially in the area. This test was made near Alta Loma, on a field of transplanted Flat Italian Red onions. The onions were transplanted on February 9 and on the next day treatments were applied: neburon at 2 and 4 pounds per acre; simazin at 3 and 6 pounds per acre; CDAA at 4 and 8 pounds per acre; CIPC at 2, 4, and 6 pounds per acre; and CDEC at 3, 6, and 9 pounds per acre.

All materials were applied over a 1′ band on single row beds at the rate of 300 gallons per acre. Each treatment was applied to three replicates consisting of two rows 25′ long. There was a light breeze blowing at the time of application and air temperature was 70°F. No weeds were showing at the time.

Within a few hours after treatment, light rains fell and continued intermittently for six weeks. A total of 25″ of rain fell on the plots.

Weed counts were made on March 19. All weeds encountered were broad leaved species.

Complete control of lamb's-quarters and mustard—the two most prevalent weed species—was obtained with neburon and simazin. The CIPC plots showed weed counts were significantly higher than neburon and simazin, but lower than CDAA, CDEC or the untreated check plot. The CDAA and CDEC plots did not differ significantly from each other, but had significantly lower counts than the check. In the case of puncture vine, the CIPC plots did not differ significantly from the CDAA and CDEC plots, but all three had a much lower count than the check plots. The number of filaree plants was too small and variable to bring out any significant differences but all treatments had populations well below those in the checks. Within each material there were no significant differences found among rates, either for individual species or total weeds.

**Weed Counts on Test Plots in Onion Field March 19, 1958 (Total of three replicates)**

| Treatment lbs/acre | | Lamb's quarters | Mustard | Puncture vine | Filaree | Total* |
|---|---|---|---|---|---|---|
| Simazin | 3 | 0 | 0 | 0 | 0 | 0 |
| Simazin | 6 | 0 | 0 | 0 | 0 | 0 |
| Neburon | 2 | 0 | 0 | 0 | 0 | 0 |
| Neburon | 4 | 0 | 0 | 0 | 1 | 2 |
| Mean/plot | | 0 | 0 | 0 | 0.1 | 0.2 |
| CIPC | 2 | 8 | 3 | 54 | 1 | 66 |
| CIPC | 4 | 3 | 4 | 58 | 0 | 65 |
| CIPC | 6 | 0 | 2 | 25 | 0 | 28 |
| Mean/plot | | 1.2 | 1.0 | 15.2 | 0.1 | 17.7 |
| CDAA | 4 | 44 | 63 | 43 | 4 | 154 |
| CDAA | 8 | 29 | 44 | 33 | 1 | 110 |
| Mean/plot | | 12.2 | 17.8 | 12.7 | 0.8 | 44.0 |
| CDEC | 3 | 40 | 72 | 20 | 3 | 141 |
| CDEC | 6 | 58 | 40 | 22 | 2 | 130 |
| CDEC | 9 | 46 | 32 | 11 | 1 | 93 |
| Mean/plot | | 16.0 | 16.0 | 5.9 | 0.7 | 40.4 |
| Check | | 265 | 631 | 245 | 30 | 1171 |
| Mean/plot | | 88.3 | 210.3 | 81.7 | 10.0 | 390.3 |

* Total includes some miscellaneous weeds.

None of the plots showed any evidence of damage to the onions with the exception of those receiving simazin. Plants in these plots appeared to be in good condition for several weeks after the material was applied. Then, as additional rain fell on the plots, damage began to appear and became increasingly severe as the season progressed until all of the plants died before reaching maturity.

Records of the number and the weight of bulbs were taken for each plot at harvest time. Stands were so variable throughout the test area that no significant differences among total yields could be demonstrated.

However, the average yield over all treatments—excluding simazin—was significantly higher than the check at the 5% level. No significant differences were found among treatments nor among rates within treatments. The increase in bulb size probably can be attributed to reduced weed competition during the early stage of growth.

**Yield of Onion Bulbs Harvested July 9, 1958 (Total of three replicates)**

| Treatment lbs/acre | | Bulbs No. | Weight lbs. | Weight per bulb |
|---|---|---|---|---|
| Simazin | 3 | 0 | 0 | |
| Simazin | 6 | 0 | 0 | |
| Neburon | 2 | 277 | 137.5 | .50 |
| Neburon | 4 | 309 | 153.0 | .50 |
| CIPC | 2 | 277 | 118.0 | .43 |
| CIPC | 4 | 265 | 118.5 | .45 |
| CIPC | 6 | 315 | 124.0 | .39 |
| CDAA | 4 | 294 | 122.0 | .41 |
| CDAA | 8 | 336 | 152.5 | .45 |
| CDEC | 3 | 293 | 118.5 | .40 |
| CDEC | 6 | 358 | 150.5 | .42 |
| CDEC | 9 | 296 | 139.5 | .47 |
| Check | | 334 | 123.0 | .37 |

Further tests are needed, but the results of the trials in 1957 and 1958 indicate that neburon, CIPC, CDAA, and CDEC show promise as materials that could help the grower of onions control weeds, reduce costs, and increase yields.

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## SOFT SCALES

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other times a summer oil emulsion is better. However, oil can be used safely only on trees that have not suffered from lack of moisture at any time during the growing season.

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