Spider Mites on Walnuts

false spider mite, European red mite, and Pacific spider mite infestations in northern California walnuts during 1955

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The false spider mite—*Brevipalpus lewisi* McGregor—first became a potential pest of walnut in the 1955 season although it has been known in California since 1944.

A small localized infestation of the false spider mite was found on one side of a single tree in a 160-acre orchard at Linden in 1953. There was no spread of the mite that season, nor was it encountered in 1954. However, in September 1955 a destructive infestation was discovered which had apparently dispersed outward in a broad arc from the 1953 infestation.

The degree of infestation was not uniform but in the most severe cases it was approaching the lower limit of economic damage. Defoliation was noticeable on the southeast exposure of the trees and was pronounced about the skirt. Where the mite population density is heavy, the infested leaves become somewhat coppery in appearance but little or no webbing occurs. Dropped leaves are coated with white shed skins of the mite.

Also during the 1955 season, there was a general increase of the European red mite infestation throughout northern California, which was—in part—associated with applications of OMPA. However, the pest developed in orchards and experimental plots where no OMPA was used. The rise in the population of the European red mite may have resulted from local and seasonal conditions, but the increase is being investigated.

The European red mite approached an economic level in several experimental orchards—particularly at San Jose—where in some of the OMPA treatments considerable mite-caused injury occurred. In the experimental orchard at Linden, the European red mite made its appearance in early August and by August 24 there was a light general infestation of both the European red mite and the Pacific spider mite. However, by this time, it was evident that natural enemies—ladybird beetles, syrphid flies, lacewings, predatory mites—were going to hold those two mites under satisfactory control. None of their natural enemies seem to exert any influence on the false spider mite.

At Linden, the increase of the European red mite was associated with other treatments as well as with OMPA.

In the experimental plots at Walnut Creek, a rather large population of the European red mite developed in the plot receiving one pound of OMPA and related phosphates, but no mites were found in an adjacent plot receiving 4.3 pounds of the treatment material.

In the two experimental orchards at San Jose, the European red mite population developed to a point where it threatened damage. The heaviest infestation occurred in the plots treated with OMPA, and the mite population density was greatest on the southeast exposure of the trees. Noticeable injury was detectable by the end of July. Because of the large population present, experiments were conducted to determine the effectiveness of the new experimental miticide—FW-293—against the European red mite. For population determinations, samples of next-to-the-terminal leaflets were picked from locations that showed evidence of mite feeding. On each survey 25 leaflets were picked from no less than five trees in each treatment. In making counts, three impressions were made, and—with the exception of the eggs—all mites within the impressions were counted.

FW-293 is compounded as a wettable powder and contains 25% of the active ingredient—1, 1-bis (chlorophenyl) trichloroethanol. It was applied at the rates of six and 12 pounds per acre along with 12 ounces of the commercial spreader B1956 in 400 gallons of water per acre. The treatments and the results obtained are given in the accompanying table.

FW-293 was highly effective against the European red mite. Treatments in experimental orchard *A* applied on July 29 remained effective for the remainder of the season. In orchard *B*, treatments were not applied until August 22, and although the mite population was controlled, the density in the untreated plots soon declined also to a very low level.

In both orchards there was a rather rapid decline of the European red mite population after a survey on August 29. Probably the two most important factors bringing about the decline was a large developing predator population and the tendency of the mites to deposit eggs on the twig growth where they overwinter. The predator population was particularly large in orchard *B*, and the decline in the mite population was more marked than in orchard *A*. Apparently, FW-293 does not seriously affect natural enemies of the mites except that it deprives them of their food.

In orchard *A*, control measures were applied as soon as injury by the Euro-

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Treatment and Average Number of European Red Mite per Sample of Walnut Leaflet

Treatment and Pounds per Acre		Average Number of Mites per Leaf Sample on: July 29[a]	Aug. 4	Aug. 12	Aug. 22	Aug. 29	Sept. 12	Sept. 20
Orchard A[b]								
OMPA (total active)	1.6	0.70	2.70	0.08	2.20	2.90	1.80	0.85
OMPA (total active)	3.6	...	0.56	2.50	2.60	4.60	0.47	1.09
OMPA (total active) + Experimental miticide FW-293	1.6 + 6.0	1.07	0.07	0.03	0.15	0.90	0.00	0.20
OMPA (total active) + Experimental miticide FW-293	1.6 + 12.0	4.30	0.02	0.01	0.03	0.01	0.01	0.03
Systox	0.5	...	...	...	...	0.56	...	0.04
Orchard B[c]								
OMPA (total active)	1.4	...	...	...	10.2[a]	6.15	0.50	0.07
OMPA (total active) + Experimental miticide FW-293	1.4 + 6.0	...	...	...	7.0[a]	0.24	0.01	0.00
OMPA (total active) + Experimental miticide FW-293	1.4 + 12.0	...	...	...	7.0[a]	0.90	0.00	0.04
Systox	0.8	...	...	...	...	0.57	...	...

[a] Pretreatment count.
[b] OMPA and Systox applied May 25; Experimental miticide applied July 29, in 400 gallons of water.
[c] OMPA and Systox applied May 18; Experimental miticide applied August 22, in 400 gallons of water.

OLIVE

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fect flowers was reduced from 32% in the check to 17% by removing half of the leaves and to 11% by complete defoliation. On the other hand, the removal of potential inflorescences months before bloom resulted in a substantial increase in perfect flowers in the remaining buds. In 1952, where there were four leaves to each bud, the per cent of perfect flowers was as high as 63%, as compared with 24% where there was only one leaf for each inflorescence.

Although complete defoliation considerably reduced the per cent of perfect flowers, some normal ones still developed. Apparently this was because the reserve materials stored in stems and branches were translocated and utilized in the development of the flowers. However, if there are leaves nearby, they contribute toward even better development of the pistil, and this beneficial effect is increased as the number of leaves increase.

The experiments at Davis indicate that cultural practices—such as shading from overcrowding, nutrient deficiencies, or disease conditions such as peacock spot — *Cycloconium oleaginum* — that tend to cause loss of leaves and therefore a decrease in the number of perfect flowers should be avoided. Whereas, if cultural practices are directed toward the retention of as many healthy leaves as possible, a higher proportion of perfect flowers—and thus a greater fruit set—can be expected.

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DEER

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cated starvation or to starvation brought on by the deterioration of their teeth.

The sex ratio of fawns at birth was determined from a sample of fetuses to be 11 males to eight females, giving a ratio of 137.5 males to 100 females. Even though the sample was small, it was considered fairly indicative.

However, during the die-off in the exceptionally severe winter of 1951–52, early and midwinter fawn losses ran to nearly 400 males to 100 females, but later in the winter more females died to bring the over-winter average to 210 males to 100 females.

The winter of 1951–52 had a high rate of rainfall, low temperatures and heavy parasite infections. During the three subsequent winters, conditions were generally milder, with the exception of the 1954–55 winter which was cold but with little rainfall. The average sex ratio of the fawn losses from natural causes for these three winters was 100 males to 100 females, which indicates that fundamental differences appear to mitigate variously against the sexes, depending on environmental circumstances.

In general, it is evident that under the conditions encountered at Hopland, parasites can contribute significantly to losses of fawns during their first winter and, to a lesser extent, to the losses of yearlings during their second summer. Few older deer carry sufficient number of worms to be affected. Likewise, the magnitude of losses involving parasitism can be increased by severe weather and overstocked conditions.

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AIR POLLUTANTS

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of unfumigated trees was 9⅛″ with an average increase in diameter of 0.16″. Although the stem diameter in the fumigated trees was significantly smaller than in the unfumigated ones, there was no real difference in the height of the two sets of trees.

Reduced growth in the Mexican seedlings has been caused in six months by exposure to ozonated gasoline. Because the effects produced by controlled air pollution are usually indistinguishable from those caused by natural pollution, growth reduction in field-grown trees may be expected. Field tests are scheduled to determine the effects of pollution on growth and production of commercial avocado varieties.

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WALNUT

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pean red mite became noticeable on July 29. Controlling the pest at this time did not appear to greatly influence the quality of the crop at harvest. Regardless of mite control, better quality was obtained from OMPA treatments than from the plot treated with Systox. The same situation held in orchard *B* where plots treated with OMPA produced better quality nuts than the Systox plot.

Serious spider mite populations have failed to develop where Systox has been used in the spring to control the walnut aphid. However, its direct use to control spider mite infestations in late season is in need of further investigation. This is particularly true in regard to the dosage required.

OMPA applied in the spring to control the walnut aphid has in all cases resulted in excellent control of the Pacific spider mite. This has not proved to be the case in regard to the European red mite, and threatening populations of this species have developed where OMPA has been used.

Serious spider mite populations are not likely to develop before August. Where it is apparent that natural enemies will not take care of the situation, control measures should be applied. Adequate control of the Pacific spider mite with conventional sprayers has been obtained where 15% wettable aramite powder was used at the rate of 1.5 pounds per 100 gallons of water and applied as a thorough coverage spray.

Control of the Pacific spider mite should result from treatment by air carrier sprayers with 12 to 14 pounds of aramite 15% wettable powder applied in from 400 to 500 gallons of water per acre. For the control of the European red mite, the aramite wettable powder should be increased to two pounds per 100 gallons where applications are made with conventional sprayers. With air carrier sprayers the amount should be increased to 15 to 18 pounds per acre. In all cases, satisfactory control of spider mites is dependent upon thorough coverage.

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MAPPING

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attention to watering. Preplanting fumigation or change of rootstock may also be indicated.

The relatively high incidence of B condition trees points toward root trouble and suggests further investigation of cultural and irrigation practices as they affect root health.

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