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Six-spotted Mite on Avocado

Spray and dust applications of various acaricides tested against pest causing serious defoliation

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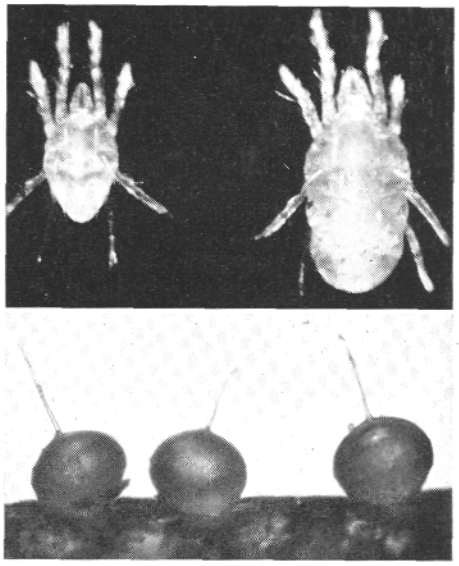
The Six-spotted Mite, *Eotetranychus sexmaculatus* (Riley) has become—at least temporarily—the most important avocado pest problem in coastal San Diego County.

The mites are barely discernable to the unaided eye, being only about 0.012 inch in length. The body of the female is oval, lemon-yellow in color, and usually with blackish spots along each side of the body. However, many individuals are without spots. The mites are found only on the underside of the leaves. The very pale greenish-yellow and globular eggs are stalked and may be found anywhere on the underside of the leaf, but active stages are usually concentrated near the midribs and veins.



Above, top row: Male, *left*, and female, *right*, of the six-spotted mite, immaculate form. Enlarged 100x.
Bottom row: Eggs of the six-spotted mite, showing the stalks. Greatly magnified.

The first evidence of injury is the dark discoloration along the midrib and larger veins of the leaf. Later the entire leaf may be affected and severe defoliation may result. The terminal leaves are usually the first to be infested and to fall, leaving the terminals leafless. The entire tree may become infested and severely defoliated.

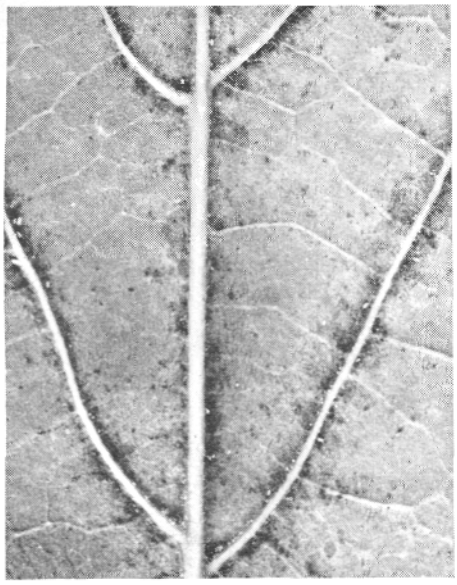
The nature of the infestation on the undersides of the leaves enables the mites to build up into large populations before growers realize that they have on hand a serious pest problem. The injury then becomes so extensive that any control measures can only arrest an infestation that has already done serious damage.

Control experiments were started in the Carlsbad-Encinitas area in May, 1950. Early attempts with dusts were satisfactory only when adequate deposits were made on the undersides of the leaves. Greater air velocity from the duster was required to create the turbulence needed to assure adequate coverage of the underside of the leaves throughout the tree.

It was also discovered that power spraying would result in penetration of the dense foliage of avocado trees and would enable an under-leaf coverage due to turbulence caused by the spray stream. By July heavy mite infestation throughout

the area caused serious defoliation to many Guatemalan varieties.

Avocado tree seriously defoliated by the six-spotted mite.



Underside of avocado leaf, showing the six-spotted mites and darkened areas along the mid-rib and veins caused by the mites.

In August the mite population decreased through natural causes to such an extent that few mites could be found even on the badly damaged leaves. Natural enemies were again becoming numerous. Throughout the late fall and winter, little additional damage was observed, but a sufficient number of mites and injuries indicated that the static populations were a potential threat to the spring development of new foliage. During the mild winter, the population density of mites on some leaves—including freshly fallen leaves—was as high as 25 mites per leaf.

Laboratory observations on the migratory habits of the six-spotted mites gave evidence that they spread by the free ballooning method of flight: the mites drop from threads and allow the wind to carry the severed threads and mites to a new location.

Sprays were applied on three different dates during March, 1951, to test the effectiveness of acaricides used prior to the spring flush of new foliage. Early in May the same acaricides—plus a few others— were applied to compare the effectiveness of treatment applied after the spring flush of growth with those applied in March. In all experiments the sprays were applied to trees of the Nabal or Anaheim varieties, for these appeared to be the most susceptible to the mites. Application was thorough, with particular attention paid to the wetting of the under sides of the leaves.

As can be seen from the table, there was a change in the rates of effectiveness of the various acaricides between March and May. Ovotran and Sulphenone, which were rated as good in the early work were later considered to be only fair. This evaluation, however, is based on only one season's experience.

Experiments with dusts were made during the mid-season height of mite infestation. A V4-powered turbine duster was obtained and sulfur and Aramite dusts were used.

Defoliated terminals of the twiglets of mite-infested avocado trees.

With this type of dusting equipment sufficient velocity was generated to force the dust out through the upper canopy of foliage of the highest trees. The turbulence from the large turbine blower caused the leaves to turn in such a manner as to insure the adequate coverage of the undersides. The results were promising, particularly with Aramite.

A separate experiment was aimed at determining the effects of the various acaricides on floral development. All stages of floral development were exposed to treatments. Florescence in early and late bud, and early and late flower stage were included. During the course of these experiments a number of days of above-normal temperatures prevailed. No evidence of arrested fruit development is as yet in evidence.

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Comparative Ratings of Acaricides Used Against the Six-spotted Mite on Avocados.

Acaricide	Formulations and concentration per 100 gallons	Date applied	Rating[1]
Ovotran DN-289[2]	1 lb. 50% wettable 3 fl. oz.	3-7-51	Good
Neotran	2 lbs. 40% wettable	3-7-51	Fair
Aramite	2 lbs. 15% wettable	"	Good
Ovotran	1 lb. 50% wettable	3-9-51	Good
Aramite	2 lbs. 15% wettable	"	Good
Sulphenone	4 lbs. 50% wettable	"	Good
DN-111	1 lb. 20% wettable	"	Poor
Sulfur	5 lbs. wettable	"	Fair
Aramite	2 lbs. 15% wettable	3-28-51	Good
Sulphenone	3 lbs. 50% wettable	"	Good
Neotran	4 lbs. 40% wettable	"	Fair
DN-111	½ lb. 20% wettable	"	Poor
EPN	½ lb. 27% wettable	"	Fair
Ovotran	½ lb. 50% wettable	5-3, 4-51	Fair
Ovotran	1 lb. 50% wettable	"	Fair
Ovotran DN-289[2]	1 lb. 50% wettable 3 fl. oz.	"	Fair
Ovotran DDD[3]	1 lb. 50% wettable 2 lbs. 50% wettable	"	Fair
Aramite	2 lbs. 15% wettable	"	Good
Sulphenone	2 lbs. 50% wettable	"	Fair
Sulphenone DDD[3]	2 lbs. 50% wettable 2 lbs. 50% wettable	"	Fair
Azobenzene	4 lbs. 50% wettable	"	Good
Genite	1 qt. 50% emulsifiable	"	Poor
Dimite	1⅔ gal. 25% emulsifiable	"	Poor
Compound 4049	3 lbs. 16% wettable	"	Fair
Sulfur	5 lbs. wettable	"	Fair

[1] Acaricides listed as: Poor, failed to control the mites; Fair, would require at least 2 applications; Good, controlled the mites until fruit harvested or the general mite population decreased.
[2] Added to increase the speed of knockdown.
[3] Added to control orangeworms attacking avocados.