# Red Mite on Citrus

## timing control treatments important and influenced by climate of growing areas

L. R. Jeppson

**Populations** of red mite—spider—on citrus are influenced by temperature and humidity, local air movements and weather variations.

Observations and measurements have shown that maturing leaves are more favorable for citrus red mite development than old leaves. Climate, in affecting leaf growth, therefore has an important influence on seasonal cycles of mite population.

In oranges, the periods of greatest plant growth are mainly in spring and fall, with the most extensive growth in spring.

In lemons, the greatest growth also occurs generally in spring and fall. However, lemon trees may produce new growth whenever weather conditions are favorable. Therefore, growth favoring mite development in lemons exists through a larger part of the year than it does in oranges. As a result, high mite populations may occur on lemons over a greater part of the year unless reduced by unfavorable weather conditions.

### Distinct Growing Areas

Three fairly distinct growing areas of southern California can be distinguished according to their effects on mites in lemon orchards.

The coastal area includes orchards between the ocean and the first coastal hills. The climate is similar to that over the ocean, and warmest daytime temperatures most often occur in fall rather than in summer.

Effective control of mite populations in coastal orchards has been obtained by treatment toward the end of June or in July, with a second application in October or November.

A broad Intermediate—Transition—Area includes citrus districts located between the first coastal hills and the coastal mountains. Here the weather is influenced by daily land and sea breezes. Mornings are typically warm and dry because of the land breezes. In the afternoons the sea breeze brings cooler humid air from the ocean. As a result, there are greater fluctuations in daily temperature and humidity than in the coastal districts. Treatment of orchards in districts toward the interior in August or September followed by a second treatment in the spring has given mite control.

The Valley Area includes the valleys between the coast mountain range and the Sierra Nevada—districts not reached by the sea breezes—which have longer periods of continental climate influence. Hot, dry winds from the interior may bring desert air to all citrus districts in this area. Because hot dry weather often reduces mite populations, applications may be delayed sometimes until September or October.

In making this study 14 or 15 treatment schedules were followed. These schedules generally consisted of two treatments a year, five or six months apart. The fall applications August through January were made with petroleum oil at 1¾ gallons actual oil per 100 gallons of spray. During the other months treatments consisted of one pound of a 50% formulation of ovex—Ovotran—per 100 gallons. Applications were made as full coverage sprays. Timing schedules are based on a 3-year study of population trends resulting from each treatment schedule and from untreated plots in groves at Somis and Tustin and on untreated plots at Oxnard and Fillmore.

### Four Groves Studied

Citrus red mite population studies made in citrus groves represented each of the three climatic areas. Population peaks and declines did not always occur at the same time each year, but certain trends were evident.

In an orchard in the Coastal Area—near Oxnard—mite populations were low each June and increased to a peak in July, August, and September. In three of the four years of the study, the mite population declined in October and December to a relatively low level.

In a 3-year study of an Intermediate Area orchard—near Somis—populations were low in June and July, increasing to a peak from August to November unless adversely affected by high temperatures and low humidities. Winter conditions were relatively unfavorable for increases in populations, and by March of each year few mites were found.

In a 3-year study of another Intermediate Area orchard—near Tustin—mite numbers followed the same trends but with higher fall peaks except in 1954 when the highest peaks occurred in early spring. In all three years they decreased in March and were low by June. In contrast to the Somis grove, however, mites seemed to develop unimpeded in July.

At Fillmore—in the Valley Area—1-year studies showed mite populations to increase during August and September. They maintained a moderate level during the winter and spring and decreased during June and July.

It is not easy to predict the time of year when citrus red mite will appear in a lemon grove in numbers sufficient to cause damage, and ideal times for treatment can not always be used because other pests of citrus must be considered when setting up treatment schedules.

*L. R. Jeppson is Associate Entomologist, University of California, Riverside.*

---

## CHLORINE

Continued from page 9

also show an increase in their chlorine content. As in the leaf samples, the chlorine content in the dry matter of the blossoms increased very markedly as the chlorine concentration in the nutrient solution was increased from 560 to 840 ppm. In this connection, orange blossoms can increase their accumulations of total sulfur, as was evident in an experiment with large out-of-door well-drained soil cultures of Valencia orange trees on Brazilian sour orange rootstocks. The nutrient cultures were made with distilled water and Hoagland's *A, B, C* stock solutions, plus the seven trace elements and various concentrations of ammonium sulfate. The nitrogen in the various nutrients was equalized by means of ammonium nitrate. The dry matter of the orange blossoms collected in March of the third year of the experiment, showed a total sulfur content, calculated as sulfate: 0.32, 0.36, 0.40, 0.41, 0.44, 0.45, 0.42, 0.41, 0.51, 0.48, and 0.49% for the cultures that received sulfate concentrations of 0, 96, 192 ppm and increasing by 96 ppm until 960.

For the chlorine analysis of the peel and pulp reported in the table, six tree-ripe lemon fruits of average size for the culture were used. The percentages of chlorine in the dry matter of the peel and pulp were found to vary but little until a concentration of 210 ppm chlorine occurred in the nutrient solution. There-

Concluded on next page