

## Citrus Red Mite<sup>1</sup>

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The citrus red mite or purple mite, *Panonychus citri* (McGregor), was first recognized as a pest of Florida citrus in 1885. From the late 1930s to about 1960, it reportedly was one of the most serious economic pests in Florida citrus. Today, growers find this mite to be a sporadic pest. Citrus red mite populations are usually greatest on lemon and grapefruit, followed by orange and then tangerine. In California, citrus cultivars on grafted Troyer citrange rootstock usually become infested with these mites before trees with other varietal-rootstock combinations.

### Physical Description

**Adults:** The newly emerged female is bright red in color. As the female ages, the color changes to a dark purple-red. The female (Figure 1) is oval in shape and about 1/50 of an inch long (Figure 2). The male (Figure 3) is smaller than the female (Figure 4), with a tapered abdomen and legs that are longer in proportion to body size. The distinguishing characteristic of this species besides the red color, is the noticeable number of large pink to white hairs, called setae, arising from prominent tubercles or

bumps on the mite's body. The tubercles are the same color as the rest of the mite's body.



Figure 1. Female citrus red mite.

**Immatures:** There are three active immature stages between the egg and the adult stages in spider mites (Figure 5). The first immature stage is the larva. It has only three pair of legs and is slightly larger than the egg. The protonymph and deutonymph are the next two stages. Both are smaller in size than the adults with four pairs of legs. Between the larva,

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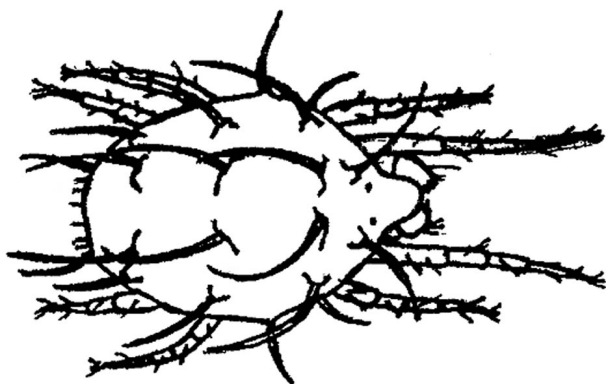


Figure 2. Citrus red mite female.



Figure 3. Male citrus red mite.

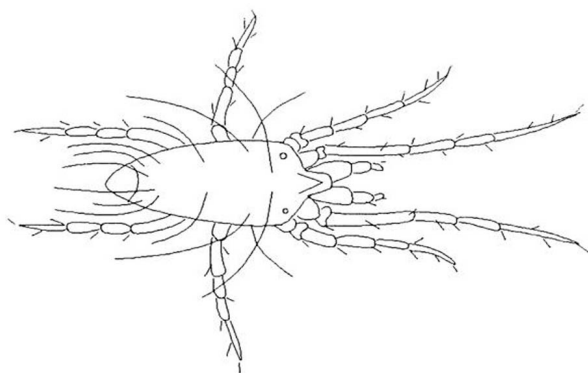


Figure 4. Citrus red mite male.

protonymph and the deutonymph stages, a mite anchors itself to a leaf, twig or fruit surface and becomes inactive. These stages are referred to as chrysalis stages (i.e. proto-, deuto-, and tritochrysalis). A new cuticle or skin is formed over the inactive mite while it transforms to the next stage in its life cycle. These mites do not move during these brief periods and are readily identified by the off-colored whitish cast over the body. Since mites do

not have an internal skeletal system like ours, they must shed their outer cuticle in order to enlarge their body for continued growth and development. When the mite has completed development to the next stage in its life cycle the outer skin splits open and the mite emerges. This is the reason many white cast-off skins can be observed among an active population of spider mites.

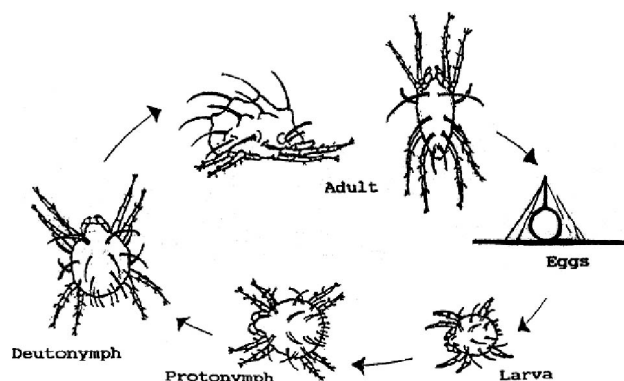


Figure 5. Spider mite life cycle.

**Eggs:** The citrus red mite egg is red in color, oval and with a vertical narrow stalk projecting upward (Figure 6). Tiny filaments run from the top of the stalk projecting down to the substrate. The eggs are deposited most commonly on the leaves and on green succulent twigs. Egg laying on leaves generally occurs on the upper side, along the midrib and frequently on the petiole.

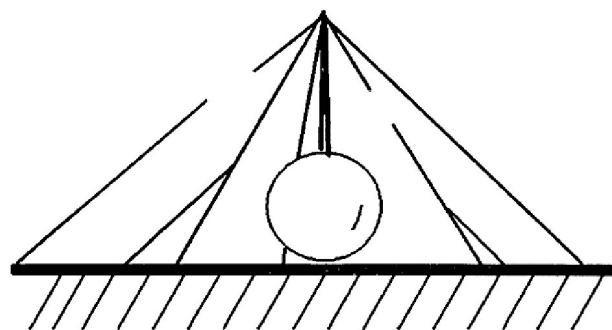


Figure 6. Citrus red mite egg.

## Life History

Citrus red mite females can produce from 17 to 37 eggs in 11 to 14 days. Development from egg to adult averages 12 days for females and 11 days for males when reared between 75 - 79°F and 50 - 70 percent relative humidity (Figure 5). Citrus red mite

adults live about 23 days between 75-77°F. A citrus red mite population can increase 8.5 times in 10 days under low humidity conditions. Higher temperatures and/or a higher humidity will reduce the population growth rate. The longevity of adults decreases as do the number of eggs deposited per female under such conditions. Therefore, citrus red mites are usually not a problem during the hot, humid summer months in Florida. The rate of population growth for this mite is lower than the Texas Citrus Mite on Florida citrus.

## Behavior and Population Dynamics

Citrus red mites overwinter in all stages on Florida citrus. Infestations may develop any time of the year, but generally occur between November and June. Peak infestations usually occur in May or June following the major plant growth cycle of new spring flush or when prolonged dry conditions occur (Figure 7). Some citrus varieties such as lemon, lime and grapefruit have several minor flushes of new growth throughout the spring, summer and fall in Florida. This allows spider mites to increase depending upon favorable weather conditions. Citrus red mite prefers green developing fruit to the more mature yellow fruit.

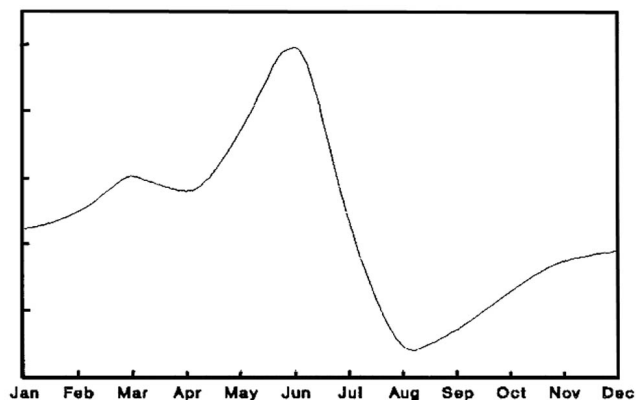


Figure 7. Citrus red mite population curve.

## Injury to Crops

The citrus red mite feeds on leaves, fruit and green twigs of all citrus varieties. Leaf infestations have been found to be considerably higher than those on fruit. The mite has piercing-sucking mouthparts which are inserted into plant tissue. When the mite feeds on the upper leaf surface, all contents except starch grains are removed two to three cell layers

deep. Visual injury resulting from this feeding is characterized by light colored scratched (etched) areas, called stippling, which gives a grayish or silvery appearance to the leaves, and fruit.

The influence of undetermined numbers of citrus red mites and weather can result in heavy leaf drop, twig die-back and even death of large limbs. Usually there is no direct effect on fruit quality although fruit drop due to heavy infestations can occur.

Two types of feeding injury (mesophyll collapse and firing) by citrus red mites either alone or in combination with environmental stress factors can occur.

Mesophyll collapse results when the leaves lose water faster than the tree can supply it. Injury to the tree through loss of effective leaf surface area may be appreciable. Mesophyll collapse and subsequent leaf drop are most likely to be severe during the winter when it is dry, cold and windy. These conditions are often accompanied by "firing" (Figure 8).



Figure 8. Firing.

The sudden death of leaves adhering to the tree is commonly called "firing." Usually one side of the tree is more severely affected.

## Monitoring Techniques

There is no established method for monitoring spider mites on Florida citrus. Economic threshold data on the three spider mite species affecting Florida citrus are lacking. However, certain control methods are available.

## Spider Mite Control Recommendations

### Biological Control

Several predaceous insects and mites along with fungi have been identified as attacking one or more of the three spider mite species on Florida citrus.

Red mites are controlled naturally by any of the predators listed in Table 1.

**Table 1.** Predators of red mites.

Lady Beetles	<i>Olla abdominalis</i> var. <i>plagiata</i> (Say) <i>Stethorus utilis</i> Horn
Aphid Lions	<i>Chrysopa</i> spp.
Tan Mite	<i>Galendromus helveolus</i> (Chant)
Shiny Button Mite	<i>Iphiseiodes quadripilis</i> (Banks)
Yellow Mite	<i>Typhlodromalus peregrinus</i> (Muma)
Fungus	<i>Entomophthora</i> sp.

### Chemical Control

Reducing or eliminating pesticides such as copper, copper plus oil, sulfur and lime sulfur can prevent citrus red and Texas citrus mites from flaring and becoming serious pests. Spray applications of azinphos-methyl and zineb have resulted in increases in citrus red mites in Florida. These compounds create spider mite explosions either by increasing the mite's reproductive rate or by eliminating biological control organisms.

Growers should be concerned about heavy buildup of citrus red or Texas citrus mites in the spring, summer or fall. Mite infestations, coupled with moisture-stressed trees and cold, windy conditions can result in serious tree injury. Normal spray routines for controlling other pests such as citrus rust mite and greasy spot may control the citrus red mite if they include one of the miticides listed for commercial use in the chemical control table from the *Florida Citrus Pest Management Guide: Spider Mites*.