



SPIDER MITE CONTROL ON FRUIT TREES

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ABSTRACT

In the article European red mite eggs are red and flattened, with a hair-like stalk growing from the top (onion-shaped). In newly hatched nymphs, there are three pairs of legs (larvae). Adults and older nymphs have four pairs of legs on each side. The first few generations develop in lockstep, but by mid-summer, all phases have fused and are present at the same time. Predator mites must be preserved in apple orchards in order to minimize European red mites. The three most prevalent predaceous mites in Uzbekistan are *Neoseiulus fallacis* (Phytoseiidae), *Agistemus fleschneri* (Stigmaeidae), and *Zetzellia mali* (Stigmaeidae).

KEYWORDS: twospotted spider, eggs, adults, leaf, crops, species, males, females, fruit

The European red mite, *Panonychus ulmi* (Koch), and the twospotted spider mite, *Tetranychus urticae* (Koch), are the two principal mite pests of apples in Uzbekistan. Both species are pests of numerous crops, including tree fruit, small fruit, vegetable, ornamental, and field crops, and belong to the phytophagous (plant-feeding) mite family Tetranychidae, or spider mites [3, 10, 9].

European red mite eggs are red, with a hair-like stalk emerging from the top, and are somewhat flattened (onion-shaped). Three pairs of legs are present in newly born nymphs (larvae). Adults and older nymphs each have four pairs of legs. Immature mites are usually reddish, however they can become green after molting (the red colour develops with feeding). Depending on life stage, European red mites range in size from 0.15 to 0.4 mm. Males and females are two separate species [2, 8].

The mature female has a rich brown-red color with raised "spines" on her back and is around 0.40 mm in length (Figure 1). Males are smaller (0.28

mm), lighter or drabber in color, and have a pointed abdomen and proportionally longer legs than females. Immature mites eat the bottom surface of the leaf, close to the veins and midrib. The upper and lower surfaces of the leaf are both eaten by the adults. Although European red mites are related to two spotted spider mites, they create less visible webbing [4, 6].

Nymphs of European red mites travel from twigs to emerging foliage to eat when the eggs hatch. Nymphs mature into adults who mate and give birth to the first generation of "summer eggs." Each year, the European red mite can have six to eight generations [5, 7, 10].

The first few generations develop in lockstep, but by mid-summer, generations have merged and all stages (eggs, nymphs, and adults) are present at the same time. Females begin depositing winter eggs on twigs, branches, and the calyx end of fruit in late August.



Figure 1. Female European red mite and eggs

Figure 2. Overwintering European red mite eggs on

Damage. Bronzing is a common leaf damage caused by European red mites eating on plants. Mites suck out the contents of leaf cells, including chlorophyll, with their needle-like mouthparts. If populations are high enough, affected leaves will appear stippled and bronzed.

Defoliation may occur with severe infestations. Long-term feeding by uncontrolled

mite populations strains the tree, resulting in lower shoot development and fruit bud set the next year. Fruit color, soluble solids, hardness, size, and weight are all influenced. Mite-induced tree stress can cause tree mortality in severe situations, especially during cold winters.

Two-spotted and European red mite binomial sample charts

Number of leaves with two or more mites	Percent of leaves with two or more mites	Average number mites per leaf
Two-spotted spider mites		
10	40	2.1
12	50	3.0
15	60	4.1
17	70	5.4
20	80	8.5
21	84	10.1



European red mites		
10	40	0.7
12	50	1.1
15	60	1.6
17	70	2.6
20	80	4.7
22	90	11.4
24	95	15.3

At each of the three to five spots each block, examine 25 leaves.

The charts are based on "Orchard Pest Management," a 1993 publication by "Good Fruit Grower."

Monitoring. In the dormant tight cluster stage, start weekly monitoring activities for European red mites. Check for overwintering mite eggs on fruit spurs and twigs. Collect 2 fruit spurs from 25 random trees each block from tight cluster to petal fall and inspect the underside of the leaves with a dissecting microscope at a magnification of 25-40 X for the presence of mite eggs, nymphs, adults, and beneficial mites. In the field, using a hand lens may aid experienced consultants and scouts in obtaining fast estimates of numbers, but it does not offer the precise counts necessary for threshold numbers. Collect 2 leaves from each of the 25 well-spaced trees each block after petal fall (50 leaves total).

Pick leaves from the canopy at arm's length. Add up the totals of each life stage, eggs, nymphs, and adults, for European red mite and two spotted spider mite counts. Miticides have various levels of effectiveness against different life stages and species. Weekly leaf samples are recommended, especially during the hot summer months when numbers can quickly rise and surpass standards. Despite the fact that mites are more abundant on trees in sheltered regions and along dusty roads, always sample evenly from all sections of blocks.

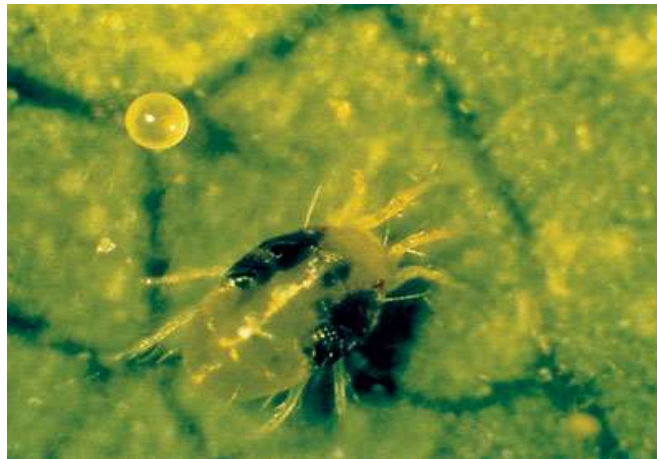
Take a sample from each orchard block or treated area separately. The biggest mite populations are found in Red Delicious, Empire, and Gala. These cultivars, as well as orchard blocks having a history of mite issues, should be tested.

Two spotted spider mites are less common in orchards than European red mites, and they arrive

later in the season. The eggs of the two spotted spider mite are clear and spherical at first, then become milky white over time. Individuals that have just hatched are colorless, but after eating, spots form. Two spotted spider mites, like European red mites, go through multiple juvenile stages, including a six-legged larva and an eight-legged nymph. Adults and nymphs of two spotted spider mites may readily be recognized from European red mites. They are more elongated than European red mite and are pale green or straw-colored with two black spots on the back (Figure 3). To cover the surface of leaves and collect dust, two spotted spider mites build thick webbing.

Females that overwinter turn a reddish-orange color and are frequently observed on the calyx and stem of fruit near harvest (Figure 4).

Under bark or on weeds underneath the tree, twospotted spider mites overwinter as orange-colored adults. In the spring, populations can develop up on broadleaf weeds, brambles, and sucker growth beneath the tree and in the surrounding surroundings. Although twospotted spider mites may successfully overwinter on trees, as weeds and other plants on the orchard floor dry out in the mid to late summer, significant numbers of them move into the tree canopy from the orchard floor. The population of twospotted spider mites continues to grow until the cold, late summer weather inhibits population activity. Every year, there are three to five generations.

**Figure 3. Two spotted spider mite adult****Figure 4. Overwintering female two spotted spider mites**

Damage. Bronzing on the foliage is caused by two spotted spider mites. On the underside of the leaf, spider mites generate a distinctive webbing. Mites and their eggs are protected by webbing from natural enemies and environmental changes. Long-term feeding by uncontrolled mite populations strains the tree, reducing subsequent shoot development and fruit bud set. Fruit color, soluble solids, hardness, size, and weight are all influenced. Mite-induced tree stress can cause tree mortality in severe situations, especially during cold winters.

Biological control. In order to reduce European red mites, predator mites must be conserved in apple orchards. *Neoseiulus fallacis* (Phytoseiidae), *Agistemus fleschneri* (Stigmaeidae), and *Zetzellia mali* (Stigmaeidae) are the three most common predaceous mites in Uzbekistan. Predaceous mites are minuscule, but a hand lens may identify them. In comparison to European red mites, predaceous mites travel very swiftly across the leaf surface. Carbamate and pyrethroid pesticides are extremely harmful to mite predators and should be avoided at all costs.

CONCLUSIONS

Collect five spur leaves at spaced intervals from one lateral branch positioned at eye level from each of 20 designated trees that have been established as representative trees in a block from July to August, or earlier if you find strong mite populations earlier in the season. Count mites but not eggs by brushing leaves in a mite-brushing machine. Every 1 to 3 weeks, take a sample. Count both predatory and web-spinning mites. If you detect one predatory mite for every ten pest mites, you may not need to use a miticide, but you should keep sampling to ensure pest mite populations do not grow. If therapy is essential, use materials that are least likely to impair biological control.

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