

MITES

Greg Hodges

Florida Department of Agriculture & Consumer Services
Division of Plant Industry
Gainesville, FL 32614

Dan Horton

Department of Entomology
University of Georgia
Athens, GA 30602

Donn Johnson

Department of Entomology
University of Arkansas
Fayetteville, AR 72701

The twospotted spider mite, *Tetranychus urticae* Koch, and the European red mite, *Panonychus ulmi* (Koch), are the principal mite pests of peach. The twospotted spider mite is native to North America and may be found on almost any type of broadleaf plant. The European red mite was first found in the United States about 1911. It is now a serious pest of tree fruits throughout North America.

DESCRIPTIONS



Figure 1. European red mite: egg, larva, nymph, adult stages.

Mites are close relatives of insects (Figure 1). Adults are minute, eight-legged, appear to have only one body segment, and are frequently oval and spiny. Color is variable. Newly hatched young, larvae, have only six legs. The two immature stages that follow are referred to as nymphs. They have eight legs. Immature mites are similar to adults in general appearance.

European red mite females (Figure 2) can be easily distinguished from other mites. Female red mites are elliptical, brownish-red, about 1/65 inch (0.3-0.4 mm) long, and have four rows of conspicuous, white, spine-bearing tubercles on their backs that are clearly visible with a 10x lens. Males are smaller, football-shaped, about 1/90 inch (0.28 mm) long, lighter in color, with less conspicuous spines. The eggs are red with a hair sticking out of the top. European red mite does not spin silken threads on the leaves, but will disperse from leaves by a silken thread.



Figure 2. European red mite female. Image by Jack Kelly Clark.



Figure 3. Twospotted spider mite summer coloration. Image by Jack Kelly Clark.

Twospotted spider mite (Figure 3) females may range in color from orange to green to yellow, depending upon their age and host. The feeding stages are usually yellowish-green with two dark spots on each side of the body; they are about 1/60 inch (0.4 mm) long. Males are smaller, about 1/80 inch (0.32 mm) long, with a narrower body and a pointed abdomen. The eggs are clear and round. Adult mites may web leaves by spinning silk threads on the leaf surface.

PLANT INJURY

Mites pierce leaf cells with tiny stylet-like mouthparts and ingest the cell contents, including the chlorophyll, which results in mottled, off-color foliage that may later appear gray or bronzed (Figure 4). Extensive webbing may be evident when twospotted spider mites are the major problem (Figure 5). Severely injured leaves often fall. Peaches can tolerate relatively high mite levels. Heavy, persistent mite infestations that begin in early season hurt fruit size and quality. Prolonged defoliation can result in low tree vigor, a decline in general tree health, and lower fruit yields the following year.

Mite infestations at harvest can be a very serious problem, because mites inadvertently get on the pickers, which can cause dermal irritation. Mite-induced work stoppage of pickers is perhaps the grower's greatest mite-related fear.



Figure 4. Leaf damage caused by mites. Bronzing on the top, light damage on the center, and a normal leaf on the bottom.

Figure 5. Webbing caused by twospotted spider mites.

SEASONAL HISTORY AND HABITS

The life history and habits of the European red mite and twospotted spider mite are similar, but there are differences that are of importance from a management perspective. The European red mite overwinters in the orchard as a fertilized egg. The overwintering eggs are bright red and are typically found in groups on the underside of twigs or branches (Figure 6). Overwintering eggs normally hatch shortly before peaches bloom. Newly hatched young have six legs and are called larvae. They pass through two nymphal eight-legged stages and become adults. Development time from hatching to adult ranges from four to 20 days, depending on temperature and other factors. Adult females live for about 18 to 20 days and lay about 20 eggs per female. Eggs are usually laid on the underside of leaves. Eggs from unmated females develop into males; eggs from fertilized females develop into both sexes, mostly females. The length of time for a complete life cycle varies, but averages about three weeks. There are multiple (six to nine) generations per year in the South.



Figure 6. European red mite eggs around a dormant bud. Image by Jack Kelly Clark.



Figure 7. Twospotted spider mite overwintering coloration. Image by Jack Kelly Clark.

The twospotted spider mite overwinters as an adult female in ground debris on the orchard floor, occasionally under loose bark on the trees. It becomes active in early spring and lays round, straw-colored eggs on weeds and other ground vegetation or on the lower, inner leaves of trees (Figure 7). Eggs are usually webbed to the underside of leaves. Eggs hatch and the young pass through a larval and two nymphal stages before becoming adults. Unfertilized eggs give rise to male mites; eggs from mated females produce both sexes, but mainly females. Twospotted spider mites develop from egg to adult in five to ten days under favorable conditions; there are numerous generations per year.

Because European red mites overwinter and reside primarily in the trees, they are typically the most numerous mites in early season. Twospotted spider mites reside primarily on herbaceous vegetation in the orchard floor until early summer, when they migrate into the trees. Time of movement to trees depends upon population levels and how long the orchard floor vegetation remains succulent and acceptable as a host. Twospotted spider mite populations often increase in fruit trees as the orchard floor vegetation dries down or following herbicide use in May or June. Mixed populations of European red mites and twospotted spider mites are commonly present, but twospotted spider mites generally predominate by mid-season. The potential for mite damage normally is greatest from June through August, when mite numbers often increase rapidly.

CONTROL

Peaches are generally more tolerant of mite infestations than other deciduous fruits, including plums. Save for preventative application of dormant oil(s) for scale and European red mite, mites in peaches seldom warrant pest management actions beyond regular scouting after mites are seen. The development of high populations of European red mites and twospotted spider mites are favored by hot, dry weather, and use of or timing of pesticide applications that decimate predators. Mite outbreaks in peaches are often thought to be attributable to pesticide use or selection. Applications of the fungicides thiophanate-methyl and captan, or any of the pyrethroid or carbaryl insecticides, have been associated with increased mite numbers in several deciduous fruits.

Because mites rapidly develop resistance to miticides, treat only as-needed and alternate miticides in a given season. When miticide applications are necessary, it is common to need two treatments at a 7- to 10-day interval. It is important to make subsequent miticide applications using another miticide(s) that has a different mode of action.

Twospotted spider mite populations in peach can be reduced by suppressing broadleaf weeds, such as vetch, in the orchard floor. A dormant oil spray should be standard as an effective tool to aid in control of scale insects and the European red mite. Twospotted spider mites are largely unaffected by dormant oil applications, as they overwinter primarily on herbaceous hosts on the orchard floor.

Targeted, in-season miticide applications should be made strictly on an as-needed basis, as peaches are more tolerant of mite injury than most other fruit crops.

Weekly monitoring of general orchard performance and pest abundance should be standard and sufficient to detect mites before infestations become problematic. Once mites are observed, scout specifically for them at least weekly. Mites are quite small, a 10 to 15x hand lens or jeweler's visor is quite helpful for mite scouting. Generally, a sample consisting of 10 leaves from 10 trees (100 leaves) per orchard is considered adequate. If 80 percent of these leaves have mites present (ca. 7.5 mites/leaf), a miticide application is probably in order.

Mite populations appear largely unaffected by organophosphate cover sprays. Mite outbreaks are favored by hot, dry weather and the use of pesticides detrimental to the mite's natural enemy complex.

Mite resistance to miticides may vary from orchard to orchard, but resistance is a serious concern that should be avoided or, as necessary, considered in making miticide choices. Mite outbreaks require targeted miticide application(s), seven to ten days apart, to bring populations under control because, save for the ovicides, most miticides do not control eggs.

Nimblewill (*Muhlenbergia schreberi* J.F. Gmelin) is a short-statured perennial grass that has many desirable attributes for an orchard floor cover. If established in an orchard, nimblewill is an almost ideal orchard floor cover. It tolerates drought, grows well in partial shade, does not harbor twospotted spider mites or catfacing insects (stink bugs or tarnished plant bugs), inhibits populations of ring nematodes (*Mesocriconema xenoplax*), and survives winter weather with little injury. Nimblewill also successfully crowds out most weed species, but its season of growth avoids competition with peach trees for water and nutrients, even when growing directly under the tree canopy. Unfortunately, nimblewill is difficult to establish and seed are frequently unavailable.