

SPIDER MITES ON LANDSCAPE PLANTS

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Spider mites are common pests in the urban landscape and can inflict serious damage to trees, shrubs and flowers. Both evergreen and deciduous plants may be attacked. Spider mites are not insects but are more closely related to ticks and spiders. Their common name is derived from their ability to produce silk, which most species spin on host plants. Mites are tiny—about the size of the period at the end of this sentence. They can also be very prolific, which is why infestations often go unnoticed until plants exhibit significant damage.

General Characteristics

Spider mites (family: Tetranychidae) have a simple, oval-shaped body and no wings or antennae. All species pass through an egg stage, a six-legged larval stage, and two eight-legged nymphal stages (protonymph and deutonymph) before transforming into an eight-legged adult. Immature stages resemble the adults except in size. An adult female may live for several weeks and lay many dozens of eggs during her lifetime. Under optimum conditions, spider mites can complete their development from egg to adult in less than one week, so there may be many overlapping generations in a single season. Therefore, populations can increase rapidly and cause extensive plant damage in a very short time. Spider mites have needle-like mouthparts and feed by piercing the leaves of host plants and sucking out the fluids from individual plant cells. This causes the leaves to have a stippled or flecked appearance, with pale dots where the cellular contents have been removed. Prolonged, heavy infestations cause yellowing or bronzing of the foliage and premature leaf drop similar to drought stress. Severely-infested plants may be stunted or even killed. Most of the mites feed from the undersides of leaves, although the damage is most evident from the upper surface.

Most spider mites have a habit of covering leaves, shoots, and flowers with very fine silken webbing, produced from a pair of glands near the mouth. The silk strands aid in dispersal by allowing the mites to spin down from infested to non-infested leaves, and to be blown by wind currents. When abundant, the silk also may shield the mites from pesticide sprays.

Damaging Species In Kentucky

Several species of spider mites live on plants. Fortunately, a rather small number routinely damage landscape plants in Kentucky. Some, such as the twospotted spider mite, have very broad host preferences, whereas with others (e.g., European red mite, spruce spider mite, southern red mite) the number of susceptible landscape plants is more limited. The twospotted

spider mite and European red mite thrive under hot, dry summer conditions, whereas the spruce spider mite and southern red mite prefer cooler temperatures in the spring and fall. Being familiar with the following four mite species will help you to determine which landscape plants are most susceptible, and the time of year they are most vulnerable to attack.

Twospotted Spider Mite (*Tetranychus urticae*)

This is the most common and destructive mite on deciduous ornamentals. It has an extremely wide host range and will feed on many varieties of trees, shrubs, flowers, weeds, fruits, greenhouse and field crops. Immatures and adults are yellowish to greenish with two dark spots on either side of the body. Eggs are spherical and translucent. Strands of webbing are spun by the mites on the undersides of infested leaves and



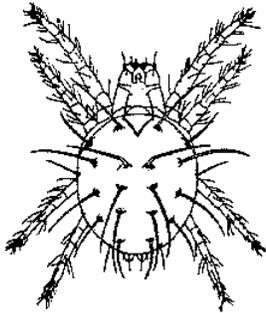
between branches. Twospotted spider mites overwinter as adult females in the soil or under the bark of host plants. They become active during the spring and may feed and reproduce throughout the summer and into fall provided conditions remain favorable for plant

growth. It is considered a “warm season” mite which thrives under hot, dry summer conditions. Damaging populations seldom during wet, cool weather. The mites are especially destructive to winged euonymus (burning bush) in landscapes.

European Red Mite (*Panonychus ulmi*)

Another “warm season” species, this mite attacks deciduous trees and shrubs. It is especially common on flowering fruit trees such as apple/crabapple, cherry, pear, plum, hawthorn, and serviceberry. European red mites overwinter as bright red

eggs laid in clusters on branches, limbs and trunk, often in such great number that the bark seems to be covered with red brick dust. Eggs of subsequent generations are laid on the foliage, usually on the lower leaf surface. Following spring egg hatch, there may be several generations per year. Development from egg to adult varies from about 3 weeks at



**EUROPEAN RED MITE
FEMALE**

55 degrees F to less than 1 week at 77 degrees F. All life stages (eggs,

immatures, and adults) are brick red. The presence of the overwintering eggs on the bark makes the use of dormant oils an effective control measure (see "Controlling Infestations" section below).

Spruce Spider Mite (*Oligonychus ununguis*)

Despite its common name, this mite feeds on more than 40 species of conifers. Most often attacked are spruce (especially Alberta spruce), pine, juniper, fir, arborvitae, hemlock, taxus and false cypress. The mites have a similar appearance to those already discussed. Coloration varies from green to deep olive to brownish red. Close inspection of the needles will reveal tiny white flecks and speckles where the mites have fed. Prolonged feeding causes yellowing, browning, and premature needle drop, often originating from the canopy interior. Infested foliage may also display webbing, eggs and cast skins. Heavy attacks can cause branch dieback or death of the plant.

The spruce spider mite is known as a "cool season" mite and is most active in early spring and late fall. It overwinters in the egg stage attached to the base of needles or on the bark. The eggs hatch in early spring, and mature in 2 to 4 weeks. Damaging populations may be reached in April and May, before warm summer temperatures slow their activity. Spruce spider mite populations rebound in the fall with the return of cooler weather, and feeding may continue into December or beyond, if winter temperatures remain mild. Damage inflicted by mite infestations present during the fall or subsequent spring often go unnoticed until the heat and dryness of June and July.

Southern Red Mite (*Oligonychus ilicis*)

This is the most common and destructive spider mite on broad-leaved evergreens, especially Japanese and American hollies, azaleas, viburnum, roses and rhododendron. Feeding on the undersides of leaves causes stippling, browning, occasional distortion, and premature leaf drop. Southern red mites overwinter in the egg stage on the undersides of leaves. Like the spruce spider mite, its numbers are greatest during cooler periods of the spring and fall.

Maple Mite (*Oligonychus aceri*)

This mite is an important pest of nursery-grown maples, especially Freeman maples, and it occasionally infests maples in landscapes as well. Feeding on the underside of leaves causes stippling and yellowing of foliage. The mites resemble twospotted spider mites but may have a more reddish or pinkish tint. Maple mites overwinter as bright red

eggs on the bark.

Diagnosing Infestations

Timely inspection of susceptible landscape plants — especially during periods favoring mite outbreaks — is key to preventing serious damage. When scouting for spider mites, pay particular attention to plants having a history of mite problems. Spider mites often re-infest the same plants year after year. Inspect stippled and distorted leaves to determine if mites are present. Similar symptoms can be caused by pests other than mites, including thrips, leafhoppers and lace bugs. Many spider mites prefer to feed on the lower leaf surface, so examine the undersides of leaves first. A 10 - 20 power hand lens or microscope is essential for clearly seeing the mites. The tiny mites will appear yellow, green, orange, purple, black or nearly transparent. Also visible on the leaf surface may be pale-colored cast "skins" shed by developing mites, and the spherical, often translucent eggs.

An efficient way to sample vegetation for mites is to hold a sheet of white paper or foam board under a branch and tap the foliage sharply. If mites are present, they will be dislodged and appear as slow-moving, dark specks on the paper.

Controlling Infestations

Spider mites are one of the more difficult groups of landscape pests to control. Infestations are easiest to control when detected early, before the mite populations have reached very high levels. Twospotted spider mite infestations can often be traced to the purchase of infested plant material, especially bedding and houseplants. When buying new plants, it pays to inspect the lower leaf surfaces for evidence of mites. Spraying plants with a strong stream of water from a garden hose or faucet can dislodge many mites from leaf surfaces. The approach is generally more effective on smaller plants (e.g., houseplants), with non-dense foliage and low mite populations. Water sprays should be directed upward against the lower leaf surfaces, and the technique will need to be repeated on regular intervals. Low populations of spider mites may be held in check by naturally occurring predatory mites which feed on both eggs and active stages.

Pesticides

Elimination of moderate to heavy infestations of spider mites usually requires the use of specific pesticides known as miticides. Some, but not all, insecticides will also control mites. Several mite-control products are listed in the table below. Some kill only active mites while others also kill eggs. Always read and follow the directions accompanying the product you are using. Some miticides may harm or discolor certain types of landscape plants.

Good spray coverage is essential when applying miticides. Thoroughly wet the foliage and try to contact as many mites as possible, paying particular attention to leaf undersides where

most mites are living. In most cases, two or more applications at 5-10 day intervals will be needed for satisfactory control. Spider mite eggs that have not yet hatched are unaffected by most miticides; the same may be true of larvae and nymphs that are molting. During molting, spider mites remain inactive beneath the former skin, which serves as a barrier against insecticides. The quiescent mites also do not feed, rendering products that kill by ingestion temporarily ineffective. Consequently, if only one application is made, some of the mites may survive and the infestation will persist.

Not all products mentioned in the table are available to homeowners. Effective homeowner options include horticultural oils, and insecticidal/miticidal soaps. Horticultural oils and soaps can be effective alternatives to conventional miticides but require thorough coverage so that all mite stages are contacted.

Horticultural oils can be used on landscape plants during the warmer months of the year when green foliage is present and the plants (and mites) are actively growing. Horticultural oils are applied at rates of 1.0 to 2.0 %. Dormant oils are applied in winter or early spring prior to bud break, or in the fall after the leaves have dropped and there have been several light frosts. They are useful for killing overwintering mite eggs and, therefore, can help to suppress infestations of spruce spider mites, European red mites and southern red mites which overwinter as eggs on infested plants. A dormant oil spray will not guarantee mite-free plants the following year, but will delay mite buildup the following spring. Dormant oils are either specially-formulated petroleum-based products or horticultural oils applied at higher rates (3.0 to 4.0%). When using any type of oil, be aware that these sprays will discolor many conifers that have a bluish, waxy coating on their needles. Maples, hickories, black walnut, smoketree and azaleas also tend to be oil sensitive. (Refer to the product label for a complete list of plants which may be sensitive to these products.)

Insecticidal/miticidal soaps are also widely available to homeowners. These products are useful in the warmer months when plants are actively growing, and may also be used to control cool season mites. Thorough coverage is essential.

Trade names are used as examples. No endorsement is intended, nor criticism implied of similar products not named.

Some Effective Products for Mite Control on Landscape Plants			
Product Name	Formulation ¹	Residual activity	Comments
Akari	SC	Up to 21 d	Controls all life stages including eggs; no translaminar activity so thorough coverage is essential
Avid	EC	Up to 28 d	Translaminar; controls mobile life stages, not active against eggs ^{2,3}
Floramite		Up to 28 d	Same as for Akari
Forbid	SC, F	Up to 30 d	Translaminar, controls all life stages
Hexygon	DF	Up to 45 d	Controls eggs and newly-hatched nymphs; no activity on adults; not translaminar so thorough coverage essential
Judo	SC	Up to 30 d	Same as for Forbid
Oil, Dormant		NR ⁴	Contact activity only, thorough coverage essential
Oil, summer		NR	Same as for Oil, Dormant
Ovation	SC	Up to 45 d	Same activity and mode of action as Hexygon
Pylon	EC	Up to 28 d	Same as for Avid
Sanmite		Up to 45 d	Same as for Akari
Shuttle	SC	Up to 28 d	Same as for Akari
Soaps (fatty acid salts)		NR	Contact activity only, thorough coverage essential
TetraSan	WDG	Up to 28 d	Translaminar, controls eggs and immature stages; minimal activity on adults but treated females do not produce viable eggs
¹ SC = soluble concentrate; EC = emulsifiable concentrate; F = flowable ; DF = dry flowable; WDG = water dispersible granule ² Translaminar refers to insecticides and miticides that can penetrate the leaf tissue and form a reservoir of active ingredient within the leaf. ³ Mobile life stages include nymphs and adults, but not eggs ⁴ NR: no residual, mites must be hit by spray			

IMPORTANT: Certain products may not be used on fruit trees grown for consumption. Miticides registered for use on edible fruits are listed in ID-21, *Diseases and Insect Control Programs for Home-Grown Fruit*.