

# SPIDER MITES

## Integrated Pest Management in the Home Garden

Mites (Fig. 1) are common pests in landscapes and gardens and can be found feeding on many fruit trees, vines, berries, vegetables, and ornamental plants. Although related to insects, mites are not insects but members of the arachnid class along with spiders and ticks. The spider mites, also called webspinning mites, are the most common mite pests and among the most ubiquitous of all pests in the garden and farm.

The webspinning spider mites include Pacific spider mite, twospotted spider mite, strawberry spider mite, and several other species. Most common ones are closely related species in the *Tetranychus* genus and cannot be reliably distinguished in the field. However, there is little need to do so since their damage, biology, and management are virtually the same.

### IDENTIFICATION

To the naked eye, spider mites look like tiny moving dots; however, you can see them easily with a 10X hand lens. Adult females, the largest forms, are less than  $\frac{1}{20}$  inch long. Spider mites live in colonies, mostly on the undersurfaces of leaves; a single colony may contain hundreds of individuals. The names "spider mite" and "webspinning mite" come from the silk webbing most species produce on infested leaves. The presence of webbing is an easy way to distinguish them from all other types of mites.

Adults have eight legs and an oval body, with two red eyespots near the head end of the body. Females usually have a large, dark blotch on each side of the body and numerous bristles covering the legs and body. Immatures

resemble adults, except the newly hatched larvae have only six legs (Fig. 2). Eggs are spherical and translucent, like tiny droplets, becoming cream colored before hatching.

### LIFE CYCLE

In some parts of California, spider mites may feed and reproduce all year on plants that retain their green leaves through the winter. In colder areas and on deciduous trees that drop their leaves, webspinning mites overwinter as red or orange mated females under rough bark scales and in ground litter and trash. They begin feeding and laying eggs when warm weather returns in spring.

Spider mites reproduce rapidly in hot weather and commonly become numerous in June through September. If temperature and food supplies are favorable, a generation can be completed in less than a week. Spider mites are generally favored by hot, dusty conditions and are usually found first on trees or plants adjacent to dusty roadways or at margins of gardens. Plants under water stress are also highly susceptible. As foliage quality declines on heavily infested plants, female mites catch wind currents and disperse to other plants. High mite populations may undergo a rapid decline in late summer when predators overtake them, host plant conditions become unfavorable, the weather turns cooler, or following rain.

### DAMAGE

Mites cause damage by sucking cell contents from leaves. A small number of mites is not usually reason for concern, but very high populations—levels high enough to show visible damage to

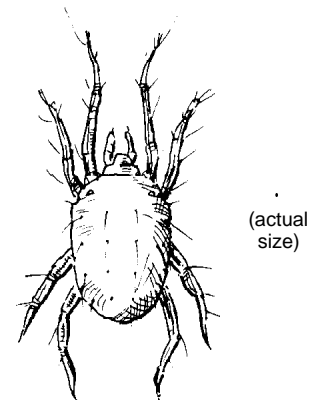


Figure 1. Spider mite.

leaves—can be damaging to plants, especially herbaceous ones. At first, the damage shows up as a stippling of light dots on the leaves; sometimes the leaves take on a bronze color. As feeding continues, the leaves turn yellow and drop off. Often leaves, twigs, and fruit are covered with large amounts of webbing. Damage is usually worse when compounded by water stress.

Loss of leaves will not cause yield losses in fruit trees during the year of infestation unless it occurs in spring or very early summer, but it may impact next year's crop. On annual vegetable crops, such as squash, melons, and watermelons, loss of leaves can have a significant impact on yield and lead to sunburning. On crops such as sugar peas and beans, where pods are attacked, spider mites can cause direct damage. On ornamentals, mites are primarily an aesthetic concern, but can kill plants if populations become very high on annual plants. Spider mites are

also important pests of field-grown roses.

## MANAGEMENT

Spider mites have many natural enemies that often limit populations. Adequate irrigation is important because water-stressed plants are most likely to be damaged. Broad-spectrum insecticide treatments for other pests frequently cause mite outbreaks, so avoid these when possible. Sprays of water, insecticidal oils, or soaps can be used for management. Always monitor before treatment.

### Monitoring

Mites are tiny and difficult to detect. Usually plant damage—stippling or yellowing of leaves—will be noticed before you spot the mites themselves. Check the undersides of leaves for mites, their eggs, and webbing; you will need a hand lens to identify them. To observe them more closely, shake a few off the leaf surface onto a white sheet of paper. Once disturbed, they will move around rapidly. Be sure mites are present before you treat. Sometimes the mites will be gone by the time you notice the damage; plants will often recover after mites have left.

### \*Biological Control

Spider mites have many natural enemies, which limit their numbers in many landscapes and gardens, especially when undisturbed by pesticide sprays. Some of the most important are

the predatory mites, including the western predatory mite, *Galendromus* (= *Metaseiulus*) *occidentalis*, and *Phytoseiulus* species. Predatory mites are about the same size as plant-feeding mites but have longer legs and are more active. Various insects are also important predators—the sixspotted thrips (*Scolothrips sexmaculatus*), the larvae and adults of the spider mite destroyer lady beetle (*Stethorus picipes*), the larvae of certain flies including the cecidomyid *Feltiella acarivora*, and various general predators such as minute pirate bugs, bigeyed bugs, and lacewing larvae. The purchase and release of predatory mites can be useful in establishing populations in large plantings or orchards, but the best results are obtained by creating favorable conditions for naturally occurring predators—for instance, by avoiding dusty conditions and pesticide sprays.

The major predator mites commercially available for release are the western predatory mite and *Phytoseiulus*. The western predatory mite is more effective under hot, dry conditions. These predators do not feed on foliage or become pests; thus if pest mites are not available when predatory mites are released, the predators starve or migrate elsewhere. If you wish to establish predators in a heavily infested orchard or garden that has few predators, use a soap spray or selective miticide to bring pest mites to a lower level and then release predatory mites. A

good guideline is that one predator is needed for every ten spider mites to provide control. More than one application of predatory mites may be required if you want to reduce pest populations rapidly. Concentrate releases in hot spots where spider mite numbers are highest. Once established on perennials, predatory mites may reproduce and provide biological control indefinitely without further augmentation unless nonselective insecticides are applied that kill the predators. For information on where to buy these predators, write or call California Department of Pesticide Regulation, P.O. Box 942871, Sacramento, CA 94271-0001, (916) 324-4100, and ask for a free copy of their leaflet "Suppliers of Beneficial Organisms in North America," or view it on the World Wide Web at <http://www.cdpr.ca.gov/docs/ipminov/bensuppl.htm>.

### Cultural Control

Cultural practices can have a significant impact on spider mites. Dusty conditions often lead to mite outbreaks. Apply water to pathways and other dusty areas at regular intervals. Water-stressed trees and plants are less tolerant of spider mite damage. Be sure to provide adequate irrigation. Mid-season washing of trees and vines with water to remove dust may help prevent serious late-season mite infestations.

In gardens and on small fruit trees, regular, forceful spraying of plants with water will often reduce spider mite numbers adequately. Be sure to get good coverage, especially on the undersides of leaves. If more control is required, use an insecticidal soap or oil in your spray (as described below), but test the product on one or two plants to be sure it is not damaging to plants.

### Chemicals

Spider mites frequently become a problem after the application of insecticides. Such outbreaks are commonly a result of the insecticide killing off the natural enemies of the mites, but also occur when certain insecticides stimulate mite reproduction. For example, spider mites exposed to carbaryl

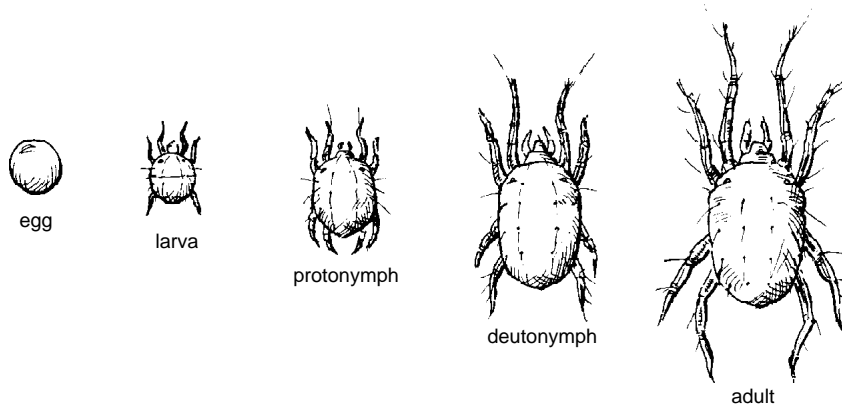


Figure 2. Spider mite life cycle: development of a typical plant-feeding spider mite.

(Sevin) in the laboratory have been shown to reproduce faster than untreated populations. Carbaryl, some organophosphates, and some pyrethroids apparently also favor spider mites by increasing the level of nitrogen in leaves. Insecticides applied during hot weather usually appear to have the greatest effect on mites, causing dramatic outbreaks within a few days.

If a treatment for mites is necessary, use selective materials, preferably insecticidal soap or insecticidal oil. Petroleum-based horticultural oils or neem oils are both acceptable. Do not

use soaps or oils on water-stressed plants or when temperatures exceed 90°F. These materials may be phytotoxic to some plants, so check labels and/or test them out on a portion of the foliage several days before applying a full treatment. Oils and soaps must contact mites to kill them so excellent coverage, especially on the undersides of leaves, is essential and repeat applications may be required. Sulfur dust or spray can be used on some vegetables, but will burn cucurbits. Do not use sulfur dust if temperatures exceed 90°F and do not apply sulfur within 30 days of an oil spray.

Sulfur dusts are skin irritants and eye and respiratory hazards. Always wear appropriate protective clothing.

#### COMPILED FROM:

Flint, M. L. 1998. *Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticides*, 2nd ed. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 3332.

#### OTHER REFERENCES

Dreistadt, S. H., J. K. Clark, and M. L. Flint. 1994. *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 3359.

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EDITOR: B. Ohlendorf  
TECHNICAL EDITOR: M. L. Flint  
DESIGN AND PRODUCTION: M. Brush  
ILLUSTRATIONS: D. Kidd

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#### WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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