

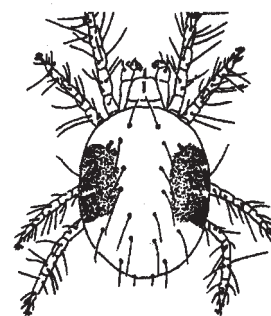
## SPIDER MITE MANAGEMENT IN HOME GARDENS

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Spider mites live and feed on a wide variety of plants grown in Nevada gardens. Trees, shrubs, flowers, vegetables and even lawns may host a small population of spider mites without serious damage.

Spider mites are not insects. They are arachnids, which also includes spiders, ticks, and scorpions. Adult mites normally have eight legs. They do not have antennae or wings.

Spider mites are small, often difficult to see without a hand lens. Color varies with species and even with the time of year: colorless red, brown, yellow and green spider mites are common. Spider mites puncture plant tissue with piercing mouthparts to feed on plant juices. Chlorophyll is removed along with plant fluids. As a result, plants infested with spider mites have a white or yellow speckled appearance. The plants look dull and unthrifty. Mites feed primarily on the undersides of leaves, out of sight and away from direct sunlight. Heavy infestations discolor leaves. When mites feed on fruit, it causes bronzing or russetting. This discoloration makes the fruit cosmetically unappealing but seldom damages the edible interior of the fruit. Heavily infested plants drop their leaves prematurely. Mites tend to congregate on the south and west side of plants, where dry winds and heat stress occur. Spider mite infestations are usually localized, occurring on a single branch, isolated in the interior branches or on new growth.



Two-spotted spider mite

If a spider mite infestation is suspected, carefully inspect individual leaves. Hold a white piece of paper beneath the branch and tap the foliage sharply. Use a magnifying lens (10X) to inspect the paper for dislodged mites. They look like tiny, moving specks.

Fine, disorganized webbing is produced by some spider mite species. It provides protection for the mites and their eggs from extreme temperatures and from natural enemies. The webbing is usually found at the tips of dry, discolored branches and among heavily infested leaves.

## Habitat and Life Cycle

Several species of spider mites occur in Nevada. The **two-spotted spider mite** is the most widespread. It occurs on a wide variety of indoor and outdoor plants. Two-spotted spider mites are particularly common on beans, raspberries, roses and many indoor plants. **Spruce spider mites** are found on junipers, spruce and other needle-leafed evergreens. **Clover mites** occur as periodic pests of lawns and are a nuisance when they migrate into homes.

Most spider mites overwinter as adults, hidden in bark cracks or under debris around gardens. As air temperatures warm in the spring, mites become active and begin to feed and mate. Adult females may lay dozens of eggs over a two week period. Eggs hatch into six-legged larvae, and then pass through two eight-legged nymph stages before becoming adults. This takes a few days to several weeks depending on environmental conditions, the availability of food, and pressure from natural enemies. Environmental conditions have an important influence on the development of spider mite populations. Populations grow rapidly when weather is hot and humidity is low, and when plants are water-stressed from drought or improper irrigation. Problems with mite injury are most common on hot, dry, dusty sites. In addition, dusty conditions inhibit the effectiveness of natural enemies of spider mites, which are not as well adapted to these harsh circumstances.

## Management Options

### Natural Enemies

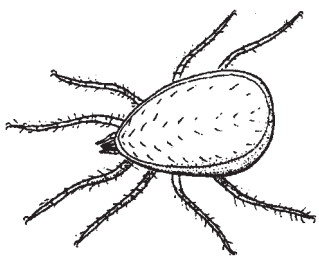
A wide variety of organisms feed on spider mites. Though small and inconspicuous, they are an important component of spider mite control. The most common of these natural enemies are beneficial insects, including a small species of black ladybird beetle, the spider mite destroyer ( *Stethorus* ). Spider mite destroyers feed only on spider mites.

Minute pirate bugs ( *Orius spp.* ) and predatory thrips ( *Scolothrips spp.* and others) are among other beneficial insects that help control spider mites. There are predatory mites that feed on mites. Phytoseiid mites are shiny, oval to pear-shaped and move much faster than spider mites. They also eat other plant

damaging mites, as well as scale insects, whiteflies, thrips, and some insect eggs. Although natural enemies of spider mites are available commercially, it is more efficient to conserve resident natural enemies in the landscape and garden by controlling dust, avoiding pesticide applications and supplying plants with adequate irrigation. One important cause of mite outbreaks in yards and

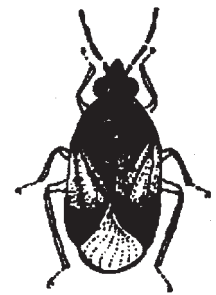
gardens is the use of insecticides that destroy spider mite predators. Outbreaks occur when pesticides eliminate natural enemies, allowing mite populations to grow unchecked. If you use broad-spectrum chemicals, limit

their application to “spot sprays” of “hot spots” - spraying individual plants in a landscape, or a portion of an individual plant where the infestation is centered. This allows surviving natural enemies to migrate in from the adjacent unsprayed areas. It is not necessary or sensible to spray all plants in a garden “just in case.”



Phytoseiid mite

Minute pirate bug



### Cultural Controls

Providing plants with adequate water during dry conditions can minimize spider mite outbreaks. Weakened plants do not tolerate mite feeding injury as well as healthy plants. Periodic hosing of plants with forceful jets of water removes dust that collects on foliage. Removing dust increases the ability of natural enemies to locate the spider mites. Directing the water towards the lower leaf surfaces helps to dislodge and kill mites. Hosing-off plants removes unsightly webbing as well.

Spider mite control on houseplants is difficult at best. Heavily infested plants should be discarded. Treat all infested houseplants at the same time. Wash small plants in the shower or sink, and wipe larger leaves with a damp, soft cloth. Be sure to clean both upper and lower leaf surfaces. Repeat the treatments at one to two week intervals to prevent additional outbreaks. Trim off heavily infested leaves and remove them immediately. Clean up infested areas with soap and water or a disinfectant before putting uninfested plants in those locations.

### Chemical Control

Chemical control of spider mites involves the use of pesticides specifically developed for the control of mites, called miticides or acaracides. There are typically several generations of spider mites each season. As a result, they are capable of developing resistance to most miticides very rapidly. To minimize the development of resistance to a pesticide, minimize pesticide applications and integrate other control measures: use biological and cultural controls first, and if necessary to prevent severe infestations, choose a miticide rather than a "broad spectrum" insecticide. Cultural controls alone will significantly impact a mite infestation. In fact, miticides are seldom needed for mite control in home gardens and landscapes.

Severe infestations may require application of a pesticide to drop the population down to manageable levels. When selecting a pesticide for mite control, remember natural enemies, and select the least-toxic chemicals with the lowest residual activity. Pesticides that can assist homeowners in mite control with minimal damage to natural enemies are, insecticidal soap, sulfur, horticultural oil, and selective miticides like dicofol (Kelthane).

### Insecticidal Soap

Insecticidal soap must be applied to upper and lower leaf surfaces for effective control. Soaps are effective only when wet and should be used in the early morning or late in the day to delay drying. Some plants are damaged by insecticidal soaps. Read and follow all label directions for safety and handling. Product labels generally list those plants known to be sensitive. When in doubt, test a small portion of the plant and wait a day or so before spraying the whole plant. Once an insecticidal soap application has dried, wash it off with fresh water. This can help to prevent damage to marginally sensitive plants. As with all pesticides, avoid spraying during the hottest part of the day. Insecticidal soap has little effect on most beneficial insects, but will kill predaceous mites.

### Sulfur

Sulfur is one of the oldest pesticides still in use today. It is used as a miticide and also as a fungicide. Sulfur is toxic to mites but less so to insects. This means it will selectively kill mites, but do little damage to beneficial insects. Some plants are sensitive and may be damaged by sulfur. Do not apply sulfur to plants labeled as sensitive. In addition, plant injury may result if sulfur is used during periods of high humidity, when temperatures are high, or if combined with horticultural oils. Sulfur can be irritating to skin, lungs and eyes. Wear a dust mask, water proof gloves and eye protection when handling sulfur, and be sure to read and follow all label directions.

## Horticultural Oils

Horticultural oils are used to control spider mites on landscape plants, vegetables, tree and small fruits. Dormant oils are effective in killing overwintering spider mite adults if applied to large limbs, trunk and the ground under trees and shrubs. They are applied in winter while the plants are dormant. Lighter, more highly refined “superior”, “supreme summer oils”, or “narrow range oils” are effective against all stages of the spider mite’s life cycle and can be applied during the growing season. An example of a newer, lighter summer spray is “Sunspray E6” (Sun Company, Inc.). *Caution is necessary when using these sprays during the growing season.* They can cause damage to sensitive plants. Product labels will list sensitive plants and other precautions. Follow label directions for safety precautions and to avoid unnecessary damage to plants. Horticultural oils should not be applied to “blue”, “silver” or “gray” evergreens (Colorado Blue Spruce, blue junipers, etc.), as color changes may result. Oils dissolve the waxy coating that produces the blue or gray leaf color, resulting in bright emerald green foliage. This color change is permanent to the shoot; however, new shoot growth will be blue or gray. **Do not apply horticultural oils to drought stressed-plants , when it is windy, or when temperatures are over 90° F or plant damage may result.**

There are few “traditional” miticides available for home gardens and landscapes. The most common is dicofol (Kelthane). Formulated as a miticide, Dicofol is specific to mites and will do little damage to beneficial insects. Dicofol is sometimes marketed in combination with an insecticide to kill a wide variety of insects and mites (including beneficial insects). These pesticides are called “broad spectrum” pesticides. Read the product label carefully before purchasing a pesticide to avoid buying a chemical that will kill natural enemies along with spider mites.

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