

# GROWER FACT SHEET: Twospotted Spider Mite Management Guide for Horticultural Crops

Rafia Khan<sup>1</sup> and Paul Winski<sup>2</sup>

## INTRODUCTION

Spider mites are common pests in ornamental crops, landscapes, bedding plants, and gardens. Spider mites are related to insects, but they are not insects. They are members of the arachnid class, along with spiders and ticks. Arachnids have two main body parts and eight legs. They differ from insects, which have three main body parts and six legs. The twospotted spider mite is in the family Tetranychidae, which includes about 1,200 species. Since they can produce webs, several mite species are grouped under spider mites. Twospotted spider mites are the most common species infesting greenhouse and garden crops.

## IDENTIFICATION OF TWOSPOTTED SPIDER MITES

The twospotted spider mite (*Tetranychus urticae* Koch) is oval to elliptical in shape. Females are 1/50 inch (0.4 mm) long, while males are smaller. The body color of the twospotted spider mite ranges from brown, orange red, greenish yellow, to translucent. The color of overwintering females can be orange to orange red. As its name suggests, this mite species has two large dark spots on its back. Newly molted mites may lack these dark spots, as they are the accumulation of body waste (Fig. 1).



Figure 1. A. Adult twospotted spider mite and egg. B. Twospotted spider mites (small, two-dotted creatures) on the underside of a leaf.

Photo credit: Dr. Pat Porter

<sup>1</sup> Assistant Professor and Extension Specialist, Texas A&M University

<sup>2</sup> Program Specialist, Commercial Horticulture/Green Industry, Texas A&M AgriLife Extension Service

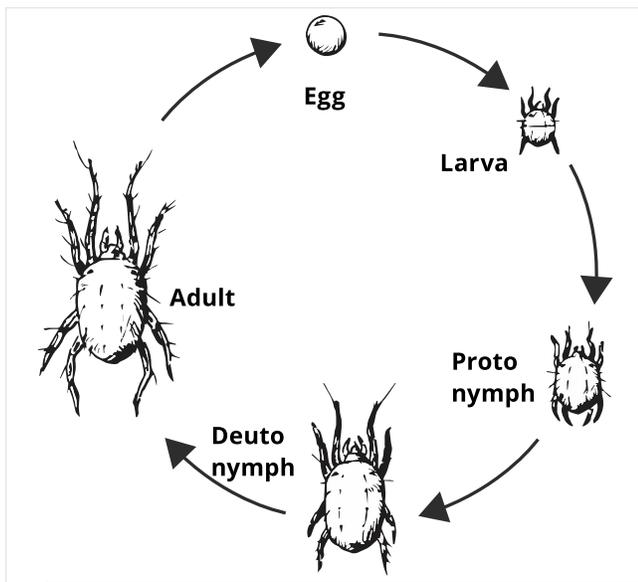


Figure 2. Twospotted spider mite life cycle. Illustration by D. Kidd, Reproduced by permission from Pest Notes: Spider Mites. UC Statewide IPM Program. Univ. Calif. Agric. Nat. Res. Publ. 7405.

## LIFE CYCLE

The life cycle of the twospotted spider mite (Fig. 2) consists of the egg, the larva, two nymphal stages (protonymph and deutonymph), and the adult. All stages feed throughout the life cycle. The female will lay eggs on the underside of the foliage, attaching them with fine silk webbing produced by the spider mite. The egg is very small, spherical, and has a shiny straw color, making it difficult to distinguish. Upon hatching, the larval stage has only three pairs of legs, resembles the same color as the egg, and consumes less food. The nymph and adult have four pairs of legs. Development time from egg to adult varies from 5 to 20 days, depending on the temperature and host plant. Adult females can lay several hundred eggs during their lifetime of 2 to 4 weeks. Adult female twospotted spider mites overwinter in the soil of non-crop and weedy locations, including grassy waterways, roadsides, set-aside acres, and pastures.

## PLANT INJURY

Twospotted spider mites have a wide host range, including vegetables, fruits, and ornamental crops, and are a serious pest of greenhouses, nurseries, and field-grown crops. All active life stages of twospotted spider mites (larva, nymph, and adult) can feed on plant tissue. With their piercing-sucking mouthparts, twospotted spider mites feed on the cell contents of the leaf. They also inject saliva during feeding, which can cause discoloration, necrosis, or abnormalities on leaves, stems, and flowers. They feed mainly on the underside of the leaf. The initial feeding injury appears



Leaf stippling symptoms caused by spider mite feeding. Photo Credit: Whitney Cranshaw, Colorado State University, Bugwood.org

as stippling of the leaves with a fine, pale-green mottling followed by yellowing, bronzing, or browning of leaves. Open flowers of affected plants can have brown and withered petals, which can be confused with spray burn or thrips damage. Fine silk webbing can often be observed completely covering the leaves on heavily infested foliage and stems. Twospotted spider mites can hide under the webbing, making them difficult to reach with sprays. Since twospotted spider mites are visible only under close inspection and plant wounds can be confused with natural or mechanical sources, injury caused by this pest is often underestimated. Twospotted spider mites also inject saliva during feeding, which can cause discoloration, necrosis, or abnormalities on leaves, stems, and flowers. Severe infestations or constant feeding produces distorted leaves, overall loss of plant vigor (despite adequate moisture and nutrition), whitening or spotting of leaves, loss of foliage and yellowing of the whole plant, and death. Spider mites are primarily an aesthetic concern on ornamental plants. They can kill annual ornamental crops if populations become very high. Spider mites are also important pests of field-grown roses.

In the garden or on outdoor plants, twospotted spider mites prefer hot, dry, and dusty conditions, which can aggravate the injury stress. There is a high risk of twospotted spider mite infestations during the months of hot weather and prolonged drought. However, twospotted spider mites can occur year-round.

## HOSTS

Twospotted spider mites attack a wide range of plants and have been recorded on more than 300 plant species, including tree fruits, small fruits, vegetables, and ornamentals. Arborvitae, azalea, marigolds, New Guinea impatiens, rose, salvia, spruce, viola, camellia, citrus, hollies, Ligustrum, pittosporum, pyracantha, and viburnum are some of the ornamental plants commonly infested by twospotted spider mites.

# MANAGEMENT PROGRAM

## Scouting/Monitoring

Twospotted spider mites are tiny and difficult to detect, so most often, evidence of plant injury, like stippled or yellowing leaves, shows up before noticing the spider mites. Spider mites should be monitored regularly to detect them early when they are easier to control. A magnifying glass (10X or 15X) is necessary to observe them. Examine the undersides of the foliage for live mites, cast skins, and webbing. Mites can be easily observed by shaking or striking an infested plant over a white piece of paper or cardboard and then watching for moving specks on the paper. Check the plant foliage for symptomatic feeding injury. Watch for leaf or petal discoloration. It is important to ensure the presence of mites before starting treatments. Identify any beneficial insects currently observed in the crop. The use of sticky cards is ineffective.

## Cultural Control

Start with and maintain a healthy crop. Stressed plants are more vulnerable to twospotted spider mite infestations. High or low levels of nitrogen fertilizers and drought or overwatering can stimulate mite problems. Provide proper spacing. Clean up the crop residue and manage weeds in the greenhouse, throughout the nursery, and in the landscape, as these can be sources of spider mite populations, especially the overwintering twospotted spider mites. They can also overwinter under bark or ground covers near their host plant. Sanitation prevents the intermigration of twospotted spider mites and can reduce early infestations.

## Mechanical Control

High-pressure water spray or overhead irrigation applied to infested plants can physically remove and kill the mites while having little impact on beneficial species. Prolonged periods of rain help reduce spider mites in landscape settings. Water also removes the dust that collects on the foliage and can interfere with predator movement. Quarantine new plants and liners brought into the greenhouse and monitor for any spider mite activity. Screening enclosures can help exclude spider mites from entering the growing area.

## Biological Control

Biological control agents can be an effective option in a twospotted spider mite management program. There are several predators and pathogens that can be released preventively to regulate mite populations. Disrupting natural enemies with insecticides is often a cause of spider mite outbreaks. Predatory mites can

Table 1. Biological control agents that can be used as part of the IPM program.

Biological Control Agent	Control Type
<i>Amblyseius andersoni</i> (Mite)	Predator
<i>Amblyseius fallicus</i> (Mite)	Predator
<i>Amblyseius swirskii</i> (Mite)	Predator
<i>Galendromus occidentalis</i> (Mite)	Predator
<i>Mesoseiulus longipes</i> (Mite)	Predator
<i>Neoseiulus californicus</i> (Mite)	Predator
<i>Phytoseiulus persimilis</i> (Mite)	Predator
<i>Feltiella acarisuga</i> (Gall midge)	Predator
<i>Stethorus</i> sp. (Lady beetles, both adults and larvae)	Predator
<i>Orius</i> spp. (Minute pirate bug)	Predator
<i>Geocoris</i> sp. (Big-eyed bug)	Predator
<i>Leptothrips</i> sp. (Thrips)	Predator
<i>Chrysopa</i> sp. (Lacewing larvae)	Predator
<i>Neozygites floridana</i> (Fungus)	Pathogen

usually be differentiated from spider mites because the predators often have longer legs, many times with the front legs considerably longer. Predatory mites also move faster than spider mites. Most of the biological control agents (Table 1) are commercially available. Companies that produce beneficial insects have side effects/compatibility databases to guide the use of insecticides if biological control agents are present.

## Chemical Control

### Pesticide Application and Safety

Whether spot spraying or treating the entire crop, thorough coverage of both lower and upper leaves is essential to reduce spider mite populations. The use of broad-spectrum insecticides should be limited because they can interfere with several natural enemies that help to manage spider mite populations. Insecticides of different modes of action (MOA) can be effective to manage spider mites (Table 2). Monitor the plants for live mites 7 to 10 days after the last spray to determine the need for an additional application.

Table 2. List of miticides as part of a twospotted spider mite management program.

Active Ingredient	Trade Name	IRAC Mode of Action Group
Abamectin	Avid	6
Acequinocyl	Shuttle	20B
Azadirachtin	Azatrol EC	-
<i>Beauveria bassiana</i> Strain PPRI 5339	Velifer	-
Bifenazate	Floramite	20D
Bifenazate + Abamectin	Sirocco	20D + 6
Bifenthrin	Attain TR, Talstar	3A
Cinnamaldehyde (Cinnacure)	Proguard	4
Chlorfenapyr	Pylon	13
Clofentezine	Novato	10A
Cyflumetofen	Sultan	25
Etoxazole	TetraSan/Beethoven	10B
Fenazaquin	Magus	21A
Fenoxycarb	Preclude TR	7B
Fenpyroximate	Akari	21A
Fenpropathrin	Tame 2.4EC	3
Fluvalinate	Mavrik Aquaflow	3
Hexythiazox	Hexygon	10A
Horticultural oil	Ultra-Fine oil, Saf-T-Side, JMS Stylet-Oil	-
<i>Isaria fumosorosea</i> Apopka Strain 97	Ancora	-
<i>Metarhizium brunneum</i> Strain 97	Met52	-
Methiocarb	MesuroI 75-W	1A
Mineral oil	Ultra-Pure Oil, SuffOil-X	Suffocation
Neem oil (Clarified hydrophobic extract)	Triact	Unknown
Potassium salts of fatty acids (Soap)	M-Pede	Desiccation
Pyridaben	Sanmite 75WP	21A
Pyrethrins	PyGanic	3A
Sodium Tetraborohydrate Decahydrate	Prev-Am	8D
Spiromesifen	Savate	23
Spinosad	Conserve SC	5
Spirotetramat	Kontos	23

Read and follow all label instructions for proper use. Consult with local agricultural/product agents about the miticide labels for targeted life stages, product rates, application information, and restrictions.

### Resistance Management

- ▶ Rotate products with different MOA to limit pesticide resistance.
- ▶ Make no more than two sequential applications of any group before rotating to another MOA.
- ▶ To ensure that every application is effective, use the right dose, adequate spray volume, and ample spray coverage.