



# CROP PEST:

## Two-Spotted Spider Mite

*Tetranychus urticae*

### OVERVIEW:

Two-spotted spider mite (TSSM), also known as greenhouse red spider mite or carmine mite, is one of the most common pests of protected crops in greenhouses and interior plantscapes. It also occurs on berry and fruit crops and many woody ornamentals grown outdoors.

### DESCRIPTION:

Adult TSM are minute, 0.5 mm (1/50 inch) long, and a pale tan colour with two greenish black spots, one on each side of the abdomen. They have 8 legs and, under magnification, 2 red eye spots can be seen. Male TSM are half the size of the females. Diapausing adults are orange-red with dark side spots. The carmine strain of TSM found on tomatoes is a brick-red colour in the adult stage. Immature and larval mites have 6 legs and the spots are less visible.

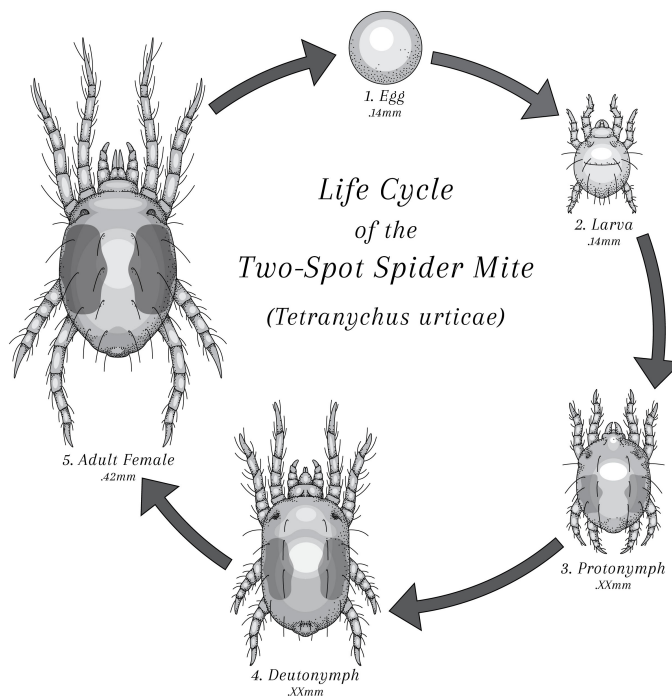
### DAMAGE:

TSM damage plants by piercing and sucking the contents of cells, which results in speckling on leaves as the cells turn yellow and die. Although most mites are on the undersides of leaves, the damage is visible on both leaf surfaces. As damage increases, the whole leaf may turn yellow and wither. The carmine strain of TSM causes more serious damage to tomato.

Yield losses start to occur in greenhouse cucumbers and tomato crops when about 30% of the leaf surface area is damaged. Ornamental plants attacked by TSM show leaf damage and reduced growth.

### LIFE CYCLE:

A complete TSM life cycle takes about 14 days at 21C (70F), 33 days at 15C (59F) and only 7 days at 30C (86F). Females lay eggs on the lower leaf surface; larvae hatch from eggs in about 3 days. Nymphs pass through two more stages before becoming adults. Feeding and number of eggs laid by TSSM females increases as temperature rises and humidity drops. Under hot, dry conditions, TSSM populations can cause extensive damage and quickly get out of control. When TSSM populations are high, they disperse easily throughout the crop on air currents and are also carried along on workers' clothing as they handle plants. TSSM diapause in response to short days, lower temperatures or a deteriorating food supply. They travel up or down the plant, away from light, searching for protected places to hibernate, such as crevices in the greenhouse structure or at the soil line at the base of posts. This phase doesn't feed and is very difficult to control with either chemicals or biological controls.



### **MONITORING TIPS:**

Inspect leaves under 10-15 X magnification for signs of TSSM infestation. Some growers use bean seedlings or climbing runner beans as trap plants to detect the first appearance of TSSM on new crops. TSSM damage is easy to see on bean leaves, which alerts growers that there may be mites present in the crop (the bean plants also serve another purpose as they are good nursery plants for predatory mites.)

### **BIOLOGICAL CONTROLS:**

TSSM can reproduce very rapidly on greenhouse cucumber so it is important to apply biological control agents as soon as mite damage is detected. A combined attack using the three biological controls listed below will provide the best results.

*P. persimilis*—a predator mite that is a very effective control for TSSM on most plants. The life cycle of *persimilis* is similar to that of TSSM, but the predators develop twice as fast as the pest at moderate greenhouse temperatures. When TSSM are first seen, introduce *persimilis* onto all infested leaves. On greenhouse peppers and woody ornamental plants, introduce *fallacis* predatory mites as well as *persimilis* for control over a longer period.

*Stethorus punctillum*—a lady beetle that feeds on all stages of TSSM and can be used with other biocontrol agents. *Stethorus* is active over a wide temperature and humidity range (16-30C and 20-90%RH). They should be released in mite infested sites as soon as TSSM are detected.

*Feltiella acarisuga*—a predatory midge that may also be used to control TSSM on cucumber. *Feltiella* feeds on all stages of TSSM. Adults fly and are able to locate mite colonies from a distance. *Feltiella* do best at humidities over 50% RH and at high mite densities. They should be released early in the season once TSSM becomes established.

### **USING CHEMICALS:**

Chemical control in conjunction with biological control is recommended if mites are clustering in balls or “stringing” down from the plant or if they are detected in high numbers without predators present. Fenbutatin oxide (Vendex®) will not harm predatory mites, but check compatibility list (Sheet 180) before using any pesticide with biological control agents.

It is important to finish each crop with low populations of TSM. High numbers at the end of the year result in the survival of many diapausing (overwintering stage) spider mites that will re-infest the next crop early in the season. If mites are still a problem in late July, a miticide should be applied in August to prevent diapausing mites from over wintering. Pesticides are less effective against the diapausing form of TSM present in the fall.

### **OTHER MEASURES:**

Thoroughly clean up the crop at the end of the season. Treat the greenhouse with naled (Dibrom®) after the last pick, before removing cucumber plants, and again after the greenhouse is empty. Wash the greenhouse structure with a strong detergent. Dormant oil sprays applied to cracks in concrete, posts and other mite hiding spots will reduce the number of diapausing mites in the greenhouse. Do not maintain ornamental plants in vegetable greenhouses and remove weeds. Keep grass or vegetation mowed adjacent to the greenhouse.

Misting TSSM infested sites with fine sprays of water will slow TSSM reproduction and increase the feeding and reproduction of predatory mites.

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