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Mites on Ornamentals

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Mites are not insects; they are in the biological class Arachnida, with spiders and scorpions. They live in almost all habitats including ocean floors, deserts, hot springs, deep soil, mountaintops, and tundra. Most are predatory or parasitic on other animals, including humans, with only a few feeding on plants. Over 30,000 different mites and ticks have been described, and thousands remain undescribed.

Unlike insects, which have six legs and three body parts, adult mites have eight legs and two body parts. The front of the body that includes the feeding structure is called a gnathosoma. Most mites that feed on plants are very small. A microscope is required to see and identify them. They damage plants by sucking the contents of individual plant cells.

Monitoring mites—Scout! Scout! Scout!

To avoid an explosive outbreak of mites, a grower has to be looking for them. Scouting the crops on a regular basis enables growers to take early action to avert disaster. Once the mite population has developed into a heavy infestation, it is very difficult to regain control, and damaged crops may not be salvageable. Walk through the crop at least once a week. Make it a ritual on a specific day and time to spend at least a half-hour or more looking for mites. Look closely at individual leaves and flowers. With good eyesight, many mites look like tiny moving dots. You can often spot the mites on leaves even with very little or no damage. Remember that many mites do not damage plants!

Spot the mites before you spot the damage. Early detection can allow spot treatments that reduce the amount of pesticide required to gain control. That saves time and money. An essential piece of equipment used in scouting is a hand lens. A 10x, 15x, or 20x lens or a 2" x 4" newspaper-type magnifying glass can be used. Tapping a leaf or plant over white paper will knock some mites off. They are easier to see on the paper. Yellow sticky traps cannot be used for most mites. By recognizing that mites are present and causing damage, and by identifying the species, you can select the best method of controlling them.

Mark the indicator plants checked before and several days after pesticide applications to determine the effectiveness of your miticides. Select plants that are in the middle of the row as well as on the aisles to ensure you are getting good coverage. Watch for trends over time, and take notes of your observations.

Using a rating system helps to quantify your observations and helps you make decisions about control options. Assign a numerical rating to the plants examined. For example, 1 = no mites or damage, 3 = some live mites and some minor damage, 5 = a significant population of living mites and damage, 7 = major damage and infestation, and 9 = the plant is totally destroyed and will be discarded. Include this information with your written record to help in evaluating the control measures taken.

Spider mites (Family Tetranychidae)

Spider mites in large numbers produce silk webbing, which is usually visible. This webbing is used for protection and as a sail to aid in their dispersal. These mites cause leaf stippling, which consists of many very small white or yellow spots. If the mites are not stopped, the damage continues until the spots merge and give a bronze or tan coloring to the leaves. If enough of the leaves are damaged, the plant will defoliate and may even die. However, the aesthetic and economic damage can occur much earlier.

Spider mites migrate via the wind or movement of plant material. Scout the plants around doors and openings where they might blow in.

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Carmine spider mite

The carmine spider mite, *Tetranychus cinnabarinus*, attacks nearly 100 cultivated crops and weeds. It is a serious pest on many flowers and ornamental plants, such as carnation, chrysanthemum, cymbidium, gladiolas, marigold, pikake, and rose, as well as many vegetables and fruits in Hawaii.

According to mite specialist Dr. Lee Goff, the carmine spider mite has the largest host range of all *Tetranychidae* species in Hawaii and is of the greatest economic importance. Adults and nymphs feed primarily on the undersides of the leaves. The mites tend to feed in "pockets," often near the leaf midrib and veins.

The carmine spider mite can complete a life cycle from egg to adult in about a week. All stages of this mite are present throughout the year. Reproduction is most favorable when the weather is hot and dry.

Adult females are about 1/50 inch long, reddish, and more or less elliptical. The males are slightly smaller and wedge shaped. They have a black spot on either side of their relatively colorless bodies. The adult female may live for up to 24 days and lay 200 eggs.

Two-spotted spider mite

The two-spotted spider mite (TSSM), *Tetrancychus urticae*, is probably the worst overall mite pest of ornamentals. It has over 300 host species, including many ornamentals and weeds. TSSM also thrives in hot, dry weather and seems to have a particular affinity for water-stressed plants. These mites are less then a millimeter long (1/25 inch) and have two distinct spots on each side of the body.

For color pictures and more information on spider mites on the Internet, go to <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7405.html>.

False spider mites (Family Tenuipalpidae)

False spider mites, also known as flat mites, are related to spider mites but do not spin webs. In general, they are half the size of the carmine spider mite and reddish in color, with black patterns. When they feed, the leaves become silvery, followed by a tanning, then a blackening. Females lay only 40–60 eggs, and the life cycle ranges from 26 to 30 days. Because of their longer life cycle and lower fecundity, they are usually not as big of a problem as the spider mites. The phalaenopsis mite, *Tenuipalpus pacificus*, is found in this group.

Thread-footed mites (Family Tansonemidae)

The thread-footed mites are so named because the fourth pair of legs on the female each end in two thread-like hairs. Cyclamen and broad mites are two species in this group that cause problems for ornamental growers. They are very small mites, only 1/100 inch long. They are susceptible to low humidity and direct sunlight. Because they are often protected in the buds and distorted plant tissues, contact miticides are not very effective in their control. Also, because of their small size and location on the plant, it is very difficult to identify them. A 20x lens or a dissecting microscope is needed.

Cyclamen mite (*Polyphagotarsonemus pallidus*)

The cyclamen mites hide in protected locations, such as buds and flowers. They attack foliage plants, African violet, ivy, mum, and begonia. The buds of affected plants become curled and distorted. Often the damage looks like thrip damage or a chemical burn. The life cycle is 5–21 days and the females lay 1–50 eggs.

Broad mite (*Polyphagotarsonemus latus*)

Broad mites, sometimes called the tropical mites, are in the same family of mites as the cyclamen mite and cause similar damage. When they feed on leaves, a puckering, curling, or wilting will occur. They often attack the growing point or terminal end of flower sprays, causing distortions and death to the buds. The symptoms may be misinterpreted to be a virus, some other disease, or chemical phytotoxicity. They are often a problem on begonia, azalea, geranium, and African violet. The life cycle is 4–6 days and the females lay about 20 eggs.

Lewis mite

Lewis mites are a problem on poinsettia and other greenhouse plants. They are slender, straw or greenish colored, with several small spots along each side of the body. They are smaller than the two-spotted spider mite, and they also produce webbing. They cause leaf stippling and yellowing, and the leaves' upper surface is often mottled or speckled. In severe infestations, leaves turn completely yellow and fall off the plant.

Mite control

Early detection and identification are essential for effective and efficient control of mites.

Natural enemies of mites often keep them in check in times when the environmental conditions do not favor them, or when chemical pesticides have not killed them. The major natural predator of the carmine spider mite is the ladybird beetle (*Stethorus*). This beetle feeds on all stages of these mites, and in laboratory conditions each individual beetle consumed an average of 2400 mites. The feeding activity of the predatory beetle is greatest in crops with leaves that are smooth on their undersides. Many other ladybird beetles feed on mites, but they are not as effective as *Stethorus*.

Predacious mites such as *Phytoseiulus macropilis* are also effective in controlling carmine spider mites on many crops. Several species of predatory thrips feed on mites—not all thrips are bad for ornamental crops. Certain flies and other general predators such as the minute pirate bugs, big-eyed bugs, and lacewing larvae also attack mites. Although some of these are commercially available for mite control, we are prohibited from importing them to Hawaii.

We can, however, take measures to conserve the populations of beneficial insects by using selective pesticides instead of broad-spectrum ones, which kill everything. Some insecticidal applications kill off the predatory insects and allow mite populations to increase rapidly. Some insecticides, such as carbaryl, actually stimulate spider mite reproduction. Also, carbaryl, some organophosphates, and some pyrethroids apparently favor spider mites by increasing the level of nitrogen in the leaves. Insecticidal soaps have a reputation of being easy on many predators. Use spot applications that allow predators to survive in the unsprayed areas.

Cultural controls help reduce mite populations. Because of the wide range of host plants for many plant-feeding mites, it is very important to eliminate weeds that are alternate hosts. If you sell whole plants, as opposed to cut flowers, it is sometimes better to discard heavily infested plants that cannot be sold rather than try to salvage them in the next crop cycle. Make sure incoming plants are free of mites before placing them near other crops.

Spider mites thrive in dusty conditions, which stress the plants. Directing a forceful spray of water at the plants to remove dust will keep mite populations down. Remember to do this soon enough before nightfall that the plants can dry, and do not do it when weather conditions favor fungal and bacterial diseases. Overhead irrigation may help, but most mites are protected under the leaves.

Chemical control is used when plant-feeding mite populations have reached a threshold where economic damage exceeds the cost of pesticide application and other controls have failed to stop their increase. Select a miticide that targets the particular species of mite that is causing the problem. Consider the growth stages of the mites and which miticide controls those stages. Try to select a chemical that does not affect beneficial organisms.

In applying the miticides, be sure to cover the plant part where the mites reside, especially if using a contact miticide. Often this means spraying the undersides of the leaves. Effective spider mite control requires two sprays, 7–10 days apart. For false spider mites, a 14–21 day interval can be used, if allowed by the miticide label.

Mite resistance to various chemicals has been reported in a number of spider mite species. To keep mite resistance from developing, rotate miticides from chemical classes having different modes of action. For more information about mite resistance management, see the article at <http://www.olympichort.com/ohp_research_mites.html>. Whenever using any pesticide, read the label to ensure that it is approved for use on the particular pest and crop, and follow all label instructions.

References

The CTAHR Web site has more information about some of the mites described here, as well as other mite species; see <http://www.extento.hawaii.edu/kbase/crop/Type/mitemenu.htm>,

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