FACT SHEET

NSW Cut Flower Industry

Managing Mites in Cut Flowers

Quick Facts

- **HOST PLANTS:**
  Mites commonly affect a range of cut flowers, including roses, chrysanthemums, carnations, and other ornamental plants
- **WHERE TO CHECK:**
  Inspect the top and undersides (including lower leaves) for damage and presence of spider mites and new growth for symptoms of broad mite damage. Webbing is an indicator of severe infestations of spider mites, and malformed new leaves is an indicator of broad mite damage.
- **WHEN TO MONITOR:**
  At least fortnightly during mite-active periods (hot, dry conditions for spider mites and warm, humid conditions for broad mites).

Description

There are a range of mites that can cause damage in cut flowers and ornamentals, but the most important are spider mites and broad mite. All mites have a pair of chelicerae (fangs, similar to spiders) that penetrate plant tissue to feed on cell contents.

Spider mites, as their name suggests, can produce webbing in heavy infestations. The most common spider mite is the two-spotted spider mite (TSM), *Tetranychus urticae*, a significant pest of horticultural crops worldwide, particularly under protected cropping. It attacks many host plant species, including fruit, vegetables, herbs and ornamental/cut flowers. TSMs are very small arachnids, typically about 0.6 mm in length. They normally vary in colour from green to white/cream normally with two distinctive dark spots on their back. Both adults and nymphs can be identified by these characteristics. The male is smaller with a pointed abdomen. In late autumn in cold climates the female may change colour to orange/pink as they go into diapause (hibernation). There are also some closely related but less important species, including the bean spider mite, *Tetranychus ludeni*, which occurs primarily in subtropical climates (and which is carmine red as an adult), but otherwise is similar to TSM. Another spider mite, the exotic southern red mite, was detected in two nurseries near Sydney in the late 1990s but is believed to be eradicated. All spider mites cause similar damage.

Figure 1. Adult female TSM (left) and smaller adult male (right). (Image: https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/twospotted-mite)

The second type of mite that causes damage in ornamentals/cut flowers is broad mite, *Polyphagotarsonemus latus*. It has a wide plant host range, and is particularly prevalent in warm, humid conditions, especially in spring and late-summer and autumn. They are much smaller than spider mites and can only be readily observed with X20 magnifying glass or a stereomicroscope. Damage occurs with mite populations much lower than for spider mites. When broad mites pierce leaf surfaces to feed, they also inject a toxin which causes misshapen plant tissues.

Damage

Spider mites feed on the underside of leaves by piercing plant cells and sucking out the contents, leading to mottled or stippled leaves. Infestations normally commence on the bottom of plants and move up. Infested leaves show yellow spotting. Severe infestations, if not managed, can cause leaves to turn bronze, dry up and fall off, reducing the photosynthetic capacity and overall vigour of the plants. This can result in stunted growth and reduced flower quality. Fine webbing produced by the mites can also cover the plants in severe infestations, by which stage, the plants are severely impacted, and leaf drop and dieback is common.

Broad mites usually occur in the growing tips of mainly leaves but also buds and flowers, and this is where damage is observed. The toxin they inject while feeding causes new leaves, buds and flowers to become malformed (either elongated or curled), and flower buds may drop off. Symptoms are similar to herbicide or virus damage. Plants may also be stunted.

Figure 2. Broad mite damage to leaves of dahlia plant

Prevention

- Maintain plant health with proper watering, nutrient management, and spacing to improve air circulation.
- Reduce nearby weed growth, as many volunteer, weed and some native species can be hosts.
- Check incoming seedling or other plant material for any signs of any infestation and follow quarantine and biosecurity practices to prevent introduction.
- Overhead watering may help reduce TSM populations, though it may require increased vigilance against fungal and bacterial problems.
- Preventative releases of predatory mites (see below) minimises problems with spider mites.

Monitoring

Spider mites affect a wide range of plant species with variable pest status. For instance, TSM lays between 2-10 eggs per day on different gerbera varieties and between 3-40 eggs on strawberries. Understanding the susceptibility of different plant varieties helps in managing TSM effectively. Females can lay up to 200 eggs each with many overlapping generations of mites per season so regular scouting for TSM is crucial. Here are the key tips for monitoring TSM:

- **Regular Monitoring:** Inspect 1-10% of the crop regularly to determine the extent of infestation. Increase frequency during hot, dry conditions.
- **Pattern Search:** Move through the crop in an M or Z pattern to identify hotspots that might be missed if only the edges are inspected.
- **Visual Inspection:** Look for signs of damage, such as speckled or yellowing leaves, which indicate spider mite presence, or deformed young leaves and flower buds, indicating broad mite. Monitor once per week or fortnight depending on environmental conditions.
- **Use of hand-lens/magnifying glass:** Closely inspect symptomatic plant parts using a 10-20x hand-lens or microscope (the higher magnifications for broad mite).
- Work with experienced IPM consultants, chemical resellers or biological control producers to refine monitoring and control strategies.

Control

Cultural

- **Plant Disposal:** Remove and destroy infested plants/plant material to prevent mites from spreading to healthier crops. Discard infested material in closed bins away from production areas to prevent wind-dispersed mites from reinfesting the crop.
- **Minimise movement:** Limit staff movement between infested and clean areas to prevent the spread of mites on clothing or tools. Visit infested areas last during routine inspections.
- **Environmental Control:** Change protected cropping watering practices to increase humidity to create less favourable conditions for spider mites. However, this may favour broad mite activity.

Biological

- For spider mites, introduce natural enemies such as predatory *Phytoseiulus persimilis, Neoseiulus californicus*, or *Typhlodromus occidentalis*.
  - » *P. persimilis* is particularly effective in humid conditions and can quickly reduce mite populations to undetectable levels.
  - » *N. californicus* and *T. occidentalis* are more heat-tolerant and are suitable for use in hotter, drier conditions.
- For broad mites, introduce predatory mites such as *Neoseiulus cucumeris* and *Neoseiulus californicus*.
- **Conservation of Natural Enemies:** Minimise the use of broad-spectrum insecticides that can harm beneficial predators. Maintain habitat areas that support predatory insects, such as ladybirds and lacewings, which also feed on mites.
- **Timing of Releases:** Release predators early in the season (trickle method) or at the first sign of infestation. Timing is crucial to ensure predators can establish and control mites before populations explode.

Figure 3. *Tetranychus urticae* (red spider mite or two-spotted spider mite).

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Chemical

- **Miticide Selection:** Spider mites (esp. TSM) have strains highly resistant to many miticides. It is therefore important to rotate registered miticides with different modes of action to prevent resistance buildup.
- **Application Techniques:**
  - » Ensure thorough coverage of the plant, especially the undersides of leaves,
  - » Identify hotspots and spot-spray heavily infested areas to limit chemical use and reduce impact on natural enemies.
- **Compatibility with Biological Control:** Select miticides that are less harmful to natural enemies, especially prior to or after their release.

Insecticide Resistance

One of the main reasons that TSM has become such an important pest worldwide is that it can rapidly develop strains that are resistant to miticides. So minimising use of miticides for strategic use as part of an IPM program and rotation of chemicals from different mode of action groups are essential for effective long-term mite management.

Image: andreaobzerova

Take Aways

- **Monitoring:** Regular monitoring is the cornerstone of IPM. Identify mite presence/damage early and track population trends to determine the best time for intervention.
- **Threshold Levels:** Although specific threshold levels are not well established in diverse nursery crops, monitoring records and consultation with experts can help determine when control measures are necessary. Early detection of broad mite is critical, as their damage is permanent.
- **Decision-Making:** Use a combination of monitoring data, pest thresholds, and environmental conditions to make informed decisions on when and how to apply cultural, biological, and chemical controls.

References / More Information

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Image: hedgehog94

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