

A Less than //ex-cellent Situation: Strategies to Treat Spider Mite Infestation in Holly

Spider mite populations can explode under winter greenhouse conditions. Targeted integrated pest management strategies are key to recovery and ensuring crop quality.

While inspecting holly (*Ilex* sp.) liners (Fig 1), we observed curling leaves with chlorotic (yellow) spotting or stippling across the upper leaf surface and webbing on the leaf undersides with small crawling pests (Fig. 2).

Dry winter greenhouse conditions, combined with the heat from nearby radiators, created an ideal habitat for spider mite (Tetranychidae) populations to explode. If left unmanaged, this infestation can lead to significant economic losses and reduce the marketability of the crop. Proper integrated pest management (IPM) must be implemented to control this spider mite infestation.

Signs and Symptoms

Signs and symptoms are the clues used to identify pests. Signs are the physical evidence of the pest while symptoms are the visible reaction of the plant to the pest. Simply put, signs are the “cause” and symptoms the “effect”.



Figure 1. Stressed holly (*Ilex* sp.) liners exhibiting various symptoms. Photo by: Olivia J. Liebing, OSU.



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Figure 2. Leaf surface and leaf underside of a curled holly (*Ilex* sp.) leaf showing shiny honeydew residue, small pests, and chlorotic (yellow) spotting or stippling. Photo by: Olivia J. Liebing, OSU.

Spider mite populations can go undetected due to their small size and by feeding on leaf undersides. Therefore, it is important to implement a routine, targeted scouting program. Tools, like a hand lens or loupe (Fig. 3), can magnify clear signs of spider mites like webbing, shed skin, eggs, and the spider mites themselves (Fig. 4). Webbing, shed skins, eggs, and mites can also be detected by gently rubbing the leaf surface, which may feel gritty to the touch. When paired with focused searches on the undersides of leaves, these scouting practices can make early identification of a spider mite infestation possible (Fig. 5).

Signs and symptoms of spider mites to look for while scouting include (Poster; page 6):

Signs of spider mites:

- Webbing
- Dropping or honeydew
- Shed skin
- Eggs
- The pest itself

Symptoms of spider mites:

- Discoloration
- Bronzing or stippling
- Crinkled or cupped growth
- Wilt
- Plant stunting
- Dieback

The combination of webbing, discoloration and overall plant decline can significantly reduce the visual appeal of holly liners while decreasing their value as transplants for subsequent production. Recognizing these signs and symptoms early can enable growers to deploy IPM strategies to mitigate and control spider mite infestations. If you have challenges identifying signs and symptoms, then submit plant samples to your preferred diagnostic lab for confirmation.

Integrated Pest Management Strategies

Cultural Control

There are several cultural practices that can be implemented to modify the greenhouse environment to make it less favorable for spider mites. These practices include:

- **Increase humidity:** Low relative humidity favor spider mites. Raising humidity can slow their population growth. Humidity can be increased through overhead irrigation, misting, wetting floors, or reducing ventilation. Also, keep crops away from heaters or other dry areas in the greenhouse or overwintering structure.
- **Fertilization:** Avoid excessive fertilization. Soft, lush growth is more susceptible to spider mite feeding, and females that consume high nitrogen levels can experience increased egg laying.
- **Discard old plant material:** Old plant debris can harbor spider mites and allow populations to carry over between crop cycles. Removing infested or leftover plant material helps break the reinfestation cycle.
- **Irrigation:** Avoid letting plants become water-stressed, as stressed plants are more prone to spider mite infestations.
- **Remove weeds:** Like old plant debris, weeds can serve as a reservoir for spider mites between crops. Keep production areas weed-free to reduce reinfestation risk.

Physical Control

Physical control methods are labor-intensive but can be effective when used consistently alongside other management strategies. These practices include:

- **Remove with water:** Spraying infested areas with a strong stream of water can physically dislodge spider mites. This method is less suitable for delicate plant material, and wet foliage may increase the risk of foliar diseases.
- **Pinch off infested growth:** Remove and destroy heavily infested leaves or shoots to reduce mite populations (Fig. 6). Be careful not to spread mites and bag plant material to be discarded. This may not be an effective control strategy.



Figure 3. A hand lens or loupe is a valuable tool when scouting, allowing you to magnify small insects and symptoms that might otherwise be missed in the greenhouse. Photo by: Olivia J. Liebong, OSU.

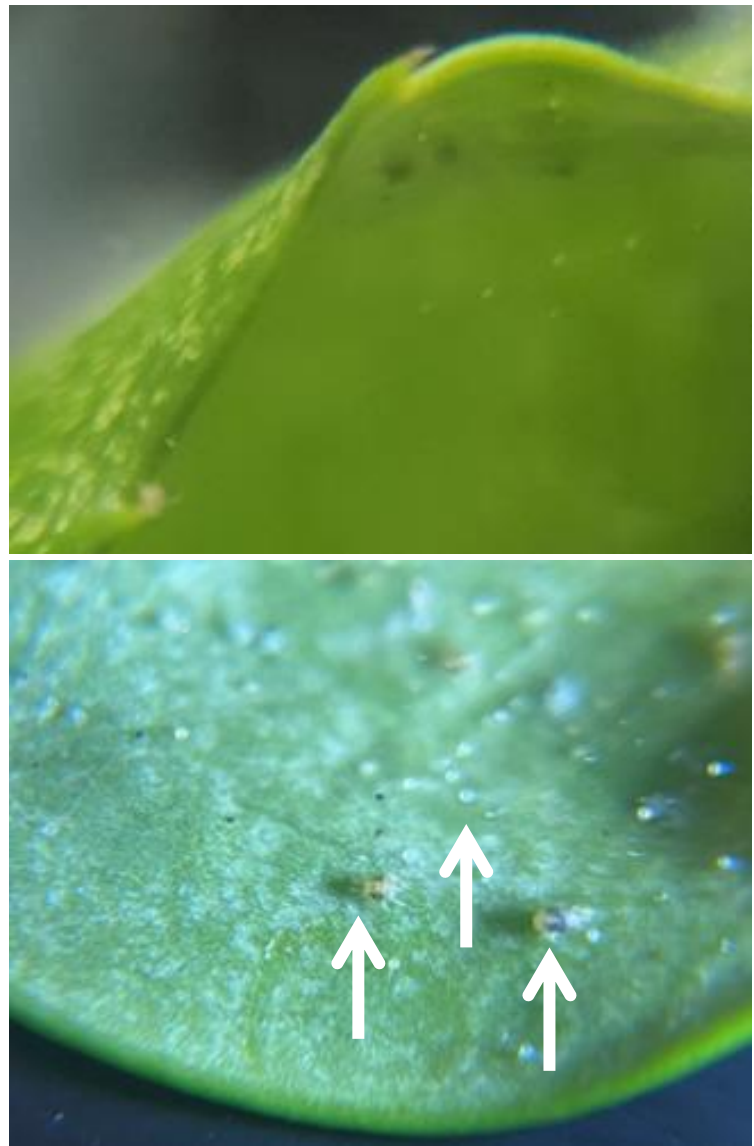


Figure 4. Webbing, eggs, and spider mites are visible through a hand lens. These signs clearly identify and confirm an active mite infestation on the holly (*Ilex* sp.) liners. Photos by: Olivia J. Liebong and W. Tyler Rich, OSU.

Biological Control

Biological control uses natural enemies to suppress spider mite populations and is most effective when started early, supported by frequent scouting, and protected from incompatible pesticide residues. Common biological approaches include:

- **Predatory mites:** Predatory mites are the primary biological control tool for spider mites. Use specialist predators such as *Phytoseiulus persimilis* for active outbreaks and hotspot suppression, and generalist predators such as *Neoseiulus californicus* or *Amblyseius andersoni* for preventive programs and low-to-moderate pressure. Apply predators early and repeat releases as needed based on scouting results and supplier guidance.
- **Predatory insects:** In some instances, and production systems, predators such as the spider mite destroyer beetle (*Stethorus* spp.) and the predatory gall midge (*Feltiella acarisuga*) can complement predatory mites, especially when mite populations are high or plants have larger canopies.
- **Release strategy:** Use preventive releases on incoming plant material and in historically high-risk areas, and curative releases directly onto infested plants when hot spots are detected. For curative releases, concentrate predators on the most infested plants first, then expand outward to nearby plants to prevent spread.
- **Distribution methods:** Predators can be applied by sprinkling carrier material onto foliage, placing predators on leaves within the canopy, or using sachets for slow, continuous release in dense crops where coverage is difficult.
- **Environmental support:** Maintain conditions that favor natural enemies and reduce spider mite reproduction. Avoid excessively hot, dry zones and reduce dust, which can interfere with predator movement and plant coverage.
- **Pesticide compatibility:** Avoid broad-spectrum insecticides and miticides that harm beneficials or leave long residuals. If a chemical application is necessary, select the most compatible option available, respect re-entry and residual intervals, and reintroduce predators after residues decline. Avoid applying oils, soaps, or other contact products immediately before or after releases unless confirmed compatible.



Figure 5. Targeted scouting focuses on inspecting plant areas where pests are most likely to hide, such as the undersides of leaves, to improve early detection and management decisions. Photos by: Olivia J. Liebing, OSU.



Figure 6. Example of removing heavily infested holly (*Ilex* sp.) leaves or shoots to reduce spider mite populations. Unlike in the photo, growers should wear gloves while pinching the plant material. Photos by: Olivia J. Liebing, OSU.

- **Follow-up monitoring:** Re-scout 3 to 5 days after releases and then at least weekly to confirm predators are present and spider mite populations are declining. Continue releases until mite hot spots collapse and new growth remains clean.

Chemical Control

When cultural and physical methods are insufficient, chemical options may be necessary. Always read and follow the manufacturer's directions and label rates before applying any pesticide for spider mite management. Common chemical approaches include:

- **Insecticidal soap:** Effective control requires repeated contact applications. Thoroughly spray all plant surfaces and reapply after 2 to 3 days to ensure coverage of newly hatched mites. Avoid applying during the hottest part of the day to prevent leaf burn.
- **Neem oil:** Like insecticidal soap, neem oil requires repeated, direct contact for control. Avoid applying during the hottest part of the day to prevent leaf burn.
- **Miticides or acaricides:** Most miticides and acaricides act through contact, so complete coverage of all plant parts is essential. Products with translaminar activity provide residual control within leaf tissues, extending control beyond the application window. Because resistance to miticides is common, rotate products with different modes of action to maintain effectiveness.

Always read and follow product labels. Avoid applying to drought stressed plants or plants under high heat/light conditions. Conduct small in-house trials and observe plants for injury before treating the entire crop.

Best Practices for Spider Mite Control During Holly Liner Production

Implementing best practices for spider mite management during holly liner production is essential for maintaining crop quality and producing successful transplants. Growers can reduce the effects of spider mite outbreaks by:

- **Scouting:** Inspect plants routinely with the help of a hand lens or loupe, paying special attention to the undersides of leaves for webbing, eggs, and mite activity.
- **Environmental management:** Maintain higher humidity levels, minimize plant stress, and keep crops away from heaters or other dry areas to create conditions less favorable for spider mite development.
- **Sanitation:** Remove old plant material and weeds that can harbor mites between crop cycles to prevent reinfestation.
- **Chemical rotation:** When necessary, apply insecticidal soaps, oils, or miticides according to label directions and rotate products with different modes of action to delay resistance.

By integrating these cultural, physical, and chemical control strategies, growers can maintain healthy holly liners and effectively manage spider mites.

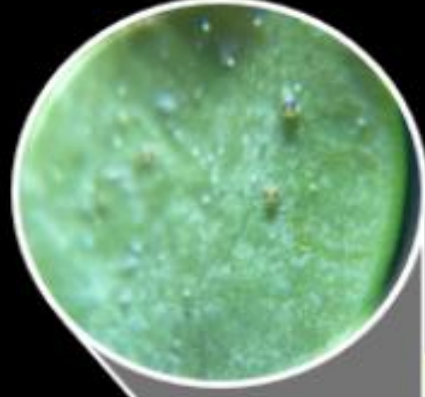
Signs and Symptoms of Spider Mites

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- Webbing
- Droppings or honeydew
- Shed skin
- Eggs
- **The pest itself!**

Symptoms:

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