

Two Spotted Spider Mite

Tetranychus urticae

QUICK FACTS

- A significant pest of hops in Michigan and can cause complete economic crop loss when high numbers occur.
- Feeding decreases the photosynthetic ability of the leaves and causes direct mechanical damage to the hop cones.
- Leaves take on a bronzed and white appearance and can defoliate under high pressure conditions.
- Intense infestations weaken plants, reducing yield and quality.

Dry conditions and hot temperatures provide ideal conditions for outbreaks of two-spotted spider mites (TSSM) in Michigan hopyards. Mites are most effectively managed while still at low population levels, so growers are encouraged to scout carefully for mites season-long, starting before damage becomes visible.

TSSM thrive under hot conditions, with the pace of development increasing until an upper threshold around 100°F is reached. Conversely, cold and wet weather is not conducive to development. TSSM are very small but can be observed on the underside of leaves using a hand lens. Growers can also look for movement to help them locate the mites. The eggs look like tiny, clear spheres and are most commonly found in close proximity to adults, webbing, cast skins and

larvae. The larvae are small, translucent versions of the adults. Adults and some larval stages also have two distinct dark spots for which they are named. When you are scouting, keep an eye out for beneficial, predatory mites that actually feed on the TSSM. Predatory mites are often translucent, smaller than TSSM and move at a faster speed across the leaf surface. Predatory mites play an important role in balancing the TSSM population and should be protected when possible. Growers should be scouting for mites season long and make applications only when needed and as recommended by the miticide manufacturer. Some miticides are better positioned early in the season when mite levels are low, others are more effective in situations with high mite populations. Use a hand lens to evaluate 2 leaves from 20 plants per yard. Thresholds developed in the Pacific Northwest have established that more than 2 adult mites/leaf in June indicates the need to implement a pest management strategy. By mid-July, the threshold increases to 5-10 mites/leaf. It is unclear at this time how applicable these thresholds are in Michigan.

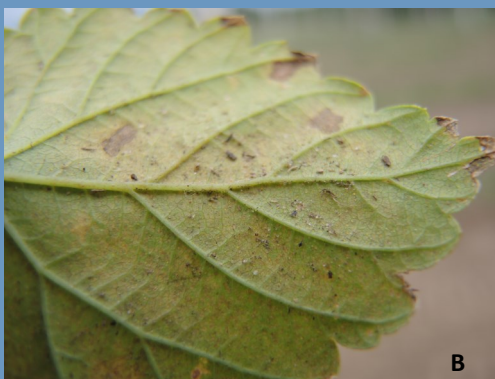


Figure A. Symptoms of two spotted spider mite damage on hop. Figure B. Underside of infested leaf with webbing and dusty appearance. Figure C. Leaf bronzing caused by mites. Photo credit Erin Lizotte, MSU Extension.

Growers needing to treat for mites are encouraged to avoid applying pyrethroids insecticides which are hard on beneficial mites and have been shown to flare pest mite populations in hop. Refer to the publication *Pesticides Registered for Use on Hop in Michigan* for more information about pesticide toxicity and predatory mites, it is available at www.hops.msu.edu. The table below lists miticide treatment options for producers in Michigan. Reference to commercial products or trade names does not imply endorsement by Michigan State University Extension or bias against those not mentioned. Information presented here does not supersede the label directions. To protect yourself, others, and the environment, always read the label before applying any pesticide.

Miticide options to control two-spotted spider mite in hop.

Compound	Active ingredient	Affected stage	Considerations	Residual control ¹	Preharvest interval	Impact on predatory mites ²
Savey	hexythiazox	Egg/larvae	Apply before burr formation and before adult build up. Savey will not control adults. Use higher rate for moderate to heavy mite pressure, for large plants or longer residual control.	6-12 weeks	0d	1
Agri-Mek	abamectin	Motiles*	Apply at threshold and with required adjuvant. Application rate is based on bine height.	6-12 weeks	28d	3
Zeal	etoxazole	Egg/larvae	For best results apply when mite populations are low, at or prior to threshold.	6-10 weeks	7d	2
Envidor	spirodiclofen	Egg, motiles*	For best results, apply early in the infestation before threshold as soon mite activity begins. Low rates are adequate if plants are small and pressure is low. Use higher rate for moderate to heavy mite pressure, on large plants or for longer residual control.	6-10 weeks	17d	2
Portal or Fujimite	fenpyroximate	Motiles*	For best results, apply before mite populations exceed 5 mites/leaf. Not recommended when temperature exceed 90F.	6-8 weeks	Portal 15d, Fujimite 14d	1
Acramite	bifenazate	Motiles*	Provides quick knockdown, good coverage is key. Best positioned as soon as mites become active. Use low rates at early infestation and increased rates under higher mite pressure.	6-8 weeks	14d	1

*Motile forms include mite larvae, nymph and adult stages.

1. Residual control is based on studies in tree fruit and is highly dependent on rate, coverage, weather and mite pressure at the time of application.

2. Rankings represent relative toxicity based on mortality data from studies conducted in tree fruit, hop, mint and grape following direct exposure. 1 = <30% mortality; 2 = 30-79% mortality; 3 = 79-99% mortality; and 4 = >99% mortality.

Modified from a table by John Wise, Larry Gut and Rufus Isaacs, Michigan State University, 2015.



Two spotted spider mite adults, larvae and eggs under magnification. Photo credit David Cappaert, Michigan State University

References: Gent, David H. 2010. *Field Guide for IPM in Hops*. USDA and Washington State University. Web accessed March 2016 at <http://www.ars.usda.gov/SP2UserFiles/person/37109/HopHandbook2010.pdf>