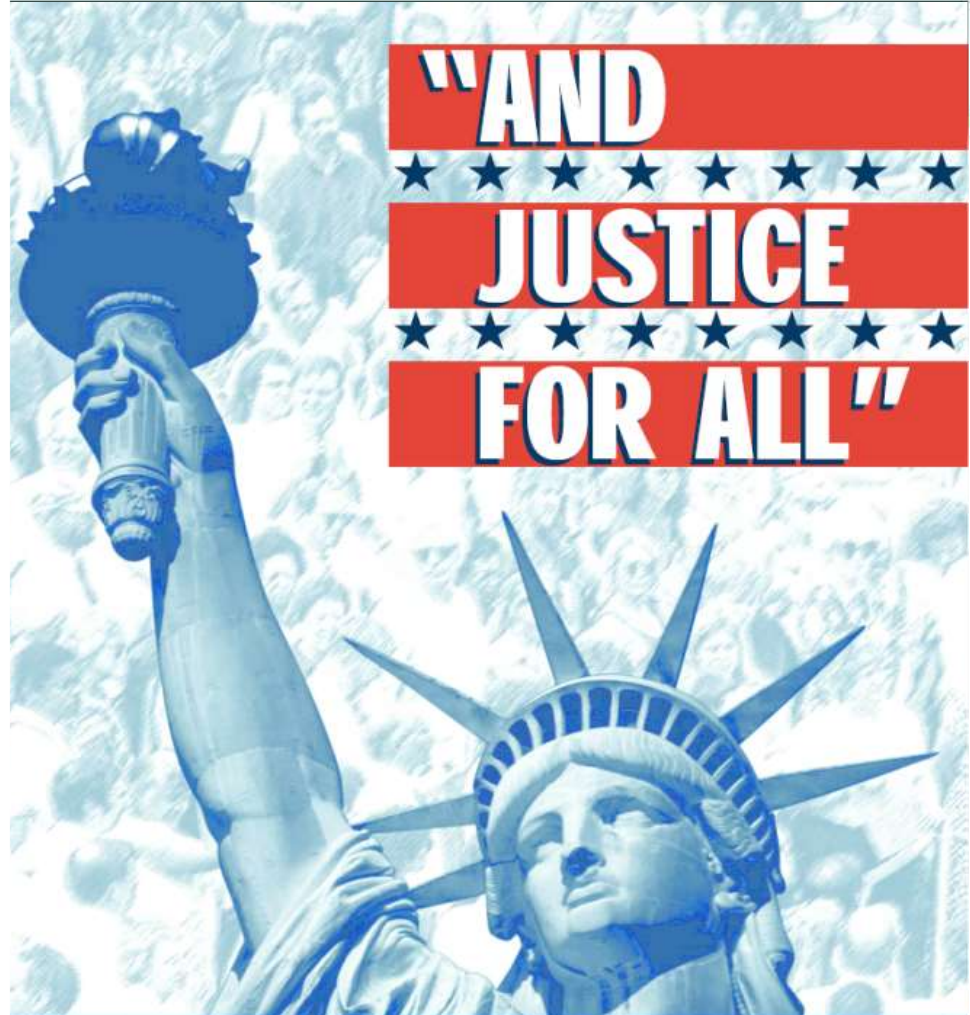


MSU Extension programs and material are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status, or veteran status.



**“AND  
JUSTICE  
FOR ALL”**

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

El Departamento de Agricultura de los EE. UU. (USDA, siglas en inglés) prohíbe la discriminación en todos sus programas y actividades a base de raza, color, origen nacional, género, religión, edad, impedimentos, credo político, orientación sexual, estado civil o familiar. (No todas las bases de prohibición aplican a todos los programas.) Personas con impedimentos que requieren medios alternativos de comunicación para obtener información acerca de los programas (Braille, tipografía agrandada, cintas de audio, etc.) deben ponerse en contacto con el Centro TARGET de USDA, llamando al (202) 720-2600 (voz y TDD).

Para presentar una queja sobre discriminación, escriba a USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410, o llame al (202) 720-5964 (voz y TDD). USDA es un proveedor y empleador que ofrece oportunidad igual a todos.



# Hop Pest Management

Erin Lizotte  
Michigan State University Extension



## Overview

- Scouting protocol
- Primary pests
- Considerations
- Resources



# Scouting

- Scouting involves monitoring the crop and cropping area for problems
- Begin as soon as plants begin to grow or pests become active
- Continue until the crop is dormant or the risk of the pest has passed





# Scouting

- A critical step in quantifying the potential pest damage
- Aids in determining if intervention to control the pest is warranted
- Helps determine the lifestage of the pest which is critical to optimize management
- Assists in determining management efficacy



## Scouting protocol

- Section your farm off into manageable portions based on acreage, variety, and age
- Review the list of known pests and beneficials
- If biological information is available, use it to gauge when you might scout more intensively



# Wait-- What am I looking for?

- One of the hardest things to learn about scouting is how to pick up on the visual cues that something is wrong with the plant
- Consider the following as a starting point:
  - Cupped, chlorotic, spotted or malformed foliage
  - Discolored, damaged, swollen or sunken areas of bark
  - A large number of insects—identify them!
  - Pockets of less vigorous or dying plants
  - **Anything out of the ordinary**



## General Protocol

- Gently shake strings or ruffle foliage as you walk looking for a flush of activity
- Remove leaves as you move through the yard—turn them over and give a close inspection using a hand lens
- Check leaves from all reachable heights, but favor the lower, denser portion of the canopy
- The more you look, the more you see.....





# Pests of Hop

## Primary

- Downy Mildew
- Powdery mildew
- Cone diseases
- Potato leafhopper
- Mites
- Beetles
- Viruses

## Emerging

- European corn borer
- Spotted lanternfly



# Seasonal Primary Pest Occurrence in Michigan Hopyards

Date	April					May					June				July			August				September									
	7	14	21	23	27	1	8	15	22	29	7	17	21	28	4	11	18	25	1	8	15	22	29	5	12	19	26				
DD Base 50 <sup>1</sup>	6	20	43	46	60	71	96	180	270	320	500	645	731	832	947	1099	1262	1459	1620	1790	1909	2024	2147	2276	2350	2400	2476				
Growth stage <sup>2</sup>	Sprouting and leaf development					Bine elongation				Cone development and maturation																					
	Dormant					Sidearm formation				Flowering				Harvest																	
<b>Pest</b>	<b>Pest lifestage</b>																														
Downy mildew	Systemic infection	Begin treatment at 6".																													
	Secondary infection											Continue treatments on a 7-14 day schedule up until harvest.																			
Two-spotted spider mite	Overwintering females	Monitor for activity as temps warm.																													
	Eggs and motiles											Monitor populations of eggs and motiles weekly, treat as needed.																			
Potato leafhopper	Arrive on spring storms						Scout carefully following spring storms.																								
	Eggs, nymphs and adults						First generation egg laying.					Eggs, nymphs and adults may be present at this time, treat as needed.																			
Rose chafer	Adult beetles											Beetles present, treat as needed.																			
Japanese beetle	Adult beetles																					Beetles present, treat as needed.									
Powdery mildew <sup>3</sup>	Initial infection						Flag shoots emerge, prune to remove.																								
	Secondary infection						Secondary disease cycle, favored by rapid plant growth, mild temperatures and high humidity. Treat with fungicide as needed.																								

1. Degree day accumulation based on 5-year average in central, lower Michigan.

2. Growth stage is highly dependent on location, annual weather fluctuations and cultivar, this table is meant as a guide to estimate pest activity, growers are encouraged to modify the table based on observations.

3. Powdery mildew is not a primary pest for growers in the midwest but is a critical pest in greenhouses and other production regions and so has been included in this table.





## Start Strong

- Site prep to reduce weed pressure
- Pesticide applicator license
- Research cultivars, market, propagators
- Review educational materials
- Prepare to apply pesticides
- Scout regularly
- Ask questions



# Resources

## Hop Production in the Midwest and Eastern North America Online Course

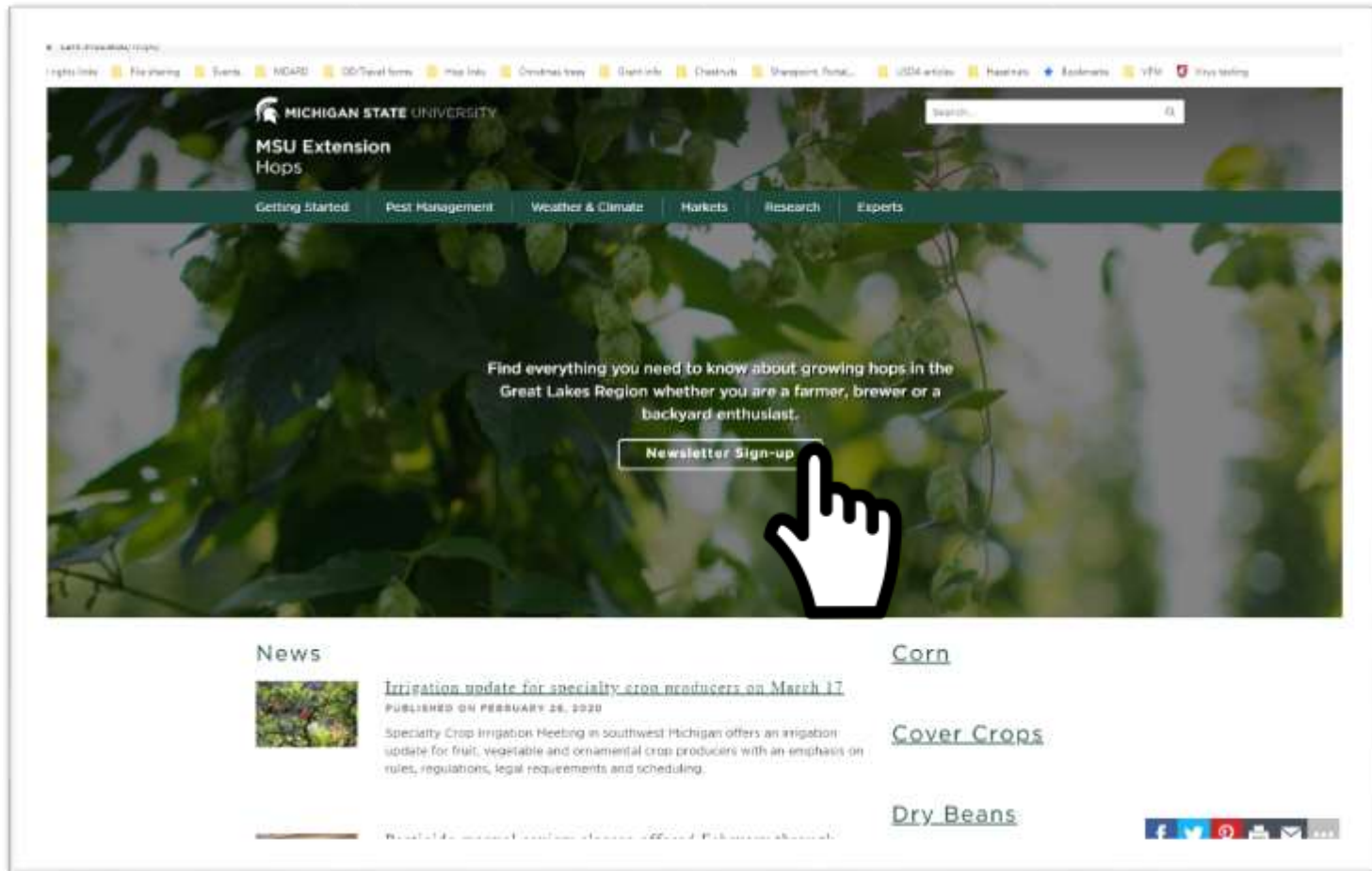
- Join experts from the Great Lakes Hop Working Group for this self-paced, comprehensive introductory course on hop production
- Online, on-demand
- \$50 fee that goes to support the work group





# Resources

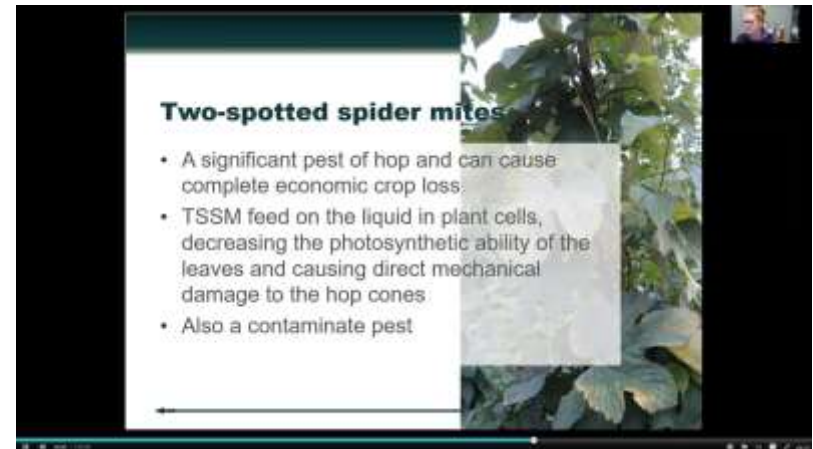
## Hops.msu.edu



# Resources

## Bine and Dine Webinar

- Monthly during the season
- Covers agronomic practices, IPM, fertility and more
- Join live or view recorded
- Free
- Registration will open soon





# Resources



## **Hop scouting pocket guide for the U.S. Upper Midwest and Northeast, and Eastern Canada**

Erin Lizotte,  
Michigan State University

Erin Hodgson,  
Iowa State University

Melanie Filotas,  
Ontario Ministry of Agriculture,  
Food and Rural Affairs

MICHIGAN STATE UNIVERSITY | Extension

2020

## **Michigan Hop Management Guide**



This work is supported by the Crop Protection and Pest Management Program 2017-70006-27175 from the USDA National Institute of Food and Agriculture. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.



United States Department of Agriculture  
National Institute of Food and Agriculture

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under Agreement No. 2015-09785. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.