

Hemp IPM

Protect your Crop with
Integrated Pest Management

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[Maine.gov/IPM](https://maine.gov/IPM)



Potential Pests

Diseases

Insects



Photo: Mary Yurlina

Weeds

Mites



Photo: Whitney Cranshaw

Rodents & Other
Vertebrates



Pesticides can be Problematic

- \$ (product + labor)
- Risk (human, environmental)
- Pest resistance and/or resurgence
- Restrictions (regulatory, market)



Photo: Whitney Cranshaw



IPM is the Answer!

- Integrated Pest Management
 - Organized and systematic approach to preventing and managing **all** pests
- IPM Offers
 - Minimized risks (health, \$, disruption)
 - Effective, long-term pest control
 - Improved crop quality/quantity



What is IPM?

Integrated Pest Management is a science-based approach that combines a variety of techniques. By studying their life cycles and how pests interact with the environment, IPM professionals can manage pests with the most current methods to improve management, lower costs, and reduce risks to people and the environment.

IPM tools include:

- Alter surroundings
- Add beneficial insects/organisms
- Grow plants that resist pests
- Disrupt development of pest
- Prevention of pest problem developing
- Disrupt insect behaviors
- Use pesticides

2

IDENTIFY/ MONITOR

Determine the causal agent and its abundance (contact your local extension agent for help).

3

Assess

The results from monitoring will help to answer the questions: Is the pest causing damage? Do we need to act? As pest numbers increase toward the economic threshold further treatments may be necessary.

1

PREVENT

Some pest problems can be prevented by using resistant plants, planting early, rotating crops, using barriers against climbing pests, sanitation, and sealing cracks in buildings.

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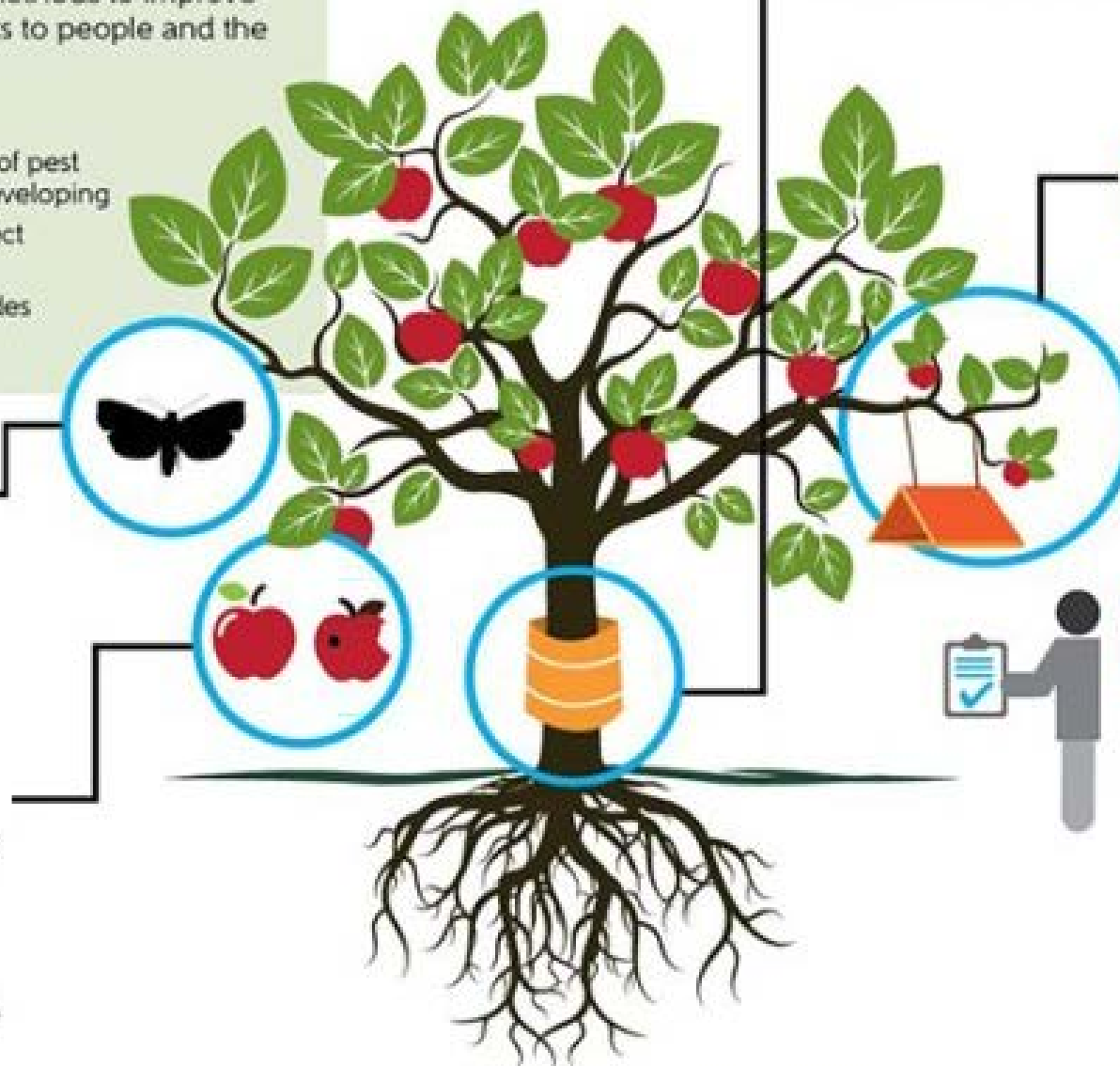
ACTION

IPM uses multiple tools to reduce pests below an economically damaging level. A careful selection of preventive and curative treatments will reduce reliance on any one tactic and increase likelihood of success.

5

Review and Evaluate

Continue to monitor the pest population. If it remains low or decreases, further treatments may not be necessary, but if it increases and exceeds the action threshold, another IPM tool should be used.





STATE OF MAINE

Guidance on Best Management Practices for Plant Health, Pest Prevention and Pest Management in Maine Hemp Cultivation

Maine Department of Agriculture, Conservation and Forestry
1/14/2021

Available on the DACF Hemp Program

This document describes practices for preventing and managing arthropods, rodents, plant pathogens and other pests using combinations of physical, mechanical, biological, cultural and chemical methods in an integrated pest management (IPM) program. The intent of this document is to provide science-based information to assist Maine hemp growers for successful management of pest problems while complying with state and federal pesticide regulations. Maine permits the use of pesticides on hemp only in accordance with best management practices. Information can be found via www.maine.gov/ipm or by contacting the Maine Board of Pesticides Control (207-287-2731 or pesticides@maine.gov). The goal of this guidance document is to guide hemp growers in the production of an uncontaminated product while providing a safe workplace environment for workers.

Best Management Practice Guidance for Hemp

DEPARTMENT OF
Agriculture, Conservation and Forestry

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Hemp News and Events

Join us for the 80th Maine Agricultural Trades Show

Maine's popular winter agricultural event is entirely online this year starting Tuesday, January 19 and ending Saturday January 23, 2021. It's free, there are virtual booths, and both live and recorded presentations. We recommend checking out the [entire schedule](#). Maine's hemp program will have an hour-long, live update starting at 8:30 am on Tuesday, January 19.

- [Register for Ag Trades Show](#)
- [Ag Trades Show Agenda](#)
- [Hemp Licensing Program Booth](#)
- [Hemp Program Update – Tuesday, January 19](#)
- [BPC Credit Presentation – Thursday, January 21](#)

New Hemp & Pesticides Best Management Practices Document

- January 21, 2021 - [Guidance on Best Management Practices for Plant Health, Pest Prevention and Pest Management in Maine Hemp Cultivation \(PDF\)](#) - This document is intended to provide additional guidance to growers of hemp to support compliance with Maine's pesticide regulations.

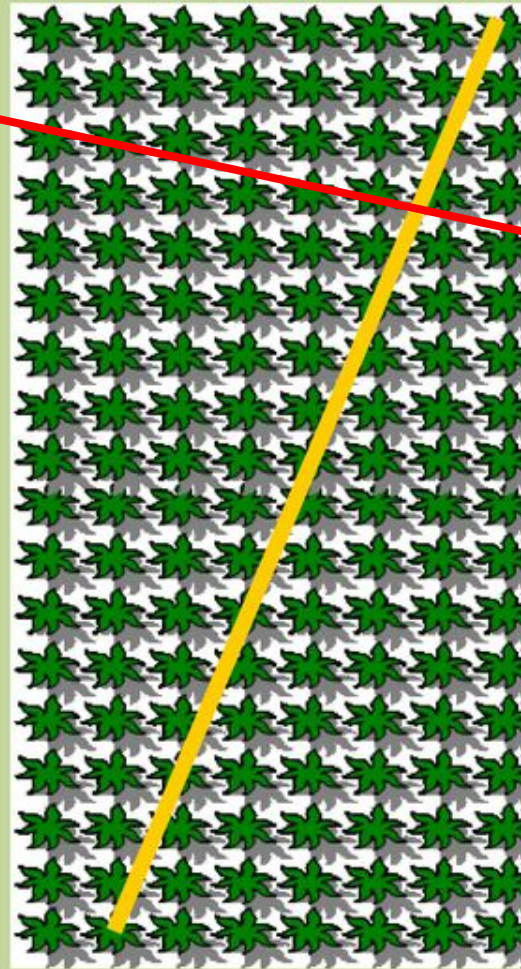


Scout Fields 1-2x/week

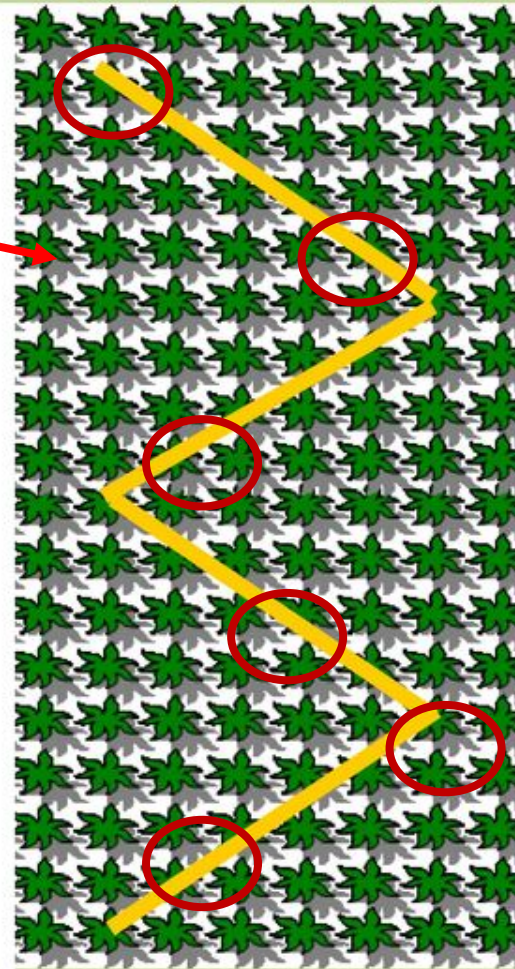
- Bring magnifier, data sheets & clipboard or tablet, insect and disease ID guides, camera, ziplock bags
- Dedicate enough time: bring water, hat, sunscreen
- Look at big picture & individual plants

Scouting patterns

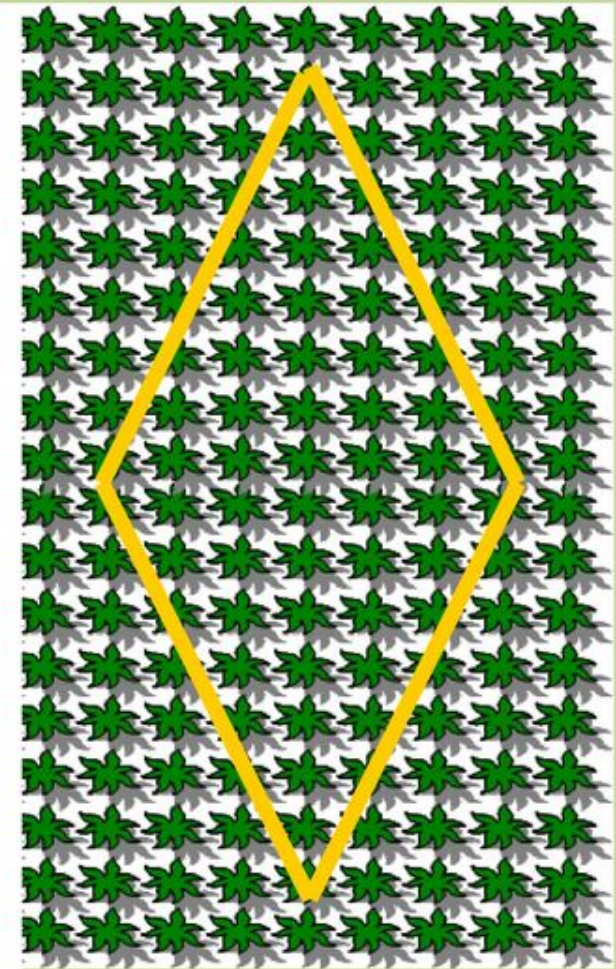
- Examine 5-10 plants at each of 5-10 spots per field. Total or 25-100 plants.
- Look for damage, pests, natural enemies, plant growth/shape/color



Transect



Zig-zag



Diamond

You Will Find Things...but are they a problem?

Identify Them!

- UM Extension Insect, Tick and Plant Disease Lab
- DACF Hemp Program
- Ipmimages.org
- GotPests.org



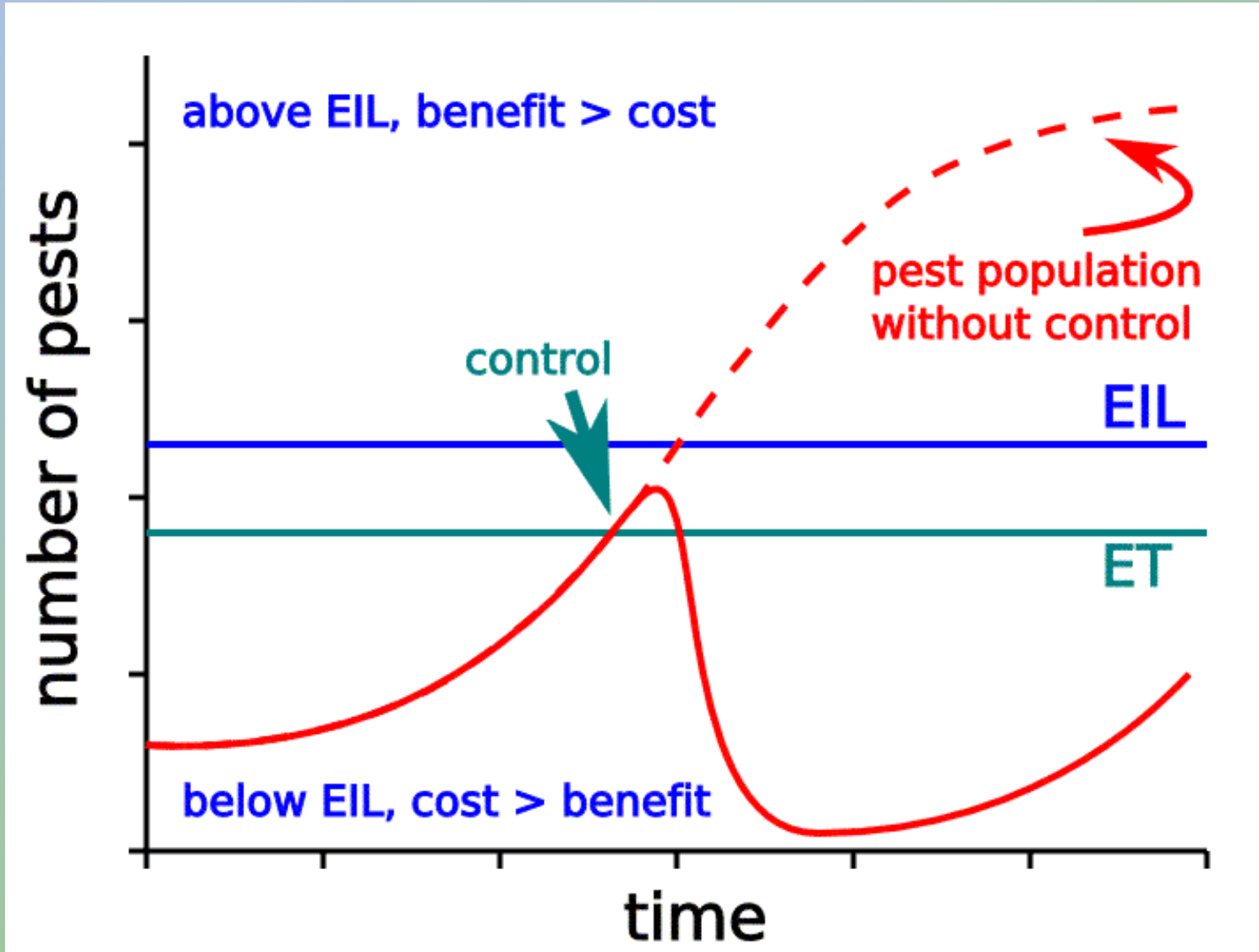
Photo: John
Jemison



- Count number of affected plants out of ~5 plants at each of ~5-10 locations within each variety or site
- Record
 - How many plants affected,
 - Severity of infestation,
 - Date,
 - Location in field (diagram, map, gps),
 - Trap captures
 - Growth stage/conditions
 - Take photos

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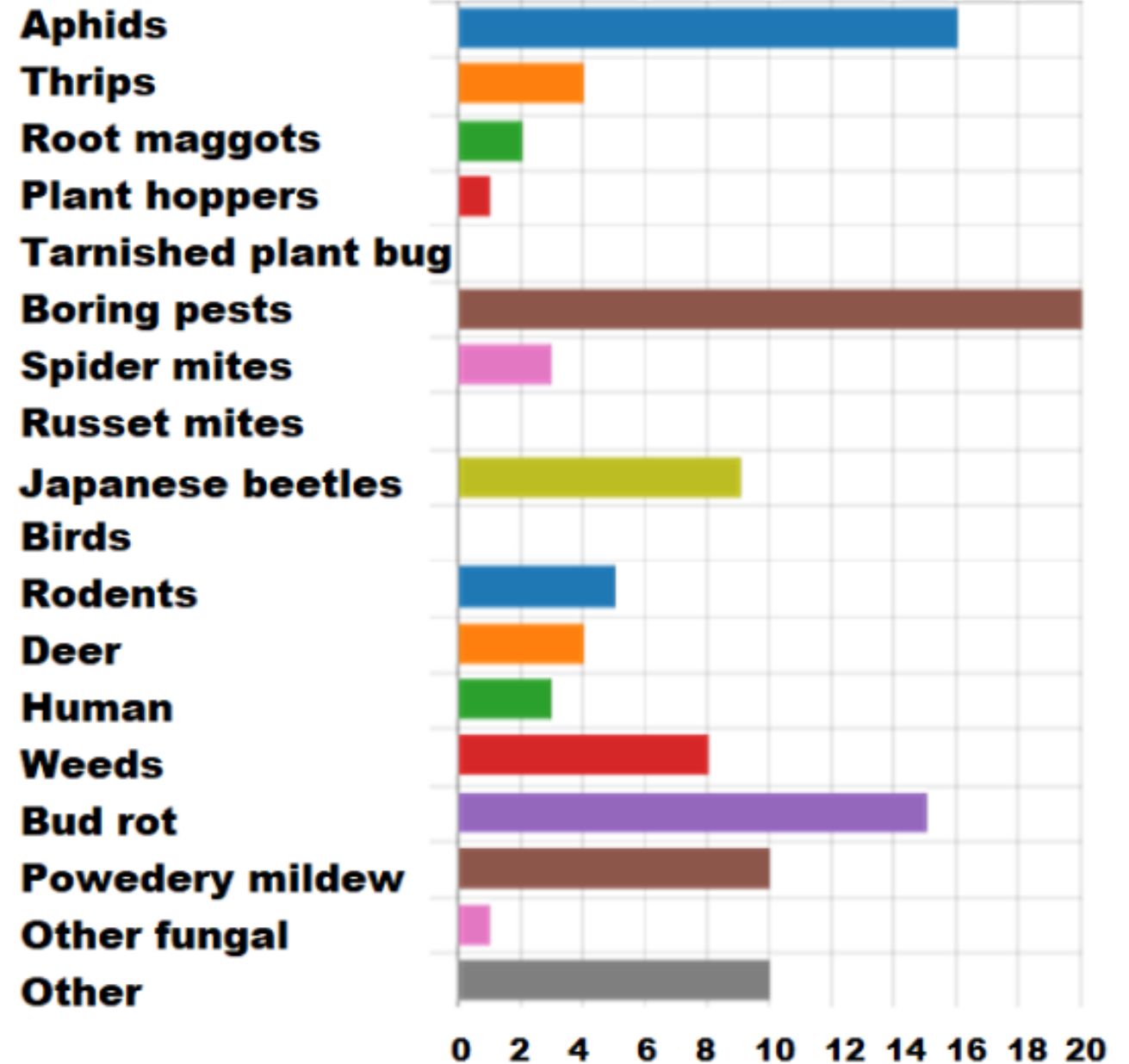
Economic Injury Level/ Economic Threshold



2020 Grower Survey

- 40 responses

What types of pest problems did you encounter?



Aphids

- Suck plant sap
- Secret honeydew = substrate for sooty mold
- Rapid population increase





Aphids

Cannabis Aphid

Image: <https://hempinsects.agsci.colostate.edu/>

Slide Borrowed from
Dr. Raymond Cloyd's
(Kansas State U)
Presentation
November 2020.



**A Sprayer Can Be Used To Apply A Forceful Water
Spray That Will Dislodge Insect And Mite Pests**

Should I Buy and Release Ladybugs in my Fields?

- NOPE!
- Permit from IFW required
- Natural populations in unsprayed fields are abundant
- Introducing bugs collected from elsewhere risks introducing a non-native species, subspecies, or insect disease.
- Ladybugs fly! Away from your field!

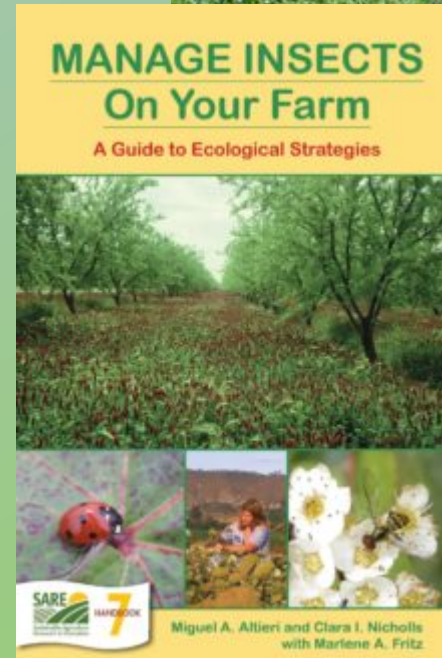


Nature Provides Biocontrol Services



Farmscape to Attract and Support Natural Enemies

- Plant strips, borders or banks of flowering plants
 - provides nectar and pollen for beneficial insects
- Resources:
 - Manage Insects on your Farm (pdf at sare.org)
 - Farmscaping: Making Use of Nature's Pest Management Services' (search for 'extension.org and farmscaping')





eXtension

articles.extension.org
<http://articles.extension.org/pages/18573/farmscaping-making-use-of-natures-pest-management-services>

Farmscaping: Making Use of Nature's Pest Management Services

Organic Agriculture July 05, 2013

eOrganic author:
Geoff Zehnder, Clemson University

Extension.org.
Search for
'Farmscaping'

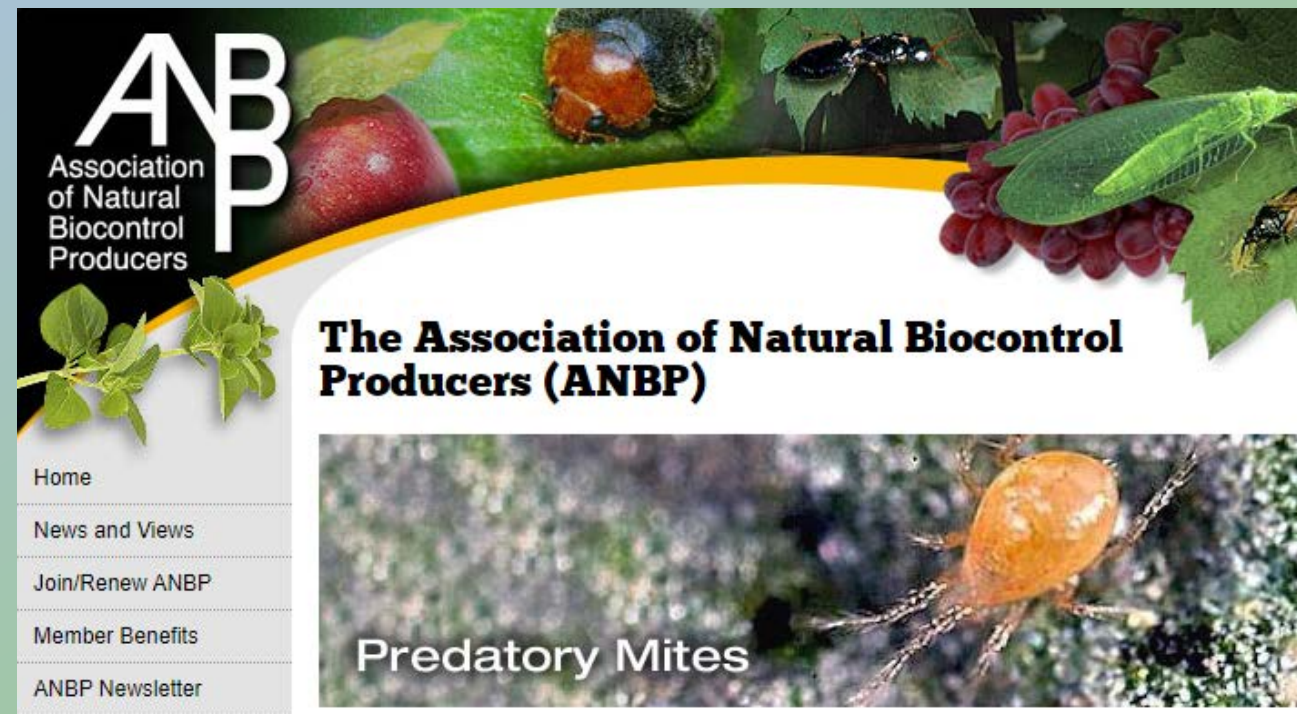
Weeds Don't Support Natural Enemies

Weed management is
critical for pest prevention
and plant vigor



Should I Buy and Release Beneficial Insects in my Indoor Grow?

- Can be helpful, BUT timing, quality, species released, conditions are very important!
- Get sound guidance from reliable source.
 - ANBP.org (Assoc of Natural Biocontrol Producers)



https://ipm.ifas.ufl.edu/pdfs/Grower%20Guide_RB.pdf

Grower Guide: Quality Assurance of Biocontrol Products

Compiled by Rose Buitenhuis, PhD, Research Scientist, Biological Control,
Vineland Research and Innovation Centre, 2014



Image: Urban-gro



Gnpmag.com

Two-spotted Spider Mite (*Tetranychus urticae*)

- Primarily indoor pest
- Thrives in warm (75F), dry (<50% RH) environment
- Provide optimal growing conditions (cooler temps and >50% RH)
- Scout plants regularly
- Biocontrol options available (predatory mites)



Photos: Whitney Cranshaw, Colorado State University

Some Common Outdoor Pests

European Corn Borer (*Ostrinia nubilalis*)

John L. Capinera



European corn borer larva



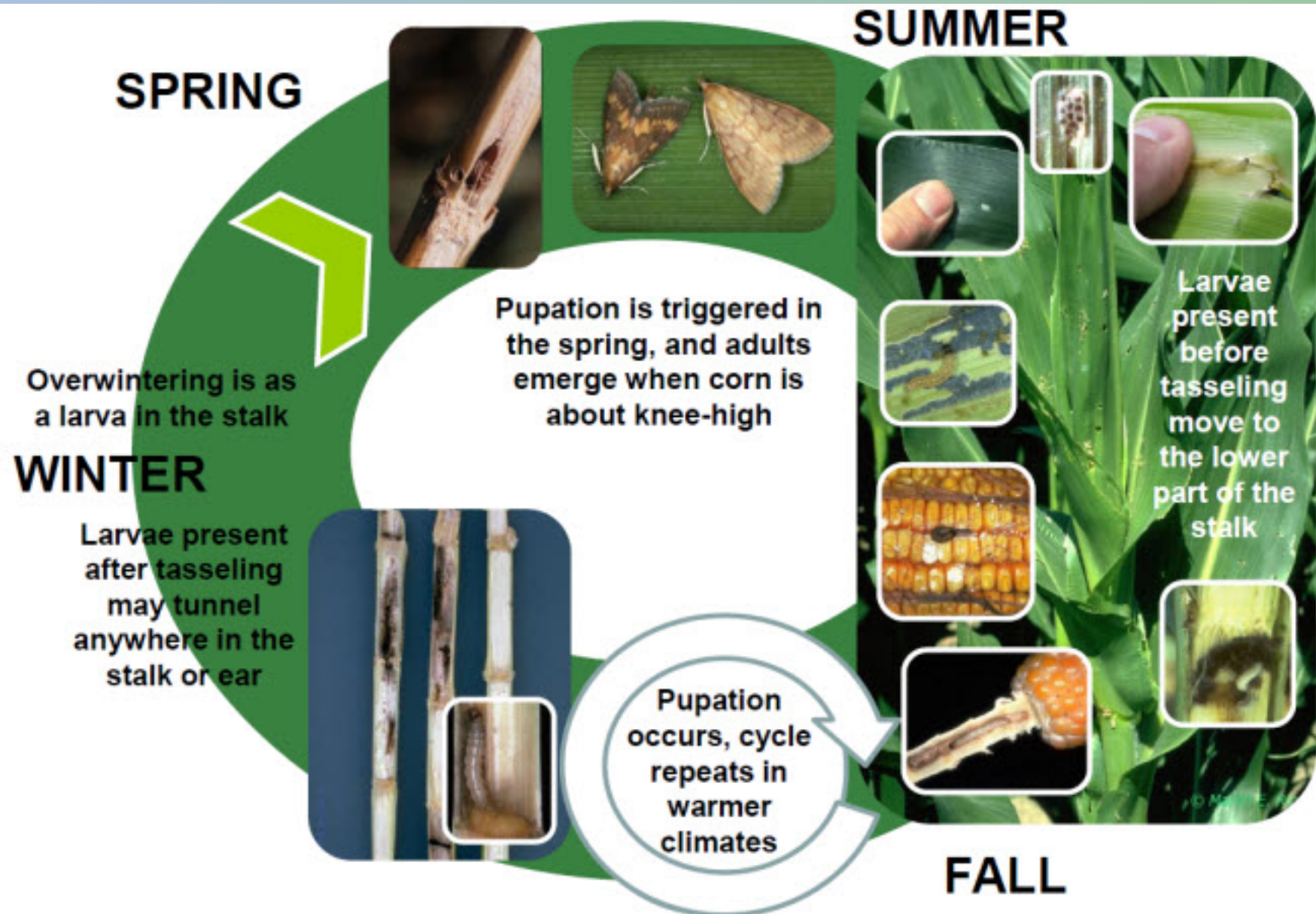
Photograph courtesy of David Keith, University of Nebraska



<http://www.hemptrade.ca/eguide/production/insects-and-pests>



European Corn Borer (ECB)





Monitor for European Corn Borer Moth Activity

- Install pheromone traps to monitor for adult moth activity in June
- Subscribe to University of Maine Extension sweet corn weekly reports



Scout for Borer Damage



5596854

Photo: Whitney Cranshaw



Photo: WI Dept Ag

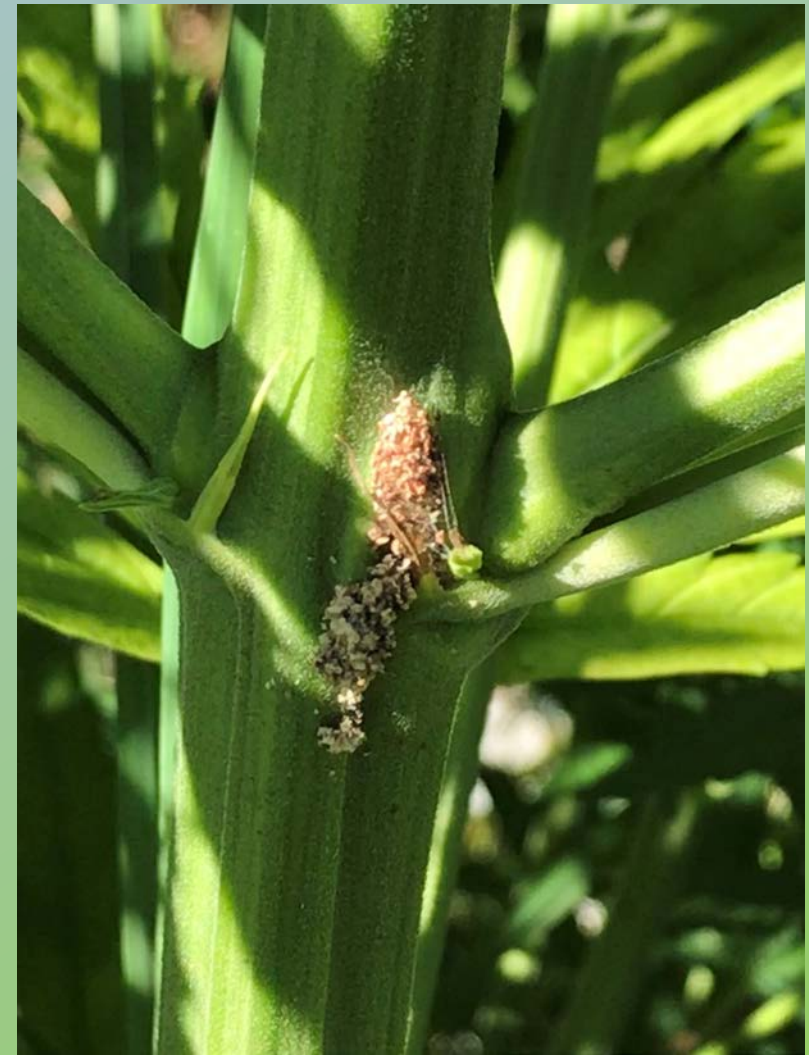


Photo: Devin McGuire



Eurasian Hemp Borer

Images:

<https://webdoc.agsci.colostate.edu/>



Image": bellavancelandworks.com/

Borer Prevention



Image:

https://minnesotafarm.files.wordpress.com/2013/11/100_2502.jpg

- Destroy crop residue after harvest
- Rotate fields to non-susceptible crops
- Manage weeds in and around fields



Hemp Russet Mite (*Aculops cannibicola*)

- Tiny, elongated, pale, on leaf undersides. 10-20x magnification needed to see them
- Can cause leaf curling, bronzing on some varieties. Heavy infestation can suppress bud growth and size.
- Can be spread mechanically and on wind currents



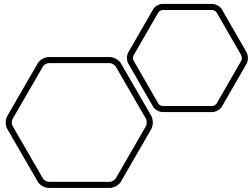
Meadow Vole

- Plastic mulch provides voles great habitat.
- Leaf litter, weeds and grass also provide good cover.
- Keep weeds under control. Use good sanitation in and around the field and greenhouse
- Set Snap traps

Vole Management in the Field

- Tillage – plowing destroys burrows
- Field sanitation
 - remove crop debris and old plastic mulch
 - Control weeds in and around field
- Trapping
- Stem guards?





Place snap traps in vole runways

- <https://grasspad.com/voles/> (video)
- <https://extensionpublications.unl.edu/assets/html/g887/build/g887.htm> (fact sheet)

Or traps at right angle to runway, with triggers in runway

Traps parallel in runway. Triggers facing away from each other



Rodent Management in the Greenhouse/Hoophouse

- Mow natural vegetation away (2-3') from perimeter
- Build them out- buried (18" deep) hardware cloth skirt around perimeter
- Set traps



IPM for Plant Disease Prevention



- Infectious (eg fungi, bacteria, viruses)
- Non-infectious (nutritional deficiencies, frost, salt, sunscald)
- Prevention is critical
 - Sanitation: remove plant debris, sanitize tools, disinfect grow room surfaces
 - Optimize Growing Conditions: water, sunlight, temperature, nutrition, soil condition
 - Adequate Spacing: reduce humidity, increase air movement
 - Scout regularly
 - Rogue-out, bag, and dispose of infected plants
- Pesticide options limited – check with BPC for guidance



Pest Prevention: Farm Hygiene/Sanitation

- Manage pests on starts BEFORE transplanting
- Prepare Field: remove old plastic mulch, properly clean and store equipment, control weeds, rogue out volunteers
- Clean equipment and boots between fields
- Work in dry, pest-free areas first before moving into infested, wet areas



Stem and Root Rots

- Young plants most at risk
- Caused by fungal pathogens: *Fusarium* spp, *Pythium* spp, *Botrytis*
- Maintain proper soil moisture -- avoid overwatering or poorly drained soil conditions
- Keep grow rooms clean of soil and plant debris
- Disinfect grow room surfaces periodically as well as pots and tools before reusing them.

Gray Mold (bud rot, *Botrytis cinerea*)

Images: Nicole Gauthier, Univ of KY.
<http://www.kyhempdisease.com/gray-mold--botrytis--in--the-greenhouse.html>

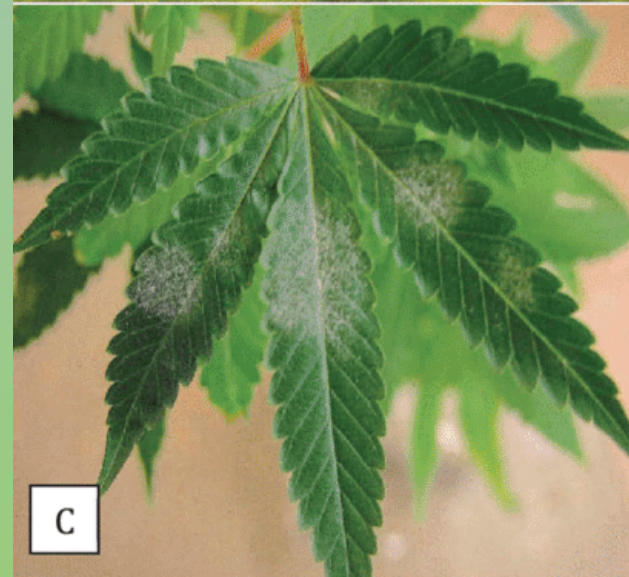


- Can be found in soil, dead plant tissue or living plants. **Remove plant debris**
- Develops in high humidity—in flower buds and tightly-packed plant parts – **provide adequate spacing. Scout regularly and remove infected plants.**
- Can enter through wounds and pruning cuts
- Stem infections and damping off disease of seedlings. **Scout early and often.**
- Good resource: UKY Hemp Disease Lab (search for Kentucky Hemp Disease)

Powdery Mildew

- Lives on live plant material
- Found on upper leaf surface
- Favored by moderate temps and high humidity
- Plant spacing to optimize air flow
- Select resistant varieties

Photo credit:
Creative
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NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



Leaf Spot Diseases (eg *Septoria*, *Cercospora*, *Anthraco*nose)

- More common outdoors
- Some persist in soil or plant debris
- Plastic mulch can reduce soil splash onto plants
- Destroy plant debris at season end
- Get a diagnosis (UMaine Plant Disease Lab)

Slide credit: Scott Lewins
Entomology Extension
Educator UVM Extension
NWCS Team



What's Ailing My Plants?

- UM Diagnostic Testing Lab
- Contact Alicyn Smart
- **207.581.3883**
Email: alicyn.smart@maine.edu
- Visit: <https://extension.umaine.edu/ipm/plant-disease/>

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Plant Disease Diagnostic Testing

 [Print](#)

The Plant Disease Diagnostic Lab has **two options** for diagnosing plant diseases. The traditional way to test is by submitting plant material to the lab that can be analyzed and cultured in the lab to identify if a disease is present. The other option is to purchase the Plant Disease Identification Box and culture the plant material yourself. The Plant Disease Identification Box is designed for those with limited plant material or for plant material that is prohibited by federal law regulations to be received in a lab.



Submit Plant Material
(Submission Form Included)



Plant Disease Identification Box

Keys to IPM Success

- Prevent: Learn how to avoid common pest issues and grow healthy plants.
- Prepare: Know your options and decision points for common pests.
- Scout: Intentionally and aggressively. 2-3x/week indoors, 1-2x/week outdoors
- Identify insects and disease accurately
- Assess and record what, where, when and severity of pest occurrence

Additional Resources

UVM: Recorded webinars:

<https://www.uvm.edu/extension/nwcrops/industrial-hemp>

CSU Hemp Resource Center:

<https://hempinsects.agsci.colostate.edu/>

Identifying and Managing Arthropod Pests in Hemp

Dr. Heather Darby
Extension Professor
Agronomy Specialist

Scott Lewins
Entomology Extension
Educator



MENU

Hemp Insect Factsheets

Insects that Chew on Leaves

[Beet Webworm](#)



Insects/Mites associated with
Buds/Flowers/Seeds

[Lygus Bugs](#)



Maine Resources

- **Maine Dept Agriculture, Conservation and Forestry**
 - **Hemp Program:**
<https://www.maine.gov/dacf/php/hemp/index.shtml>
 - **Maine Board of Pesticides Control:**
www.thinkfirstspraylast.org, pesticides@maine.gov
- **Cooperative Extension**
 - **Food and Ag Center:**
<https://umaine.edu/mainefoodandagcenter/>
 - **Insect, Tick and Plant Disease Lab:**
<https://extension.umaine.edu/ipm/>
 - **County Offices:** <https://extension.umaine.edu/county-offices/>

