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## **Pest Management Considerations 2019**

Erin Lizotte, Statewide IPM Educator  
Michigan State University Extension



# Overview

- Scouting
- Review of primary insect pests
- Review management guide
- Management considerations
- Resources



# Scouting

- Scouting involves monitoring the crop and cropping area for problems
- Begin as soon as trees begin to grow or pests become active
- Continue until crop is dormant or 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



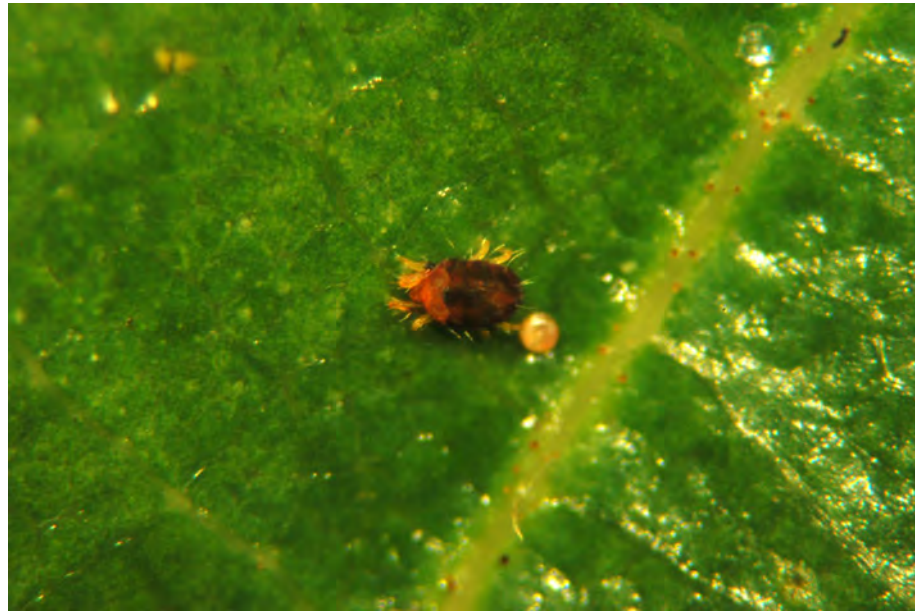
# Scouting

- Scouting for diseases includes monitoring the crop for signs and symptoms of disease and quantifying incidence and severity



# Scouting

- Scouting for insects includes looking for all life stages and attempting to quantify the population
- May also include inspecting for crop damage and setting traps to collect them



# Abiotic issues

- Unexplained by pests
  - Cold
  - Lack of water
  - Lack of nutrient
  - pH
  - Mechanical damage
  - Excessive water





# Vertebrate pests



# Scouting protocol

- Section your farm off into manageable portions based on orchard acreage and age
- Review the list of known pests and beneficials known to be active at that time



# Wait-- What am I looking for?

- 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 trees
  - **Anything out of the ordinary**



## General Protocol

- Interior and edge
- Check new area each time
- Gently ruffle foliage as you walk looking for a flush of activity
- Remove leaves as you move through the orchard, flip them over and give a close inspection using a hand lens
- Check leaves from all reachable heights
- The more you look, the more you see.....



## Review of primary insect pests

- Potato leafhopper
- Mites
- Rose chafer
- Japanese beetle



# Potato leafhopper

- Adult is pale to bright green and about 1/8 inch long
- Adults are very active, jumping, flying when disturbed
- The immature forms, or nymphs, are green and wingless
- Does not overwinter in northern US













Don't be tricked by "boating"

# Damage

- PLH feed near the edges of the leaves with piercing-sucking mouthparts
- Heavily damaged leaves have necrotic and chlorotic edges and abscise from the tree
- Severely infested shoots produce small, bunched leaves
- In many crops leafhopper can reduce plant vigor, reduce cropload and crop quality—impact unkown in chestnut



## Scouting for PLH

- Scouting should be performed weekly to ensure detection early and prevent injury
- More frequent spot checks should be done immediately following rain storms in spring
- For every acre of orchard, select 5 trees to inspect and inspect the leaves on 3 shoots per tree (a total of 15 per acre)
- Russel foliage as you scout
- Flip the shoot over and look for adults and nymphs on the underside of leaves



# PLH management

- The most common classes of insecticides for control include the pyrethroids, carbamates, neonicotinoids and organophosphates
- Carbamates and organophosphates are broad spectrum and can disrupt natural enemies so only use when necessary (like targeting another pest at the same time)
- Pyrethroids can cause mite flaring but are less expensive
- Neonicotinoids are longer lasting and narrow spectrum making them a solid choice for management



# Mites

- European red mite and two-spotted spider mites are pests for many growers
- Both species can be found in the orchard season long and can do considerable damage to the trees, particularly when in high numbers or on young trees
- No established threshold, but 100% control is likely not necessary





Two-spotted Spider Mite

# ERM





# Don't hurt the good guys!

Predatory mites tend to move quickly.



# Symptoms of mite damage

- Injury is cumulative
- Leaves appear mottled, stippled, and in more severe cases bronzed
- Injured leaves have reduced photosynthetic activity potentially leading to reduced nut size, and return crop load potential as well as increased sensitivity to winter injury



# Scouting for mites

- ERM: Begin scouting early for eggs
- TSSM: Take a soil sample and look for overwintering females
- During the season, inspect leaves on inner shoots of at least 10 trees per acre
- Look on the upper and lower leaf surfaces of the leaves



# Mite management

- Dormant Superior oil applications are effective for ERM
- There are a number of miticides that have shown excellent efficacy against TSSM and ERM and are relatively soft on predatory mites
  - Avermectins (8-12 weeks residual control)
  - Hexythiazox (8-12 weeks residual control)
  - Bifenezate (6-8 weeks residual control)
  - Etoxazole (8-10 weeks residual control)
  - Spirodiclofen (8-10 weeks residual control)
- Consider spot treatments



# Japanese beetle

- Adult Japanese beetles are 3/8-inch long, metallic green beetles with copper-brown wing covers
- Adults emerge from the ground and begin feeding on plants in June
- Individual beetles live about 30-45d
- Activity is concentrated over a four to six week period, after which the beetles gradually die
- Large, well established trees can likely tolerate considerable feeding damage



## Japanese beetle damage



- JB skeletonize leaves and feed in large groups
- Can be particularly destructive to young trees with limited leaf area



# Scouting for JB

- Take a walk—they aggregate so they are highly visible!
- Check preferred hosts in the vicinity (apples are a favorite)
- Wild raspberry, blackberry, Virginia creeper, wild grape or sassafras are highly attractive and beetles will aggregate on these plants



# Managing Japanese beetle

Difficult to control because of their aggregating behavior

- Carbamates-immediate knockdown and 7d residual
- Organophosphates-takes 3 days for effect, 10-14d residual
- Pyrethroids-good knockdown, 7-10d residual, may flare mites
- Neonicotinoids-2-5d contact poison, then must be ingested, long residual
- OMRI approved, Azadactrin (neem) products 1-2d residual, good knockdown
- OMRI approved, Surround (kaolin clay) has had good results in blueberry and grape





## Rose chafer

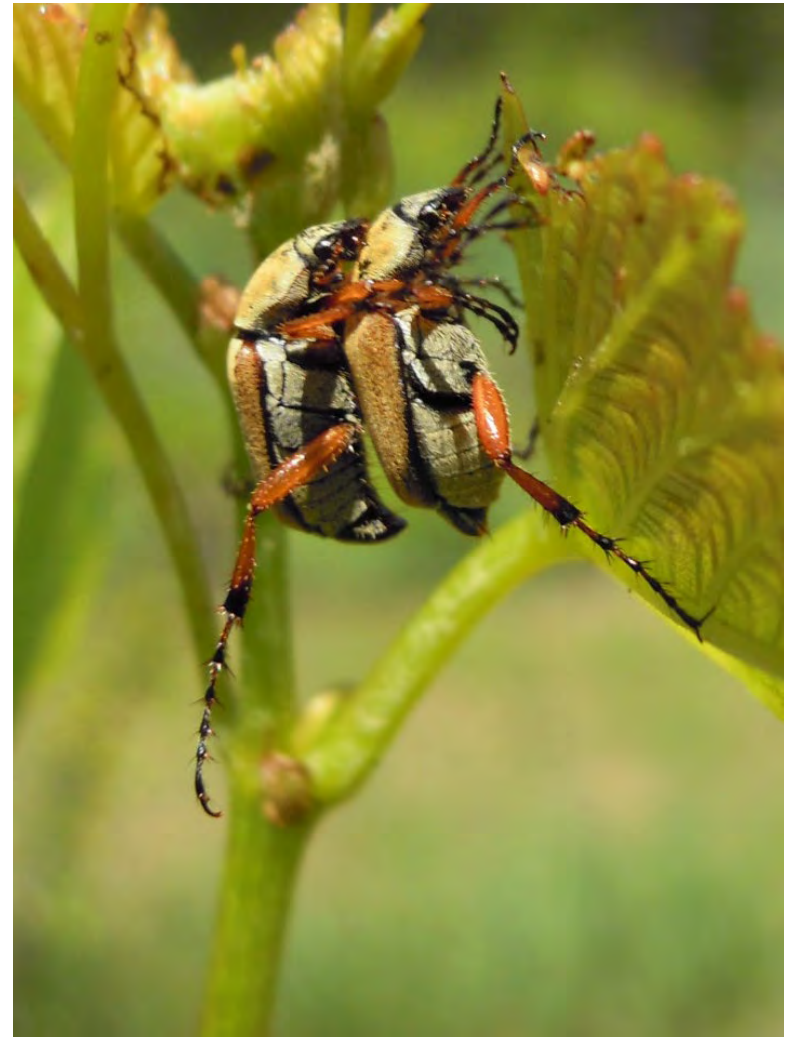
- Feed on many crops grown on sandy soils
- There is a single generation per year with the adults showing up in June
- The activity of adults typically lasts for only two to three weeks
- Particularly damaging on young trees with limited leaf area





## Scouting for RC

- They are often found in mating pairs and fly during daylight hours
- Visual observation via transect is the best method for locating them



## RC management

- Difficult to control due to reinfestation
- Carbamates, organophosphates, pyrethroids and neonicotinoids can provide some control
- Organic options including azadactrin (neem) products and surround are marginally effective
- It is likely that large, established trees can tolerate a fair amount of feeding



# Management considerations

- Necessity of application
- Outcomes of application



## Necessity of application

Consider the following before making a treatment:

- Are trees small with limited leaf area or well established?
- Are trees healthy and thriving or struggling?
- What is the historical pest pressure on this site?
- Use your grower experience, it is **VERY** important.



# Outcomes of application

Consider the outcomes before making a treatment:

- Can this application control more than one target pest?
  - How should I position my applications to optimize control and minimize use?
- How will beneficial insects, particularly predators mites be affected?
- Are there implications for pollinators?
  - How can I mitigate negative effects?

Relative impact of pesticides on beneficial insects.

Fungicides	Signal Word	Trade Name	Beneficial arthropod		rankings <sup>1</sup>
			Predatory mites	Lady beetles	
Beauveria pumilus	Caution	Sonata	1	ND	ND
boscalid	Caution	Pridine	1	ND	ND
copper	Caution	Various formulations	1	ND	ND
cyproconazole	Warning	Curato 50DF	ND	ND	ND
dimethomorph	Caution	Acrobat (revamped focus)	ND	ND	ND
Fenoxadone & pyraclostrobin	Caution	Tanos	ND	ND	ND
fostylyl-M	Caution	Aliette WDG	ND	ND	ND
tebuconazole	Caution	Surround	3	ND	ND
mandipropamid	Caution	Revus	OK <sup>2</sup>	OK <sup>2</sup>	ND
mefenoxam	Caution	Midomil	ND	ND	ND
metalaxyl	Warning	MetasStar	ND	ND	ND
mineral oil/petroleum distillate	Caution	Various formulations	2	ND	ND
phosphorous acid	Caution	Fosphite & other formulations	ND	ND	ND
pyridostrobin	Caution	Pridine	ND	ND	ND
quinoxifen	Caution	Quinex	1	ND	ND
sulfur	Caution	Various formulations	2	ND	ND
tebuconazole	Caution	Follicur 3.0F	1	ND	ND
<b>Herbicides</b>					
2,4-D	Danger	Weedar 64 & other formulations	ND	ND	ND
carfentrazone	Caution	Aim EC	1	ND	ND
diclofopim	Warning	Select Kiva	1	ND	ND
glifosifamid	Caution	Stinger	1	ND	ND
fluroxypyr	Caution	Chateau	OK <sup>2</sup>	OK <sup>2</sup>	ND
glyphosate	Caution	Roundup & other formulations	1	ND	ND
metolachlor	Caution	Solcam	ND	ND	ND
pelargonic acid	Warning	Soythe	ND	ND	ND
trifluralin	Caution	Treflan & other formulations	2	ND	ND

1. International Organization for Biological Control (IOBC) has categorized pesticides using a ranking of 1 to 4. Rankings represent relative toxicity based on data from studies conducted with tree fruit, hop, mint and grape. 1= less than 30% mortality following direct exposure to the pesticide; 2 = 30 to 79% mortality; 3 = 79 to 99% mortality; and 4 = greater than 99%. ND = not determined.

2. IOBC rankings not available for this newly registered product. Tests in 2009/2010 determined these compounds safe on predatory mites and Stethorus.

Pacific Northwest Hop Handbook 2010

# Resources

2019

## Michigan Chestnut Management Guide



MICHIGAN STATE UNIVERSITY | Extension



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### Registered Insecticides













2019 Insecticide efficacy<sup>1</sup> of registered products on edible chestnuts in Michigan.

Chemical Class (IRAC Insecticide group)	Active ingredient	Products Labeled	Pesticide efficacy <sup>2</sup>					
			Potato leaftopper	Rose chaffer	Japanese beetle	Two-spotted spider mite	Supernumerary red mite	
Multi-site, Organophosphate (8)	Malathion	Chemnova Malathion 37%, Malathion 57 EC, Malathion 8 Aquasol	N	F-G	F-G	U	U	
	Phosmet	Phosmet 70W	G-G	G	E	N	N	
Avermectin (6)	Abamectin**	Abate, Abate 0.15EC, Abamectin 0.15EC, Abate Ultra, Agri-Mek SC, Agri-Mek 0.15EC, Epi-mek 0.15 EC, Reaper 0.15 EC, Reaper Clearform, Reaper Advance, Zoro	U	G	N	E	E	
	Emamectin benzoate**	Proclaim	N	N	N	F	U	
Carbamate (14)	Carbaryl	Carbaryl 4L, Sevin 4F, Sevin XLR Plus, Sevin SL	E	G	G	U	U	
Dicycldimazine (18)	Methoxyfenozide	Intrepid ZF	N	N	N	N	N	
	Tebufozate	Confirmit ZF	N	N	N	N	N	
Diamides (28)	Chlorantraniliprole	Alicor	N	N	N	N	N	
	Flupendiamide	Belt SC	N	N	N	N	N	
Buprofezin (16)	Buprofezin	Centaur	G	N	N	N	N	
	Fenpyroximate	Portal XLO	G	N	N	G	E	
Pyridobenzimidazole (21A)	Pyridobenzimidazole	Wester	N	N	N	G	E	
	Pyridobenzimidazole	Bifenxate 200F, Bifenxate EC, Bifen 24IG Gold, Bifenxate WS8, Bifenxate 2EC, Fenfare ES, Fenfare 2EC, Hero EW, Sniper	G	U	E	U	U	
Pyrethroids (3)	Bifenthrin**	Baythroid XL	E	G	G	U	U	
	Beta-cyfluthrin**	Tombstone, Tombstone Helios	U	N	U	N	N	
	Cyfluthrin**	Declare, Proaxis	U	G	G	U	N	
	Gamma-cyhalothrin**	Grizzly Z, Kendo, Lambda T, Lambda-CY EC, Lambda-CY AG, Lambda-CY, Lambda-CY SC, Lambda, Wolfarm, Lambda-Cyhalothrin 1EC, Paradigm, Provinoc, Silence, Warrior I with Zeon, Lambda-CY 1EC	U	G	G	U	N	
	Permethrin	BioGreen EC 80-8*, Pyganic EC 1.4*, Pyganic EC 1.4 (1)*, Pyganic EC 3.0 (1)*	U	F	F	U	U	
	Deltamethrin**	Delta Gold	U	N	U	N	N	
	Alpha-cypermethrin	Festac EC	G	U	G	U	G	
	Fenprothrin**	Denitol 2.4EC Spray	G	U	G	U	G	
	Neonicotinoids	Imidacloprid (4A)	Advise 2FL, Ailix 4F, Macho 20 R, Mecho 4.0, Mellec 2F, Mene Ailix 4F, Montana 2F, Montana 4F, Nuprid 2SC, Nuprid 4.9F Pro, Nuprid 4F Max, Pounce 1.8F, Pounce 1.8F Provice, Sherpa, Trimax Pro, Widow, Wrangler	G	G	G	N	N
		Acetaminonil (4A)	Aselli 30SG, Aselli 70WP	E	G	G	N	N
Clothianidin (4A)		Belay	E	G	G	N	N	
Flupyradifurone (4D)		Sivanto Prime	N	N	N	N	N	
Buthiazin (4C)		Closter SC	U	U	U	U	U	

1. Pesticide efficacy ratings: E=excellent, G=good, F=fair, P=poor, U=unknown, N=pest not included on label. 2. Pesticide efficacy based on trials in fruit crops with products containing the same active ingredient, as reported in the E134 Fruit Management Guide, Michigan State University Extension. \*\*OMR approval for organic production. \*\* Products containing these active ingredients are classified as restricted use pesticides and require the



### Chestnut Pest Scouting Calendar

	Dormancy	Bud swell	Bud break	Leaf expansion	Shoot elongation and catkin initials	Catkin maturity and pollen shed	Bur formation and catkin senescence	Kernel development	Bur splitting	Nut drop	Leaf senescence	Dormancy
												

**Insects**

Asian chestnut gall wasp	+	+	+	+	+	+	+	+	+	+	+	+
Potato leafhopper		+	+	+	+	+	+	+	+	+	+	
European rose chafer				+	+	+	+					
Japanese beetle						+	+	+	+			
European red mite	+	+	+	+	+	+	+	+	+	+	+	+
Lecanium Scale	+	+	+	+	+	+	+	+	+	+	+	+

**Disease**

Chestnut blight	+	+	+	+	+	+	+	+	+	+	+	+
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High risk, monitoring and control may be required

Less risk, monitoring or control may be required

+ Potential pest activity or visibility, monitoring should occur



# An IPM Pocket Guide for Scouting Chestnuts

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## Chestnut weevils

Lesser chestnut weevil (*Curculio sayi*) and large chestnut weevil (*C. caryatipes*)

**When it occurs:** development  
**Where seen:**

**Description:** weevils have brown or tan stripes. Lesser inch long with length. Large inch long with long. Begin just before



Large chestnut weevil  
Todd Lueety, Ontario Min. of Rural Affairs

## pH and nutrient deficiency

Nutrient deficiency caused by pH

**When it occurs:**  
**Where seen:**

**Comments:** Soil chemical property nutrients are organisms and measure of soil



Chestnut leaves caused by an ex

## Lacewings

**Green lacewing** adults (10 to 12 millimeters) have net-veined wings and gold-colored eyes. They feed on nectar, pollen and aphid honeydew.



Green lacewing adult.



Egg on its stalk.

Lacewing eggs are suspended at the tips of long, erect stalks.



David Cappaert, Bugwood.org

Lacewing larvae are alligator-shaped with long, piercing mandibles. They are active predators of soft-bodied insects.

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PUBLISHED ON JANUARY 28, 2019

Register now and join new and experienced growers for an informative and fun meeting March 8-9, 2019, at the Kellogg Biological Station in Hickory Corners, Michigan. This meeting is open to the public.

 [Michigan Family Farms Conference celebrates diversity in agriculture](#)  
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