

Insect Identification: The first step of Integrated Pest Management for Garden and Field

Scott Schell, MS

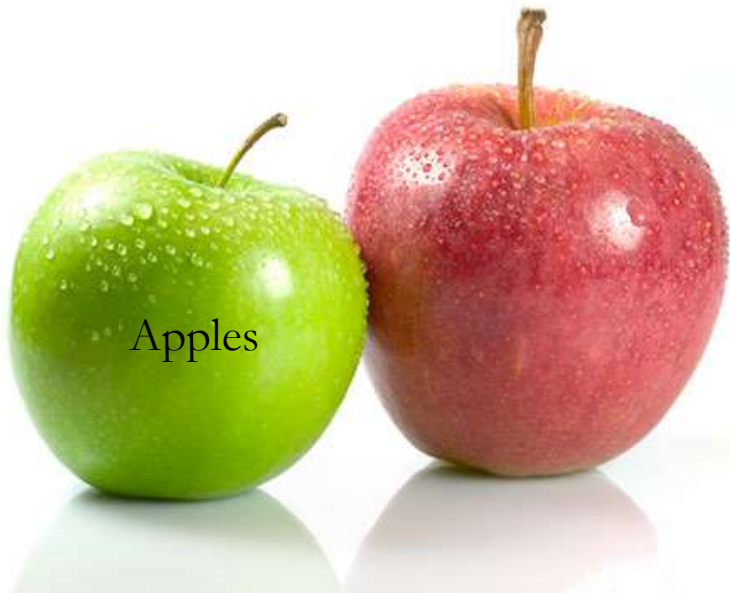
UW Extension Entomology Specialist



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I was going start alphabetically...



Apples



Woolly apple aphid

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What is Integrated Pest Management (IPM)?

“Management of pest (**insect**) populations by the utilization of **all suitable techniques** in a compatible manner so that **damage is kept below economic levels.**”



Commercial Growers Have to Keep In Mind Cost to Benefit Analysis of management.

- If plant pest populations reach damaging levels and warrant treatment keep in mind that **treatment cost should NOT exceed the expected return.**
- However, **home gardens and ornamental plantings** often have value beyond money.



Keep in mind that it is very important to keep plants unstressed and growing vigorously to help defend against pests.



Pest Scouting & Monitoring

Regular, scheduled, field, garden, and landscape scouting is a good habit to get into. (look while you watch your garden grow!)

Sweep Net Sampling and Pest Trap establishment & monitoring provide early warning



Any type of pest management requires the ID of the plant and the pest, if it is one...

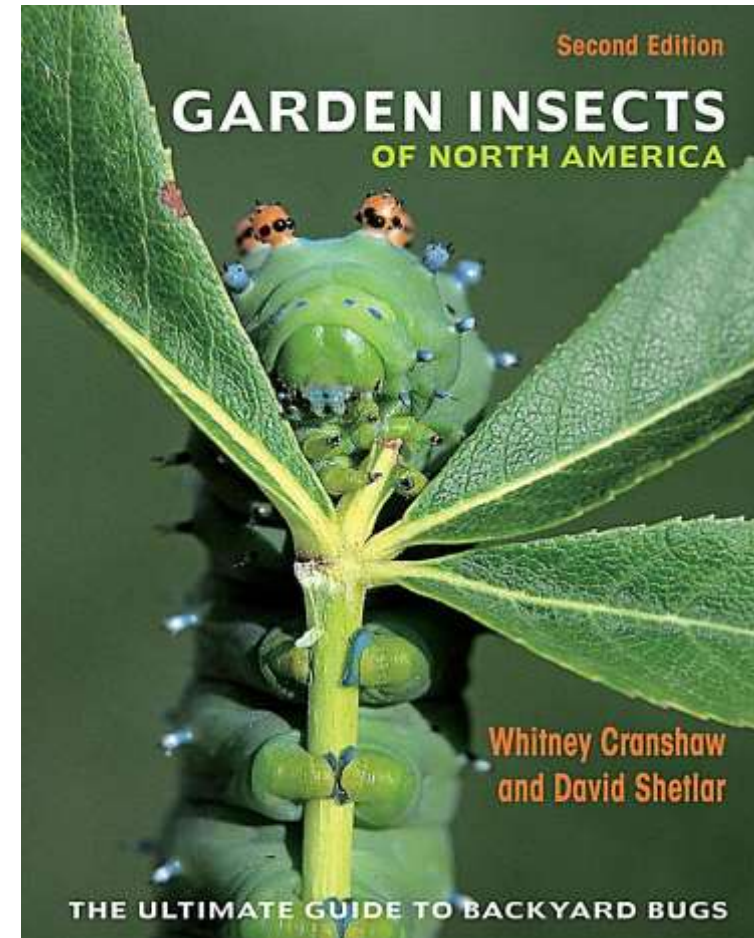
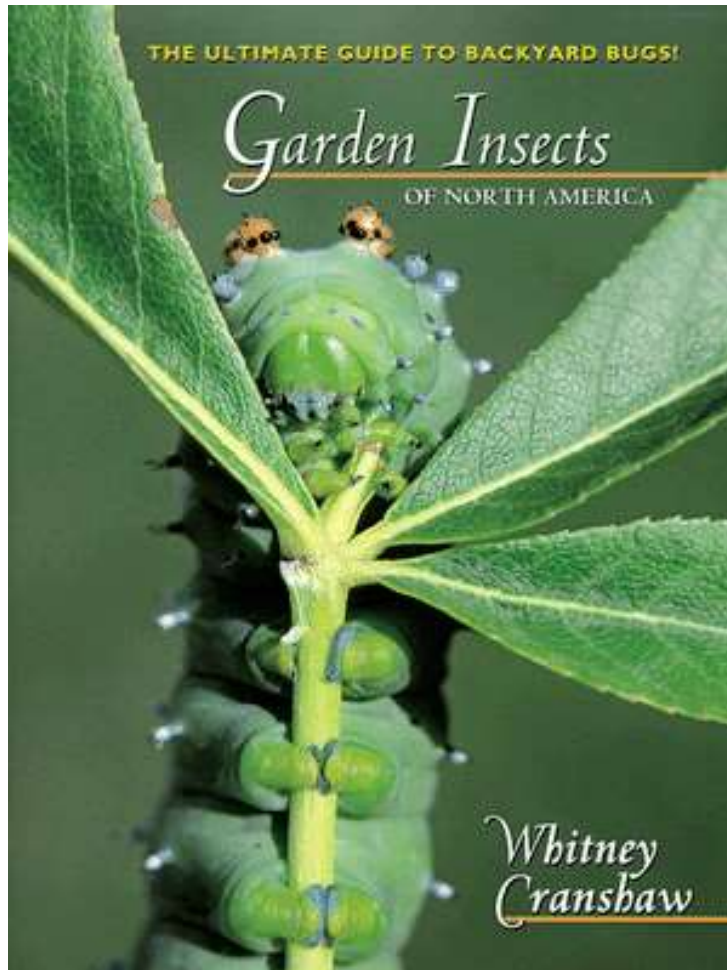
Zucchini squash



The Best Reference for Identifying Garden Insects was-

Now-

(contact me for a copy of
plant/pest index for 2nd. Ed.)



To use these reference books efficiently you need to know the plant species and the type of feeding damage on the plant.



Chewing Mandible Type Feeding Damage





A root weevil adult and its characteristic edge notching damage to leaves

© A. Latchinsky 2006

© A. Latchinsky 2006

Leaf cutter bees and leaf damage



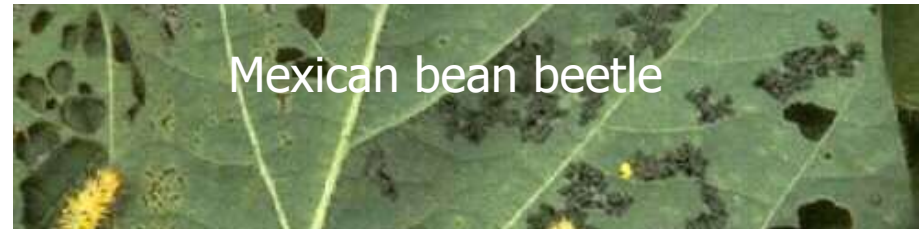
Leaf cutter bees make chambers from leaf fragments for an egg and a ball of pollen they collect.



Skeletonized leaf style feeding



Partial chewing feeding on leaf surface



Hidden Chewing - Stem borer damage

Cottonwood twig borer



European corn borer



Rose stem girdler on red raspberry cane

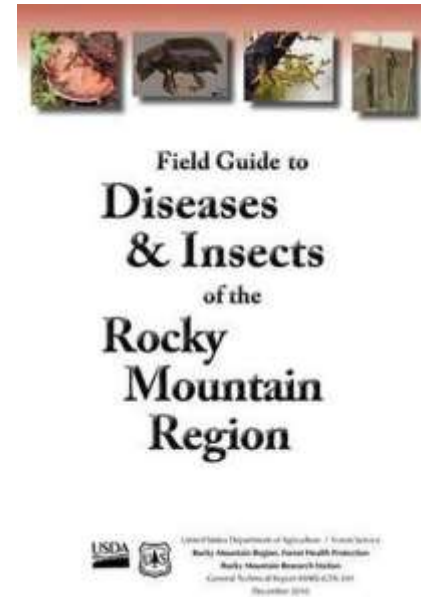
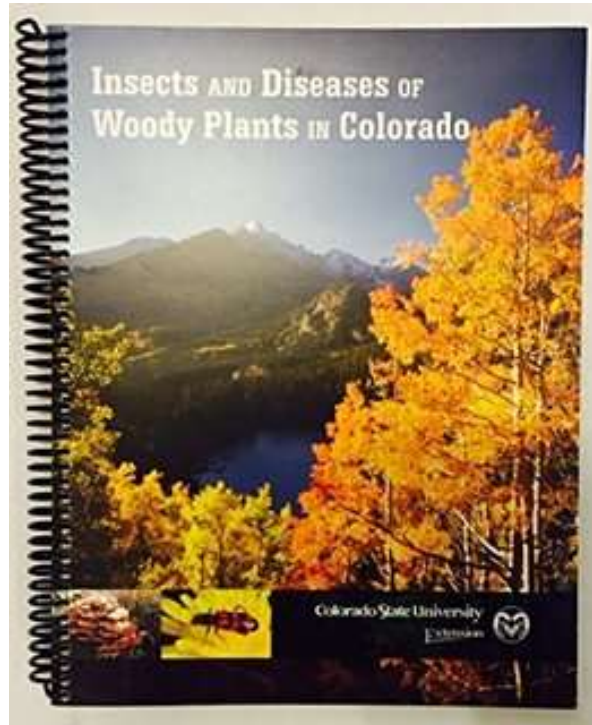


Cambium feeders – bark beetles and some borers

Emerald ash borer (EAB), *Agrilus planipennis*



Many reference books use an appendix of plant species attacked and the feeding damage observed to identify the pest, such as:
“Insects and Diseases of Woody Plants in Colorado”
and “Field Guide to Diseases & Insects of the Rocky Mountain Region”*



*Available as PDF document that can be downloaded and printed.

Correct ID is important and sometimes you have to look closely

Friend - rough stink bug



Foe – brown marmorated stink bug



Piercing-sucking beaks - plants and predation



Some tools to look at specimens closely





Smartphones are very useful tools



Use Magnifier with your iPhone or iPad

With Magnifier, you can turn your iPhone or iPad into a magnifying glass so you can zoom in on objects near you.

How to turn on Magnifier

1. On your iPhone or iPad, go to Settings > Accessibility.
2. Tap Magnifier, then turn it on. This adds Magnifier as an [accessibility shortcut](#).

Quickly access Magnifier

To quickly open Magnifier:

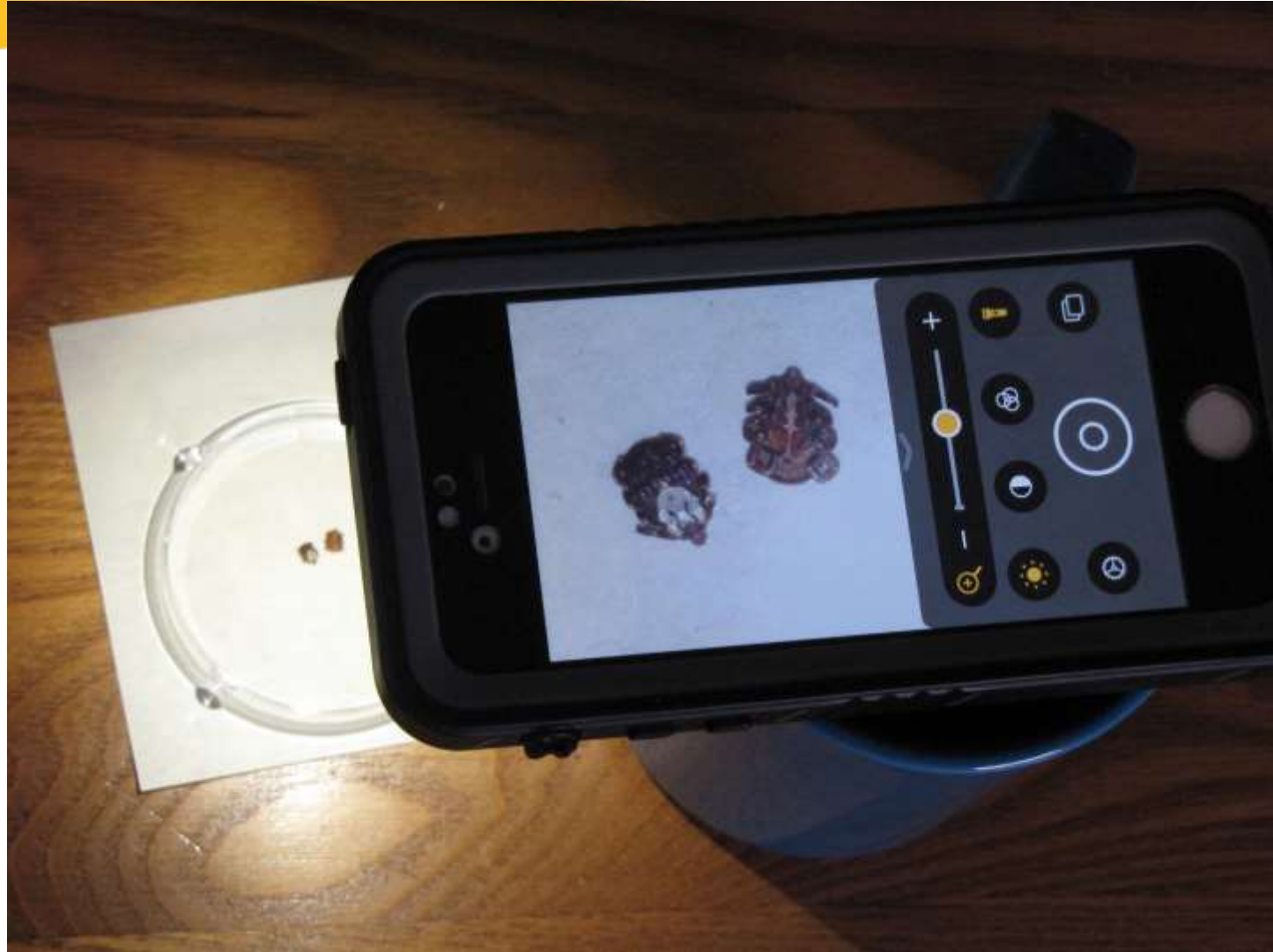
- On an iPhone X and later, or iPad with Face ID: Triple-click the Side button. Then drag the slider to adjust the magnification level. To close Magnifier, swipe up from the bottom of your screen.
- On an iPhone 8 and earlier, and iPad models with a Home button, triple-click the Home button. Then drag the slider to adjust the magnification level. To close Magnifier, press the Home button.

You can also add Magnifier to Control Center:

1. Go to Settings > Control Center, then tap Customize Controls.
2. Tap the add button  next to Magnifier.

Then from Control Center, tap the Magnifier button to use it.







 **ProScope**

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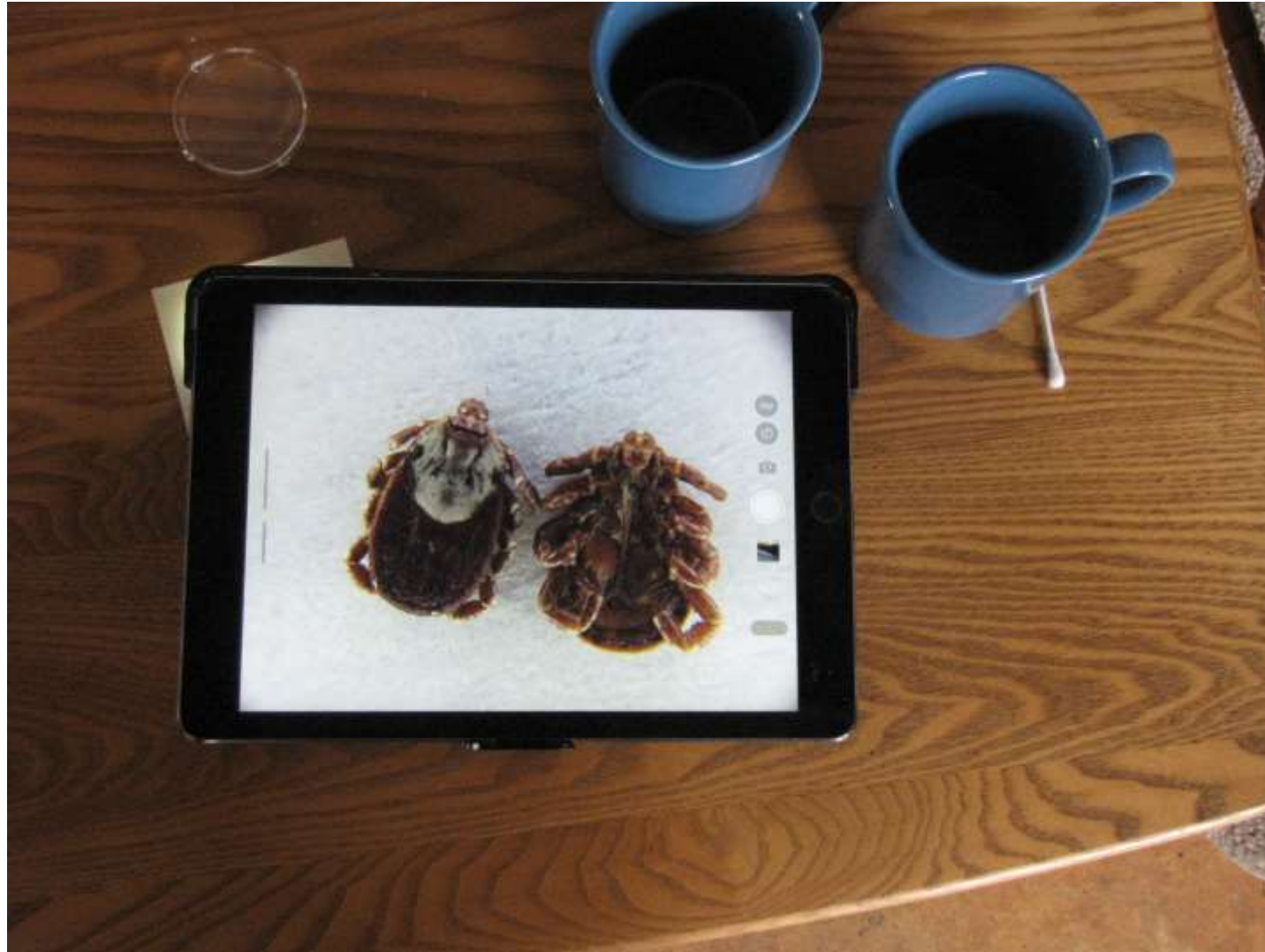


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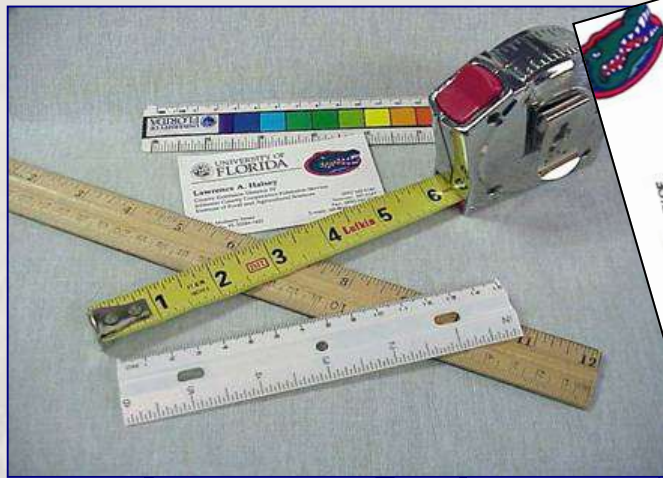
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ProScope on Ipad image

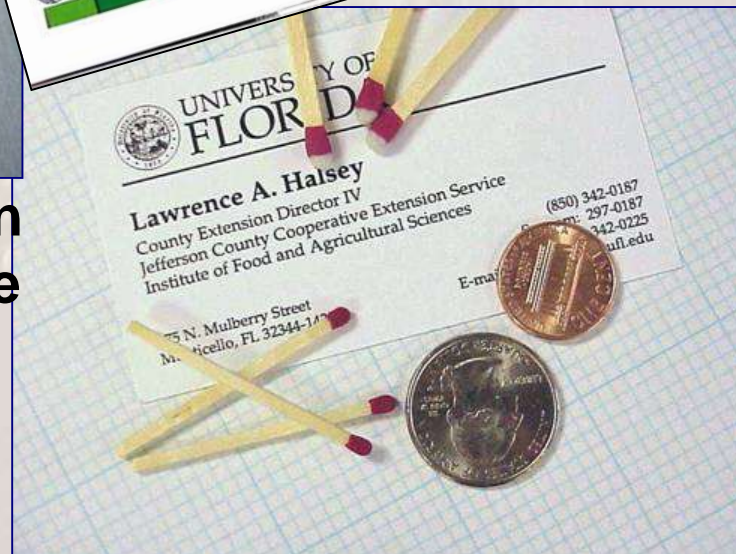


If you need to send a photo to me please include information about the specimen's size, where you caught it (inside, outside, plant species), and plant damage if applicable.

MODULE 6 – Effective Digital Photos for Sample Submission



**paper, give the size in the text portion of the digital sample....
10x10/inch in this photo**



You are welcome to send me photographs for identification assistance but-

MODULE 6 – Effective Digital Photos for Sample Submission



Review images the photos you take. Sharp focus is essential. You **cannot re-focus** during post-processing

<https://keys.lucidcentral.org/keys/v4/uwyo/index.html>

Common Wyoming Vegetable & Fruit Identification Tools

- ▶ Asparagus pest identification
- ▶ Bean pest identification
- ▶ Carrot parsley & cilantro pest identification
- ▶ Pea pest identification
- ▶ Pepper pest identification
- ▶ Potato pest identification
- ▶ Sweet corn pest identification
- ▶ Tomato pest identification



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IPM - Pest Prevention Methods

Cultural Control Measures

- **Crop rotation** – good for insects with long life cycles (e.g., corn rootworms) less viable w/ perennial plantings
- **Tillage** – good for some soil-inhabiting stages of pest insects but can reduce soil health
- **Clean culture** – removal of crop residues if that is where a specific pest overwinters – note that this can impact some beneficial insects
- **Timing of planting and harvesting** – soil temperature very important for rapid germination
- **Pest Resistant plant varieties** – always choose disease resistance over pest resistance if, you have to choose



Hypothesized that metallic mulch reflectance interferes with insect vision.



Cultural Control Continued-

Metallic Artificial Mulches

“Silver Mulch..the extra light from the reflection repels insects and the increased light from reflection is one of the reasons your yields increase.”

Cultural control: advantages

- Use Common growing practices to make environment unfavorable for pests
- Preventive strategy
- Economical

Cultural control: drawbacks

- Will not work in an pest outbreak situations

Biological Pest Control

- Classical biological is the introduction of non-native species of parasites and predators for non-native/exotic pests
- Conservation of native parasites and predators of crop pest
- Artificial augmentation of pest parasites and predators
- Bio-pesticide control (insect pathogens) applications

Drawbacks: may be costly, often slow to work,
and sometimes weather dependent

Insect Pest Biocontrol agents



Predators



Parasitoids



Pathogens

Some sources of biocontrol agents:

ARBICO Organics - Many types such as: spined soldier bugs, minute pirate bugs, green lacewings, predatory mites, nematodes, and insect pathogens

Gardens Alive! - Some biocontrol agents, a large selection of pest traps

Planet Natural – broad selection of predators and parasitoids of pests



Naturally occurring but under recognized beneficial insects

Tachinid flies

Second largest
dipteran family with
~1350 spp. in
North America

Adults nectar feed
and carry pollen. The
larvae feed internally
on caterpillars, beetle
grubs, and
grasshoppers, etc...



©AVL2006

Tachinid fly eggs, infested host, and pupa



UC Statewide IPM Project
© 2000 Regents, University of California



UC Statewide IPM Project
© 2000 Regents, University of California

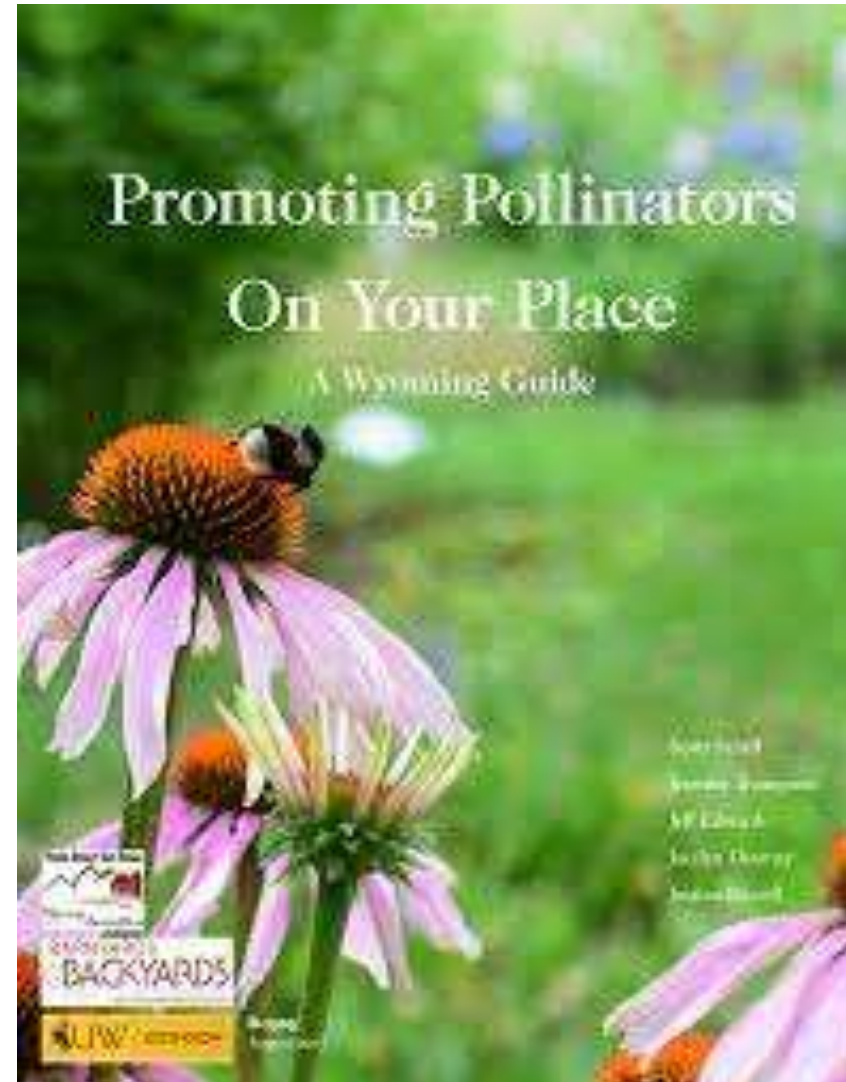
Having flowers as a source of food for the adult stages of many beneficial insects is important



Flower fly larvae preying on aphids



Flower or Syrphid fly



Will flowers attract unwanted insects?

Cabbage white butterfly



Additional Types of Control

“Mechanical”

- Hand picking
- Trapping
- Using devices like screens and barriers (i.e. row covers)



Drawbacks: time and labor consuming, wind storms can damage row covers.

Scale is important

- Hand picking pests works well on 2 tomato plants in a hanging baskets.
- Hand squishing bugs doesn't work well in a 2 acre field (unless you have a lot of children!).



UPSIDE DOWN TOMATO PLANTERS - AUG/8/04 © HFW

IPM and Pesticides

- Pesticides are, perhaps, undesirable and labor enjoyable(?) for a gardener
- Pesticides, synthetic or organic, are relatively inexpensive compared to labor for a commercial farmer



IPM and Pesticides

“Synthetic and Organic Pesticides



are for reduction of pest populations or prevention of pest injury by the use of materials to poison them or repel them from specific areas.”

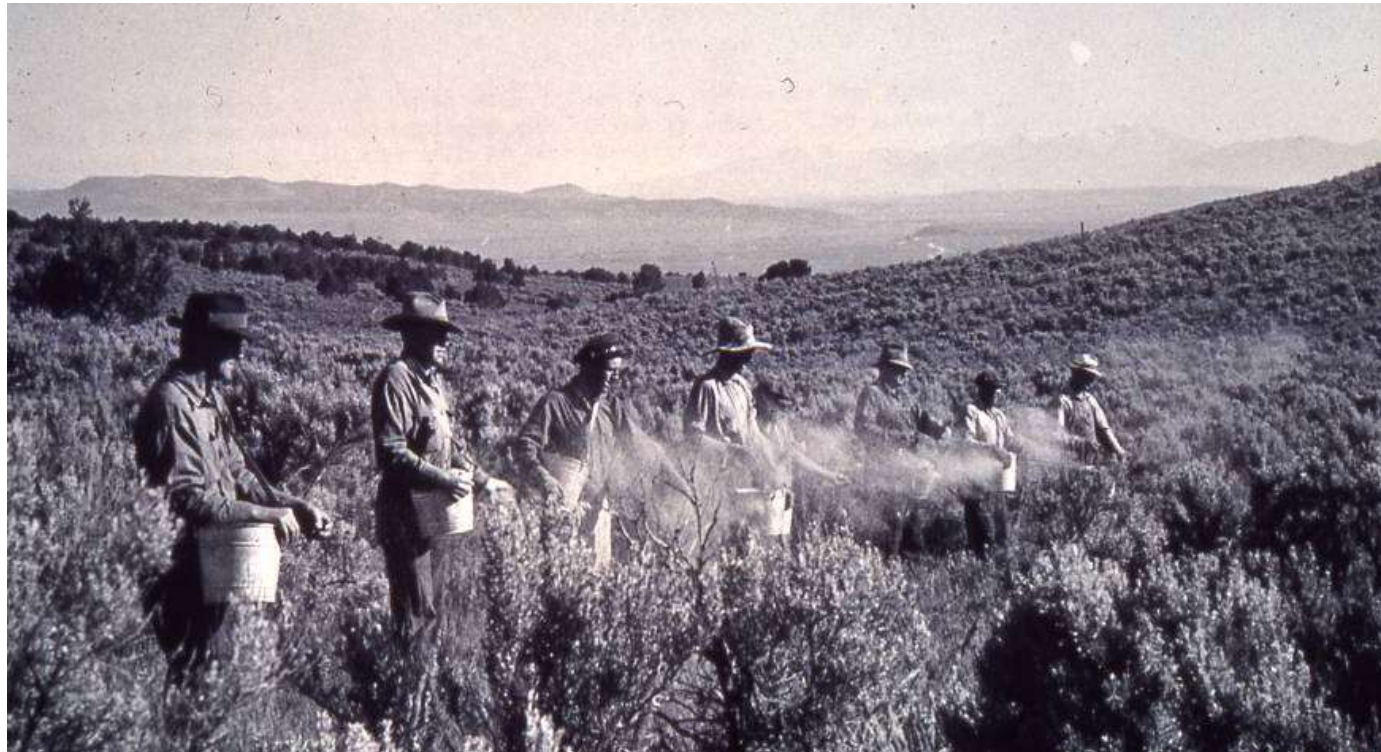
I consider them a tool of last resort for hobby gardeners.

How to Reduce Hazard When Using Pesticides

$$\text{Hazard} = \text{Toxicity} \times \text{Exposure}$$



Choose pesticides with **lower non-target** toxicity



<http://npic.orst.edu/>



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Pesticide Safety for Youth in Agriculture



What are pests?

Pests are destructive or nuisance organisms (insects, weeds, bacteria, wildlife) that affect crops, food, livestock, health, etc.

[How to Identify Your Pest](#)
[Pest-specific Information \(by name\)](#)
[Before You Control Your Pest](#)
[Pest Control Tips](#)
[Integrated Pest Management](#)

What are pesticides?

According to the law, a pesticide is any substance "intended for preventing, destroying, repelling, or mitigating any pest."

[Herbicides](#)
[Disinfectants](#)
[Fungicides](#)
[Insecticides](#)
[Natural and Biological Pesticides](#)
[Repellents](#)
[Rodenticides](#)
[Other types of pesticides](#)

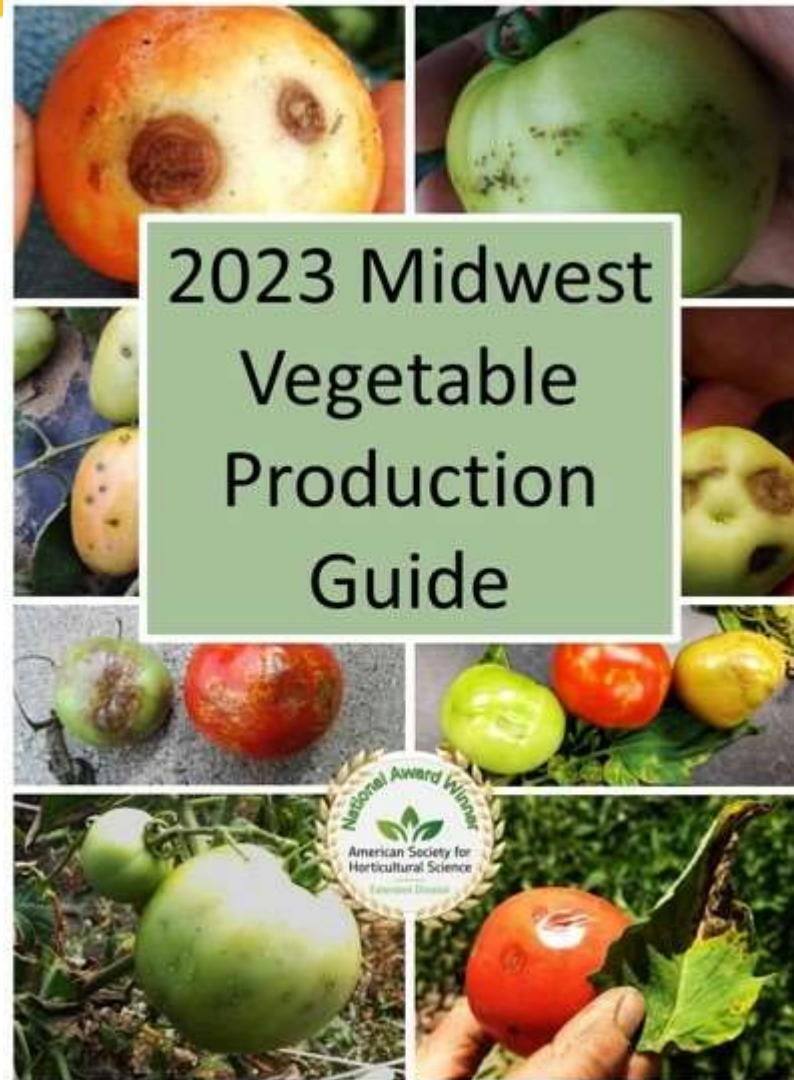
Local Contacts



Find local pesticide & pest control information

Enter your zip code here...

<https://mwvegguide.org/guide>



Available as a hardcopy or PDF file

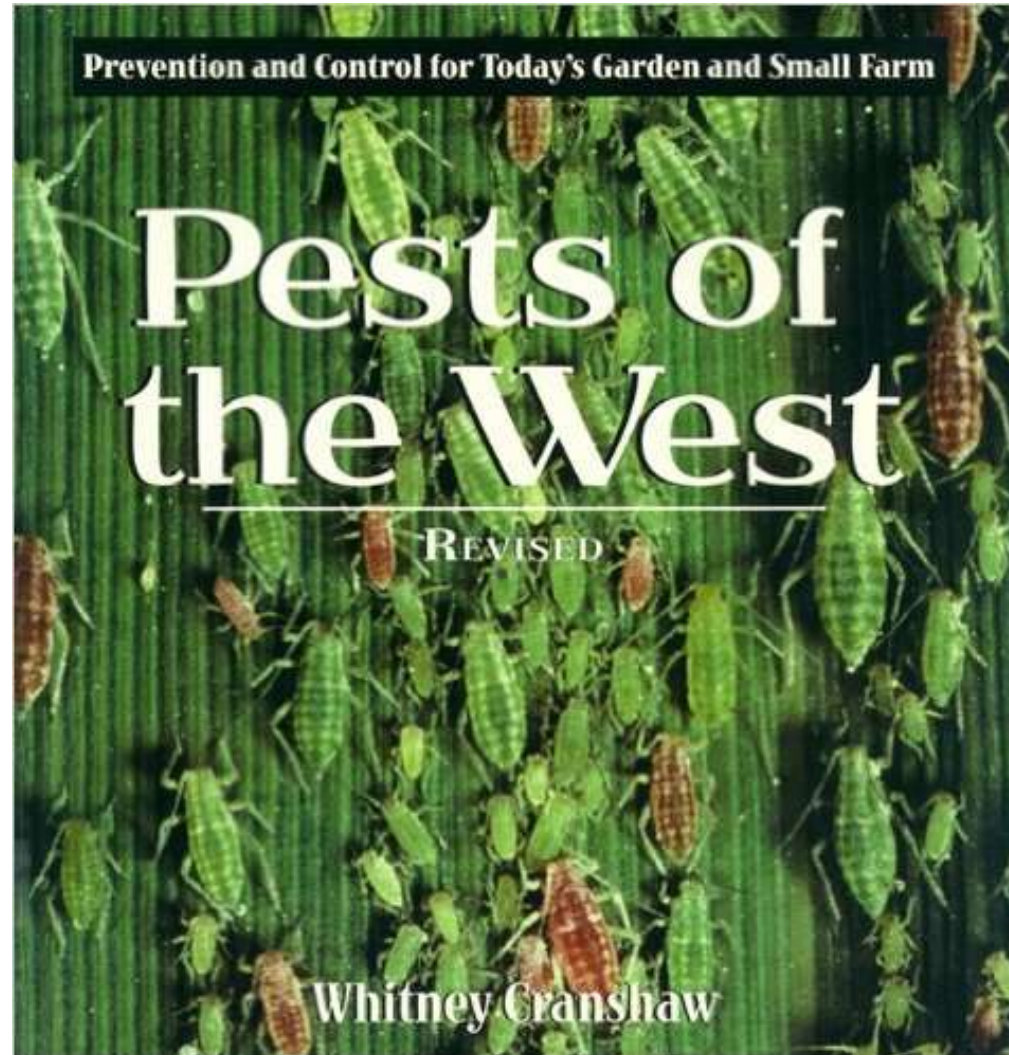
Online Version of the Midwest Guide Address:

<https://mwveguide.org/>

The screenshot shows the Purdue University website header with the logo and 'College of Agriculture'. A navigation menu includes 'ABOUT US', 'ACADEMICS', 'RESEARCH', 'EXTENSION', 'DIVERSITY', 'INTERNATIONAL PROGRAMS', 'DEPARTMENTS', and 'APPLY ONLINE'. Below the menu, there are links for 'Online Guide', 'Hardcopy Guide', 'Labels', 'About Us', and 'Feedback'. The main content area is titled 'CHOOSE HOW TO BEGIN' and features three large buttons: 'PICK MY CROP' (blue background with a green leaf image), 'PICK MY PEST' (yellow background with a green pest image), and 'PICK MY CONTROL MEASURE' (green background with a field image).

Another great reference book!

Out of print but still available-



A great book.
Includes a lot information on
the various forms control
That are practical for gardeners.

It has information of pest baits and traps

Garden slug IPM example – the slugs die with a smile on their “face”



Strange but true - the best beer to use for slugs always matches the favorite beer of the gardener!

If you chose to use pesticide

- Always wear label safety equipment (**P**ersonal **P**rotective **E**quipment)
- Take a training course to become a certified applicator.
- Follow the label directions of products. It is the law.



Questions



- Contact Information
- Scott Schell
- Office: 307-766-2508
- Cell: 307-399-9344
- Email: sschell@uwyo.edu