

Organic Integrated Pest Management

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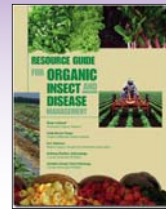
Clemson University –
USDA Cooperative Extension Slide Series
www.ipmimages.org



University of California, Pest
Management Guidelines,
photo by Jack Kelly Clark

Presentation Overview

1. Define IPM components
2. Focus on disease
 - sanitation
3. Focus on insect pests
 - scouting
4. Resources



Definition of Integrated Pest Management

Combination of biological, cultural, physical and chemical tools to manage...

plant pathogens, insects and other arthropods, nematodes and weeds (plants out of place), in order to...

minimize economic, health, and environmental risk.

National Coalition for IPM

Organic Systems: Defining General Management Components

- **Cultural:** host resistance and crop rotation
- **Physical:** scouting and sanitation
- **Biological:** use of living organism to control or manage another living organism
- **Chemical:** as listed by NOP

Plant Disease



“What is wrong with my plant?”

1. Environmental stress
2. Nutritional deficiency
3. Chemical injury
4. Insect damage




Alternaria cabbage, mink

***Infectious Disease:**
*viruses, fungi,
bacteria, nematodes*


Viruses

TSWV:
Wilt, decline, death




Photos: Ned Tisserat

- Ring spots
- Veinal chlorosis
- Mosaic & distortion
- Mottling & distortion



Vectors: whiteflies, aphids, thrips




Alton N. Sparks, Jr., The University of Georgia, www.ipmimages.org


Bacteria

Many symptoms:
leaf spots, wilts
rots, galls, blights

Tomato Fruits with Bacterial Spot Symptoms



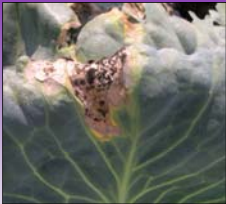
ipm.usuic.edu/fin/volume13/images/tomato_bacterial.jpg




Xanthomonas campestris—bacterial spot on pepper
Volcani Center Archives, Bet Dagan, Israel, www.ipmimages.org

Bacterial spread:

- Rainsplash
- Vectors
- Seed
- Vegetative propagation




Black rot cabbage, MMK




NAT

Fungi

- Many kinds of symptoms
- Most fungi spread by spores

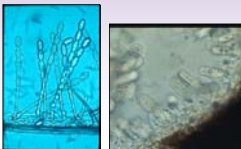



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Photo courtesy of T.A. Zitter, Cornell University, Ithaca, NY

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Organic IPM Strategies

Cultural:

- Prevention is best
- Using resistant cultivars is critical first step in management
- Rotate to a non-host when possible
- Certified seed
- Disease-free transplants/ Disease-free cuttings

Organic IPM Strategies

Cultural:

- Proper spacing
- Raised beds
- Water management
drainage, drip irrigation
- **Maintain plant vigor!**



Organic IPM Strategies

Physical:

* Sanitation

- Clean equipment
- Staking/trellising
- Remove diseased material
- Control weeds
- Tillage: bury infected debris



Organic IPM Strategies

Chemical:

**Begin spray control before the disease appears*

- Midwest Vegetable Growers Guide



Organic IPM Strategies

Biological:

- Actigard
- Messenger
 - *Plant defense activators rather than pesticide*

Insect Pests



Scouting and Identifying

Cultural:

*Scouting

- Plant inspection
- Monitor with traps
- Recordkeeping
- Proper identification and knowledge of pest biology

Jun J. Tolcison
www.ipm.iastate.edu/ipm/ctr/files/images



(www.ent.uga.edu/~f66co-po-larva-large.jpg)

Organic IPM

Cultural:

- Planting date and variety choice
- Rid of weeds that harbor pests
- Trap cropping
- Select cover crop that doesn't favor pest
- **Maintain plant vigor!**



ufinsect.fas.uff.edu/stink_bugs/trap_crop01.jpg

Organic IPM

Biological:

- Parasites and predators
- Passive- Natural enemy refuge
- Active- Commercial insectaries



Lady Bird Beetle



Green Lacewing



Tachinid Fly

Organic IPM

Physical:

- Row covers
- Sanitation
- Hand picking pests



extension.oregonstate.edu/.../EC124703-00.jpg

Organic IPM

Chemical:

- **Essential plant oils**- broad spectrum, phytotoxicity issue, efficacy issue
- **Horticultural oils**- soft bodied arthropods, contact
- **Soaps**- soft bodied arthropods, contact
- **Bt**- lepidopterans, contact
- **B. bassiana**- soft bodied arthropods
- **Spinosad**- caterpillars, thrips, flies, some beetles

**incomplete list*

Case Study: Squash bug

mdvegetables.umd.edu



www.meadowoodgarden.com



** Effective treatments have to be applied during susceptible life stage*



www.extension.umn.edu/.../images



IPM Management

Conclusions:

- * *Plan IPM program, always include:*
 - **Sanitation:** to break pest cycle, get rid of weeds and diseased material, clean equipment
 - **Scouting:** for prevention, for insect pests and disease
 - Maintain plant vigor

Resource Materials

- 2005 Resource Guide for Organic Insect and Disease Management
www.nysaes.cornell.edu
- Midwest Growers Guide 2008 and 2009
- Insects in Kansas- Identification Handbook-
visit KSU Entomology Extension website
- Handouts
- Dr. Ray Cloyd, Extension Entomologist, KSU
785-532-4750 , rcloyd@ksu.edu
- Dr. Megan Kennelly, Extension Pathologist, KSU
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