# Your IPM Plan

# For Next Session – Tuesday, March 31, 2015

**1. Use the plant pest planning sheet (Tab 3 in your spreadsheet) to draft a management plan for your primary insect(s) of concern.**

• Name your target species.

• Name your target life stage.

• Name at least **TWO** different IPM tools you plan to use to manage your pest and **WHEN** you plan to use them.

• List the advantages and the potential drawbacks or issues that are involved with your management approach.

• Will you evaluate your effectiveness of your management approach? If so, how?

•Prepare to present your DRAFT management plan to the large group next meeting.

• What sources did you use? Why did you use them?

## Primary pests

- Colorado Potato beetle
- Squash vine borer
- Apple maggot
- Cabbage butterfly
- Cabbage flea beetle
- Japanese beetle
- Slugs

## Secondary pests

- Onion maggot
- Spinach leafminer
- Two-spotted spider mite
- Aphids
- Squash bugs
- Bean Leaf beetle

# IPM plan for cabbage flea beetles

- Name
- Degree day information (see spreadsheet, Tab 2, row 6)
- Recommended actions

# EXAMPLES

# IPM plan for Cabbage butterflies *Pieris rapae*

*Goal: Prevent visual damage from cabbage butterfly on commercial cabbage*

*Strategy: Active, Constant Prevention.*

1) **Monitor twice a week after expected spring adult emergence. (~May 20)**
2) **Setup yellow sticky traps around perimeter of plot. (~May 24)**
3) **Catch observed adult butterflies with a net. (~May 24-June 15)**
4) **Scout for eggs 1 week after first sign of adults. Crush on sight. (~May 30-June15)**

4a) Remove yellow sticky cards. (June 15)

5) **Scout for caterpillars based on visual damage 2 weeks after first sign of adults. Crush on sight. (~June 1-June 30)**
6) **Order and release green lacewing larvae and soldier bug attractant lure, if # of caterpillars exceeds 1-2 per leaf after random sample of 30 leaves. (June 7)**
7) **Spray insecticidal soap under leaves if # of caterpillars exceeds 3-4 per leaf after random sample of 30 leaves. (June 7)**
8) **Scout for mature larvae and/or chrysalis based on visual damage 4-5 weeks after first sign of adults. (June 30)**
9) **Setup yellow sticky cards 5-6 weeks after 1st sign of adults and/or 1-2 weeks after first sign of chrysalises. (July 1)**

Image: VegeEdge, U of M Extension

# IPM plan for squash vine borer

## Mass trapping, pesticide, defensive barrier, post-season cultural techniques, and biological control.

Pest: Squash vine borer (*Melitta curcurbitae*)

Product: Yellow sticky cards

Host plants: squash, cucumbers,

a) Expect adults. Action: Setup yellow sticky cards and/or floating row covers before **DD~900-1000. Late June or early July adults emerge from cocoons in the ground. Plant varieties that are not as preferred by squash vine borers, such as "butternut squash, cucumbers, melons, and watermelons" (U of MN nExtension).**

b) Look for eggs 1 week after first adults are seen. **DD~1000-1200. Late June or early**

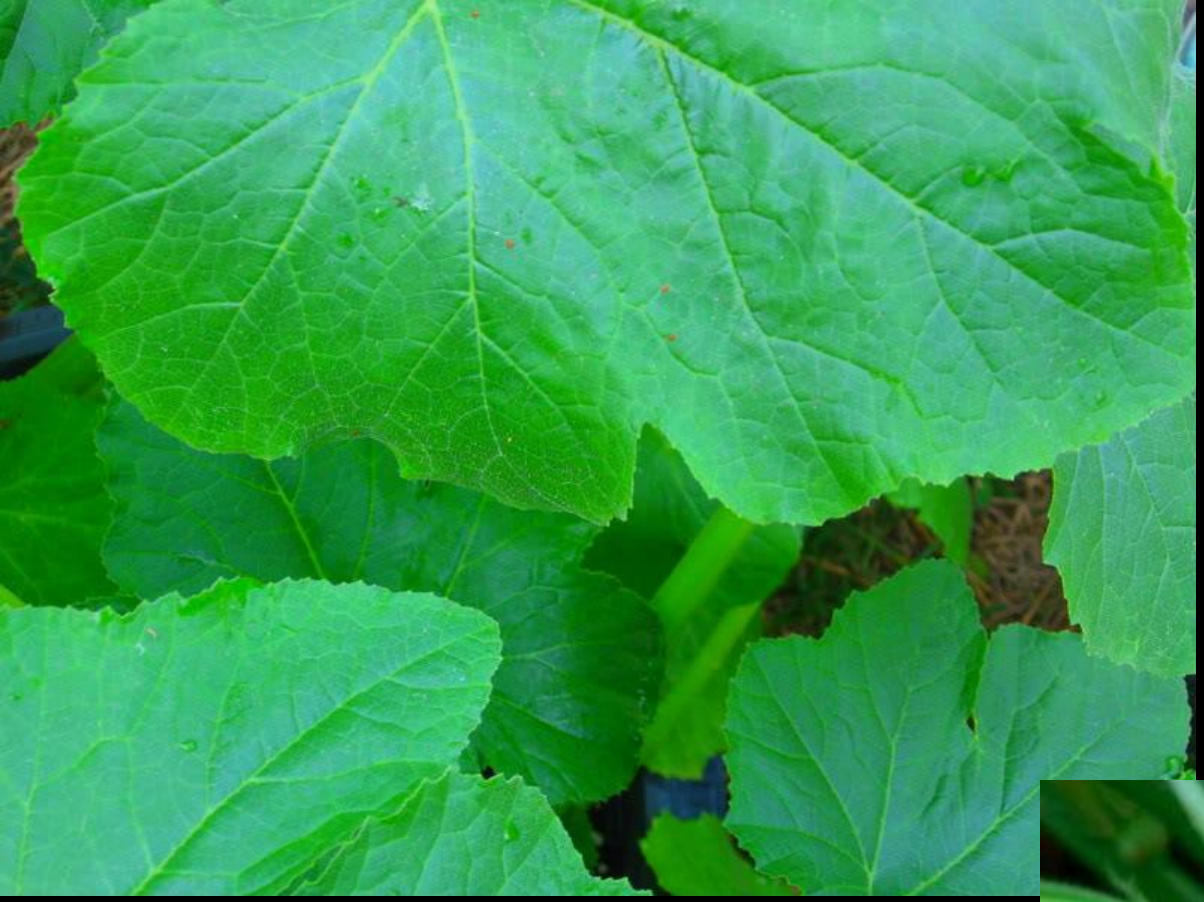
**July. Watch for nymphs.**

c) Apply pesticide treatments ~8 days after seeing first adults.

d) Scout for frass tunnels. Action: Remove borers with a razor blade, if needed. Bury vine.

Photo: U of MN, Jeff Hahn.

Info: University of Minnesota Extension, The Ohio State IPM



Bottom Image: Maria Schneider
Top image: Author unknown. Photo found on Village Garden Web website.

# IPM plan for Squash bugs
## *Anasa tristis*

a) Expect adults late May/early June. Action: Scout and squash on sight and/or add floating row covers.

b) Scout for for bronze egg masses. Crush on sight.

c) Scout for nymphs 8-14 days after observing 1st egg masses. Crush on sight.

d) Scout twice weekly for more evidence of sawdust-ish entry points.

e) Use resistant varieties such as Butternut, Royal Acorn, Sweet Cheese

f) During season: lay boards or shingles under plants to attract aggregates of squash bugs. Destroy them in the morning.

g) Post season: Remove debris around plants that they may use to overwinter.

Encourage habitat for Tachinid fly, *Trishopoda pennipes, or Sceleonids such as Eumicorsoma spp.*

Apply sabadilla, ryalia, rotenone during nymphal stage.

Info: U of Minnesota VedgeEdge, Midwest Vegetable Production Guide for Commercial Growers (Purdue), National Sustainable Agriculture Information Service

Image: VegeEdge, U of M Extension

# Apple Maggot DD Life Events

- Base Temperature for AM = 50 F
- **Approximate initial spring emergence in MN: from mid-June to mid-July**
- **Degree day adult emergence: ~900 DD**
- **Degree day flight peak: ~1400 DD**
- Eggs laid singly under the fruit skin
- Larvae develop under the fruit ~30 days
- **Overwintering**: Fruit tend to fall, maggots leave fruit and burrow under the soil to pupae until the following year….which leaves them vulnerable to nematodes

Info: University of Minnesota Extension, Michigan State IPM Resources, MDA IPM Program

# Example IPM plan #3: apple maggots (lite)

## Mass trapping

Product: Red sphere trap, tanglefoot, grocery store apples

Target pest: Apple maggot

Host plants: Apple trees

a) **Timed trapping.** In late June/early July, place red sphere traps and/or grocery store apples covered with Tanglefoot every 10-15’ depending on the pressure.

a) **Larval disruption**. Diligently remove infested apples and apples that fall to the ground in the late summer/fall to prevent maggots

Info: University of Minnesota Extension, Michigan State IPM Resources, MDA IPM Program

# Example IPM plan #4: apple maggots (aggressive)

## Mass trapping, pesticide, defensive barrier, post-season cultural techniques, and biological control.

Product: Red sphere trap, tanglefoot, grocery store apples , Spinosad, kaolin clay, plastic bags, mesh, beneficial nematodes, Target pest: Apple maggot, Host plants: Apple trees

a) **Timed trapping.** In late June/early July, place red sphere traps and/or grocery store apples covered with Tanglefoot every 10-15' depending on the pressure.

b) **Time trapping with organic-approved bio-insecticide**. In late June/early July, place red sphere traps and/or grocery store apples baited with scent volatiles and laced with Spinosad for greater adult reduction.

c) **Place baited traps**. Trap baits. Place volatiles attractants with baits for greater attraction

d) **Defensive barrier**. Spray weekly applications of Surround kaolin clay to reduce attraction and visibility. Bag each fruit or cover limbs with mesh bags to prevent adults from laying eggs.

e) **Larval disruption**. Diligently remove infested apples, apples that fall to the ground, and leaves in the late summer/fall to prevent maggots from pupating successfully.

f) **Biological control**. Release beneficial nematodes into the ground late August or early September to help control or impact next generation of apple maggots. See: Steinernema carpocapsae and Heterorhabditis bacteriophora.

Examples of sources: Great Lakes IPM (apple lures), Planet Natural (kaolin clay), Green Methods (nematodes)

Info: University of Minnesota Extension, Michigan State IPM Resources, MDA IPM Program

# Example IPM plan #8: Japanese Beetle Nematodes & Milky spore.

Product: Beneficial nematodes, milky spore,

Target pest: Japanese beetle

Host plants:

# Japanese Beetle Example IPM plan #8:

Share your IPM plan

Consider using nematodes & milky spore

## Beneficial nematodes

*Heterorhabditis bacteriophora*


Source: MDA, USDA, Forestry Images