

Vegetable Garden Insects and Their Management

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Integrated Pest Management

Integrated Pest Management (IPM) is a scientifically-based, worldwide standard for managing pests. It encourages the use of multiple and flexible strategies for the control of insects, weeds, rodents and other vertebrates and plant, animal and human diseases. The goal is the development and use of safe, sustainable and effective management methods that reduce environmental and human health risks and protect natural resources and non-target organisms for future generations.



Integrated Pest Management

1. Correctly identify the damage and pest.
 2. Learn pest and host life cycle and biology.
 3. Monitor or sample environment for pest population.
 4. Establish action threshold (economic, health or aesthetic).
 5. Choose appropriate combination of management tactics starting with prevention and least-toxic pest management methods. Conventional pesticides may be used if necessary.
 6. Evaluate results.
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Types of Damage in the Garden

Chewing mouthparts


Species: Beetles (adults and larvae), caterpillars, and crickets/grasshoppers

Damage: holes in foliage or stems, missing leaves, skeletonizing, severed stems, leaves or buds or wilting of stems or canes

Piercing/sucking mouthparts

Species: Aphids, leafhoppers, thrips (rasping), and true bugs

Damage: Discoloration (yellow or brown), stippling, mottled or necrotic (dead) spots, wilted appearance of plant or plant parts



Examples of Chewing Damage



Caterpillars



Leafcutter bee



Blister beetles



Grapeleaf Skeletonizer

Examples of Piercing/Sucking Damage



Aphids on cabbage



Thrips damage on eggplant



Squash bugs



Stink bug damage on tomato

Common Vegetable Pests in Yavapai County

- Squash bugs
- Stink bugs
- Blister beetles
- Grasshoppers
- Flea beetles
- Tomato Hornworm
- Cabbage loopers
- Aphids
- Cutworms
- Earwigs
- Sowbugs



Squash Bugs

Life Cycle: Gradual

Crops Impacted:

Cucurbits (squash and melons)

Damage: feeding on shoots, leaves and fruit resulting in wilted plants and death

Management: remove infested plants, hand pick or shopvac insects and egg masses, protect with row cover, trellising, resistant varieties, spray nymphs with oils/soaps, conventional pesticides can negatively impact pollinators and beneficial insects



Stink/Leaf-footed Bugs

Life Cycle: gradual

Crops Impacted: corn, tomatoes, peppers, legumes

Damage: small tomatoes can cause the fruit to abort, feeding on medium-sized fruit can result in depressions or discoloration at the feeding site as the fruit expands and ripens. If fruits develop, they are still edible

Management: same as squash bugs – these are not usually as damaging as squash bugs.



Blister Beetles

Life Cycle: complete

Crops Impacted:

tomatoes, potatoes, melons, carrots, cabbage, peas, squash, eggplants, leafy greens

Damage: eat foliage and usually travel in large numbers

Management: hand pick with gloves or shopvac insects, protect with row cover, Surround (kaolin clay), conventional pesticides may be effective but can negatively impact pollinators and beneficials



Grasshoppers/Crickets

Life Cycle: gradual,
many species

Crops Impacted: young
green plants: corn,
beans, lettuce, carrots,
onions

Damage: foliar damage,
tender plants

Management: hand pick
with gloves or shopvac
insects, protect with
row cover, Nosema bait
(largely ineffective),
baits laced with carbaryl
(not available in AZ)
conventional pesticides
may be effective but
can negatively impact
pollinators and
beneficial insects



Flea Beetles

Life Cycle: complete, many species, they hop

Crops

Impacted: eggplant, arugula,

Damage: small holes in leaves, larvae feed on roots stunting young plants

Management: remove debris from previous crops, protect young plants with row cover, sulfur treatment may act as a repellent, Surround (kaolin clay) may also protect, carbaryl (Sevin) can be used with serious infestations



Tomato Hornworm

Life Cycle: complete,
larvae cause damage,
eggs laid singly

Crops Impacted:
tomato

Damage: eats, leaves,
stems, and fruit

Management: Hand
pick worms by
monitoring damage and
following frass, eggs
are attacked by
beneficial wasps, crop
rotation, tillage,
Bacillus thuringiensis
(Bt) sprays will work
where hand picking is
impractical



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Cabbage Loopers

Life Cycle: complete

Crops Impacted: crucifers – mature green cabbage and Brussels sprouts are preferred

Damage: holes in leaves and a reduction in leaf area.

Management: Treat just before heading or at Brussels sprouts formation with Bt if counts show more than one looper or other caterpillar in 25 plants. Other insecticides are also labelled for cabbage loopers.



Aphids

Life Cycle: gradual, females can give live birth resulting in large numbers over a short period

Crops Impacted: many vegetables (cucurbits and crucifers mostly)

Damage: stunted or distorted shoots/fruits, they exude honeydew which causes other issues, can also transmit diseases

Management: be patient and allow natural enemies to move in, soap/oil sprays, use row covers, reflective mulches, do not over apply N, manage ants farming aphids, avoid synthetic insecticides



Cutworms

Life Cycle: complete (larvae of a moth)

Crops Impacted: many annual vegetables

Damage: seedlings cut off at soil level

Management: sanitation (remove debris and manage weedy areas), plow the refuge areas, use "collars" or floating row cover as a barrier, Bt or boric acid baits, carbaryl (Sevin) if necessary



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Earwigs

Life Cycle: gradual

Crops Impacted:

vegetable and annual
flower seedlings, fruit,
corn silks

Damage: holes in
leaves, toppled
seedlings

Management: earwigs
also eat aphids, so give
consideration prior to
taking action, go out
and monitor for
presence/damage at
night, traps, spinosad,
carbaryl can be used
but is not usually
necessary, view video
on UC IPM Site



Sowbugs and Pillbugs

Life Cycle: not insects
(Isopods)


Crops Impacted:
various vegetable crops

Damage: seedlings,
new roots, lower
leaves, and fruits or
vegetables lying
directly on the soil or
near a damp soil
surface

Management: limit soil
amendment to reduce
moisture and organic
matter, irrigate early in
the day, use drip
irrigation, use black
plastic mulch



Protecting Pollinators and Beneficial Insects

- Use IPM and be aware of pollinator presence
 - Read product labels carefully
 - Use products having short residual toxicity and only when damage is significant
 - Avoid applications when pollinators are present and apply in the evening after bees are done foraging
 - Adjuvants, fungicides, and herbicides can harm pollinators
 - Grow crops that attract beneficial insects and pollinators
 - Continue to educate yourself about pollinators and beneficial insects
 - Observe, identify, photograph, and share
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Cultural/Preventative Practices for IPM



Apple with Surround (kaolin clay)



Black plastic mulch



Black plastic mulch



Plants wrapped with floating row cover



Low tunnel w/lettuce 6/2/20



Inside low tunnel 6/26/20



Pollinators and Beneficial Insects



Honeybee on daylily



Solitary native bee on carrot flower



Assassin bug on carrot flower



Green lacewing



Big eyed bug



Syrphid fly foraging



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