

Cucumber Beetles in Vegetable Crops

2019 Continuing Education for Pest Management

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In the next 50-55 minutes...

- **Cucumber beetles: Identity**
- **Their damage**
- **Control/prevent practices across the country**

Cucumber Beetles: Identity

Cucumber beetles in general: Stripped cucumber beetle
Spotted cucumber beetle
Banded cucumber beetle

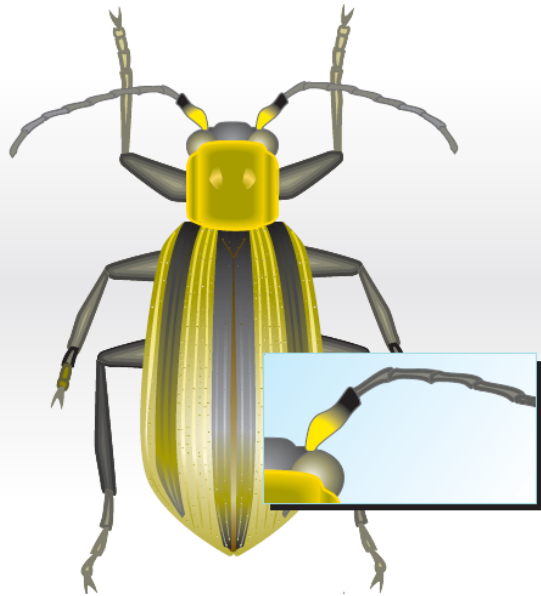


Abundant info from
xxx.edu.

Cucumber Beetles: Identity

Common name	Latin name	Major distribution	Susceptible vegetables
Western spotted cucumber beetle	<i>Diabrotica undecimpunctata undecimpunctata</i>	Rocky Mountains, Mississippi River are considered the limits of their distributions.	Major pest for cucurbits including all melons, cucumber, watermelon, squash.
Spotted cucumber beetle (Southern corn rootworm)	<i>D. Undecimpunctata howardi</i>		
Western stripped cucumber beetle	<i>Acalymma trivittatum</i>	Western spotted and striped cucumber beetles are commonly found in California.	Other vegetables include beans, sweet corn, sweet potato, etc. (mainly fed by Western species).
Eastern stripped cucumber beetle	<i>A. vittatum</i>		
Banded cucumber beetle	<i>Diabrotica balteata</i>	Banded cucumber beetle is found mainly in southern California.	Level of severity is varied.

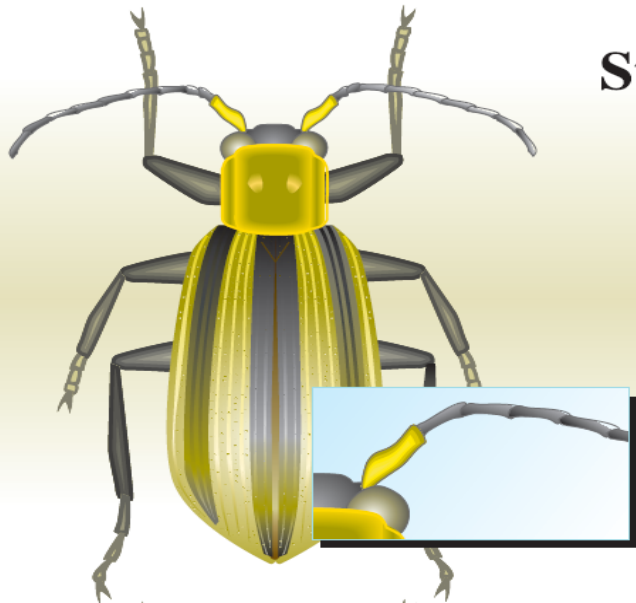
Cucumber Beetles: Morphology



Western striped cucumber beetle
Acalymma trivittatum

Yellowish elytra with black stripes
Abdomen and antennae black with only basal part of 1st antennal segment pale yellow

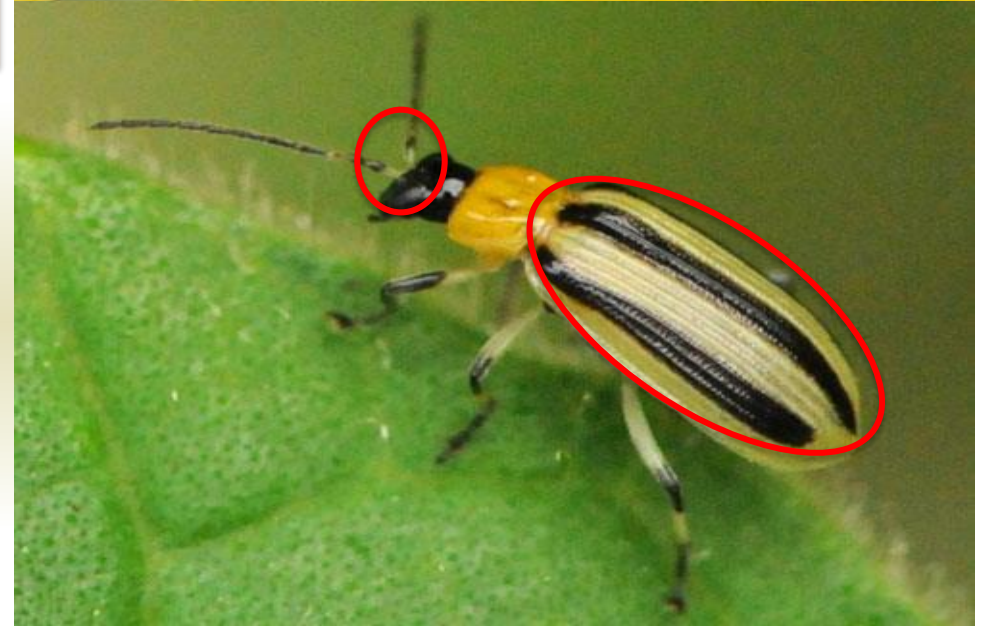
1/5-in long, 1/10-in wide



Striped cucumber beetle
Acalymma vittatum

Yellowish elytra with black stripes
Abdomen and antennae black with 1st antennal segment pale yellow

Source: P. Goodell and P. Phillips



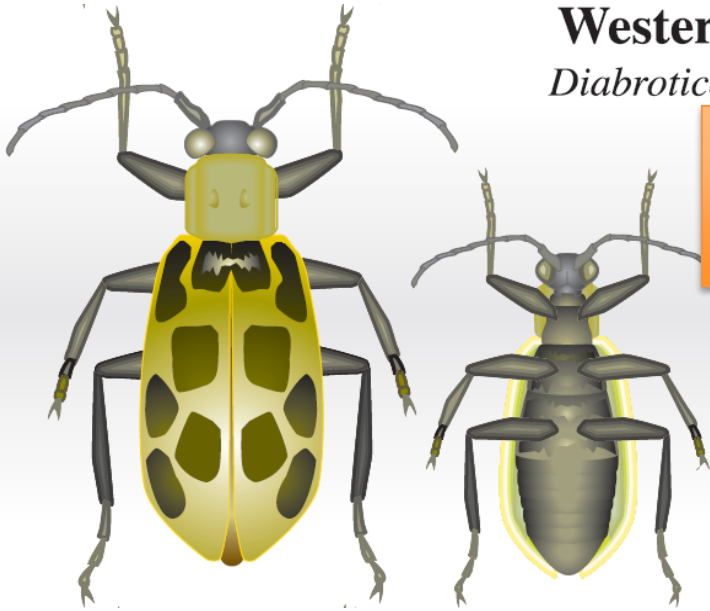
Cucumber Beetles: Morphology

Western spotted cucumber beetle
Diabrotica undecimpunctata undecimpunctata

1/4-in long, 12 black spots on elytra

Elytra with 12 black spots

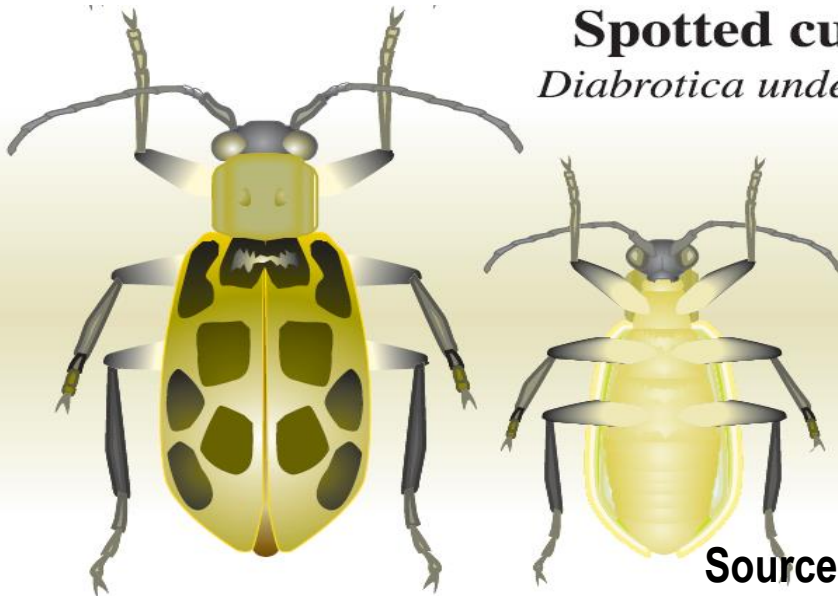
Yellowish elytra, antennae, legs, and body (underside) entirely black



Spotted cucumber beetle
Diabrotica undecimpunctata howardi

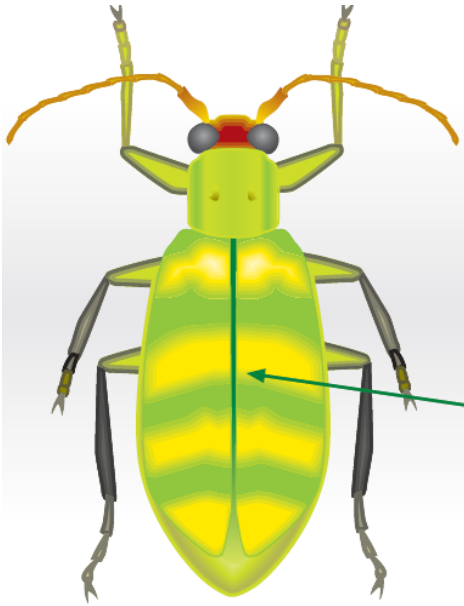
Yellowish elytra with 12 black spots

Bases of the legs and body (underneath) pale yellow



Source: P. Goodell and P. Phillips

Cucumber Beetles: Morphology



Banded cucumber beetle

Diabrotica balteata

Yellowish elytra with horizontal greenish blue bands and thin green band running down center; greenish blue thorax; with black eyes and orange-red head and antennae



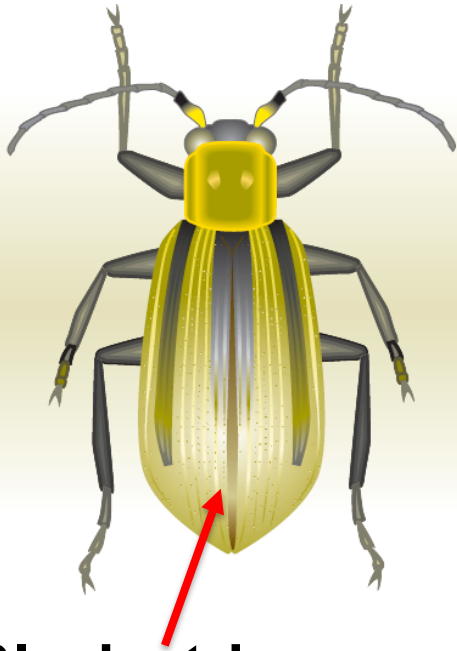
Range throughout southern U.S. from NC to southern CA

Similar size to spotted cucumber beetle

Prefer Legumes and Cucurbitaceae crops

Source: J. Castner, Univ. of FL

Cucumber Beetles: Morphology



Western corn rootworm

Diabrotica virgifera

Abdomen yellow, central black stripe on yellowish elytra does not extend to the tip of the abdomen

Black stripes end before reaching the abdomen tip

Do not confuse striped cucumber beetle with Western corn rootworm.



Source: Dept. of Entomology, KSU

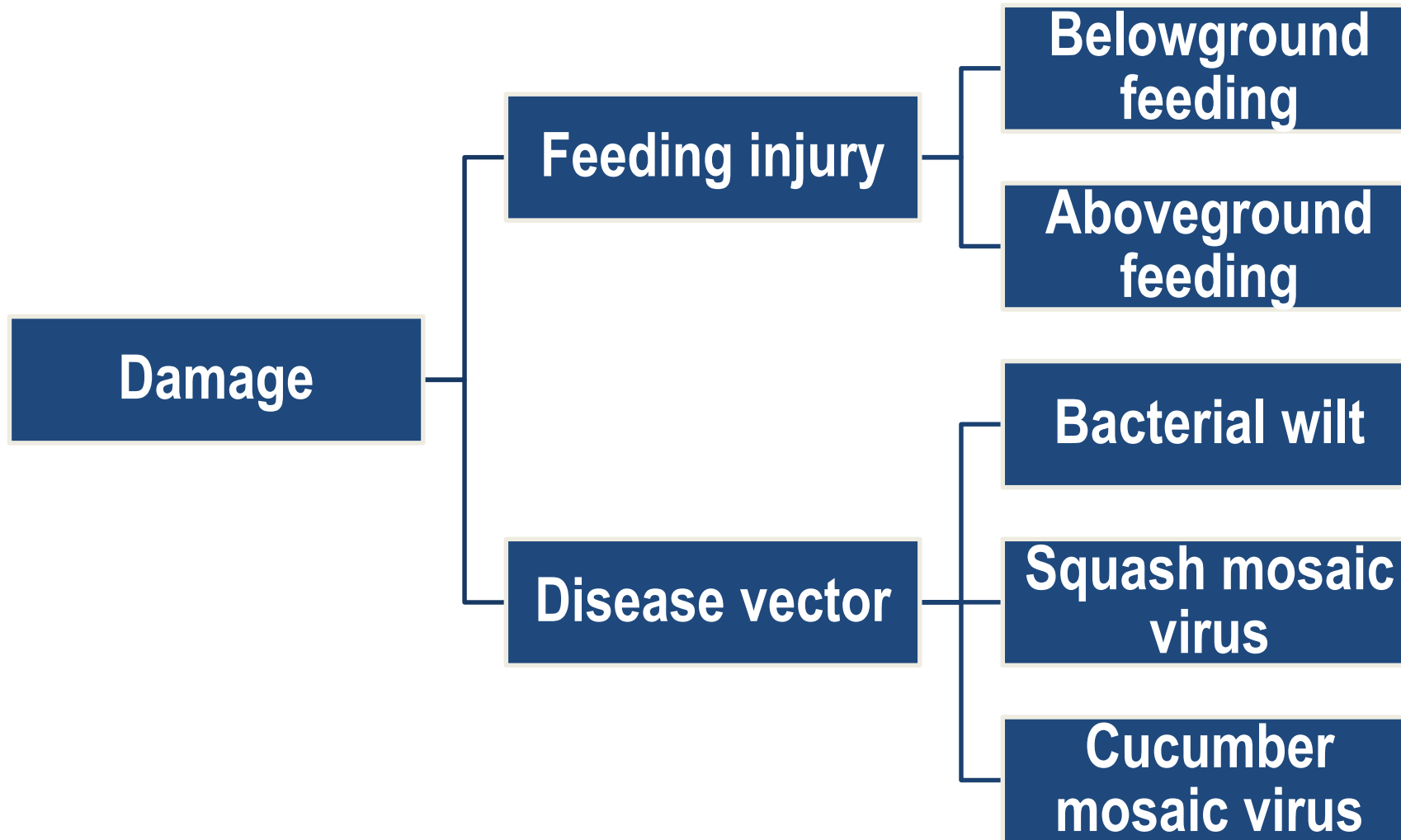
In the next 50-55 minutes...

- **Cucumber beetles: Identity**
- **Their damage**
- **Control/prevent practices across the country**

Cucumber Beetles: Damage

- **Cucumber beetles have a wide range of host plants.**
- **Feeding damage is more severe on Cucurbits than other families.**
- **Adult feeding is more serious than larvae.**
- **Striped species are more detrimental than spotted ones on feeding damage and disease transmission.**

Cucumber Beetles: Damage



Belowground Feeding: Larvae (Stripped Species)



Adult from last year: overwintering, hide in plant debris, wooded area, fence. Become active early spring when temp >50 F. Feed pollen and blossoms before host plants emerge. Fly long distance to reach the cucurbits and lay eggs near the plant base or underneath soil after mating.

Egg: laid mid-spring by female adults. They are oval, yellow-orange, and will hatch in about a week.

Larva: It is the damaging stage, exclusively feeding on cucurbit roots. Take about two weeks to complete the development, and ready to go to pupa.

Pupa: no wings. Resting in the soil for about a week to complete development to the adult stage.



Belowground Feeding: Larvae (Spotted Species)

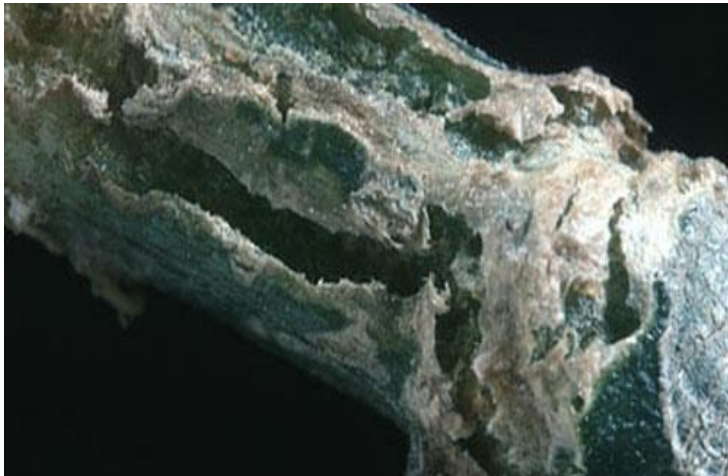
The following differences are:

- 1) Spotted cucumber beetles lay eggs on many host vegetables and grass plants.
- 2) Larvae do not host on cucurbits nor feed on, instead, on agronomic and grass crops such as corn, small grains, and beans.

Aboveground Feeding: Adult (Stripped Species)



Feed exclusively on cucurbits, preference of favor from high to low: muskmelon, catalogue, honeydew, cucumber, zucchini, pumpkin, summer squash, winter squash (butternut), and watermelon.

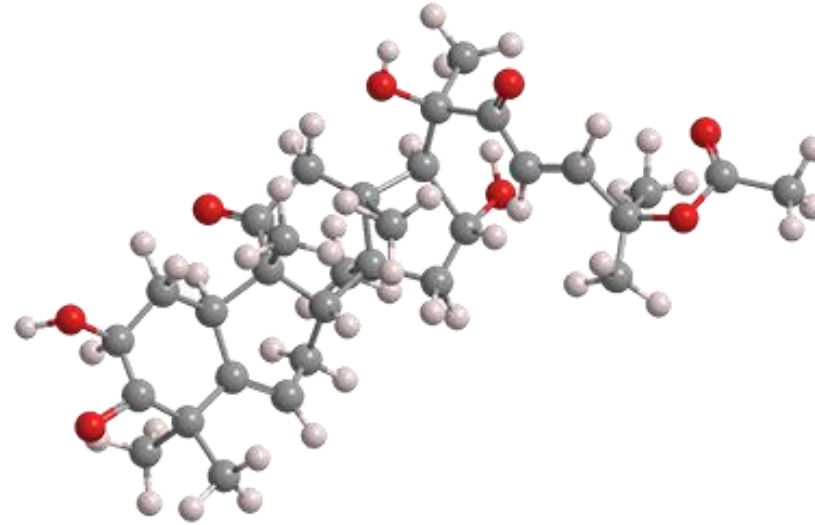
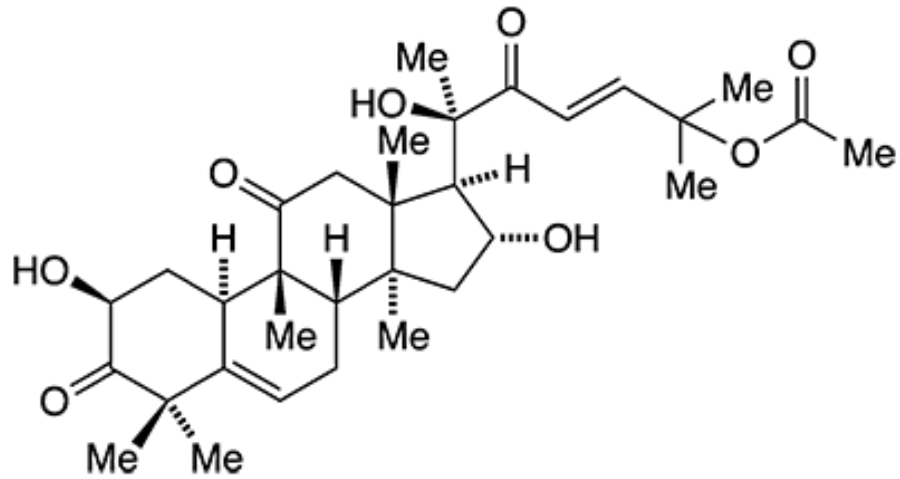


Cosmetic damage on fruit especially at immature stage, where underside is soft.

Photo courtesy: Univ. of MN, Cornell Univ., CO State Univ.

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Why Cucurbits Are Attractive



From: American Chemical Society

Cucurbitacin: A compound produced by cotyledons of young seedlings as a defense against herbivorous attack, but as a feeding stimulant for cucumber beetles.

Aboveground Feeding: Adult (Spotted Species)

- **Less damaging on cucurbits.**
- **Adults feed on leaves and cotyledons and then fly away to non-cucurbits to lay eggs.**
- **Next generation of adults come back to feed on leaves and occasionally on soft fruit.**
- **Plants at that stage are tolerant to foliar feeding.**

Feeding Damage: Banded Species

- **Banded species are omnivorous.**
- **All parts of plants can be injured.**
- **Defoliation resulting from adult and larva feeding.**
- **Legumes are more suffered due to vectoring of virus diseases and inducing Fusarium wilt.**

Cucumber Beetles: Disease Transmission

Bacterial wilt (*Erwinia tracheiphila*) is known to be the top one detrimental disease for cucurbits especially in the mid- to eastern U.S. This may also impact melon production in California.



- **Both striped and spotted species are vectors.**
- **Spreading through feeding wounds.**
- **Individual leaf wilting appears within 7 days after feeding.**
- **Damaging plant vascular systems (xylem), blocking water transport.**
- **Colonies can overwinter in beetle's gut.**

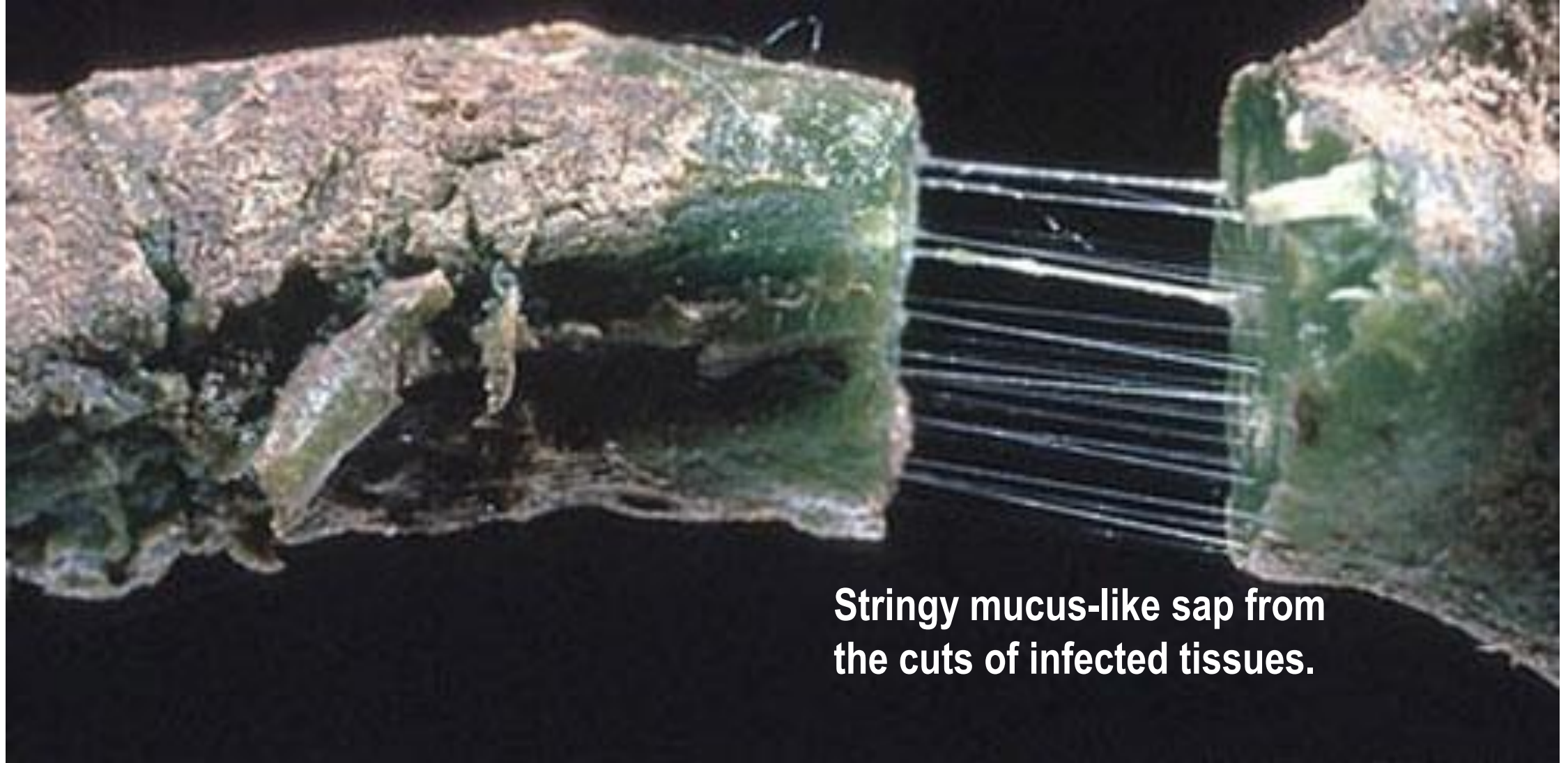
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Cucumber Beetles: Disease Transmission



**All symptoms spread very quickly.
Once a plant is infected, there is
nothing we can stop.**



Stringy mucus-like sap from the cuts of infected tissues.

Photo by M.P. Hoffmann, Cornell Univ.

Cucumber Beetles: Disease Transmission

Squash mosaic virus (SqMV) is mainly vectored by spotted species and a greater concern in the western U.S. squash and other cucurbit commodity production.



- Not only vectored by beetles, but also seed-borne.
- Plants get infected by the saliva of beetles as feeding.
- Virus can be retained in beetle bodies for up to 3 weeks.
- Mottling or mosaic patterns of green and yellow distorted leaves
- Fruit is also infected, resulting in blistered surface, misshape and small size.

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Cucumber Beetles: Disease Transmission



Photo by H. Schwartz, Colorado State Univ.



Photo from UCIPM.

Cucumber Beetles: Disease Transmission

Other reported diseases transmitted mainly by spotted and banded species include cucumber mosaic virus and bean mosaic virus though the major vector for these virus is aphid.

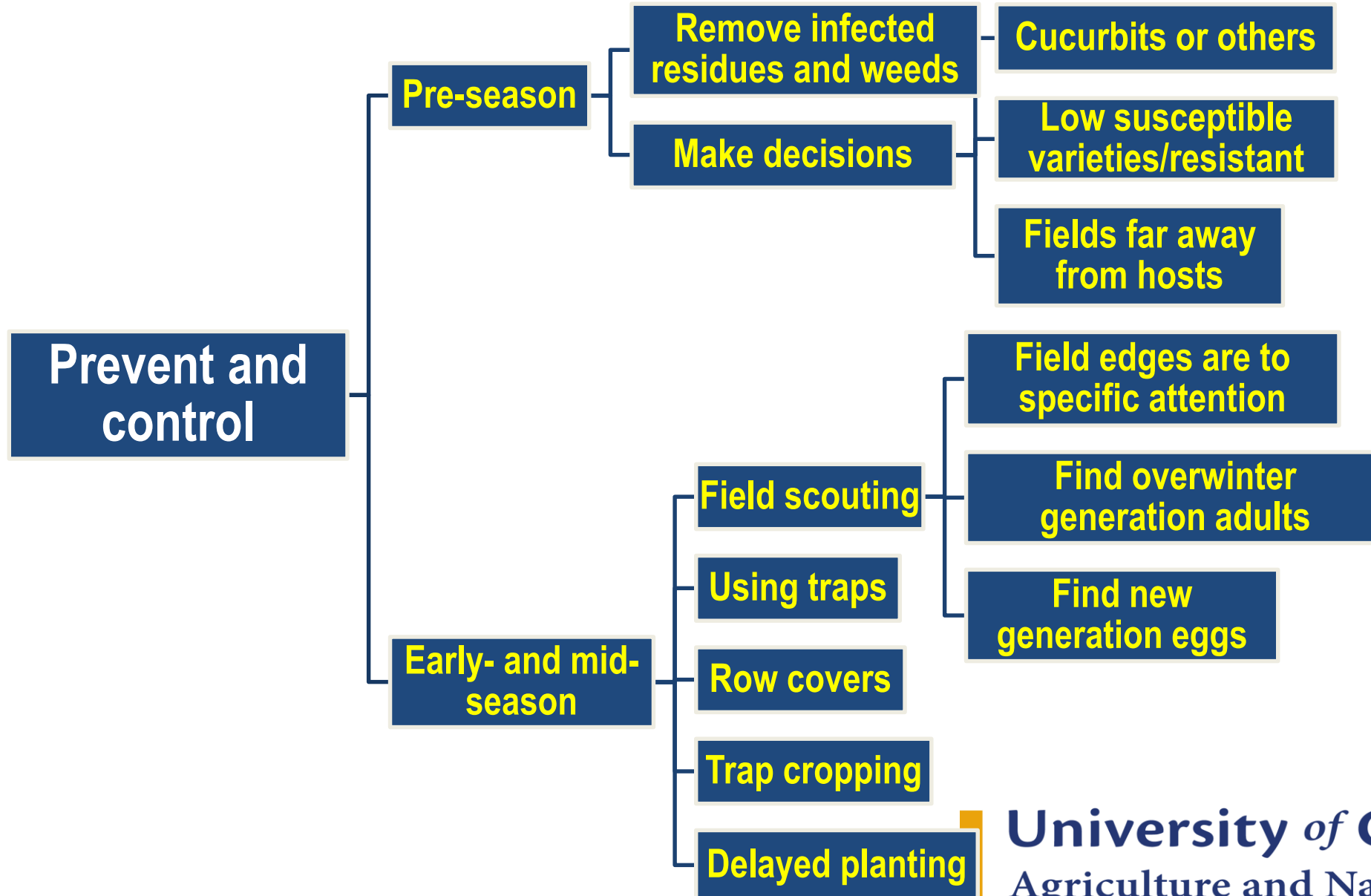


In the next 50-55 minutes...

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**In general, monitoring,
controlling, and blocking beetle
population is much more
important and effective than
treating infected plants.**

Cucumber Beetles: Prevent and Control



Cucumber Beetles: Prevent and Control (Traps and Lures)

Specify the species!

Mount above canopy

Check following scouting schedule

Cannot replace field scouting



Cucumber Beetles: Prevent and Control (Row Covers)

Use it early to prevent beetles from landing on young plants.

Pay attention to irrigation to avoid over-moist for fungal disease.

Open sides for air ventilation.

More common for small scale growers.

Remove before flower opening for pollination.



Cucumber Beetles: Prevent and Control (Trap Cropping)

Grow trap crops on borders or adjacent plots before transplanting main crops.

Trap crops secrete high amount of cucurbitacin.

Commonly used trap crops include Hubbard squash (*Cucurbita maxima*) and Nasturtiums.

Effects may be highly varied. Used more as an organic control practice.



Cucumber Beetles: Prevent and Control (Confusing)

Surround WP (Kaolin clay): OMRI listed, use as a crop protectant and growth enhancer. **Note: currently, growth enhancer uses are not registered in California.**

Confuse beetles by covering a white layer outside leaves, thereby delaying beetle attack and buying time for crop growth.



Cucumber Beetles: Prevent and Control (Natural Enemies)

To reduce beetle population below unacceptable damaging level.

Braconid wasps and parasitic tachinid fly have been reported as natural predators.



Cucumber Beetles: Prevent and Control (Insecticides)

- Cucumber beetles are difficult to control.
- Reading labels: the only authority.
- Using threshold: 1-2 adult beetles per plant at young stage and 3-5 adult beetles per plant at more mature stage warrant pesticide controls.
- Spray to adult beetles. Larvae of spotted species are on non-cucurbit fields, and those of striped species are on roots beneath soil surface.
- Spray before beehives are introduced. If not using beehives, avoid pollination time in a day.

Cucumber Beetles: Prevent and Control (Insecticides)

Brand name	Common name	Use rate (per acre)	REI (hours)	PHI (days)
Assail 30SG/70WP	Acetamiprid	2.5-5.3 oz (30SG) 1.1-2.3 oz (70WP)	12	0
Sevin 4F/XLR Plus	Carbaryl	1qt	12	3
Danitol	Fenprothrin	10.67-16 fl oz	24	7
Asana XL	Esfenvalerate	5.8-9.6 oz	12	3
Kryocide	Cryolite	8-12 lb	12	7 (summer squash); 14 (winter squash, cucumber, melons, and pumpkin)

<http://ipm.ucanr.edu/PMG/r116300511.html>

**Prepared, Scout, Identify,
Control, Integrated, Spray,
Remove, Clean.....**

Don't forget to ASK!

GOOD LUCK!

THANK YOU

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