Recognizing Plant Feeding Insects by the Damage They Do (Or how to be right 90% of the time)

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TEXAS A&M AGRILIFE EXTENSION

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Integrated Pest Management

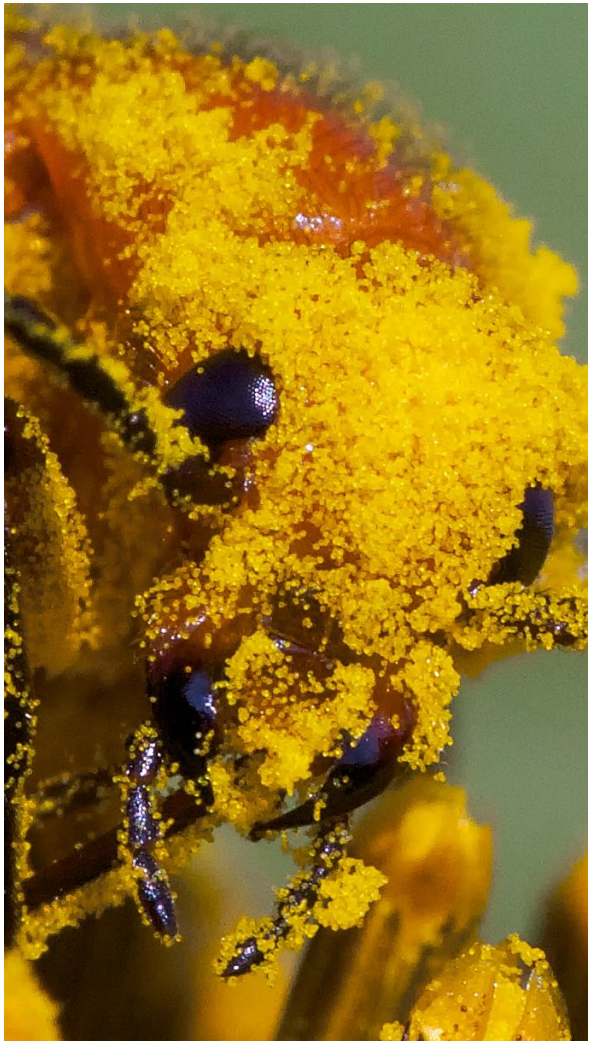
Most insect groups are not serious plant feeders

- Bristletails
- Silverfish
- Mayflies
- Dragonflies / Damselflies
- Walking sticks
- Earwigs
- Termites
- Mantids
- Cockroaches
- Barklice / Booklice
- Lice
- Alderflies / Dobsonflies
- Lacewings / Antlions
- Fleas
- Flies
- Caddisflies

But there are a few that can do a lot of damage …..

Plant Feeders: Chewing Mouthparts

Chewing Insects: Mandibles (Teeth)
Grasshoppers, katydids (Orthoptera)
Beetles (Coleoptera)
Larvae of butterflies, moths (Lepidoptera)
Wasps and sawflies (Hymenoptera)
Symptoms: Missing tissue
One Mandible = Thrips (rasping)
Symptoms: **Wrinkled leaves and flowers, discoloration**



Chewing Insects Eat Chunks

Caterpillars:

- Prefer softer tissue
- Normally eat interior of leaves first
- Often don’t eat veins
- Usually on the underside of leaves
- Can be in the soil in daytime

- Beetles:
- No preference for softer tissue
- Eat chunks anywhere on leaves
- More often on the top of leaves
- Adults usually not in soil, but larvae often are

caterpillar mandible

Plant Feeders: Piercing-Sucking Mouthparts

Piercing/Sucking (Straw-like)
Hemiptera
- True bugs
- Aphids
- Hoppers
- Whiteflies
- Scales
- Psyllids
Spider Mites: needle-like
Symptoms: **Wilting, bronzing, discoloration, honeydew occasionally present**

True bugs have Piercing-Sucking Mouthparts

Kissing bug: blood feeder
(3-segmented beak)

Leaf-footed bug: plant feeder
(4-segmented beak)

Piercing-Sucking Insects Punch Holes and Drink

- Do not remove leaf tissue
- Can feed on leaves, stems and fruits/flowers, seeds
- Can transmit disease
- Symptoms include
  - Wilting
  - Stunting
  - Dry, brittle leaves
  - Fruit drop
  - Can be present in high numbers (aggregation pheromone)

Aggregation Pheromone: Conchuela Stink Bug on Sorghum

Insecticides are selected based on the way the pest feeds.

Chewing Mouthparts

⃠ Systemic insecticides(neonicitinoids) – not so much

✓ Stomach poisons (carbaryl, Bt)

✓ Contact poisons (pyrethroids)

Insecticides are selected based on the way the pest feeds.

Piercing-Sucking Mouthparts

⊘ "Stomach poisons"

✓ Contact Poisons (pyrethroids)

✓ Systemic insecticides (neonicitinoids)

As they grow up, some insects don't change much

Incomplete metamorphosis: Grasshoppers and True Bugs (Hemiptera)

Nymph (immature) looks much like the adult, except nymphs don't have fully-formed wings

Zelus renardi very young nymph

Zelus renardi adult

As they grow up, some insects change a lot

Complete metamorphosis: Beetles and Caterpillars

Larvae (immatures) look nothing like the adult, and sometimes have different mouthparts

Ladybeetle larva

Ladybeetle adult

As they grow up, some insects change a lot

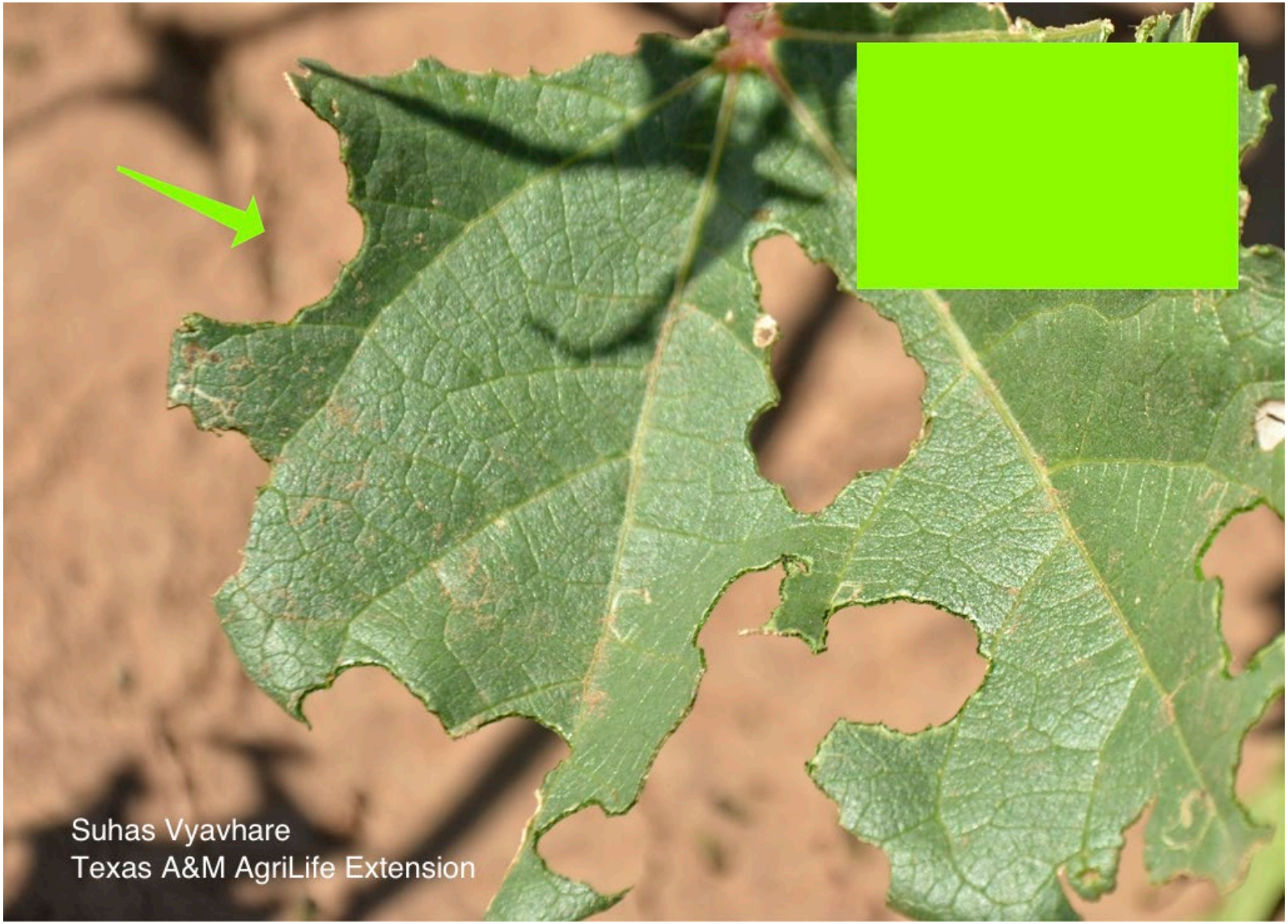
Complete metamorphosis: Beetles and Caterpillars

Larvae (immatures) look nothing like the adult, and sometimes have different mouthparts

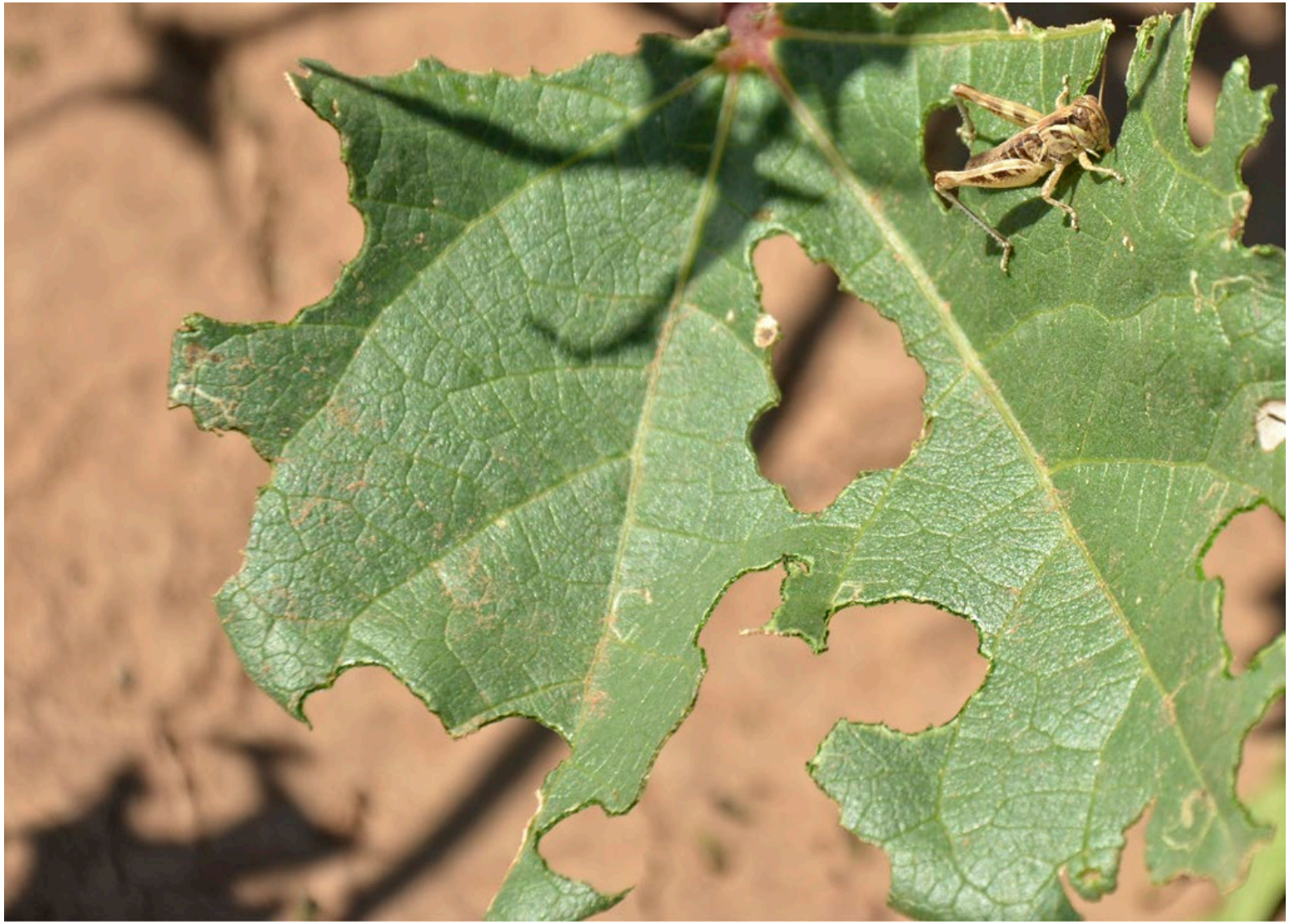
Corn earworm larva

Corn earworm adult moth

Which Group of Insects Did This?



Grasshoppers



The clue was feeding on leaf edges first

Grasshoppers

- Generalist feeders;
  - eat almost anything
  - And down to the stalks occasionally
- Usually on the top of leaves
- Normally eat leaf edges first
- Holes more “ragged” than caterpillars
- Easy to see, usually present in numbers

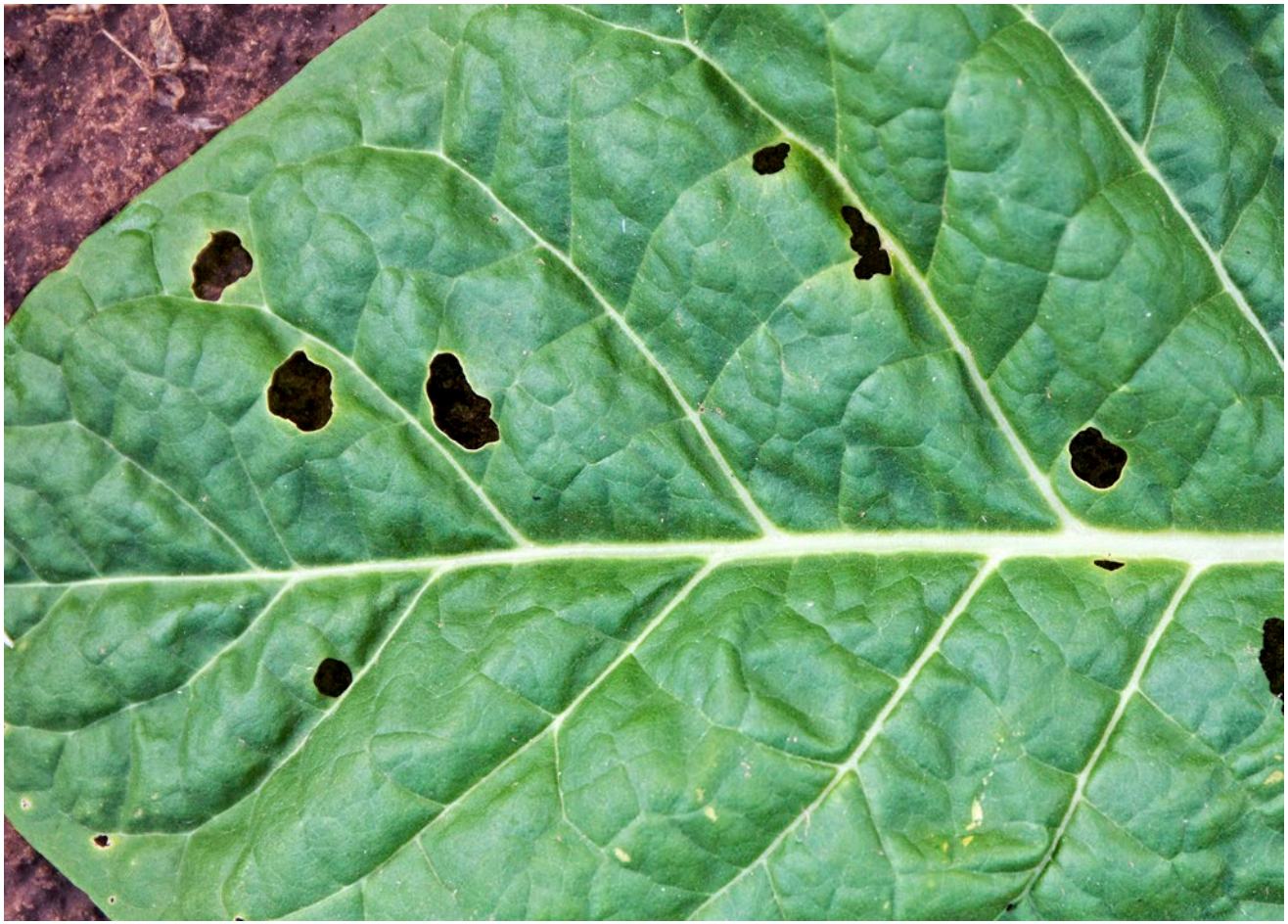
Which Group of Insects Did This?


True Bugs:
Chelinidea vittiger
The Cactus Coreid

The Cactus Coreid (plant bug)
- click below to play video -

Which Group of Insects Did This?

How do you know this is older damage?



Tobacco Hornworm

What Else Do You See?

Frass is Our Friend

- Easier to see than caterpillars
- Provides “bread crumbs” to find them
- Pelletized frass = caterpillars
- Fluffy frass = grasshoppers
- Moist frass = fresh feeding
- Dry frass = old feeding

Do Moths and Butterflies Cause Damage?

Do Moths and Butterflies Cause Damage?

Never:

- They don’t have teeth (mandibles)
- They have a coiled proboscis that can be used to drink nectar
- Can be good pollinators of flowers

Which Group of Insects Did This?
(Grapes at TTU Horticultural Garden)

A closer look

Leafhoppers (Hemiptera)

Stippling due to sheer numbers of the tiny insects.

So many it sounds like rain.

Leaves dry and brittle.

Could Have Easily Been Spider Mites

Spider Mites

- Cause similar stippling and dry, brittle leaves
- **Usually produce a large amount of webbing**
  - Plant-feeding insects usually don't make webbing
- Are more common where hard insecticides have been used to control insects
- Difficult to control
  - Have very few effective miticides in the homeowner market

Spider Mite Webbing on Rose

Which Group of Insects Did This?

Leafcutter Bees

Right: a *Polistes* wasp.
Note the mandibles.

Which Group of Insects Did This?

Notice the pattern of holes.

What could explain this?

Caterpillars: Corn Earworm or Fall Armyworm

The damage was done when the leaves were rolled up in the whorl stage of growth.

Which Group of Insects Did This?

Aphids

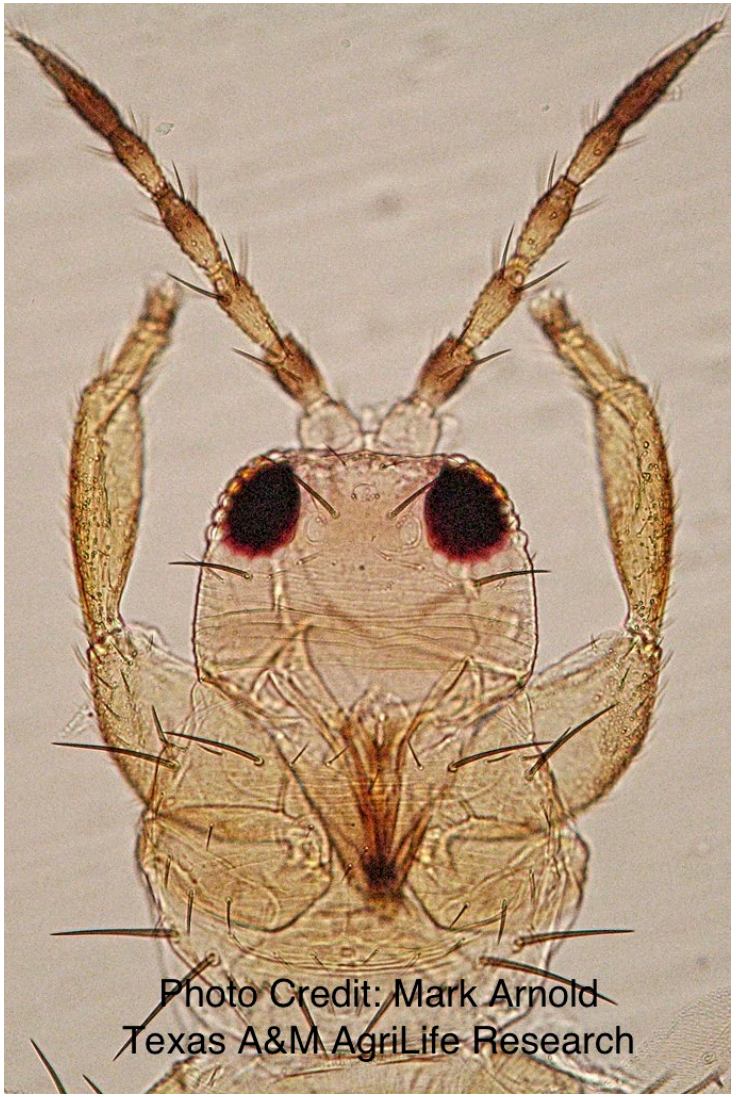
Aphids

- Feed on the underside of leaves
- Drink plant juices that are high in sugar
- Must excrete excess sugars as honeydew
- The easy giveaway is the honeydew

Which Group of Insects Did This?

Thrips

- Extremely small insects
- Have one mandible
- Rasp leaf surfaces
- Prefer to feed on flowers
- Present in high numbers



And one more thing ….

True bug eggs

- Usually barrel-shaped or oval
- Often in clusters
- Usually hardened

And one more thing ….

Moth/butterfly eggs

- Usually oval when laid singly
- Usually flattened when in clusters
- Usually soft

Conclusions

- Look for damage; easier to see than insects
  - New or old damage?
- Type of damage reflects mouthparts
- Mouthparts suggest insecticide choice

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