

Tips on Scouting Vegetable Bedding Plants

Pest and Disease ID



Leanne Pundt

UConn Extension

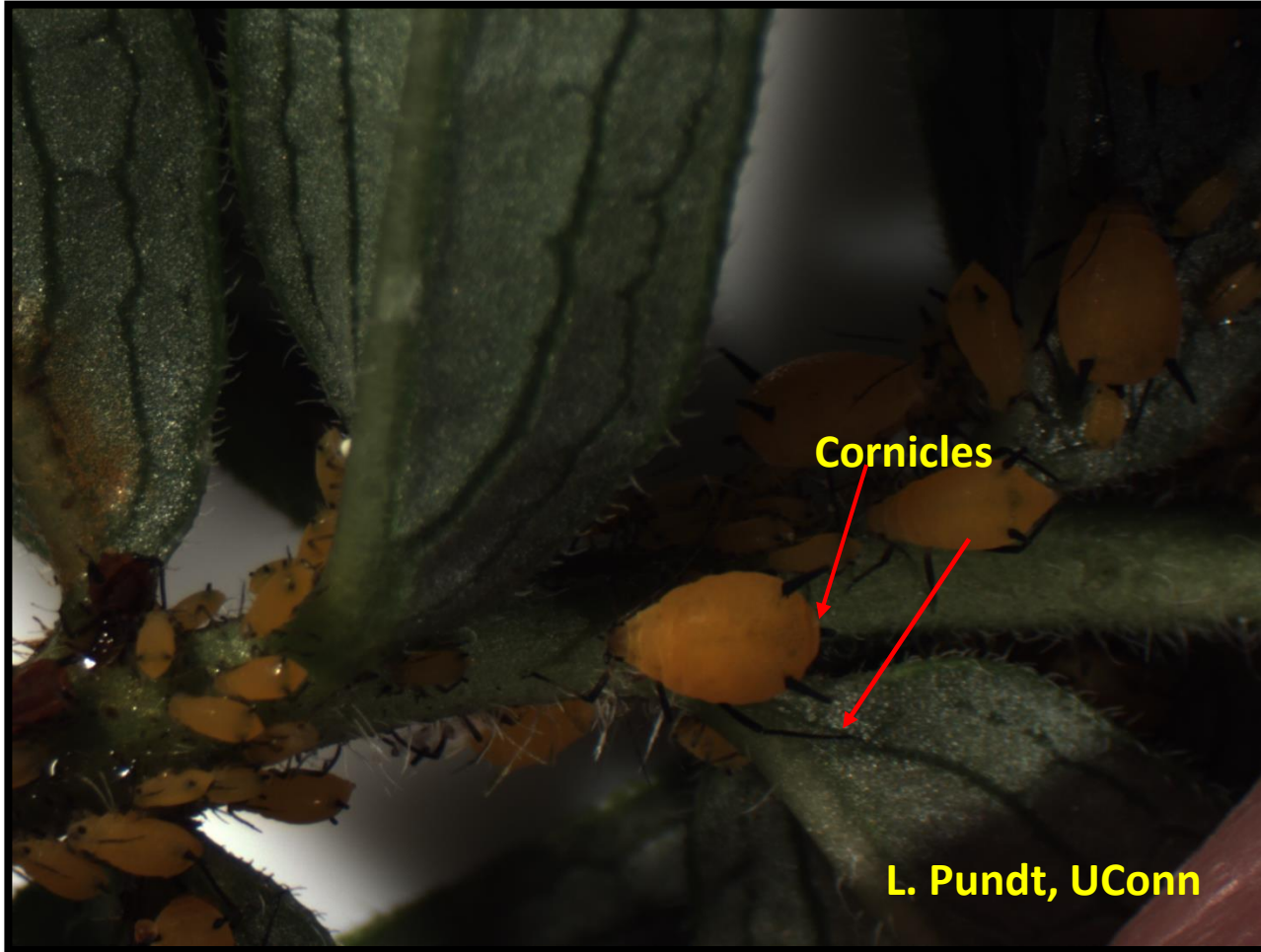
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Insect and Mite Pests

Scouting for Aphids

- **Most aphids will be wingless and not found on yellow sticky cards.**
- **Wide host range. Look along the stems, new growth and underside of leaves of cole crops, eggplant, numerous leafy greens, and peppers...**
- **Shed white skins, shiny honeydew, curled new leaves, distorted growth and presence of ants can alert you to an aphid hot spot.**
- **Identification of species is needed for using host specific parasitic wasps.**

Aphids



Look for cornicles (“tailpipes”) at the end of the abdomen.

Aphids



Small, 1/16 inch long, round, soft bodied insects, feeding on the new terminal growth.

Aphids



Aphids feeding on the underside of pepper leaves.

Aphids



Molting or white shed skins (sometimes mistaken for whiteflies) are an indicator of aphid hot spots.

Foxglove Aphid



D. Gilrein, Cornell

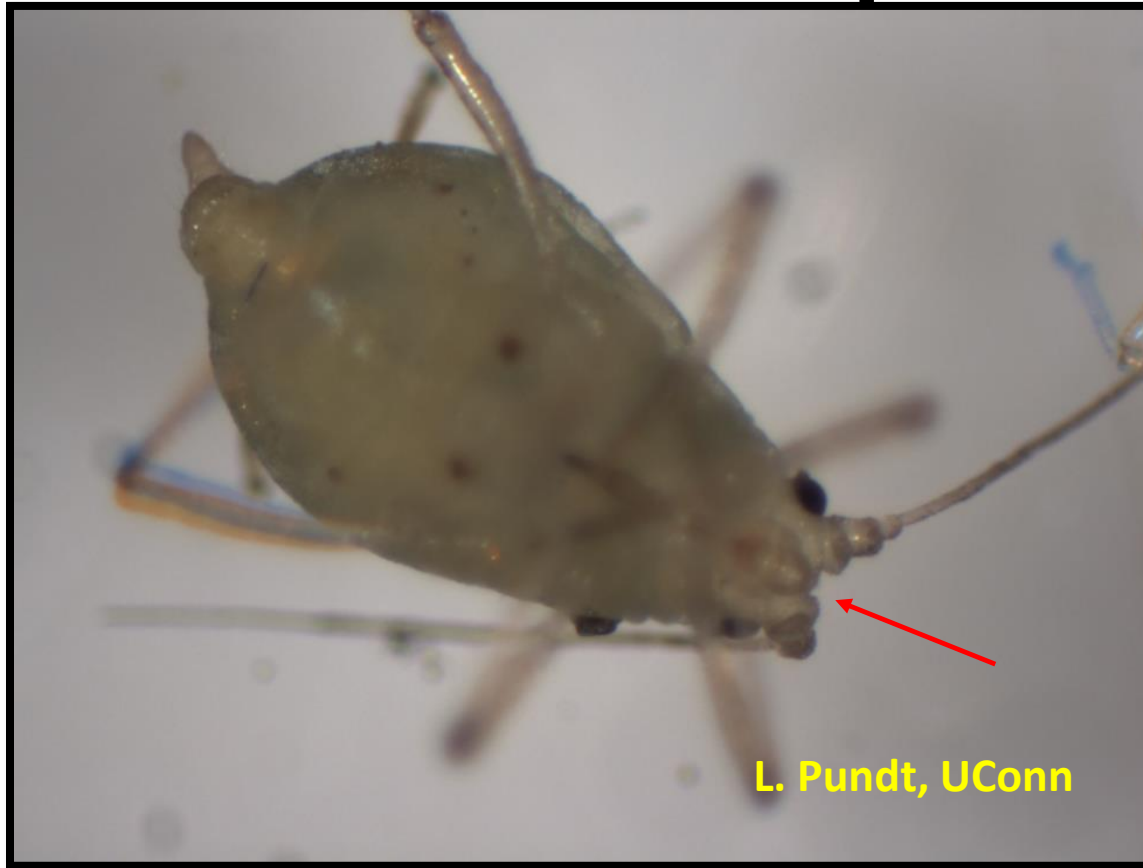
Shiny, light yellowish green aphid with dark green patches at the base of the cornicles and black markings on legs & antennae.

Green Peach Aphid



Green peach aphid is yellowish green in summer & pink or yellowish in spring or fall. Look for darkened tips on the cornicles.

Green Peach Aphid



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Look for a pronounced indentation between the base of the antennae, with protrusions that aim toward each other.

Potato Aphids



Joan Allen, UConn

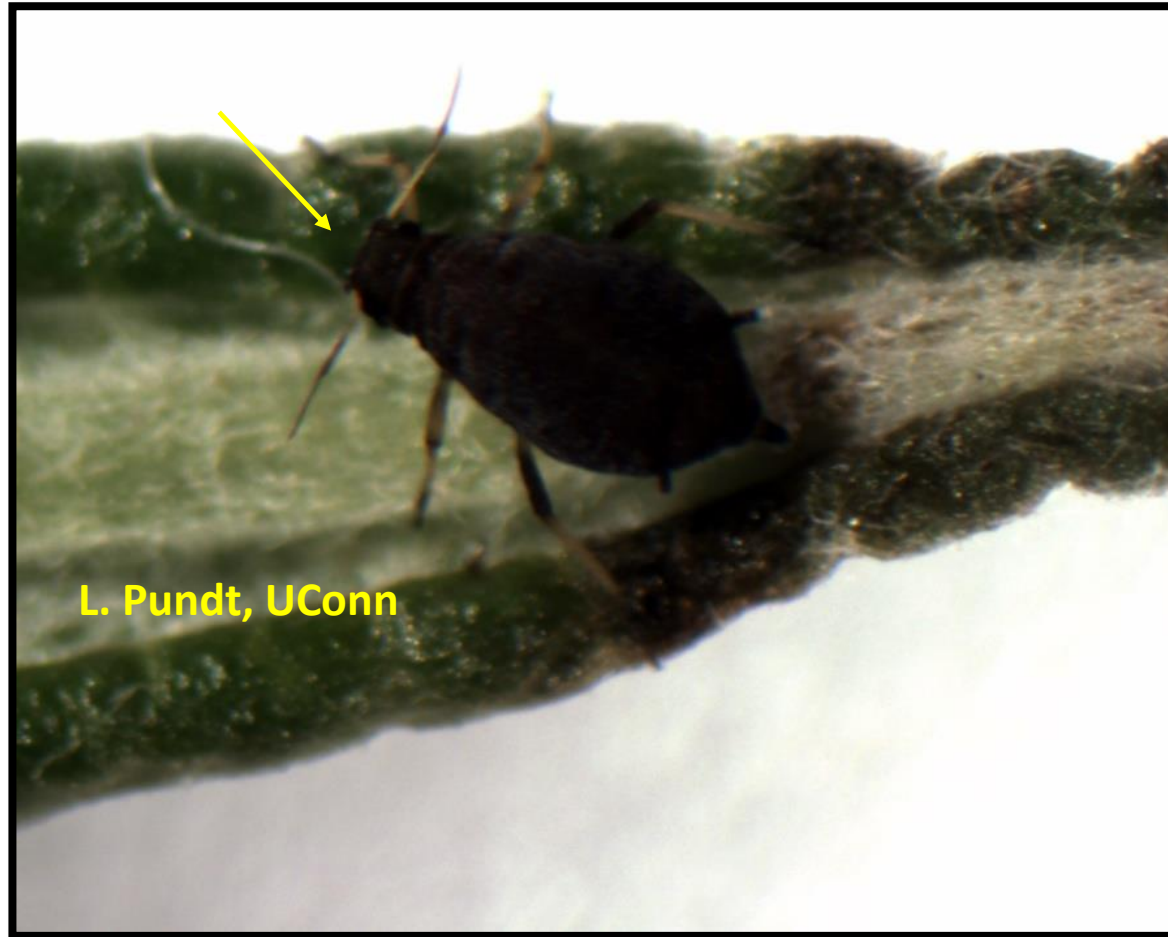
The potato aphid is pink or green, with a darker stripe down its back. Antennae are longer than their bodies, with long, black tipped cylindrical cornicles.

Melon Aphids



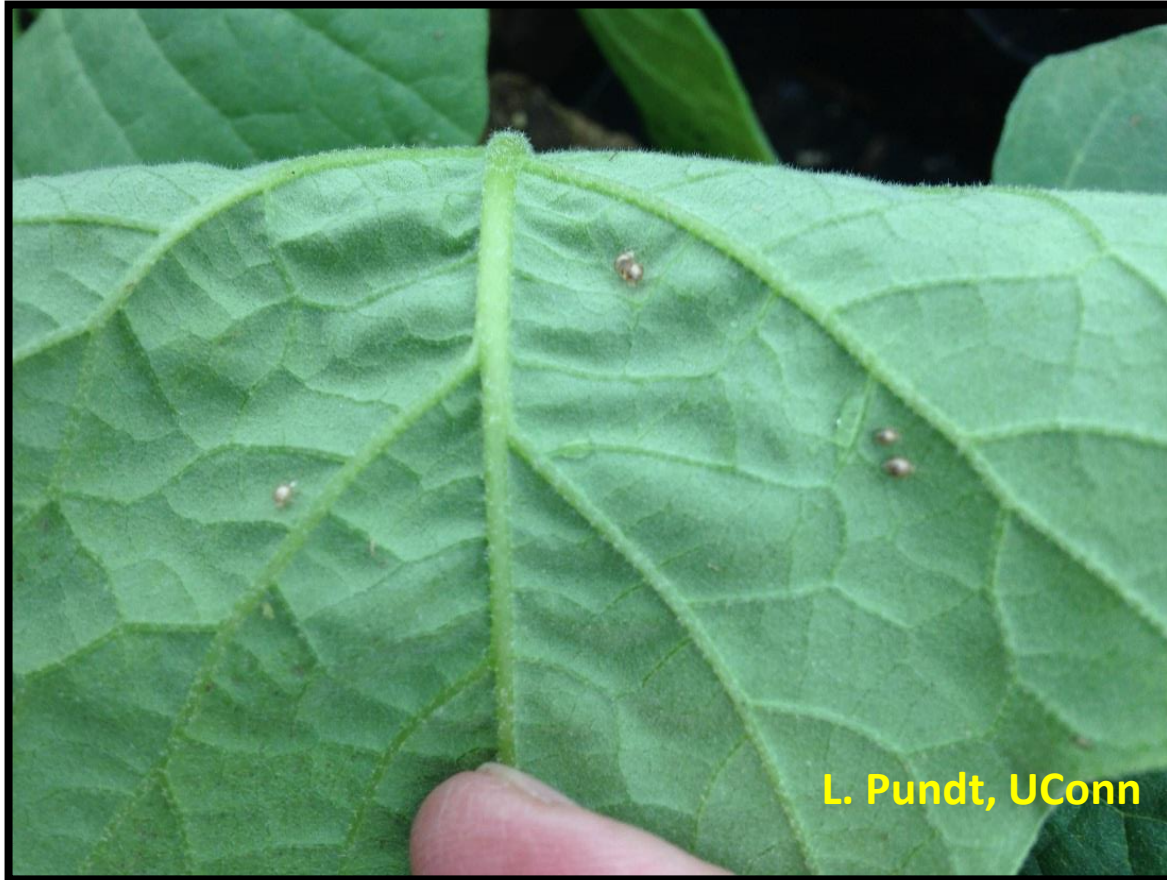
Light green, dark green to yellow to dark olive melon aphids have short, entirely black cornicles.

Melon Aphid



Between the antennae, the top of the head lacks the indentation found in the green peach aphid.

Aphid mummies



Parasitic wasp larvae (*Aphidius sp.*) have parasitized these swollen brown aphids known as “aphid mummies”.

Aphid mummy



Look for the round exit hole, where the adult parasitic wasp has emerged.

Scouting for Broad Mites

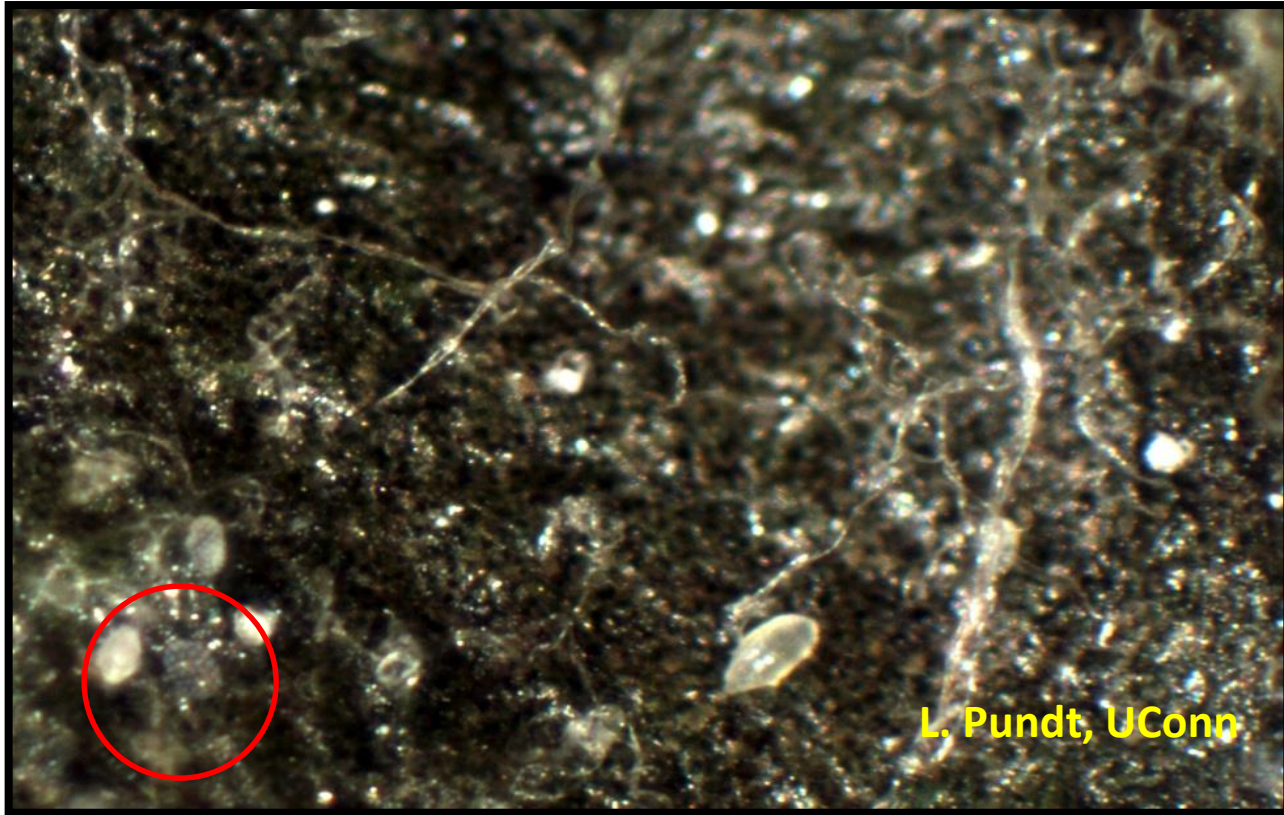
- **Look for characteristic damage (leaf edges curling downward, bronzing on underside of leaves, distorted buds).**
- **Look for damage on peppers and tomatoes.**
- **Microscopic examination is helpful to observe the underside of leaves for broad mites and their eggs.**

Broad mite damage



Outer leaf edges turn downward. Broad mite's toxic saliva causes twisted, hardened, distorted tip growth.

Broad mite adults and eggs



Use a dissecting microscope to look for the very small, broad mites on the underside of leaves. The elliptical, translucent, colorless eggs are covered with whitish bumps (within circle).

Scouting for Caterpillars

- **Visually inspect plants when adult moths and butterflies are active, especially cole crops.**
- **Inspect plants near greenhouse doors, openings, weedy areas and greenhouses near vegetable fields.**
- **Look for presence of caterpillars, their feeding damage and fecal droppings.**

Diamondback Moth Larvae



Pale green larvae feed on underside of leaves.

Diamondback Moth Larva



Larvae wriggle rapidly when disturbed and are tapered at each end.

Diamondback Moth Pupa



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Yellowish pupa is enclosed within loosely spun cocoon.

Diamondback Moth Adult



Grayish brown moth with line of white or pale yellow diamonds down the middle of its back.

Imported Cabbageworm Larva



Velvety green larva, feeding on the underside of the leaves.

Imported Cabbageworm Larva



Larger caterpillars have a delicate yellow line that runs down the center of their bodies. Note: insect droppings or frass.

Imported Cabbageworm Pupa



Green chrysalis (pupal stage).

Imported cabbageworm adult



**Small white butterfly with a dark margin at it's tip and one or two round black spots near the center.
Underside of wings is yellowish.**

Cross Striped Cabbageworm



Bluish-gray coloring along the back with numerous transverse black bands (“cross-striped”).

Striped Cucumber Beetles



Oblong, yellowish green, adult striped cucumber beetles with three even dark-black stripes.

Striped cucumber beetle feeding damage



Adults also transmit a bacterium that produces bacterial wilt in cucurbits.

Scouting for Fungus Gnats

- **Use yellow sticky cards (horizontal placement is best or vertically near growing media to attract winged adults).**
- **Use potato chunks or slices to monitor for larvae. Check after two days.**
- **Look for larval feeding damage on young seedlings in propagation houses.**
- **Fungus gnats have a wide host range and are favored by moist habitats.**

Fungus Gnat Adults



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Fungus Gnat Adult



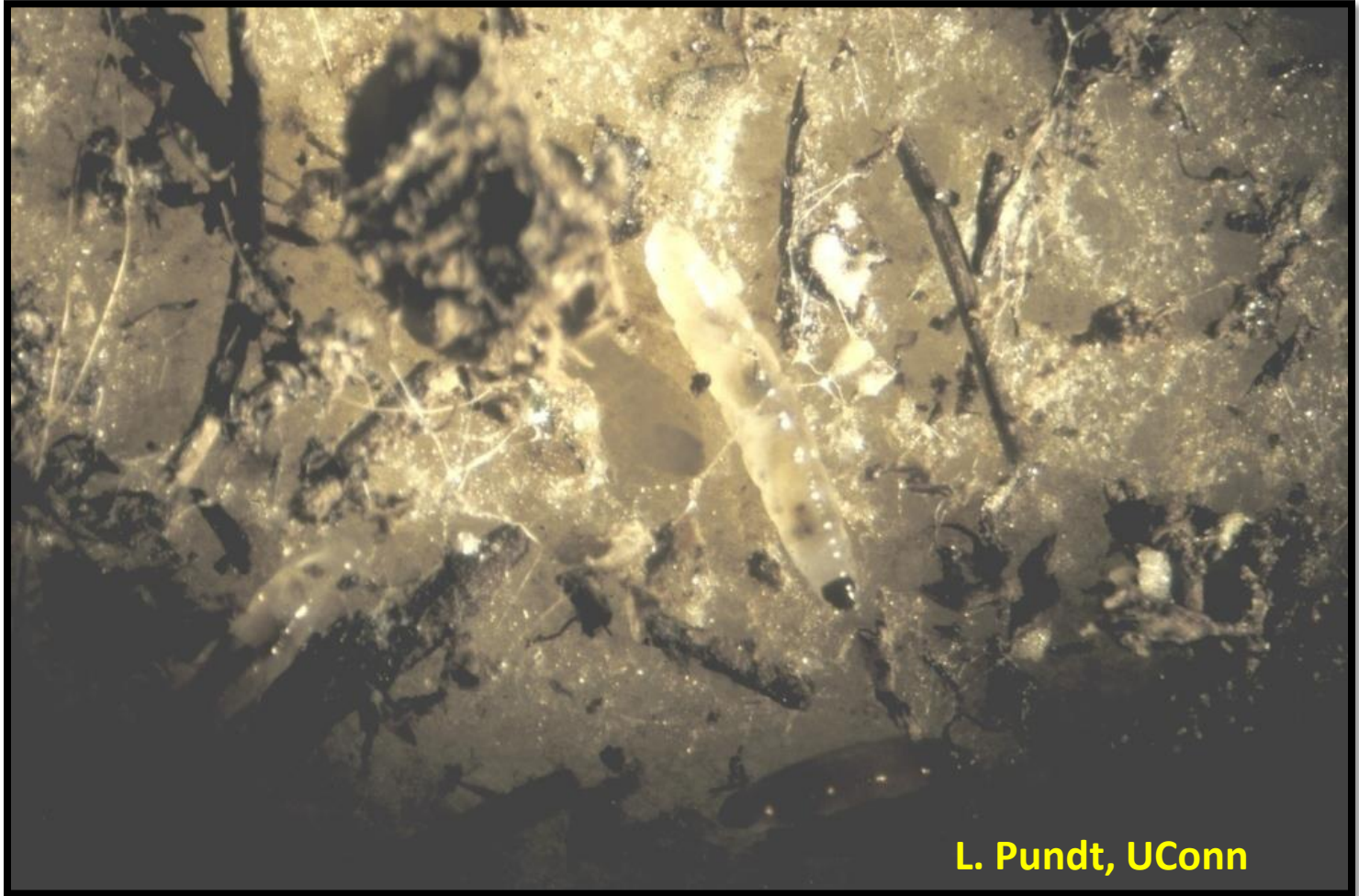
Adult fungus gnats are mosquito-like in body shape, with long legs, a clear pair of wings, & long beaded antennae. Look for distinct Y pattern on the wings.

Fungus Gnat Larva



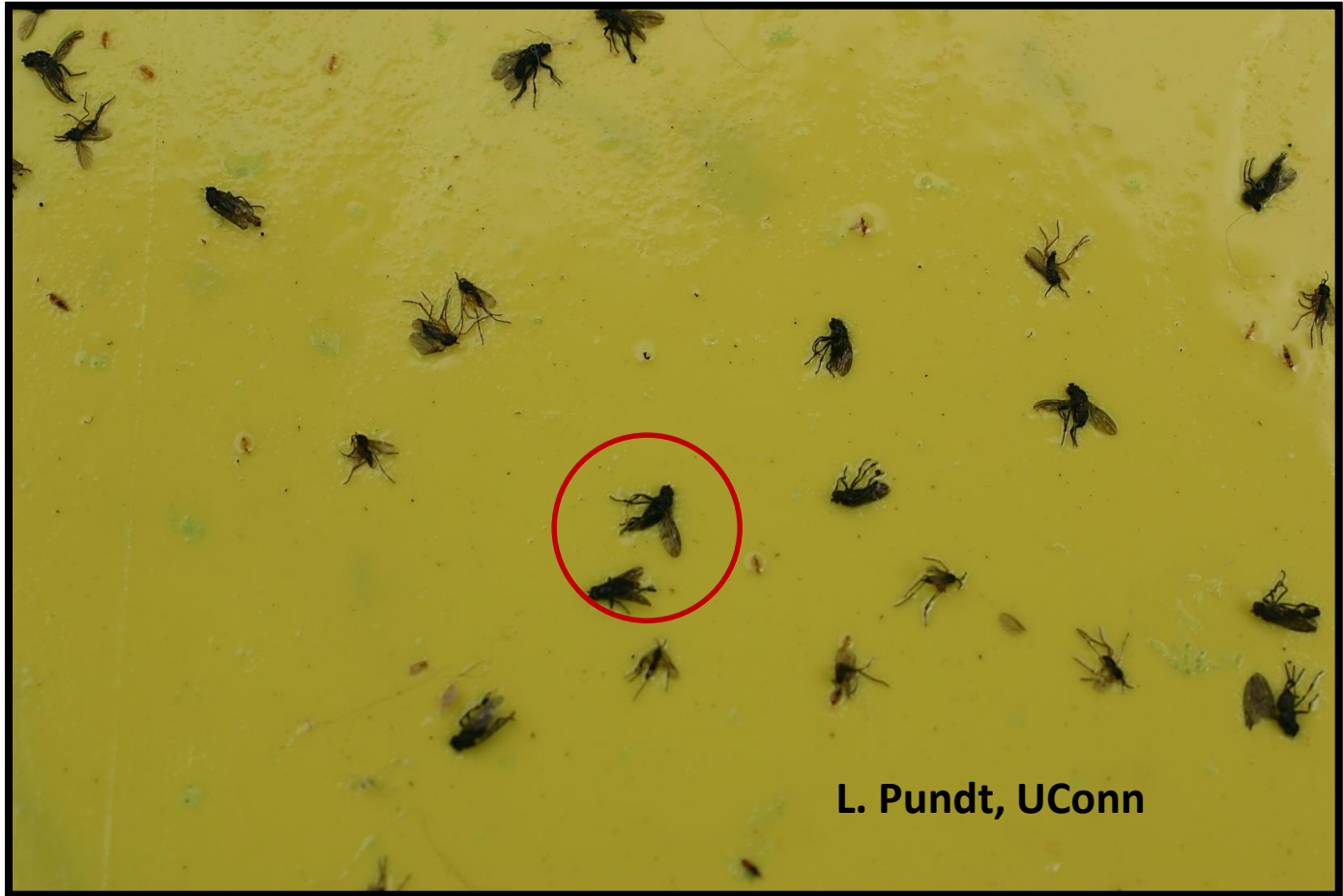
¼ inch long, opaque to white, black headed legless larva that feeds on young roots.

Fungus Gnat Larva



Use potato slices to monitor for black headed larva.

Adult Shore flies



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Adults are more robust than fungus gnats with 5 light colored spots on each wing and short legs & antennae.

Shore Flies



Shore flies are stronger fliers than fungus gnats and may be seen resting on plant leaves.

Shore fly damage



Shore flies feed on algae. Their black droppings (frass) may be unsightly.

Beneficial Hunter Flies



Hunter flies have clear wings with no spots and are about twice the size of shore flies.

Scouting for Spider Mites

- **Visual inspection is needed as the wingless mites will not be found on sticky cards.**
- **Wide host range. Look on underside of leaves, along the leaf vein on beans, tomatoes, eggplants....**
- **Scout plants in hot, dry areas of a greenhouse.**

Spider Mite Damage



Green beans used as an early indicator of spider mite feeding in a greenhouse tomato crop. Note: stippling or flecking on the leaves.

Spider Mites



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Look on underside of leaves, especially along the midvein, for small, 1/50 inch long, greenish to orange mite with characteristic two dark spots on either side of abdomen. Look for their round eggs. (Predatory mite eggs are oblong or football shaped.)

Spider Mites



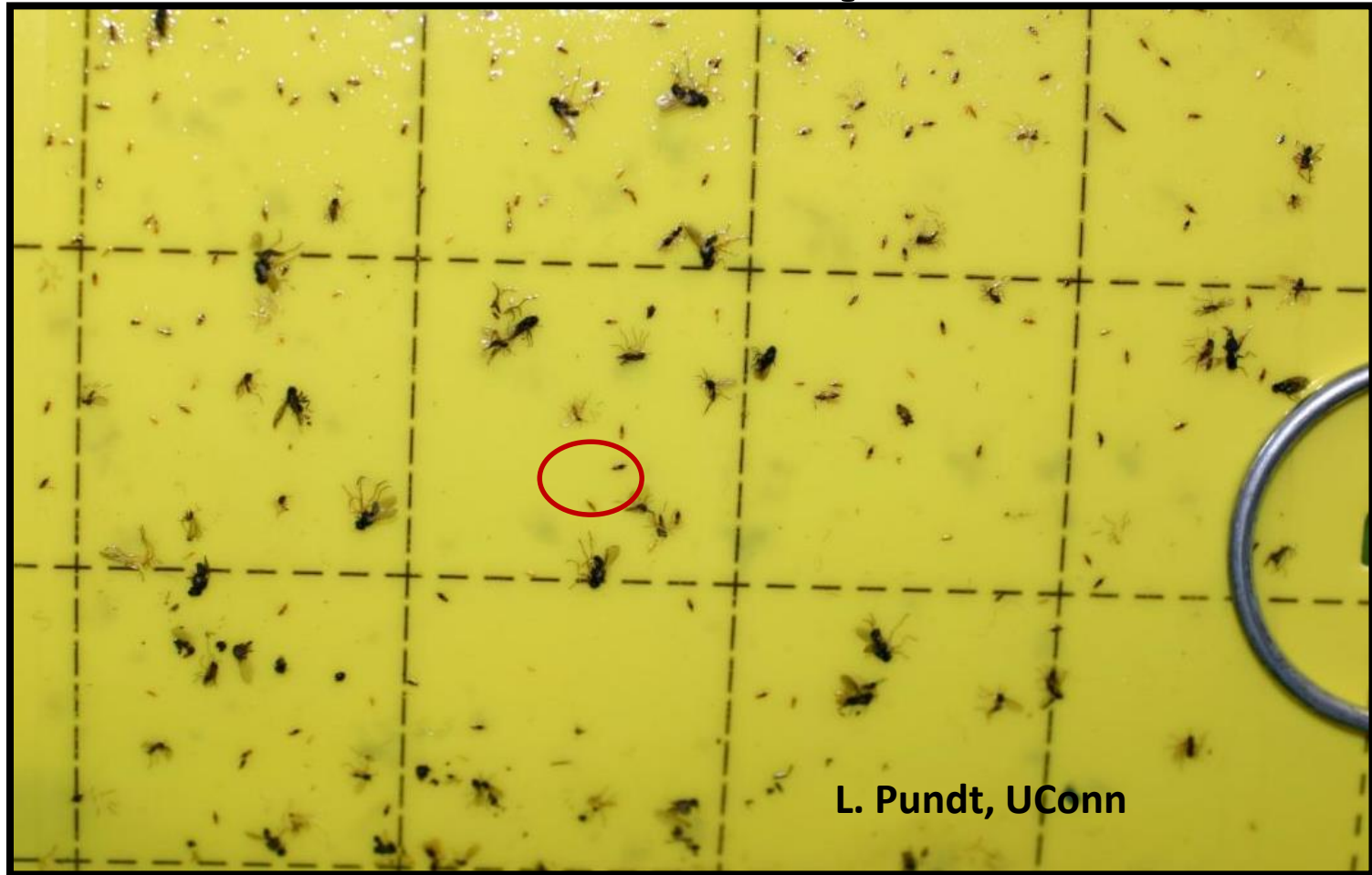
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Two-spotted spider mites, round eggs and bright red diapausing or overwintering spider mite on underside of leaves along the midvein.

Scouting for thrips

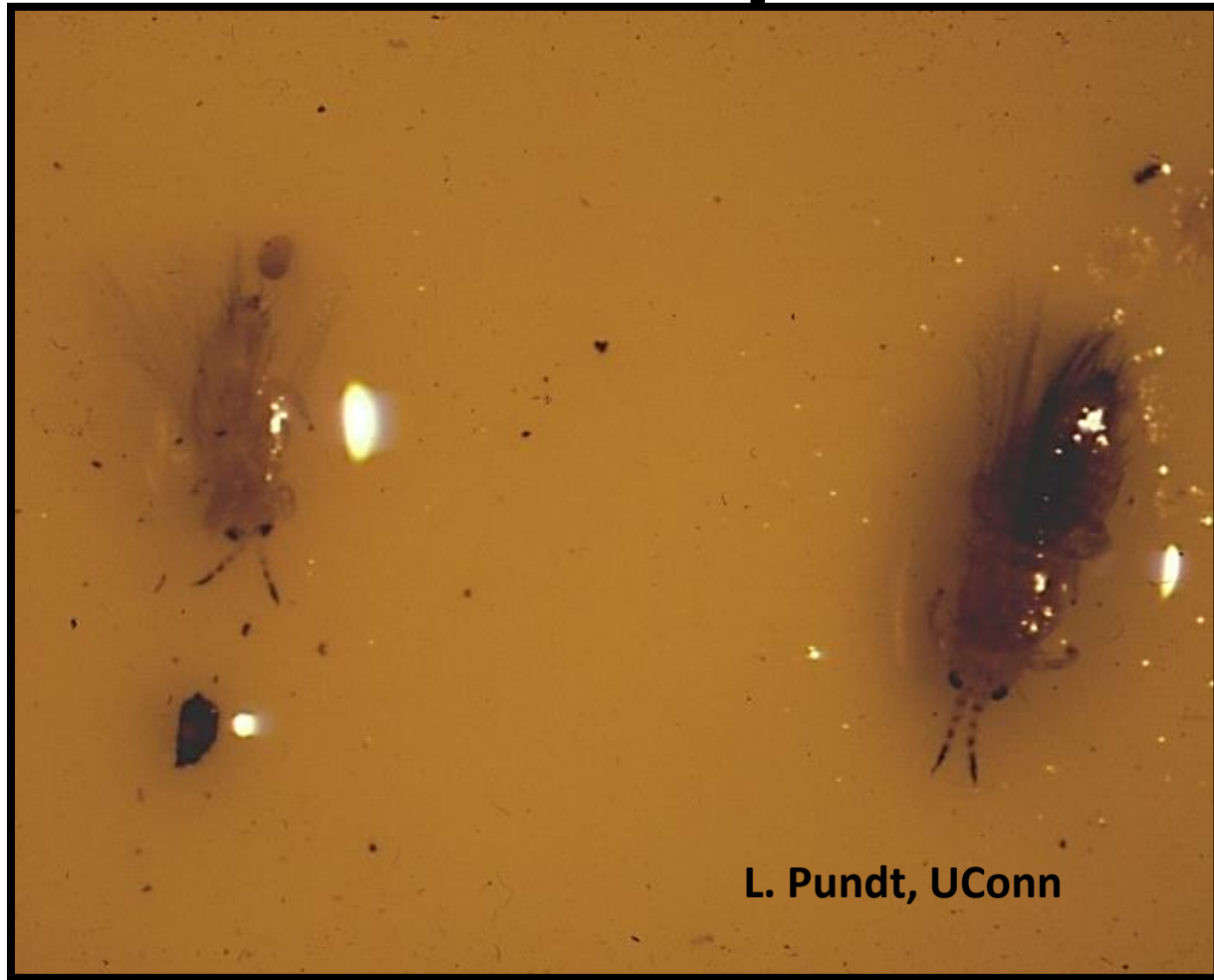
- **Yellow sticky cards are needed to detect early infestations.**
- **Wide host range. Look for thrips adults and larvae and their damage (white scarring, distorted growth) especially on cole crops, eggplant, leafy greens, peppers, tomatoes...**
- **Tap foliage over a sheet of white paper to see the small thrips.**

Adult thrips



Small, (1/16 inch long) cigar shaped winged insects.

Adult thrips



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Male thrips on left & female western flower thrips on right.

Thrips feeding damage



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Leaves have a characteristic “silvery” appearance with leaf scarring and distorted growth.

Thrips feeding damage



Small, (1/16 inch long) cigar shaped thrips and their damage.

Thrips



Black fecal droppings and silvery appearance from thrips feeding.

Thrips larva



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Yellow, wingless thrips larva on underside of leaf.

Adult thrips



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Scouting for Whiteflies

- **Yellow sticky cards can be used to monitor for adults.**
- **Look on underside of leaves for eggs, immature nymphs, pupae and adults on susceptible plants such as tomatoes.**

Greenhouse whitefly adults



Small (1/16 inch long) insects with distinct white powdery wings found on underside of leaves.

Greenhouse Whiteflies



Greenhouse whitefly pupae infected by the beneficial fungus *Beauvaria bassiana* on underside of tomato leaf. Note brown discoloration. Place leaves in plastic bag to see sporulation of *Beauvaria*.

Scouting for slugs

- **Slugs feed at night on a wide range of crops.**
- **Look for holes in leaves and stems, and shiny mucous-like slime trails.**
- **Inspect areas under containers and damp areas in greenhouse.**

Slugs



J. Boucher, UConn

Slugs eat holes in leaves and leave slime trails.

Slug Damage



Young slugs rasp away at plant tissue and eat irregularly shaped holes in the foliage.

Diseases

Bacterial Leaf Spot



Chocolate brown irregularly shaped spots on pepper leaves.

Black Rot on Cabbage



Y. Li, CAES

V-shaped tan to yellow diseased tissue with blackened veins.

Scouting for Botrytis Blight

- **Look for leaf blight and gray fuzzy appearing spores on plant leaves during humid conditions.**
- **Tan stem cankers may develop on greenhouse tomatoes.**

Botrytis Blight



Tan stem cankers with characteristic gray fuzzy appearing spores.

Scouting for Damping-off

- **Common disease of germinating seeds and young seedlings (tomatoes, peppers, cole crops).**
- **Seeds may fail to emerge (pre-emergence damping off).**
- **Young seedlings may wilt, with a water soaked stem lesion at the soil line.**
- **Plants often die in a circular pattern.**

Damping Off



Fungus spreads radially from a central point of origin, resulting in a circular pattern.

Scouting for Tospoviruses

Impatiens Necrotic Spot Virus (INSV) or Tomato Spotted Wilt Virus (TSWV)

- **Some of the more common symptoms of INSV/ TSWV include target leaf spots, necrotic areas, mottling and ringspots.**
- **Wide host range.**
- **Vectored by thrips.**
- **Symptoms vary according to plant species.**
- **Young plants are especially vulnerable to infection.**
- **There is no cure. Infected plants must be rogued.**

Tomato Spotted Wilt Virus (TSWV)



Small, dark brown spots and black line patterns.

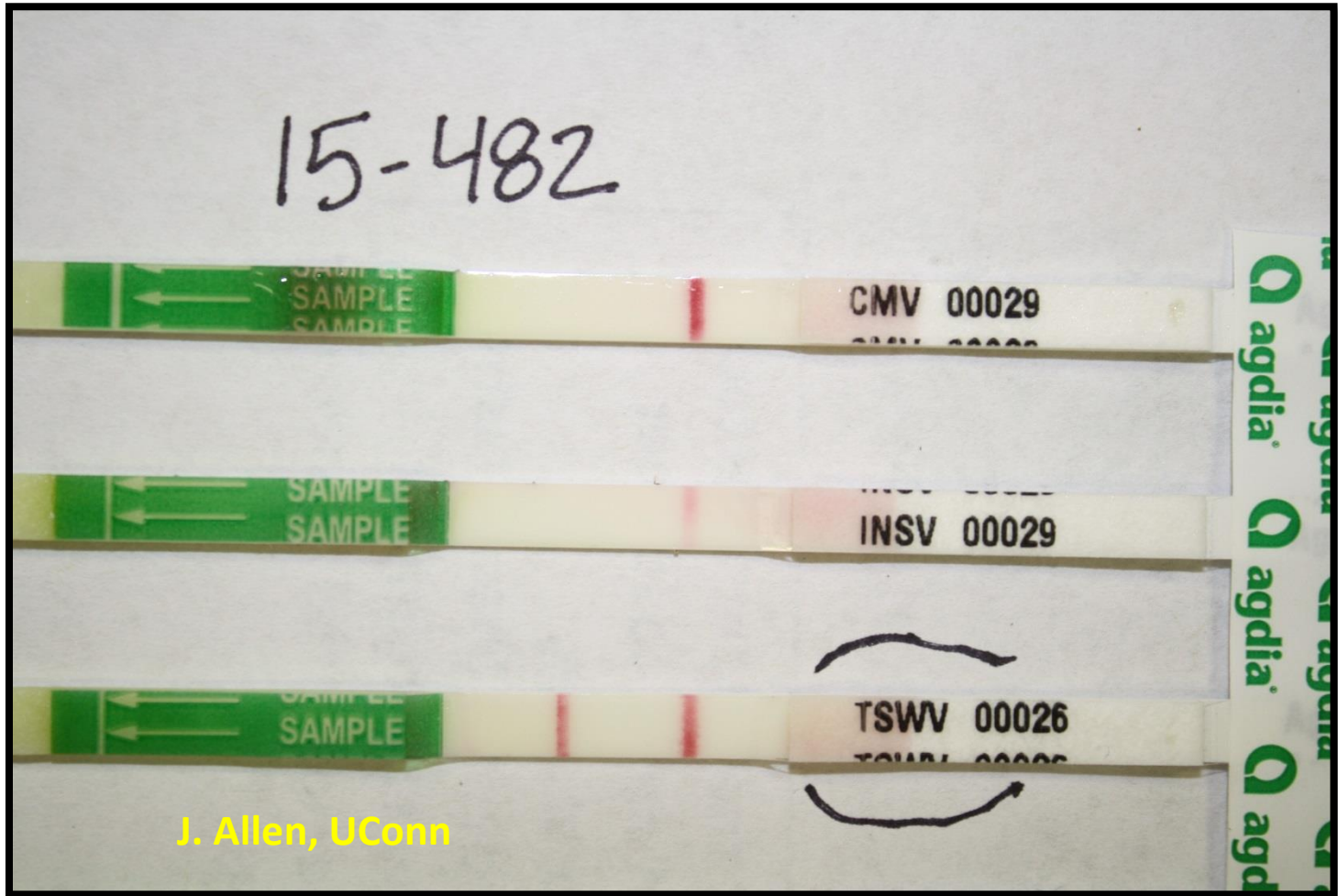
Tomato Spotted Wilt Virus (TSWV)



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Dark brown streaks on stems and leaf petioles.

Agdia Immuno Strip Test



Impatiens necrotic spot virus (INSV) on tomato



Y. Li, CAES

Dark line patterns on leaves.

Impatiens necrotic spot virus (INSV) on pepper



Brown ringspots on leaves.

Tobacco Mosaic Virus (TMV)



**Dark line patterns and distortion of leaves.
Spread by plant handling (no insect vector).**

Scouting for Late Blight

- **Overwinters in potato cull piles or outdoors in field soil that is not completely frozen, so is not generally considered a problem for locally grown tomato transplants.**
- **Common symptoms are sunken, water soaked lesions on leaves and brown lesions on tomato stems.**

Late Blight on Tomato



Darkened, irregular, and water-soaked lesions on leaves or stems are typically seen on tomato seedlings affected by late blight.

Scouting for Powdery mildew

- **Look for faint, white fungal threads on leaves and stems of cucumber, eggplant, pumpkin, tomato, and squash.**

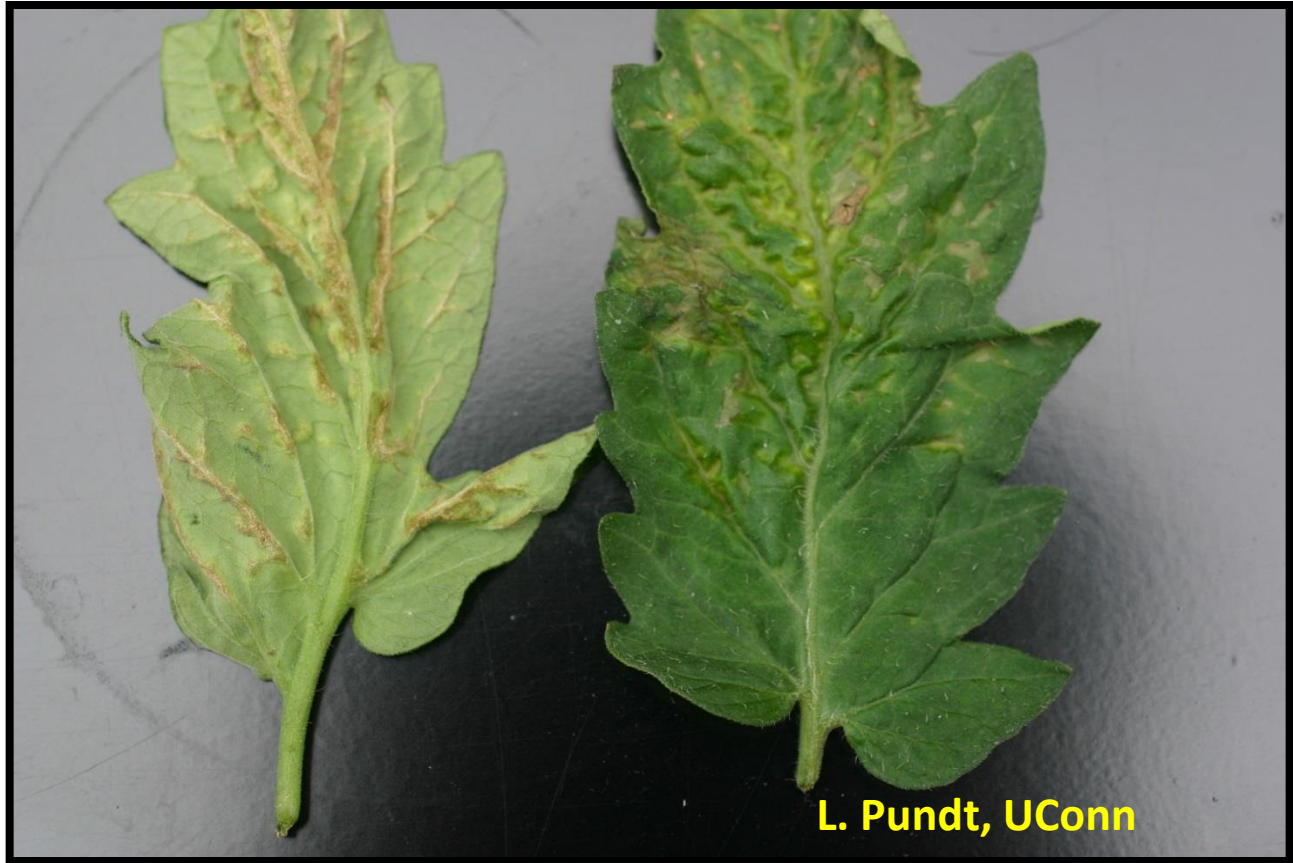
Powdery Mildew



Faint white fungal threads of powdery mildew fungus.

Abiotic Disorders

Edema



Look for small, clear blisters on the lower leaves that turn reddish brown as they dry.

Injury from Fumes from Unvented Heater



Spray Injury



Phytotoxicity or plant damage or spray burn.

Herbicide Injury



Herbicide vapors from a pre-emergent herbicide not labeled for greenhouse use damaged the tender growing points of these young pepper seedlings.

Some Suggested References:

- **New England Vegetable Management Guide**
Includes section on Vegetable Transplant
Production
- <https://nevegetable.org/>