Insect and other pests in high tunnel vegetables

Over the years high tunnel (HT) production of vegetables have enabled growers to extend their vegetable production time by 3-5 months. Producing earlier and later season vegetables compared with field production. Though at times it seems HT vegetables have fewer insect problems this is not true and certain pests need to be watched for and anticipated.

Hornworms *Manduca sexta* (L) are often found in HT tomatoes. Their parasitoids are slower to find and kill them compared to field tomato production


Parasitized hornworm with cocoons
of parasitic wasps (these are NOT eggs)

Yellow striped armyworms *Spodoptera ornithogalli* (Guenée) are also found frequently in HT tomatoes

Because there is little leaf wetness and no rain in a HT twospotted spider mites *Tetranychus urticae* Koch can become much more of a problem in the summer compared with the field.

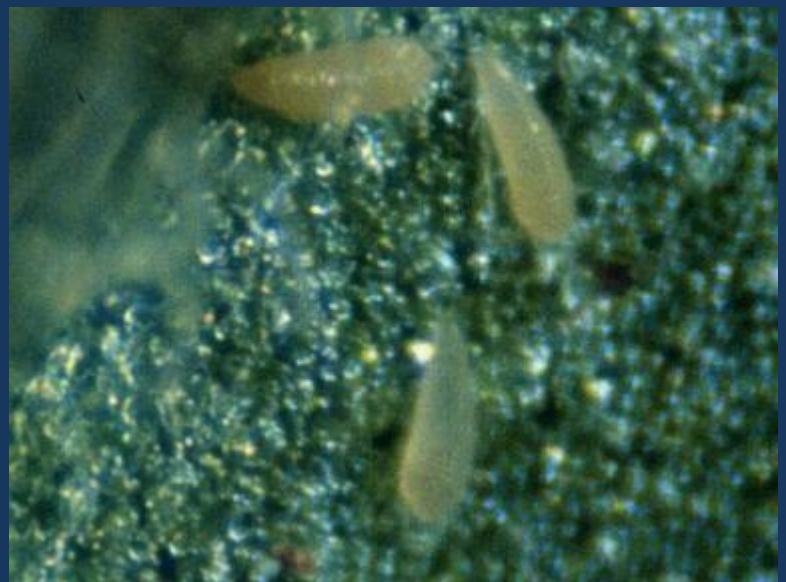
Mite feeding damage called stippling on tomato leaf appears as small white spots


This is much more severe mite feeding damage

Tomato russet mites

Aculops lycopersici

These mites are extremely small and cannot be seen even with a 10X hand lens and often go overlooked

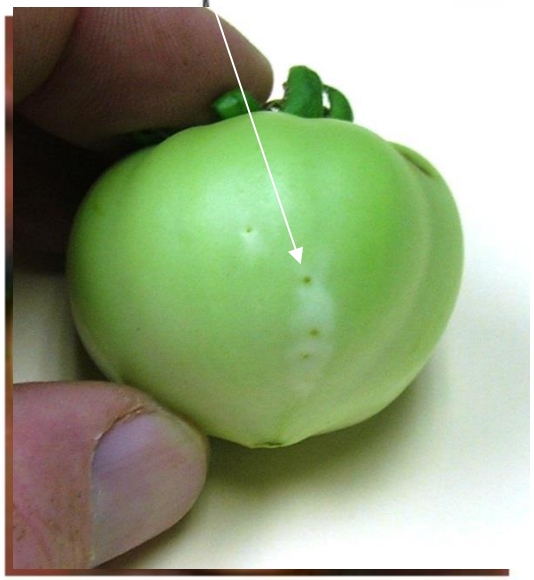


They cause a russeting or a bronzing on tomato leaves

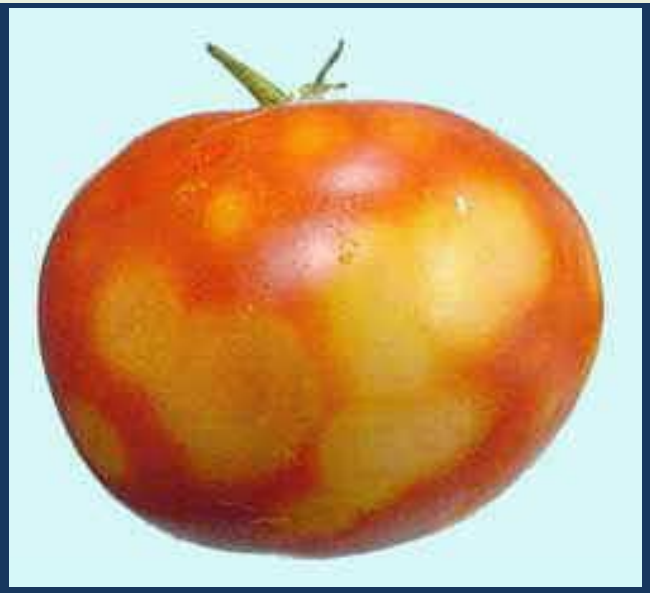
Thrips

Dimples and halo spot in tomato fruit caused by thrips ovipositioning

Halo spot caused by Western flower thrips



Thrips can transmit tomato spotted wilt virus in tomatoes



Major thrips species in Maryland vegetable fields

Frankliniella tritici: eastern flower thrips
F. fusca: tobacco thrips
F. occidentalis: western flower thrips
Thrips tabaci: onion thrips
Anaphothrips spp: grass thrips
Limothrips spp: grain thrips

Preplant Survey for thrips

Winter annual weeds were examined throughout the winter for overwintering thrips

Henbit

Chickweed

Marestail

Wild mustards and radish

Chickweed found outside of HT in late February just before grower was ready to plant


Chickweed leaves fed on by thrips

Sampling winter weeds for thrips

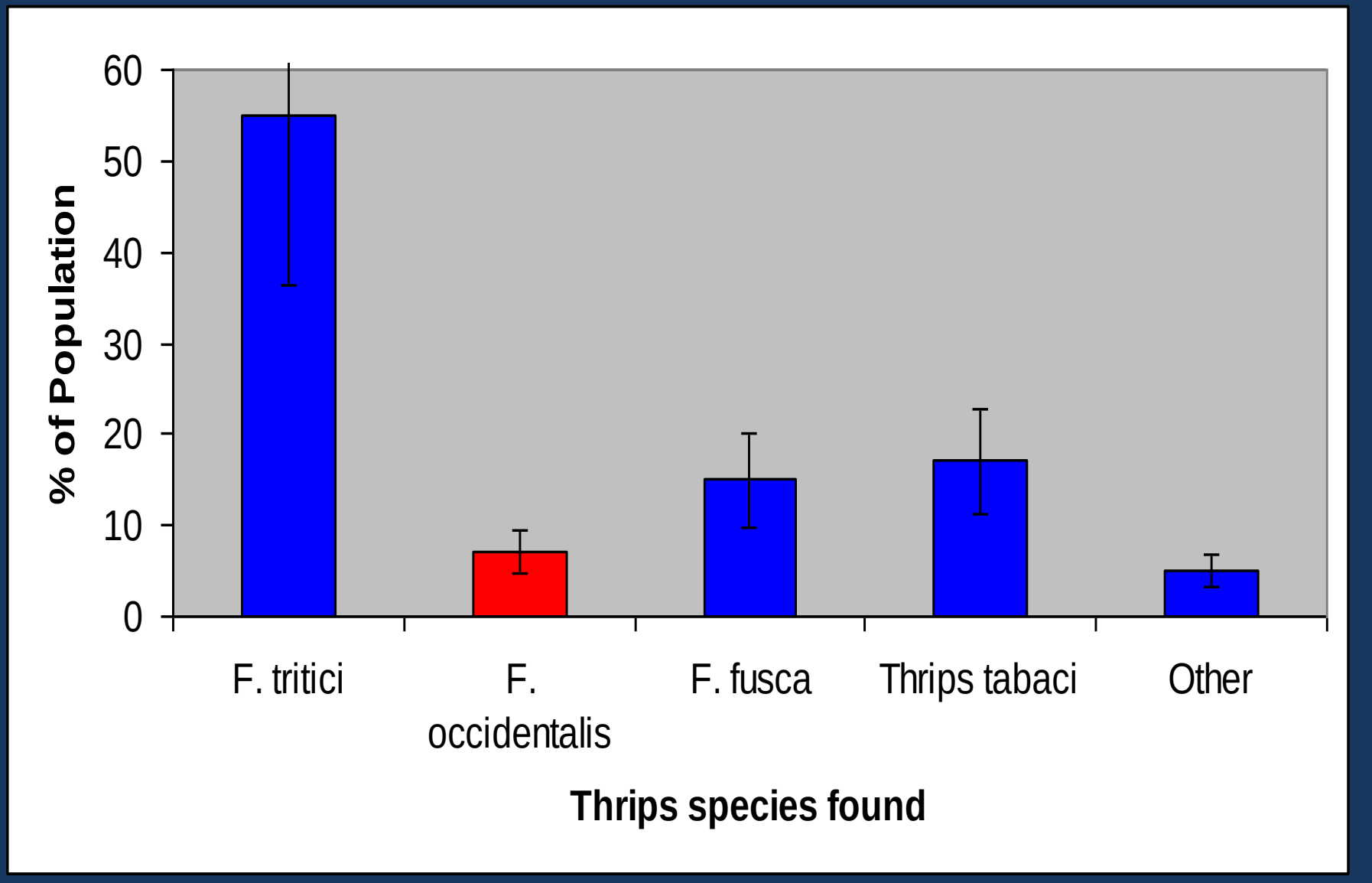
- Most sample sites had no thrips
- In 5 of the 12 sites thrips were found in December and January on winter annuals
- In four sites thrips were found in March
- Worse sample site had 25% of winter annual weeds with at least one thrips.

- 87% of the thrips found were female adults, 11% were males and 2% were immatures or pupae

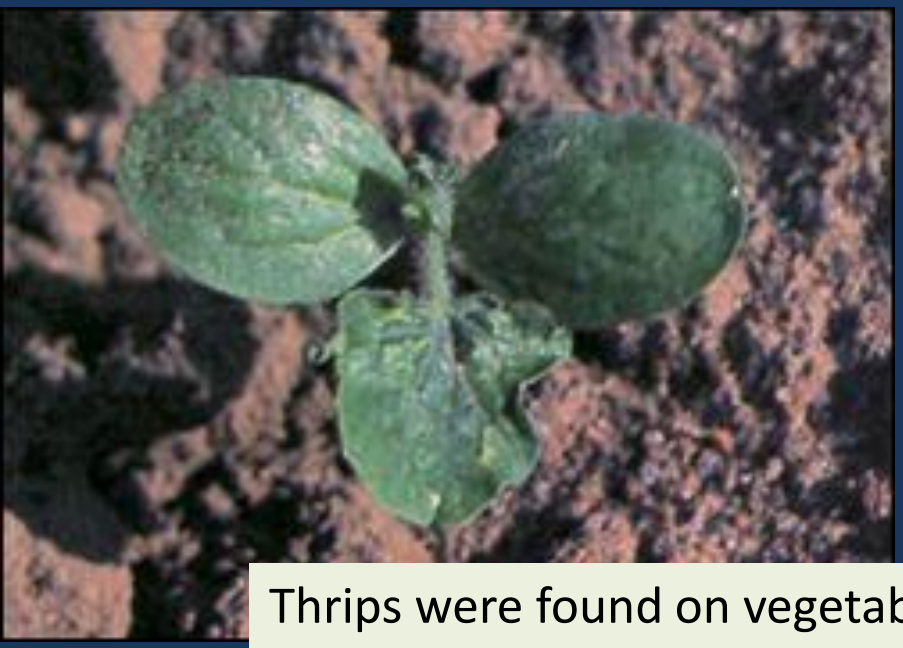
- Chickweed was found to harbor 70% of all thrips with wild mustards and henbit being the next best winter hosts

- Sampling-sites near high tunnels or woods had a greater probability of containing thrips than sites out in a field

- Farms where thrips were found to overwinter had greater probabilities of infestations during the season


60
50
40
30
20
10
0
% of Population
F. tritici
F. occidentalis
F. fusca
Thrips tabaci
Other
Thrips species found

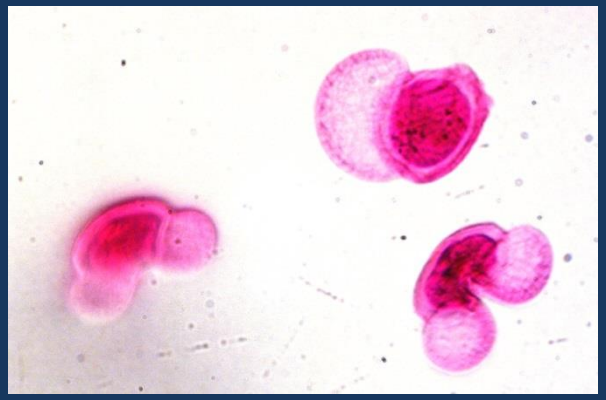
Early season thrips-sampling on crops



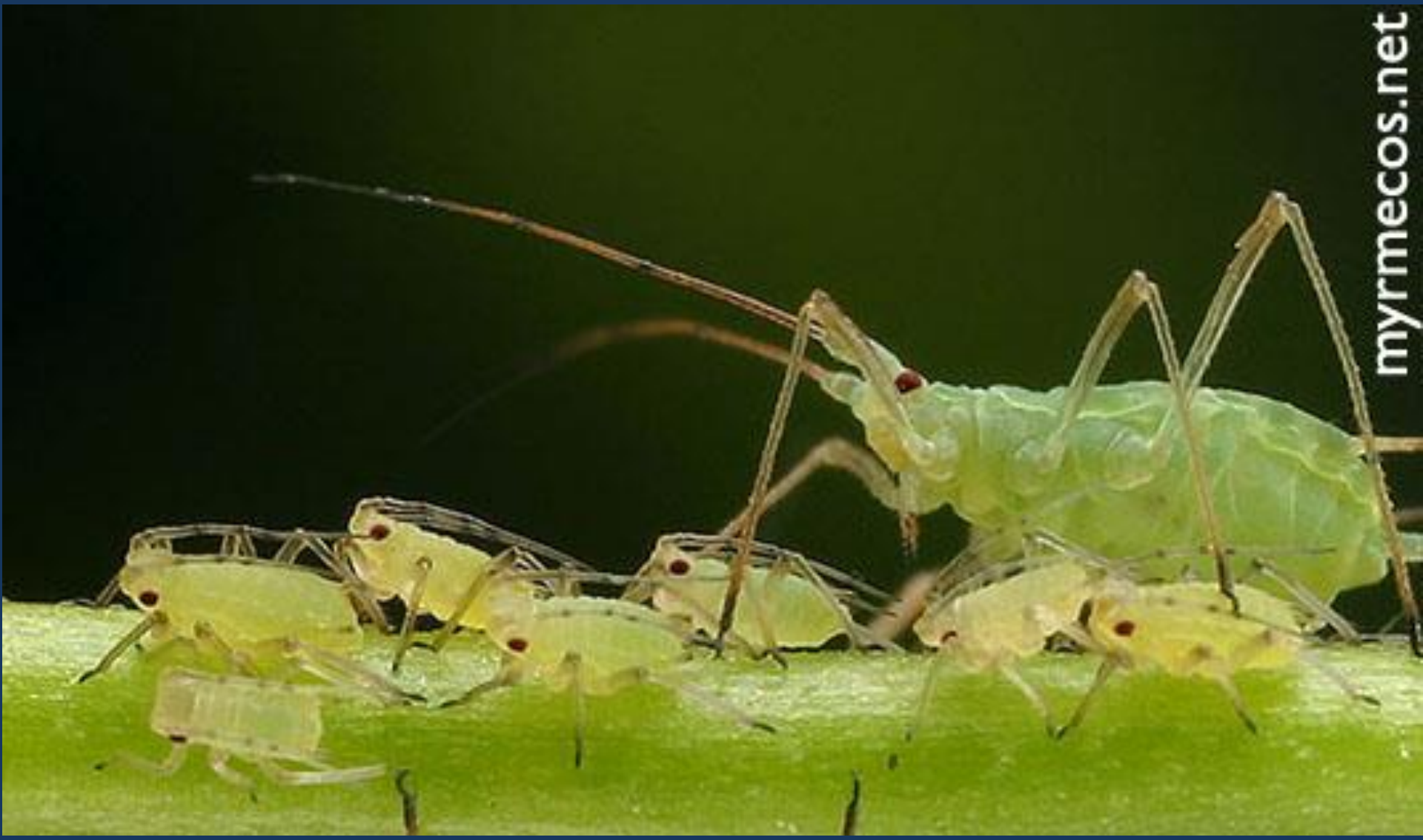
Thrips were found on vegetable crops in April and May—very early for thrips, why were they there?

Pine pollen

was found sticking to these vegetables and thrips like to eat pollen and were attracted to the vegetable crops



Several species of aphids can infest HTs

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Whiteflies, especially in fall plantings, can be much more of a problem in HT vegetables than field vegetables

Silverleaf whitefly Bemisia tabaci

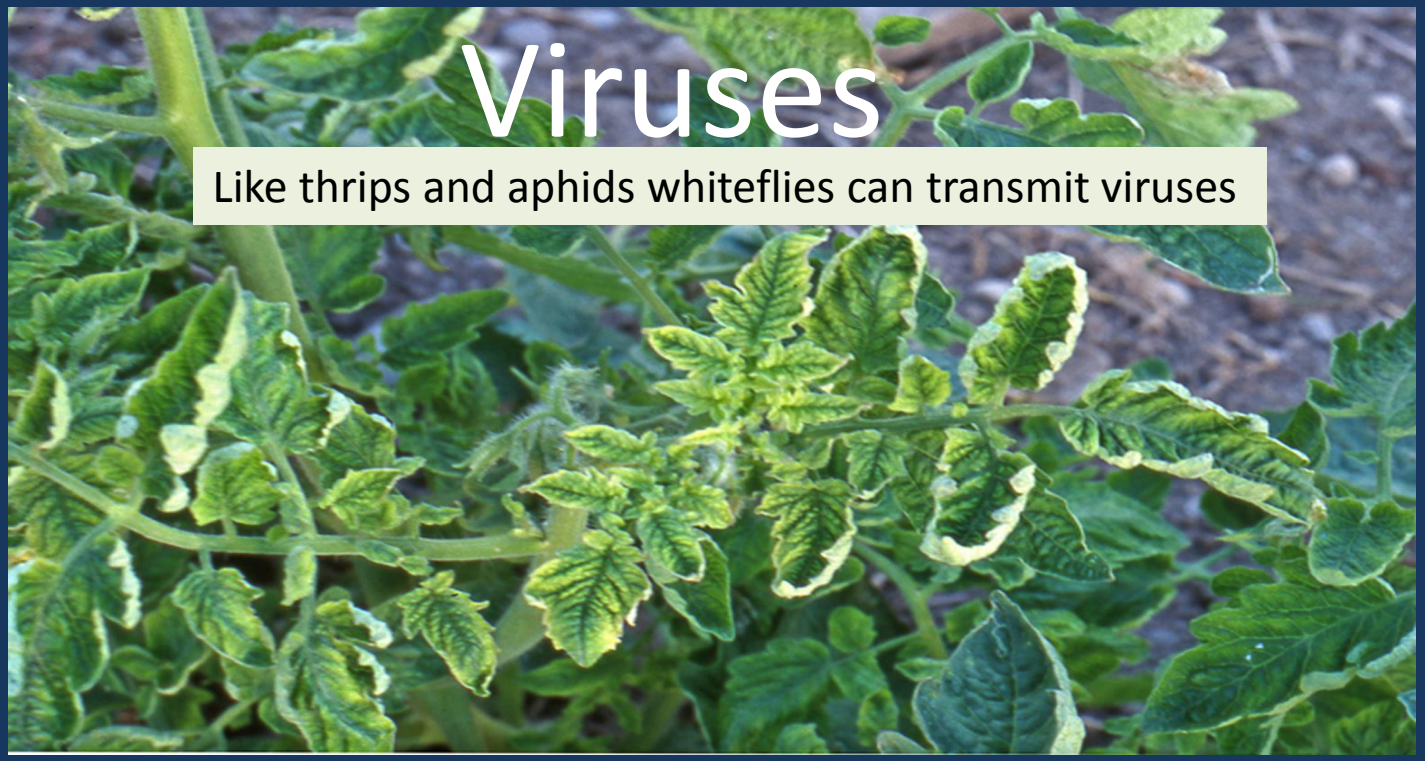
Greenhouse whitefly *Trialeurodes vaporariorum,*

Silverleaf whitefly

GH whitefly

Viruses

Like thrips and aphids whiteflies can transmit viruses



Organic Control

Horticultural oils
Beauveria bassiana
Neem
Insecticidal soap

Bt for worm control

Publication EB-236

Commercial Vegetable Production Recommendations

Maryland

2014









Odd problem showing up in a few HT tomato plantings


Tomato plants do not grow well and slowly decline

The problem was found to be symphylans

Myriapoda, Symphyla, Scutigerellidae
Scutigerella immaculata (Newport)
Garden symphylan

Garden symphylans, also called garden centipedes, are slender, white arthropods, closely related to insects, about 0.33 inch (8 mm long), with 10 to 12 legs and distinct antennae.

They are fast-moving and live in soil and move up and down in the soil profile in relation to the moisture gradient. After an irrigation they are near the soil surface. As the soil dries, they move deeper. They hide when exposed to light. They occur mainly in soil with high organic matter and especially in organic farms that fertilize with manures.

Most commonly damaged plants include:

Broccoli
Spinach
Beets
Onion
Squash
Cabbage
Crucifers

Less damaged plants include:

Tomato
Pepper
Beans (dry and succulent)

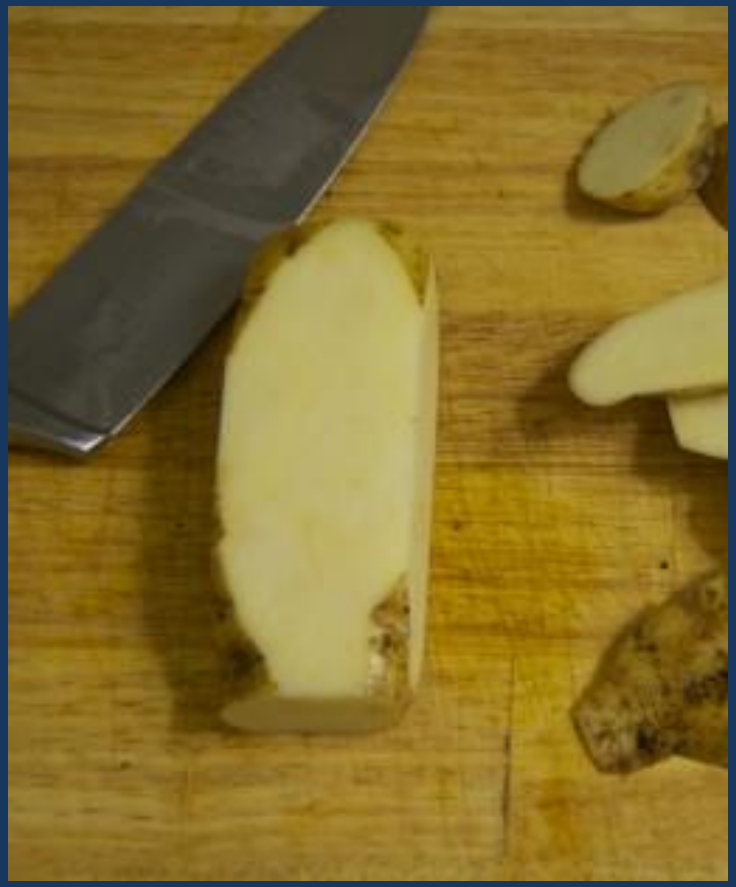
Monitoring

Symphylans can be detected with bait trapping

Use either carrots or potatoes as bait

Cut the bait in half longitudinally and scratch the cut surface just before placing it on the soil to ensure that the surface is moist

Place the bait at a depth where the soil is moist, and cover it with a plastic cup to exclude light and prevent the soil from drying



5-10 per shovelful can indicate damage will occur in susceptible crops

Questions

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Solutions in your community

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http://extension.umd.edu/mdvegetables