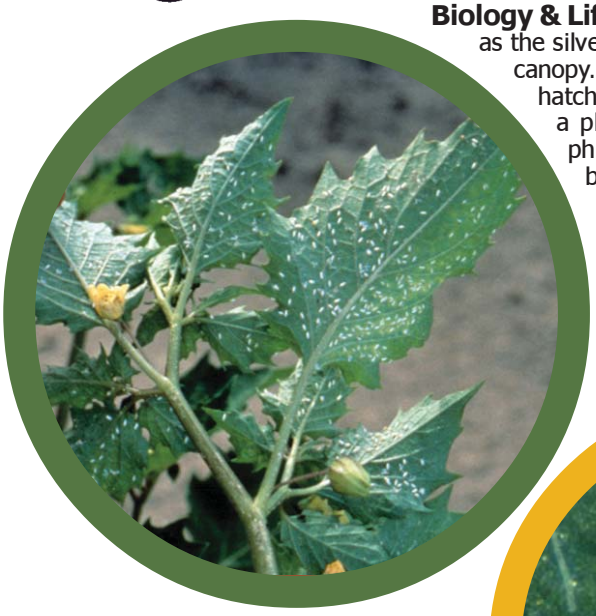
# Sweetpotato/Silverleaf Whitefly: *Bemisia tabaci*



**Biology & Lifecycle:** Biotype B of the sweetpotato whitefly in Florida is also known as the silverleaf whitefly. Adults prefer the undersides of leaves, especially the upper canopy. Females produce about 160 eggs, on the undersides of leaves. Upon hatching, the 1st instar nymph or "crawler" moves about the leaf in search for a place to insert its needle-like mouthparts into the plant to suck up plant phloem. Large quantities of sweet liquid waste or honeydew are excreted by nymphs which supports the growth of black sooty mold fungi. Complete development takes from 2.5 to 7 weeks over a temperature range of 93 to 61°F.

**Environmental Factors:** Present year round in south Florida, although highest populations occur in spring. Up to 21 generations per year in southwest Florida and 15 generations in north Florida, where freezing temperatures will kill host plants. Whiteflies oversummer on abandoned and volunteer crops and on weeds such as primrose willow (*Ludwigia* spp.).

**Adult:** About 0.8 mm (1/32 inch) long with two pairs of white wings held roof-like over the cream colored body **(Figure 1)**. The white color is due to a covering of powdery wax. Males are generally a bit smaller than females.

**Nymphs:** Only the 1st instar (0.3mm) has tiny legs and antennae, later instars are immobile. Clear to whitish with two yellow patches on the posterior end **(Figure 2)**. Red eye spots develop in the final 4th instar/"pupa". Nymphal appearance depends somewhat on host leaf surface, flat with few spines on smooth leaves, more rounded with more spines on hairy leaves.

**Host Range:** Over 500 host plant species in over 74 plant families including most broadleaf agronomic and vegetable crops and many ornamentals such as poinsettia and hibiscus. Pepper harbors lower populations than tomato or other solanaceous crops.

**Damage:** Heavy populations are debilitating due to sap loss and buildup of sooty mold. Feeding by nymphs on leaves causes tomato irregular ripening (TIR), where fruit do not color uniformly and exhibit areas of green or white tissue internally **(Figure 4)**. An average of 0.5 nymphs per leaf during fruit maturation may be sufficient to induce TIR.

The sweetpotato whitefly is **the** key pest of tomato, primarily as a vector of the geminivirus, *Tomato yellow leaf curl virus* (TYLCV). TYLCV causes severe stunting, chlorosis, cupping and puckering of leaves, and flower abortion. Little fruit is set above the point of initial infection. The earlier the infection, the greater the impact on yield. Losses of up to 90% may be sustained if plants show symptoms within the first month after transplanting **(Figure 3)**.

**Figure 1.** Infestation of adults on the underside of a weed. Photograph by: James Castner.

**Figure 2.** Immobile 2nd or 3rd instar nymph. Photograph by: David Schuster.

**Figure 3.** TYLCV symptoms on tomato. Photograph by: Jane Polston.

**Actual Size:**

Adult 1/32 inch/.8mm

Nymph .3mm

## Monitoring:

**Scouting:** Monitor incoming adults with yellow sticky cards and by observing adults by gently inverting upper leaves. Count nymphs on the terminal leaflet of leaves below the 6th node counting from the top.

**Action Thresholds:** 0.5 nymphs per terminal leaflet or 1 adult per leaf or plant for TIR.

There is no set threshold for TYLCV because incidence depends on the portion of adults carrying the virus.

*Prepared by: Dr. Phil Stansly*

# Sweetpotato/Silverleaf Whitefly:
## *Bemisia tabaci*

## CULTURAL CONTROLS:

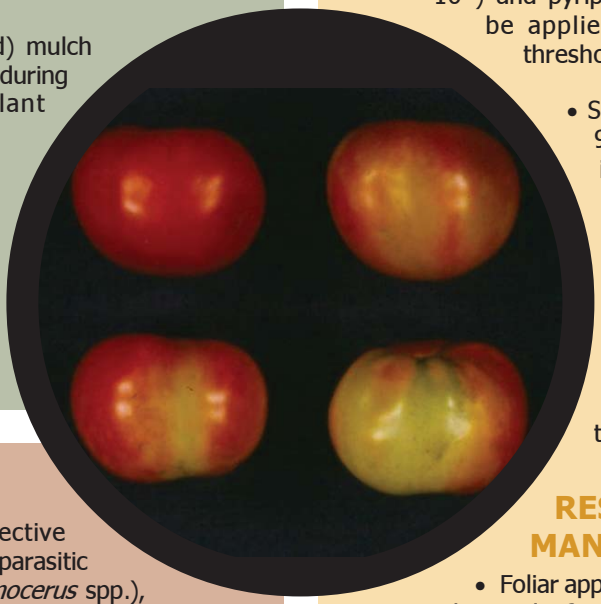
**Start Clean:** Transplants must be free of whiteflies and virus.

**Field Manipulations:** Newly planted crops must be located distant from older plantings that may serve as a source of virus and whiteflies.

Residues from spring crops should be removed and volunteers controlled during at least two months prior to fall planting.

**Mulch:** Reflective (aluminized) mulch may be used to repel whiteflies during the first weeks of plant development.

TYLCV infected plants early in the crop cycle should be removed from the field, after being sprayed with an insecticide effective against adults, to prevent dispersal of infected whiteflies.



## NATURAL ENEMIES:

- Whiteflies have many effective natural enemies, including parasitic wasps (*Encarsia* and *Eretmocerus* spp.), tomato bugs (*Engytatus* = *Cyrtopeltis* spp.), ladybeetles (*Nephaspi* and *Delphastus* spp.), lacewings (*Chrysoperla* and *Ceraeochrysa* spp.) and mites (*Amblyseius swirskii*).

- Natural enemies are responsible for the low whitefly populations observed in weeds and can help control whitefies in field crops if broad spectrum insecticides are avoided. Mass release of certain natural enemies has also proved effective in greenhouse crops.

## CHEMICAL CONTROLS:

- Drenches of systemic "neonicotinoid" insecticides (4A*) such as imidacloprid (Admire Pro®), thiamethoxam (Platinum®) and dinotefuron (Venom®) before and immediately following transplanting provides early season control that is essential for most tomato production in Florida.

- Foliar sprays of spiromesifen (Oberon®; 23*) and the insect growth regulators buprofezin (Courier®; 16*) and pyriproxyfen (Knack®; 7C*) should be applied according to the nymphal threshold.

- Soaps, oils, pymetrozine (FulFill®; 9B*) and broad spectrum insecticides, alone or tank-mixed with products such as endosulfan (cyclodiene; 2A*), organophosphates (several products; 1B*) and pyrethroids (numerous products; 3) should be applied according to the adult threshold. The latter three groups are best used toward the end of the crop.

## RESISTANCE MANAGEMENT:

- Foliar applications of neonicotinoids should not be made 6 weeks following soil drenches of the insecticides. Other products of different chemical classes* should be rotated.

* IRAC insecticide classification system
**See Appendix 5**

**Figure 4.** Tomato Irregular Ripening (TIR) external symptoms. Photograph by: Dave Schuster.

## CONTACT INFORMATION:

Dr. Phil Stansly
UF/IFAS SWREC- Immokalee
pstansly@ufl.edu
239-658-3400

Dr. David Schuster
UF/IFAS GCREC- Balm
dschust@ufl.edu
813-633-4124

IPM Integrated Pest Management Florida
UF UNIVERSITY of FLORIDA IFAS Extension

## References:

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McAuslane, H.J. 2000. Sweetpotato whitefly B biotype, *Bemisia tabaci* (Gennadius), or silverleaf whitefly, *Bemisia argentifolii* Bellows & Perring (Insecta: Hemiptera: Aleyrodidae) UF/IFAS EENY-129, http://creatures.ifas.ufl.edu/veg/leaf/silverleaf_whitefly.htm.