Whiteflies

(*Hemiptera, Aleyrodidae)*
Bemisia tabaci (Gennadius), also referred to as *B. argentifolii* or silverleaf whitefly

Description:
The whitefly *Bemisia tabaci* (Gennadius) is a species complex containing at least 35 morphologically indistinguishable cryptic species. Some members of the complex are pests of agricultural and horticultural crops in temperate and tropical regions. In the past 20 years, whiteflies have risen to international prominence due to their global invasions.

Immature stages – Immature stages begin with a pointed oblong yellow egg (0.2 mm) which darkens at the apex just before hatching. The first instar or crawler stage (0.2-0.3 mm) settles down on the underside of leaves close to the egg shell and goes through three more molts as a sessile, flattened oval nymph. Late third and fourth instars begin to develop eye spots and are often referred to as red-eyed nymphs. The last instar, or "pupal stage" (0.7-0.8 mm, late instars are shown in the photo), has very distinct eye spots.

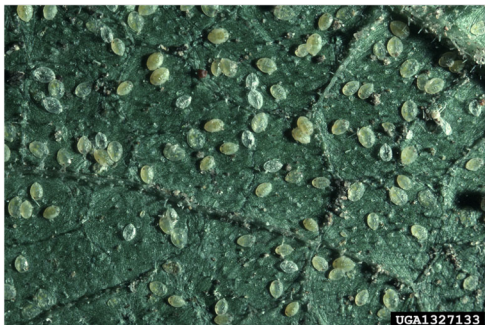
Adult stages – The adult is small, about 0.9 to 1.2 mm in length and holds solid white wings roof-like over a pale yellow body at rest.

Biology:
Life Cycle – The life cycle from egg to adult may be 18 days under warm temperatures (86°F) but may take as long as 2 months under cool conditions. The number of eggs produced is also greater in warm weather than in cool weather. The rate of reproduction ranges from 50 to 400 eggs (avg. 160, of which about ⅔ are female)/female.

Seasonal Distribution – In Georgia, whiteflies are generally not an economic problem in early spring if winter temperatures are cold enough to keep populations low. Whiteflies can become severe in mid to late summer, and cause severe economic losses to several crops, especially cotton and cucurbits.

Damage to Crop:
In tomato, curcubits, and beans the main damage caused by whitefly results from the transmission of plant viruses (e.g., in tomato mainly Tomato yellow leaf curl [TYLCV], see leaf image) which causes a severe stunting of the plant and a drastic reduction in yield. The presence of high whitefly numbers in vegetables can also cause severe direct damage even if the virus is not present. When virus is present in the field even low number of whiteflies can cause damage. In cotton, whiteflies can build up high populations, causing sooty mold, sticky cotton, and heavy migrations of adults from defoliated cotton can cause severe problems in vegetable crops in the area.

Whitefly nymphs



Whitefly adults

TYLCV damage in tomato

Sooty mold on cotton boll

Management:

Whitefly populations build up on many agronomic and non-agronomic hosts across the landscape. Populations must be managed in all crops to minimize infestation and damage potential in successive crops. For example, cole crops and cucurbits provide excellent spring hosts that support populations that will likely infest cotton. Close proximity of a cotton field to an infested vegetable field can explain rapid population increases. Further, populations that develop in cotton will disperse to tomato, snap bean, and other vegetable crops later in the season. Defoliation, timely harvest, and the destruction of crop residues are important steps to mitigate subsequent population increases.

Chemical Control: Use effective, curative insecticide treatments based on crop specific thresholds or preventative treatments and host plant resistance to virus when whitefly transmitted viruses are present. The proper selection of insecticides will vary with the crop and situation, and understanding the target life stage and mode of action will help in designing the optimal control program. Crop-by-crop options for insecticides, recommended by University of Georgia Cooperative Extension, can be found in the Georgia Pest Management Handbook at: https://extension.uga.edu/programs-services/integrated-pest-management.html. To reduce the potential for resistance, rotate the insecticide classes used for whitefly control. The presence of whitefly in a crop whould also influence insecticide decisions for other pests; for example, growers should avoid broad spectrum insecticides that cause whitefly populations to flare.

Biological Control: A number of beneficial organisms are effective in reducing whitefly populations. For example, spiders prey upon whitefly adults, and beneficial insects like bigeyed bugs, lacewing larvae, minute pirate bugs, and lady beetles are common predators of whitefly eggs and immatures. Several species of tiny wasps, including those in the genera Encarsia and Eretmocerus, parasitize immature silverleaf whiteflies. Naturally occurring insect pathogens, including Isaria and Beauveria, can suppress populations of whiteflies when environmental conditions are optimal. In order to conserve natural enemies, insecticides should not be applied when insect populations (whiteflies or any other species) are below the recommended treatment thresholds. Low-level whitefly populations can be suppressed by natural enemies to the point that no insecticide application is required. Using organophosphate or pyrethroid insecticides will eliminate natural enemies and flare whitefly populations.

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