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Citrus Blackfly, *Aleurocanthus woglumi* Ashby (Insecta: Hemiptera: Aleyrodidae)[1]

Ru Nguyen, Avas B. Hamon, and Thomas R. Fasulo[2]

The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

Introduction

While the citrus blackfly, *Aleurocanthus woglumi* Ashby (Figure 1), is a serious citrus pest of Asian origin (Dietz and Zetek 1920), it is usually under effective biological control in Florida. Although a member of the whitefly family, the adult of this species has a dark, slate blue appearance that led to it being given the name "blackfly."

Figure 1. Citrus blackfly, *Aleurocanthus woglumi* Ashby, egg spiral and first instars.
Credit: Division of Plant Industry

Distribution

Citrus blackfly was discovered in the Western Hemisphere in 1913 in Jamaica. It spread to Cuba in 1916, Mexico in 1935 (Smith et al. 1964), and was detected in Key West, Florida, in 1934. It was eradicated from Key West in 1937 (Newell and Brown 1939). Rediscovered in Ft. Lauderdale, Florida, in 1976 (Dowell et al. 1981), citrus blackfly was detected in Palm Beach and Miami-Dade counties in 1977; Lee, Highlands, and Brevard counties in 1979; Manatee County in 1986; Polk County in 1989; Marion and Volusia counties in 1991; and Alachua County in 1992 (Nguyen, unpublished data). At present, it is widely spread from north-central through south Florida.

Description and Life History

The life cycle from egg to adult ranges from 45 to 133 days, depending on the temperature (Dietz and Zetek 1920). Six generations per year are produced in south Florida (Nguyen et al. 1983).

Egg

The egg is laid with other eggs in a spiral pattern on the underside of the leaf. Each female lays two to three egg spirals during her 10- to 14-day lifespan. Eggs hatch within seven to 10 days (Dowell et al. 1981).

Nymph

The first instar is elongate oval, averaging 0.30 mm (0.010 in) long by 0.15 mm (0.006 in) wide and is brown in color, with two glassy filaments curving over the body. The first instar lasts seven to 16 days. The second instar is more ovate and convex than the first instar, averaging 0.40 mm (0.015 in) long by 0.20 mm (0.008 in) wide, and is dark brown in color with numerous spines covering the body. The second instar lasts seven to 30 days. The third instar is more convex and much longer than the second, averaging 0.87 mm (0.034 in) long by 0.74 mm (0.029 in) wide. The body is a shiny black with spines stouter and more numerous than those in the second instar. The third instar lasts six to 20 days (Dietz and Zetek 1920, Smith et al. 1964).

Pupa

The fourth instar, or so-called pupa case, is ovate and a shiny black with a marginal fringe of white wax (Figure 2). The sex is readily distinguishable. Females average 1.24 mm (0.49 in) long by 0.71 mm wide (0.028 in); males are 0.99 mm (0.039 in) long by 0.61 mm (0.024 in) wide. The pupal stage lasts 16 to 50 days (Dietz and Zetek 1920, Dowell et al. 1981).

Figure 2. Pupae of citrus blackfly, *Aleurocanthus woglumi* Ashby.
Credit: Division of Plant Industry

Adult

The adult emerges from a T-shaped split appearing in the anterior end of the pupal case. At emergence, the head is pale yellow, legs are whitish, and eyes are reddish-brown (Figure 3). Within 24 hours after emergence, the insect is covered with a fine wax powder, which gives it a slate blue appearance (Dietz and Zetek 1920).

Figure 3. Adult citrus blackfly, *Aleurocanthus woglumi* Ashby.
Credit: Division of Plant Industry

Identification

The identification key provided here is designed to identify the four major species of whiteflies that commonly infest citrus in Florida.

1a. The whitefly adult is white or white with dark spots on the wings. Nymphs are difficult to see or identify. 2

1b. The whitefly adult is slate blue in color, eggs are present and laid in spirals. Nymphs are black with prominent spines. . . . . citrus blackfly

2a. The whitefly adult is all white without any dark spots on wings. . . . . citrus whitefly

2b. The whitefly adult is white with a darkened area at the end of each wing. Occasionally a yellow fungus is present.. . . cloudywinged whitefly

2c. The whitefly female adult is all white and is surrounded by waxy filaments. Eggs are laid in a circle with the female at rest in the center. . . . . woolly whitefly

Economic Importance

Citrus blackfly infests over 300 host plants, but citrus is the most suitable for large population development (Figure 4). It damages citrus by sucking nutrients from foliage, which weakens the plants. Citrus blackflies excrete honeydew on which sooty molds develop. Sooty molds coat citrus leaves, causing them to appear black. Sooty molds can severely impair leaf respiration and photosynthesis.

Figure 4. Heavy infestation of citrus blackfly, *Aleurocanthus woglumi* Ashby, on citrus leaves.
Credit: Division of Plant Industry

While this species is found in very low numbers in most groves, it is normally under effective biological control and pest populations rarely require treatment (Browning et al. 2006).

Management

Biological Control

Citrus blackfly has several natural enemies. In Florida, the most effective agents for controlling citrus blackfly are the parasitic wasps, *Encarsia perplexa* Huang & Polaszek (Huang and Polaszek 1998) and *Amitus hesperidum* Silvestri (Hart et al. 1978). A female citrus blackfly larva will support two, and occasionally three or four, parasites while a male citrus blackfly larva will support only one parasite.

Development of *Amitus hesperidum* (Figure 5) is synchronized with its host, in that adult female parasites are ready to lay eggs when the susceptible larval stages of citrus blackfly are present. Each female parasite can produce up to 70 offspring in four to five days with adequate hosts available. Female *Amitus hesperidum* lay

eggs in all three larval stages of citrus blackfly, with a preference for the first stage. However, this parasite has poor searching ability and a short lifespan. *Amitus hesperidum* is most effective with high density citrus blackfly populations, especially during cool temperature and high humidity seasons. An *Amitus hesperidum* population will expire soon after suppression of the citrus blackfly population (Nguyen et al. 1983).

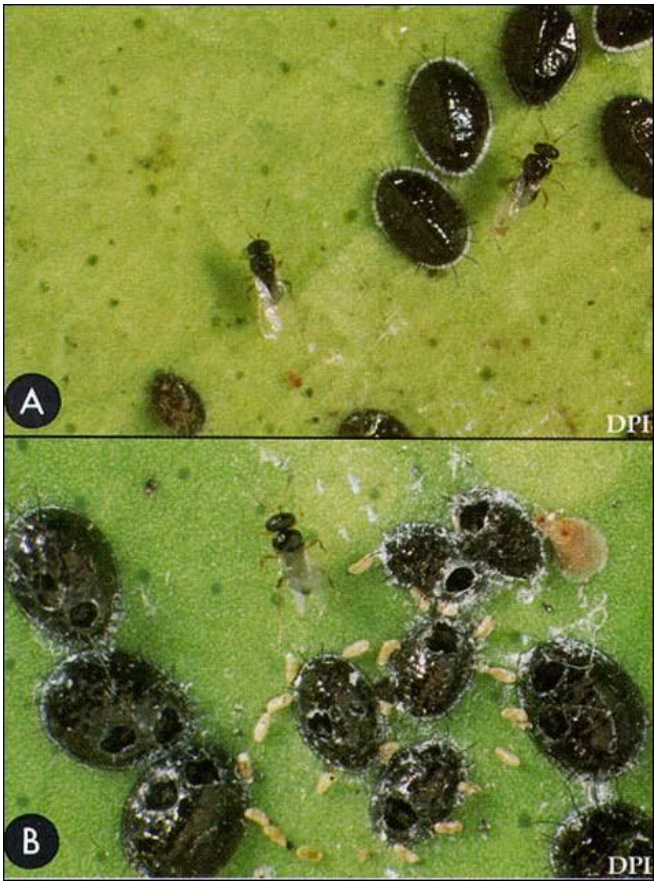

Figure 5. A) Pupae of citrus blackfly, *Aleurocanthus woglumi* Ashby, and the adult parasitoid, *Encarsia perplexa* Huang & Polaszek, and B) Pupal cases of the citrus blackfly, *Aleurocanthus woglumi* Ashby, from which the parasitoid has emerged. Egg spirals of the citrus blackfly are also evident.
Credit: Division of Plant Industry

Encarsia perplexa (Figure 6) has a lower rate of reproduction than *Amitus hesperidum* but has better searching ability. Generally, *Encarsia perplexa* can maintain a citrus blackfly population at a lower level than *Amitus hesperidum*. Mated females of *Encarsia perplexa* lay a single diploid egg in any larval stage of the host, although the second stage appears preferable. This egg will produce a female parasite. Adult females may survive up to six weeks. Virgin female *Encarsia perplexa* may deposit a haploid egg in a fully developed female larva of *Encarsia perplexa* (her own species), and this egg will produce a male parasite (adelphoparasite). The sex ratio in the field is 1:7 (male: female) (Smith et al. 1964, Nguyen 1987).

Figure 6. A) Adult *Encarsia perplexa* Huang & Polaszek, and (B) pupal cases of the citrus blackfly, *Aleurocanthus woglumi* Ashby, from which the parasitoid has emerged.
Credit: Division of Plant Industry

Chemical Control

Whiteflies also are controlled by sprays applied primarily for control of scale insects. Spraying of commercial citrus exclusively for whitefly control is seldom practiced in Florida. Recommended control measures for commercial or dooryard citrus are significantly different. Please consult the specific management guide, Florida Citrus Management Guide for Whiteflies in Commercial Groves, for your situation.

It is important to note that spraying with copper for control of harmful fungal diseases will inhibit growth of "friendly fungi" resulting in an increase in whitefly populations. Also, more than one application of sulfur per year can have an adverse effect on parasites. Spray oil has some insecticidal properties but is primarily used to remove sooty mold that grows on the fruit and leaves.

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[2] Ru Nguyen, Florida Department of Agriculture and Consumer Services, Division of Plant Industry; courtesy assistant professor, Department of Entomology and Nematology; Avas B. Hamon, Florida Department of Agriculture and Consumer Services, Division of Plant Industry; Thomas R. Fasulo, retired scientist, Department of Entomology and Nematology; UF/IFAS Extension, Gainesville, FL 32611.