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HOST PLANT PREFERENCE OF THE WHITEFLY, *ALEURODICUS DISPERSUS* RUSSELL[1,2]

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ABSTRACT

Ovipositional preference and survival of the whitefly, *Aleurodicus dispersus* Russell, was measured on 7 economically important species of host plants growing in southern Florida. A survey also measured frequency and abundance of *A. dispersus* infestation under field conditions. Ovipositional preference was significantly correlated (0.96) with survivorship. The overall field infestation was light in that although 35.3% of the trees sampled were infested, only a mean 1% of the leaves per infested tree had live *A. dispersus* present.

The whitefly, *Aleurodicus dispersus* Russell, was recently described (Russell 1965) and found to occur abundantly on many economically important host plants in Florida. Its spread on mainland Florida is of concern since it is a suspect vector of the coconut palm disease, lethal yellowing (Weems 1971). Cherry (1979) showed that range expansion of *A. dispersus* northward in Florida is limited by winter cold temperatures.

Although *A. dispersus* is highly polyphagous and has been recorded from 38 genera and 27 plant families (Weems 1971), little data exists on host plant preference and suitability of plants to support the insect's development. To evaluate the importance of various host plants of *A. dispersus*, data are needed on the attractiveness of plants to ovipositing females, survivorship of immatures on the plants, and frequency of host plant infestation throughout the pest's range. This information was determined for 7 species of economically important plants occurring in southern Florida.

MATERIALS AND METHODS

OVIPOSITION AND SURVIVAL: Seven economically important species of plants (Table 1) commonly found growing in southern Florida were selected from Weem's (1971) list. Potted plants without *A. dispersus* and ca. 2 m high

[1]Homoptera: Aleyrodidae.
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were tested simultaneously by placing 1 plant per species in a screenroom at the Agricultural Research Center, Fort Lauderdale, FL. Plants were placed randomly throughout the 3 m x 6 m x 3 m high screenroom which contained large numbers of *A. dispersus* already being maintained on 4 plants of each of the 7 plant species being tested. To test for ovipositional preference, potted plants were left in the room for 6-7 days and then removed and the total number of eggs laid/plant were counted with the aid of a hand magnifying lens. Survival was measured by following the fate of 100 eggs on each potted plant. Some plants received less than 100 eggs during the 6-7 day period and were left in the screenroom until 100 eggs had accumulated. Leaf edges and petioles were lightly covered with Tanglefoot® to reduce predation during whitefly development. The whiteflies were allowed to develop until they were mature fourth instars and then counted because adults disperse and empty exuviae tend to fall from leaves. During this period, the plants were stored in a similar screenroom containing few or no *A. dispersus*. This procedure for testing ovipositional attractiveness and survival was repeated 5 times at ca. 6 week intervals from March-Sept. 1979.

FREQUENCY OF INFESTATION: *Aleurodicus dispersus* has been reported from 5 Florida counties of which 3 counties (Broward, Dade, Monroe) form the major contiguous range in southern Florida (A. B. Hamon[4] personal communication). To determine the degree of infestation and correlate with ovipositional data, a survey was made in the 3 contiguous counties during August 1979. The 5 urban areas (Table 2) that were sampled are ca. 56 km apart in a roughly northeast to southwest transect through the 3 counties. Black olive, seagrape, and sweet orange were surveyed since previous tests (Table 1) showed *A. dispersus* to have a high, medium, and low oviposi-

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TABLE 1. NUMBER OF EGGS LAID AND SURVIVAL OF IMMATURE *Aleurodicus dispersus* ON 7 HOST PLANT SPECIES.

Common name*	Plant species	Total eggs laid**	Total survival†
Black olive ('Bucerus')	*Bucida buceras* L.	11,146	270
Coconut ('Malayan Dwarf')	*Cocos nucifera* L.	4,240	116
Banana ('Cavendishii')	*Musa sapientum* L.	2,759	129
Mango ('Keitt')	*Mangifera indica* L.	2,077	76
Seagrape	*Coccoloba uvifera* (L.) L.	1,600	33
Grapefruit ('Thompson Pink')	*Citrus paradisi* Macf.	287	3
Sweet orange ('Valencia')	*Citrus sinensis* (L.) Osbeck	238	0

*Name in parenthesis refers to variety.
**Sum of 5 plants per species exposed to *A. dispersus* for 6-7 days in infested screenroom. Significant difference ($x^2 = 26{,}784$, 6 D.F., $p < 0.005$) in ovipositional preference between species.
†Sum of 5 plants per species with 100 eggs per plant followed to mature fourth instar. Significant difference ($x^2 = 597$, 6 D.F., $p < 0.005$) in survival between species.

tional preference, respectively, for these species. In each of the 5 areas, 10 trees of each of the 3 plant species were sampled. To determine frequency of infestation, each tree was visually examined for 5 minutes by 2 observers for the presence of live *A. dispersus*. If live *A. dispersus* was found on a tree, the degree of infestation was measured by examining 20 randomly selected leaves/tree for the presence of live *A. dispersus*. In addition, 1 leaf with live fourth instar whiteflies was excised from each infested tree. These leaves were then stored for 7 days at room temperature in plastic bags to maintain high humidity. At the end of 7 days, bags and leaves were examined for adult parasites. Exuviae were also examined for parasite emergence holes and 100 randomly selected fourth instars were dissected.

TABLE 2. FREQUENCY IN PERCENT OF 3 HOST PLANT SPECIES INFESTED BY *Aleurodicus dispersus* IN SOUTHERN FLORIDA.

	Location				
Host Plant*	Ft. Lauderdale**	Miami	Key Largo	Marathon	Key West
Black Olive	0 (0)†	70 (10)	0 (0)	100 (5)	100 (0)
Seagrape	0 (0)	80 (30)	0 (0)	70 (10)	90 (5)
Sweet Orange	0 (0)	10 (0)	0 (0)	0 (0)	10 (0)

*Scientific names in Table 1.
**10 trees/species sampled by visual survey at each location.
†Number in parenthesis is mean percentage of leaves infested/infested tree. N = 20 leaves sampled/infested tree.

RESULTS AND DISCUSSION

The ovipositional preference of *A. dispersus* was significantly ($p < 0.005$) different among the 7 plant species tested (Table 1). Black olive received the most total eggs and the 2 species of *Citrus* the least. There was also a significant ($p < 0.005$) difference in total survival of *A. dispersus* immatures among the 7 plant species with highest survival on black olive and lowest survival on the 2 *Citrus* species. A significant ($p < 0.005$) positive linear correlation of 0.96 was determined between ovipositional preference and survivorship on the 7 species. Positive correlation between oviposition and survival has also been found for the greenhouse whitefly, *Trialeurodes vaporariorum* (Westwood) on 4 host plant species (Boxtel et al. 1978). In contrast, another whitefly, the citrus blackfly (*Aleurocanthus woglumi* Ashby), exhibited ovipositional preference between host plant species, but oviposition and survivorship were not correlated (Dowell and Steinberg 1979).

The frequency of host plant infestation by *A. dispersus* is shown in Table 2. At the time of the survey, the overall infestation was light in that although 35.3% of the trees sampled were infested, only a mean 1% of the leaves per infested tree had live *A. dispersus* present. In contrast, Weems (1971) reported that *A. dispersus* populations occasionally became so extremely abundant on some host plants that the whitefly would "spill over" to even inanimate objects such as cars, etc.

Under screenhouse conditions, oviposition and survival of *A. dispersus* was greater on black olive than seagrape. However, our survey showed

roughly equal infestation by *A. dispersus* on both plant species suggesting additional factors affecting infestation level under field conditions. These factors are not known, but Weems (1971) noted that seagrape and various broad leaf palms provide excellent protection for the pest from wind and rain and are good hosts to check when surveying for the whitefly. The extremely low infestation on sweet orange correlates with the low oviposition and survival previously noted on the 2 *Citrus* species tested. Mortality factors limiting *A. dispersus* populations are not known, but our survey did not detect the presence of any parasite activity. Russell (1965) reported that *A. dispersus* specimens were frequently parasitized, but no data on parasite species nor frequency were given.

In summary, black olive was the best host plant tested in screenhouse conditions for *A. dispersus* oviposition and survival, and coconut, banana, mango, and seagrape were moderately good hosts. Since the use of black olive in landscaping in southern Florida has increased greatly in the last 8 years (H. Donselman[5] personal communication), *A. dispersus* may gain importance on this host plant in the future. Sweet orange and grapefruit which comprise greater than 90% of all citrus acreage in Florida (Fla. Crop and Livestock Reporting Service: Commercial Citrus Inventory as of January 1976) were fortunately very poor hosts.

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