STUDIES OF THE HOST PLANT SUITABILITY OF
ARDISIA SOLANACEAE1 AND CITRUS JAMBHIRI2
FOR CITRUS BLACKFLY3 AND CITRUS WHITEFLY4

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ABSTRACT

Ardisia solanacea Roxb. was comparable to rough lemon, Citrus jambhiri
Lush., in the number of eggs of citrus blackflies, Aleurocanthus woglumi
Ashby, per plant. Survival of citrus blackflies was greater (P < 0.05) on
A. solanacea than on C. jambhiri. Citrus whiteflies, Dialeurodes citri (Ash-
mead), oviposited on C. jambhiri but not on A. solanacea. Ardisia spp. could
serve as a reservoir for citrus blackflies where control measures against this
insect are restricted to citrus.

The citrus blackfly, Aleurocanthus woglumi Ashby, infests citrus in
southeastern Florida and other regions of the world. The insect lays eggs in
spiral-shaped clusters on undersides of leaves. If the plant upon which eggs
have been laid is a suitable host, the insects complete the development of
their immature stages on the leaves, and emerge as adults through T-shaped
slits in the exoskeleton of the fourth instar nymphs (Dietz and Zetek 1920,
Gowdy 1921). In Florida, citrus blackflies oviposit on at least 115 plant
species (David Colbert5 personal communications; Dowell et al. 1979) and
has been observed to complete its development to adulthood on species of 19
genera in 12 families (Howard and Neel 1978, R. V. Dowell6 unpublished
data).

The citrus blackfly has been reported to prefer citrus species as hosts
(Angeles et al. 1972, Clausen and Derry 1952, Howard and Neel 1976, Shaw
1959). However, Dietz and Zetek (1920) reported, apparently on the basis
of their general observations, that Ardisia revoluta HBK (Myrénaceae)
was preferred over citrus species as a host of citrus blackfly in Panama.
Marlberry, Ardisia esculentoides Schlecht. and Chamb., a native to Florida,
is apparently a highly favorable host (Howard and Neel 1978).

Two additional aleyrodids, the citrus whitefly, Dialeurodes citri (Ash-
mead) and the cloudy-winged whitefly, D. citrifolii (Morgan) are common on
citrus in southeastern Florida and often contaminate research colonies of
citrus blackfly. Thus, it is of interest to find a host of citrus blackfly that is
not a host of other aleyrodids. This report presents results of an experiment

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1Myrénaceae.
2Rutaceae.
3Aleyrodidae.
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in which *Ardisia solanacea* Roxb., an Asian species naturalized in Florida, was tested to determine its suitability as a host of citrus blackfly and citrus whitefly.

**Materials and Methods**

Rough lemon, *Citrus jambhiri* Linn., was chosen as a standard for comparison of host suitability for citrus blackfly, because in a previous study it was found to support greater survivorship of this insect than 5 other citrus species tested (Howard 1979). The rough lemon plants were obtained as bare root seedlings from the Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Winter Haven. They were potted and grown for 8 weeks without application of insecticides.

*Ardisia solanacea* was grown from seed obtained from Fairchild Tropical Garden, Miami. No insecticides were applied. During the year preceding the experiment, aleyrodids were not observed on these plants. Plants of both species were grown in a shade house in Fort Lauderdale in potting mix consisting of equal parts of muck, sharp sand, and cypress sawdust in plastic pots 15 cm in diameter. Plants were watered and fertilized to promote rapid growth.

Potted seedlings of both species, each about 0.3 m tall and with about 30 leaves were examined on 26 May 1978 and were free of aleyrodids. Seven plants of each species were arranged in a randomized block under a citrus tree with a very heavy infestation of citrus blackflies and were exposed from 26 May to 7 June, after which they were transferred to a screened enclosure. Leaves were examined on 7 June to determine the number of egg clusters of citrus blackflies per plant and the number of eggs per cluster. On 20 July, the number of citrus blackflies that had developed on each plant was determined by counting the number of fourth instar nymph exoskeletons with T-shaped emergence slits.

Ten plants each of *A. solanacea* and *C. jambhiri* which were free of aleyrodids were placed in a randomized block outdoors under a lemon tree with a high infestation of citrus whiteflies. After 2 weeks of exposure, the plants were examined for eggs of citrus whiteflies.

The significance of differences in mean egg clusters of *A. vogliumi* per plant, mean eggs per cluster, mean adults developed per plant, and survivorship indices were determined by Student’s t-test. The survivorship index per plant was calculated by dividing the number of adults that developed by the number of egg clusters observed previously on the same plant.

**Results and Discussion**

*Ardisia solanacea* was a more favorable host of citrus blackfly than *C. jambhiri* in that the survival index was about 5 times higher on the former than on the latter (Table 1). Of the citrus species studied, lemons and limes were shown to be highly favorable hosts of citrus blackfly (Dowell et al. 1978, Howard, 1979). Thus, *A. solanacea* compares well with citrus as a host of this species.

There was an average of 96.8 citrus whitefly eggs per leaf on *C. jambhiri* and no eggs on *A. solanacea* when they were simultaneously exposed to an infested lemon tree.
TABLE 1. Oviposition, development, and survival of *Aleurocanthus wolffi* Ashby on *Ardisia solanacea* Roxb. compared to *Citrus jambhiri* Lush.

<table>
<thead>
<tr>
<th>Host species</th>
<th>Eggs/spiral cluster</th>
<th>Egg clusters/ plant</th>
<th>Mean no. adults developed/ plant*</th>
<th>Std. error</th>
<th>Mean survival index**</th>
<th>Std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ardisia solanacea</em></td>
<td>30.7a†</td>
<td>89.9a</td>
<td>131.6a</td>
<td>26.6</td>
<td>1.71a</td>
<td>0.25</td>
</tr>
<tr>
<td><em>Citrus jambhiri</em></td>
<td>22.0a</td>
<td>85.7a</td>
<td>21.7b</td>
<td>11.2</td>
<td>0.35b</td>
<td>0.10</td>
</tr>
</tbody>
</table>

* Determined by the number of fourth instar exoskeletons with adult emergence sites.
** Calculated by dividing the number of adults developed per plant by the number of egg clusters oviposited previously on the same plant.
† Within a column values not followed by the same letters are significantly different (P < 0.05) by Student's t-test.

By using *A. solanacea* as a host plant, high populations of citrus blackflies free of contamination by citrus whiteflies may be maintained. This may be used to advantage in studies in southeastern Florida requiring pure cultures of citrus blackfly and in mass-rearing of citrus blackflies and their parasitoids for biological control. Whether *A. solanacea* is a host of cloudy-winged whitefly has not been investigated.

*Ardisia solanacea* is planted in southern Florida as an ornamental, and has become naturalized in the Miami area. Along with native marlberry and other non-citrus hosts (Howard and Neel 1978, Dowell et al. 1979), *A. solanacea* could serve as a source of reinfestation where citrus blackflies are controlled by chemical treatments of citrus. Recently, however, citrus blackflies have been under biological control in southeastern Florida (R. H. Cherry’s personal communications) and the emphasis on chemical control of this insect has been curtailed.

ACKNOWLEDGMENT

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LITERATURE CITED


BIOLOGY, HOST SPECIFICITY, AND DESCRIPTIONS OF THE IMMATURE STAGES OF LIPOSTEMMATATA MAJOR ASHLOCK AND L. HUMERALIS BERG (HEMIPTERA: LYGAEIDAE)

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ABSTRACT

Lipostemmata humeralis Berg and L. major Ashlock are recorded from Trinidad. Screening tests indicate that both are restricted to the aquatic fern Salvinia auriculata Aubl. The immature stages are described and the 5th instar of L. major is illustrated.

The genus Lipostemmata, without reference to species, was reported as occurring in Trinidad by Bennett (1975). Here we first record the occurrence of L. humeralis Berg and L. major Ashlock in Trinidad. Since laboratory-grown plants of its host, the aquatic fern Salvinia auriculata Aubl., deteriorated within 6-8 weeks when exposed to low numbers of adults of either species, we felt that the low priority assigned to Lipostemmata humeralis (as purpurata Distant, a junior synonym) as a potential control agent by Bennett (1966) merited reconsideration, particularly in situations where Salvinia was already under stress from other agents. Also, as the immature stages were previously unknown, detailed descriptions were prepared.

DISTRIBUTION IN TRINIDAD

Both species were first collected in south Trinidad,Victoria Co. (VIII-1975) near Debe and more recently L. major was collected at the edge of the north range St. George Co. (11-IV-1978) in the Guanapo Valley; (22-