ALEYRODIDAE, OR WHITE FLIES ATTACKING THE
ORANGE, WITH DESCRIPTIONS OF THREE NEW
SPECIES OF ECONOMIC IMPORTANCE

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tigation, and A. C. Baker, Entomological Assistant, Bureau of Entomology

Thirteen species of so-called white flies are recorded in literature as
infesting Citrus plants in different parts of the world. Eight of these
are present in Florida, four of them being native to the United States
and four having been introduced. The native forms have thus far been
of little economic importance, whereas two of the introduced species
are first-class Citrus pests. The remaining two introduced forms,
although recently established on the orange (Citrus aurantiaca), have
already attracted attention by reason of their injuries. Our knowledge
of the remaining five species of Citrus white flies, while meager, indicates
that these, in their range of distribution, are abundant and destruc-
tive and would in all probability prove to be very undesirable immi-
grants. The new forms treated herein must be classed in the same
category, especially Aleurocanthus woglumi, which, although previously
named, is here technically described for the first time. This last species,
of oriental origin, has already found its way to Jamaica and the Bahamas,
where it infests the orange to a serious extent.

The present paper brings together the essential information concern-
ing the distribution and food plants of the white flies which attack Citrus
plants and describes three new species of economic importance.

Aleurocanthus citricolus (Newstead)


This species is known only from the original description. It was
taken at Dar es Salaam, German East Africa, on Citrus sp. in 1902.
The immature stages occurred in large, overcrowded colonies, appearing
to the unaided eye as patches of a sootlike deposit on the lower surface
of the leaves. This is one of the spiny forms and bears a general resem-
blance to A. woglumi (fig. 2, A–J, Pl. LXIV, LXV).

Aleurocanthus citripertus, n. sp.

This insect (fig. 1) was taken by Mr. R. S. Woglum, of the Bureau of
Entomology, in several localities in the Orient, as follows: Royal Bo-
tanic Gardens, Ceylon, on an unknown tree, October, 1910; Lahore,
India, on Citrus sp., July, 1911; Buitenzorg, Java, on orange, January,
1911; Sandan Glaya, Java, on Citrus sp., January, 1911. It is reported

1 All bibliographic citations in synonymy are given in full in "Literature cited," pp. 471–472.
"Aleurocanthus citriperdus": A, Pupa case; B, egg; C, polygonal markings of egg; D, vasiform orifice of pupa case; E, spine from dorsum of pupa case; F, margin of pupa case; G, genitalia of adult male; H, forewing of male; I, antenna of pupa case; J, leg of pupa case; K, L, marginal teeth, much enlarged; M, central swollen spine from dorsal area.
as occurring abundantly on species of Citrus and is regarded as of considerable economic importance.

**Pupa Case** (fig. 1, A).—Length 1.36 mm.; width 0.96 mm.; shape elliptical to oval, broadest across the third abdominal segment, narrowest cephalad. Dorsum with a moderate central abdominal ridge on which the abdominal segments are not distinctly marked off, though they may be distinguished. Submarginal area somewhat flat; suture separating the thorax and abdomen quite distinct; surface appearing somewhat granular or faintly corrugated, an appearance which may be due to difference in pigmentation. Dorsum with numerous heavy spines (fig. 1, E) which after clearing remain black at the tips, but are otherwise a clear greenish yellow. These are arranged as follows: On the submarginal area is a more or less even row of usually 32 spines. This row is composed of two series alternating with one another. The one is made up of spines averaging about 0.288 mm., and the other of spines averaging 0.192 mm. in length. Near the medio-dorsal abdominal line there are three pairs of spines, one pair situated about 0.19 mm. anterior to the vasiform orifice and the others on the cephalic part of the abdominal region. The spines of the pair on the first abdominal segment are somewhat more widely separated than those of the other two pairs. Six other pairs of spines are present on the abdomen. Five of these pairs are short, about 0.08 mm. long, and form an even subdorsal row on each side, the rows thus formed diverging on the cephalic part of the abdomen. The remaining pair is composed of much longer spines, situated about 0.29 mm. from the thoracic suture and about the same distance from the lateral margin of the case. On the thorax there is a subdorsal row of four spines on each side (fig. 1, M) and near the medio-dorsal line another pair of spines is present. Just anterior to the vasiform orifice a pair of tubercled setæ is situated, and another pair is present on the medio-caudal portion of case. The margin of the case (fig. 1, F) is dentate, the teeth (fig. 1, K, L) being rather fine and acute. A distance of 0.16 mm. is occupied by twelve of the teeth. At the base of the teeth small clear areas are found, and some distance in from the margin a row of elliptical areas, possibly glands, are present. These appear to be on the under surface of the case, while on the submarginal dorsal region, scattered between the margin and the insertion of the spines, are small dark pores. The vasiform orifice is situated on a tubercle which forms the caudal portion of the medio-dorsal ridge. It is subcircular in outline, tending to cordate. The operculum is somewhat similar in shape and obscures the lingula. The color of cleared specimens under the microscope is a light brown, with the margin and the borders of the dorsal ridge darker.

On the leaf the cases are shining black. There is little or no dorsal secretion, but a short, white, waxy marginal fringe is present. The rods forming this fringe are not distinct, but are more or less frayed and give a woolly appearance to the outer edge of the fringe. In some specimens, however, this woolly appearance is not evident, but the wax forms a series of marginal plates. When the pupae are removed from the leaf, their former position is marked by the white oval wax ring which remains attached to the leaf. The larvae present a similar appearance on the leaf, but are brown instead of black.

**Adult Male.**—Length 0.96 mm.; general color brownish, shaded with dusky. Vertex rounded, with a longitudinal median ridge, color dark brown; ocelli clear; compound eyes Vandyke, constricted; antennæ absent in the specimens at hand; labium tipped with dusky; thorax shaded with dusky. Forewings 0.88 mm. long by 0.35 mm. wide, marked with dark bluish gray, as indicated in fig. 1, H. Veins olive color; radial sector bent caudad at 0.4 mm. from the distal end. Hind wings 0.64 mm. long and 0.25 mm. wide at widest part; color uniform dusky, vein olive color. Legs with the femora and the proximal half of the tibiae dusky, the remainder of the tibiae and the tarsi greenish yellow. Fore femora 0.19 mm.; fore tibiae 0.23 mm.; fore tarsi, proximal segment 0.08 mm., distal 0.064 mm.; middle femora 0.24 mm.
FIG. 2.—*Aleurocanthus woglumi*: A, egg; B, polygonal markings of egg; C, pupa case; D, margin of pupa case; E, vasaiform orifice of pupa case; F, forewing of adult female; G, same, showing variation in markings; H, costal margin at base of wing of female; I, forewing of male; J, male genitalia.
hind tibiae 0.36 mm., hind tarsus, proximal 0.112 mm., distal 0.72 mm. Claws normal, with a hairy central paronychium; genital segment dark brown, 0.112 mm., broad at the insertion of the claspers. These latter are dark-brown, becoming lighter at their distal tips. They are 0.128 mm. long and each about 0.03 mm. at the shoulder near the base. They are acute at the tips, curved inward, and armed on the inner margin with a number of prominent spines (fig. 1, G). A few small hairs are scattered here and there, situated on small tubercles. The penis is as long as the claspers, somewhat bulbous at the base, greenish yellow, and slightly curved upward.

**ADULT FEMALE.**—Unknown.

Described from adult males in balsam mounts and numerous pupa cases in balsam mounts and dry upon the foliage.

_Type._—Cat. No. 19099, U. S. National Museum.

**Aleurocanthus woglumi** Ashby.¹


Specimens of this species (fig. 2; Pl. LXIV, LXV), which may be called the “spiny Citrus white fly,” were first received by the Bureau of Entomology on June 16, 1910, from Dr. E. W. Berger, the material coming from India from H. Maxwell-Lefroy. Specimens were also received in 1910 from Mr. George Compere, who had collected the insect in the Philippine Islands. During 1910 and 1911 Mr. R. S. Woglum, in the course of his search for parasites of the orange white fly (*Dialeurodes citri* Ashm.), found this insect common and widely distributed on orange in India and Ceylon, and it has subsequently been received from that region from Mr. A. Rutherford.

Our first knowledge of its presence in the Western Hemisphere came with the receipt of specimens from Col. C. Kitchener, Half Way (Kingston), Jamaica, on November 27, 1913. Additional material was received during 1914 from Jamaica from Col. Kitchener and from Prof. S. F. Ashby, Microbiologist of the Jamaica Department of Agriculture. Under date of February 5, 1916, specimens were submitted by Mr. P. Cardin, Entomologist of the Cuba Agricultural Experiment Station, for verification of determination made by Prof. Ashby. On February 7, 1916, a large lot of orange leaves infested with *A. woglumi* was received from Mr. L. J. K. Brace, Nassau, New Province, Bahamas, who states:

Certain orchards in this island at least have been very much affected with this insect, all of the leaves being so much infested on their undersurfaces that they present a black appearance, not only killing the trees but causing some persons to attempt to stop the mischief by cutting down the trees, though the young shoots become again covered ** * * **. I have no doubt that the planters’ exchange have introduced this pest from the East. Plants have been for some time obtained by individuals here from the Jamaican establishment and also from Florida.

Prof. Ashby thinks the insect was introduced into Jamaica on the mango during the last 20 years. In that island it has become very

¹ _Aleurocanthus woglumi_, the writers’ manuscript name for this species, was furnished to Prof. Ashby. According to the International Code, his descriptive remarks, as cited, make him the author of the species.
prominent, infesting the leaves of all species of Citrus on the lowland plains. Honeydew is excreted in small amounts, which is followed by the development of sooty fungi, but not to the extent that is true of certain other white flies and scale insects.

The present known distribution and food plants are shown in Table I.

### Table I.—Present known distribution and food plants of Aleurocanthus woglumi

<table>
<thead>
<tr>
<th>Date</th>
<th>Quaintance No.</th>
<th>Locality</th>
<th>Host plant.</th>
<th>Collector</th>
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<tr>
<td>June 16, 1910</td>
<td>5264</td>
<td>India</td>
<td>Orange</td>
<td>Maxwell-Lefroy</td>
</tr>
<tr>
<td>1910</td>
<td>6553</td>
<td>Manila, P. I.</td>
<td>do</td>
<td>George Compere</td>
</tr>
<tr>
<td>Oct., 1910</td>
<td>6556</td>
<td>India</td>
<td>Unknown tree</td>
<td>Do</td>
</tr>
<tr>
<td>Do</td>
<td>6558</td>
<td>Lahore, India</td>
<td>Citrus sp.</td>
<td>Do</td>
</tr>
<tr>
<td>Do</td>
<td>6557</td>
<td>Gujranwala, India</td>
<td>do</td>
<td>Do</td>
</tr>
<tr>
<td>Dec., 1910</td>
<td>6558</td>
<td>Lahore, India</td>
<td>do</td>
<td>Do</td>
</tr>
<tr>
<td>Nov., 1910</td>
<td>6562</td>
<td>Kapilpung, Sikim, India</td>
<td>Capparis pedunculosa</td>
<td>Do</td>
</tr>
<tr>
<td>Do</td>
<td>6564</td>
<td>India</td>
<td>do</td>
<td>Do</td>
</tr>
<tr>
<td>Jan., 1911</td>
<td>6566</td>
<td>Lahore, India</td>
<td>Citrus sp. and Morus sp.</td>
<td>Do</td>
</tr>
<tr>
<td>Do</td>
<td>6564</td>
<td>India</td>
<td>do</td>
<td>Do</td>
</tr>
<tr>
<td>Aug., 1913</td>
<td>6572</td>
<td>Peradeniya, Ceylon</td>
<td>Salticus reticulata</td>
<td>A. Rutherford</td>
</tr>
<tr>
<td>Sept., 1913</td>
<td>6568</td>
<td>do</td>
<td>Kurrinia zeylanica</td>
<td>Do</td>
</tr>
<tr>
<td>Nov., 1913</td>
<td>6566</td>
<td>Hall Way, Jamaica</td>
<td>Orange</td>
<td>Col. C. Kitchener</td>
</tr>
<tr>
<td>Feb., 1914</td>
<td>8782</td>
<td>do</td>
<td>do</td>
<td>Do</td>
</tr>
<tr>
<td>May, 1914</td>
<td>8782</td>
<td>Kingston, Jamaica</td>
<td>Citrus sp.; Guiacum officinale; Cestrum nocturnum L.</td>
<td>S. F. Ashby</td>
</tr>
<tr>
<td>Feb., 1916</td>
<td>12066</td>
<td>Guantanamo, Cuba</td>
<td>Orange</td>
<td>P. Cardin</td>
</tr>
<tr>
<td>Do</td>
<td>12067</td>
<td>Nassau, N. P., Bahama</td>
<td>do</td>
<td>L. J. K. Brace</td>
</tr>
</tbody>
</table>

**Egg (fig. 2, A).**—Size, 0.208 mm. by 0.08 mm.; shape elliptical, curved, with the stalk short and attached some distance from the base. Color yellowish, surface apparently without reticulations in some cases and with them in others, which is no doubt due to the structure being destroyed in boiling. When they are present (fig. 2, B) they average 0.006 mm. in diameter.

**Larva.**—Larvae are present in the material at hand, but they are in too poor a condition for accurate description. They are brown in color and armed with numerous long spines.

**Pupa Case (fig. 2, C).**—Size variable in the different lots of material, averaging 1.4 by 0.89 mm.; shape regular elliptical, with the dorsum considerably arched or rounded; the median ridge high, but not markedly distinct from the dorsal area, excepting near the caudal portion of the abdomen and at the vasiiform orifice, which is elevated into a more or less prominent tubercle. Color dense black, so much so that it is almost impossible, even after prolonged boiling, to make out details. When the denser dorsal portion of the case is removed the ventral part appears under the microscope as dark brown and more or less irregularly mottled. Submarginal area with usually 20 spines forming a ring. These vary considerably in length, but the caudal pair is nearly always the longest. The spines are curved outward. A pair of hairs is present on the caudal margin caudad of the vasiiform orifice. The spines on the dorsum are small excepting two pairs on the abdomen and three pairs on the thorax. Their number and arrangement are shown in the figure. The vasiiform orifice (fig. 2, E) is prominent, being on a tubercle, but is small. It is somewhat triangular in shape, tending to circular. The operculum almost entirely fills the orifice obscuring the lingula—all but a very small portion at the tip. Cephalad of the orifice a pair of minute setae is situated one on each side. The margin of the case
is dentate, the teeth large and bluntly rounded (fig. 2, D). The inner spaces are not acute, but often squarely truncate. A space of 0.1 mm. is occupied by six or seven teeth. On this feature alone the case is easily separable from those of the other species. At the base of the teeth, forming a ring around the case, is a series of minute, clear, porelike areas. On the leaf the case is jet black with the dorsum somewhat arched and the abdominal segments marked, but not distinctly separated. On the margin all around is a narrow cottony lateral wax fringe. This sometimes extends mesad, irregularly covering the submarginal area, but dorsal secretion is usually absent.

**Adult Female.**—Length from vertex to tip of ovipositor, 1.12 mm.; color brown, under the microscope a deep wine color with darker shadings on head, thorax, and tip of abdomen. The specimens at hand are somewhat imperfect and it is difficult to make out the structure. The vertex seems to be rounded and possessed of a slight median ridge. The eyes are very dark brown. The antennae are absent from the specimens at hand. Labium yellowish, tipped with black. Legs yellowish, shaded on femora with dusky. The femora and tibiae of the hind legs are considerably darker than the others; length of hind femora 0.288 mm.; hind tibiae 0.432 mm. The tarsi have the proximal segment 0.1 mm. and the distal 0.06 mm. The proximal segment is armed on its distal extremity with one large spine and several smaller ones; the foot is normal, with the paronychium straight and hairy. The forewings (figs. 2, F, G) are 1.268 mm. long and 0.76 mm. wide at the widest part. The radial sector is heavy, yellowish brown in color, and much curved. The cubitus is very fine, long and slightly curved, that portion of the wing below it forming a more or less distinct lobe. In color the wing is a deep smoky, excepting as follows: A line following the cubitus, and a rather large spot near its distal extremity are colorless. A line following the radial sector from its distal extremity to almost its median curve, and another crossing it almost at right angles are colorless. This gives the appearance of a white cross on a dark background. In some wings the marking is not so evident, but there is one curved colorless line angling across the wing a short distance above and parallel with the radial sector. The border of this white line seems more heavily shaded than the remainder of the wing. The margin of the wing (fig. 2, H) is armed with a series of rather prominent teeth directed toward the distal extremity of the wing. Each one of these is armed with one prominent spine and usually three smaller ones. The margin formed by these teeth and a line along their bases is bright wine red. The hind wing is uniform smoky, with the vein yellowish brown.

**Adult Male.**—Much smaller than the female, measuring only about 0.79 mm. from vertex to tip of claspers. The specimens are in poor condition, the antennae are absent, and it is impossible to make out the structure with certainty. The color is a yellowish or a reddish brown. The hind femora, 0.24 mm. and the hind tibia, 0.4 mm. in length. They are marked as in the female. The claspers (fig. 2, J) are 0.126 mm. long. Near their distal ends there are a number of jagged teeth and they are armed with a number of long slightly curved hairs, those near the tip being the longest. The penis is as long as the claspers, yellowish, and almost straight.

Described from females, males, and pupa cases in balsam mounts and pupa cases and eggs on the leaves.

**Aleurocanthus spiniferus** (Quaintance)


Collected on *Citrus* sp. and rose by Mr. C. L. Marlatt, of the Bureau of Entomology, at Garalt, Java, on December 7, 1901; also taken on orange at Macao, South China, by Mr. R. S. Woglum, in February, 1911.
Aleurolobus marlatti (Quaintance)

*Aleurodes marlatti* Quain., 1903, in Canad. Ent., v. 35, no. 3, p. 6r.

This species (Pl. LXVI, fig. 3) was collected by Mr. C. L. Marlatt on May 17, 1901, at Kumomoto, Japan, on orange; also by Mr. R. S. Woglum on *Citrus* sp. and *Morus* sp. at Lahore, India; also collected by Mr. Woglum on *Ficus* sp. in the Royal Botanic Gardens, Ceylon; on an unknown tree in the Botanic Gardens, Buitenzorg, Java. This insect has also been received by the Bureau of Entomology from Mr. S. I. Kuwana, collected at Fukuoka, Japan. Mr. Kuwana states that this same species has been collected on Rivkin Island. One lot of infested orange leaves is also in the Bureau collection from Tokyo, Japan.

**Aleurothrixus floccosus** (Maskell)


This species (fig. 3, H) is based on material from Jamaica on lignum-vitae (*Guaiacum officinale*) and was first recorded on orange by Cockerell (1902) from Mexico. The insect has several color phases, ranging from clear yellow, the typical and more abundant form, to individuals with the dorsum striped with dark brown, or with the dorsal disk dark brown and the submarginal area yellow, etc.

Hempel’s *A. horridus* from Brazil on guava (*Psidium guajava*) is apparently the same as *A. floccosus*. This latter differs from *A. howardi* only in the absence of a comb of teeth on the caudal margin of the vasiform orifice (fig. 3, H). Both *A. floccosus* and *A. howardi* are almost always present together on the same leaf and their food plants and distribution are practically identical. *A. floccosus* is common in the islands of the West Indies and also occurs in Florida, Mexico, British Guiana, Brazil, Argentina, Canal Zone, Chile, and Paraguay. In addition to the orange, lime, grapefruit, etc., *A. floccosus* has been taken on the sea-grape (*Coccoloba uvifera*), *Plumeria* sp., *Baccharis genistelloides*, guava, a coarse grass, and a climbing vine.

**Aleurothrixus howardi** (Quaintance)


This species (fig. 3, E, J; Pl. LXVII) occurs on the same host plant and has the same distribution as *A. floccosus*. It was apparently first found in Florida by Prof. P. H. Rolfs at Miami on sea-grape, September 25, 1900, and therefore gained a foothold in that State some years previous to its discovery by Dr. E. A. Back.

**Aleurothrixus porteri**, n. sp.

This species (fig. 3, A–D, F, G, I, K, L; Pl. LXVIII) has been received only from Chile and Brazil. The first collection was sent by Prof. T. D. A.

1 Bibliographic citations in parentheses refer to “Literature cited,” pp. 472–472.
Fig. 3.—Aleurothrixus porteri, A. howardi, and A. floccosus: A, Aleurothrixus porteri: Larva, first instar.  
B, A. porteri: Caudal spine of pupa case.  
C, A. porteri: Clasper of male.  
D, A. porteri: Egg.  
E, A. howardi: Caudal spine.  
F, A. porteri: Pupa case.  
H, A. floccosus: Vasiform orifice of pupa case.  
I, A. porteri: Vasiform orifice of pupa case.  
J, A. howardi: Vasiform orifice of pupa case.  
K, A. porteri: Margin of pupa case.  
L, A. porteri: Margin of early larva.
Cockerell on June 7, 1895, who received the material from Mr. Lataste, under the name phalaenoides.

In a letter to the senior author in January, 1905, Cockerell suggested that Lataste supposed the species to be Blanchard’s phalaenoides. Since that time we have shown that phalaenoides Blanchard is a species of Aleurodicus. Table II records the distribution and food plants of the specimens of A. porteri in the collection of the Bureau of Entomology.

Table II.—Distribution and food plants of Aleurothrixus porteri in the collection of the Bureau of Entomology

<table>
<thead>
<tr>
<th>Date</th>
<th>Collector</th>
<th>Host</th>
<th>Bureau No.</th>
<th>Locality</th>
</tr>
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<tr>
<td>Feb. 13, 1894</td>
<td>M. Lataste</td>
<td>Orange</td>
<td>Q. 406a</td>
<td>Santiago, Chile.</td>
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<tr>
<td>May 14, 1894</td>
<td>do</td>
<td>do</td>
<td>Q. 406b</td>
<td>Do.</td>
</tr>
<tr>
<td>Mar. 14, 1894</td>
<td>Edward Reed</td>
<td>Orange</td>
<td>Q. 406c</td>
<td>Chile.</td>
</tr>
<tr>
<td>Oct. 7, 1899</td>
<td>D. G. Fairchild</td>
<td>Solanaceous plant</td>
<td>Q. 451</td>
<td>Villa del Mar, Chile.</td>
</tr>
<tr>
<td>Oct. 1903</td>
<td>M. J. Rivera</td>
<td>Orange</td>
<td>Q. 1201</td>
<td>San Bernardo, Chile.</td>
</tr>
<tr>
<td>Oct. 25, 1904</td>
<td>do</td>
<td>Schinus dependens</td>
<td>Q. 1202</td>
<td>Santiago, Chile.</td>
</tr>
<tr>
<td>June 20, 1912</td>
<td>Prof. Carlos E. Porter</td>
<td>Schinus molle.</td>
<td>Q. 452</td>
<td>Chile.</td>
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<tr>
<td>Mar. 1913</td>
<td>do</td>
<td>Orange</td>
<td>Q. 453</td>
<td>Santiago, Chile.</td>
</tr>
<tr>
<td>Jan. 5, 1914</td>
<td>Poponoe and Dorsett</td>
<td>Jaboticaba</td>
<td>Q. 12004</td>
<td>Rio de Janeiro, Brazil.</td>
</tr>
<tr>
<td>Aug. 8, 1915</td>
<td>Prof. Carlos E. Porter</td>
<td>Lippia citriodora Kunth.</td>
<td>Q. 12005</td>
<td>Santiago, Chile.</td>
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<tr>
<td></td>
<td>do</td>
<td>Myrtus</td>
<td>Q. 12006</td>
<td>Do.</td>
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</table>

Of this material, Quaintance No. 351 is chosen for the type.

Larva, first stage (fig. 3, A).—Size 0.352 by 0.208 mm. Shape elongate elliptical; abdomen with a moderately distinct keel, the caudal extremity of which projects to the vasiform orifice; dorsum armed with four pairs of stout straight spines; margin very minutely serrate and armed on its caudal part with a pair of long curved spines and the remainder of the margin with 11 pairs of minute spines; antennae straight, not quite as thick as the dorsal spines and extending slightly beyond the margin; vasiform orifice almost completely filled by the operculum; color under the microscope pale brown.

Pupa case.—Size 0.88 by 0.502 mm.; shape elliptic, some specimens slightly broader across the thorax than across the abdomen; dorsum somewhat elevated, the abdomen with a distinct keel; incisions between marginal wax tubes shallow; vasiform orifice (fig. 3, I) small, elevated, operculum filling about half of the orifice and obscuring the lingula; spines latero-cephalad of the vasiform orifice and those on the caudal margin of case short, stout, and somewhat vasiform (fig. 3, B); those on the medio dorsum long; other characters very similar to those of A. floccosus. Color varying from yellow to dark brown and with flocculent wax as in A. floccosus.

Adult male.—Color yellow, eyes dark brown; clasper rather short (fig. 3, C), its spur acute and not armed within with lobes; a few prominent spines present; length 0.08 mm.; length of insect from vertex to tip of claspers 0.88 mm.; forewing 1.04 mm. long, without markings, but often uniformly clouded with dusky.

Adult female.—Similar to male in color; length 1.12 mm.; forewing 1.28 mm. The adults in the collection are poorly preserved, and it is impossible to describe them in detail.

Described from larvae, pupa cases, and adults in balsam mounts and pupa cases upon foliage.

Type.—Cat. No. 20172, U. S. National Museum.
**Bemisia giffardi** (Kotinsky)


This insect is reported present on Citrus trees in several gardens in Honolulu, where it is stated to be so abundant that the foliage of the trees becomes blackened by the sooty fungus growing on the exuded honeydew. Mr. Kotinsky believes that the insect has been introduced into Hawaii, and this opinion is strengthened by its discovery in collections of material made by Mr. Woglum at Lahore, India, in 1911. The host, however, was an unknown tree.

**Dialeurodes citri** (Ashmead)


This is the destructive Citrus white fly of Florida, where it has been known since about 1880 (Pl. LXVI, fig. 1). It is rather generally distributed over the orange-growing regions of the Gulf States and is common on chinaberry and Cape jasmine considerably north of the Citrus belt. It is also recorded from Colorado, Illinois, and the District of Columbia, where it is probably confined to conservatories. This insect was discovered in California in 1907 and serious attempts were made to effect its eradication. It is still present in one locality (Marysville), where it is now so widespread and abundant that its eradication is considered to be impracticable (Weldon, 1915).

**Dialeurodes citrifolii** (Morgan)


This species, long confused with *D. citri*, may be readily distinguished from that species by the reticulate eggs, character of the tracheal folds of the pupa case, and the smoky patch on front wings of the adults. The insect is known from North Carolina, Mississippi, Louisiana, California,

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1 This species was first fully described by Riley and Howard in Insect Life, as cited, but had earlier been named and briefly described in The Florida Dispatch, November, 1885, by W. H. Ashmead, who, according to the rules of the International Code, must be known as the author of the species.
and Florida. While not as important as *D. citri*, it is nevertheless decidedly noxious. It is also known to occur in Cuba and Mexico. No specimens of this insect were found in the Woglum collection of white flies from India, Ceylon, and other points in the East visited by him. By reason of its affinities, *D. citrifolii* is, however, almost surely oriental in origin.

This species, with one exception, is known to attack only Citrus plants. It was found on *Ficus nitida* growing in greenhouses at Audubon Park, New Orleans, La.

**Paraleyrodes perseae** (Quaintance)


This species is known only from Florida, where it is frequently found on orange, though never in destructive numbers thus far. It also feeds upon *Persea*, the avocado (*Persea americana*), and doubtfully on persimmon (*Diospyros* spp.). Several species of the genus are common in the West Indies, *perseae* being the only one known from the United States.

**Trialeurodes floridensis** (Quaintance)


*T. floridensis* has thus far been recorded by the Bureau of Entomology only from Florida, where it is rather generally distributed. It infests avocado, guava, *Annona squamosa*, and the orange. While often very numerous on guava and avocado, it is at present of no importance on orange.

**Trialeurodes vitrinellus** (Cockerell)


The type of this species is from Mexico on orange. Apparently the same insect has been taken in southern California on oak. Its injuries to orange in Mexico are probably not great.

**Tetraleurodes mori** (Quaintance)


This indigenous species (Pl. LXIX, fig. 2) is widely distributed over the eastern United States and occurs on a large variety of plants, as mulberry, sycamore, maple, dogwood, hackberry, persimmon, holly, mountain laurel, etc. It has been found several times on orange, but not as yet in injurious numbers. That it may become troublesome under certain conditions, however, will be evident from the discussion relative to *T. mori*, var. *arizonensis*, which follows:
Tetraleurodes mori, var. arizonensis (Cockerell)


Aleyrodes mori Ckll., 1900, in Sci. Gossip, n. s. v. 6, no. 72, p. 366.

Described from specimens taken in Arizona on orange (Pl. LXIX). The variety *T. mori arizonensis* is stated to differ from the typical *T. mori* in having the wings white marked with black without any red. An examination of the type specimens after mounting shows the presence of red markings on wings exactly as in *T. mori*, and we are unable to distinguish any characters in support of its status as a variety. On different occasions the Bureau of Entomology has received from Mexico an aleyrodid seriously infesting the orange (Pl. LXIX) which we are unable to distinguish in the immature stages from *T. mori*, and this species is considered by Cockerell to be identical with his variety *T. mori arizonensis*. While the variety, in our judgment, is invalid, we retain the name to designate a race of *T. mori* which, in Mexico, for some reason breeds abundantly on orange and is a pest of importance. *T. mori arizonensis* occurs only on orange in Mexico so far as bureau records indicate. It was first collected in 1894 by Dr. C. H. T. Townsend at Guadalajara and San Luis, and again by Townsend in 1902 at Zapotlan. Two lots of material were received from Prof. A. L. Herrera in 1905, without statement as to locality.

LITERATURE CITED

ASHBY, S. F.


BERGER, E. W.


COCKERELL, T. D. A.


HEMPEL, Adolph.


KOTINSKY, Jacob.


MASKELL, W. M.

MORGAN, H. A.
1893. The orange and other citrus fruits, from seed to market, with insects beneficial and injurious, with remedies for the latter. La. Agr. Exp. Sta. Spec. Bul. 110, p. 36, fig., 3 pl. (2 col.).

MORRILL, A. W., and BACK, E. A.

NEWSTEAD, Robert.

QUAINTANCE, A. L.


and BAKER, A. C.

[RILEY, C. V., and HOWARD, L. O.]

WELDON, G. P.
PLATE LXIV

*Aleurocanthus woglumi*: Eggs, larvæ, and pupa cases on orange leaves.
PLATE LXV

Aleurocanthus woglumi:

Fig. 1.—Colony on an orange leaf.
Fig. 2.—Eggs and pupa cases, greatly enlarged

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PLATE LXVI

Fig. 1.—*Dialeurodes citri*: Pupae, much enlarged.
Fig. 2.—Male and female adults of an aleyrodid.
Fig. 3.—*Aleurolobus marlatti*, much enlarged.
PLATE LXVII

*Aleurothrixus howardi*: Larvae and pupa cases on an orange leaf, enlarged.
PLATE LXVIII

*Aleurothrixus porteri*: Larvae and pupa cases on *Myrtus* sp., enlarged.
PLATE LXIX

Fig. 1.—*Tetraleurodes mori*, var *arizonensis*: Larvae and pupa cases on an orange leaf, enlarged.

Fig. 2.—*Tetraleurodes mori*: Pupa cases on a mulberry leaf, much enlarged.