

# Whiteflies (Homoptera: Aleyrodidae) Intercepted at Japanese Plant Quarantine from Fresh-Cut Twigs of *Cleyera japonica* and *Eurya japonica* (Theaceae) Imported from China

Goro TOKIHIRO

Yokohama Plant Protection Station  
5-57 Kitanakadohri, Naka-ku, Yokohama 231-0003, Japan

**Abstract:** Fourteen species of whiteflies were found at Japanese plant quarantine from fresh-cut twigs of *Cleyera japonica* and *Eurya japonica* (Theaceae) imported from China. Of these, nine species including two indeterminate species, have been unknown to occur in Japan. Brief notes on their morphology and condition of parasitism are provided with images of puparia.

**Key words:** whitefly, plant quarantine, *Cleyera japonica*, *Eurya japonica*, China

## Introduction

In Japan, two species of theacean trees: *Cleyera japonica* and *Eurya japonica*, are widely used for religious service. Large quantities of cut twigs of these trees are imported from China, to compensate for shortage of domestic product in Japan. A total of 870 million twigs were imported in 2002. This is the largest amount among all kinds of cut flowers and cut twigs imported to Japan. According to the export phytosanitary certificates, these twigs came mainly from Hangzhou, Xinchang, and Ningbo, of Zhejiang Province, China. Since these areas and Japan are located on nearly the same latitude, high risk can be surmised that some insect pests accidentally introduced with their host trees will establish habitats not only on the theacean trees but also on other plants cultivated in Japan. To prevent their invasion to Japan, it is most important to know what insect pests have been imported with these trees. Although various species of whiteflies on fresh-cut twigs of *Cleyera japonica* and *Eurya japonica* have so far been intercepted frequently at plant quarantine in Japan, their identities remain unknown, in most cases. I thus investigated the whitefly fauna on these trees imported from China, with cooperation by plant quarantine offices in Japan. This paper reports the results of the investigation, with brief notes on the morphology, condition of parasitism of host trees, and so on, for respective species.

## Materials and methods

Whiteflies on fresh-cut twigs of imported *Cleyera japonica* and *Eurya japonica* were collected, as many as possible, at plant quarantines in ports of Yokohama, Nagoya, and Kobe, in 2001 and 2002. Several samples collected at Narita Airport before 2001 were also included. Slide specimens of puparia (fourth instar larvae) were used for identification. Identification of whiteflies was requested, in many cases, of the following specialists: Dr. J. H. MARTIN, of The Natural History Museum, London, and Dr. C.-C. KO, of the National Taiwan University, Taipei.

## Results

More than 180 whitefly samples were found from a large amount of investigated twigs. From these samples, 14 species of whiteflies were recorded, as shown in Table 1. Nine species of them, including two indeterminate species, have so far been unknown to occur in Japan.

Most of these 14 species are easily separable by the color and shape of the puparia (fourth instar larvae). They are grouped into three types by the puparial coloration, as shown below. For easier identification, brief notes for respective species are presented, as follows.

**Table 1.** Number of whitefly samples found from imported *Cleyera japonica* and *Eurya japonica*.

Whitefly species	Number of samples	
	<i>Cleyera japonica</i>	<i>Eurya japonica</i>
[Black type]		
<i>Aleurocanthus spiniferus</i>	2	10
<i>Aleuroplatus pectiniferus</i> *	3	3
<i>Aleuroplatus</i> sp.*	6	0
<i>Aleurolobus marlatti</i>	6	33
<i>Aleuroclava gordoniae</i> *	10	3
<i>Aleuroclava guyavae</i> *	5	17
<i>Aleuroclava neolitsea</i> *	2	0
[Light yellow - light brown type]		
<i>Rusostigma tristylis</i>	27	0
<i>Dialeuropora holboelliae</i> *	4	0
<i>Dialeurodes</i> sp.*	26	0
<i>Dialeurodes citri</i>	1	2
<i>Massilieuodes kirishimensis</i>	10	3
[Red type]		
<i>Rhachisphora alishanensis</i> *	6	1
<i>Aleurotrachelus caeruleus</i> *	5	1
Total	113	73

\*Unknown to occur in Japan.

### Black type

***Aleurocanthus spiniferus* (QUAINTANCE, 1903)** [Japanese name: mikan-toge-konajirami] (**Fig. 1**)

Puparium about 1.1 mm long, coated marginally with white wax, with spines on the dorsum; 11 pairs of these spines similar in length, arranged along the submargin.

This species was found frequently from *Eurya japonica* (Table 1). No morphological difference was observed between imported material and Japanese *A. spiniferus* collected from *Citrus unshiu* (Rutaceae).

***Aleuroplatus pectiniferus* QUAINTANCE & BAKER, 1914 (Fig. 2)**

Puparium 0.8-1.0 mm long, covered by mucous secretion, with scar-like pockets on the anterior margin of the 8th abdominal segment (Fig. 2Ca). Teeth of thoracic tracheal combs of the same size or slightly larger than those of the puparial margin (Fig. 2B). Operculum smaller than that of the next species (Fig. 2Cb).

This species was intercepted infrequently from both hosts (Table 1). Identification for this species was made by J. H. MARTIN.

***Aleuroplatus* sp. (Fig. 3)**

Puparium 0.9-1.0 mm long, covered by membranous secretion, lacking scar-like pockets on the anterior margin of the 8th abdominal segment (Fig. 3Ca). Teeth of thoracic tracheal combs more slender than those of the puparial margin (Fig. 3B). Operculum covering the entire vasiform orifice (Fig. 3Cb).

This species was found only from *Cleyera japonica* (Table 1). The specific assignment of this species remains uncertain.

***Aleurolobus marlatti* (QUAINTANCE, 1903)** [Japanese name: mahratto-konajirami] (**Fig. 4**)

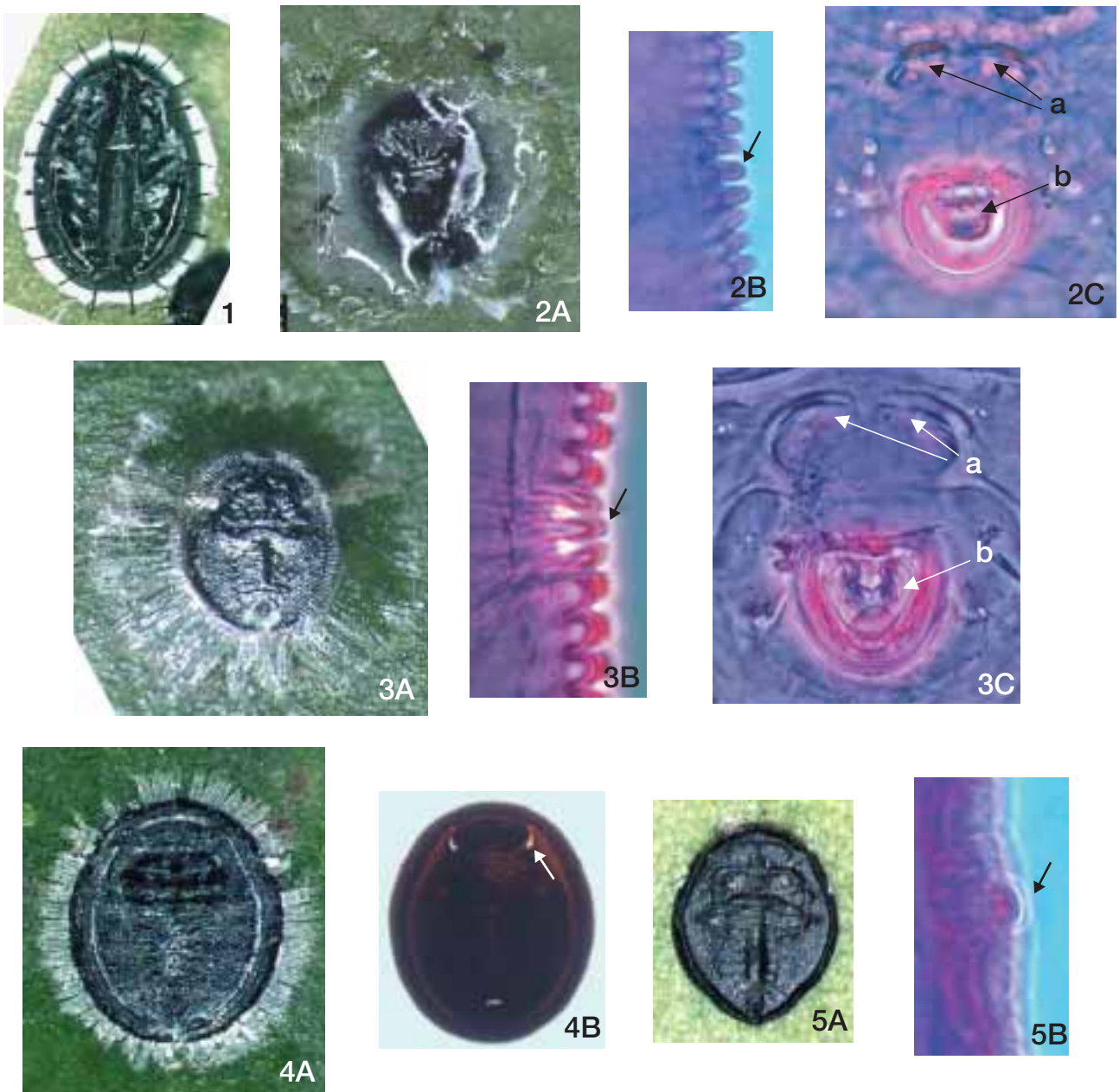
Puparium large, 1.1-1.3 mm long.

This species can be differentiated from resembling species by having crescent transparency on the head (Fig. 4B). In this investigation, it was found most frequently among the 14 species, being biased from *Eurya japonica* (Table 1). Identity of this species was confirmed by J. H. MARTIN.

***Aleuroclava gordoniae* (TAKAHASHI, 1932) (Fig. 5)**

Puparium small, 0.6-0.8 mm long, nearly circular. A pair of thoracic tracheal pores indistinct, displaced with small projections (Fig. 5B).

In many cases, this species was found from *Cleyera japonica* (Table 1). The genus *Aleurotuberculatus*, used previously for this species and following two species, was synonymized with *Aleuroclava* by MARTIN (1999). Identification for this species was made by C.-C. KO.

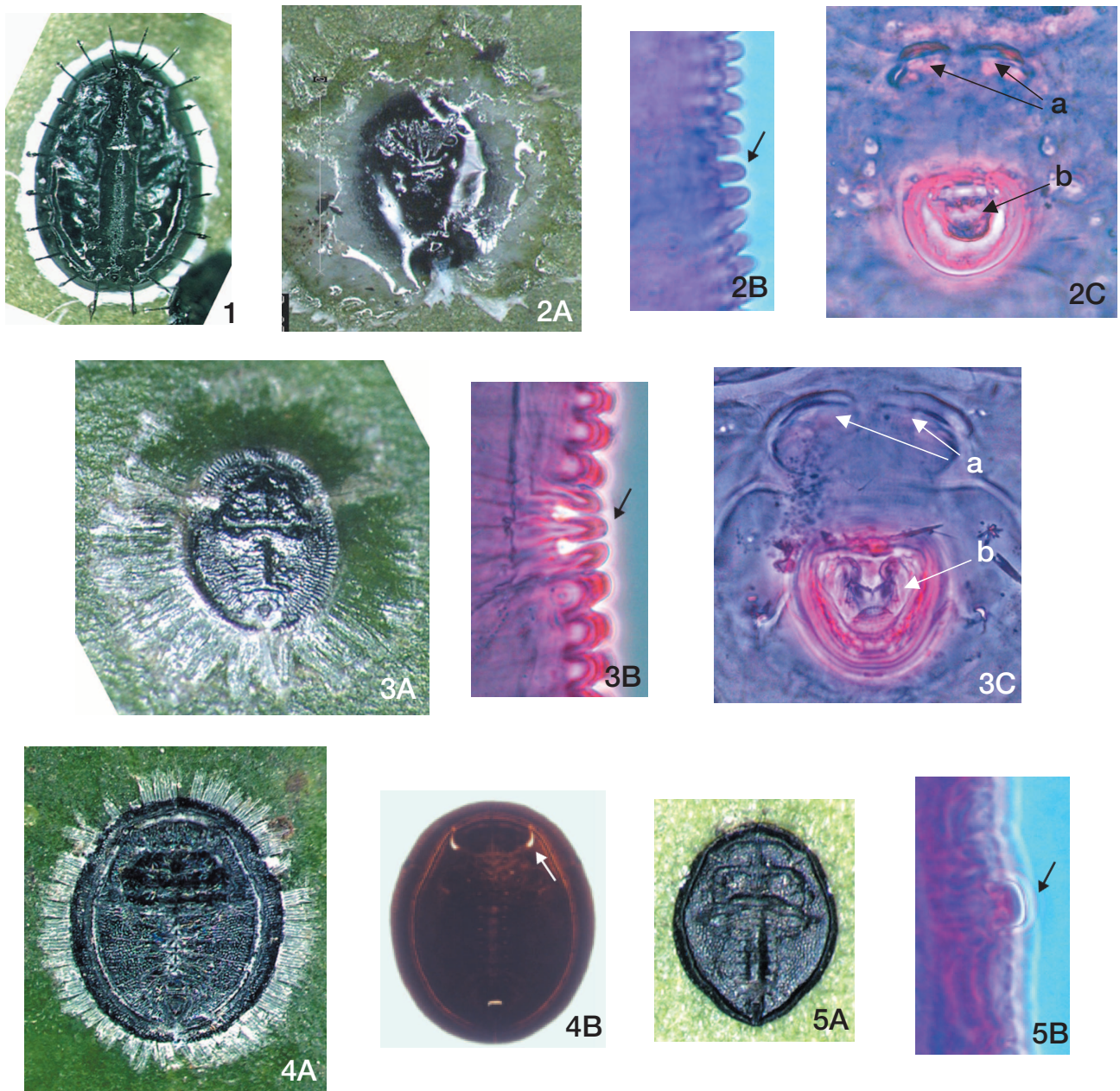


**Figs. 1-5.** 1, *Aleurocanthus spiniferus*, habitus of puparium. 2, *Aleuroplatus pectiniferus*: A, habitus of puparium; B, thoracic tracheal comb (arrow); C, 8th abdominal segment (a: anterior margin) and vasiform orifice (b: operculum). 3, *Aleuroplatus* sp.: A, habitus of puparium; B, thoracic tracheal comb (arrow); C, 8th abdominal segment (a: anterior margin) and vasiform orifice (b: operculum). 4, *Aleurolobus marlatti*: A, habitus of puparium; B, puparium on slide (arrow: crescent transparency). 5, *Aleuroclava gordoniae*: A, habitus of puparium; B, thoracic tracheal pore (arrow: projection).

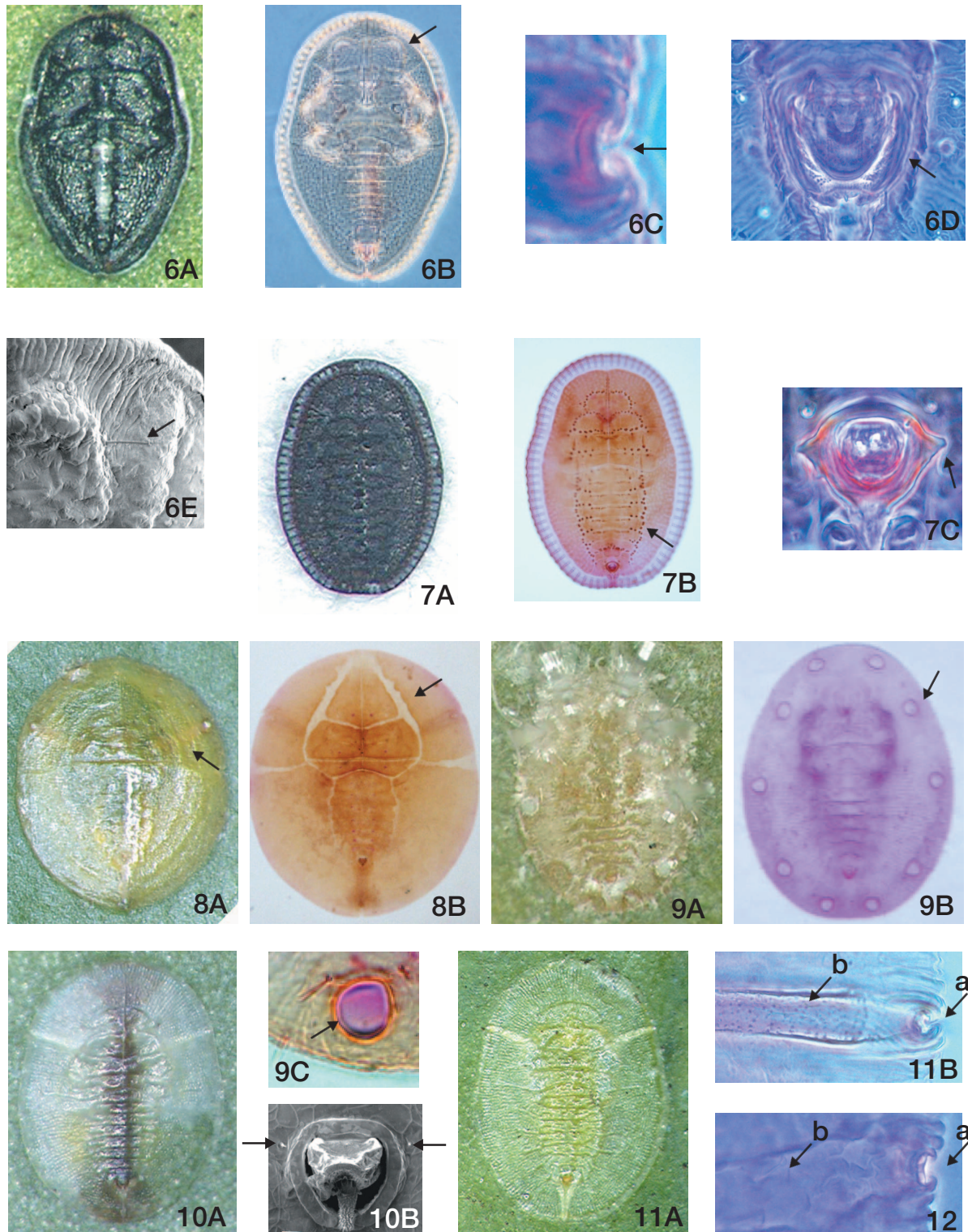
***Aleuroclava gordoniae* (TAKAHASHI, 1932) (Fig. 5)**

Puparium small, 0.6-0.8 mm long, nearly circular. A pair of thoracic tracheal pores indistinct, displaced with small projections (Fig. 5B).

In many cases, this species was found from *Cleyera japonica* (Table 1). The genus *Aleurotuberculatus*, used previously for this species and following two species, was synonymized with *Aleuroclava* by MARTIN (1999). Identification for this species was made by C.-C. Ko.



**Figs. 1-5.** 1, *Aleurocanthus spiniferus*, habitus of puparium. 2, *Aleuroplatus pectiniferus*: A, habitus of puparium; B, thoracic tracheal comb (arrow); C, 8th abdominal segment (a: anterior margin) and vasiform orifice (b: operculum). 3, *Aleuroplatus* sp.: A, habitus of puparium; B, thoracic tracheal comb (arrow); C, 8th abdominal segment (a: anterior margin) and vasiform orifice (b: operculum). 4, *Aleurolobus marlatti*: A, habitus of puparium; B, puparium on slide (arrow: crescent transparency). 5, *Aleuroclava gordoniae*: A, habitus of puparium; B, thoracic tracheal pore (arrow: projection).



**Figs. 6-12.** 6, *Aleuroclava guyavae*: A, habitus of puparium; B, puparium on slide (arrow: tubercle); C, thoracic tracheal pore (arrow: cavity); D, vasiform orifice (arrow: lateral margin); E, cephalic tubercle (arrow: seta). 7, *Aleuroclava neolitsea*: A, habitus of puparium; B, puparium on slide (arrow: dots); C, vasiform orifice (arrow: projection). 8, *Rusostigma tristylis*: A, habitus of puparium (arrow: thoracic tracheal fold); B, puparium on slide (arrow: oblique pale strip). 9, *Dialeuropora holboelliae*: A, habitus of puparium; B, puparium on slide (arrow: pore); C, distal pore (arrow). 10, *Dialeurodes* sp.: A, habitus of puparium; B, vasiform orifice (arrows: 8th abdominal setae). 11, *Dialeurodes citri*: A, habitus of puparium; B, thoracic tracheal pore (a) and thoracic tracheal fold (b). 12, *Massilieurodes kirishimensis*, thoracic tracheal pore (a) and thoracic tracheal fold (b).



**Figs. 13 & 14.** 13, *Rhachisphora alishanensis*, habitus of puparium (arrow: arm of rhachis). 14, *Aleurotrachelus caerulescens*: A, habitus of puparium; B, puparium on slide (arrow: longitudinal ridge).

***Aleuroclava guyavae* (TAKAHASHI, 1932) (Fig. 6)**

Puparium small, 0.5-0.8 mm long, oval, weakly constricted at the anterior third. Thoracic tracheal pores with a distinct cavity (Fig. 6C). Lateral margin of the vasiform orifice straight (Fig. 6D).

This species resembles both *A. aucubae* (KUWANA, 1911) and *A. euryae* (KUWANA, 1911), known from Japan, but it can be distinguished from the Japanese species by different positioning of the dorsal cephalic disc spines that originate from the lateral margin of the cephalic tubercle (Fig. 6B & E). This whitefly was commonly found at quarantine, especially from *Eurya japonica* (Table 1). Identification for this species was made by C.-C. Ko.

***Aleuroclava neolitsea* (TAKAHASHI, 1934) (Fig. 7)**

Puparium about 0.8 mm long, elliptic, covered by white wax submarginally, with distinct dots along the inner border of the submarginal area (Fig. 7B). Vasiform orifice angularly projected laterally (Fig. 7C).

This species was found, though not often, only from *Cleyera japonica* (Table 1). It was identified following MARTIN (1999) and LIN (1999).

**Light yellow - light brown type**

***Rusostigma tristylis* (TAKAHASHI, 1935) [Japanese name: sakaki-konajirami-modoki] (Fig. 8)**

Puparium large, 1.6-2.1 mm long, nearly circular. Thoracic tracheal folds obvious when alive (Fig. 8A). Oblique pale stripes on the cephalothoracic area, becoming clear when slide-mounted (Fig. 8B).

This species was found frequently only from *Cleyera japonica* (Table 1). Unlike other whiteflies, the puparia of this species preferably live attaching themselves to the upper surface of leaves of host plants. Identification for this species was confirmed by J. H. MARTIN. *Rusostigma tokyonis* (KUWANA, 1911), one of the commonest whiteflies injurious to *Cleyera japonica* in Japan, resembles this species, but it was not found in this investigation at all.

***Dialeuropora holboelliae* YOUNG, 1944 (Fig. 9)**

Puparium 1.3-1.6 mm long, elliptic, covered thickly by wax on the dorsum, with five pairs of pores submarginally (Fig. 9B); the posterior-most pair of these located near the posterior puparial margin (Fig. 9C). No setae present just behind posterior-most pores.

This whitefly was found from a small number of cut twigs of *Cleyera japonica* (Table 1). This species was identified by C.-C. Ko.

***Dialeurodes* sp. (Fig. 10)**

Puparium 1.2-1.4 mm long, elliptic, widely dark brown along meson.

This species resembles *D. kirkaldyi* (KOTINSKY, 1907), but it is separable from the latter by differ-

## 和 文 摘 要

## 中国産輸入サカキ・ヒサカキの切枝から発見されたコナジラミ

時広五朗

横浜植物防疫所

サカキとヒサカキの切枝は神事用として中国から大量に輸入されている。これらには種々のコナジラミが発見されるが、その種名はほとんど不明であった。そこで2001年から2002年の間に輸入されたこれらの切枝から発見されたコナジラミを収集し、精査したところ14種

のコナジラミを見出した。これらの内、属までしか判明しなかった2種を含めて、9種は我が国に未発生であった。これら14種の特徴を生時とプレパラート標本の写真を用いて簡単に解説した。

