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DESCRIPTION OF A NEW SPECIES OF *ALEUROCLAVA* SINGH (HEMIPTERA: ALEYRODIDAE) FROM CHINA

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ABSTRACT

A new whitefly species, *Aleuroclava tianmuensis* Wang & Dubey (Hemiptera: Aleyrodidae) is described from *Daphniphyllum macropodum* Miq. (Saxifragales: Daphniphyllaceae) and *Litsea cubeba* (Lours.) Pers. (Laurales: Lauraceae) from Tianmu Mountain (China). The puparium of this new species differs from that of the closely related species *Aleuroclava gordoniae* (Takahashi) by the presence of median tubercles on the abdominal segments, the position of the cephalic setae, and by the absence of a minute tubercle associated with the thoracic tracheal pores. An identification key of *Aleuroclava* species known from China is provided.

Key Words: *Daphniphyllum macropodum*, *Litsea cubeba*, *tianmuensis*, whitefly

RESUMEN

Se describe una nueva especie de mosca blanca, *Aleuroclava tianmuensis* Wang y Dubey (Hemiptera: Aleyrodidae) sobre *Daphniphyllum macropodum* Miq. (Saxifragales: Daphniphyllaceae) y *Litsea cubeba* (Lours.) Pers. (Laurales: Lauraceae) de la Montaña Tianmu (China). La pupa de esta nueva especie difiere de *Aleuroclava gordoniae* (Takahashi) que es una especie estrechamente relacionada por la presencia de los tubérculos medianos en los segmentos abdominales, la posición de las setas cefálicas y por la ausencia de un tubérculo diminuto asociado con los poros traqueales del toráx. Se provee una clave para la identificación de las especies conocidas del género *Aleuroclava* en China.

Palabras Clave: *Daphniphyllum macropodum*, *Litsea cubeba*, *tianmuensis*, mosca blanca

The genus *Aleuroclava* (Hemiptera: Aleyrodidae) was established by Singh (1931) with *Aleuroclava complex* Singh as its type species. *Aleuroclava* is an Old World genus and represented with 36 species including 4 undetermined species from China (Martin & Mound 2007; Evans 2008; Martin & Lau 2011). It occurs predominantly in the Oriental and Austro-Oriental Regions but also occurs in the Palaearctic and subSaharan (Afro-tropical) regions (Dubey & Sundararaj 2005). Martin (1999) regarded *Aleurotuberculatus* Takahashi as a junior synonym of *Aleuroclava*, which was followed subsequently by Dubey & Sundararaj (2005) and other authors. However, many species in this genus differ little in their morphology and a type-based revision is needed, which includes a study of the shape and position of the tubercles along with other characters.

MATERIALS AND METHODS

Puparia of the new species were collected from Tianmu Mountain, China. Specimens were mounted following the method given by Martin (1987). The terminology for morphological structures follows Bink-Moenen (1983), Martin (1985) and Gill (1990). The holotype is deposited in the Insect Collection of Yangzhou University, China. One paratype will be deposited in each of the following institutions: Natural History Museum (NHM), London, UK; United States Natural History Museum (USNM) aleyrodid collection located in the US Department of Agriculture (USDA), Beltsville, Maryland, USA and Zoological Survey of India (ZSI), Kolkata, India. The remainder of the specimens are deposited at Yangzhou University and in A. K. Dubey's personal collection. The measurements and camera lucida drawings were

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made using a Leica microscope MZAPO located in the Institute of Applied Entomology, Yangzhou University, China. A sample of the specimen was prepared for SEM studies by cutting the leaf along with a puparium, then mounted it on a stub on black carbon conductive adhesive.

The Scanning Electron Microscope images were taken by Philips XL30-Environmental Scanning Electron Microscope at 20 kV/EHT and 80 Pa between 128 × to 1034 × magnification.

Aleuroclava Tianmuensis Wang & Dubey **sp. nov.** (Figs. 1–3, 4–6, 7–10)

Puparium

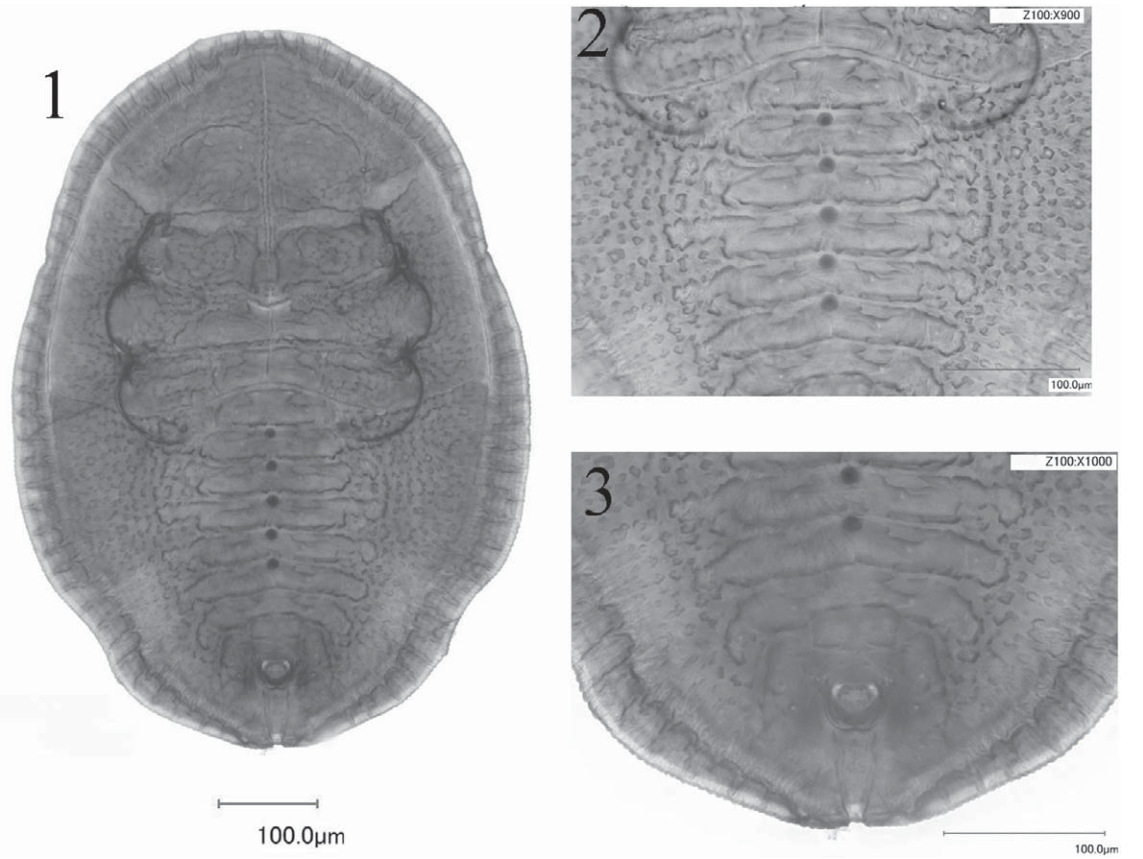
Body black, elliptical, 731-840 µm long, 413-630 µm wide, broadest at the metathoracic region. Specimems were found 2-4 per leaf, centrally on the under surface of leaves.

Lateral Margin

Crenulate, 28-30 crenulations in 0.1 mm. Paired anterior and posterior marginal setae 24-28 µm and 20-24 µm long, respectively. Thoracic tracheal pore area slightly recessed and differentiated from margin.

Dorsum

Submargin demarcated from dorsal disc by a line along the bases of submarginal papillae. Submargin with a row of tuberculate papillae. Longitudinal molting suture reaching anterior margin and the transverse molting suture reaching the submargin. Cephalic setae 15-20 µm, first abdominal setae 28-35 µm, eighth abdominal setae 5-8 µm and caudal setae 60-70 µm long. Subdorsum with crescent-form tubercles. Caudal furrow indicated with irregular ridges, 52 µm long, 22 µm wide. Median tubercles pres-



Figs. 1-3. *Aleuroclava tianmuensis* **sp. nov.**, slide mounted specimen: (1) puparium; (2) median tubercles; and. (3) vasiform orifice and caudal furrow.

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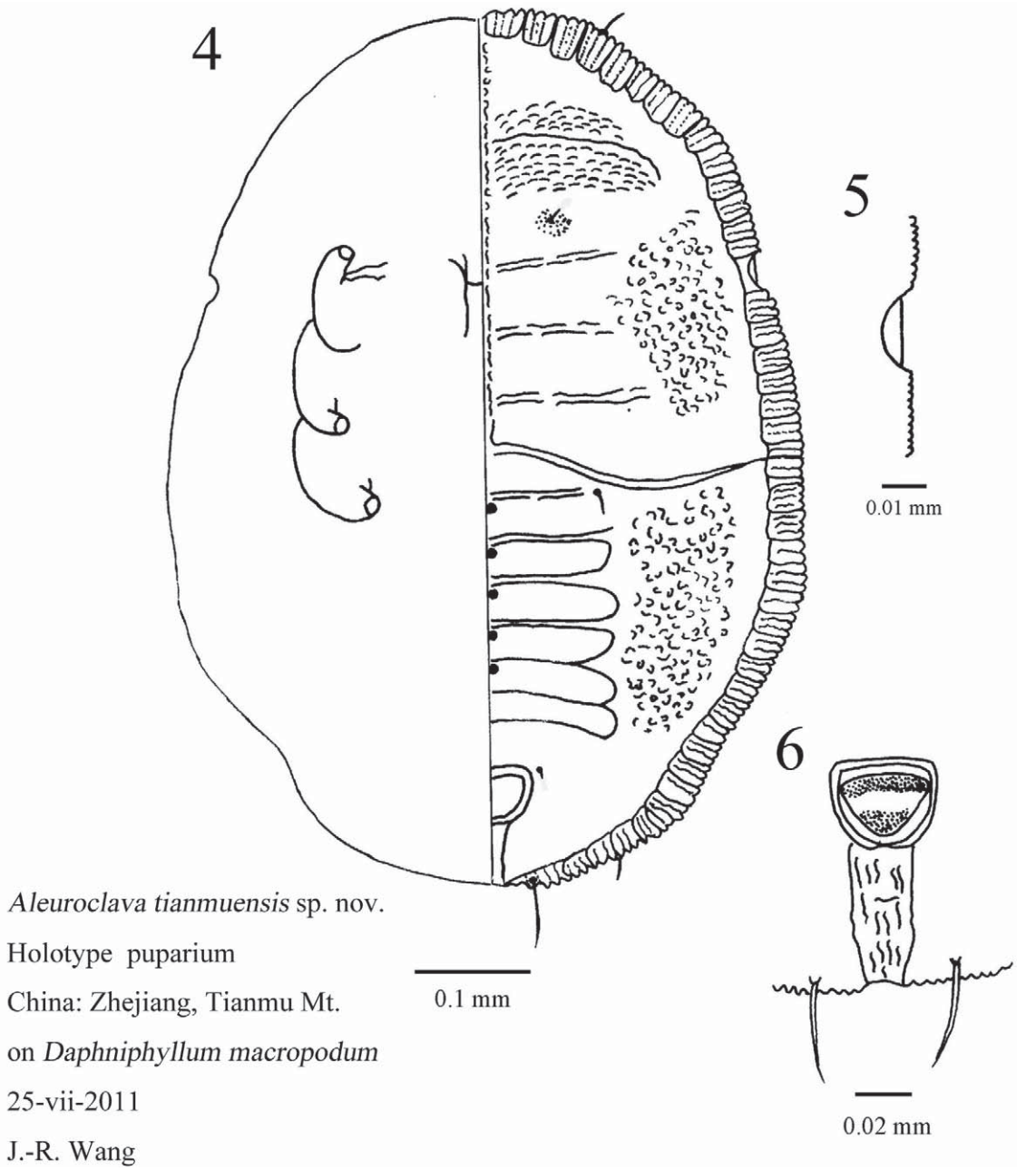

Figs. 4-6 *Aleuroclava tianmuensis* **sp. nov.**: (4) puparium, dorsal and ventral views; (5) margin; and (6) vasiform orifice and caudal furrow.

ent on abdominal segments II-VI. Submedian tubercles enlarged near termination of cephalothoracic segment sutures abdominal segment I & II. A few submedian tubercles also present on abdominal segment sutures. Geminate pores present on dorsum.

Vasiform Orifice

Subcordate to subcircular, slightly longer than wide, 39 µm long, 32 µm wide; operculum cordate, almost covering the orifice and obscuring the lingula, 26 µm long, 22 µm wide.

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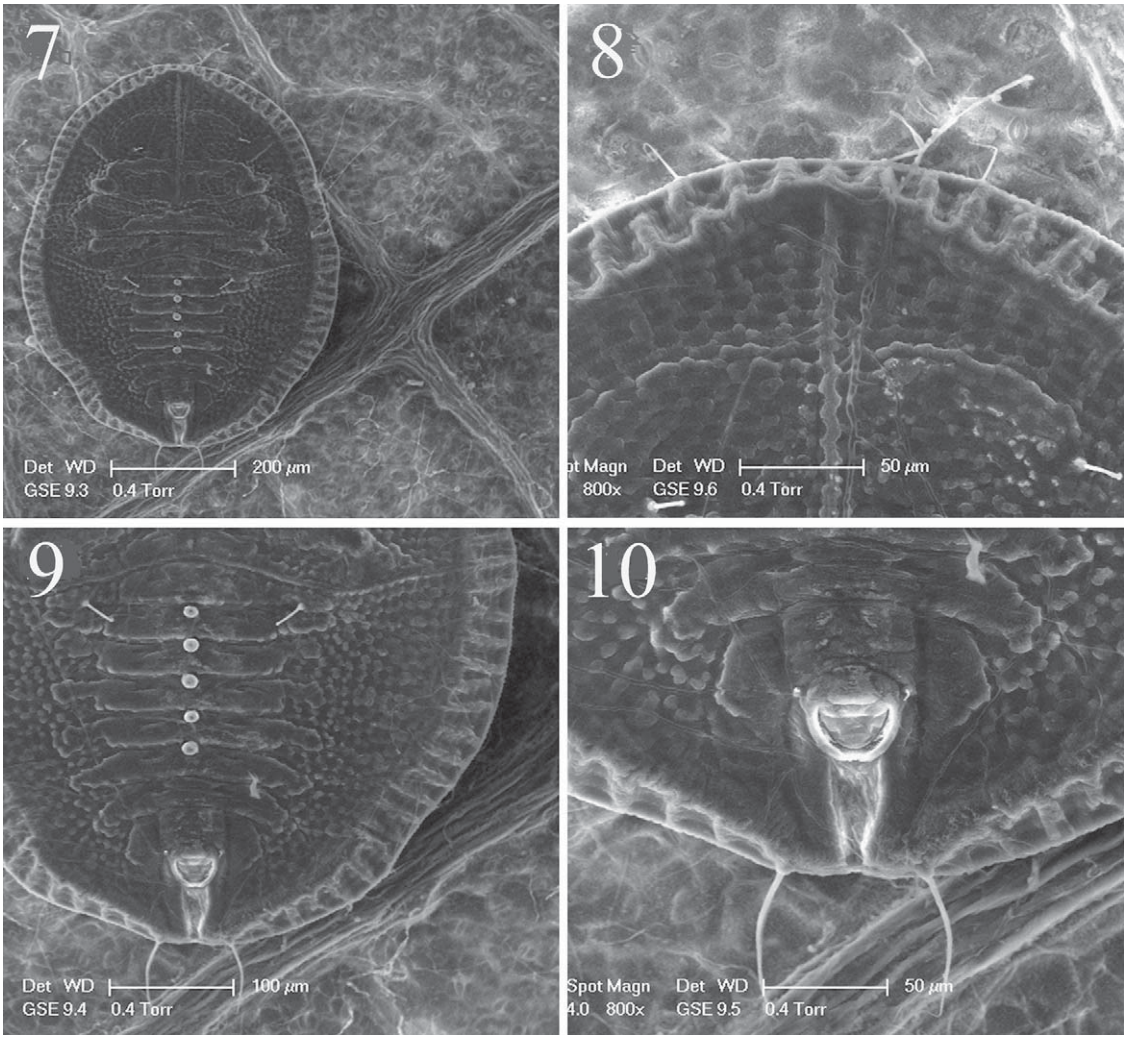

Figs. 7-10. SEM of *Aleuroclava tianmuensis* **sp. nov.**: (7) puparium; (8) anterior setae and cephalic setae; (9) median tubercles on abdominal segments; and (10) vasiform orifice and caudal furrow.

Venter

A pair of ventral abdominal setae 6-8 µm long, 33 µm apart. Antennae extending near the base of prolegs, 53 µm long. Adhesive pads present at apex of legs.

Host Plants

Daphniphyllum macropodum (Saxifragales: Daphniphyllaceae), *Litsea cubeba* (Laurales: Lauraceae).

Material Examined

HOLOTYPE: China, Zhejiang, Hangzhou, Tianmu Mountain, 1 puparium on slide, on *Daphniphyllum macropodum*, 25.vii.2011, J. R. Wang (AM-NO.1), deposited in the Insect Collection of Yangzhou University, Yangzhou, Jiangsu, China.

Paratypes: Twenty six paratypes. All puparia from China, Zhejiang, Tianmu Mt., 13 puparia on 10 slides, 25.vii.2011, J. R. Wang. On *Daphniphyllum macropodum*: 5 puparia on 5 slides (AM-NO.11, ANIC); (AM-NO.13, USDA); (AM-NO.14, ZSI); (AM-NO.2, Yangzhou Uni.); (AM-NO.7, Yangzhou Uni.); 2 puparia on a slide (AM-NO.9-10, Yangzhou Uni.). On *Litsea cubeba*: 1 puparium on slide (AM-NO.8, A. K. Dubey); 1 puparium on slide (AM-NO.12, NHM); 2 puparia on 1 slide (AM-NO.3-4, Yangzhou Uni.); 2 puparia on 1 slide (AM-NO.5-6, Yangzhou Uni.). Numerous dry puparia on *D.*

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macropodum and *L. cubeba* leaves with above collection data available at Yangzhou University.

Etymology

The species name *'tianmuensis'* is derived from collection locality of the species, Tianmu Mountain. (China).

Remarks

The puparium of *A. tianmuensis* **sp. nov.** resembles that of *Aleuroclava gordoniae* (Takahashi) but differs from it by the presence of median tubercles on the abdominal segments, position of cephalic setae, and by the absence of a minute tubercle associated with each thoracic tracheal pore.

KEY TO THE PUPARIA OF CHINESE SPECIES OF *ALEUROCLAVA*

[Puparial characters obtained from original descriptions of species are indicated by asterisks (*)].

1. Puparia with elongate tuberculate setae 2

—. Puparia without tuberculate setae, simple setae present 3

2. Cephalic setae 360 µm and first abdominal setae 340 µm long; submargin with 3 pairs of rounded pores; abdominal segments I-IV with small median tubercles; vasiform orifice circular . . . . . *tripori* (Dubey & Sundararaj)

—. Cephalic setae 264 µm and first abdominal setae 231 µm long; submargin without 3 pairs of rounded pores; abdominal segments without median tubercles; vasiform orifice subcircular . . . . . *indica* (Singh)

3. Puparia with many long papillae arranged in a single row along the margin of the case, papillae protruding beyond margin 4

—. Puparia without papillae or with small papillae arranged in a single row along the margin of the case, papillae not protruding beyond margin 5

4. Small median tubercles present on all the abdominal segments . . . *subindica* Martin & Mound

—. Median tubercles absent on the abdominal segments . . . . . *thysanospermi* (Takahashi)

5. Puparium with T–shaped tubercle on cephalothorax 6

—. Puparium without T–shaped tubercle on cephalothorax 8

6. Dorsum with brown pigmentation on median area . . . . . *psidii* (Singh)

—. Dorsum without brown pigmentation on median area 7

7. Puparia about 1.1-1.3 mm long; submargin with radial striations, transverse moulting suture not reaching the margin; thoracic tracheal clefts present . . . . . *murrayae* (Singh)

—. Puparia about 0.6-0.8 mm long; submargin without radial striations, transverse moulting suture nearly reaching the margin; thoracic tracheal clefts absent . . . . . *pyracanthae* (Takahashi)*

8. Puparia black 9

—. Puparia white or pale 15

9. Cephalothorax with 4 pairs of tubercles 10

—. Cephalothorax without tubercles 13

10. Abdominal segments II-VI with median tubercles . . . . . *tianmuensis* **sp. nov.** Wang & Dubey

—. Median tubercles absent on abdominal segments 11

11. Vasiform orifice rounded; puparium narrowed on the posterior region, slightly constricted across the thoracic tracheal clefts . . . . . *guyavae* (Takahashi)

—. Vasiform orifice subcordate; puparium narrowed on the anterior and posterior regions, not constricted across the thoracic tracheal clefts 12

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12. Thoracic tracheal folds faintly discernible; submarginal area with many transverse ridges; caudal furrow distinct, expanded basally . . . . . *gordoniae* (Takahashi)

—. Thoracic tracheal folds distinct; submarginal area without transverse ridges; caudal furrow slender, very narrow, a little widened near the hind end . . . . . *aucubae* (Kuwana)

13. Transverse suture reaching the margin; with many small circular papillae distributed on the dorsum; vasiform orifice with 2 eminent pointed lateral tubercles . . . . .*neolitseae* (Takahashi)*

—. Transverse suture not reaching the margin; without small circular papillae on the dorsum; vasiform orifice without 2 eminent pointed lateral tubercle 14

14. Puparia oblong, dorsum and submarginal area with many long fine wavy furrow-like lines; thoracic tracheal clefts distinct; vasiform orifice subcordate . . . . . *kuwanai* (Takahashi)

—. Puparia oval, dorsum without wavy furrow-like lines but with many larger granules; thoracic tracheal clefts indistinct; vasiform orifice circular . . . . . *montanus* (Takahashi)

15. Cephalothorax with 5 pairs of submedian tubercles 16

—. Cephalothorax with fewer pairs of submedian tubercles or without tubercle 19

16. Median tubercles on abdominal segment absent; venter with an indistinct marginal rim . . . . . *malloti* (Takahashi)

—. Median tubercles on abdominal segment present; venter without marginal rim 17

17. Dorsum smooth; metathoracic tubercles with brown pigment . . . . . *jasmini* (Takahashi)

—. Dorsum granulated; metathoracic tubercles without brown pigment 18

18. Thoracic tracheal folds discernible; submarginal area distinct from the dorsal disk; mid-thoracic suture not reaching the margin; marginal teeth nearly triangular. . . . . *elatostemae* Takahashi*

—. Thoracic tracheal folds not discernible; submarginal area not well distinct from the dorsal disk; mid-thoracic suture reaching the margin; marginal teeth rounded . . . . . *ficicola* (Takahashi)

19. Cephalothorax with 4 pairs of tubercles 20

—. Cephalothorax with fewer pairs of tubercles or without tubercles 24

20. Dorsum with 3 dark brown patches and numerous very small granules scattered . . . . . .*carpini* (Takahashi)*

—. Dorsum without dark brown patch and with few granules 21

21. Abdominal segments I - VI with median tubercles 22

—. Median tubercles absent on abdominal segment 23

22. Margin teeth crenulate, cephalic and first abdominal setae capitates; caudal furrow with irregular markings; a row of papillae numbering about 50 on submargin . . . . . *takahashii* (David & Subramaniam)

—. Margin teeth triangular, cephalic and first abdominal setae pointed; caudal furrow without irregular markings; a row of papillae numbering about 80 on margin . . . *lithocarpi* (Takahashi)*

23. Mid-thoracic sutures not reaching the margin, a pair of bristles present on the cephalothorax, basal abdominal segment reaching beyond the margin; thoracic tracheal folds indistinct . . . . . *rhododendri* (Takahashi)

—. Mid- thoracic sutures reaching the margin, a pair of setae present on the cephalothorax, basal abdominal segment short, not reaching beyond the margin; thoracic tracheal folds distinct . . . . . *uraianus* (Takahashi)*

24. Cephalothorax with 3 pairs of tubercles 25

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—. Cephalothorax with 2 pairs of tubercles or without tubercle 27

25. Transverse suture reaching the margin; the dorsal setae capitate, not reaching beyond the margin; numerous longitudinal wavy lines on the median area of each segment . . . . . *latus* (Takahashi)

—. Transverse suture not reaching the margin; the long, dorsal setae pointed, reaching the margin, longitudinal wavy lines absent on the median area 26

26. Dorsum with numerous very small short rounded papillae scattered; the metanotum with a pair of dorsal tubercles, the first abdominal segment with median tubercles, the thoracic tracheal fold not distinct, with the cleft deeper and narrowed distally . . . . . *multipori* (Takahashi)*

—. Dorsum lacking papillae and granules but with some small circular pores scattered on the disk; the metanotum without tubercles, abdominal segments without median tubercles, the thoracic tracheal fold distinct, the cleft small and widely opening . . . . . *longispinus* (Takahashi)

27. Cephalothorax with 2 pairs of tubercles . . . . . *piperis* (Takahashi)*

—. Cephalothorax without tubercles 28

28. Cephalic and first abdominal setae reaching beyond margin 29

—. Cephalic and first abdominal setae not reaching beyond margin 30

29. Puparia about 0.65 mm long, each abdominal segment with faint longitudinal markings on the median area near the hind margin; caudal furrow without markings . . *melastomae* (Takahashi)

—. Puparia about 0.75 mm long, each abdominal segment without faint longitudinal markings; caudal furrow with a few transverse striae on the side . . . . . *meliosmae* (Takahashi)

30. Cephalothorax indented at the front; constricted across the thoracic tracheal pores; caudal furrow constricted near the base . . . . . *trachelospermi* (Takahashi)*

—. Cephalothorax not indented at the front; not constricted across the thoracic tracheal pores; caudal furrow not constricted near the base 31

31. Puparia about 0.75-0.78 mm long, marginal teeth crenulate; venter without faint circular markings; vasiform orifice subcordate . . . . . *lagerstroemiae* (Takahashi)*

—. Puparia about 0.81-0.86 mm long, marginal teeth rounded; venter with many faint circular markings; vasiform orifice rounded . . . . . *similis* (Takahashi)*

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References Cited

Bink-Moenen, R. M. 1983. Revision of the African whiteflies (Aleyrodidae), mainly based on a collection from Tchad. Monogr. Nederland Entomol. Ver., 10: 1-210.

Dubey, A. K., and Sundararaj, R. 2005. A review of the genus *Aleuroclava* Singh (Hemiptera: Aleyrodidae) with descriptions of 8 new species from India. Oriental Insects. 39: 241-272.

Evans, G. A. 2008. The whiteflies (Hemiptera: Aleyrodidae) of the world and their host plants and natural enemies. Available at http://www.sel.barc.usda.gov:591/1WF/whitefly_catalog.htm (version 23 Sep 2008).

Gill, R. J. 1990. The morphology of whiteflies, pp. 13-46 *In* D. Gerling [ed.], Whiteflies: Their Bionomics, Pest Status and Management. Intercept. Andover.

Martin, J. H. 1985. The whitefly of New Guinea (Homoptera: Aleyrodidae). Bull. British Mus. (Nat. Hist.) (Entomol.). 50: 303-351.

Martin, J. H. 1987. An identification guide to common whitefly pest species of the world (Homoptera: Aleyrodidae). Trop. Pest Mgt. 33: 298-322.

Martin, J. H. 1999. The whitefly fauna of Australia (Sternorrhyncha: Aleyrodidae) a taxonomic account and identification guide. CSIRO Entomology Tech. Paper. 38: 1-197.

Martin, J. H., and Mound, L. A. 2007. An annotated checklist of world's whiteflies (Insecta: Hemiptera: Aleyrodidae). Zootaxa. 1492: 1-84.

Martin, J. H., and Lau, S. K. 2011. The Hemiptera-Sternorrhyncha (Insecta) of Hong Kong, China - an annotated inventory citing voucher specimens and published records. Zootaxa. 2847: 1-122.

Singh, K. 1931. A contribution towards our knowledge of the Aleyrodidae (whiteflies) of India. Mem. Dept. Agric. India (Entomol. Series). 12: 1-98.

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