

# A New Species of Whitefly *Crescentaleyrodes vetiveriae* (Hemiptera: Aleyrodidae) from India

Anil Kumar Dubey Institute of Wood Science and Technology (IWST), 18th Cross Malleswaram, Bangalore 560 003, India

Chiun-Cheng Ko\* Department of Entomology, National Taiwan University, 1 Roosevelt Rd., Sec. 4, Taipei 106, Taiwan

## ABSTRACT

*Crescentaleyrodes vetiveriae* sp. nov. found on *Vetiveria zizanioides* (Poaceae) is described with scanning electron micrographs and illustrations in this paper. The generic characters of *Crescentaleyrodes* are redefined.

**Key words:** Aleyrodidae, taxonomy, *Crescentaleyrodes*, new species, India.

## Introduction

The whitefly genus *Crescentaleyrodes* was described by David and Jesudasan in 1987. It can be recognized by the crescent-shaped pores on the submargin of pupal case. So far, only one species (namely, *Crescentaleyrodes semilunaris* (Corbett)) recorded as distribution of India. It was recorded by Abraham and Joy (1978) as a pest of lemon grass, *Cymbopogon flexuosus* (Poaceae) from India. We found another species of this genus which is breeding on *Vetiveria zizanioides* (Poaceae) as pest too. The new species is described with scanning electron micrographs and illustrations in this paper. The generic characters of *Crescentaleyrodes* are redefined in the morphological characters observed in the new species.

## Specimen depositories

ANIC — Australian National Insect Collection, CSIRO Entomology, Canberra, ACT, Australia  
BNHM — Natural History Museum, London, U.K.  
CDFA — California Department of Food and Agriculture, Sacramento, U.S.A.  
IARI — Indian Agricultural Research Institute, New Delhi, India  
NMNH — National Museum of Natural History, Tel Aviv University, Israel  
NTU — National Taiwan University, Taipei, Taiwan  
SMTD — Staatliches Museum für Tierkunde, Dresden, Germany  
USNM — U. S. Department of Agriculture, Beltsville, Maryland, U.S.A. (Sternorrhyncha collections of the United States National Museum of Natural History, Washington D.C.)  
ZMU — Zoological Museum, Universitetsparken,

\*Correspondence address  
e-mail: kocc2501@ntu.edu.tw

Department of Zoology, Copenhagen,  
Denmark  
ZSI — Zoological Survey of India, Kolkata,  
India

## Materials and Methods

Leaf undersurfaces containing eggs and late instar nymphs of the new species were collected in the field, and a colony was established in the laboratory. Emergent parasitoids were removed. Specimens for scanning electron microscopy were removed from host plants and washed in 95% ethanol with ultrasonic mini cleaner at 50-60 Hz for 2 min, then dehydrated in 95%, 100% ethanol sequentially. Specimens were critical-point dried by using CO<sub>2</sub> as a transfer fluid, then mounted on stubs and sputter-coated with a gold-palladium alloy. The scanning electron microscope (JEOL S-800) observed in Department of Entomology, National Taiwan University, Taipei, Taiwan. Descriptions and terminology of external and interior morphological structures are based on the previous works such as Bink-Moenen (1983), Martin (1985), and Gill (1990).

### *Crescentaleyrodes* David and Jesudasan, 1987

*Tetraleyrodes* Cockerell, 1902: 283; Corbett, 1926: 282; Abraham and Joy, 1978: 313.

*Aleurolobus* Quaintance and Baker, 1914: 108; Bink-Moenen, 1983: 50.

*Crescentaleyrodes* David and Jesudasan, 1987: 42; Regu and David, 1993: 53.

**Diagnosis:** Elongate or elongate oval; anterior and posterior marginal setae present, margin crenulate; thoracic and caudal tracheal pores possibly differentiated; submargin demarcated by oblong distinct suture from dorsal disc and possessing row of minute setae, and distinct crescent-shaped pores arranged on submargin, each pore filled with transverse bands;

dorsal setae discernible; first abdominal, meso- and metathoracic setae possibly present; longitudinal molting suture reaching submargin, sometimes margin and transverse molting sutures reaching submarginal furrow; thoracic and abdominal segment sutures marked by paired submedian pockets, abdominal segment VII shorter than VIII; vasiform orifice not elevated, subcordate; operculum subtrapezoidal, filling two-thirds of orifice, lingula tip exposed and possibly setose. Setae at base of meso- and metathoracic legs possibly present; thoracic tracheal folds sometimes with stipples.

**Comments:** The genus *Crescentaleyrodes* was described by David and Jesudasan (1987) due to the vertical submargin of pupal case not elevated from leaf surface, crenate margin and absence of first abdominal setae and eye spots, vasiform orifice being not elevated; lingula setose and exposed. It is distinct from *Aleurolobus* in the absence of trilobed eighth abdominal segment and in the shape of vasiform orifice (David and Jesudasan, 1987). Their observation suggests that crescent-shaped pores arranged at equidistant in submargin and dorsal setae discernible. The observations on new species, *C. vetiveriae* Dubey and Ko, suggests the shape, size, and distance between submarginal crescent-shaped pores may differ and all the pores are filled with transverse bands (the number of bands differs with the size of the pore); the first abdominal setae are absent and meso- and metathoracic setae are present. This suggests that these setae are present in the genus *Crescentaleyrodes*. The character of margin varies from irregular to regularly crenulate, and the longitudinal molting suture reaches the margin, beyond submarginal furrow, it may be faint. In light of these observations, the generic characters are redefined. With the redefined characters and a perusal of literature suggested, one African species, *Aleurolobus fouabii* Cohic will result in

new combination to this genus, however, formal combination is not proposed here. The description of this species agree with the characters of *Crescentaleyrodes*, such as the character of crescent-shaped pores on submargin (hence, the generic name), filled with transverse bands, first abdominal setae present and submargin completely separated from dorsal disc with furrow. The genus *Aleurolobus* has incomplete submarginal furrow (exception, *A. olivinus* and *A. subrotundus*), but it still unstudy in these species. The genus *Crescentaleyrodes* was known by 3 worldwide species viz., *C. semilunaris* (Corbett), *C. monodi* (Cohic) and *C. paulianae* (Cohic). Our observations on this new species will help in understanding variation of generic level in aleyrodids puparia and zoo-geographic distribution of the genus *Crescentaleyrodes*.

***Crescentaleyrodes vetiveriae* sp. nov.**  
**Dubey and Ko** (Figs. 1-9)

**Puparium:** Pale to brown, with secretion of white wax; elliptical, widest across the third and fourth abdominal region, 1.02-1.07 mm long, 55-86 mm wide; found singly, 30-42 puparia per leaf, on the under surface of leaves. Margin crenulate, 4-7 crenulations in 0.1 mm. Thoracic and caudal tracheal pores indicated with a comb of 3 and 4 distinct teeth, respectively. Anterior and posterior marginal setae present.

**Dorsum:** Submargin separated from dorsal disc by submarginal furrow or fold, which is complete. Submargin with row of minute setae and row of crescent-shaped pores, each pore filled with transverse bands. Wax-secreting gland present between crescent-shaped pores at convergence of crenulations. Submedian pockets with depressions present in all segment sutures. Longitudinal molting suture reaching margin and transverse molting sutures reaching submargin. Median length of abdominal segment VII shorter than VIII.

**Chaetotaxy:** Cephalic setae 20  $\mu\text{m}$  long, first abdominal setae absent, eighth abdominal setae 46  $\mu\text{m}$  long, and caudal setae near caudal furrow on submargin present. A pair of setae each on meso- and metathorax on submedian area 20  $\mu\text{m}$  and 16  $\mu\text{m}$  long, respectively. Submargin with row of setae near submarginal furrow. Vasiform orifice subcircular, 40-54  $\mu\text{m}$  long, 54-60  $\mu\text{m}$  wide, wider than long; operculum subcordate, 36-38  $\mu\text{m}$  long, 40-42  $\mu\text{m}$  wide. Lingula slightly exposed and included. Pores and porettes scattered throughout dorsum.

**Venter:** Paired ventral abdominal setae 22  $\mu\text{m}$  long, 56  $\mu\text{m}$  apart. A pair of minute setae at base of meso- and metathoracic legs, 10  $\mu\text{m}$  long. Thoracic and caudal tracheal folds with stipples. Antennae reaching to half of prothoracic legs and inside. Median area near abdominal segment sutures and submarginal furrow granulated. Spiracles visible.

**Materials examined:** Holotype pupal case, India: Tamil Nadu: Top Slip, on *Vetiveria zizanioides*, 25-VI-2005, A. K. Dubey (ZSI). Paratypes, 68 pupal cases on the same data (ANIC; BNHM; CDFA; IARI; NMNH; NTU; SMTD; USNM; ZMU; ZSI).

**Host plant:** *Vetiveria zizanioides* (Poaceae).

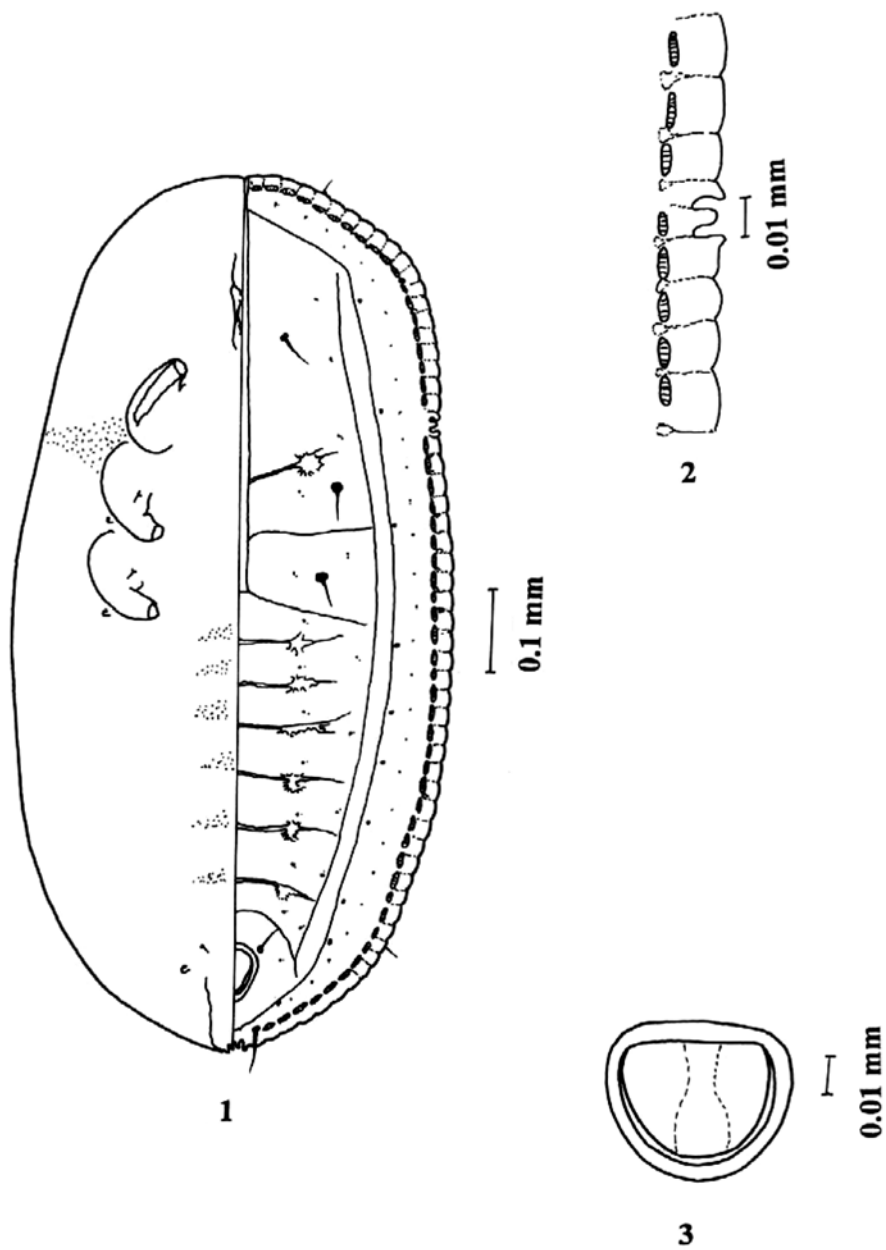
**Distribution:** India: Tamil Nadu: Top Slip (10°28.22'N, 76°50.52'E; altitude 739 m.).

**Etymology:** Named after its host plant genus, *Vetiveria*.

**Comments:** This species resembles *Crescentaleyrodes semilunaris* (Corbett) in having crescent-shaped pores on submargin but differs in the absence of the first abdominal setae and by the presence of meso- and metathoracic setae, distinct thoracic tracheal pores, and stipples in the thoracic tracheal folds.

***Crescentaleyrodes semilunaris* (Corbett)**

*Tetraleurodes semilunaris* Corbett. 1926:



Figs. 1-3. *Crescentaleyrodes vetiveriae* sp. nov. Dubey and Ko, 4th instar: 1, dorsal and ventral view; 2, tracheal pore area; 3, vasiform orifice.

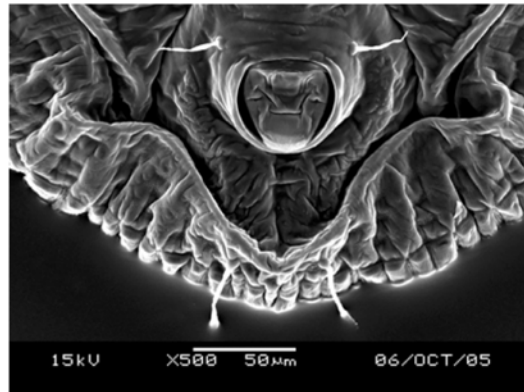
Bull: Entomol. Res. 16: 282.  
*Tetraleyrodes semilunaris* (Corbett) Abraham  
 and Joy, 1978: Entomon 3: 313-314.  
*Aleurolobus semilunaris* (Corbett) Bink-

Moenen, 1983: Monogr. Nederlandse  
 Ent. Ver. 10: 50.  
*Crescentaleyrodes semilunaris* (Corbett)  
 David and Jesudasan, 1987: Curr. Sci.

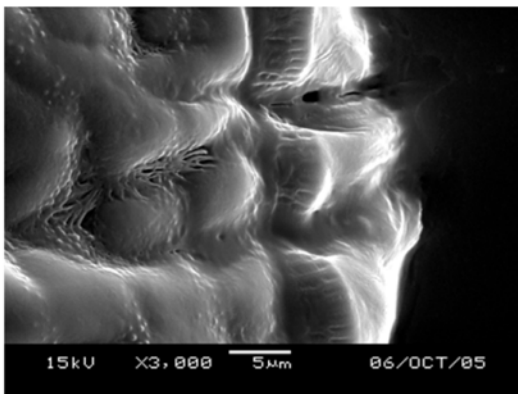
4



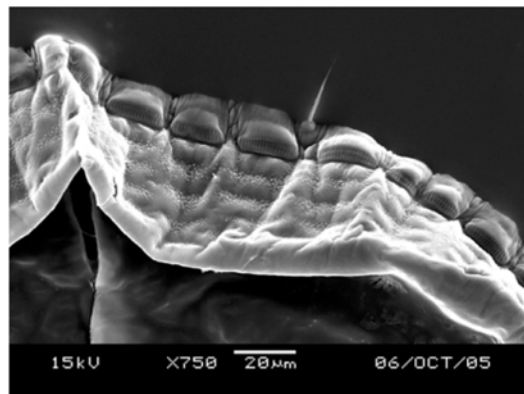
5



6



7



Figs. 4-7. *Crescentaleyrodes vetiveriae* sp. nov. Dubey and Ko, 4th instar: 4, dorsal view; 5, posterior area; 6, tracheal pore area; 7, submarginal area.

56: 42-44; Regu and David, 1993: FIPPAT Entomology Series 4: 53-54.

**Material examined:** India: Kerala: Calicut, 21 puparia, on *Themeda* sp., 1-I-1993, K. Regu (IWST); 10 puparia, on *Cymbopogon flexuosus*, 20-XII-2002, A. K. Dubey (IWST).

**Host plants:** *Cymbopogon flexuosus* (Abraham and Joy, 1978); *Cymbopogon* sp. (David and Jesudasan, 1987); *Themeda* sp. (new host record).

**Distribution:** Sri Lanka (Mound and Halsey, 1978), China (Mound and Halsey,

1978), India (Abraham and Joy, 1978; David and Jesudasan, 1987).

**Comments:** The description by Corbett (1926) and additional description by Regu and David (1993) are adequate.

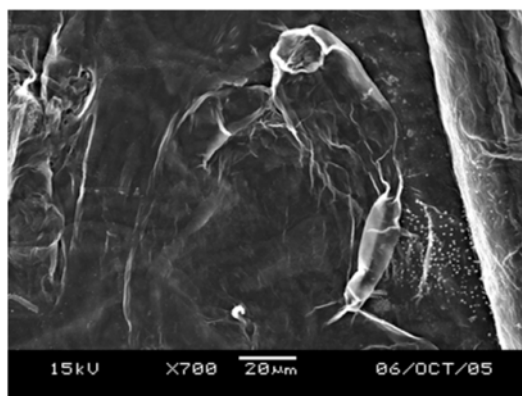
### Acknowledgments

We thank C. H. Chen (NTU) for assistance with the scanning electron microscope, to Dan Chamberlin for English editing, to H. F. Hung (NTU) for help with formatting of the draft.

8



9



Figs. 8-9. *Crescentaleyrodes vetiveriae* sp. nov. Dubey and Ko, 4th instar: 8, ventral view; 9, antenna and foreleg.

## References

- Abraham, C. C., and P. J. Joy.** 1978. New record of *Tetraleurodes semilunaris* Corbett (Aleyrodidae: Hemiptera) as a pest of lemon grass *Cymbopogon flexuosus* (Steud.). *Entomon* 3: 313-314.
- Bink-Moenen, R. M.** 1983. Revision of the African whiteflies, mainly based on a collection from Tchad. *Monograf. Ned. Entomol. Ver.* 10: 1-211.
- Corbett, G. H.** 1926. Contribution towards our knowledge of the Aleyrodidae of Ceylon. *Bull. Entomol. Res.* 16: 267-284.
- David, B. V., and R. W. A. Jesudasan.** 1987. Description of a new genus *Crescentaleyrodes* for *Aleurolobus semilunaris* (Corbett) (Aleyrodidae: Homoptera) and two new combinations. *Curr. Sci.* 56: 42-44.
- Gill, R. J.** 1990. The morphology of whiteflies. pp. 13-46. *In:* D. Gerling ed. *Whiteflies: Their Bionomics, Pest Status and Management*. Andover: Intercept.
- Martin, J. H.** 1985. The whitefly of New Guinea (Homoptera: Aleyrodidae). *Bull. Br. Mus. Nat. Hist. (Entomol.)* 50: 303-351.
- Mound, L. A., and S. H. Halsey.** 1978. *Whitefly of the World*. British Museum and John Wiley and Sons, London. 340 pp.
- Regu, K., and B. V. David.** 1993. Taxonomic studies on Indian Aleyrodids of the tribe Aleurolobini (Aleyrodinae: Aleyrodidae: Homoptera). *FIPPAT Entomol. Ser.* 4: 1-79.

Received: November 21, 2005

Accepted: December 29, 2005

# *Crescentaleyrodes* 屬之一新種 (半翅目：粉蝨科)

A. K. Dubey Institute of Wood Science and Technology, 18th Cross Malleswaram, Bangalore 560 003, India  
柯俊成\* 國立台灣大學昆蟲學系 台北市大安區羅斯福路四段一號

## 摘 要

本文描述 *Crescentaleyrodes* 屬之粉蝨一新種：*Crescentaleyrodes vetiveriae* Dubey and Ko (Hemiptera: Aleyrodidae)。文中並附電顯圖及圖繪。

關鍵詞：分類、粉蝨科、*Crescentaleyrodes*、新種、印度。