



## TAXONOMIC STUDIES OF GENUS *ALEUROLOBUS* (HOMOPTERA: ALEYRODIDAE) WITH ONE NEW SPECIES FROM PAKISTAN

Muhammad Tayyib<sup>1\*</sup>, Muhammad Mukhtar<sup>2</sup>, Muhammad Jawad Yousuf<sup>3</sup> and Muhammad Akbar<sup>4</sup>

<sup>1</sup>Department of Entomology, University of Agriculture, Faisalabad, Pakistan.

<sup>2</sup>Directorate of Malaria Control, Islamabad, Pakistan.

<sup>3</sup>Entomological Section, Ayub Agricultural Research Institute Faisalabad, Pakistan.

<sup>4</sup>Pest Warning & Quality control of Pesticide, Okara.

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### \*Corresponding Author:

Muhammad Tayyib

E-mail: muhammadyayib81@yahoo.com

### ABSTRACT

The present research was conducted to collect and identify genus *Aleurolobus* from Punjab, province of Pakistan. These species were collected from Bahawalpur, Faisalabad, Lahore, Chakwal, Vehari, Multan, Rahim Yar Khan, Rawalpindi and Sialkot. Three species *Aleurolobus barodensis*, *Aleurolobus hederæ* and *Aleurolobus marlatti* were identified from pupal cases mounted on slides. *A. hederæ* was new record for Pakistan. Specimens of these species were feeding on *Saccharum officinarum*, *Sapindus saponaria* and *Murraya exotica*. A taxonomic key for the identification of species of this genus was also given. Present research is helpful for identification of pest species of this genus for their effective control.

**Keywords:** Taxonomy, *Aleurolobus*, new record Pakistan, Punjab, Whitefly

### INTRODUCTION

There are more than 1600 species of whiteflies (Aleyrodidae) Martin and Mound (2007). These being tropical and subtropical in nature. Whiteflies are becoming serious pests in Pakistan. They are severely attacking agricultural crops, ornamental plants, vegetables, weeds, trees and shrubs. Population of whiteflies remain attached on the lower side of leaves. They suck sap from leaves and throw honey dew, which is responsible for sooty mould.

Genus *Aleurolobus* was identified by Quaintance and Baker, (1914). Type species by original designation for this genus was *Aleurodes marlatti*, later on Takahashi in 1951 proposed a new genus *Neoaleurolobus* from species *Aleurolobus musae*, but he did not have idea or specimens of Corbett's *A. musae*. (Martin and Mound, 2007).

At present 84 valid species were published under this genus in an annotated check list of the world's whiteflies (Insecta: Hemiptera: Aleyrodidae) Martin and Mound (2007). This check list tells about *A. longicornis*, *A. niloticus*, *A. ravisei*, *A. chinensis*, *A. clematidis*, *A. puripennis* were synonymised by Quaintance and Baker, 1917, Martin, 1999, Bink-Moenen, 1983, Takahashi, 1954 and Zahradnik, 1963 respectively.

Ragupathy and Ravichandran (2016), reported *Aleurodes marlatti* feeding on a new host plant *Strychnos nux-vomica* from Tirumala Hills of Andhra Pradesh, India. Soo-Jung Suh (2014), added *Aleurolobus confuses* to the Korean fauna. Ghahari *et al.*, (2009) identified four species under this genus from Iran in an catalogue of whiteflies from Arasbaran region, these species are *A. marlatti*, *A. moundi*, *A. olivinus* and *A. selangorensis*.

Three species of whiteflies, viz., *Aleurolobus barodensis*, *Neomaskellia bergii* and *N. Andropogonis*, have been recorded on sugarcane in Pakistan, of which the former two were very serious pests. These whiteflies cause a loss of 30-40% in sucrose and 20-25% in total solids every year. In severe cases, the juice quality is also adversely affected (Singh *et al.*, 1956). This study is helpful for future taxonomic studies of whiteflies identified under this genus.

### MATERIALS AND METHODS

The pupal cases on the leaves of different types of vegetation were collected in the years 2015-2016 from 20 localities of the Punjab province, viz., Bahawalpur, Bhukkar, Chakwal, Dera Ghazi Khan, Faisalabad, Gujrat, Islamabad, Jhelum,

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Kallar Kahar, Lahore, Lodhran, Multan, Muree, Okara, Rahim Yar Khan, Rawalpindi, Sahiwal, Sargodha, Sialkot and Vehari. The leaves having pupal cases on them were detached and brought to the laboratory in paper envelopes after writing the name of locality, host plant and date of collection on them. The pupal cases were removed from the leaves with a fine needle and preserved in 75 per cent alcohol in vials.

For identification of these specimens, the permanent slides were prepared according to Martin (1987) with little modifications, as given below.

1. The pupal cases were punctured from the ventral surface with a minuten pin and gently heated to the boiling point in 5-10% KOH in a watch glass for 5-10 minutes to remove their inner body contents.
2. Then they were treated with glacial acetic acid to neutralize the alkali.
3. The pupal cases were thereafter treated with chloral phenol and heated for a few minutes to remove the wax coating present on them.
4. The black pupae were rinsed in alcohol and then treated with hydrogen peroxide to bleach their colour. They were then left as such. The white and pale cases were rinsed in glacial acetic acid and then stained with acid fuchsin for a few minutes.
5. After this, the specimens were treated with 95 and 100 per cent alcohol each for 5-10 minutes to remove the excessive stain.
6. Finally, the pupal cases were then mounted in Hoyer's medium on microscopic slides, which were dried at room temperature for 24 hours.

**Key to the species of *Aleurolobus* in Punjab**

1. Pupal case narrow, elongate, more than 1.7 times longer than wide.....*barodensis* (Maskell)
  - Pupal case not narrow, elongate, less than 1.7 times longer than wide.....2
2. Caudal furrow longer than orifice; no additional yellow spots to eyes and no yellow lines along submarginal suture.....*marlatti* (Quaintance)
  - Caudal furrow nearly as long as orifice; with additional yellow spots to eyes and yellow lines along submarginal suture.....*hederae* Takahashi

***1. Aleurolobus* Quaintance and Baker**

*Aleurolobus* Quaintance and Baker, 1914. Tech, Ser. Bur. Ent. U.S., 27: 108.

Type specimen: *Aleurodes marlatti* Quaintance

Specimens of three species have been collected from various places of the Punjab Province. Of these, one species is new to Pakistan. These species are identified with the published description of Singh (1931), David & Subramaniam (1976), Qureshi (1978) and Dubey and Ko (2009) of this genus.

***1. Aleurolobus barodensis* (Maskell)**

*Aleurodes barodensis* Maskell, 1895. Trans. Proc. N. Z. Inst., 28: 424-425.

**Pupal case:** (Fig. 1) Large sized, narrow from anterior side, black to dark brown, broadest between thorax and abdomen, with length 2.2 mm and width 1.00 mm.

**Margin:** (Fig. 3) Provided with double row of teeth, with 9-10 teeth in 0.1mm. Anterior and posterior marginal setae not visible. Thoracic and caudal tracheal margins with 5 and 6

teeth.

**Submargin:** Broad longitudinal subdorsal fold is present, caudal setae absent.

**Dorsal surface:** (Fig. 3) Three pairs of submedian setae are present, i.e., cephalic pair, 8<sup>th</sup> abdominal pair is on the anterior sides of vasiform orifice and another pair on the lower sides of orifice are present, transverse moulting suture first bends down and then ends near subdorsal fold by slightly climbing up 7<sup>th</sup> abdominal segment is shorter than 6<sup>th</sup> one.

**Vasiform orifice:** (Fig. 2) Almost semi circular, surrounded by three lobes, operculum is of the same shape, nearly filling the orifice and lingual is hidden, bubble shaped, caudal furrow broad, longer than orifice and reaching the posterior border.

**Ventral surface:** Thoracic and tracheal caudal folds are not visible. Legs visible, with indistinct adhesive sacs. Antenna long, lying on the inner side of proleg. Posterior abdominal spiracles are present.

This species is a serious pest of sugarcane, particularly in the Punjab and causes heavy losses in certain years. The ratoon crop is especially prone to serious attacks. The infested leaves turn pale reddish and dry due to the loss of cell sap Misra, (1920). Its specimens collected from the Punjab confirmed the description of Singh (1931), Qureshi (1978) and Mukhtar



**Fig. 1**  
Pupal case



**Fig. 2**  
Vasiform orifice



**Fig. 3**  
Margin and Transverse moulting suture examined:

230 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Faisalabad, 6-9-2015, M.Tayyib; 451 mounted

pupal cases, on Sugarcane (*Saccharum officinarum*), Faisalabad, 1-10-2016, M. Tayyib; 135 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Multan, 4-5-2015, M. Tayyib; 317 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Rahim Yar Khan, 9-9-2016, M. Tayyib; 127 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Bahawalpur, 22-8-2015, M. Tayyib; 19 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Vehari, 25-5-2016, M. Tayyib; 351 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Rawalpindi, 10-5-2016, M. Tayyib; 145 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Sialkot, 17-11-2016, M. Tayyib; 430 mounted pupal cases, on Sugarcane (*Saccharum officinarum*), Lahore, 3-10-2015, M. Tayyib; 176 mounted pupal cases, on Sugarcane (*Saccharum officinarum*) Chakwal, 6-6-2015, M. Tayyib;

## 2. *Aleurolobus hederæ* Takahashi

*Aleurolobus hederæ* Takahashi, 1935b. Rept. Deptt. Agric. Govt. res. Inst. Formosa, 66: 63-64.

**Pupal case:** (Fig. 4) Medium sized, elliptical, black to dark brown, broadest at metathorax, with length 0.99 mm and width 0.72 mm.

**Margin:** (Fig. 5) Provided with medium teeth, with 7-8 teeth in 0.1mm. Anterior and posterior marginal setae not visible. Thoracic and caudal tracheal margins with 2 to 3 teeth.

**Submargin:** Broad longitudinal subdorsal fold is present, 10 to 11 pairs of setae are present along subdorsal fold, caudal setae not visible.

**Dorsal surface:** (Fig. 5) Dorsum covered with zigzag irregular lines, three pairs of submedian setae are present, i.e., cephalic pair, 8<sup>th</sup> abdominal pair and near vasiform orifice and another pair on the lower sides of orifice are present, transverse moulting suture is arc shaped, 7<sup>th</sup> abdominal segment is much shorter than 6<sup>th</sup> one, rachis is present between abdominal segments 3 to 7.

**Vasiform orifice:** (Fig. 6) Cordate shaped, surrounded by three lobes, operculum is of the same shape, nearly filling the orifice and lingual is hidden, caudal furrow is faintly visible, longer than orifice and reaching the posterior border.

**Ventral surface:** Thoracic and tracheal caudal folds are not visible. Legs visible, with indistinct adhesive sacs. Antenna not clear, posterior abdominal spiracles are present.

This is a rare species presenting a new record in Pakistan. Its specimens collected from the Punjab area are easily identified with the help of key, diagrams and descriptive remarks of Dubey and Ko (2009) of this species.



**Fig. 4**  
Pupal Case



**Fig. 5**  
Margin and Transverse moulting suture



**Fig. 6**  
Vasiform orifice

## Material examined:

16 mounted pupal case, on Rethia (*Sapindus saponaria*), Rahim Yar Khan, 23-9-2016, M. Tayyib.

## 3. *Aleurolobus marlatti* (Quaintance)

*Aleurodes marlatti* Quaintance, 1903. Canad. Ent., 35: 61-63. *Aleurolobus niloticus* Priesner and Hosny, 1934b. Bull. Minist. Agric. Egypt. Tech. Scient. Serv., 145: 1-5.

**Pupal case:** (Fig. 7) Medium sized, subelliptical, black in color, broadest near 3<sup>rd</sup> abdomen segment, with length 0.98 mm and width 0.86 mm.

**Margin:** (Fig. 9) Provided with broad dark teeth, with 6-8 teeth in 0.1mm. Anterior and posterior marginal setae not visible. Thoracic and caudal tracheal margins with 3 teeth.

**Submargin:** broad longitudinal subdorsal fold is present, caudal setae absent.

**Dorsal surface:** (Fig. 7) Three pairs of submedian setae are present, i.e., cephalic pair, 1<sup>st</sup> abdominal and 8<sup>th</sup> abdominal pair is on the anterior sides of vasiform orifice and another pair on the lower sides of orifice are present, transverse moulting suture first bends down and then ends near subdorsal fold by slightly climbing up. 7<sup>th</sup> abdominal segment is much shorter than 6<sup>th</sup> one.

**Vasiform orifice:** Almost semi circular, surrounded by three lobes, operculum is of the same shape, nearly filling the orifice and lingual is hidden, caudal furrow broad, equal to orifice and reaching the posterior border.

**Ventral surface:** (Fig. 8) Thoracic and tracheal caudal folds are visible. Legs visible, with indistinct adhesive sacs. Antenna long, lying on the inner side of proleg. Posterior abdominal spiracles are present.

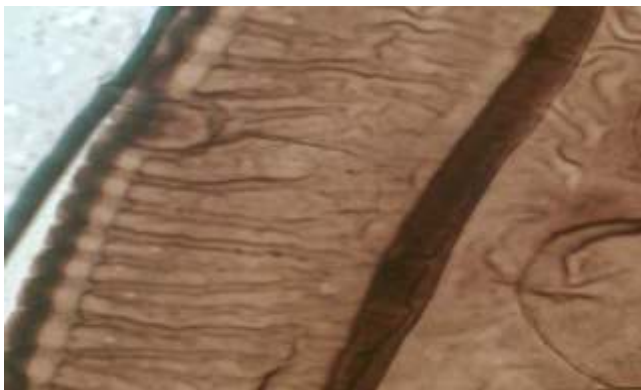
This is a minor pest of citrus in the Punjab Husain and Khan (1945). Specimens of this species taken from the Punjab conform to the description of Quaintance (1903) and Qureshi (1978) of this species. In addition, a characteristic pattern of short, broken lines on dorsum, submarginal line or suture complete on anterior side only and vasiform orifice shorter than caudal furrow.



**Fig. 7**  
Pupal case and transverse  
mouling suture



**Fig. 8**  
Vasiform Orifice



**Fig. 9**  
Thoracic tracheal margin

#### Material examined:

13 mounted pupal cases, on Marva (*Murraya exotica*), Faisalabad, 8-03-2016, M. Tayyib; 11 mounted pupal case, on unknown host, Lahore, 6-12-2016, M. Tayyib; 3 mounted pupal cases, on Marva (*Murraya exotica*), Sialkot, 24-10-2015, M. Tayyib.

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