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Pushpaleyrodes glandulus, a new genus and species of whitefly (Hemiptera: Aleyrodidae) from India

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Abstract

Pushpaleyrodes glandulus, a new genus and species of whitefly (Hemiptera: Aleyrodidae) breeding on *Xanthophyllum flavescens* from Palakkad in Kerala state of India is described and illustrated. This new genus is characterized by the absence of all dorsal setae. It is distinct from *Aleuroglandulus* Bondar by the transverse moulting suture and all abdominal segment sutures except I and II reaching margin, in having thickened and strongly chitinised metathoracic segment suture, submedian longitudinal ridge, bilobed lingula without spine/setae and by the absence of any dorsal setae. It differs from *Pseudozaphanera* Manzari by the presence of distinct thoracic tracheal furrows, having thickened and strongly chitinised metathoracic segment suture, bilobed lingula and by the absence of tracheal folds and all dorsal setae.

Keywords: Indian aleyrodidae, *Pushpaleyrodes glandulus*, *Xanthophyllum flavescens*

1. Introduction

Whiteflies comprise a single hemipterous family Aleyrodidae which includes exclusively phytophagous insects infesting primarily on lower surface of the leaves of host plants. They cause enormous damage to plants by their sap-sucking habit and also as vector of many viral diseases [1]. There are 1556 described whitefly species grouped in 161 genera in the world [2]. The whitefly fauna of India comprises 440 species of whiteflies under 63 genera in which the subfamily Aleyrodinae Westwood is represented by 61 genera and the subfamily Aleurodicinae Quaintance & Baker is by 2 genera [3]. India being a mega-biodiversity, it was felt that a large number of whitefly species are still indefinite and there is a vast scope to explore the Indian whitefly fauna. The Western Ghats of India are second only to the Himalayas in diversity of species and floristically richest in the country [4]. These tropical rain forests of Western Ghats have been the site of some recent collections of unique and interesting whitefly taxa, of which the new taxa described here, forms a small part under the subfamily Aleyrodinae. *Pushpaleyrodes* gen. nov. is described here to accommodate a new species that differ distinctly from all the known genera of the subfamily Aleyrodinae.

2. Materials and Methods

The present finding was largely based on the whitefly puparia collected from various localities of Western Ghats of south India during the period 2005-10. The whitefly infested leaves were collected from the host plants and permanent mounts of the puparia were prepared by adopting the method of David and Subramaniam [5]. The best mounts were obtained from puparium from which adults have emerged. Parasitised specimens were avoided because the presence of parasite often causes morphological changes in the puparium. Observations, micro-measurements and camera lucida drawings were made by using Nikon Optiphot T-2 EFD (Japan) microscope and the identity of the whiteflies were confirmed. The new generic status is confirmed by running the recent key to the whiteflies of India [6].

3. Results and Discussion

***Pushpaleyrodes* Sundararaj and Vimala gen. nov.**

Type species: *Pushpaleyrodes glandulus* gen. et. sp. nov.

3.1 Diagnosis: Puparium black, subcircular; margin toothed, not modified at thoracic tracheal

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and caudal tracheal pore regions; longitudinal and transverse moulting sutures reaching margin. Submargin not separated from dorsal disc, segment sutures typical, corrugated in the submedian area, all abdominal segment sutures except I and II reaching margin; metathoracic segment suture thickened and strongly chitinised; dorsum without any dorsal and submarginal setae, with distinct geminate pores/ porettes;

thoracic and caudal tracheal furrow distinct; caudal ridge prominent; vasiform orifice cordate, not elevated, mostly occupied by operculum, lingula tip bilobed, without setae, exposed and included; tracheal folds not indistinct.

3.2 *Pushpaleyrodes glandulus* gen. et. sp. nov. (Figs. 1 and 2).

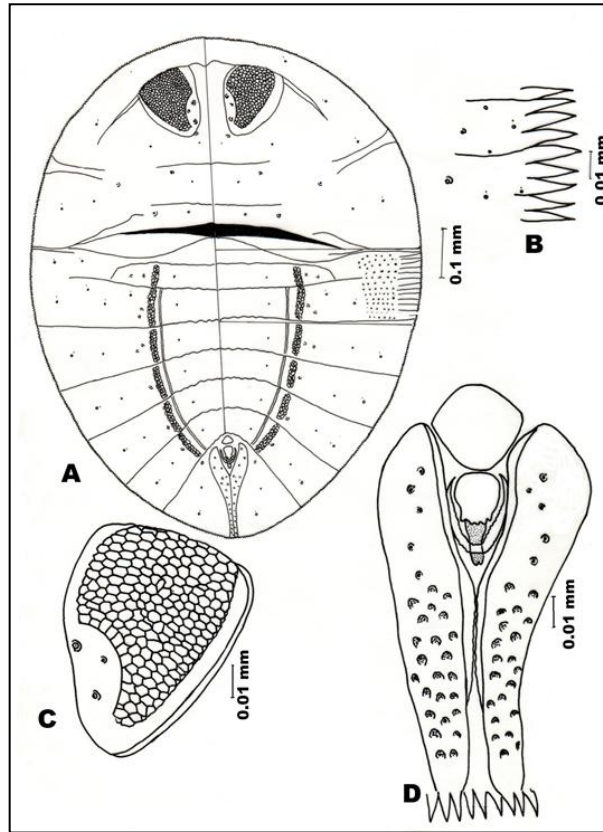


Fig 1: Line diagram of *Pushpaleyrodes glandulus* gen. et. sp. nov. (A) Puparium. (B) Margin. (C) Prominent glandular structure at the cephalad. (D) Vasiform orifice with caudal ridge.

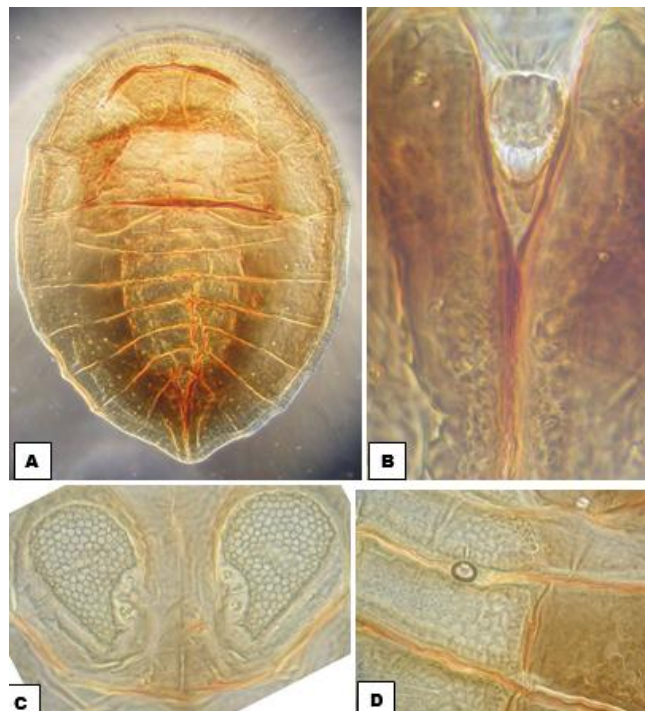


Fig 2: Mounted images of *Pushpaleyrodes glandulus* gen. et. sp. nov. (A) Puparium. (B) Vasiform orifice with caudal ridge. (C) Prominent glandular structure at the cephalad. (D) Subdorsal area with prominent geminate pore

Puparium: Black, with white wax fringe on the margin, subcircular, 1.55 - 1.70 mm long, 1.30 - 1.50 mm wide, widest at abdominal segment II region; found singly on the under surfaces of leaves. Anterior and posterior marginal setae absent.

Margin: Serrate, 13-15 tooth in 0.1mm. Thoracic and caudal tracheal pore regions not modified at margin. Anterior and posterior marginal setae absent.

Dorsum: Submargin with few radiating lines starting from margin one per three or four teeth, subdorsum with dense microtubercles; abdominal segment sutures corrugated in the submedian area, all abdominal segment sutures except I and II reaching margin. Abdominal segments sub-equal in length, I, 54.9, II 51.4, III 58.2, IV 61.8, V 62.6, VII 47.6 μm in holotype. Longitudinal moulting suture reaching margin, transverse moulting suture bends upwards at the inner subdorsum and reaches margin. Submedian area of abdominal segments II – VII glandular, with coarse reticulate structure; cephalad with a pair of very large subdorsal glandular areas of similar structure to those on abdominal segments connected by arc-like ridge at the anterior side. Metathoracic segment suture thickened and strongly chitinised, a longitudinal ridge extending from second abdominal segment suture to the cephalad of caudal ridge. Dorsum with rows of geminate pores/porettes- submargin with a row of pores and porettes, inner submedian and outer subdorsum each with a row of pores and a row of geminate pores on the outer submedian area in each abdominal and thoracic segments. In addition, few prominent geminate pores scattered on the dorsum.

Chaetotaxy: All dorsal setae viz., cephalic, first abdominal, eighth abdominal and caudal setae absent; submarginal and subdorsal setae absent.

Vasiform orifice: Cordate, not elevated, a pentagonal-shaped structure on cephalad, postero- lateral wall is sclerotized 57.5 – 62.5 μm long, 53.5 – 57.5 μm wide; operculum subcordate 37.5 – 40.0 μm long, 35 – 37.5 μm wide. Lingula tip bilobed, exposed without any setae, included within the orifice boundary. Thoracic tracheal furrows distinct, caudal tracheal furrow distinct 200 – 250 μm long, with prominent ridges having dark micro tubercles and few geminate pores.

Venter: Ventral setae not discernible; thoracic and caudal tracheal folds not indicated. Specimens examined. Holotype. Mounted puparium, INDIA, Kerala: Palakkad, on *Xanthophyllum flavescens*, 28.iii.07 (R. Pushpa) will be deposited in the collection of National Bureau of Agricultural Insect Resources (NBAIR), Bangalore, India. Paratypes. 6 mounted puparia, data same as holotype, deposited one each in the collections of National Forest Insect Collection, Forest Entomology Division, Forest Research Institute, Dehradun (NFIC# 22067); Zoological Survey of India, Kolkata (5648/H15) and the remaining in the collection of Institute of Wood Science and Technology, Bangalore.

Host Plant: *Xanthophyllum flavescens* Roxb. (Polygalaceae).

Distribution: India: Kerala.

Etymology: Named after Dr. (Mrs) Pushpa who collected the species and in recognition of her contribution on Indian

whiteflies.

The whitefly identity is mainly based on nymphal characters and 'it seems almost certain that puparia will continue to be dominant in whitefly systematics and there is no particular reason for larval characters to be regarded as second-rate' [7]. The new genus *Pushpaleyrodes* is characterized by the absence of all dorsal setae. It differs from its closely related genus *Aleuroglandulus* Bondar by the transverse moulting suture and all abdominal segment sutures except I and II reaching margin, in having thickened and strongly chitinised metathoracic segment suture, submedian longitudinal ridge, bilobed lingula without spine/setae and by the absence of any dorsal setae. It also differs from *Pseudozaphanera* Manzari by the presence of distinct thoracic tracheal furrows, having thickened and strongly chitinised metathoracic segment suture, bilobed lingula and by the absence of tracheal folds and all dorsal setae. This is the first report of a whitefly on *X. flavescens* in India and in the world. On its family Polygalaceae, so far two species viz., *Aleuroclava cardamomi* (David & Subramaniam), *A. serchhipensis* Chhakchhuak & Sundararaj were reported from India and in the world *Aleuroplatus bossi* Takahashi and *Dialeurodes bancoensis* Ardaillon & Cohic were reported.

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