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**Ragupathy E**  
Department of Zoology,  
Sri S. Ramasamy Naidu  
Memorial College (Autonomous),  
Sattur, Tamil Nadu, India

**Ravichandran B**  
Department of Zoology,  
Sri S. Ramasamy Naidu  
Memorial College (Autonomous),  
Sattur, Tamil Nadu, India

## First record of whiteflies (Aleyrodidae: Hemiptera: Insecta) in Tirumala Hills in Eastern Ghats of Andhra Pradesh

**Ragupathy E and Ravichandran B**

### Abstract

Whiteflies infesting on the flora of Tirumala hills have been reported for the first time from Andhra Pradesh, India. Five species of whiteflies viz., *Acaudaleyrodes rachipora* (Singh), *Aleurolobus marlatti* (Quaintance), *Dialeurodes davidi* Mound and Halsey, *Pealius simplex* (Singh) and *Aleurodicus dispersus* Russell have been found infesting on various host plants in the Tirumala hills of Eastern Ghats of Andhra Pradesh, India.

**Keywords:** Whitefly, host plants, Tirumala, Eastern Ghats

### 1. Introduction

The Tirumala Hills are located along the Seshachalam-Velikonda Range of the Eastern Ghats. The Palar River cuts through the ranges. The Velikonda Range eventually descends to the coastal plain in northern Nellore District. Tirumala is a census town in Chittoor district of the Indian state of Andhra Pradesh. The town is a part of Tirupati Urban Development Authority and located in Tirupati (rural) Mandal of Tirupati revenue division. It is a hill town where Tirumala Venkateswara Temple is located, which is the abode of Lord Venkateswara [1]. The geographical coordinates at which it is situated is between latitude 13° and 14° North and longitude 17° East. The Tirumala Hill is 3200 feet (980 m) above sea level, and covers an area of approximately 10.33 square miles (26.8 km<sup>2</sup>). The family Aleyrodidae (Insecta: Hemiptera) includes insects which are commonly known as whiteflies. They are the serious pests of agricultural and horticultural importance. Though aleyrodids were recorded in India as early as 1895 [2], after David and Subramaniam [3] only a new imputes were given to the taxonomic studies of Indian Aleyrodidae. Following this, significant contributions were made [4-9]. However no information available on the whitefly fauna of the Tirumala hills of Eastern Ghats, hence the present survey was undertaken to study the Aleyrodidae fauna in Tirumala hills.

### 2. Materials and Methods

Intensive survey was carried out in the month of April 2016 in Tirumala hills of Eastern Ghats in Andhra Pradesh. The whiteflies infested leaves were collected in and preserved in paper covers and mounts were prepared from the adult emerged and unparasitised puparia. The puparia were slide mounted following the method given in Dubey and David [10]. Terminology for morphological structures follows [11-13].

### 3. Results

#### 3.1 Taxonomy

##### 1. *Acaudaleyrodes rachisphora* (Singh)

*Acaudaleyrodes rachipora* Singh, 1931 [9]. *Mem. Dep. Agric. Bull. Minst. Agric. Egypt. Tech. Sci. Serv.*, 145: 7-8.

*Aleurotrachelus alhagi* (Priesner & Hosny): Russell, 1962. *Bull. Brooklyn Ent. Soc.*, 57: 64.

*Acaudaleyrodes rachipora*: Russell, 1962. *Bull. Brooklyn Ent. Soc.*, 57: 64.

*Acaudaleyrodes citri*: Russell, 1962. *Bull. Brooklyn Ent. Soc.*, 57: 64.

*Acaudaleyrodes rachipora*: David & Subramaniam 1976 [2]. *Rec. Zool. Surv. India*, 70: 146.

*Acaudaleyrodes rachipora*: Jesudasan & David, 1991. *Oriental Insects*, 25:242-243.

**Correspondence**  
**Ragupathy E**  
Department of Zoology,  
Sri S. Ramasamy Naidu  
Memorial College (Autonomous),  
Sattur, Tamil Nadu, India

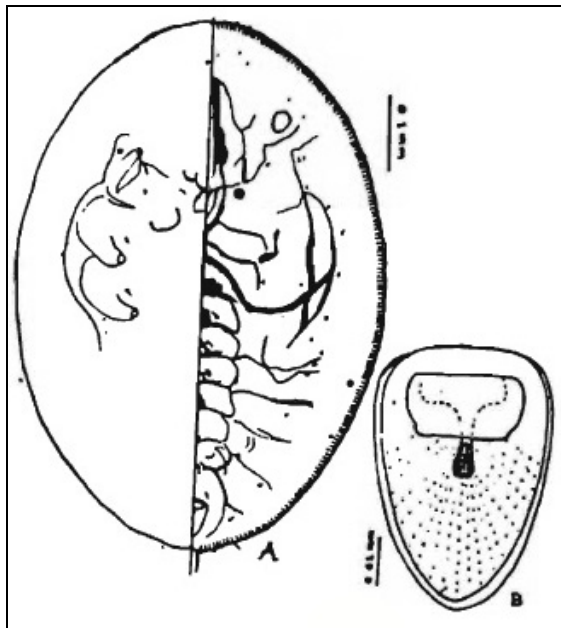


Fig 1: A. *Acaudaleyrodes rachipora* pupal case, B. Vasiform orifice

**3.2 Distribution:** India- Bihar: Baroda (Singh, 1931); Andhra Pradesh: Hyderabad (Rao, 1958); Tamil Nadu and Karnataka (David & Subramaniam, 1976) [2]; Rajasthan: Jodhpur (Sundararaj *et al.*, 2000); Andhra Pradesh – Tirumala hills (new record).

**3.3 Host Plants:** *Bauhinia* sp., *Dalbergia sissoo*, *Euphorbia pilulifera* (Singh); *Cassia auriculata*; *Tamarindus indicus* (Rao, 1958); *Abrus precatorius*, *Delonix elata*, *Inga dulce*, *Prosopis juliflora* (David & Subramaniam, 1976) [2]; *Securinea virosa*, *Peltophorum ferrugineum*, *Erythroxylum monogynum*, *Dodonaea viscosa*, *Tephrosia purpurea* (Jesudasan & David, 1991) [3]; *Carissa carandas*, *Dichrosta chyscinerea*, *Acacia pennata*, *Indigofera* sp., *Derris elliptica*, *Phyllanthus* sp. (David, 1994); *Cordia myxa*, *Rosa chinensis* (Sundararaj *et al.*, 2000).

**3.4 Materials Examined:** India-Andhra Pradesh: Tirumala hills, 10 puparia, on *Bauhinia* sp., 16.iv.2016, E. Ragupathy. Tirumala hills, 6 puparia, on *Cassia auriculata*, 16. iv. 2016, E. Ragupathy.

**3.5 Aleurolobus marlatti:** (Quaintance)

*Aleurolobus niloticus*, Priesner & Hosny, 1934. *Bull. Minist. Agric. Egypt. Tech. Scient. Serve.* 145: 1-5. (Synonymised by Martin, 1999) [4].

*Aleurolobus ravisei* COHIC, 1968. *Cah. Off. Rech. Sci. Tech. Outre-Mer. (Biologie)*, 6: 95-98.

*Aleurolobus niloticus* Priesner & Hosny. Cohic 1969. *Annl. Univ. Abidjan (E)*, 2:50.

*Aleurolobus niloticus* Priesner & Hosny. Habib & Farag, 1970. *Bull. Soc. Entomol. Egypte*, 54: 21.

*Aleurolobus niloticus* Priesner & Hosny. Hayat, 1972. *Entomophaga*, 17: 100.

*Aleurolobus niloticus* Priesner & Hosny. Bink-Moenen, 1983. *Monografieen Van de Nederlandse Entomologische Vereniging*, 10:50-52.

*Aleurolobus niloticus*, Priesner & Hosny, 1934. Regu & David, 1993 [1, 7] *FIPPAT Entomology Series*, 4:33-34.

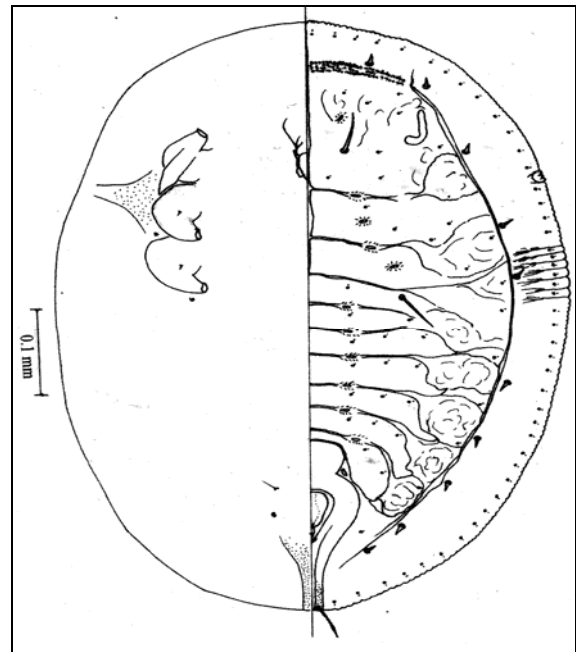


Fig 2: *Aleurolobus marlatti* (Quaintance), Puparium

**3.6 Distribution:** India- throughout Tamil Nadu (Regu & David, 1993) [1, 7] Coimbatore; Karnataka: Gokarna, Kudremukh National Park; Kerala: Calicut; Andhra Pradesh: Tirumala hills (new record).

**3.7 Host Plants:** *Tamarindus indica*, *Thespesia populnea*, *Tecoma stans*, *Allophylus cobbe*, *Terminalia bellirica*, *Hydnocarpus pentandra*, *Bauhinia* sp. (new record).

**3.8 Materials Examined:** India: Andhra Pradesh: Tirumala hills, 5 puparia, on *Bauhinia* sp., 16. iv. 2016, E. Ragupathy.

**3.9 Dialeurodes davidi:** Mound and Halsey

*Dialeurodes distinctus* David & Subramaniam, 1976. *Rec. Zool. Surv. India.* 70: 190.

*Dialeurodes davidi*: Mound & Halsey, 1978. *Whitefly of the World*.p.136

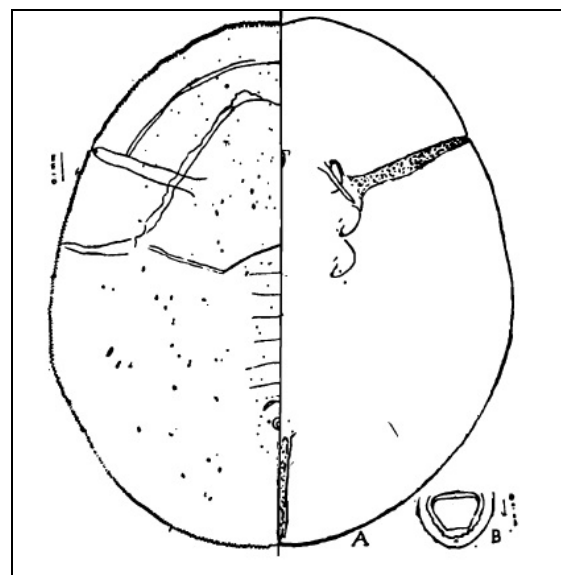


Fig 3: A. *Dialeurodes davidi* pupal case, B. Vasiform orifice

**3.10 Distribution:** India – Tamil Nadu: Coimbatore (B.V. David, 1969); Kerala: Calicut (A.K. Dubey, 2004); Andhra Pradesh – Tirumala hills (new record).

**3.11 Host Plant:** *Elaeodendron glaucum* (B.V. David, 1969); *Vaccinium leschenaultia* (A.K. Dubey, 2004); *Strychnos nux-vomica* (new record).

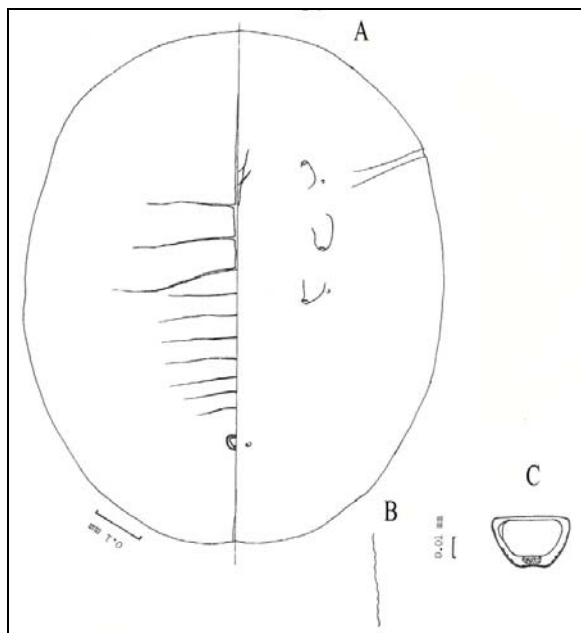
**3.12 Materials Examined:** India- Andhra Pradesh: Tirumala hills, 15 puparia on *Strychnos nux-vomica*, 16.iv.2016, E. Ragupathy.

**3.13 Pealius simplex (Singh)**

*Aleurocanthus simplex* Singh, 1931. *Mem. Dep. Agric. India*, 12 (1): 69.

*Dialeurodes glomerata* Singh, 1931. *Mem. Dep. Agric. India*, 12 (1): 39. (Synonymised by Jesudasan and David, 1991).

*Pealius indicus* David and Subramaniam, 1976. *Rec. Zool. Surv. India*, 70: 206. (Synonymised by Jesudasan and David).



**Fig 4:** A. *Pealius simplex* Pupal Case, B. Margin, C. Vasiform orifice

**3.14 Distribution:** India- Bihar (Pusa) (Singh, 1931); Tamil Nadu: Coimbatore, Ootacamund (The Nilgiris) (David & Subramaniam, 1976) [2]; Padappai (Jesudasan and David, 1991) [3]; Andhra Pradesh: Tirumala hills (new record).

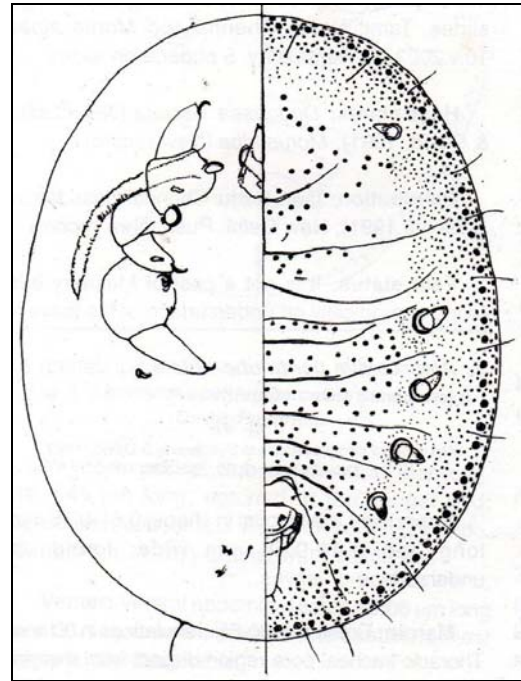
**3.15 Host Plants:** *Ficus bengalensis*, *F. glomerata* (Singh, 1931) [9]; *Azalea indica* (David & Subramaniam, 1976) [2].

**3.16 Materials Examined:** India- Andhra Pradesh: Tirumala hills, 3 puparia on unidentified tree, 17.iv.2016, E. Ragupathy.

**3.17 Aleurodicus dispersus Russell**

*Aleurodicus dispersus* Russell, 1965. *The Florida Entomologist*, 48: 49-54.

**3.18 Distribution:** Widely distributed in India (Srinivasa, 2000), Lakshadweep (Ramani, 2000); Andhra Pradesh: Tirupati Tirumala hills (new record).



**Fig 5:** *Aleurodicus dispersus* Russell, Puparium (after Russell 1965, redrawn)

**3.19 Host Plants:** 481 host plants in the world and 253 host plants from India (Srinivasa, 2000).

**3.20 Materials Examined:** India- Andhra Pradesh: Tirumala hills, 3 puparia on *Syzygium cumini*, 16.iv.2016, E. Ragupathy; 2 puparia on *Psidium guava*, 17.iv.2016, E. Ragupathy; 3 puparia on *Ficus mollis*, 17.iv.2016, E. Ragupathy; 2 puparia on *Hibiscus rosa-sinensis*, 17.iv.2016, E. Ragupathy.

**4. Discussion**

A perusal of Indian literature as well as the world catalogue of whiteflies [14, 15] has shown that occurrence of whiteflies has not been reported so far from Tirumala hills. In the present study five species were recorded from various host plants in the hills of Eastern Ghats. Among the five species *Acaudaleyrodes rachipora* and *Aleurodicus dispersus* found infested severely in various host plants. Considering the small but unexplored area of the Tirumala hills, the present contribution emphasizes the need for further extensive and intensive study of aleyrodidae fauna of Tirumala hills especially related to the ecological and geographical distribution pattern of various genera.

**5. Acknowledgment**

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