

Diversity of agriculturally important whiteflies (Aleyrodidae: Homoptera) in coastal areas of Tamil Nadu

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Abstract

An extensive survey was conducted across various localities, including agricultural and horticultural crops in selected coastal districts of Tamil Nadu viz., Villupuram, Cuddalore, Mayiladuthurai and Nagapattinam during the warm months (March to July) of 2022-23. This survey documented a total of 29 species under 15 genera within two subfamilies, namely, Aleurodicinae Quaintance and Baker, 1913, and Aleyrodinae Westwood, 1840. In which the most abundant genera, *Aleurocanthus* (4 species) and *Aleurolobus* (4), followed by *Aleuroclava* (3), *Aleurodicus* (2), *Aleurothrixus* (2), and *Trialeurodes* (2) were recorded.

Keywords: Abundance, diversity, exotic whitefly, invasive alien species, whiteflies

Introduction

Whiteflies (Hemiptera: Aleyrodidae) pose a significant threat to agriculture worldwide, serving as devastating pests. These small, powdery-white insects primarily feed on plants, predominantly congregating on the lower leaf surfaces (Jesudasan & David, 1991) ^[1]. Both adults and nymphs of whiteflies directly damage plants by extracting sap and act as vectors of plant diseases. Their excretion of honeydew creates favourable conditions for sooty mould growth, impacting photosynthesis negatively (Ouvrard & Martin, 2023) ^[2]. The family Aleyrodidae comprise 1707 species under 192 genera documented throughout the world, and is represented by 469 species and 71 genera in India (Sundararaj *et al.*, 2021) ^[3]. The coastal regions benefit from favourable weather conditions and an abundance of host plants, fostering the growth and development of exotic whitefly species. While rice stood as the primary crop in this

region and a diverse range of other crops, including groundnuts, banana, maize, cashew, coconut, and cotton were also grown. Most invasive whitefly species are inadvertently introduced alongside their host plants through the trade of plants. Their small, inconspicuous nature, along with their immature stages attaching to host plants, contributes to their status as one of the most transported arthropod groups to new geographical areas. Furthermore, shifts in climate patterns and global warming may influence the introduction and distribution of exotic whitefly species, potentially enhancing their survival in new environments (Sundararaj *et al.*, 2021) ^[4]. Hence, the present study was planned to record the abundance of whitefly species in various agricultural and horticultural crops in the coastal areas of Tamil Nadu.

Materials and methods

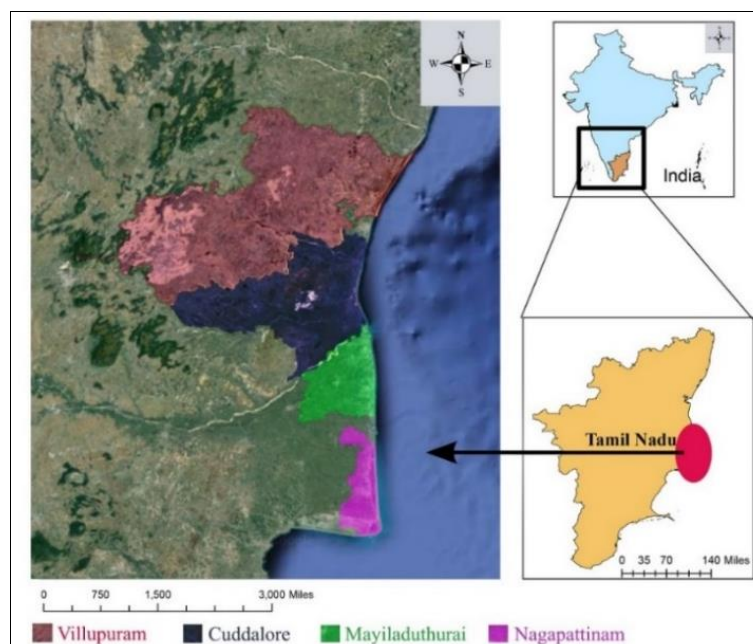


Fig 1: Map showing the selected districts in coastal region of Tamil Nadu

The specimens were collected from different localities of agricultural and horticultural crops in the selected coastal districts viz., Villupuram (12.1447°N, 79.4704°E), Cuddalore (11.6113°N, 79.6502°E), Mayiladuthurai (11.1013°N, 79.6501°E) and Nagapattinam (10.7662°N, 79.7848°E) was undertaken during the warm months (March to July) of 2022-23 (Figure. 1). The location and sampling sites were randomly chosen for the survey within the districts. The collected specimens were taken to the Insect Taxonomy Laboratory, Department of Entomology, Faculty of Agriculture, Annamalai University, and the puparia (IV instar) were separated carefully with the needle from the host leaves for the preparation of permanent mount slides. The permanent mounts of the puparia were prepared by following the mounting procedure followed by David & Subramaniam (1976) [4] using a Leica S4E stereo zoom microscope. Observations and examining the slide mounted specimens were done with the help of Leica DM750 Binocular compound microscope, and the identities of the whiteflies were confirmed. The details of taxonomic characteristics and keys were obtained from Martin (1987) [5] were used for whitefly identification. The identified specimens and permanent slides were deposited in insect storage boxes which were placed in the Insect Repository, Department of Entomology, Faculty of Agriculture, Annamalai University for future references.

Result and discussion

The present study reveals the occurrence of 29 species under 15 genera within two subfamilies, namely, Aleurodicinae Quaintance and Baker, 1913, and Aleyrodinae Westwood, 1840 were recorded in the coastal districts of Tamil Nadu during the warm months (March to July) of 2022-23. Repetition of the identified specimens from the various districts were omitted, and the list below comprises representative samples. The systematic details of the taxa, locality, host plant and collection details were also provided in detail.

Subfamily I: ALEURODICINAE Quaintance and Baker, 1913

1. *Aleurodicus rugipericulatus* Martin

Aleurodicus rugipericulatus Martin, 2004: 29. *Zootaxa*, 1–119.

Material examined: India: Tamil Nadu: Villupuram; 7 puparia on *Musa paradisiaca*, 10.iii.2022, L. Gopianand; India: Tamil Nadu: Cuddalore, 10 puparia on *Cocos nucifera*, 20.iv.2023, L. Gopianand.

Hosts: Highly polyphagous; Mainly found on *Cocos nucifera*, *Terminalia catappa*, *Musa* spp., *Syzygium jambos*, *Morinda citrifolia*, *Ficus* spp., *Thespesia populnea*, *Psidium guajava*, *Citrus* spp., *Mangifera indica*, *Manilkara zapota*, *Abelmoschus esculentus*, *Annona squamosa*, *Jatropha curcas*, *Hibiscus rosa sinensis* (Selvaraj *et al.*, 2016) [6].

Distribution: Throughout India (Except Jammu and Kashmir); India: Tamil Nadu, Goa, Karnataka, Kerala, Telangana, Assam, West Bengal, Maharashtra, Gujarat and Meghalaya (Selvaraj *et al.*, 2016; Gopianand *et al.*, 2023) [6,7].

2. *Aleurodicus dispersus* Russell

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

Material examined: India: Villupuram, 10 puparia on *Manihot esculenta*, 24.iii.2022, L. Gopianand; India: Tamil Nadu: Nagapattinam, 5 puparia on *Psidium guajava*, 15.iv.2023, L. Gopianand.

Hosts: 481 host plants in the world and 253 host plants from India; 320 host plants belonging to 225 genera and 73 families (Sundararaj & Pushpa, 2011) [8]; *Passiflora edulis*, *Duranta* sp., *Cassia* sp., *Tabernaemontana divaricata*, *Diplocyclos palmatus*, *Cassia glauca*, *Tephrosia hirsute*, *Cassia spectabilis* and *Datura metel* (Revathi, 2014) [9].

Distribution: Widely distributed in India (Revathi, 2014) [9].

3. *Paraleyrodes bondari* Peracchi

Paraleyrodes bondari Peracchi, 1971: 146–148.

Material examined: India: Tamil Nadu: Villupuram, 15 puparia on *Cocos nucifera*, 19.iv.2022, L. Gopianand; India: Tamil Nadu: Cuddalore, 7 puparia on *Annona squamosa*, 12.vi.2023, L. Gopianand; India: Tamil Nadu: Cuddalore: Chidambaram, 10 puparia on *Cocos nucifera*, 19.vii.2023.

Hosts: Highly polyphagous; *Cocos nucifera*, *Musa* spp., *Persea americana*, *Manihot esculenta*, *Psidium guajava*, *Citrus* spp., *Mangifera indica*, *Manilkara zapota*, *Abelmoschus esculentus*, *Annona squamosa*, *Jatropha curcas*, *Hibiscus rosa sinensis* (Selvaraj *et al.*, 2016) [6].

Distribution: India: Tamil Nadu (Gopianand *et al.*, 2023) [7], Goa, Karnataka, Kerala (Selvaraj *et al.*, 2016) [6].

Subfamily II. ALEYRODINAE Westwood, 1840

4. *Acaudaleyrodes rachipora* (Singh)

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

Material examined: India: Tamil Nadu, Chidambaram, 5 puparia, on *Tecoma stans*, 18.vii.2022, L. Gopianand.

Hosts: *Helianthus annuus*, *Tecomella undulata*, *Cassia* sp., *Delonix regia*, *Sesbania grandiflora*, *Acacia cavan*, *A. farnesiana*, *Albizia lebbek*, *Leucaena leucocephala*, *Ficus racemosa*, *Morus alba*, *Punica granatum*, *Delonix regia*, *Rosa chinensis*, (Sundararaj *et al.*, 2000) [21]; *Albizia procera*, *Derris indica*, *Ficus carica*, *F. religiosa*, *Mimusops hexandra*, *Tecoma stans*, *Terminalia arjuna*, *Phyllanthus reticulatus*, *Senna auriculata*, *Zizyphus xylopyrus* (Revathi, 2014) [9]; *Ficus microcarpa*.

Distribution: India: Bihar; Gujarat (Singh, 1931) [10], Andhra Pradesh; Tamil Nadu and Karnataka (David & Subramaniam, 1976) [4]; Rajasthan (Sundararaj *et al.*, 2000) [11].

5. *Aleurocanthus mangiferae* Quaintance and Baker

Aleurocanthus mangiferae Quaintance and Baker, 1917. *Proc. U. S. Natl. Mus.*, 51: 345.

The species is known to infest the leaves of mango throughout the plains of India.

Material examined: India: Tamil Nadu: Nagapattinam, 15 puparia, on *Mangifera indica*, 18.iii.2022, L. Gopianand;

Tamil Nadu: villupuram, 7 puparia, on *Mangifera indica*, 22.v.2023, L. Gopianand.

Host: *Mangifera indica* (Singh, 1931) ^[10].

Distribution: India: Uttar Pradesh (Singh, 1931) ^[10]; Karnataka, Tamil Nadu (Jesudasan & David, 1991) ^[1].

6. *Aleurocanthus rugosa* Singh

Aleurocanthus rugosa Singh, 1931. *Mem. Dep. Agric. India*, 12 (1): 71; David and Subramaniam 1976. *Rec. Zool. Surv. India*, 70: 151.

Material examined: India: Cuddalore: Chidambaram, 7 puparia, on Piper betle, 20.iii.2023, L. Gopianand.

Hosts: *Eugenia (Syzygium) jambolana*, *Piper betel*, *Psidium guajava*, *Michelia champaca* (Singh, 1931) ^[10]; *Annona* sp., *Polyalthia longifolia*, *P. pendula* (David & Subramaniam, 1976) ^[4]; *Dodonaea viscosa* (Jesudasan & David, 1991) ^[1].

Distribution: India: Bihar, Tamil Nadu (Jesudasan & David, 1991) ^[1].

7. *Aleurocanthus spiniferus* (Quaintance)

Aleurodes spinifera Quaintance, 1903, 35: 63; *Aleurocanthus rosae* Singh, 1931. *Mem. Dep. Agric. India*, 12 (1): 70 (Synonymised by Takahashi, 1932).

Material examined: India: Tamil Nadu: Nagapattinam, 5 puparia, on *Citrus* sp., 17.iii.2022, L. Gopianand.

Hosts: *Citrus* sp., *Rosa* sp. (Singh, 1931) ^[10]; *Vitis vinifera* (David & Subramaniam, 1976) ^[4]; *Bauhinia variegata* (Revathi, 2014) ^[9].

Distribution: Widespread in India (Jesudasan & David, 1991) ^[1].

8. *Aleurocanthus woglumi* Ashby

Aleurocanthus woglumi Ashby, 1915. *Bull. Dep. Agric. Jamaica*, 2: 321 - 322; *Aleurocanthus punjabensis* Corbett, 1935b,8 (Syn. by Husain & Khan, 1945).

Material examined: India: Tamil Nadu: Nagapattinam, 13 puparia, on *Citrus* sp., 17.iii.2022, L. Gopianand; Tamil Nadu: Villupuram, 7 puparia, on *Citrus maxima*, 23.v.2023, L. Gopianand.

Hosts: *Achras sapota*, *Citrus* spp., *Morinda tinctoria*, *Murraya koenigii* (David & Subramaniam, 1976) ^[4]; *Manilkara hexandra* and *Peltophorum pterocarpum*.

Distribution: Widely distributed throughout India (Jesudasan & David, 1991) ^[1].

9. *Aleuroclava jasmini* (Takahashi)

Aleurotuberculatus jasmini Takahashi, 1932. *Rep. Dept. Agric. Govt. Res. Inst. Formosa*, 59:26-27; *Aleuroclava jasmini*: Jesudasan and David, 1990. *FIPPAT. Entomology Series*, 2:3; Sundararaj, 1999. *Indian J. Ent.* 61(2):192-194.

Materials examined: India: Cuddalore, 3 puparia on *Jasminum* sp., 21.iii.2023, L. Gopianand.

Hosts: *Mitragyna* sp., *Bauhinia* sp., *Murraya koenigii* (Dubey & Sundararaj, 2005a) ^[12].

Distribution: India: Rajasthan; Andhra Pradesh, Palamaner (Dubey & Sundararaj, 2005a) ^[12].

10. *Aleuroclava psidii* (Singh)

Aleurotrachelus psidii Singh, 1931. *Mem. Dep. Rep. India*, 12 (1): 61.

Aleurotuberculatus psidii (Singh) Takahashi, 1932. *Rep. Dep. Agric. Govt. Res. Inst. Formosa*, 59: 20; Jesudasan and David, 1991. *Oriental Ins.*, 25: 292.

Aleuroclava psidii (Singh): Dubey and Sundararaj, 2005a. *Oriental Ins.*, 39: 259.

Material examined: India: Tamil Nadu: Mayiladuthurai, 3 puparia, on *Streblus asper*, 16.iv.2022, L. Gopianand.

Hosts: *Psidium guajava* (Singh, 1931) ^[10]; *Streblus asper*, *Schima wallichii*, *Psidium* sp., *Oxyceros regulosus*, *Tarenna asiatica*, *Tiliacora acuminata*, *Clerodendrum* sp. (Dubey & Sundararaj, 2005a) ^[12].

Distribution: India: Bihar (Singh, 1931) ^[10]; Karnataka (Dubey & Sundararaj 2005a) ^[12].

11. *Aleuroclava sivakasiensis* Sundararaj and David

Aleuroclava sivakasiensis Sundararaj and David, 1993. *Oriental Ins.*, 27: 248.

Material examined: India: Tamil Nadu, Cuddalore, 5 puparia on *Holoptelea integrifolia*, 23.iv.2022, L. Gopianand.

Hosts: *Jasminum malabaricum*, *Manihot esculenta* (Dubey & Sundararaj, 2005a) ^[12].

Distribution: India: Tamil Nadu, Goa, Karnataka, Kerala (Dubey & Sundararaj, 2005a) ^[12].

12. *Aleurolobus azadirachtae* Regu and David

Aleurolobus azadirachtae Regu and David, 1993. *FIPPAT Entomology Series*, 4: 18.

Material examined: India: Cuddalore: Chidambaram, 4 puparia on *Azadirachta indica*, 2.iii.2022, L. Gopianand.

Hosts: *Azadirachta indica*, *Holoptelea* sp., *Lagerstroemia* sp., *Vitex altissima* (Dubey & Sundararaj, 2006) ^[13]; *Amomum cannicarpum*, *Carissa spinarum*, *Diospyros paniculata*, *Santalum album*, *Schleichera oleosa*, *Tiliacora acuminata* (Sundararaj & Pushpa, 2011) ^[8].

Distribution: India: Tamil Nadu, Kerala, Karnataka, Goa (Dubey & Sundararaj, 2006) ^[13]; Andhra Pradesh, Kerala, Tamil Nadu (Sundararaj & Pushpa, 2011) ^[8].

13. *Aleurolobus barodensis* (Maskell)

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

Aleurolobus barodensis: Quaintance and Baker, 1914. *Tech. Ser. Bur. Entomol. U. S.*, 27: 109; David and Subramaniam, 1976. *Rec. Zool. Surv. India*, 70: 159.

Material examined: India: Cuddalore, 3 puparia, on *Saccharum officinarum*, 15.vi.2022, L. Gopianand.

Hosts: *Saccharum officinarum*, *Erianthus arundinaceus*, *E. ciliaris*, *Saccharum spontaneum* (Dubey & Sundararaj, 2006) ^[13].

Distribution: Throughout India (Dubey & Sundararaj, 2006) ^[13].

14. *Aleurolobus marlatti* (Quaintance)

Aleurodes marlatti Quaintance, 1903. *Canadian Ent.*, 35: 61.
Aleurolobus marlatti: Quaintance and Baker, 1917. *Pro. U. S. Nat. Mus.*, 51: 363; David and Subramaniam, 1976. *Rec. Zool. Surv. India*, 70: 160.

Material examined: India: Cuddalore: Chidambaram, 4 puparia, on *Tamarindus indica*, 16.iii.2023, L. Gopianand; India: Cuddalore, Annamalai University, 4 puparia, on *Tecoma stans*, 16.iii.2023, L. Gopianand.

Hosts: Many host plants; *Chloroxylon swietenia*, *Ixora pavetta*, *Terminalia elliptica*, *Zizyphus oenoplia* (Sundararaj & Pushpa, 2011) [8]; *Artocarpus heterophyllus*, *Cordia wallichii*, *Terminalia chebula*, *T. paniculate*, *Carissa carandas*, *Zizyphus glabrata* (Revathi, 2014) [9].

Distribution: India: Throughout Tamil Nadu, Karnataka, Kerala (Dubey & Sundararaj, 2006) [13]; Andhra Pradesh, Karnataka, Kerala (Sundararaj & Pushpa, 2011) [8].

15. *Aleurolobus moundi* David and Subramaniam

Aleurolobus moundi David and Subramaniam, 1976. *Rec. Zool. Surv. India*, 70: 161.

Material examined: India: Tamil Nadu, Nagapattinam, 11 puparia, on *Madhuca longifolia*, 30.iv.2022, L. Gopianand.

Hosts: *Madhuca indica*, *M. longifolia*, *Madhuca* sp. (David & Subramaniam, 1976) [4]; *Michelia champaca*, *Tecoma stans* (Dubey & Sundararaj, 2006) [13]; *Madhuca nerurifolia*, *Mallotus* sp., *Tectona grandis* (Sundararaj & Pushpa, 2011) [8].

Distribution: India: Tamil Nadu (David and Subramaniam, 1976) [7]; Karnataka, Kerala (Dubey and Sundararaj, 2006) [13]; Karnataka (Sundararaj & Pushpa, 2011) [8].

Distribution: India: Throughout Tamil Nadu (Dubey & Sundararaj, 2006) [13]; Andhra Pradesh (Sundararaj & Pushpa, 2011) [8].

16. *Aleurothrixus floccosus* (Maskell)

Aleurodes floccosa Maskell 1895: 432.

Aleurothrixus horridus (Hempel); Quaintance and Baker 1914: 103.

Aleyrodes howardi Quaintance 1907: 91; synonymized by Costa Lima 1945: 425.

Material examined: India: Nagapattinam, 10 puparia, *Psidium guajava*, 02.vii.2023, L. Gopianand.

Hosts: *Anacardium* sp., *Mangifera indica*, *Cyperus rotundus*, *Persea americana*, *Psidium guajava*, *Psidium* sp., *Bougainvillea* sp., *Coffea arabica*, *Citrus* sp., *Citrus reticulata*, *Lucuma caimito*, *Manilkara* sp., *Manilkara zapota*, *Solanum melongena* (Sundararaj *et al.*, 2020) [14].

Distribution: India: Kerala: Kozhikode; Karnataka: Ramanagara, Mandya and Bangalore; Tamil Nadu: Coimbatore (Sundararaj *et al.*, 2020) [14].

17. *Aleurothrixus trachoides* (Back)

Aleyrodes trachoides Back 1912: 151.

Aleurotrachelus trachoides (Back); Quaintance and Baker 1914: 103. *Aleurotulus* bodkini Baker and Moles 1923: 635.; synonymy according to Mound and Halsey 1978: 77.

Material examined: India: Villupuram, 25 puparia on *Capsicum annum*, 15.v.2022, L. Gopianand.

Hosts: *Acalypha lanceolata*, *Alternanthera paronychioides*, *Capsicum annum*, *Clerodendrum viscosum*, *Duranta erecta*, *Duranta plumeria*, *Emilia sonchifolia*, *Ipomoea* sp., *Santalum album*, *Solanum esculentum*, *Solanum melongena*, *Solanum xanthocarpum*, *Tabebuia argentea*, *Vitex leucoxylon* (Sundararaj *et al.*, 2018) [15].

Distribution: India: Karnataka, Kerala, Maharashtra and Tamil Nadu (Sundararaj *et al.*, 2018) [15].

18. *Bemisia crossandrae* David and Subramaniam

Lipaleyrodes crossandrae David and Subramaniam, 1976. *Rec. Zool. Surv. India*, 70: 201; *Bemisia crossandrae* (David and Subramaniam) Dubey *et al.*, 2009:548.

Material examined. India: Villupuram, 12 puparia, *Crossandra infundibuliformis*, 02.v.2022, L. Gopianand.

Hosts: *Achyranthes aspera*, *Crossandra undulaefolia*, *Blepharis madraspatensis* (David and Subramaniam, 1976) [4].

Distribution. India: Tamil Nadu; Karnataka (David & Subramaniam, 1976) [4].

19. *Bemisia tabaci* (Gennadius)

Aleurodes tabaco Gennadius, 1889; *Bemisia tabaci* (Gennadius) Takahashi, 1936. *Tenthredo*, 1: 110.

Material examined. India: Tamil Nadu: Cuddalore, 10 puparia on *Gossypium herbaceum*, 05.v.2022, L. Gopianand; India: Tamil Nadu: Chidambaram, 25 puparia on *Phyllanthus niruri*, 10.viii.2022, L. Gopianand.

Hosts. Many host plants (Jesudasan & David, 1991) [1]; *Cocculus hirsutus*, *Phyllanthus reticulatus*, *Allophylus cobbe*.

Distribution. Widely distributed in India (Jesudasan & David, 1991) [1].

20. *Dialeurodes kirkaldyi* (Kotinsky)

Aleurodes kirkaldyi Kotinsky, 1907. *Bull. Bd. Commnrs. Agric. For. Hawaii. Dev. Ent.*, 2: 95.

Dialeurodes yercaudensis Jesudasan and David, 1991. *Oriental Ins.*, 25: 307 - 308 (Synonymised by Sundararaj & Dubey, 2006).

Material examined. India: Tamil Nadu: Cuddalore, 5 puparia on *Jasminum sambac*, 05.iv.2022, L. Gopianand; India: Mayiladuthurai, 25 puparia on *Phyllanthus reticulatus*, 15.v.2022, L. Gopianand.

Hosts. *Jasminum auriculatum*, *J. sambac*, *J. sessiliflorum*, *Morinda citrifolia*, *M. tinctoria* (Sundararaj & David, 1992) [16]; *Amomum cannicarpum*, *Morinda pubescens*, *Mussaenda frondosa*, *Phyllanthus reticulatus*, *Jasminum rigidum* (Revathi, 2014) [9].

Distribution. India: Tamil Nadu, Maharashtra, West Bengal, Karnataka, Kerala (Sundararaj & David, 1992) [16]; Andhra Pradesh, Karnataka (Sundararaj & Pushpa, 2011) [8].

21. *Dialeuronomada ixorae* (Singh)

Dialeurodes ixorae Singh, 1931. *Mem. Dept. Agric. India Ent. Ser.*, 12 (1): 38.

Dialeuronomada ixorae (Singh): Sundararaj & Pushpa, 2011:407-534.

Material examined: India: Tamil Nadu: Cuddalore: Chidambaram, 10 puparia, *Ixora coccinea*, 12.iv.2022, L. Gopianand.

Hosts: *Ixora coccinea* (Singh, 1931) ^[10]; *Tarenna asiatica*, *Aporosa lindleyana*, *Antidesma acidum* (Sundararaj & David, 1991a) ^[17]; *Jasminium malabaricum*, *Lepisanthes* sp., *Oxyceros rugulosus*, *Strychnos colubrina* (Sundararaj & Pushpa, 2011) ^[8]; *Ixora brachiata* (Revathi, 2014) ^[9].

Distribution. India: Bihar (Singh, 1931) ^[10]; Tamil Nadu (Sundararaj & David, 1991a) ^[17]; Andhra Pradesh; Karnataka; Kerala (Sundararaj & Pushpa, 2011) ^[8].

22. *Pealius nagerkoilensis* Jesudasan and David

Pealius nagerkoilensis Jesudasan and David, 1991. *Oriental Ins.*, 25: 320.

Odontaleyrodes selvakumarani David, Sundararaj and Regu, 1991. *J. Insect Sci.*, 4 (2): 117 - 119. (Synonymised by Dubey & Sundararaj, 2005a) ^[14].

Material examined. India: Tamil Nadu: Nagapattinam, 5 puparia on *Annona squamosa*, 26.iii.2022, L. Gopianand.

Hosts: *Artocarpus heterophyllus*, *A. incisus*, *Chukrasia velutina*; *Loranthus* sp. (Jesudasan & David, 1991) ^[1]; *Ageratum conyzoides*, *Cestrum aurantiacum*, *Derris* sp., *Madhuca neriifolia* *Salvia splendens* (Dubey & Sundararaj, 2005b) ^[18]; *Ichnocarpus frutescens*, *Strychnos potatorum* (Sundararaj & Pushpa, 2011) ^[8]; *Artocarpus heterophyllus*, *Annona squamosa*.

Distribution. India: Tamil Nadu: (Jesudasan & David, 1991) ^[1]; Karnataka (Dubey & Sundararaj, 2005b) ^[18]; Kerala (Sundararaj & Pushpa, 2011) ^[8].

23. *Rhachisphora ixorae* Sundararaj and David

Rhachisphora ixorae Sundararaj and David, 1991. *Entomon*, 16: 311 - 315.

Material examined: India: Tamil Nadu: Nagapattinam, 16 puparia, on *Ixora arborea*, 17.ii.2022, L. Gopianand; Tamil Nadu: Mayiladuthurai, 10 puparia, on *Ixora* sp., 20.iii.2023, L. Gopianand.

Hosts: *Ixora* sp. (Sundararaj & David, 1991b) ^[19]; *Ixora pavetta*, *Murraya koenigii* (Sundararaj & Pushpa, 2011) ^[8]; *Ixora arborea*.

Distribution: India: Tamil Nadu (Sundararaj & David, 1991b) ^[19]; Karnataka (Sundararaj & Pushpa, 2011) ^[8].

24. *Singhiella simplex* (Singh)

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

Singhiella simplex (Singh) Martin and Mound, 2007. *Zootaxa*, 1492: 43.

Material examined: India: Tamil Nadu: Chidambaram, 5 puparia on *Syzygium cumini*, 26.iii.2022, L. Gopianand.

Hosts: *Ficus bengalensis*, *Ficus glomerata* (Singh, 1931) ^[10]; *Ficus racemosa* (David & Subramaniam, 1976) ^[4]; *Ficus parasitica*, *Syzygium* sp. (Revathi, 2014) ^[9].

Distribution. India: Bihar (Singh, 1931) ^[10]; Karnataka, Tamil Nadu (David & Subramaniam, 1976) ^[4].

25. *Singhius hibisci* (Kotinsky)

Aleyrodes hibisci Kotinsky, 1907. *Bull. Bd. Commonrs. Agric. For. Hawaii Div. Ent.*, 2: 96.

Singhius hibisci (Kotinsky) Mound and Halsey, 1978. *Whitefly of the World*, 191.

Singhius ehretiae Jesudasan and David, 1991: 328-329 (Synonymised by Dubey *et al.*, 2008) ^[45].

Material examined. India: Tamil Nadu: Villupuram, 7 puparia, *Holoptelea integrifolia*, 23.vi.2023, L. Gopianand.

Hosts. *Breynia rhamnoides* (Singh, 1931) ^[10]; *Ehretia ovalifolia* (Jesudasan & David, 1991) ^[1]; *Synedrella nodiflora*; *Phyllanthus reticulatus* (David & Dubey, 2006) ^[20]; *Holoptelea integrifolia* (Revathi, 2014) ^[9].

Distribution. India: Bihar, Tamil Nadu (Jesudasan & David, 1991) ^[1]; Kerala; Andaman and Nicobar (David & Dubey, 2006) ^[20]; Karnataka (Revathi, 2014) ^[9].

26. *Siphoninus phillyreae* (Haliday)

Aleurodes phillyreae Haliday, 1835. *Ent. Meg.* 2: 119.

Siphoninus phillyreae: Mound and Halsey, 1978. *Whitefly of the World*, P. 192. (Full synonymy).

Material examined: India: Villupuram, 12.vi.2023, 10 puparia on *Punica granatum*, L. Gopianand.

Hosts: *Prunus persica*, *Punica granatum*, *Pyrus communis* (Singh, 1931) ^[10].

Distribution: India: Bihar (Singh, 1931) ^[10]; Karnataka, Andhra Pradesh; throughout Tamil Nadu (Jesudasan & David, 1991) ^[1].

27. *Tetraleurodes acaciae* (Quaintance)

Aleurodes acaciae Quaintance, 1900: 19.

Tetraleurodes acaciae: Quaintance and Baker, 1914:108

Tetraleurodes herberti Penny 1922:32, synonymy by Nakahara 1995: 108.

Material examined: India: Tamil Nadu: Villupuram, 5 puparia, *Leucaena leucocephala*, 04.vii.2022, L. Gopianand.

Host: *Leucaena leucocephala* (Sundararaj *et al.*, 2021) [21].

Distribution: India: Andhra Pradesh, Tamil Nadu (Sundararaj *et al.*, 2021) [21].

28. *Trialeurodes ricini* (Mishra)

Aleyrodes ricini Mishra, 1924. *Proc. VthEnt. Mtg. Pusa*, 1923: 129 - 135.

Trialeurodes ricini: Bink-Moenen, 1983. *Monogr. Nederlandse Ent. Ver.*, 10: 185.

Material examined: India: Tamil Nadu: Cuddalore: Chidambaram, 20 puparia on *Phyllanthus acidus*, 21.iv.2022, L. Gopianand.

Hosts: *Ricinus communis* (Singh, 1931) [10]; *Euphorbia* sp., *Murraya koenigii*, *Phyllanthus* sp., *Rosa* sp., *Aristolochia bracteolata*, *Lablab niger*, *Gossypium hirsutum*, *Moringa oleifera*, *Phyllanthus acidus* (David & Subramaniam, 1976) [4]; *Cissampelos pariera*, *Tabebuia avellaneda* (Sundararaj & Pushpa, 2011) [8]; *Cryptolepis buchani*, *Cordia obliqua* (Revathi, 2014) [9].

Distribution: India: Bihar, Maharashtra, Uttar Pradesh (Singh, 1931) [10]; Andhra Pradesh; Karnataka, Tamil Nadu (David & Subramaniam, 1976) [4].

29. *Trialeurodes vaporariorum* Westwood

Aleurodes vaporariorum Westwood, 1856. *Gdar'sChron.*, P. 852.

Trialeurodes vaporariorum (Westwood) Quaintance and Baker, 1915. *U.S.D.A. Bur. Ent. Tech. Ser.*, 27: 11; Russell, 1948. *Musc. Publs. U.S.D.A.*, 635: 44. Syn. of species; David and Subramaniam, 1976. *Rec. Zool. Surv. India*, 70: 216.

Material examined: India: Tamil Nadu: Nagapattinam, 5 puparia on *Phyllanthus emblica*, 24.vi.2022, L. Gopianand.

Hosts: *Glycine max*, *Abutilon hirtum*, *Begonia floccifera*, *Chrysanthemum moorifolium*, *Nicotiana glauca*, *Pelargonium hortorum*, *Philadelphus coronarius*, *Caesalpinia pulcherrima*, *Lantana camara*, *Punica granatum*, *Camellia japonica* (Sundararaj & Pushpa, 2011) [8].

Distribution: India: Tamil Nadu: Thummanathy (Nilgiris) (David & Subramaniam, 1976) [4]; Kotagiri (Nilgiris); Ketti, Udagamandalam, Coonoor, Kattabettu, Majur (Nilgiris); Kerala: Munnar, Singampara (Sundararaj & Pushpa, 2011) [8].

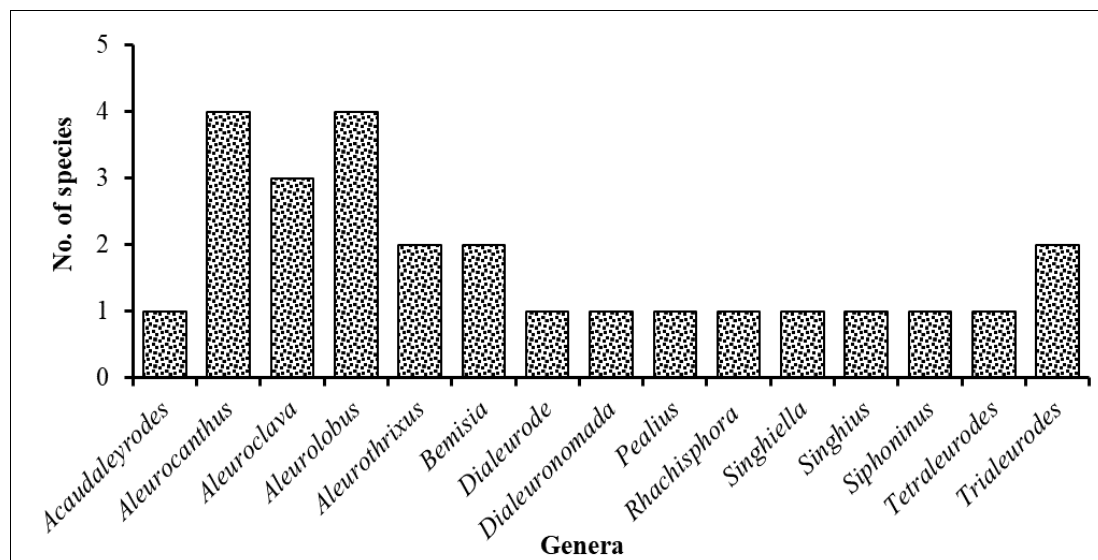


Fig 2: Abundance of whitefly Genera in coastal areas of Tamil Nadu

The present study revealed that the most abundant genera were *Aleurocanthus* (4 species) and *Aleurolobus* (4), followed by *Aleuroclava* (3), *Aleurodicus* (2), *Aleurothrixus* (2), and *Trialeurodes* (2) (Figure. 2). Among the collected whitefly species, *Aleuroclava sivakasiensis* Sundararaj and David, *Trialeurodes vaporariorum* Westwood, *Aleurodicus rugioperculatus* Martin, *Aleurocanthus rugosa* Singh, *Acaudaleyrodes rachipora* (Singh) and *Bemisia tabaci* Gennadius were found detrimental to the economical important crops and trees viz., *Manihot esculenta*, *Glycine max*, *Musa paradisiaca*, *Cocos nucifera*, *Psidium guajava*, *Citrus* spp., *Mangifera indica*, *Manilkara zapota*, *Abelmoschus esculentus*, *Annona squamosa*, *Gossypium herbaceum* (Jesudasan & David, 1991; Selvaraj *et al.*, 2016; Dubey & Sundararaj, 2005a,b) [1,6,12,18] (Figure. 3 & 4). The

severe infestation of the invasive rugose spiraling whitefly, *A. rugioperculatus* Martin, in coconut and banana was observed throughout the survey period, along with the co-occurrence of *P. bondari* (Gopianand & Kathirvelu, 2023) [22]. During the study period, *Bemisia tabaci* was observed on the alternative host plant, Stonebreaker (*Phyllanthus niruri*), acting as a refuge for the survival of *B. tabaci* during the off season when the main crop is absent (Figure. 4). The whitefly breeding in the different ornamental plants and trees might also serves as the alternate host for the future infestation in the economical important crops. Hence, continuous and comprehensive monitoring, including meticulous inspections via surveys to detect whitefly infestations in new areas, in order to develop effective management strategies.

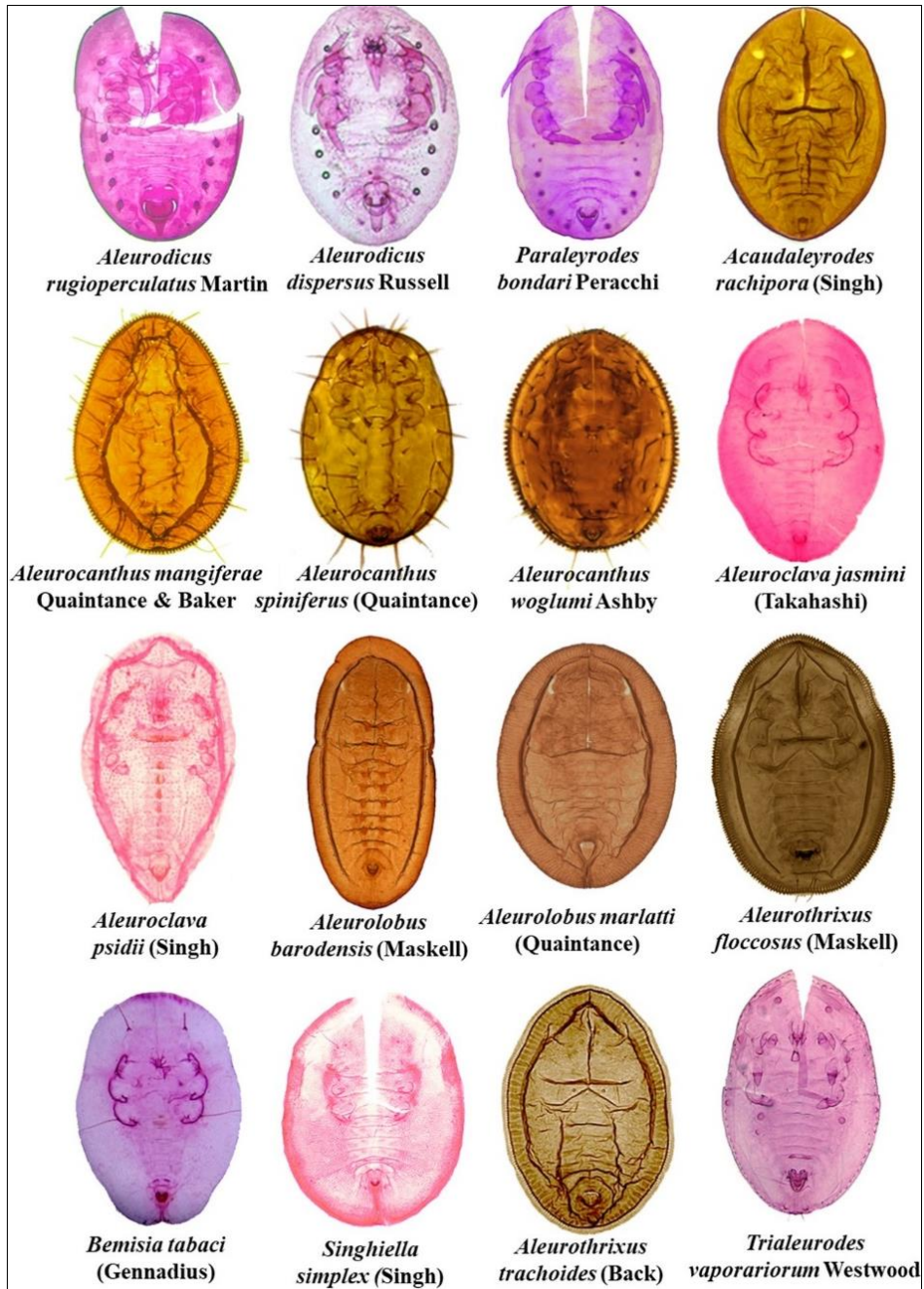


Fig 3: Pupa of agriculturally important whitefly species

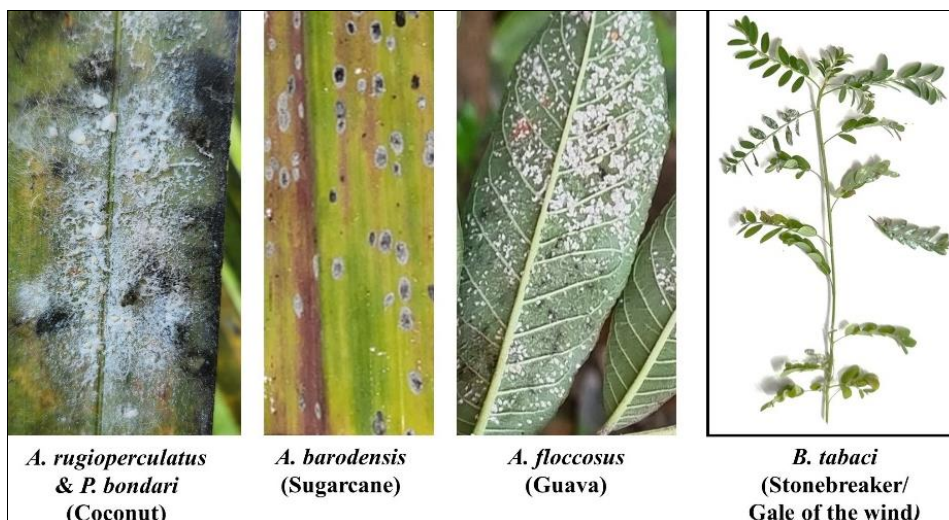


Fig 4: Host plants of some agriculturally important whitefly species

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