



First Report of *Encarsia colima* Myartseva from India and Other Distributional Records of Aphelinidae (Hymenoptera: Chalcidoidea) from Kerala and Tamil Nadu, India

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An attempt was made to survey the aphelinid parasitoid fauna of Kerala and Tamil Nadu, India from December, 2008 to January, 2011 which resulted in the recovery of 15 genera and 30 species of aphelinids of which one and two genera and three and 18 species are new distributional records for Kerala and Tamil Nadu respectively. *Encarsia colima* Myartseva is reported for the first time from India.

Key Words: Survey, Aphelinidae, parasitoids, distributional record, Kerala, Tamil Nadu, India.

Aphelinidae is one of the most important chalcidoid families for biological control. In spite of their small size and less abundance, the family is a major source of biocontrol agents of economically important pest species belonging to the homopteran group of coccoids, aphids and aleyrodids. The number of successes or near successes obtained (in terms of preventing economic losses) in the control of pests of agricultural and horticultural crops by the use of aphelinid parasitoids is much higher than that by the use of other hymenopteran parasitoids including other chalcidoids (Noyes, 1985). Hayat (1998) while compiling the aphelinid fauna of India in his book titled "Aphelinidae of India (Hymenoptera: Chalcidoidea): A taxonomic revision" reported 21 and 13 genera and 180 and 46 species from India and Tamil Nadu respectively. Recently, Hayat and Khan (2010) reported one additional genus *Idiococcobius* Hayat from West Bengal. Further 40 new species have been added to the Indian fauna since 1998 by Hayat and Khan (2010) and Hayat (2010), taking the total tally to twenty two genera and 220 species of aphelinid parasitoids from India. Despite their importance, not much work has been done from Tamil Nadu since 1998, on the taxonomy of this parasitoid group hence an attempt was made to explore the aphelinid parasitoids from Tamil Nadu.

Materials and Methods

Survey was conducted from December, 2008 to January, 2011, to recover aphelinid parasitoids through host rearing (of mainly coccoids and aleyrodids), yellow pan trapping and net sweeping. The collected parasitoids were preserved in 70 per cent alcohol and stored in deep freezer (-20°C).

Preserved specimens were dried using Hexamethyldisilazane (HMDS) as described by Brown (1993) and then card mounted. They were further slide mounted wherever necessary for species identification as described by Noyes (1982). The identification of genera and species was done by the keys provided by Hayat (1998), Hernandez-Suarez *et al.*, (2003), Myartseva and Evans (2007) and Hayat (2011). The identified specimens were deposited in the repository of Parasitoid Taxonomy and Bio control laboratory of the Department of Entomology, Faculty of Agriculture, Annamalai University.

Results and Discussion

The survey resulted in the recovery of *Encarsia colima*, first record of this species from India and 14 genera [*Aphelinus* Dalman, *Aphytis* Howard, *Ablerus* Howard, *Coccobius* Ratzeburg, *Coccophagus* Westwood, *Centrodora* Foerster, *Eriaphytis* Hayat, *Encarsia* Foerster, *Eretmocerus* Haldeman, *Euryischia* Riley, *Marietta* Motschulsky, *Pteroptrix* Westwood, *Promuscidea* Girault and *Proaphelinoides* Girault] and 27 species of aphelinid parasitoids from Tamil Nadu. Though Hayat (1998) reported the genus *Euryischomyia* ex. *Nippococcus viridis* (Newstead) from *Mangifera indica* from Tamil Nadu, the same could not be collected from the present survey. However, the genera *Pteroptrix* and *Proaphelinoides* have been additionally reported from Tamil Nadu, thus increasing the total tally of genera from Tamil Nadu to 15. The genus *Eutricho somella* Girault and three species (*Ablerus williamsi* (Anneck & Insley), *Coccophagus fumadus* Hayat and *C. longicornis* Hayat) are new distributional records from Kerala.

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Even though 40 species were added to Indian aphelinid fauna from 1998 to 2010, none of them were from Tamil Nadu. Here from the present survey, out of the 30 species recovered, eleven new species have been identified (to be described) and the following species are reported as new distributional records from the states Tamil Nadu and Kerala.

***Encarsia colima* Myartseva**

Encarsia colima is close to *E. clypealis* (Silvestri) but can be easily distinguished by the segments of male antenna. In *E. clypealis*, first and second funicle segments are united to form a large oval structure, where as this is absent in *E. colima*. Further the first and second funicular segments in *E. colima* are longer than in *E. clypealis*, third and fourth flagellar segments in *E. colima* 3.0 x as long as wide, where as in *E. clypealis*, they are 1.8x and 1.7x as long wide, respectively. In females of *colima*, fifth and sixth flagellar segments combined are distinctly shorter than two preceding segments together, whereas this is opposite in *E. clypealis*. It was also noticed that both sexes of *E. colima* and *E. clypealis* have a tooth on clypeus, but the apex of this tooth is roundish in *colima* and triangular in *clypealis*. For details of comparison, one can refer to Myartseva and Evans (2007) (*E. colima*) and Hayat (1998) (*E. clypealis*). Myartseva and Evans (2007) have reported *E.colima* from citrus blackfly *Aleurocanthus woglumi* Ashby from Colima, Mexico and here also we report this parasitoid from *A.woglumi* from Perumalpalayam of Tiruchirappalli district, Tamil Nadu.

Distributional records from Kerala and Tamil Nadu

1. *Ablerus connectens* Silvestri

Specimen examined: INDIA, Tamil Nadu, Coimbatore, Puthur, 1 female, ex. *Aleurocanthus woglumi* Ashby on *Citrus* sp., 25.ix.2009 (C. Menakadevi).

Distribution: Sri Lanka: Colombo (Silvestri, 1928), China (Viggiani and Ren, 1993) and India: Karnataka (Hayat and Anis, 2004), Tamil Nadu (New record).

Host: Citrus blackfly, *Aleurocanthus woglumi* (Silvestri, 1928), *A. spiniferus* (Quaintance), (Viggiani and Ren, 1993), unidentified whitefly (Homoptera: Aleyrodidae) on sandal wood trees (*Santalum album*) (Hayat and Anis, 2004).

2. *Ablerus williamsi* (Annecke & Insley)

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through yellow pan trap from orchard ecosystem, 11.vii.2010 (C. Menakadevi); Kerala, Kasaragod, 1 female, through net sweep from Cocoa ecosystem, 25.xii.2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: INDIA, Assam, Orissa (Hayat and Khan, 2010), Tamil Nadu and Kerala (New record).

Host: Unknown.

3. *Aphelinus basilicus* Hayat

Specimens examined: INDIA, Tamil Nadu,

Cuddalore, Chidambaram, 4 females, through net sweep from grass ecosystem, 20.i.2011 (C. Menakadevi).

Distribution: India: Andhra Pradesh, Assam, Bihar, Goa, West Bengal. (Sri Lanka and Bangladesh) (Hayat, 1998), Tamil Nadu (New record).

Host: Indetectable Aphids on *Ocimum basilicum*, *Lantana camara* and 'Okra' (Hayat, 1998).

4. *Aphelinus desantisi* Hayat

Specimens examined: INDIA, Tamil Nadu, Coimbatore, Puthur, 7 females, ex. unidentified Aphids on sugarcane, 25.ix.2009 (C. Menakadevi).

Distribution: India: Karnataka, Meghalaya, Nagaland, Punjab, Rajasthan, Uttar Pradesh (Hayat, 1998), Tamil Nadu (New record).

Host: *Longuingius sacchari*, on *Sorghum vulgare*; indetectable aphids on *S. vulgare*, *Saccharum officinarum*, *Citrus* spp. (Hayat, 1998).

5. *Coccobius mirus* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through yellow pan trap from forest ecosystem, 15.x.2010; Tamil Nadu, Cuddalore, Chidambaram, 4 females, through yellow pan trap from grass ecosystem, 10.vii.2010; Tamil Nadu, Cuddalore, Chidambaram, 4 females, through yellow pan trap from orchard ecosystem, 20.x.2010 (C. Menakadevi); Tamil Nadu, Tanjore, Aduthurai, 2 females, through yellow pan trap from rice ecosystem, 29.vi.2010 (S. Manicka vasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Assam, Kerala, Orissa, West Bengal (Hayat, 1998), Tamil Nadu (New record).

Host: Unknown.

6. *Coccobius reticulatus* (Compere & Annecke)

Specimens examined: INDIA, Tamil Nadu, Dharmapuri, Rajapattai 15 females, ex. unidentified coccids on ornamental plant, 20.iv.2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra and Uttar Pradesh (Pakistan; Sultanate of Oman) (Hayat, 1998), Tamil Nadu (New record).

Host: *Aonidiella orientalis* on *Dalbergia sissoo*, *Agave americana*; *Aonidiella orientalis* on *Punica granatum*; [?]*Cerococcus hibisci*; [?]*Coccus hesperidum* on *citrus* sp.; indetectable coccids on rose and indetectable plants (Hayat, 1998).

7. *Coccophagus burksi* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Jayakondapattinam, 5 females, ex. unidentified coccids on *Thespisia papulnia*, 4.ii.2010 (C. Menakadevi).

Distribution: India: Puducherry (Hayat, 1998), Tamil Nadu (New record).

Host: Unidentified Coccoids (Hayat, 1998).

8. *Coccophagus fumadas* Hayat

Specimen examined: INDIA, Kerala, Calicut, 1 female, through sweep from forest ecosystem, 25.xii.2010 (S. Manickavasagam and A. Ramesh kumar).

Distribution: India (Orissa) (Hayat and Khan, 2010), Kerala (New record).

Host: Unknown.

9. *Coccophagus gilvus* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 7 females, ex. *Coccus* sp., on *Psidium guajava*, 5.ii.2010 (S. Manicka vasagam and A. Rameshkumar).

Distribution: India: Goa (Hayat, 1998), Tamil Nadu (New record).

Host: *Coccus hesperidum* (Hayat, 1998).

10. *Coccophagus longicornis* Hayat

Specimen examined: INDIA, Kerala, Calicut, 1 female, through sweep from forest ecosystem, 25.xii.2010 (S. Manickavasagam and A. Ramesh kumar).

Distribution: India: Punjab (Hayat, 1998), Kerala (New record).

Host: *Ceroplastodes cajani* on *Ficus glomerata* (Hayat, 1998).

11. *Coccophagus longipedicellus* Shafee

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, ex. unidentified Coccids on Citrus sp, 14.vii.2010 (C. Menakadevi).

Distribution: India: Andaman & Nicobar Islands, Karnataka (Hayat, 1998), Tamil Nadu (New record).

Host: *Coccus* sp. on *Mangifera indica* (Hayat, 1998).

12. *Centrodora lineascapa* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, 15.x.2010; Tamil Nadu, Cuddalore, Chidambaram, 2 females, through net sweep from weed ecosystem, 20.vii.2010 (C. Menakadevi).

Distribution: India: Uttar Pradesh (Hayat, 1998), Tamil Nadu (New record).

Host: Unknown.

13. *Encarsia aurantii* (Howard)

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 15 females, ex. unidentified coccids on brinjal, 19.viii.2010 (C. Menakadevi).

Distribution: India: Andhra Pradesh, Karnataka. (Sri Lanka; U.S.A.; probably widely distributed) (Hayat, 1998), Tamil Nadu (New record).

Host: *Aonidiella orientalis* on *Agave americana*,

Canthium parviflorum, *Polygonum hysterothorus*; *Hemiberlesia lantaniae*; *Lindingaspis fusca* on *Tamarindus indica* (Hayat, 1998).

14. *Encarsia brevipalpis* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 5 females, through yellow pan trap from grass ecosystem, 15.v.2010 (C. Menakadevi).

Distribution: India: Uttar Pradesh (Hayat, 1998), Tamil Nadu (New record).

Host: Unknown.

15. *Encarsia colima* Myartseva

Specimens examined: INDIA, Tamil Nadu, Tiruchirappalli, Perumalpalayam, 2 females, ex. *Aleurocanthus woglumi* Ashby on citrus sp, 18.iii.2009 (S. Manickavasagam and A. Ramesh kumar).

Distribution: Mexico: Colima, Veracruz. (Myartseva and Evans, 2007), India: Tamil Nadu (New record for India).

Host: *Aleurocanthus woglumi* Ashby on Citrus sp. (Myartseva and Evans, 2007).

16. *Encarsia guadeloupae* Viggiani

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 15 females, 27.ii.2009; Tamil Nadu, Cuddalore, Chidambaram, 17 females, 30.iv.2009 (C. Menakadevi); Tamil Nadu, Nammakkal, Paramathi - Vellore, 19 females, 29.xi.2009 (S. Manickavasagam and A. Rameshkumar); Tamil Nadu, Virudhunagar, Raja palayam, 17 females, 25.xii.2009 (R. Kanagaraj); Tamil Nadu, Krishnagiri, Puthur, 6 females, all the five ex. *Aleurodicus dispersus* Russell on *Psidium guajava*, 17.xii.2009 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Bangalore, Hassaragatta (Antony et al., 2006), Tamil Nadu (New record).

Host: *Aleurodicus dispersus* Russell (Antony et al., 2006).

17. *Encarsia hitam* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 5 females, through yellow pan trap from grass ecosystem, 10.vi.2010 (C. Menakadevi).

Distribution: India: Assam, Meghalaya, Uttar Pradesh, Uttarkand (Hayat, 2011), Tamil Nadu (New record).

Host: Unknown.

18. *Encarsia muliyali* Mani

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 7 females, ex. unidentified whitefly on Ixora sp. 28.viii.2009 (C. Menakadevi).

Distribution: India: Orissa, Uttar Pradesh (Thailand) (Hayat, 1998), Tamil Nadu (New record).

Host: *Aleurolobus barodensis* on sugarcane (Hayat, 1998).

19. *Encarsia obtusiclava* Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 10 females, ex. *Aleurocanthus* sp., on *Mangifera indica*, 10.iii.2010 (C. Menakadevi).

Distribution: India: Karnataka, Uttar Pradesh (Hayat, 1998), Tamil Nadu (New record).

Host: *Aulacapis tubercularis* on *Mangifera indica* (Hayat, 1998).

20. *Eutrichosomella Girault* [Genus record]

Specimen examined: INDIA, Kerala, Calicut, 1 female, through yellow pan trap forest ecosystem, 15.xii.2010 (S. Manickavasagam and A. Ramesh kumar).

Distribution: world species, 7, all Australian; one undescribed species from India (Hayat, 1998), Kerala (New record).

Host: Unknown for six of the seven species. One species (*E. blattophaga* Girault) was reared from blattid oothecae (Girault, 1915).

21. *Pteroptrix machiaveli* (Girault) [Genus and species record]

Specimens examined: INDIA, Tamil Nadu, Tiruchirappalli, Nagalapuram, 20 females, 2 males, ex. unidentified coccids on *Acacia* sp., 4.viii.2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Uttar Pradesh, Orissa, Meghalaya, Assam and Karnataka (Hayat, 1998), Tamil Nadu (New record).

Host: *Chionaspis ramakrishnai* (Hayat, 1998).

22. *Proaphelinoides Girault* [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 13 females, 6 males, through yellow pan trap from grass, cotton and forest ecosystems, 12.vi.2010 to 10.xi.2010 (C. Menakadevi). Distribution: India: Sri Lanka, USSR, Japan, Guam Island (Girault, 1917), Tamil Nadu (New record).

Host: *Odonaspis secreta* (Cockerell); swept from bamboo leaves infested with *Asterolecanium miliaris longum* (Green) (Swezey, 1946).

Thus the survey has thrown light on additional distributional records of one species from India, two genera and 18 species from Tamil Nadu and one genus and three species from Kerala. However, additional and consistent efforts are necessary to bring to science more genera and species, as more than 32 genera and 1000 species are reported globally, so that homopterans may be effectively managed through aphelinids.

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