New Records of Genera and Species of Encyrtidae (Hymenoptera: Chalcidoidea) from Tamil Nadu, India

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Faunistic survey conducted for two years (February 2009 - January 2011) through host rearing, net sweep, yellow pan trap and malaise trap in the major districts of Tamil Nadu resulted in new distributional records of 16 genera, 39 species and two new hosts of encyrtid parasitoids attacking homopteran pests.

Key words: Survey, parasitoids, Encyrtidae, distributional records, host record, Tamil Nadu, India.

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Recent outbreaks of homopteran insects including mealybugs in many crops around the globe including India have triggered focussed research on biocontrol agents of these homopterans. In particular, research on biological control of mealybugs has gained momentum. Of the various biocontrol agents of mealybugs and other coccids, encyrtid parasitoids are very important. The Indian sub continent is represented by 143 genera and 500 species of encyrtids of which only 56 and 140 genera and species respectively are reported from Tamil Nadu (Hayat, 2006 and 2009). Hence efforts were made for two years to report additional encyrtid parasitoids useful in biological control of homopteran insects.

Material and Methods
A survey was conducted from February, 2009 to January, 2011 in Tamil Nadu in search of encyrtid parasitoids of homopteran insects. Coccids, pseudococcids, cercopids, membracids, fulgorids and psyllids infested plant parts were collected and kept in secured polythene bags and reared in the laboratory to observe for parasitoid emergence. Other methods of collections like yellow pan trapping, net sweeping and malaise trapping were also employed and the recovered parasitoids were dry mounted on rectangles and labelled according to the standard procedure provided by Noyes (1982). References and keys for identification to all the species recorded here are available in Noyes and Hayat (1994) and Hayat (2006 and 2009) and insects were deposited with Parasitoid Taxonomy and Biocontrol Laboratory, Department of Entomology, Faculty of Agriculture, Annamalai University, Chidambaram.

Results and Discussion
The survey conducted for a two year period revealed the following additional presence of encyrtid parasitoids from Tamil Nadu:

1. Acerophagus papayae Noyes and Schauff [Genus record]
   Specimens examined: INDIA, Tamil Nadu, Tiruchirappalli, Perumalpalayam, 44 females, ex. Paracoccus marginatus on Abutilon indicum, i.2011 (S. Manickavasagam and A. Rameshkumar)
   Distribution: India: Tamil Nadu (New record).
   Host: Paracoccus marginatus (Noyes & Schauff, 2003)

2. Acerophagus solidus Hayat
   Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, through yellow pan trap from grass ecosystem, viii, 2010, (S. Manickavasagam and A. Rameshkumar).
   Distribution: India: Assam, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).
   Host: Unknown.

3. Adektitopus longipennis (Shafee & Avasthi)
   Specimens examined: INDIA, Tamil Nadu, Velore, Kalavai, 2 females, through rearing of unidentified scales on mango, vi, 2010, (C. Menakadevi).

4. Adelencyrtus bimaculatus Alam
   Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, through net sweep from grass ecosystem, vii, 2010, (S. Manickavasagam and A. Rameshkumar).
   Distribution: India: Kerala, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).
   Host: Coccidohystrix insolita (Shafee & Avasthi, 1983).

5. Acerophagus papayae Noyes and Schauff [Genus record]
   Specimens examined: INDIA, Tamil Nadu, Tiruchirappalli, Perumalpalayam, 44 females, ex. Paracoccus marginatus on Abutilon indicum, i.2011 (S. Manickavasagam and A. Rameshkumar)
   Distribution: India: Tamil Nadu (New record).
   Host: Paracoccus marginatus (Noyes & Schauff, 2003)

6. Acerophagus solidus Hayat
   Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, through yellow pan trap from grass ecosystem, viii, 2010, (S. Manickavasagam and A. Rameshkumar).
   Distribution: India: Assam, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).
   Host: Unknown.

7. Adektitopus longipennis (Shafee & Avasthi)
   Specimens examined: INDIA, Tamil Nadu, Velore, Kalavai, 2 females, through rearing of unidentified scales on mango, vi, 2010, (C. Menakadevi).

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Distribution: India: Andaman & Nicobar, Jharkhand, Karnataka, Rajasthan, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).


5. **Adelencyrtus quadriguttus** (Girault)
   
   Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 2 females, through rearing of unidentified scales on mango, viii, 2009, (S. Manickavasagam & A. Rameshkumar).
   
   Distribution: India: [Locality not given in original publication] (Hayat, 2006), Tamil Nadu (New record).

   Host: Red scale (Girault, 1932).

6. **Anagyrus discolor** Noyes & Hayat
   
   Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through net sweep from grass ecosystem, vii, 2010, (S. Manickavasagam and A. Rameshkumar).
   
   Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

   Host: Unknown.

7. **Anagyrus floris** Noyes & Hayat
   
   Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, through net sweep from grass ecosystem, vii, 2010, (S. Manickavasagam and A. Rameshkumar).
   
   Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

   Host: Unknown.

8. **Anagyrus greeni** Howard
   
   Specimens examined: INDIA, Tamil Nadu, Coimbatore, TNAU campus, 1 female, through net sweep from grass ecosystem, viii, 2010, (S. Manickavasagam and A. Rameshkumar).
   
   Distribution: India: Assam, [?] Jharkhand, [?] Karnataka (Hayat, 2006), Tamil Nadu (New record).


9. **Anagyrus qadrii** (Hayat, Alam & Agarwal)
   
   
   Distribution: India: Goa, Karnataka (Hayat, 2006), Tamil Nadu (New record).

   Host: *Ferrisia virgata* (Hayat et al., 1975).

10. **Anicetus angustus** Hayat, Alam & Agarwal
    
    
    Distribution: India: Goa (Hayat, 2006), Tamil Nadu (New record).

    Host: *Ceroplastes actiniformis* (Hayat et al., 1975).

11. **Anicetus ashmeadi** Hayat, Alam & Agarwal
    
    
    Distribution: India: Haryana (Hayat, 2006), Tamil Nadu (New record).

    Host: *Ceroplastes* sp. (Hayat et al., 1975).

12. **Anicetus howardi** Hayat, Alam & Agarwal
    
    
    Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

    Host: *Ceroplastes* sp. (Hayat et al., 1975).

13. **Anomalencyrtus longicornis** Hayat & Verma [Genus record]
    
    Specimens examined: INDIA, Tamil Nadu, Velore, Kalavai, 1 female, through yellow pan traps on grass ecosystem, xi, 2010, (C. Menakadevi).
    
    Distribution: India: Uttar Pradesh, Delhi (Hayat, 2006), Tamil Nadu (New record).

    Host: Unknown.

14. **Aphycus sapporoensis** (Compere & Annecke) [Genus record]
    
    Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 2 females, 1 male, through net sweep from grass ecosystem, vii, 2010, (S. Manickavasagam and A. Rameshkumar).
    
    Distribution: India: Uttar Pradesh, Delhi (Hayat, 2006), Tamil Nadu (New record).

    Host: Unknown.

15. **Carabunia zora** Hayat [Genus record]
    
    
    Distribution: India: Kerala (Hayat, 2006), Tamil Nadu (New record).

    Host: *Clovia puncta* on grass (New record).
16. Cerchysius laticeps Kerrich [Genus record]

Specimens examined: INDIA, Tamil Nadu, Coimbatore, TNAU campus, 3 females, through net sweep from grass ecosystem, vii, 2009, (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Assam, Meghalaya (Hayat, 2006), Tamil Nadu (New record).


17. Charitopus panchgania (Mani & Saraswat)

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through net sweep from grass ecosystem, vii, 2010, (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Assam, Arunachal Pradesh, Bihar, Kerala, Maharashtra, Orissa, Uttaranchal, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Icerya pilosa (Shamim & Shafee, 1984).

18. Cheiloneurus parvus (Hayat)

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through Malaise trap from grass ecosystem, iii, 2010, and 1 female, sweep from paddy ecosystem, i, 2010, (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

19. Cheiloneurus zeyai Anis & Hayat


Distribution: India: Delhi, Kerala (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

20. Comperiella lemniscata Compere and Annecke

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, Annamalai University orchard, 2 females, ex. diaspidid scales on mango, viii, 2009,(S. Manickavasagam and A. Rameshkumar).

Distribution: India: Jharkhand, Maharashtra, Rajasthan, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Aonidiella orientalis (Hayat, 1977).

21. Diaphorencyrtus aligarhensis (Shafee, Alam & Agarwal) [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 11 females, 4 males, x, 2009; Trichy, Thurayur, 15 females, 3 males; x-xx, 2009 and Namakkal, Paramathi-Vellore, 13 females, 3 males, all ex. unidentified psyllids on curry leaves, x - xii, 2009, (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Diaphorina sp. (Hayat, 1981), Psylla sp. (Shafee et al., 1975).

22. Encyrtus noyesi Singh


Distribution: India: Assam (Hayat, 2006), Tamil Nadu (New record).

Host: Coccus sp., Spondias pinnata and Terminalia chebula (Singh, 1997).

23. Homalotylus flaminius (Danman)


Distribution: India: Andhra Pradesh, Delhi, Karnataka, Punjab, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host:[Coccinellids predaceous on]: Nipaecoccus sp. (Hayat et al, 1975 and Avasthi & Shafee, 1977).

24. Indaphycus planus Hayat [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, through net sweep from grass ecosystem, vii, 2010, (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

25. Lakshaphagus daulai (Shafee, Alam & Agarwal)

Specimens examined: INDIA, Tamil Nadu, Nagapattinam, Thalachangadu, 4 females, ex. Anomalococcus sp. on Acacia sp., ii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Anomalococcus crematogasteri (Shafee et al., 1975).

26. Leptomastix longicornis Khan & Shafee

Specimens examined: INDIA, Tamil Nadu, Tiruchirappalli, Kanapadi hills, 1 female, through...
net sweep from forest ecosystem, viii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Karnataka (Hayat, 2006), Tamil Nadu (New record).


27. Manicnemus indicus (Mani & Saraswat) [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 4 females, 6 males, through net sweep and yellow pan trap from grass ecosystem, vii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Assam, Bihar, Delhi, Jharkhand, Karnataka, Kerala, Maharashtra, Orissa, Rajasthan, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Greenaspis divergens (Shafee et al., 1975).

28. Meniscocephalus optabilis Hayat [Genus record]

Specimens examined: INDIA, Tamil Nadu, Coimbatore, Vadavalli, 1 female, ex. membracid nymphs on Prosopis sp., xii, 2009 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Kerala (Hayat, 1979), C. hibisci (Shafee et al., 1975), C. indicus (Hayat, 1986).

Host: Unidentified membracid nymphs on Prosopis sp. (New record).

29. Monstranusia antennata (Narayanan) [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through net sweep from grass ecosystem, vii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Delhi (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

30. Neastymachus angustifrons (Shafee, Alam & Agarwal)

Specimens examined: INDIA, Tamil Nadu, Nagappattinam, Thalachankadu, 2 females, ex. unidentified scale on Acacia sp., ii, 2010 and Cuddalore, Maruthur, 2 females, ex. unidentified scale on Prosopis sp., ii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Kerala, Maharashtra (Hayat, 2006), Tamil Nadu (New record).

Host: Anagyrus kamali, through coccids (Sureshan & Narendran, 2005), [with] Nipaecoccus viridis (Shafee et al., 1975).

31. Neastymachus cerococi (Shafee, Alam & Agarwal)

Specimens examined: INDIA, Tamil Nadu, Nagappattinam, Thalachankadu, 4 females, ex. unidentified scale on Acacia sp. ii, 2010 and Cuddalore, Maruthur, 5 females, ex. unidentified scale on Prosopis sp., ii, 2010, (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Uttar Pradesh, Kerala, Bihar (Hayat, 2006), Tamil Nadu (New record).

Host: Cerococcus sp. (Hayat, 1979), C. hibisci (Shafee et al., 1975), C. indicus (Hayat, 1986).

32. Parablatticida citri (Mercet) [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 3 females, through net sweep from grass ecosystem, vii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

33. Parechthrodryinus excelsus Hayat

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 10 females, ex. Rastrococcus iceryoides on pungam tree, iii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Rastrococcus iceryoides (Hayat, 2003).

34. Prochiloneurus javanicus (Ferriere)

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, ex. Phenacoccus solenopsis on bhendi, x, 2010 and Salem, Attur, 1 female, ex. unidentified mealybugs on weeds, x, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India: Andhra Pradesh, Kerala, Maharashtra (Hayat, 2006), Tamil Nadu (New record).

Host: Anagyrus kamali, through coccids (Sureshan & Narendran, 2005), [with] Nipaecoccus viridis (Shafee et al., 1975).

35. Psyllaphycus diaphorinae Hayat [Genus record]


Distribution: India: Maharashtra, Punjab (Hayat, 2006), Tamil Nadu (New record).


Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 2 females, through net sweep and malaise trap from grass ecosystem, iii, 2009 (S. Manickavasagam and A. Rameshkumar).

Distribution: India; Assam, Uttaranchal (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

37. *Sakencyrtus mirus* Hayat [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 4 females, through net sweep from grass ecosystem, iv, 2010 and Madurai, Melur, 5 females, through net sweep from grass ecosystem, ix, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India; Assam, Orissa, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

38. *Saucencyrtus insulanus* Hayat & Singh [Genus record]

Specimens examined: INDIA, Tamil Nadu, Cuddalore, Chidambaram, 1 female, through net sweep from grass ecosystem, iv, 2009 (S. Manickavasagam and A. Rameshkumar).

Distribution: India; Andaman & Nicobar (Hayat, 2006), Tamil Nadu (New record).

Host: Unknown.

39. *Zaomma lambinus* (Walker) [Genus record]

Specimens examined: INDIA, Tamil Nadu, Tiruchirappalli, Nagalapuram, 6 females, ex. unidentified disapidid scales on *Acacia spicegera*, ii, 2010 (S. Manickavasagam and A. Rameshkumar).

Distribution: India; Andaman & Nicobar, Kerala, Uttar Pradesh (Hayat, 2006), Tamil Nadu (New record).

Host: Indet. Diaspidini (Hayat et al., 1975).

In Tamil Nadu, a total of 72 genera and 179 species of encyrtid parasitoids were reported including the 16 genera and 39 species reported in the present study.

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