

A CHECKLIST OF ENCYRTIDAE (HYMENOPTERA: CHALCIDOIDEA) FROM PUNJAB, INDIA

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ABSTRACT: The present paper deals with the study of family Encyrtidae of Punjab which includes 16 genera with 28 species. *Copidosoma floridanum* (Ashmead) is new record from Indian state Punjab.

KEY WORDS: Checklist, Parasitic wasp, Chalcidoidea, Encyrtidae, Punjab, India.

The family Encyrtidae is second largest among chalcidoidea whose members are used in the biological control of insect pests. The family Encyrtidae is mostly primary internal parasitoids and hyper-parasitoids of coccoidea (Homoptera), Lepidoptera, Diptera, Coleoptera and also attack on aphids and psyllids.

In recent year several new genera and species of Encyrtidae described from various Indian states by Mani (1989), Noyes & Hayat (1984, 1994), Huang & Noyes (1994), Hayat (2002, 2003, 2006, 2010), Kazmi (2006, 2008, 2012), Kazmi & Hayat (1995, 1998), Hayat & Kazmi (1999, 2011), Anis & Hayat (1998, 2002), Singh & Hayat (2005). The family Encyrtidae is represented by 148 genera under 560 species in India. Accordingly an updated checklist of the Encyrtidae fauna of Indian state Punjab is presented here. It includes 16 genera with 28 species.

Subfamily ENCYRTINAE Walker

Genus *Anicetus* Howard

Hosts: Parasitoids of Homoptera (Coccidae).

Species and Distribution: World 41 species; 13 species from India and one species from Punjab.

Anicetus integrellus Trjapitzin

Hosts: *Ceroplastes* sp. on *Citrus aurantifolia*; *Ceroplastodes cajani* on *Ficus* sp.; *Ceroplastodes* sp. on edible fig.

Distribution: India: Punjab, Uttar Pradesh, Delhi.

Genus *Cheiloneurus* Westwood

Hosts: Hyperparasitoids of Coccidae and Pseudococcides (Homoptera) via other chalcidoids (Hymenoptera).

Species and Distribution: World 125 species; 33 species from India and one species from Punjab.

Cheiloneurus neparvus Hayat

Hosts: Unknown.

Distribution: India: Punjab.

Genus *Copidosoma* Ratzeburg

Hosts: Polyembryonic parasitoids of larvae of Lepidoptera.

Species and Distribution: World 185 species; 25 species from India and two species from Punjab.

Copidosoma floridanum (Ashmead)

Hosts: *Plusia signata*, *Cosmophila sabulifera*.

Distribution: India: Punjab, Uttar Pradesh, Bihar, Jharkhand, Karnataka, Kerala, Jammu & Kashmir, Odisha, Tamil Nadu, West Bengal.

Remarks: New record from state Punjab, India.

Copidosoma varicorne (Nees)

Hosts: ?*Anarsia ephippias*, ?*A. sigmatica*, *Dichomeris eridontis*, *Eucosma* sp.

Distribution: India: Kerala, Punjab, Andhra Pradesh, Uttar Pradesh, Tamil Nadu.

Genus ***Diaphorencyrtus*** Hayat

Hosts: Parasitoids of nymph of Psyllidae (Homoptera).

Species and Distribution: World 02 species, 01 species from India and Punjab.

Diaphorencyrtus aligarhensis (Shafee et al.)

Hosts: *Diaphorina* sp., *D. cardiae*, *Psylla* sp.

Distribution: India: Punjab, Uttar Pradesh, Maharashtra, Andhra Pradesh, Rajasthan.

Genus ***Homalotylus*** Mayr

Hosts: Parasitoids of larvae of lady bird beetle (Coleoptera: Coccinellidae).

Species and Distribution: World 40 species; 12 species from India and two species from Punjab.

Homalotylus flaminius (Dalman)

Hosts: Coccinellids predaceous on *Nipaeococcus viridis* on *Solanum* sp..

Distribution: India: Punjab, Uttar Pradesh, Andhra Pradesh, Karnataka, Delhi.

Homalotylus turkmenicus Myartseva

Hosts: Coccinellids predaceous on: *Centrocooccus* sp. on *Wittania somnifera*; *Coccidohystrix insolita* on *Solanum melongena*; *W. somnifera*; *Nipaeococcus* sp. on *Pteristropa bicalyculata*; coccids on *Dalbergia sissoo*, *Zizyphus* sp.; mealybugs on *Solanum* sp.

Distribution: India: Punjab, Uttar Pradesh, Rajasthan, Haryana.

Genus ***Metaphycus*** Mercet

Hosts: Parasitoids of mainly soft scale insects (Homoptera: Coccidae).

Species and distribution: World more than 400 species, 15 species from India and two species from Punjab.

Metaphycus gilvus Compere

Hosts: *Ceroplastes* sp. on *Mangifera indica*; *Ceroplastodes cajani* on *Ficus* sp.; *Chloropulvinaria* sp. on *Dalbergia sissoo*; *Chloropulvinaria polygonata*; *Pulvinaria maxima*.

Distribution: India: Punjab, Uttar Pradesh, Karnataka, Madhya Pradesh.

Metaphycus zebratus (Mercet)

Hosts: *Ceroplastodes cajani* on *Ficus* sp.; (?) *Aonidiella orientalis* on *Dalbergia sissoo*; (?) *Nipaeococcus* sp. on *Citrus* sp.

Distribution: India: Punjab, Uttar Pradesh, Himachal Pradesh.

Genus ***Ooencyrtus*** Ashmead

Hosts: Oophagous, parasitoids of eggs of various insects, notably Lepidoptera and Heteroptera. Also hyperparasitoids of Lepidoptera and Auchenorrhyncha (Homoptera) via other Hymenoptera.

Species and distribution: World over 120 species, 29 species from India and two species from Punjab.

Ooencyrtus manii Huang & Noyes

Hosts: Eggs of *Pyrilla perpusilla*.

Distribution: India: Punjab, Delhi, Haryana, Maharashtra, Tamil Nadu, Uttar Pradesh.

Ooencyrtus segestes Trjapitzin

Hosts: Unknown.

Distribution: India: Punjab, Assam, Andhra Pradesh, Bihar, Delhi, Karnataka, Tamil Nadu, Uttar Pradesh.

Genus ***Psyllaphycus*** Hayat

Hosts: Parasitoids of nymphs of Psyllidae (Homoptera).

Species and distribution: One species, India and Punjab.

Psyllaphycus diaphorinae Hayat

Hosts: *Diaphorina cardiae* on *Cardia ruyxa* (Hayat, 1972; 1979); *Diaphorina* sp. (Hayat, 1972).

Distribution: India: Punjab, Maharashtra.

Genus ***Xenostrixis*** Girault

Hosts: Parasitoids on diaspidid scales (Homoptera: Diaspididae).

Species and Distribution: World 09 species; 03 species from India and one species from Punjab.

Xenostrixis bella Hayat & Badruddin

Hosts: Unknown.

Distribution: India: Punjab.

Genus ***Prochiloneurus*** Silvestri

Hosts: Hyperparasitoids on Homoptera (Coccidae and Pseudococcidae).

Species and Distribution: World 29 species; 09 species from India and three species from Punjab.

Prochiloneurus comperei Viggiani

Hosts: *Icerya formicarum* on *Acacia* sp., *Nipaeococcus* sp. on *Casuarina equisetifolia* and *Morus alba*.

Distribution: India: Punjab, Tamil Nadu, Andhra Pradesh.

Prochiloneurus pulchellus Silvestri

Hosts: *Centrocooccus* spp. on *Leucas cephalotus*, *Pupalia lappacea* and *Wittania somnifera*, *C. insolita*; *Ferrisia virgata*; *Icerya aegyptica*; *Nipaeococcus* spp.

Distribution: India: Uttar Pradesh, Tamil Nadu, Bihar, Punjab, Gao, Haryana, Karnataka, Kerala, Maharashtra, Andhra Pradesh.

Prochiloneurus testaceus (Agarwal)

Hosts: *Coccus viridis*; *Nipaeococcus* sp.; *Nipaeococcus viridis*; *Rastrococcus iceryoides*.

Distribution: India: Uttar Pradesh, Andaman & Nicobar Is., Maharashtra, Tamil Nadu, Punjab, Andhra Pradesh.

Genus ***Tassonia*** Girault

Hosts: Parasitoids of Aphididae (Homoptera).

Species & Distribution: World 03 species, 03 species from India and one species from Punjab.

Tassonia gloriae Girault

Hosts: *Hysteroneura setariae*; *Longiunguis sacchari*; *Myzus persicae*.

Distribution: India: Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Punjab, Rajasthan, Tanil Nadu, Uttar Pradesh, Uttrakhand, West Bengal.

Subfamily **TETRACNEMINAE** HowardGenus ***Aenasius*** Walker

Hosts: Parasitoids of mealybugs (Homoptera: Pseudococcidae).

Species and distribution: World 36 species, 05 species from India and two species from Punjab.

Aenasius advena Compere

Hosts: *Ferrisia virgata*.

Distribution: India: Andaman & Nicobar Islans, Delhi, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Punjab, Uttrakhand, Uttar Pradesh.

Aenasius indicus (Narayanan & Subba Rao)

Hosts: *Icerya formicarum* on *Psidium guajava*; *Nipaeococcus* spp. on *Citrus*, *Morus alba*, *Acacia* sp.; *N. viridis* on *Citrus* sp., *Euphorbita hirta*, *Morus alba*, *Dalbergia sissoo*, *Vitis vinifera*; *Planococcides robustus* on *Atrocarpus heterophyllus*, *Mangifera indica*.

Distribution: India: Punjab, Delhi, Himachal, Madhya Pradesh, Kerala, Odisha, Uttrakhand, Uttar Pradesh.

Genus ***Alamella*** Agarwal

Hosts: Parasitoids of mealybugs (Homoptera: Pseudococcidae).

Species and distribution: World 05, one species from India and one species from Punjab.

Alamella flava Agarwal

Hosts: *Eriococcus greeni*; *Maconelliococcus hirsutus*; *Nipaeococcus* sp.; *Nipaeococcus viridis*.

Distribution: India: Karnataka, Andhra Pradesh, Himachal Pradesh, Haryana, Kerala, Punjab, Maharashtra, Tamil Nadu, Uttar Pradesh.

Genus ***Anagyrus*** Howard

Hosts: Parasitoids of mealybugs (Homoptera: Pseudococcidae).

Species and distribution: World about 250, 50 species from India and six species from Punjab.

Anagyrus agraensis Saraswat

Hosts: *Centrococcus* sp. on *Morus indica*; *Ferrisia virgata*; *Nipaeococcus* sp. on *Citrus* sp., *Ficus* sp.; *Nipaeococcus viridis* on wild plant, *Ziziphus* sp. *Ficus* sp., *Jatropha* sp.; *Planococcus citri* on coffee; *Pseudococcus* sp. on *Casuarina*; *Rastrococcus iceryoides* on *Ziziphus* sp.

Distribution: India: Himachal Pradesh, Goa, Haryana, Karnataka, Kerala, Odisha, Punjab, Tamil Nadu, Uttar Pradesh.

Anagyrus aligarhensis Agarwal

Hosts: *Saccharicoccus sacchari* on sugarcane; *Kiritshenkella sacchari* on sugarcane.

Distribution: India: Bihar, Delhi, Karnataka, Maharashtra, Haryana, Punjab, Tamil Nadu, Nagaland, Odisha, Uttrakhand, Uttar Pradesh.

Anagyrus dactylopii (Howard)

Hosts: *Planococcus citri* on *Citrus medica*; *Pseudococcus* sp. on *Citrus aurantifolia*; *Rastrococcus capparidae*; *Ferrisia virgata* on *Acacia* sp. *Maconelliococcus hirsutus* on *Anona squamosa* and grapes.

Distribution: India: Andhra Pradesh, Bihar, Andaman & Nicobar Islands, Goa, Delhi, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Tamil Nadu, Uttrakhand, Uttar Pradesh.

Anagyrus indicus (Subba Rao)

Hosts: *Ferrisia virgata* on guava, *Psidium guajava*; *Planococcus* sp. on *Giricidia sepium*.

Distribution: India: Andhra Pradesh, Assam, Delhi, Karnataka, Kerala, Maharashtra, Tamil Nadu, Punjab, Uttar Pradesh, West Bengal.

Anagyrus mirzai Agarwal & Alam

Hosts: *Ferrisia virgata*; *Icerya formicarum* on *Psidium guajava*; *Nipaeococcus viridis*, same host on wild plant; *Nipaeococcus* sp. on *Casuarina equisetifolia*, *Tamarindus indica*, *Morus alba*; *Planococcus citri* on *Citrus medica*; *Rastrococcus iceryoides* on *Citrus*.

Distribution: India: Andhra Pradesh, Andaman & Nicobar Islands, Karnataka, Haryana, Himachal Pradesh, Haryana, Odisha, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh.

Anagyrus saccharicola Timberlake

Hosts: *Ripersia* [= *Kiritshenkella*] *sacchari* (Ahmad, 1942); *Saccharicoccus sacchari* [on sugarcane] (Mani, 1939; Pruthi & Mani, 1940; Puttarudriah, 1954; Usman & Puttarudriah, 1955; Narayanan et al., 1957); *Trionymus sacchari* (Dorge et al.).

Distribution: India: Punjab, Maharashtra, Haryana, Delhi, Himachal Pradesh, Karnataka, Tamil Nadu.

Genus ***Leptomastix*** Foerster

Hosts: Parasitoids of mealybugs (Homoptera: Pseudococcidae).

Species and distribution: World 33 species; 10 species from India and one species from Punjab.

Leptomastix nigrocoxalis Compere

Hosts: *Coccidohystrix* sp. on *Achyranthes aspera*, *Pupalia lappacea*, *Wittania somnifera*; *C. insolita* on *A. aspera* and *W. somnifera*; *Icerya aegyptica*; *Nipaeococcus* sp. on *Citrus*, *Acacia*, *Peritropha bicalyculata*, *Morus alba*; *N. viridis* on *Ziziphus* sp., *Acacia* sp., *Tephrosia purpurea*; *Planococcus citri* on *Citrus medica*.

Distribution: India: Punjab, Andhra Pradesh, Goa, himachal Pradesh, Karnataka, Kerala, Tamil Nadu, Maharashtra, Odisha, Pondicherry, Uttrakhand, Uttar Pradesh, West Bengal.

Genus ***Rhopus*** Foerster

Hosts: Parasitoids of mealybugs (Homoptera: Pseudococcidae).

Species and distribution: World about 50 species; 15 species from India and one species from Punjab.

***Rhopus gramineus* Hayat**

Hosts: *Antonina* sp. on *Cynodon* sp..

Distribution: India: Punjab, Delhi, Tamil Nadu, Uttar Pradesh.

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