CHECKLIST OF INDIAN TRICHOGRAMMATIDAE (HYMENOPTERA: CHALCIDOIDEA)

Salma Begum*, Shoeba B. Anis

Department of Zoology, Section of Entomology, Aligarh Muslim University, Aligarh, Uttar Pradesh.

A B S T R A C T

A complete updated checklist of Indian Trichogrammatidae is presented here. This list is based on a detailed study of all available published data and on recent collected materials from different state of India. A total of 151 species representing 31 genera were recognized from India.

Keywords: Checklist, Trichogrammatidae, India.

INTRODUCTION

The family Trichogrammatidae is one of the most widely distributed, speciose and biologically diverse group. The members of this family are very minute, measuring about 0.2-1.0 mm and are easily recognized by three segmented tarsi. The trichogrammatid fauna is represented by 89 genera and more than 800 species across the world (Ranyse et al., 2010). However, in India, it is represented by only 151 species in 31 genera (Noyes, 2012) and among them Trichogramma Westwood and Oligosita Walker are highly speciose (Noyes, 2012). The trichogrammatids constitute an economically important group of hymenopterous parasitoids attacking eggs of various groups of insect pests mostly on Lepidoptera and Hemiptera, few on Coleoptera, Diptera and Thysanoptera (Yousuf and Shafee, 1987). The species of Trichogrammatidae are showing a great diversity in host preference, thus play a major role in regulating pest population in nature and therefore potentially important in biological control programs against various pests, Trichogramma are used commercially to control Lepidopterous pests of various crops (Ridgway and Morrison, 1985). The confusion still present in the Trichogrammatidae can only be alleviated with further collecting efforts and the necessary taxonomic work. Beside the usefulness of these insects in the control of pests, their taxonomic study is fascinating such as modifications in antennal, wing, male genitalic characters, though laborious and time consuming work. Because of their small size, lack of literature, lack of collection and less taxonomy studies resulted in many nomenclature problems, Girault (1911, 1912a, b, 1913) was perhaps the only chalcidologist who made great strides in the study of trichogrammatids, and Ashmead (1904) laid the foundation for subsequent taxonomists to work further. However, the need for a reliable system for classifying trichogrammatids was fulfilled by Doutt and Viggiani (1968). These authors studied all the available types and presented for the first time a workable key to the genera known from the world and gave notes on their distribution and synonym. Their paper forms the basis for the subsequent studies on Trichogrammatidae. The present checklist is an attempt to bring at one place the available information on the distribution of Indian Trichogrammatidae.

CLASSIFICATION OF THE FAMILY TRICHOGRAMMATIDAE

Ashmead (1904) divided the family Trichogrammatidae into two subfamilies, viz. Trichogrammatinae and oligositinae; the former with 9 genera and the later with 5 genera. His classification was based on the discal ciliation of the forewing. Girault (1912) rejected his classification. He divided the family into two subfamilies, Chaetostrichinae and Trichogrammatinae and further recognized two to three tribes, Chaetostrichinae, Ophioneurini and Lathromerini (Girault, 1912a, b, c, 1913) in Chaetostrichinae; and Trichogrammatinae with

* Corresponding Author:
Email: salma.taxo@gmail.com
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two tribes, Trichogrammatini and Poropaeni (Girault, 1912c) and Trichogrammatinae and Ophionineurinae (Nowicki, 1933) Viggiani, 1971 divided the family into Trichogrammatinae and Oligositinae as earlier done by Ashmead (1904), but he further recognized 4 tribes, namely, Trichogrammatini and Paracentrobinini in Trichogrammatinae, and Oligositini and Chaetostrichini in Oligositinae. Yousuf and Shafee (1988) agreed with Viggiani (1971) in dividing the family into subfamilies but recognized 5 tribes within these two subfamilies. More recently, Pinto (2006) greed with the subfamilial classification of Ashmead (1904), Viggiani (1971) and Yousuf and Shafee (1988b), but recognized only one tribe Trichogrammatini in Trichogrammatinae, and 3 tribes in the Oligositinae: Oligositini (with subtribes, Oligositina and Eterolegitina), Paracentrobinini and Chaetostrichini. In spite of the above mentioned studies, suprageneric classification remains largely an unsettled problem.

MATERIAL AND METHODS
The following checklist is based on our taxonomic studies and data obtained from all the available literature for the territory of current India, as well as other publications handling Indian data (till 2013). Data of only valid species described from India are given in the distributions cited, as much as feasible, and included only after critical assessment. The present study is based only on females, though males are present in our collection), because it is difficult to associate sexes correctly from swept material and these can only be identified when both the sexes are reared together from known hosts. See Noyes (1982) for hints on collecting and preserving chalcidoid wasps. The list is arranged alphabetically by genus and species. For each species, the most recent combination followed by the author name, year and the Indian distribution (name of state between brackets). The synonyms are given between parentheses after the name (for genus) and distribution (for species), where present.

CHECK LIST OF INDIAN TRICHOGRAMMATIDAE
At present, a total of 151 species in 31 genera of trichogrammatid wasps is recorded from Indian fauna. The most specious genus is Trichogramma, which includes 32 species.

1. **Genus Aphelinoidea Girault, 1911**
(Synonyms: Lathromeroides Girault, 1913; Diaclava Blood & Kryger, 1928; Krygeriola Nowicki, 1934; Thalesanna Girault, 1938; Lengerkeniola Nowicki, 1946; Encyrtogramma De Santis, 1957; Tanygramma De Santis, 1957)

2. **Genus Brachygrammatella Girault, 1915**
(Synonym: Pseudbrachygramma Girault, 1915)
   a. *indica* Viggiani & Hayat, 1974. [Maharashtra; Uttar Pradesh; Punjab; Tamil Nadu; Rajasthan]
   b. *jaipurensis* Yousuf & Shafee, 1988. [Rajasthan]

3. **Genus Burksiella De Santis, 1957**
(Synonym: Parhispidophila Yousuf & Shafee, 1988)
   a. *singularis* (Yousuf & Shafee), 1988. [Haryana; Uttar Pradesh; Orissa]

4. **Genus Chaetogramma Doutt, 1974**
(Synonym: Brachistarapha De Santis, 1997)
   b. *hisarensis* Yousuf & Shafee, 1993. [Haryana]
   c. *maculata* Hayat, 1981. [Uttar Pradesh]
   (Synonym: *Brachygrammatella singularis* Yousuf & Shafee, 1985)

5. **Genus Chaetostrichella Walker, 1851**
(Synonym: Centrobiia Foerster, 1856; Centrobiella Girault, 1912; Ratzbergalla Girault, 1938)
   a. *fumipennis* (Yousuf & Shafee) 1988. [Uttar Pradesh]
   b. *magniclavata* Yousuf & Shafee1988. [Uttar Pradesh]
   c. *terebrata* (Yousuf & Shafee), 1984. [Andhra Pradesh; Uttar Pradesh; Orissa]
   (Synonym: *Chaetostrichra terebrator* Yousuf & Shafee, 1985; Oligositoides latipennis Yousuf & Shafee, 1988)

6. **Genus Chaetostrichella Girault, 1914**
   a. *Indica* Hayat, 2009. [Assam]

7. **Genus Epoligosita Girault, 1915**
   b. *bicolor* Hayat & Viggiani, 1981. [Uttar Pradesh]
   c. *clara* Hayat & Viggiani, 1981. [Uttar Pradesh]
   d. *duliniae* Livingstone & Yacoob, 1983. [Kerala; Tamil Nadu]

8. **Genus Haeckeliania Girault, 1912i.**
   a. *magniclavata* Yousuf & Shafee, 1984. [Uttar Pradesh]
9. **Genus Hayatia Viggiani, 1982**
   (Alhinda Hayat, 2008 as subgenus)
   a. *indica* Viggiani, 1982. [Maharashtra; Uttar Pradesh; West Bengal]
   b. *triclada* Hayat, 2008. [Uttar Pradesh]
   c. *uttara* Hayat, 2009. [Uttar Pradesh]

10. **Genus Lathromeris Foerster, 1856**
    (Synonyms: Lathromerella Girault, 1912; Garouella Risbec, 1956.)

11. **Genus Lathromeroidea Girault, 1912**
    (Synonym: Centrobiopsis Girault, 1918)
    c. *nigrella* Girault, 1912. [Uttar Pradesh]

12. **Genus Lathromeromina Livingstone & Yacoob, 1983**
    a. *tingipaga* (Livingstone & Yacoob, 1983). [Karnataka; Kerala, Orissa, Tamil Nadu; Kerala]

13. **Genus Lathromerygia Girault, 1914**
    (Synonym: Lathromerygia Girault, 1916)
    a. *dimorpha* Hayat, 1981. [Uttar Pradesh; Orissa]

14. **Genus Megaphragma Timberlake, 1923**
    (Synonyms: Sethosiella Kryger, 1923; Paramegaphragma Lin, 1992)
    b. *magniclava* Yousuf & Shafee, 1988. [Uttar Pradesh]
       (Synonym: Megaphragma aligarhensis Yousuf & Shafee, 1988a)
    c. *shimalianum* Hayat, 2009. [Uttar Pradesh]

15. **Genus Mirufens Girault, 1915**
    (Synonym: Trachocera Blood & Kryger, 1928)
    a. *afrangiata* Viggiani & Hayat, 1974. [Punjab; Rajasthan; Uttar Pradesh]
       (Synonyms: Mirufens albiscutellum Khan & Shafee, 1977; Mirufens magniclava Khan & Shafee, 1977)
    b. *brevisculus* Khan & Shafee, 1977. [Uttar Pradesh; Rajasthan]
    c. *longifunicalata* Viggiani & Hayat, 1974. [Punjab; Gujarat; Karnataka]
    d. *mangiferae* Viggiani & Hayat, 1974. [Tamil Nadu; Uttar Pradesh]
       (Synonym: Mirufens longiclava Khan & Shafee, 1977)

16. **Genus Neocentrobiella Girault, 1915**
    a. *terebreator* Yousuf & Shafee, 1985. [Uttar Pradesh]
    b. *viggiani* Hayat, 1980. [Uttar Pradesh]

17. **Genus Oligosita (Haliday MS) Walker, 1851**
    (Synonyms: Westwoodella Ashmead, 1904; Paroligosita Kurdjumov, 1911; Orligosita Hayat, 2009 as subgenus)
    a. *angustipennis* Yousuf & Shafee, 1922. [Uttar Pradesh]
    b. *breviclava* Yousuf & Shafee, 1988. [Uttar Pradesh; Rajasthan]
    d. *gilvinus* Yousuf & Shafee, 1984. [Uttar Pradesh]
    f. *longipennis* Yousuf & Shafee, 1992. [Uttar Pradesh]
    g. *longirhinaria* Yousuf & Shafee, 1988. [Uttar Pradesh]
    h. *meerutensis* Yousuf & Shafee, 1984 [Bihar; Uttar Pradesh; Rajasthan; Jharkand] (Synonyms: Oligosita aligarhensis Yousuf & Shafee, 1984; Oligosita kasimpurensis Yousuf & Shafee, 1988)
    i. *naias* Girault, 1938. [Andhra Pradesh; Karnataka; Orissa; Tamil Nadu]
    j. *novisanguinea* Girault, 1912. [Haryana; Himachal Pradesh; Jammu and Kashmir; Uttarakhand; Uttar Pradesh; Rajasthan]
    k. *sanguinea* (Girault), 1911. [Uttar Pradesh]
    m. *younusi* Yousuf & Shafee, 1988. [Uttar Pradesh]

18. **Genus Paracentrobia Howard, 1897**
    (Synonyms: Abbella Girault, 1911; Brachistella Girault, 1911; Jasidophthora Perkins, 1912; Abbelisca Ghesquiere, 1946)
    b. *andoi* (Ishii, 1938). [Andhra Pradesh]
    c. *bharatpurensis* Yousuf & Shafee, 1988. [Rajasthan]
    e. *longiclavata* Yousuf & Shafee, 1985. [Uttar Pradesh; Madhya Pradesh]
    f. *longipedicelata* Yousuf & Shafee, 1988. [Uttar Pradesh]
    g. *longipennis* Yousuf & Shafee, 1988. [Madhya Pradesh; Uttar Pradesh]
    h. *maduraienensis* Yousuf & Shafee, 1988. [Tamil Nadu]
    i. *magniclava* Yousuf & Shafee, 1985. [Uttar Pradesh]
j. *neoflava* Yousuf & Shafee, 1988. [Rajasthan; Uttar Pradesh]


l. *parflava* Yousuf & Shafee, 1988. [Rajasthan]

m. *pubipennis* Yousuf & Shafee, 1988. [Kerala]

### 19. Genus Paratrichogramma Girault, 1912


### 20. Genus Poropoea Foerster, 185

(Synonym: *Poropoeoides* Nowicki, 1936).


b. *bella* Hayat & Poorani, 2013. [Karnataka]

c. *indica* Subba Rao, 1970. [Delhi]

### 21. Genus Prestwichia Lubbock, 1864

(Synonym: *Austromicron* Tillyard, 1926)


b. *nympha* Hayat, 2009. [Orissa; Meghalaya; West Bengal]

c. *proxima* Hayat, 2009. [West Bengal]

### 22. Genus Probrachista Viggiani, 1968


### 23. Genus Prosoligosita Hayat & Husain, 1981


c. *perplexa* Hayat & Husain, 1981. [Orissa; Madhya Pradesh; Uttar Pradesh]

(Synonym: *Paruscanoidea longiclavata* Yousuf & Shafee, 1984)

d. *proxima* Hayat, 2009. [West Bengal]

### 24. Genus Pseudobrachysticha Girault, 1915

a. *semiaurea* Girault, 1915. [Bihar]

(Synonym: *Paruscanoidea indica*, Mani, 1939)

### 25. Genus Pseudolisogota Girault, 1913

(Synonym: *Zorontogramma* Silvestri, 1915)

a. *aesopi* (Girault, 1929). [ Gujarat; Orissa; Uttar Pradesh]

b. *brevicilia* Girault, 1915. [Orissa; Tamil Nadu; Uttar Pradesh]

c. *brevisiringiata* (Yousuf & Shafee, 1988). [GUjarat; Orissa; Uttar Pradesh]

d. *latipennis* (Yousuf & Shafee, 1984). [Uttar Pradesh; Jharkhand]

e. *longicilia* (Yousuf & Shafee, 1984). [Bihar; Jharkhand; Uttar Pradesh]

f. *nephotettticum* (Mani, 1939). [Bihar; Jharkhand; Rajasthan; Uttar Pradesh]

g. *sakara* (Hayat, 2009). [Uttar Pradesh; Orissa]

h. *singularis* (Yousuf & Shafee, 1984). [Jharkhand; Uttar Pradesh]

i. *tachikawai* (Yashiro, 1979). [Andhra Pradesh]


### 26. Genus Trichogramma Westwood, 1833

(Synonyms: *Callentipes* Haliday, 1833; *Pentarthon* Packard, 1872; *Aprobosca* Westwood, 1978 as subgenus; *Oopthora* Aurivillius, 1897; *Pentarthon* Dalla Torre, 1898, *Xanthoatomus* Ashmead, 1904; *Neotrichogramma* Girault, 1911; *Trichogrammatana* Girault, 1932 as subgenus; *Trichogrammanza* Carver, 1978 as subgenus; *Nuniella* Kostadinov, 1988, Vanlisus Pinto, 1992 as subgenus).

a. *achaeae* Nagaraja & Nagarkatti, 1969. [Gujarat; Karnataka; Punjab; West Bengal]

b. *agriae* Nagaraja, 1973. [Karnataka]

c. *australicum* Girault, 1912. [Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal]


e. *brevisiringiata* Yousuf & Shafee, 1988. [Uttar Pradesh]


g. *chilonis* Ishii, 1941. [Andhra Pradesh; Bihar; Delhi; Gujarat; Haryana; Himachal Pradesh; Jammu & Kashmir; Kerala; Madhya Pradesh; Maharashtra; Orissa; Punjab; Rajasthan; Tamil Nadu; Uttar Pradesh; West Bengal]

h. *chilotraeae* Nagaraja & Nagarkatti, 1969. [Punjab; West Bengal]

i. *convolvuli* Nagaraja, 2008. [Karnataka]

j. *cuttackensis* Nagaraja, 2008. [Orissa]

k. *danausicida* Nagaraja, 2008. [Karnataka]

l. *dendrolini* Matsumura, 1926. [Jammu & Kashmir]


n. *exiguum* Pinto & Platner, 1978. [Himachal Pradesh; Karnataka]

(o. *Trichogramma beckeri* Nagarkatti, 1973)


q. *hebbalensis* Nagaraja, 2008. [Karnataka]

r. *japonicum* Ashmead, 1904. [Andhra Pradesh, Bihar, Haryana, Jammu & Kashmir, Karnataka,
Mahrashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Utta Pradesh, West Bengal)

(Synonym: Neotrichogramma acutiventre Girault, 1911)

s. kankerensis Yousuf & Hassan, 2008. [Chhattisgarh]
t. kashmiricum Nagaraja, Ahmad & Gupta, 2007. [Jammu & Kashmir]
u. manii Nagaraja & Gupta, 2007. [Karnataka]
v. minutum Riley, 1871. [Assam; Himachal Pradesh; Tamil Nadu]

(Synonyms: Trichogramma helocharae Perkins, 1907; T. intermedium Howard, 1889; T. minutissimum Packard, 1881; T. nagarkattii Voegelé & Pintureau, 1982; Xanthoatomus raphis Ashmead, 1904)

w. pallidiventris Nagaraja, 1973. [Karnataka]
x. perkinsi Girault, 1910. [West Bengal]
y. pintoi Voegelé, 1982. [Karnataka]
z. plasseynese Nagaraja, 1973. [Andhra Pradesh; West Bengal]
aa. poliae Nagaraja, 1973. [Haryana; Utta Pradesh; West Bengal]
bb. pretiosum Riley, 1879. [Bihar; Haryana; Himachal Pradesh; Karnataka; Maharashtra; Rajasthan; Tamil Nadu]

(Synonym: Trichogramma pretiosa Riley, 1879; Trichogramma subhala Torre, 1980)

cc. raoi Nagaraja, 1973. [Karnataka; Rajasthan]
dd. sankarani Nagaraja, 2008. [Karnataka]

ee. semblidis Aurivillius, 1897. [Karnataka]

(Synonyms: Ophthoria semblidis Aurivillius, 1898; Trichogramma schuberti Voegelé & Russo, 1982)

ff. semifiuros (Perkins, 1910). [Karnataka]

27. Genus Trichogrammatoides Girault, 1911

a. armigera Manjunath, 1972. [Karnataka; West Bengal]
b. bactrae Nagaraja, 1979. [Bihar; Karnataka; Tamil Nadu; West Bengal]
c. brasiilenis (Ashmead, 1904). [Bihar; Haryana; Himachal Pradesh; Karnataka; Maharashtra; Punjab; Tamil Nadu]

(Synonym: Pentarthron brasiilenis Ashmead, 1904)

d. eldanea Viggiani, 1979. [Punjab]
e. fulva Nagaraja, 1978. [Assam; Karnataka]
f. fumata Nagaraja, 1978. [Utta Pradesh]
g. nana Zehntner, 1896. [Bihar; Kerala; Himachal Pradesh; Tamil Nadu; Utta Pradesh; West Bengal]

(Synonym: Trichogrammatoides arara Girault, 1925)
h. prabhakeri Nagaraja, 1978. [Karnataka]
i. robusta Nagaraja, 1978. [West Bengal]
j. ruficarpa Yousuf & Hassan, 2006. [Madhya Pradesh]

28. Genus Tumidicleta Girault, 1911

(Synonyms: Orthoneura Blood, 1922; Orthoneurella Blood & Krycer, 1929)

a. agraensis Yousuf & Shafee, 1988. [Uttar Pradesh]
b. gilvis Yousuf, Kumar & Chauhan, 1998. [Rajasthan]
c. longiclavata Yousuf & Shafee, 1988. [Uttar Pradesh]
d. magnicora Yousuf & Shafee, 1988. [Uttar Pradesh]
e. sasniensis Yousuf & Shafee, 1988. [Uttar Pradesh]
f. tenkasiensis Yousuf & Shafee, 1988. [Keral; Rajasthan; Tamil Nadu]

29. Genus Ufens Girault, 1911

(Synonyms: Grantanna Girault, 1939; Neocentrobia Blood, 1923; Stephanotheisa Soika, 1931; Ufens Girault, 1913)

a. breviclavata Yousuf & Shafee, 1991. [Uttar Pradesh]
b. gurgoanensis Yousuf & Shafee, 1988. [Haryana]
c. jaipurenis Yousuf & Shafee, 1988. [Rajasthan; Uttar Pradesh]

(Synonym: Ufens angustipennis Yousuf & Shafee, 1988)

d. hmaai Owen, 2011. [Karnataka]
e. latipennis Yousuf & Shafee, 1988. [Uttar Pradesh]

(Synonym: Ufens alami Yousuf & Shafee, 1988; Ufens singularis Yousuf & Shafee, 1988)

f. similis (Kryger, 1932). [Karnataka; Uttar Pradesh]

(Synonym: Ufens anomalus, Linn, 1994)

30. Genus Uscana Girault, 1911

(Synonym: Bruchoctonus Grese, 1923)

a. alami Yousuf & Shafee, 1988. [Uttar Pradesh]
b. bruchidius Pajni & Tewari, 2004. [Punjab]

d. femoralis Pajni & Sood, 1999 [Punjab]
e. indica Pajni & Tewari, 2002. [Himachal Pradesh]
f. latipennis (Yousuf & Shafee, 1985). [Uttar Pradesh]
g. mukerjii (Mani, 1935). [Delhi; Haryana; Punjab; West Bengal; Meerutensis] Yousuf and Shafee, 1993. [Uttar Pradesh]

31. Genus Xiphogramma Nowicki, 1940

a. indicum Hayat, 1980. [Uttar Pradesh; Assam]

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