



Taxonomic studies on some genera of Indian Trichogrammatidae (Hymenoptera: Chalcidoidea)

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Article Information	Abstract
<p>Article history:</p> <p>Received: 12.06.2013 Revised: 06.07.2013 Accepted: 11.07.2013</p>	<p>The trichogrammatid fauna is represented by 89 genera and more than 800 species across the world. However, in India, it is represented by only 157 species in 31 genera (Noyes, 2012). The present study deals with the biosystematics studies of only 5 genera. The genus wise analysis shows that the genus <i>Epoligosita</i> Girault by 4 species, genus <i>Megaphragma</i> Timberlake by 3 species, genus <i>Oligosita</i> Walker by 13 species, genus <i>Prosoligosita</i> Hayat and Husain, 1981 by 4 species and genus <i>Pseudoligosita</i> Girault, 1913 by 10 species. Pinto and Viggiani (2004) treated <i>Zorontogramma</i> Silvestri as synonym of <i>Pseudoligosita</i> but the author now treated <i>Zorontogramma</i> as distinct subgenus of <i>Pseudoligosita</i> and transfer 5 Indian species of <i>Oligosita</i> (<i>Oligosita brevifringiata</i>, <i>Oligosita latipennis</i>, <i>Oligosita longicilia</i>, <i>Oligosita singularis</i>) described by Yousuf and Shafee (1988) and <i>Oligosita sakara</i> Hayat and Khan, 2009 to <i>Pseudoligosita</i> as new combinations.</p>
<p>Keywords:</p> <p>Biosystematics, Trichogrammatidae, Indian</p>	

1. INTRODUCTION:

The super family Chalcidoidea divided into 19 families, present considerable biological, ecological and morphological diversity. Among them, the family Trichogrammatidae is one of the most widely distributed, speciose and biologically diverse group. The members of the family Trichogrammatidae are very minute measuring about 0.2-1.0 mm and are characterized by 3 segmented tarsi. The trichogrammatids 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 157 species in 31 genera (Noyes, 2012).

The family Trichogrammatidae consists of small to minute wasps that develop in the eggs of other insects (Hayat and Subba Rao, 1988). Because of their small size and relatively uniform morphology of species within the genus, lack of literature, lack of collection and less taxonomy studies resulted in many nomenclature problems. The identification of Indian species of this family has proved to be difficult in spite of the publications by several authors such as Girault, Yousuf and Shafee etc. It is, therefore, essential that thorough taxonomic studies of trichogrammatids fauna be conducted leading to their correct identification, and their placement at various levels of natural classification along with the priority focused on the exploration of undescribed

species and their incorporation in Integrated Pest Management as they are egg parasitoid of many agriculture pests.

The present paper deals with the taxonomic studies of only 5 genera. The genus wise analysis shows that genus *Epoligosita* Girault by 4 species, genus *Megaphragma* Timberlake by 3 species, genus *Oligosita* Walker by 13 species, genus *Prosoligosita* Hayat and Husain, 1981 by 4 species and genus *Pseudoligosita* Girault, 1913 by 10 species. Each genus is diagnosed and relevant information is given on the hosts, distribution in the world, and number of species in the world and in India.

2. MATERIALS AND METHODS:

2.1. Specimen Collection:

Specimens were collected by sweeping with net. The insects collected in the net were sucked up by an aspirator and killed in ethyl acetate fumes. Some specimens were directly transferred from the net to 80% alcohol.

2.2. Card Mounting:

The procedure that was given by Noyes (1982) was adopted for card mounting. This procedure mainly consists of attaching the specimen via the

thorax on a rectangular card (14 x 5 mm) using any water soluble glue.

2.3. Slide Mounting:

The procedure given by Noyes (1982) is adopted for slide preparation:

- Remove wings with the help of a fine needle and placed in a small drop of Canada balsam.
- Knocked off antenna and attach to the side of the thorax with a small quantity of Canada balsam. Head will be knocked off and attached to the thorax with a small quantity of Canada balsam.
- Specimens will transfer to a small quantity 10% KOH. In a short time the specimen frees from the card and sinks to the bottom of the cavity block. It is kept in KOH for 48 hours at room temperature. If the specimen will be processed quickly then the block is placed in thermostat at 95-98°C for 10 minutes.
- After 48 hours (or 10 minutes at 95-98°C), the KOH is pipette off, and the specimen passed through (for 10 minutes each) glacial acetic acid, distilled water and equal amount of distilled water and 80% alcohol. Dehydrate the specimens in ascending grades of alcohol (80%, 90%, 96%, absolute alcohol) for 10 minutes in each grade. Then pass the specimen through a mixture of absolute alcohol and oil of cloves, and finally clear in oil of cloves.
- Remove the specimen from oil of clove and various parts arrange on the slide.
- Dry slide for about two weeks, and then placed cover slips on the parts. The slide is then allowed to dry for another two weeks in a thermostat at 40°C.

2.4. Photography:

Photographs of required part were taken by using digital camera (Leica DFC295) attached to a compound microscope (Leica, DM2500).

3. RESULTS AND DISCUSSION:

Synopsis of some Indian genera of family Trichogrammatidae:

3.1. Genus *Epoligosita* Girault (Figs. 1-4):

Paroligosita Girault and Dodd, 1915. Mem Qd Mus, 3: 145. Type species *Paroligosita biclavata* Girault and Dodd, by monotypy and original designation. Preoccupied by *Paroligosita* Kurdjumov, 1911

Epoligosita Girault, 1916. Mem Qd Mus, 5: 206. Replacement name for *Paroligosita* Girault and Dodd, not Kurdjumov.

Epoligositina Livingstone and Yacoob, 1983. Entomophaga, 28: 213. Type species *Epoligosita (Epoligositina) duliniae* Livingstone and Yacoob, by monotypy and original designation. (As subgenus of *Epoligosita*).

3.1.1. Diagnosis:

Antenna with 1 funicular segment present or absent, and a 1-2 (rarely 3) segmented clava; funicle, when present, distinct from clava; mid lobe of mesoscutum and scutellum each with 2 setae; fore wing with disc bare and apically narrowed or narrowly rounded; venation long, exceeding half wing length, marginal vein longer than pre-marginal and stigmal veins together, post marginal veins absent; marginal fringe long; tarsi elongate, mid and hind legs with first and second tarsal segment long and those of fore and middle leg longer than their respective tibia; gasteral terga uniformly sclerotized. Propodeal disk subtended by a small subtriangular lobe.

3.1.2. Species: World, 23 species; 4 species from India.

3.1.3. Host: Hemiptera: Cicadellidae (Viggiani, 1985; Pinto and Viggiani, 1987), Tingidae (Livingstone and Yacoob, 1983).

3.1.4. Distribution: World wide

3.1.5. Comments: *Epoligosita* is not easily confused with any other genus. The fore wing alone makes its identification.

3.1.6. Subgenus *Epoligosita* s. str.

1. *Epoligosita albiscutellum* Yousuf and Shafee, 1988

2. *Epoligosita bicolor* Hayat and Viggiani, 1981

3.1.6.1. Material examined: India: 1 female, Uttarakhand, Almora, Matikhola, 28.x.2009, coll. F.R. Khan

3. *Epoligosita clara* Hayat and Viggiani, 1981

3.1.6.2. Material examined: 1 female, Uttar Pradesh, Hathras, 6.iii.2013, coll. M.T. Khan.

Subgenus *Epoligositina* Livingstone and Yacoob

4. *Epoligosita duliniae* Livingstone and Yacoob, 1983

3.2. Genus *Megaphragma* Timberlake (Fig. 5-7):

Megaphragma Timberlake, 1923. Proc Hawaii Ent Soc, 5: 412. Type species *Megaphragma*

mymaripenne Timberlake, by monotypy and original designation.
Sethosiella Kryger, 1932. Bull Soc Ent Egypte, 1932: 38. Type species *Sethosiella priesneri* Kryger, by monotypy and original designation.

Paramegaphragma Lin, 1992. Entomotaxonomia, 14: 133-134. Type species *Paramegaphragma stenopterum* Lin, by original designation. Synonymy by Delvare, 1993: 149-152.

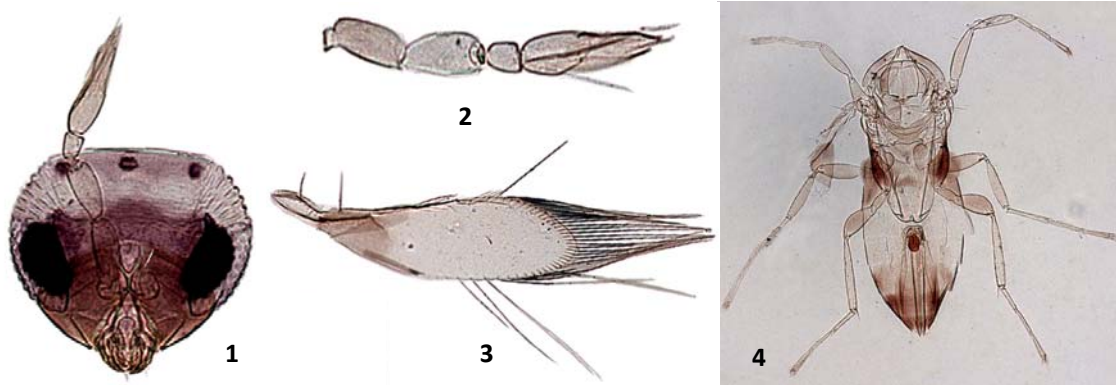


Fig. 1-4. *Epoligosita* Girault, 1. Head, 2. Antenna, 3. Forewing, 4. Thorax, Gaster and leg

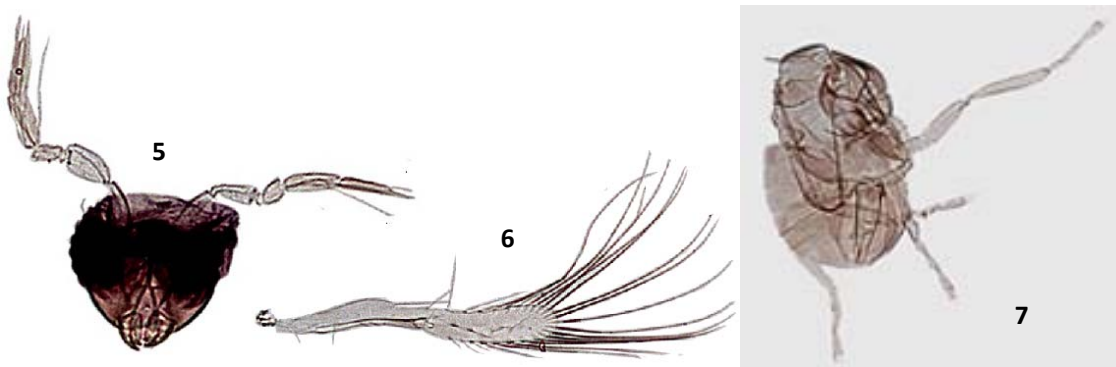


Fig. 5-7. *Megaphragma* Timberlake, 5. Head with Antenna, 6. Forewing, 7. Thorax, Gaster and leg

3.2.1. Diagnosis.

Extremely small insect, ranging in size from about 0.16 mm to less than 0.3 mm. Antenna with 0-1 funicular segments and 2-3 segmented clava; mid lobe of mesoscutum and scutellum each with 2 setae; maxillary palp present but very small; fore wing extremely narrow, at least 8x as long as broad; disc with a few setae arranged in one or two curved lines, marginal vein long, postmarginal vein absent; marginal fringe many times longer than wing width; hind wing usually bare with marginal fringe consisting of a few setae.

3.2.2. Species: World, 15 species; 3 species from India.

3.2.3. Host: Eggs of thrips (Thysanoptera).

3.2.4. Distribution: Cosmopolitan except Australian region.

3.2.5. Comments. The narrow wings with their long marginal cilia and flattened sigmoid shape are unique in the family. The antenna and wing structure suggests its derivation from the same stock that gave rise to the *Oligosita* complex of genera. (Doutt and Viggiani, 1968)

3.2.6. Indian species:

1. *Megaphragma longiciliatum* Subba Rao, 1969
2. *Megaphragma magniclava* Yousuf and Shafee, 1988

3.2.6.1. Material examined: India: 1 female, Uttar Pradesh, Aligarh, Dept. of Zoology, 23.vii.2013, coll. M.T. Khan

3. *Megaphragma shimalianum* Hayat, 2009

3.3. Genus *Oligosita* Walker (Fig. 6-8):

Oligosita (Haliday MS) Walker, 1851. Ann Mag Nat Hist, 7: 213. Type species *Oligosita collina* Walker, by monotypy.

Westwoodella Ashmaed, 1904. Mem Carnegie Mus, 1: 359. Type species *Oligosita subfasciata* Westwood by monotypy and original designation.

Paroligosita Kurdjumov, 1911. Rev Russe Ent, 11: 434. Type species *Paroligosita bella* Kurdjumov, by original designation.

Orioligosita Hayat, 2009. Oriental insects, 43:201-227. Type species *Oligosita (Orioligosita) similiana* Hayat, by original designation (As subgenus of *Oligosita*).

3.3.1. Diagnosis.

Antenna with funicle distinctly separated from 3-segmented clava; mid lobe of mesoscutum and scutellum each with 2 setae; fore wing with apex narrowed or rounded but few to numerous discal setae, marginal fringe usually long, marginal vein long, stigmal vein well developed; maxillary palp present; pronotum medially membranous consisting of two plates or pronotum undivided; propodeal disk not subtended by a small subtriangular lobe; male genitalia without digiti and denticles. Its antennal structure alone separates *Oligosita* from virtually all other *Oligositina*.

3.3.2. Species. World, 121 species; 13 species from India

3.3.3. Host. Hemiptera: (primarily Cicadellidae, Noyes, 2005)

3.3.4. Distribution. World wide

3.3.5. Comments. The female types of the species of *Westwoodella*, *Oligosita subfasciata* Westwood, were examined and are assigned to the Collina group. The clavate sensillum at the antennal apex, the triangular propodeal disk, and fore wing characteristics clearly place it here. Kurdjumov (1911) considered *Paroligosita bella* close to *Oligosita collina* and his description is consistent with certain European species belonging to the Collina Group. 12 species of *Oligosita* are described from India. Many species previously assigned to *Oligosita* were recently transferred to *Pseudoligosita*. *Orioligosita* was described as subgenus of *Oligosita* by Hayat, 2009, distinguish by having pronotum long, propodeum medially elongate, about 3.5x as long as metanotum and with apex truncate, ovipositor originates from base of gaster and exerted at apex; maxillary palp unsegmented. Although some characters are found either in *Oligosita* or *Pseudoligosita*, the undivided pronotum appears to be unique.

3.3.6. Indian species:

3.3.6.1. Subgenus *Oligosita*

1. *Oligosita angustipennis* Yousuf and Shafee, 1992

3.3.6.1.1. Material examined: 1 female, Uttar Pradesh, Aligarh, Begum Sultan Jahan, 23. x. 2011, coll. S. Begum; 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17. ix. 2013, coll. M.T. Khan

2. *Oligosita breviclavata* Yousuf and Shafee, 1988

3. *Oligosita debaiensis* Yousuf and Shafee, 1988

3.3.6.1.2. Material examined: 1 female, Uttar Pradesh, Aligarh, Begum Sultan Jahan, 23. x. 2011, coll. S. Begum; 2 females, Uttar Pradesh, Aligarh, Jamalpur Nala, 17. ix. 2013, coll. M.T. Khan

4. *Oligosita gilvus* Yousuf and Shafee, 1984

5. *Oligosita longiflagellata* Yousuf and Joshi, 2003

6. *Oligosita longipennis* Yousuf and Shafee, 1992

7. *Oligosita longirhinaria* Yousuf and Shafee, 1988

8. *Oligosita meerutensis* Yousuf and Shafee, 1984

3.3.6.1.3. Material examined: India: 3 females, Uttarakhand, Almora, Matikhola, 28. x. 2009, coll. F.R. Khan

9. *Oligosita naitas* Girault, 1938

10. *Oligosita novisanguinea* Girault, 1912

3.3.6.1.4. Material examined: 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17. ix. 2013, coll. M.T. Khan

11. *Oligosita sanguinea* (Girault, 1911)

12. *Oligosita younsi* Yousuf and Shafee, 1988

3.3.6.1.5. Material examined: 1 female, Uttar Pradesh, Aligarh, Dept. of Zoology, 13.x.2010, coll. S. Begum; 2 female, Uttar Pradesh, Aligarh, Begum Sultan Jahan, 23. x. 2011, coll. S. Begum; 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17. ix. 2013, coll. M.T. Khan

3.3.6.2. Subgenus *Orioligosita* Hayat

13. *Oligosita similiana* Hayat, 2009

3.4. Genus *Prosoligosita* Hayat and Husain (Fig. 9-10):

Prosoligosita Hayat and Husain, 1981. Boll. Lab. Ent. Agr. Filippo Silvestri, Portici, 38: 81. Type species *Prosoligosita perplexa* Hayat and Husain, by monotypy and original designation.

3.4.1. Diagnosis.

Antennal with placoid sensilla present on 1st, 3rd and 4th claval segment but absent in 2nd claval segment, 4th segment of clava is the longest and extremely narrow; mid lobe of mesoscutum and

scutellum each with 2 setae; fore wing almost 3 x as long as wide; marginal vein long; post marginal vein absent; stigmal vein well developed, vein track RS1 absent. The apparently 4-segmented clava combined with the elongate and exceptionally narrow last

claval segment in females; the presence of a linear placoid sensillum on the 1st postanellar antennal segment, and the occurrence of apical metasomal spiracles separate *Prosoligosita* from other members of its subtribe.

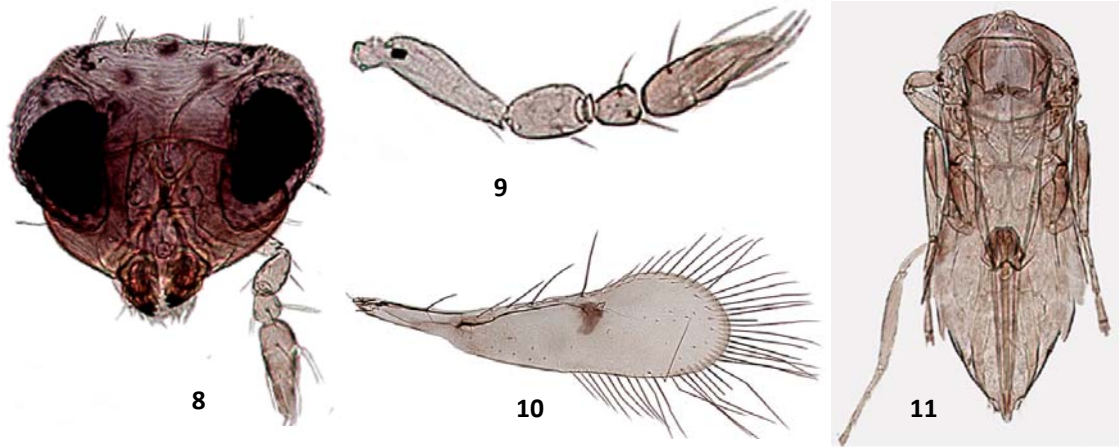


Fig. 8-11. *Oligosita* Haliday, 8. Head, 9. Antenna, 10. Forewing, 11. Thorax, Gaster and leg



Fig. 12-14. *Prosoligosita* Hayat and Husain. 12. Head with antenna, 13. Forewing, 14. Thorax, Gaster and leg

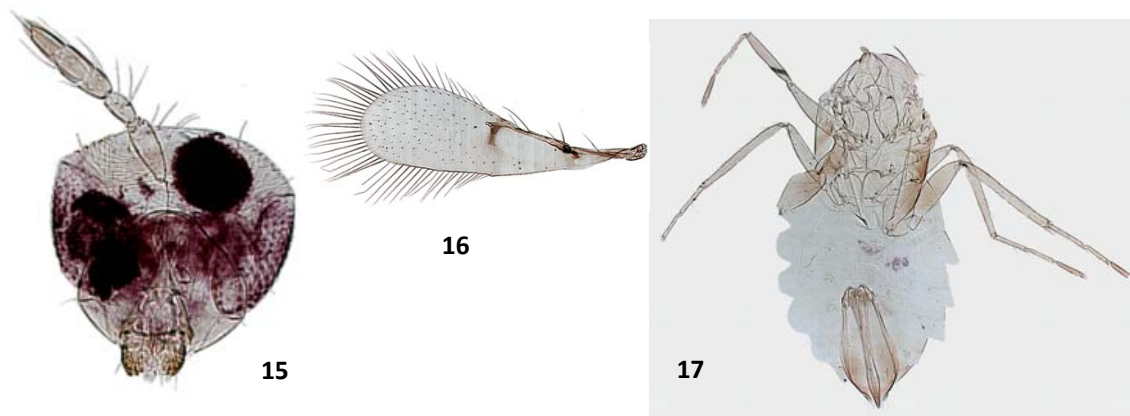


Fig. 15-17. *Pseudoligosita* Girault, 15. Head with Antenna , 16. Forewing, 17. Thorax, Gaster and leg

3.4.2. Species. World, 4 species, all from India.

3.4.3. Host. Unknown.

3.4.4. Distribution.

Oriental region

3.4.5. Comments. *Prosoligosita* was described from three females of a single species from India. The distinct four segmented club appears to render this genus unique in the Oligositini. The genus *Prosoligosita* is closely related to *Oligosita*, except for the absence of funicle and a 4-segmented clava.

3.4.6. Indian species:

1. *Prosoligosita aseta* Hayat, 2009
2. *Prosoligosita longicauda* Hayat, 2009
3. *Prosoligosita perplexa* Hayat and Husain, 1981

3.4.6.1. Material examined: India: 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17. ix. 2013, coll. M.T. Khan

4. *Prosoligosita proxima* Hayat, 2009

3.5. Genus *Pseudoligosita* Girault, 1913 (Fig. 15-17)

Pseudoligosita Girault 1913: 104. Type species: *Pseudoligosita arnoldi* Girault, by original designation (type examined).

Zorontogramma Silvestri 1915: 104. Type species: *Zorontogramma distinctum* Silvestri, by original designation (type examined). Douth and Viggiani 1968: 537 (as subgenus of *Oligosita*).

3.5.1. Diagnosis:

Antennal with 2-3segmented clava; clava compact with segments short or long and with a few longitudinal sensilla; mid lobe of mesoscutum and scutellum each with 2 setae; fore wing more or less similar as in *Oligosita*; hind wing with 2 lines of setae; gaster with tergite I-III in posterior third or more with ridges like elongate reticulations, propodeum medial length at most slightly longer than medial length of metanotum.

3.5.2. Species. World, 56 species; 10 species from India.

3.5.3. Host. Unknown.

3.5.4. Distribution. World wide

3.5.5. Comments: The genus *Pseudoligosita* was earlier considered a synonym of *Oligosita* and as a subgenus of *Oligosita* by Douth and Viggiani (1968). Recently, however, Pinto and Viggiani (2004) reinstated the genus as a valid taxon, with *Zorontogramma* Silvestri as its synonym but the author now treating *Zorontogramma* as distinct subgenus of *Pseudoligosita* on the basis of 2-segmented antennal clava. Three Indian species described or recorded from India have earlier been transferred to *Pseudoligosita* by Pinto and Viggiani

(2004), and the present author transfer 5 species (*Oligosita brevifringiata*, *O. latipennis*, *O. longicilia*, *O. sakara*, *O. singularis*) described by Yousuf and Shafee (1988) and *Oligosita sakara* Hayat and Khan, 2009 to *Pseudoligosita* as new combinations.

3.5.6. Indian species:

3.5.6.1. Subgenus *Pseudoligosita* s.str

1. *Pseudoligosita aesopi* (Girault, 1929)
2. *Pseudoligosita brevicilia* (Girault, 1915)
3. *Pseudoligosita brevifringiata* (Yousuf and Shafee, 1988), **comb. nov.**

3.5.6.1.1. Material examined: India: 1female, Uttar Pradesh, Bahraich, Gulwa Ghat, 2.x. 2006, coll. F.R. Khan; 1 female, Orissa, Sambalpur Budharaja, 11. xii. 2007, coll. F.R. Khan; 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17.ix.2013, coll. M.T. Khan.

4. *Pseudoligosita latipennis* (Yousuf and Shafee, 1984), **comb. nov.**

3.5.6.1.2. Material examined: 1 female, Uttar Pradesh, Aligarh, Dept. of Zoology, 13.x.2010, coll. S. Begum; 1female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17.ix.2013, coll. M.T. Khan.

5. *Pseudoligosita longicilia* (Yousuf and Shafee, 1984), **comb. nov.**

3.5.6.1.3. Material examined: 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17.ix.2013, coll. M.T. Khan.

6. *Pseudoligosita nephoteticum* (Mani, 1939)

3.5.6.1.4. Material examined: India: 1female, Uttar Pradesh, Bahraich, Gulwa Ghat, 2.x. 2006, coll. F.R. Khan.; 3 females, Uttar Pradesh, Aligarh, Dept. of Zoology, 13.x.2010, coll. S. Begum

7. *Pseudoligosita sakara* (Hayat and Khan, 2009), **comb. nov.**

3.5.6.1.5. Material examined: 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17.ix.2013, coll. M.T. Khan

8. *Pseudoligosita singularis* (Yousuf and Shafee, 1984), **comb. nov.**

3.5.6.1.6. Material examined: 1 female, Uttar Pradesh, Aligarh, Dept. of Zoology, 13.x.2010, coll. S. Begum; 1 female, Uttar Pradesh, Aligarh, Jamalpur Nala, 17.ix.2013, coll. M.T. Khan.

9. *Pseudoligosita tachikawai* (Yashiro, 1979)
10. *Pseudoligosita yasumatsui* (Viggiani and Subba Rao, 1978)

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5. REFERENCES:

- Doutt RL and Viggiani G. 1968. The Classification of the Trichogrammatidae (Hymenoptera: Chalcidoidea). Proc California Acad Sci, 35: 477-586.
- Hayat M and Husain T. 1891. A new genus of Trichogrammatidae from India (Hymenoptera: Chalcidoidea). Boll Laborat Entomol Agraria 'Filippo Silvestri', Portici, 38:81-83.
- Hayat M and Viggiani G. 1981. The genus *Epoligosita* from India, with descriptions of two new species (Hymenoptera: Trichogrammatidae). Boll Laborat Entomol Agraria 'Filippo Silvestri', Portici, 38: 119-123.
- Hayat M and Viggiani G. 1984. A Preliminary Catalogue of the Oreintal Trichogrammatidae (Hymenoptera: Chalcidoidea). Boll Laborat Entomol Agraria 'Filippo Silvestri', Portici, 41: 23-52.
- Hayat M. 2008a. Taxonomic notes on the Indian Trichogrammatidae (Hymenoptera: Chalcidoidea), with descriptions and records of some species. Oreint Insect, 42: 1-32.
- Hayat M. 2008b. A new subgenus and three new species of trichogrammatidae (Hymenoptera: Chalcidoidea) from India. Oreint Insect, 42: 117-123.
- Hayat M. 2008c. On the types of *Oligosita* species from India (Hymenoptera: Chalcidoidea: Trichogrammatidae), with some records. Biosystemat, 2: 5-18.
- Hayat M. 2009. Records and Descriptions of Trichogrammatidae from India (Hymenoptera: Chalcidoidea). Oreint Insect, 43: 201-207, 2009.
- Lin Q. 1990. Systematic studies of Trichogrammatidae II. On the species of *Epoligosita* and *Epoligositina* (new status) from China (Hymenoptera, Chalcidoidea). J Fujian Agricul Coll, 19: 41-51
- Livingstone D and Yacoob M. 1983. A new subgenus of *Epoligosita* (Hymenoptera: Trichogrammatidae) an egg parasite of Tingidae (Het.) from southern India. Entomoph, 28(3): 213-216.
- Nowicki S. 1935. Descriptions of new genera and species of the family Trichogrammatidae (Hymenoptera: Chalcidoidea) from the Palearctic Region, with notes-I. Zeitsch fiir Angewand Entomol, 21: 566-596.
- Nowicki S. 1936. Descriptions of new genera and species of the family Trichogrammatidae (Hymenoptera: Chalcidoidea) from the Palearctic Region, with notes-II. Zeitsch fiir Angewand Entomol, 23: 114-148.
- Noyes JS. 1982. Collecting and preserving chalcid wasps (Hymenoptera: Chalcidoidea). J Nat Hist, 16: 315-334.
- Noyes JS. 2012. Universal Chalcidoidea Database. Worldwide Web electronic publication. www.nhm.ac.uk/entomology/index.htm[access ed october 2013]
- Pinto JD and Viggiani G. 2004. A Review of the genera of Oligositini (Hymenoptera: Trichogrammatidae) with a Preliminary Hypothesis of Phylogenetic Relationships. J Hymenopt Res, 13: 269-294.
- Subba Rao BR. 1969. A new species of *Megaphragma* (Hymenoptera: Trichogrammatidae) from India. Proc Royal Entomolog Soci London (B), 38: 114-116.
- Viggiani G and Hayat M. 1974. New Trichogrammatids from India (Hymenoptera: Chalcidoidea). Boll Laborat Entomol Agraria 'Filippo Silvestri', Portici, 31:145-151.
- Yousuf M and Shafee SA. 1988a. Taxonomy of Indian Trichogrammatidae (Hymenoptera: Chalcidoidea). Indian J Syst Entomol, 4: 55-200.
- Yousuf M and Shafee SA. 1993. A new species of *Prosoligosita* (Hymenoptera: Trichogrammatidae) from India. Bull Pure Appl Sci, 12(A): 29-30.