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New record of Genus *Trichogramma* Westwood (Hymenoptera: Chalcidoidea) from Kashmir Valley, J&K, India

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Abstract
This paper presents new distribution record of genus *Trichogramma* Westwood, 1833 [16], within the Trichogrammatidae family from Kashmir Valley, J&K, India. These findings expand the known diversity of these egg parasitoids and mark the first time these trichogrammatids have been recorded in Kashmir Valley, J&K, India.

Keywords: Hymenoptera, *Trichogramma*, new record, Egg Parasitoids, Kashmir Valley, India

Introduction
The Trichogrammatidae family is a key group within the Chalcidoidea superfamily. These insects, which can be either solitary or gregarious, are egg parasitoids. They target a diverse array of insects across various orders, with a particular focus on Coleoptera, Diptera, Hemiptera, and Lepidoptera (Pinto and Stouthamer 1994) [14]. Trichogrammatidae are found worldwide, but their tiny size—ranging from approximately 0.2 mm to 1.5 mm—and delicate nature pose challenges for their collection and study. Globally, there are over 1,000 species spread across 98 genera within two subfamilies of this family. In India, however, there are 174 species across 34 genera, distributed among two subfamilies and five tribes (Noyes, 2019) [11]. The research was conducted in the Kashmir Valley, located in Jammu and Kashmir, India. This valley is surrounded by the Himalayan mountains, with the Pir Panjal Range to the southwest and the Greater Himalayan Range to the northeast. This study represents the first systematic examination of Trichogrammatids in the Kashmir Valley. It includes new records of four species from the Trichogrammatidae family, within the genus *Trichogramma* Westwood.

Material and Methods
Study area: Pulwama and Kulgam district is being the collection site of Kashmir Valley, J&K, India.

Collection method and preservation: The samples were gathered from various habitats including grass fields, rice paddies, vegetable gardens, orchards, herbs, shrubs, and bushes across different locations in Pulwama and Kulgam district in the Kashmir Valley using a sweeping net. The samples were immediately transferred into small vials with 70% ethyl alcohol for preservation. The freshly collected Trichogrammatid specimens were sorted under a Stereo zoom microscope (Olympus SZX16) and then preserved in Eppendorf tubes with 70% ethyl alcohol. Slides were prepared following Noyes' (1982) [10] method. Dissections were performed using the Stereo zoom microscope (Olympus SZX16) and photography and measurements were taken using a CILIKA Patented Digital Head Technology slide microscope equipped with an 8-megapixel camera on an iPad.

Identification
Identification was accomplished by reviewing both global and Indian literature, as well as utilizing keys from Nagaraja and Nagarkatti (1973) [8], Yousuf and Shafee (1987) [18], and Ikram & Yousuf (2019) [6].

Results
Order: Hymenoptera
Superfamily: Chalcidoidea
Family: Trichogrammatidae
Sub family: Trichogrammatinae
Tribe: Trichogrammatini

Genus *Trichogramma* Westwood, 1833 [16]
Synonyms include *Calleptiles* Haliday, 1833 [5]; *Pentarthron* Packard, 1872 [12]; *Aprobosca* Westwood, 1978 [17] (as a subgenus); *Oopthora* Aurivillius, 1897 [1]; *Pentarthron* Dalla Torre, 1898; *Xanthoatomus* Ashmead, 1904 [2]; *Neotrichogramma* Girault, 1911 [3, 4]; *Trichogrammatana* Girault, 1932 (as a subgenus); *Trichogrammanza* Carver, 1978 (as a subgenus); *Nuniella* Kostadinov, 1988; and Vanlisus Pinto, 1992 (as a subgenus).

Diagnosis
The female has antennae made up of a two-segment funicle and a single-segment club. The mid-lobe of the mesoscutum and the scutellum each have two pairs of setae. The forewings exhibit sigmoid venation in the distal veins, with discal setae organized in rows. There is a vein track identified as RS1, and the pronotum features a U-shaped anterior margin.

1. *Trichogramma chilotraeae* Nagaraja and Nagarkatti, 1969 [7]
Diagnosis: The male measures 0.20 mm in length and has a yellow body with a blackish pronotum, mesopleurae, mesoscutum, abdominal terga, and hind coxae. The antennal (Fig 1) flagellum features blunt hairs, with the longest hairs being about three times the maximum width of the flagellum. The genitalia include a somewhat triangular dorsal expansion of the gonobase, which does not reach the

tips of the gonoforceps (GF) but extends only to the level of a chelate structure. The aedeagus is long and prominent, approximately 1.2 times the length of the apodemes, projecting beyond the GF, which is nearly equal to or slightly longer than the overall length of the male genitalia.

Host: Unknown

Material examined: INDIA: J&K, Kashmir: Pulwama: Ratnipora ;1♂ (on slide),1♂ 14.vii.2023; coll. Rabiya Irshad (sweeping); ;1♂ (on slide), 15.vii.2023; coll. Rabiya Irshad (sweeping); Kulgam Laroo 1♂ (on slide), 11.ix.2023; coll. Rabiya Irshad (sweeping); Qaimoh ;1♂ (on slide) 13.ix.2023; coll. Rabiya Irshad (sweeping).

Previous Distribution: India: Andhra Pradesh, Gujrat, Karnataka, Punjab and West Bengal.

New Distribution: New record from Kashmir, J&K, India.

2. *Trichogramma poliae* Nagaraja, 1973 [9]

Diagnosis: The male measures 0.56 mm in length and 0.18 mm in width across the head. It has a light brownish-yellow head, with the gena colored yellowish-orange, and the thoracic sclerites and abdomen also yellowish-orange (Fig 2). The antenna features 30 to 35 tapering, moderately long hairs, with the longest being about three times the maximum width of the flagellum. The forewing has a fringe on the tornus that is about one-sixth the width of the wing. In terms of genitalia, the dorsal expansion of gonobase (DEG) has prominent, narrow lateral lobes that are broadly separated, with the apex nearly reaching the upper level of the chelate structure (CS), which is positioned below the level of the gonoforceps (GF). The median ventral projection (MVP) is large and broad at the base but situated below the level of the CS. The cerci (CR) are paired and extend anteriorly to less than half the length of the genitalia. The aedeagus is longer than the apodemes, and together they are shorter than the hind tibia.

Host: Unknown

Material examined: INDIA: J&K, Kashmir, Pulwama Pampore ;1♂ (on 1 slide), 16.vii.2023; coll. Rabiya Irshad (sweeping); Koil;1♂ (on 1 slide), 17.vii.2023; coll. Rabiya Irshad (sweeping); Kulgam Khudwani ;1♂ (on slide), 12.ix.2023; coll. Rabiya Irshad (sweeping).

Previous Distribution. India: Haryana; West Bengal and Uttar Pradesh.

New Distribution: New record from Kashmir, J&K, India.

3. *Trichogramma japonicum* Ashmead, 1904 [2]

Diagnosis: The male has a dull brownish-yellow body, accented by black thoracic sclerites, abdominal terga, and genitalia. The antenna (Fig 3) features a scape that is about 3.5 times longer than it is wide, a pedicel that is 2.14 times as long as broad, and a clava that is also 3.5 times longer than broad. The antennal hairs are long and sharp, with the longest being approximately 3.5 times the maximum width of the flagellum. The forewings are about 1.5 times longer than wide, with 14 rows of discal setae, and RS1 contains 4 setae, while the median vein (MV) is as long as the stigmal vein (STV). The genitalia feature a highly sclerotized dorsal expansion of gonobase (DEG) shaped like a horseshoe, with a blunt posterior end; the sides of the DEG extend to meet the sides of the genitalia. The chelate structure (CS) is situated well below the tip of the gonoforceps (GF). The aedeagus is noticeably longer than the apodemes, and together they are about as long or slightly longer than the hind tibia.

Host: Unknown

Material examined: INDIA: J&K, Kashmir, Pulwama Newa ;1♂ (on slide), 18.vii.2023; coll. Rabiya Irshad (sweeping); Arigam ;1♂ (on slide), 19.vii.2023; coll. Rabiya Irshad (sweeping); Kulgam Wanpoh ;1♂ (on 1 slides), 15.ix.2023; coll. Rabiya Irshad (sweeping).

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Bihar, Delhi, Kerala, Odisha and Punjab.

New Distribution: New record from Kashmir, J&K, India.

4. *Trichogramma pretiosum* Riley, 1879 [15]

Diagnosis: The male has a yellow head and light-yellow antennae, although the basal segments are tinged with brown. The thorax (Fig 4) is yellow with a dark mesoscutum and abdomen. The antennae feature elongate, slender flagelliform setae, with the longest setae being about 2.5 times the maximum width of the flagellum, tapering gradually to the tip. The fringes along the margins of the forewing are about one-sixth of the wing's width. In terms of genitalia, the dorsal expansion of gonobase (DEG) is highly sclerotized, chitinized, and triangular in shape, featuring a notch at the base and a rounded apex. The peak of the DEG, the chelate structure (CS), and the median ventral projection (MVP) are nearly aligned at the same level, while the CS is situated well below the tip of the gonoforceps (GF). The MVP is distinctly sharp and pointed, reaching up to the level of the CS. The aedeagus is slightly longer than the apodemes, and together they are shorter than the hind tibia.

Host: Unknown

Material examined: INDIA: J&K, Kashmir, Pulwama Awantipora ;1♂ (on slide), 20.vii.2023; coll. Rabiya Irshad (sweeping); Parigam ;1♂ (on slide), 21.vii.2023; coll. Rabiya Irshad (sweeping); Kulgam: Chawalgam;1♂ (on 1 slides), 18.ix.2023; coll. Rabiya Irshad (sweeping); Khudwani ;1♂ (on slide), 12.ix.2023; coll. Rabiya Irshad (sweeping).

Distribution: India: Bihar, Haryana, Himachal Pradesh, Tamil Nadu.

New Distribution: New record from Kashmir, J&K, India.

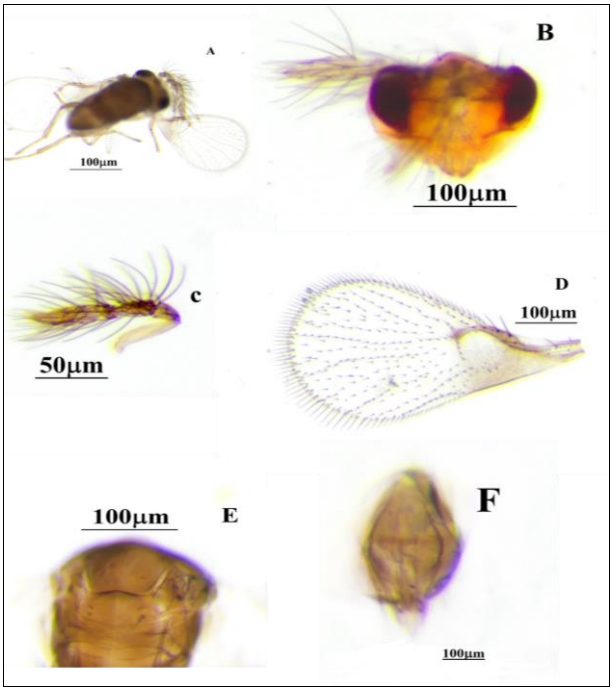

Fig 1(A-F): *Trichogramma chilotraeae* Nagaraja and Nagarkatti A. adult; B. head; C. antenna; D, forewing; E. mesosoma; F. genitalia.

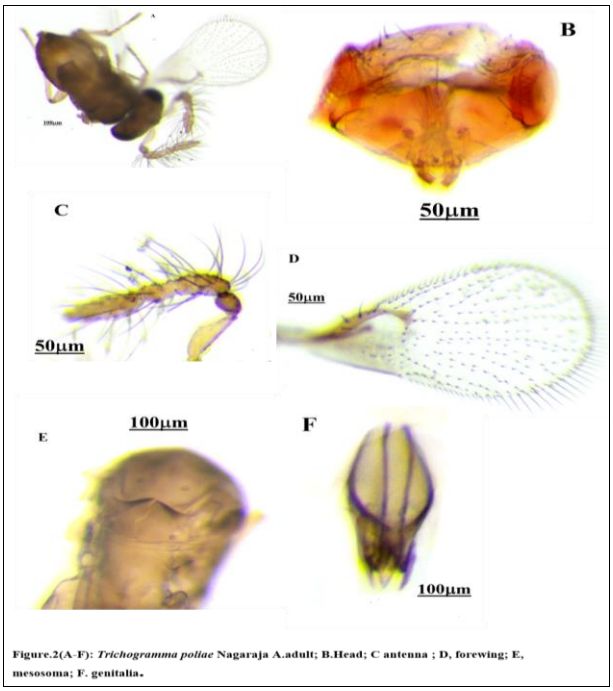

Fig 2(A-F): *Trichogramma poliae* Nagaraja A. adult; B. head; C. antenna; D, forewing; E. mesosoma; F. genitalia.

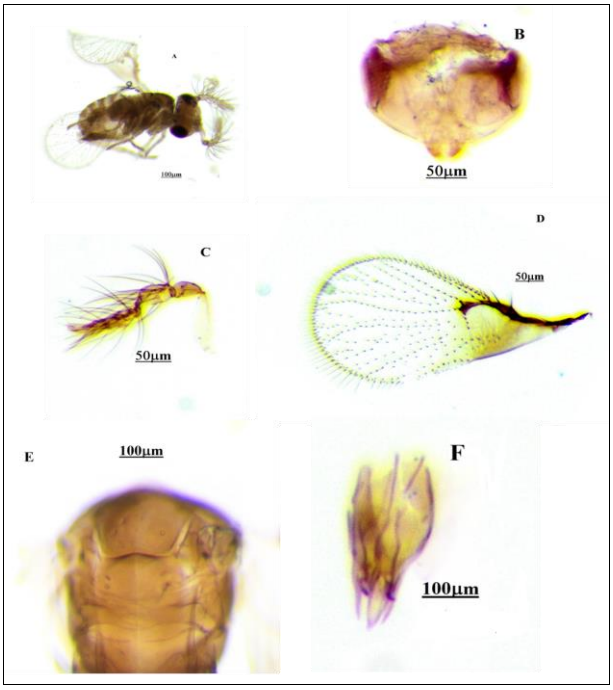

Fig 3(A-F): *Trichogramma japonicum* Ashmead A. adult; B. head; C. antenna; D, forewing; E. mesosoma; F. genitalia.

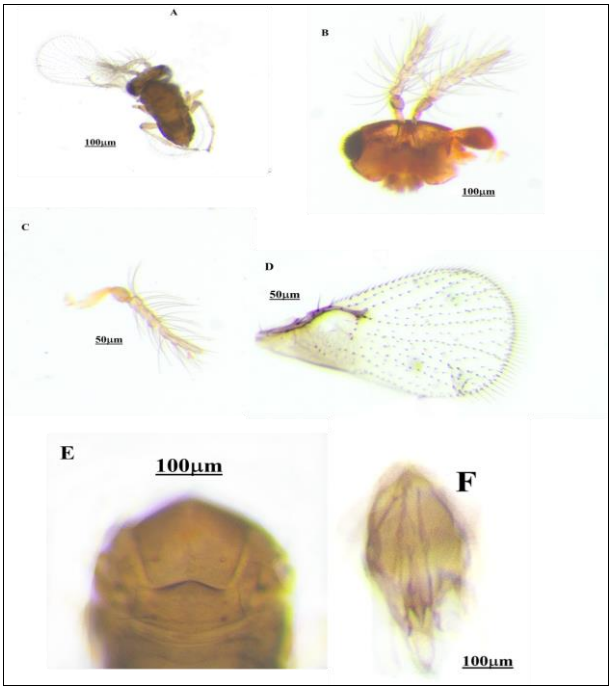

Fig 4(A-F): *Trichogramma pretiosm* Riley A. adult; B. head; C. antenna; D, forewing; E. mesosoma; F. genitalia.

Discussion and Conclusion

Trichogramma kashmirica, *Oligosita novisanguinea* was initially recorded from the Kashmir Valley, but since then, no systematic research has been conducted on the taxonomy of Trichogrammatid egg parasitoids in this region. During a recent survey, four species from genus *Trichogramma* were documented for the first time in the Kashmir Valley: *Trichogramma chilotraeae*, *Trichogramma poliae*, *Trichogramma japonicum* and *Trichogramma pretiosum.*

This study thus makes a significant contribution to the understanding of Trichogrammatid diversity in the Kashmir Valley.

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References

1. Aurivillius. Enny svensk Agg parasit. Entomol Tidskrift,1897:18:248-257.
2. Ashmead WH. Descriptions of new Hymenoptera from Japan. II. Journal of the New York Entomological Society,1904b:12(3):146-165.
3. Girault AA. Synonymic and descriptive notes on the chalcidoid family Trichogrammatidae with descriptions of new species. Transactions of the American Entomological Society,1911a :37:43–83.
4. Girault AA. Descriptions of nine new genera of the chalcidoid family Trichogrammatidae. Transactions of the American Entomological Society,1911b:37:1- 42.
5. Haliday AH. An essay on the classification of the parasitic Hymenoptera, etc. (Continued) Entomological Magazine,1833:1(4):333-350.
6. Ikram M, Yousuf M. Taxonomic study of the family trichogrammatidae hymenoptera chalcidoidea from Northern India, 2019. http://hdl.handle.net/10603/280048.
7. Nagaraja H, Nagarkatti S. Three new species of *Trichogramma* (Hymenoptera: Trichogrammatidae) from India. Entomophaga,1969:14(4):393-400.
8. Nagaraja H. On some new species of Indian *Trichogramma* (Hymenoptera: Trichogrammatidae). Oriental Insects,1973:7:275-290.
9. Nagaraja H, Nagarkatti S. A key to some New World species of *Trichogramma* (Hymenoptera: Trichogrammatidae), with descriptions of four new species. Proceedings of the Entomological Society of Washington,1973:75(3):288-297.
10. Noyes JS. Collecting and preserving chalcid wasps (Hymenoptera: Chalcidoidea). Journal of Natural History,1982:16:315-334. DOI: 10.1080/00222938200770261
11. Noyes JS. Universal Chalcidoidea Database. The Natural History Museum, London. Available from: http://www.nhm.ac.uk/ourscience/data/chalcidoids/database/, 2019.
12. Packard AS. Hymenoptera. Record of American Entomology for the year 1871, 1872, 5-8.
13. Pinto JD. A review of the New World genera of Trichogrammatidae (Hymenoptera). Journal of Hymenoptera Research,2006:15(1):38-163.
14. Pinto JD, Stouthamer R. Systematics of the Trichogrammatidae with emphasis in *Trichogramma*, p. 1-36. In E. Wajnberg & S.A. Hassan (eds.), Biological control with egg parasitoids. Wallingford, CAB International, 1994, 304.
15. Riley CV. Parasites of the cotton worm. Canadian Entomologist,1879:11(9):161.
16. Westwood JO. Descriptions of several new British forms amongst the parasitic Hymenopterous Insects.The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science,1833:2:443-445.
17. Westwood JO. Descriptions of some minute hymenopterous insects. Transactions of the Linnean Society of London (Zoology),1879:1(8):583-593.
18. Yousuf M, Shafee SA. Taxonomy of Indian Trichogrammatidae (Hymenoptera: Chalcidoidea). Indian J. Syst. Entomol,1987:4(2):55-200.