An account of three new species of Trichogrammatididae (Hymenoptera: Chalcidoidea) from India

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Abstract
Trichogrammatids (Chalcidoidea: Trichogrammatidae) represent a large group of minute parasitic wasps. These egg parasitoids widely used in biological control of many lepidopteran pests. Some trichogrammatids also parasitize the eggs of aquatic hosts, such as Dytiscidae, Notonectidae or Odonata. In the present studies pertaining three new species of the family trichogrammatidae, L. deoriaensis sp. nov., L. indica sp. nov. & H. singularis sp. nov., have been described based on male and female collected from Uttar Pradesh & Haryana, India.

Keywords: Haeckeliania, Lathromeroidea, new species, trichogrammatidae, India

Introduction
Trichogrammatids are important egg parasitoids with having a key role in bio-control programmes in India and all over the world. They are used widely as bio control agents against a variety of lepidopteran pests. Genus Lathromeroidea Girault comprise important insect egg parasitoids infesting several key insect pests of agriculture, horticulture and forestry tree species. Lathromeroidea nigra Girault was also recorded from the eggs of Cicadellidae (Homoptera) and Gerridae (Hemiptera). Fourteen species have been recorded world over these are: L. ajmerensis Yousuf and Shafee [1]; L. angustipennis Yousuf and Shafee [2]; L. araguenensis De Rios [3]; L. domestica Girault [4]; L. exemplum Pinto [5]; L. latiscapa Liu and Li [6]; L. longiclavata Viggiani and Velasquez [7]; L. longiciliata Ikram and Yousuf, [8]; L. multidenta Hu, Lin and Won, [9]; L. nigra Girault [10]; L. nigrella Girault, [10]; L. silvarum Nowicki [11] and L. trichoptera Lin [12] of which three species (L. ajmerensis, L. angustipennis and L. longiciliata) have been recorded from India. The species of the genus Haeckeliania also important egg parasitoids of coleopteran insects, Pinto [13] recorded Haeckeliania sperata as an egg-endoparasitoid of Diaprepes abbreviatus L. (Coleoptera: Curculionidae) on Citrus sp. Genus comprises eleven species throughout the world: Haeckeliania atria Girault [14]; Haeckeliania domestica Girault [4]; Haeckeliania haecckeli Girault [15]; Haeckeliania longicilia Lou and Cao [16]; Haeckeliania longituba Lin [12]; Haeckeliania magna Girault [14]; Haeckeliania magniclavataYousuf and Shafee [2]; Haeckeliania minutaViggiani [17]; Haeckeliania nigra Lin [12]; Haeckeliania orissaina Hayat [18]; Haeckeliania sperata Pinto [13] have been described including two Indian species Haeckeliania magniclavata Yousuf and Shafee [19] and Haeckeliania orissaina Hayat [18]. In present paper, three new species: Lathromeroidea deoriaensis sp. nov., Lathromeroidea indica sp. nov. and H. singularis sp. nov., are described in detail with photographs of important morphometric characters.

Materials and methods
Specimens were collected with sweep net by the sweeping on grass bed at agro-climatic zone of district Deoria, Uttar Pradesh and Kalesar; Yamunanagar, Haryana, India and preserved into 70% ethanol. Specimens belonging to the genus Lathromeroidea and Haeckeliania were sorted out under stereoscopic microscope. After series of dehydration, specimens were dissected in the clove oil under stereo-zoom microscope. Dissected body parts of specimens were mounted on a slide in a drop of euparol and covered with fine cover slip. All photographs were taken with Nikon Digital sight camera attached with opti-phot microscope and relative measurements were taken at different magnifications 10x, 20x and 40x (Objective lens).
through ocular scale in eye piece of Leica compound microscope (Leitz labor luxs). The holotypes of the new species are deposited in the (NFIC) National Forest Insect Collection, Forest Entomology Discipline, Forest Protection Division in Forest Research Institute, Dehradun, India.

Results

Taxonomy

1. *Lathromeroidea deoriaensis* sp. nov. (Fig1. A-F)

**Description**

**Female**

Body length 0.45mm. Body dark brown; head brown; ocelli and eyes dark. Antennae brown with numerous thick hairs on club. Midlobe of mesoscutum and scutellum dark brown, fore wings hyaline, except light infuscation beneath stigmal vein. Legs brown with stiff bristles, ovipositor slightly exserted.

**Head** (Fig.1 A) 1.38× wider than long in facial view (192:139); ocelli arranged in obtuse triangle; Mandible with three denticles. Antennae (Fig.1 B) with scape, 3.4× as long as broad (58:17); pedicel 1.9× (38: 20) as long as wide and slightly wider than scape (20: 17), 2-anelli (A1 and A2) present, A2 closely appressed with first club segment; club 5-segmented (C1-C5), 3.5× as long as broad (89: 25).

**Mesosoma** (Fig.1 D) Mid lobe of mesoscutum, 1.3× wider than long (93: 72); scutellum about 1.8× as wide as long (89:48); propodeum about 3× longer than dorsellum medially. Fore wings (Fig.1 C) with discal setae dense and arranged in rows; 2.3× as long as wide (596:256); costal cell narrow; marginal fringe about 0.30× as long as forewing width (78:256); RS1 vein track having 7 setae.

**Metasoma** (Fig.1 E); Gaster about 1.8× longer than mesosoma (291:159); ovipositor slightly exserted about 1.8× longer than hind tibial length (258: 144) (Fig.1 F).

![Fig 1(A-F); Lathromeroidea deoriaensis (Female). A, head B, Antenna; C, Forewing; E, Mesosoma; F, Ovipositor & F, Hind tibia](http://www.entomoljournal.com)
Male: Unknown
Host: Unknown


Distribution: India: Uttar Pradesh.

Etymology: The species name is derived from the name of the collection site “Deoria” district in Uttar Pradesh, India.

Discussion
L. deoriaensis sp. nov. is very close to L. silvarum Nowicki but can be separated by having antennae with club 3.5× as long as wide; scape 3.4× as long as wide; pedicel 1.9× as long as wide; fore wings 2.3× as long as wide; ovipositor slightly exerted, 1.8× longer than hind tibial length.

In L. silvarum Nowicki antenna with club 2.8× as long as wide; scape 2.8× as long as wide; pedicel 1.3× as long as wide; fore wing 2.5× as long as wide; ovipositor slightly exerted 1.9× longer than hind tibial length.

2. Lathromeroidea indica sp. nov. (Fig. 2. A-F)

Female
Body length 0.54mm. Body dark brown; head brown; ocelli and eyes dark. Antennae brown with numerous thick hairs on club. Midlobe of mesoscutum and scutellum dark brown, fore wings hyaline, except light infuscation beneath stigmal vein and premarginal vein. Legs brown with stiff bristles, ovipositor much exerted.

Fig 2 (A-F): Lathromeroidea indica (Female). A, Head B, Antenna; C, Forewing; D, Mesosoma; E, Ovipositor & F, Hind tibia

Head (Fig.2 A) 1.36× wider than long in facial view (186: 136); ocelli arranged in obtuse triangle; Mandibles with three denticles. Antennae (Fig.2 B) with scape, 2.4× as long as broad (55:23); pedicel 1.5× (38: 25) as long as wide and slightly wider than scape (25: 23), 1-anelli A1 present, club 5-segmented (C1-C5), 2.4× as long as broad (81: 33).

Mesosoma (Fig.2 D) Mid lobe of mesoscutum, 1.1 × wider than long (90: 79); scutellum about 1.6× as wide as long (85:51); propodeum about 1.6× longer than dorsellum medially. Fore wings (Fig.2 C) with discal setae dense and arranged in rows; 2.7× as long as wide (462:168); costal cell...
narrow; marginal fringe about 0.41× as long as forewing width (70:168); RS1 vein track having 9 setae.

**Metasoma** (Fig.2 E): Gaster about 1.8× longer than mesosoma (320:178); ovipositor much exserted about 2.3× longer than hind tibial length (320:143) (Fig. 2 F).

**Male**: Unknown

**Host**: Unknown


**Distribution**: India: Uttar Pradesh.

3. *Haeckeliania singularis* (Figs 3 A-E)

![Fig 3 (A-E): Haeckeliania singularis (Male). A, Head B, Antenna; C, Forewing; D, Mesosoma & E, Genitalia](image)

**Description**

**Male**

Body length 0.53 mm. Body completely dark brown. Head fronto-vertex yellow; eyes and ocelli reddish, ocellar triangle with apical angle obtuse; Antennae with scape pale yellow, pedicel and club dark brown except apical segment. Pronotum short and dark brown. Fore wings subhyaline with light infuscation beneath the stigmal vein. Legs: coxae, trochanters

**Etymology**: The species name is derived from the name of the country of origin of the type specimen, India.

**Discussion**

*L. indica* sp. nov. is very close to *L. silvarum* Nowicki but can be separated by having antennae with scape 2.4× as long as wide; pedicel 1.5× as long as wide; fore wings 2.7× as long as wide; marginal fringe 0.41 × as long as fore wing width; ovipositor much exserted, 2.3× longer than hind tibial length. In *L. silvarum* Nowicki antenna with scape 2.8× as long as wide; pedicel 1.3× as long as wide; fore wing 2.5× as long as wide, marginal fringe 0.30× as long as fore wing width; ovipositor slightly exserted 1.9× longer than hind tibial length.
and femora pale brown. Gaster brown.

**Head** (Fig.1), in frontal view, slightly broader than long. Antennal toruli with lower margins above level of lower eye margins; malar sulcus present; MS half of the length of eyes; POL slightly longer than OOL; Mandibles dark brown with 3-denticles. Antennae (Fig. 2) with scape 3.5× as long as wide (66: 18); pedicel 1.6× as long as wide (43: 27); funicle absent; club five-segmented (C1, C2, C3, C4 and C5), PLS as long as wide sensillae present.2.2× as long as wide (76:34), C5 longest about 2× as long as wide (28: 14).

**Mesosoma** (Fig.4). Midlobe of mesoscutum having 2 pairs of setae and sculpture as shown in Fig.4, slightly longer than wide (610: 574); scutellum with one pair of setae, 1.6× as wide as long (127: 77); propodeum 1.8× as long as metanotum (29:16) medially. Fore wings (Fig. 3) 2× as long as wide (437:225), all discal setae arranged in rows; marginal fringe about one-eighth of wing width (225:26); stigmal vein well-developed and half of the length of marginal vein (70:32).

**Metasoma**, Gaster longer than mesosoma; genitalia with phallobase narrowed anteriorly; parameres and digiti present; phallobase narrowed anteriorly; parameres and digiti present; stigmal vein well-developed and half of the length of marginal vein (70:32).

**Female**: Unknown.

**Host**: Unknown.

**Type specimen examined**: Holotype (NFIC-FRI-22175), ♂ (on slide). INDIA: HARYANA: Yamunanagar, kalesar, 26.iii.2019, coll. M.Ikram. Type specimen has been deposited in NFIC (National Forest Insect Collection), Forest Entomology Discipline, Forest Protection Division, Forest Research Institute, Dehra Dun, Uttarakhand.

**Distribution**: India: Haryana.

**Eymology**: The species name is derived from Latin: “singularis”, meaning unique.

**Discussion**: *Haeckeliania singularis* sp. nov.is very close to *Haeckeliania atra* Girault (Original description is too short) but can be differentiated by having fore wings with MV 3× as long as wide; discal setae with seventeen rows; stigmal vein thick having long neck. In *Haeckeliania atra* Girault, fore wings with MV 2× as long as wide; discal setae with 15 rows; stigmal vein thick with short neck.

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**References**