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A New Species of *Trichogramma* Westwood (Chalcidoidea: Trichogrammatidae) from Unknown Lepidopterous Egg on *Populus deltoides* from India

Mohammad YOUSUF[1] Neha RAJWAR[2]* Mohsin IKRAM[3]
Akhilesh Kumar MISHRA[4]

[1,2,4]Forest Entomology Discipline, Forest Protection Division, Forest Research Institute, New Forest, Dehradun-248006, Uttarakhand, INDIA
[3]Department of Entomology, School of Agriculture, Uttaranchal University, Dehradun-248007, Uttarakhand, INDIA
e-mails: [1]yousufm@icfre.org, [2,*]rajwar.neha89@gmail.com, [3]mohsin3757@gmail.com, [4]akmishra30186@gmail.com
ORCID IDs: 0000-0002-8070-6577, 0000-0003-1189-2748, 0000-0002-2040-1923

ABSTRACT

The genus *Trichogramma* Westwood comprises as egg parasitoids attacking lepidopterous insect pests of important forestry and agro-forestry tree species. Survey was conducted in forest areas of Thano range, Dehradun, India, for collection of parasirized eggs. In the present paper, a new species *Trichogramma hayati* sp. nov. is decribed from an unknown lepidopterous egg from poplar tree.

Key words: Egg parasitoid, biological control, *Trichogramma,* Hymenoptera, poplar.

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INTRODUCTION

Trichogramma species are well known natural egg parasitoids which have been used as biocontrol agents against various insect pests of important forest tree species including the key defoliators of teak, poplar and shisham. Nagarkatti & Nagaraja (1977) compiled the information on 48 species of *Trichogramma*. Yousuf, Joshi, & Kulkarni (2004) enlisted 142 species of *Trichogramma*, distributed worldwide. About 250 species of genus *Trichogramma* have been recorded all over the world of which twenty eight species have been recorded from India (Yousuf, Ikram, & Faisal, 2015). Recently, some researchers have also made contribution in taxonomic study of *Trichogramma* (Khan, Yousuf, Ikram, & Singh, 2017; Khan, Yousuf, & Ikram, 2018; Yousuf, Khan, & Ikram, 2018) from India. Currently, *Trichogramma* comprises worldwide 251 species with 29 species from India including the species described in this paper from unknown lepidopterous egg on *Populus deltoides*.

MATERIAL AND METHODS

Survey of important forestry and agro-forestry areas of Thano range, Dehradun (Uttarakhand), India was conducted for collection of egg bunches of insects. Collected samples of eggs were reared for the emergence of egg parasitoids (Fig. 3.). Specimens (♂♂ & ♀♀) of *Trichogramma* were emerged out from unknown lepidopterous egg on *Populus deltoides*. Emerged *Trichogramma* specimens were preserved in 70% ethanol, after following the course of dehydration the speciemens were dissected out in clove oil under microscope and dissected body parts were mounted on a slide in drop of Euparol. All measurements and photographs were taken from Leica wild M10-MDG. Type specimens have been deposited in the National Forest Insect Collection, Forest Entomology Discipline, Forest Protection Division of the Forest Research Institute, Dehradun, India.

The following abbreviations are used in the text:

DEG - Dorsal expansion of gonobase; CS - Chelate structure; GF - Gonoforceps; RS1-Radial sector 1.

Trichogramma hayati sp. nov.

Description

Male: Body length 0.52 mm. Body honey yellow to dark brown; ocelli and eyes dark red. Antennae light to dark brown except scape pale yellow. Mesosoma (Fig. 1D) light brown, forewing (Fig. 1C) hyaline, lightly infuscated behind stigmal vein and sub marginal vein, RS1 vein track having 4 setae. Legs light yellow, genitalia light to dark brown.

Head wider than long (219: 149) (Fig. 1A); eye length slightly shorter than malar sulcus (93:87); mandible three denticles; scape 3.6×(84:23) as long as wide (Fig. 1B); pedicel 2.1×(42: 20) as long as wide; 35 to 40 pointed flagellar hairs, longest hair of antennae about 2.7× (77:28) maximum width of flagellum.

Mesosoma: Fore wing about 2× (540:283) as long as wide (Fig. 1C); discal setae arranged in rows, RS1 vein track with 4 setae, marginal fringe on tornus long, about

1/8 (32: 283) of forewing width.

Metasoma: Genitalia with DEG having broadly rounded lobes with notches (Fig. 1E); GF below the level of CS. Aedeagus longer than apodemes, both together slightly shorter than entire; about 1/2 of hind tibia (Fig. 1F).

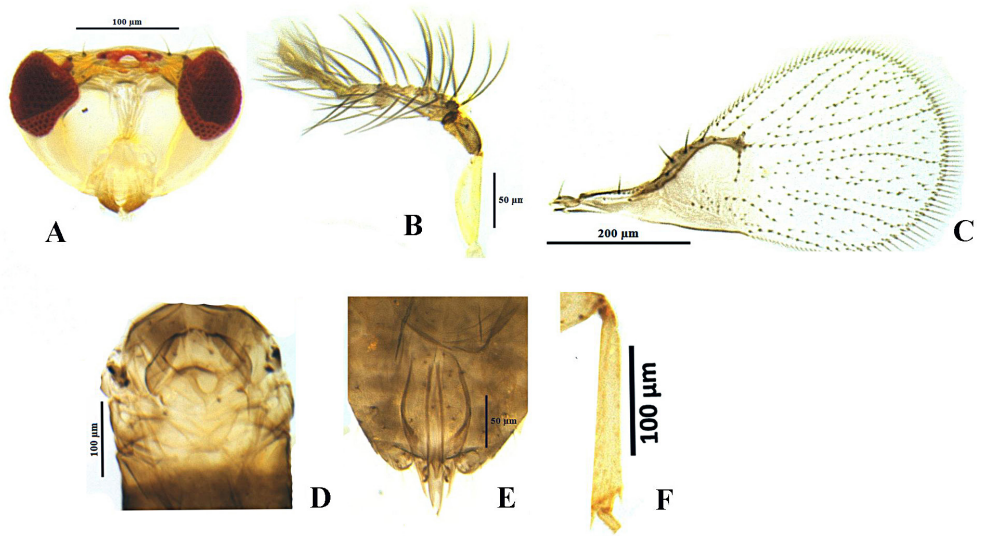

Fig. 1A-F. *Trichogramma hayati* sp. n. (Male). A. Head, B. Antenna, C. Forewing, D. Mesosoma, E. Genitalia, F. Hind tibia.

Female: Body length 0.53mm. Body yellow to dark brown in ocelli and eyes dark red. Antennae yellowish. Forewing (Fig. 2C) hyaline, lightly infuscated behind stigmal vein and sub marginal vein, with RS1 having 5 setae. Legs light yellow, ovipositor dark brown in colour.

Head 1.3× longer than wide (230: 175) (Fig. 2A); eye 1.2× shorter than malar sulcus (117:101); mandible tridentate; antennal scape about 3.4× as long as wide (206:60) (Fig. 2B); pedicel 2.3× as long as wide (91:39); funicle two and club single segment 3× (177:74) as long as wide.

Mesosoma: 2.1× (553:263) as long as wide (Fig. 2C); discal setae arranged in rows, with vein track RS1 having 5 setae, marginal fringe on tornus, about 1/7 (36: 263) wing width.

Metasoma: Ovipositor (Fig. 2D) slightly longer than hind tibial length (219: 201) (Fig. 2E).

Host: Unknown lepidopterous egg

Material examined: Holotype ♂. INDIA: UTTARAKHAND: Dehradun, Thano range, 29.09.2019, coll. A. K. Mishra. Paratpye 2♂♂, ♀♀ same data as holotype.

Distribution: India: Uttarakhand

Etymology: The species is named for Dr Mohd. Hayat, Aligarh Muslim University,

Aligarh, in recognition of his contribution to the taxonomy of Chalcidoidea.

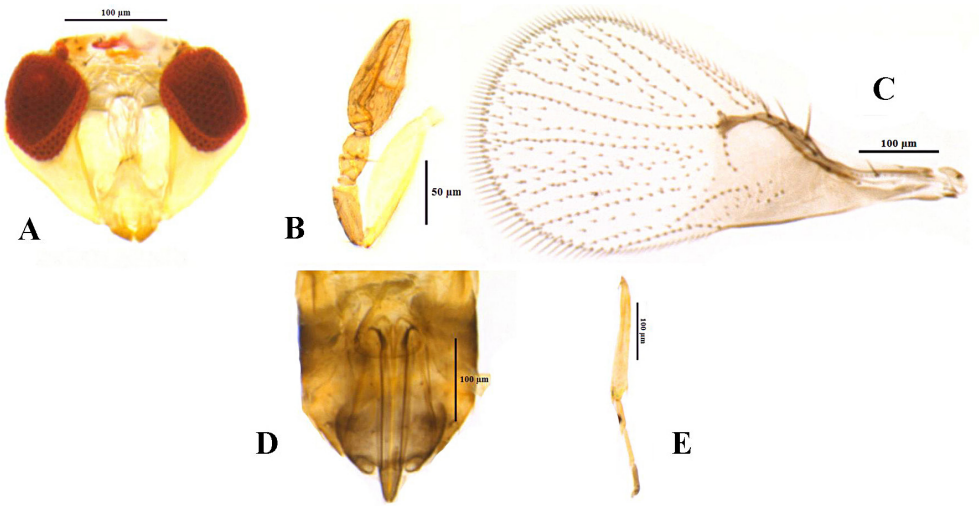

Fig. 2A-E. *Trichogramma hayati* sp. n. (Female). A. Head, B. Antenna, C. Forewing, D. Ovipositor, E. Hind tibia.

Fig. 3. A. Lepidopterous egg on poplar leave, B. Parasitized egg with emergence hole.

DISCUSSION

T. hayati sp. nov. is very close to *T. evanescens* Westwood but can be separated by having its antennal scape 3.6× as long as wide; pedicel 2.1× as long as wide; fore wings with RS1 having 4 setae in males and 5 setae in females; Male genitalia with tip of DEG reaching the base of CS; basal notch of DEG broadly rounded and reaching almost side lobes of Genital capsule; central ridge restricted up to mid of GC; GF below the level of CS. In *T. evanescens,* antennal scape 4× as long as wide; pedicel 1.5× as long as wide; forewing with RS1 having 5 setae; DEG reaching beyond level of CS; basal notch of DEG narrowly rounded and not reaching wall of GC; Central ridge reaching beyond mid of GC; GF far below level of CS.

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