

New Records and a Key to the Species of Genus *Hockeria* Walker (Hymenoptera: Chalcididae) from Khyber Pakhtunkhwa, Pakistan

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Abstract.- Three newly recorded species of *Hockeria* (Chalcididae), *Hockeria nikolskayae*, *Hockeria anupama* and *Hockeria manii*, are described. An identification key to the species of Pakistan is also provided along with illustrations of important features.

Keywords: Chalcididae, Hymenoptera, *Hockeria*.

INTRODUCTION

Hockeria was erected by Walker (1834) based on the type species *Chalcis bispinosa* Fabricius *sensu* Kirby (*Hockeria bifasciata* Walker) (Narendran and Sudheer, 2005). As a member of the subfamily Haltichellinae, the genus has the postmarginal vein relatively longer and in some *Hockeria*, a slightly concave frons, and the vertex is thin in some species. A distinguishing feature of this genus is the presence of variable carinae on the basal tergite of the gaster, and species may have two or three short longitudinal carinae (Narendran, 1989). In some cases the gaster may be ecarinate or polycarinate. Morphologically, *Hockeria* and *Antrocephalus* are extremely close and it is often difficult to distinguish between the two genera. In some *Hockeria* (*lankana* and *bangalorica*), postmarginal vein is relatively long and in some *Hockeria* frons is slightly concave (*bangalorica*). The vertex is extremely thin in some species of *Hockeria*. The carinae present on gaster is variable in this genus (Narendran, 1989). Species of *Hockeria* are mostly parasitic on Lepidoptera (Narendran, 1989). *Hockeria* has a worldwide distribution, with 66 species of genus *Hockeria* reported from the Oriental region (Narendran, 1989; Noyes, 2011). The current study outlines three new species of *Hockeria* from Khyber Pakhtunkhwa.

Hockeria tamaricis Boucek has been reported from Pakistan (Boucek, 1982; Narendran, 1986), but

the exact location of the species is unknown from where the species was reported. The present study adds three more species to this genus, known from Pakistan.

MATERIALS AND METHODS

This study was based on specimens collected from different ecological zones in the northern and plain areas of Khyber Pakhtunkhwa. The main areas of collection were Peshawar, Mardan, Swabi, Gilgit, D. I. Khan, Swat, Chitral and Hazara Division. Collected specimens were preserved in 70% alcohol and then transferred to 97% alcohol for 5 hours before being mounted on a card point.

Morphological terms follow Gibson *et al.* (1997). Terminology of surface sculpture was from Harris (1979). The synonymy, diagnostic characters and material examined are provided for each species.

All material is deposited in the insect museum, Department of Entomology, The University of Agriculture, Peshawar.

Genus *HOCKERIA* Walker, 1834

Key to species of *Hockeria* in Pakistan

1. Hind femora and tibiae blackish brown; metasoma reddish brown laterally and ventrally; scutellum as in Fig. 2 *Hockeria nikolskayae* Husain & Agarwal
- 1'. Hind femora and tibia of different color from above, metasoma and other characters not as above 2
- 2 (1). Fore wing hyaline, Frons convex. Scutellum as in Fig. 14; preorbital carinae distinct Fig. 1; Metasomal T1 without any carinae, vertex broad (Fig. 11)

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- *Hockeria anupama* Narendran
 2'. Fore wing with brown or black infuscation. Gastral tergum Gt1 basally with three long carinae and several small carinae (Fig. 16); hind coxa black; hind femur black with base and apex brown; hind tibia black with apex brown *Hockeria manii* Narendran

Hockeria nikolskayae Husain & Agarwal, 1982
 (Fig. 1)

Diagnosis

Genotemporal margin with carina (Fig. 1C); frontogenal carina not reaching eye (Fig. 1C); hind femur with row of minute denticles on three lobes reaching to middle of femur (Fig. 1H).

Measurements : 3.5 mm

Description of female : n = 1 (1♀)

Husain and Agarwal (1982) has provided detailed description of the species. We, therefore, do not consider redescription of the species necessary.

Male : Unknown

Distribution in Pakistan

Swabi, Khyber Pakhtunkhwa, Pakistan. The species has already been reported from Uttar Pardesh, India (Husain and Agarwal, 1982).

Hosts

Spilosoma obliqua Walker (Lepidoptera, Arctiidae). *S. obliqua* was reared in the laboratory of the Department of Entomology, The University of Agriculture, Peshawar Pakistan and is deposited in insect museum of the department.

Comments

Narendran (1989) included *Hockeria nikolskayae* in his key to *Hockeria* of the Oriental region. Detailed description is however provided by Husain and Agarwal (1982).

The species can be easily separated from other species of the genus by having the genal margin carinate, frontogenal carina not reaching eye margin, hind femur with a row of minute denticles on 3 lobes to middle of femur.

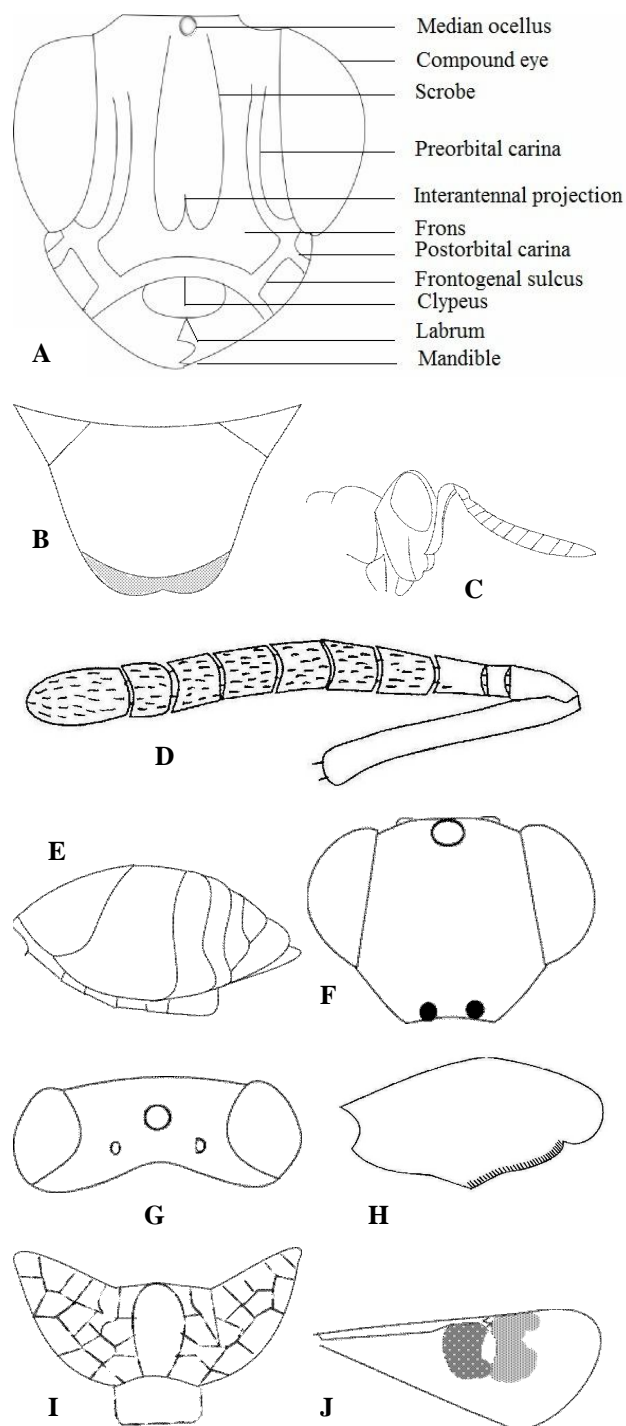


Fig. 1. *Hockeria nikolskayae* ♀: A, Typical head of Chalcididae B, scutellum; C, head with antenna; D, antenna; E, gaster; F, head, facial view; G, head, dorsal view; H, hind femur; I, propodeum; J, fore wing.

The species is reported by Husain and Agarwal (1982) to be parasitoid of *Diacrisia obliqua* (Lepidoptera: Arctiidae) and by Narendran (1989) to be the parasitoid of *Spilosoma obliqua* (Lepidoptera: Arctiidae), which severely damage mung, mash and vegetables (Atwal, 1976). Keeping in view the importance of *Hockeria nikolskayae* as a biological agent, it is therefore of much value in the natural and biological control of these pests.

Material examined

1 ♀, Swabi, 20.viii.2004 (Inayatullah).

2. *Hockeria anupama* Narendran, 1986 (Fig. 2)

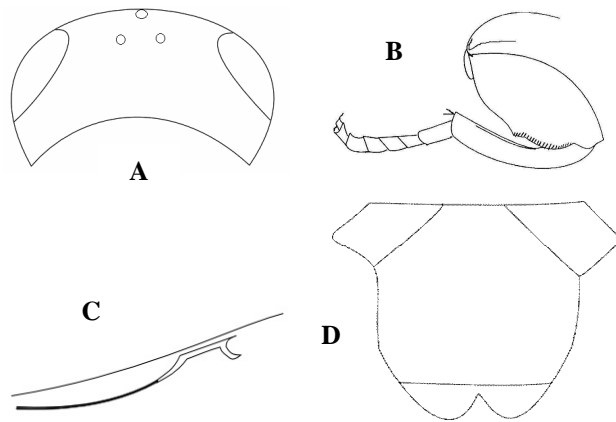


Fig. 2. *Hockeria anupama* ♀, A, vertex; B, hind femur; C, fore wing; D, scutellum.

Diagnosis

Scape dark black; T₁ attached broadly to mesosoma; a tooth shaped structure present at the distal end of hind femur (Fig. 2B), marginal vein of fore wing slightly away from wing margin, postmarginal vein almost indistinct (Fig. 2C).

Measurements : 3mm

Description of female : n=1 (1 ♀)

Colour

Body, hind femur and scape black; head, tarsus brown; antennae dark brown; eyes whitish.

Head

with dense punctuation, interocular space plain (Fig. 2A) with slight furrow for reception of antennae, scape not reaching front ocellus, similar to *Hockeria nikolskayae*; pre and postocular carinae absent, frontogenal carinae present; genotemporal margin present, malar space covered with sparse hairs just above the clypeus.

Mesosoma

Mesosoma with light punctuation, space between punctures more than size of punctures, each puncture with a hair; hind femur with small tooth at anterior side on single lobe, a tooth shaped structure present at the distal end of the femur, length of femur 2x its maximum width; tibia with 2 carinae at anterior end, with 2 apical spurs; marginal vein of fore wing slightly away from wing margin, postmarginal vein very short, stigmal vein short with distinct uncus.

Metasoma

Abdomen pointed posteriorly; T₁ broadly attached to mesosoma; 2 basal carinae at T₁ with 2 strong ridges, distance between carinae shorter than length of these carinae; T₁ with dense but light punctuation in the middle, laterally smooth and covers half of the abdomen; T₂ 3x the length of T₃ with slight punctuation and lateral less dense hairs; T₄ 1.25 times T₃; ovipositor not exerted.

Male : Unknown

Distribution in Pakistan

Peshawar, Khyber Pakhtunkhwa Pakistan. This species has already been reported from Kerala, Malampuzha, India by Narendran & Party in 1986.

Host : Not known

Comments

The species can be differentiated from other members of the genera by having dark black scape, T₁ broadly attached to mesosoma, tooth shaped structure present at distal end of hind femur, marginal vein of fore wing slightly away from wing margin and post marginal vein short.

Description tallies with Narendran (1989) at

many points however there are few differences with the description *i.e.* hind femur black and postmarginal vein is comparatively short. These characters are showing very minute differences and I consider the specimen as *Hockeria anupama*. Moreover the specimens correctly keys out as *H. anupama* when it is run through the key to Oriental species of the genus.

Host of the species is not known. This species can be one of the biocontrol agents and it can reduce pest population, but lab rearing and field application needs to be manipulated and check its affectivity against its hosts.

Noyes (2001) has provided a long list of host for the species of genus *Hockeria*. The list includes *Atherigona soccata* (Diptera), *Ceratina flavipes* (Hymenoptera), *Coleophora malivorella*, *Corcyra cephalonica* and *Cydia aceriana* (Lepidoptera). Out of these its parasitism on rice moth *Corcyra cephalonica* and *Cydia aceriana* is of significant importance. Rearing techniques need to be perfected for *Hockeria* species using *Corcyra cephalonica* which is a stored grain pest. The parasitoid can be tested/utilized against *Cydia* species and *Atherigona soccata* for biological control of the pest.

Seasonal pattern of flight of this insect is noted to be August in Peshawar. This is a rare species and only one specimen is collected from the whole Khyber Pakhtunkhwa. In India this specimen was reported from Kerala.

Material examined

One ♀, Peshawar, 7.viii.2008 (Toheed).

3. *Hockeria manii* Narendran, 1987 (Fig. 3)

Diagnosis

Scrobe narrow but not shallow, not reaching front ocellus.

Measurements : 5mm

Description of female : n= 2 (1♂, 1♀)

Colour

Body shining black; scape, pedicel, ring

segment, first funicular segment, all tarsi, bases and apices of fore and mid tibiae, and bases and apices of fore and mid femora dark brown; mid region of fore tibia, fore femora, mid tibia and mid femora liver brown; hind femur light brown; hind tibia liver brown with apex testaceous; eyes transparent (dirty white) with small blackish spots; Forewing hyaline (transparent) with veins pale brown.

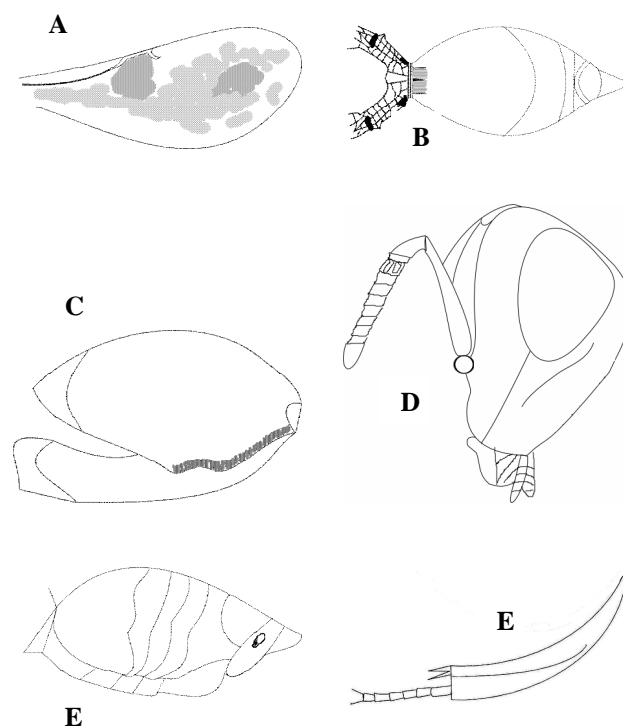


Fig. 3. *Hockeria manii* ♀: A, fore wing; B, gaster; C, hind femur; D, head, Genotemporal margin; E, gaster, side view; F, hind tibia

Head

width 1.1x its length; frons flat, scrobe narrow but not shallow, not reaching front ocellus; preorbital and postorbital carinae absent; frontogenal sulcus distinct but not well carinate.

Mesosoma

Mesosoma with small and close pits at pronotum and wide at meso and metanotum; scutellum rounded at posterior end, not emerginate over propodeum; pronotum with a row of dense

hairs at posterior margin of pronotum; mesosoma covered with spars hairs; forewing with post marginal vein absent; marginal vein distinctly separated from anterior margin of the forewing; stigmal vein short; foreleg and meso leg liver brown completely; hind femur rust brown, with a basal tooth and long comb of small teeth covering almost 3/4th of the femur (Fig. 3C); hind tibia brownish black with 2 carinae anteriorly forming 2 apical spurs (Fig. 3F), sparsly hairy.

Metasoma

Metasoma distinctly longer than mesosoma; first tergite smooth and shiny with a pair of very short carinae at base (Fig. 3B), length of each carina less than space between them; second tergite smooth and shiny with a belt of small dots at the posterior end, faintly green on sides; third to sixth tergite faintly green with a belt of small dots at the posterior end; sixth tergite with dense pubescence.

Male : Similar to female but smaller in size from female.

Host : Unknown

Distribution in Pakistan

Swabi and Peshawar Khyber Pakhtunkhwa Pakistan. This species is also reported by Narendran (1989) from Kerala, India.

Comments

Among the *Hockeria* species this species can be identified by the narrow but not shallow scrobe, scrobe not reaching front ocellus. This character separates it from the rest of the species of this genus.

Some minor differences like hyaline forewing and a distinct frontogenal sulcus exist between Narendran description and our specimen but the specimen can be correctly keyed out as *H. manii*.

As is the case with other *Hockeria* species regarding their host, we need to test the parasitism on rice moth and *Cydia* species as reported by Noyes (1985).

The species is very rare and its occurrence in

Khyber Pakhtunkhwa is reported from Peshawar and Swabi.

In Pakistan this species is reported for the first time and is a new addition to the list of chalcidid fauna of Pakistan.

Material examined

1♂ Peshawar, 25.vii.2003; 1♀ Swabi, 15.vii.2000 (Inayatullah).

ACKNOWLEDGEMENT

The author is grateful to Prof. Dr. T. C. Narendran for providing his monograph and necessary literature. He was also very much helpful in giving guidance and help during this study.

REFERENCES

- ATWAL, A.S., 1976. (Ed.). *Agricultural pests of India and South East Asia*. Kalyani Publishers, New Delhi, India: 502 pp.
- BOUCEK, Z., 1982. Description of a new *Hockeria* (Hymenoptera: Chalcidoidea), a parasite of a lepidopterous gall causer on *Tamarix*. *Isr. J. Ent.*, **16**:49-51.
- GIBSON, G.A.P., HUBER, J.T. AND WOOLLEY, J.B. (Eds). 1997. *Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera)*. National Research Council Research Press, Ottawa, Canada, PP. 794 pp.
- GRISSELL, E. E. AND SCHAUFF, M.E., 1990. A handbook of the families of Nearctic Chalcidoidea (Hymenoptera). *Proc. Ent. Soc. Wash.*, **12**: 22-23.
- HARRIS, R.A., 1979. A glossary of surface sculpturing. *Occ. Pap. Ent. Sacramento Calif.*, **28**:1-31.
- HUSAIN, T. AND AGARWAL, M. M. 1982. Taxonomic studies on Haltichellinae of India (Hymenoptera: Chalcididae). *Orient. Insects*, **16**:313-336
- NARENDRAN, T.C., 1986. Family Chalcididae. In: The Chalcidoidea (Insecta: Hymenoptera) of India and the adjacent countries. (eds. B.R. Subba Rao and M. Hayat) *Orient. Insects*, **20**:11-41: 307-310.
- NARENDRAN, T.C., 1989. *Oriental Chalcididae (Hymenoptera: Chalcidoidea)*. Published by Department of Zoology, University of Calicut, Kerala, India, pp. 439-440.
- NARENDRAN, T. C. AND SUDHEER, K., 2005. Two new species of *Hockeria* Walker from Oriental Region. *J. Ad. Zool.*, **26**: 95-99.

NOYES, J.S., 1985. Chalcidoids and biological control. *Chalcid Forum*, 5:5-10.

NOYES, J.S., 2001. *Interactive catalogue of world Chalcidoidea*. Taxapad 2001. The Natural History Museum, London. (CD Rom).

NOYES, J.S., 2011. *Universal Chalcidoidea Database*. Accessed: (25.04.2013)

<http://www.nhm.ac.uk/research-curation/research/projects/chalcidoids/database/>

WALKER, F., 1834. Monographia Chalciditum. *Entomol. Mag.*, 2:13-39.

(Received 12 February 2013, revised 31 May 2013)