

RECORD OF *ELASMUS* WESTWOOD (HYMENOPTERA: EULOPHIDAE: ELASMINI) FROM INDIAN THAR DESERT

Sarfrazul Islam Kazmi*, Sheela S. and Prahlad Ch. Mazumdar

* Zoological Survey of India, M-Block, New Alipore, Kolkata (West Bengal), INDIA. E-mail: kazmizsi@gmail.com

[Kazmi, S. I., Shela, S. & Mazumdar, P. Ch. 2017. Record of *Elasmus* Westwood (Hymenoptera: Eulophidae: Elasmini) from Indian Thar desert. Munis Entomology & Zoology, 12 (2): 470-474]

ABSTRACT: The present paper deals with the study of subfamily Eulophinae from Indian Thar desert which includes five female species. In which *Elasmus grimmi* Girault, *Elasmus khandalus* Mani & Saraswat, *Elasmus brevicornis* Gahan, *Elasmus indicus* Rhower are new records from states of Indian Thar desert (Rajasthan & Gujarat). A key to *Elasmus* species of Indian Thar desert is also given.

KEY WORDS: New record, parasitic wasps, Chalcidoidea, Eulophidae, Elasmini, Thar desert, India

The genus *Elasmus* is the only member of the hymenopteran subfamily Elasminae (formerly classified as a separate family, Elasmidae), and contains approximately 226 species worldwide. Indian species of genus *Elasmus* Westwood was reviewed by Verma et al. (2002) and Narendran et al. (2008). The genus *Elasmus* contains 54 species from India; out of which six species are represented from the Indian Thar desert.

Indian Thar desert is one of the smallest desert in the world exhibits a wide variety of habitats and biodiversity. Indian Thar is an extension of Sahara Desert, through Arabian and Persian deserts. In India, it extends from Punjab, Haryana, and Rajasthan to Gujarat state. Among desert it is most densely populated having average density 83 person per sq. Km (Baqri & Kankane, 2001). The analysis of literature shows that knowledge of distribution and diversity of family Eulophidae is insufficient in this region on the ground of utterly inadequate survey.

The present study is based on the specimens collected from Indian Thar desert during 2013 to 2016. By the sweeping method and were collected with the help of aspirator. Freshly collected specimens were killed in ethyl acetate fumes and stored in 70% ethyl alcohol. They were later dried and mounted on rectangular card using water soluble glue. Dried specimens were photographed by Leica stereo microscope version 3.6.0.

Terminology used the following abbreviations are used: F1-F3 = first, second and third funicle segments; TI – TVII = gastral terga 1 to 7; F = female; M = male; BMNH = The Natural History Museum, London; QMB = Queensland Museum, Brisbane, Australia; USNM = The U. S. National Museum, Washington, D.C.

An asterisk (*) marked after the name of the species indicates that it is a new record from the state of Indian Thar desert. The species studied are deposited in the National Zoological collections, Zoological Survey of India, Kolkata, India.

Genus *Elasmus* Westwood

Elasmus Westwood, 1833: 343 [Type species *Elasmus flabellatus* Fonscolombe, by monotypy] *Aneure* Nees, 1834: 194 [Type species *Aneure nuda* Nees, designated by Gahan & Fagan, 1923: 12. Synonymy by Westwood, 1839: 74]
Heptocondyla Rondani, 1877: 182 [Type species *Heptocondyla unicolor* Rondani, by monotypy. Synonymy by Bouček, 1974: 252, 279]

Cyclopleura Cameron, 1913: 96 [Type species *Cyclopleura fumipennis* Cameron (*Elasmus cameroni* Verma & Hayat as replacement name), designated by Gahan & Fagan, 1923: 41. Synonymy by Waterston, in Mahdihasan, 1925]

Austelasmus Riek, 1967: 148 [Type species *Elasmus trifasciiventris* Girault, by original designation. Synonymy by Burks, in Krombein et al., 1979: 1020]

Diagnosis: Female. The *Elasmus* are easily recognized by the enlarged body, yellowish, and brown to black in colour, with metallic luster. Antenna with funicle 3-segmented and a conspicuous anellus, scutellum with a triangular apical projection, notaular lines incomplete, fore wings elongate and narrow, densely covered with setae, with a very long marginal vein, hind coxae compressed and disc like; hind tibiae with diamond-shaped or wavy lines patterns of setae, tarsi four-segmented.

Male. Similar to female except antennal formula (1143) with F1 to F3 each with a dorsal ramus.

Biology: They are mainly parasitoids or hyperparasitoids of lepidopteran larvae, though several species are parasitoids of *Polistes* wasp larvae. Some species develop regularly both as primary and hyperparasitoids. They are usually gregarious.

Distribution: *Elasmus* have been distributed all over major zoogeographical regions but they are not particularly abundant.

Statistics: Number of world genera one and species nearly 226 (from Indian region 54, Nearctic 16, Neotropical 20).

Key to species of *Elasmus* Westwood, from Indian Thar desert based on females

(Adopted from Verma et al., 2002 and Narendran et al., 2008)

1. Hind tibia with bristles arranged in three wavy lines which do not touch one another; mid tibia with three lines of bristles; posterior pair of scutellar bristles long, reaching up to base of gaster, gaster orange yellow, with basal half of TI blackish and from apical half of TV to apex of gaster brownish; scape 3.0X as long as broad; F1 about 1.33X as long as pedicel and about 2.25X as long as broad; F2 and F3 each slightly less than 2.0X as long as broad..... **grimmi Girault**
- Hind tibia with bristle arranged in diamond shape; mid tibia with two lines of bristles; posterior pair of scutellar bristle short, not reaching up to base of gaster.....2
2. Mesothoracic dorsum (also prothorax and propodeum) dark brown to black.....3
- Mesothoracic dorsum not completely dark; mesoscutum yellowish brown with a blackish transverse band posteriorly; F1-3 each about 3X as long as broad, and each about 1.5X as long as pedicel; gaster yellowish brown with base of TI and apical fourth blackish..... **khandalus Mani & Saraswat**
3. F1 slightly shorter than pedicel and at most slightly longer than broad, F2 and F3 broader than long; body blackish; gaster completely black or apices of TI and TII and occasionally also TIII, and basal four sternites, honey yellow.....**brevicornis Gahan**
- F1-3 usually elongate, F1 almost sub-equal in length to pedicel; F3 at most quadrate, usually larger than broad, if pedicel longer than F1 then F2 and F3 quadrate, usually clearly longer than broad.4
4. Gaster entirely dark brown to black, at most ventre yellowish; scutellum completely dark; mid and hind tibia brownish, at most with both ends pale; pedicel shorter than F1; F1-3 relatively longer; F3 1.5× as long as broad; forewing 3.5 × as long as broad.....
-**johnstoni Ferriere**
- Gaster with apical half of TI and basal half or so of TII yellowish; pedicel shorter than F1; F1-3 each slightly more than 2.5X as long as broad.....**indicus Rohwer**

Elasmus grimmi Girault*

Elasmus grimmi Girault, 1920: 186, F. Holotype F, Australia (QMB).

Austelasmus grimmi (Girault): Riek, 1967: 148.

Diagnosis: Body black with greenish shine on head and thoracic dorsum, more strong on propodeum; tegulae vilot; posterior extention of metanotum hyaline with a basal yellowish spot; gaster orange yellow except a transverse blackish band with bright greenish shine at basal half of TI, a transverse brownish shine at the apex of TV, TVI and TVII brownish; Antennal radical and scape yellowish; flagellum dark brown covered with dense brownish setae; wings hyaline; fore leg yellowish except brownish at the base of coxa; middle and hind coxae and femora blackish with greenish shine; all tibiae and tarsi yellowish; gaster subequal in length to head and thorax combined.

Host: Unknown.

Distribution: India: Tamil Nadu, Karnataka, Kerala, Maharashtra, West Bengal, Rajasthan.

Specimen examined: 1 female, INDIA: Rajasthan, Sirohi, Mount Abu 11.xii.2013 (Gaurav Sharma & party), Regd. No. 18067/H3.

Elasmus khandalus Mani & Saraswat*

Elasmus khandalus Mani & Saraswat, 1972: 471-472, F. Holotype F: India, Khandala (USNM).

Diagnosis: Yellowish brown; legs including coxae light brown; mesoscutum with a transverse black and posteriorly; hind coxa narrowly above, TI basodorsal part and last 1/4th of gaster black.

Host: Unknown.

Distribution: India: Kerala, Maharashtra, West Bengal, Rajasthan.

Specimen examined: 1 female Nagaur, Nagri 14.xi.2013 (Gaurav Sharma & party), Regd. No. 18063/H3; 1 female, INDIA: Rajasthan, Ganganagar, Manjuvas, 16.xi.2013 (Gaurav Sharma & party), Regd No. 18064/H3.

Elasmus brevicornis Gahan*

Elasmus brevicornis Gahan, 1922: 50, M, F. Type F: Indonesia: Java, Buitenzora (USNM).

Diagnosis: Body dark brown to black; head, pronotum and mesoscutum with bluish shine; tegula brownish, yellowish at base, gaster blackish with the venter except at apex, apices of TI and TII somewhat honey yellow; antennal radicle and scape pallid, flagellum yellowish brown; wings hyaline. Legs: coxae dark brown except yellowish at apex of fore coxa; fore femur with brownish infuscation at base; middle and hind femora dark brown, yellowish at base and tip; all trochanters, tibiae and tarsal segments yellowish.

Hosts: *Biloba subsecivela*; *Cnaphalocrocis medinalis*; *Diaphania indica*; *Hapalia machaeralis* on *Tectona grandis*; *Lamprosema indicate*; *Lygropia quarternalis* defoliating *Helictares isora*; *Marasma suspicalis*; *Nausinoe geometralis*. Braconid, *Apanteles machaeralis*.

Distribution: India: Punjab, Andhra Pradesh, Kerala, Chhattisgarh, Uttar Pradesh, Delhi, Goa, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttarakhand, West Bengal, Assam, Haryana, Gujarat.

Specimen examined: 1 female, INDIA: Rajasthan, Jodhpur, Bavdi, 17.xi.2013 (Gaurav Sharma & party), Regd No. 18065/H3 ; 2 females, INDIA: Gujarat, Banaskantha, Tharad, 21.xi.2013 (Gaurav Sharma & party) , Regd No. 18069/H3 & 18070/H3.

Elasmus johnstoni Ferriere

Elasmus johnstoni Ferriere, 1929: 258, F, M. Type F: Sudan, Wad Medani (BMNH).

Elasmus valparaicus Mani & Saraswat, 1972: 481, F.: India (USNM). Synonymy by Narendran et al., 2008: 12.

Diagnosis: Body dark brownish with bluish green shine on propodeum and base of TI of gaster; tegulae brownish; antennal radicle and scape dusky; flagellum brownish; wings hyaline; legs concolourous with body, except sometimes trochanters, base and apex of all femora, base and extreme apex of hind tibia and tibial spurs yellowish.

Hosts: *Earias insulana*; *E. cupreoviridis*; *E. fabia*; *Hapalia machaeralis*; *Hyblaea puera*; *Nephanteryx rhodobasalis*; *Pectinophora gossypiella*; *Sylepta derogate*; *Braconidae*: *Apanteles impartunus*; *A. machaeralis*; *A. malevolus*.

Distribution: India: Punjab, Haryana, Jharkhand, Maharashtra, Rajasthan, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Tamil Nadu, Chhattisgarh, West Bengal.

Specimen examined: 3 females, INDIA: Rajasthan, Churu, Sujangarh, 17.xi.2013 (Gaurav Sharma & party), Regd No. 18060/H318061/H3 & 18062/H3; 1 female, INDIA: Rajasthan, Jodhpur, Bavdi, 17.xi.2013 (Gaurav Sharma & party), Regd No. 18066/H3.

Elasmus indicus Rohwer*

Elasmus indicus Rohwer, 1921: 123-124, F. M. Holotyp F, India, Coimbatore (USNM).

Diagnosis: Head and thorax blackish; posterior extension of metanotum hyaline; gaster dark brown, apical half of TI, basal half or more of TII slightly extending on sides, reddish yellow; legs dark brown except fore leg beyond basal half of coxa, basal third or so of fore femur, distal fourth or so of middle femur, tibiae, tarsi and tibial spurs of all legs yellow.

Hosts: *Anomalococcus* sp.; *A. indicus*; coccids on *Acacia* sp. *Diaphania* (*Margaronia*) *indica*; *Lamprosema indicate*; *Eublemma* sp. predaceous on *A. indicus*; probably parasitic on larvae of *Eublemma* sp.; *Sylepta derogate*.

Distribution: India: Karnataka, Tamil Nadu, Uttarakhand, Maharashtra, Gujarat.

Specimen examined: 1 female, INDIA: Gujarat, Banaskantha, Tharad, 21.xi.2013 (Gaurav Sharma & party), Regd No. 18068/H3.

ACKNOWLEDGEMENTS

We are grateful to Dr. Kailash Chandra, Director, Zoological Survey of India, Kolkata, for providing facilities. We are also grateful to Dr. K.C. Gopi, Additional Director & Officer-in-Charge of Entomology Division (A), Zoological Survey of India, Kolkata for his useful suggestions in the preparation of the manuscript.

LITERATURE CITED

- Ferriere, C.** 1929. The Asiatic and African species of *Elasmus* Westwood (Hymenoptera: Chalcidoidea). Bulletin of Entomological Research, 20: 411-423.
- Gauthier, N., La Salle, J., Quicke, D. L. J. & Godfray, H. C. J.** 2000. Phylogeny of Eulophidae (Hymenoptera: Chalcidoidea), with a reclassification of Eulophinae and the recognition that Elasmidae are derived eulophids. Systematic Entomology, 25: 521-539.
- Girish Kumar, P. & Kazmi, S. I.** 2012. Eulophidae and Eupelmidae (Insecta: Hymenoptera: Chalcidoidea) of Indian Thar Desert. In: J. C. Grunwaldt et al. (Eds.) Deserts Fauna, Flora and Environment Nova Science Publishers, Inc. New York, U.S.A., pp. 155-164.
- Kazmi, S. I. & Girish Kumar, P.** 2013. The species of *Elasmus* Westwood (Hymenoptera: Eulophidae: Eulophinae) from West Bengal, India. Prommalia, 1: 79-92.
- Kazmi, S. I. & Girish Kumar, P.** 2015. *Elasmus* Westwood (Hymenoptera: Chalcidoidea: Eulophidae: Eulophinae: Elasmini) of Maharashtra, India. Munis Entomology & Zoology, 10 (2): 460-467.
- Kazmi, S. I. & Sheela, S.** Record of *Elasmus* Westwood (Hymenoptera: Chalcidoidea: Eulophidae: Eulophinae: Elasmini) of Punjab, India. Munis Entomology & Zoology, 12 (1): 280-284.
- Kazmi, S. I., Sheela, S. & Girish Kumar, P.** 2008. The Species of *Elasmus* Westwood (Hymenoptera: Eulophidae: Eulophinae) from Uttar Pradesh, India. Columban Journal of Life Science, 9 (1&2): 124-129.
- Khan, F. R. & Hayat, M.** 2011. Record of some species of *Elasmus* from India (Hymenoptera: Chalcidoidea: Eulophidae). Bionotes, 13 (1): 7-10.

- Mani, M. S. & Saraswat, G. G.** 1972. On some *Elasmus* (Hymenoptera: Chalcidoidea) from India. *Oriental Insects*, 6: 459-506.
- Narendran, T. C., Sheeba, M. & Kulkarni, H.** 2008. A review on the taxonomy of the Indian species of *Elasmus* Westwood (Hymenoptera: Chalcidoidea: Eulophidae: Eulophinae: Elasmini). *Biospectra*, 3 (1): 1-25.
- Noyes, J. S.** 2016. Universal chalcidoidea database. <http://www.nhm.ac.uk/research-curation/projects/chalcidoidea/> (accessed 14 June 2016).
- Riek, E. F.** 1967. Australian Hymenoptera Chalcidoidea, family Eulophidae, subfamily Elasmidae. *Australian Journal of Zoology*, 15: 146-199.
- Verma, M. & Hayat, M.** 1985. Family *Elasmidae*. In: B. R. Subba Rao & M. Hayat (eds) *The Chalcidoidea (Insecta: Hymenoptera) of India and the adjacent countries. Part I.* *Oriental Insects*, 19: 233-234.
- Verma, M. & Hayat, M.** 1986. Family *Elasmidae*. In: B. R. Subba Rao & M. Hayat (eds) *The Chalcidoidea (Insecta: Hymenoptera) of India and the adjacent countries. Part II.* *Oriental Insects*, 20: 173-178.
- Verma, M., Hayat, M. & Kazmi, S. I.** 2002. The species of *Elasmus* from India (Hymenoptera: Chalcidoidea: Eulophidae). *Oriental Insects*, 36: 245-306.