

New Records and Redescription of a Gonocerine Squash Bug *Cletomorpha hastata* (F.) (Hemiptera: Coreidae) from Indo-Pakistan Subcontinent and its Cladistic Relationships

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Abstract:- New records and redescription with special reference to metathoracic scent auricles, male and female genitalia including inflated aedeagus and spermatheca of a gonocerine squash bug *Cletomorpha hastata* (F.) are given from different localities of Pakistan and Bangladesh. It is also compared with its closest ally *C. punjabensis* Ahmad *et al.* and in this light its cladistic relationships within its genus is also briefly discussed.

Key words: Hemiptera, Coreidae, *Cletomorpha hastata*, Indo-Pakistan areas, cladistic relationship.

INTRODUCTION

Fabricius (1787) described *hastata* under *Cimex* Linnaeus for which Mayer (1866) described his new genus *Cletomorpha*. Species of this genus are pest of Amaranth, purslane and different vegetables. Distant (1902) recorded *hastata* from Karachi, Bombay and Cuttack, in the then British India, and redescribed it only on the basis of superficial characters. This species in addition to the above localities was collected from Hyderabad, Miani Forest and Tandojam in Sindh, Lahore, Changa Manga, Rawalpindi and Shahdra in Punjab in Pakistan and Muzaffarabad in Kashmir and from Dacca, Jessore, Juntipur, Ishurdi and Sylhet in Bangladesh as new records. Because the metathoracic scent auricles and male and female genitalia including inflated aedeagus and spermatheca of this species are unknown in the literature, presently these characters are described in detail to fill this gap and compared with those of *C. punjabensis* Ahmad *et al.* (2000) the above characters of which were described by its authors. In this light the cladistic relationships of *C. hastata* within its genus is also briefly discussed.

MATERIALS AND METHODS

The specimens were identified following the description and keys provided by Distant (1902), Ahmad *et al.* (1977) and Ahmad (1979). The measurements are given in millimeters.

For the study of male genitalia, particularly for the inflation of the aedeagus, the techniques of Ahmad (1986) and that of Ahmad and McPherson (1990, 1998) were generally followed. For the inflation of aedeagus the pinned dry specimen after removing the label, was plunged into boiling water in a beaker, for 4-5 minutes. The specimen was then slipped by the pin. The genital capsule (pygophore) was then removed from the relaxed specimen under a binocular microscope, using very fine watchmaker forceps (5 or finer). The genital capsule was then placed in 10% KOH and was warmed at 40°C for 5-10 minutes in a cavity block. The capsule was then removed in tap water (room temperature) in a depression dish and was washed thoroughly. The above fine forceps were used to hold the basal plate (attaching aedeagus to capsule) and then with the help of forceps the opening of phallosome was widened very carefully and then vesica was pulled out gently. This was done very carefully because the distal tip of vesica is very delicate and breaks off quickly.

For dissection of the female spermatheca, the entire abdomen was warmed on a bench lamp (after

completing the external view diagram of the ovipositor) for 15 minutes. The spermatheca was dissected out in tap water after washing the specimen thoroughly. The components of male and female genitalia were preserved in glycerine in microvials pinned with the specimen. The female abdomen after it was thoroughly dried with a filter paper was glued with the specimen. For description and for finalizing illustrations the conventional techniques specially those described by Ahmad et al. (2000) were generally followed.

For illustrations an ocular grid was placed in an eyepiece of Wild Herberg binocular microscope. For completion of illustrations pencil drawings were transferred on a Bristol board and finalized with pelican black ink. All the materials examined were deposited at the Natural History Museum, Department of Zoology-Entomology, University of Karachi. Holotype was examined by the first author at Natural History Museum, Vienna, Austria.

Cletomorpha hastata (F.)
(Fig. 1A-G)

Cimax hastata F. 1787,2:287-88.

Cletomorpha hastata (F.) Mayr 1866: 118; Distant 1902:369

Colouration

Body dull ochraceous with head, posterior areas of pronotum and corium thickly and darkly punctate having brownish appearance.

Head

Quadrangular, clypeus rounded; antenniferous tubercles toothed; anteocular distance more or less equal to remainder of head, anteocular distance 0.6 (0.5-0.6), length remainder of head 0.6 (0.6-0.7), width of head 1.4 (1.3-1.4); interocular distance 0.9 (0.9); interocellar distance 0.4 (0.4); antenna with basal segment equal to 3rd, length of segments I 1.3 (1.2-1.3), II 1.6 (1.5-1.7), III 1.4 (1.2-1.4), IV 0.8 (0.8-0.9); antennal formula IV<I<III<II; labium not reaching 3rd coxae, basal segment about 2x length of 3rd, length of labial segments I 1.0, II 0.9, III 0.5 (0.4-0.5), IV 0.7; labial formula III < IV < II < I.

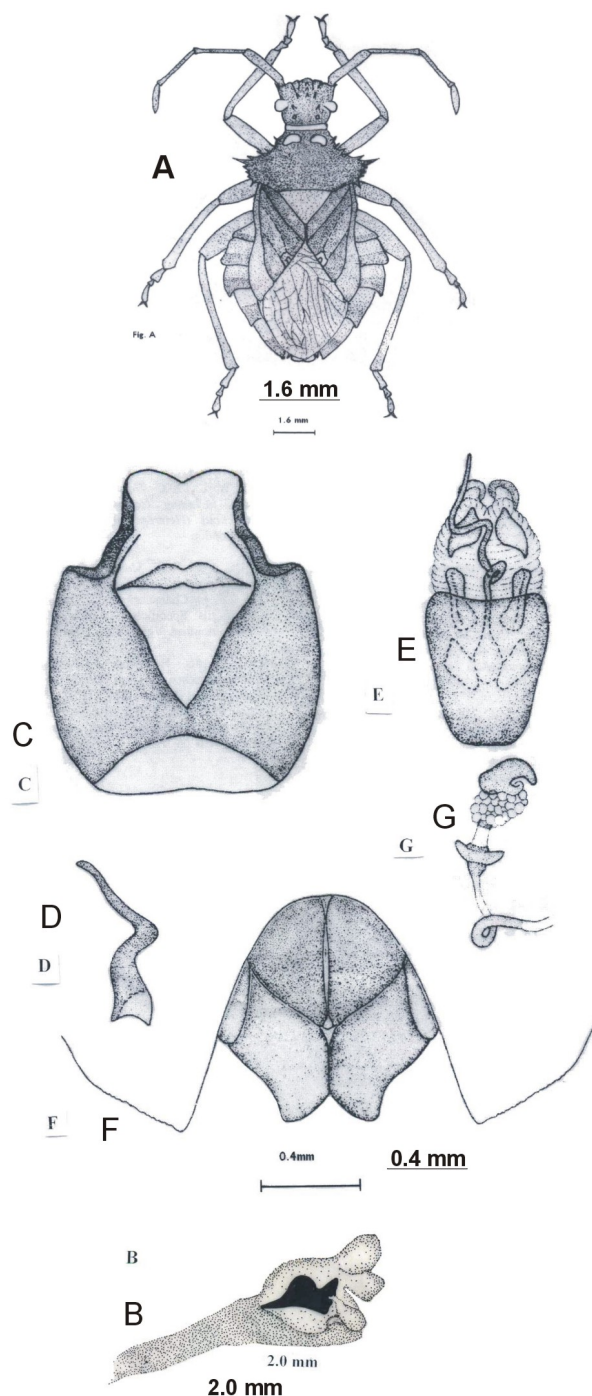


Fig. 1. *C. hastata*. A, dorsal view; B, metathoracic scent auricle, ventral view; C, pygophore, dorsal view; D, paramere; E, inflated aedeagus, ventral view; F, female terminalia, ventral view; G, spermatheca, dorsal view.

Thorax

Pronotum about 2x broader than long, spines on lateral margins of pronotum conspicuously sharp, anterolateral margins concave with spines, posterolateral margins concave, posterior lobes prominent, pronotal disc with black patches, length of pronotum 1.8 (1.71-1.8); width 3.6 (3.3-3.6); scutellum triangular, slightly broader than long, length of scutellum 1.1 (1.0-1.2), width 1.2 (1.1-1.2); metathoracic scent ostiole (Fig. 1B) prominent, outer upper lobe of auricle sub round, lower outer lobe sub acute; evaporatoria continuing between middle and hind coxae, slightly raised and light pale in colour, ventrally continuing across mesosternum, not raised as above.

Abdomen

Connexiva markedly exposed at repose; distance base scutellum-apex calvus 1.8 (1.71-1.8); apex clavus-apex corium 1.3 (1.2-1.3); apex scutellum-apex abdomen including membrane 3.6 (3.6-3.7). Total length 7.7 (7.4-7.9).

Male genitalia

Pygophore (Fig. 1C) longer than broad, dorsoposterior margin V-shaped, ventroposterior margin medially notched; paramere (Fig. 1D) with blade elongate, outer and inner margins distinctly sinuate; aedeagus (Fig. 1E) with bilobed dorsal membranous conjunctival appendages apically sclerotized plate distally present and pair of broad, elongate and truncate appendages proximally present.

Female genitalia

Terminalia (Fig. 1F) with first gonocoxae triangular, narrowed; eighth paratergites with posterior margins convex; 9th paratergites large with narrowed apex; spermatheca (Fig. 1G) with developed proximal flange, distal flange short, glandular, spermathecal bulb short with distal margin sinuate.

Comparative note

This species is most closely related to *C. punjabensis* in having body slightly longer but less

than 8.5mm among other species and 3rd antennal segment sub equal to 1st but it can easily be separated from the same in having lateroposterior spines of pronotum little shorter and continuing with posterior margin and posterior margin of 8th paratergites acutely produced in comparison to *C. punjabensis* in which lateroposterior spines are markedly conspicuous and posterior margins of 8th paratergite round.

Material examined

10 males, 10 females; Pakistan: Sindh, Karachi, Hyderabad, Miani forest and Tandogram; Punjab, Lahore, Changamanga, Rawalpindi and Shahdra; Azad Kashmir, Muzaffarabad, Bangladesh, Dacca, Jessore, Juntipur, Ishurdi and Sylhet; on Purslane (*Portulaca oleracea*), Amaranth (*Amaranthus viridus*), grass, wild bushes and vegetables. 4-6-1972, leg. Ahmad, I., Khan, A.A., lodged at NHMUK.

DISCUSSION

Ahmad *et al.* (2000) have described *C. punjabensis* with a key to all the species known from Indo-Pakistan subcontinent. They in the same paper also cladistically analysed these species. The *hastata* group includes the species represented in the Indo-Pakistan subcontinent of which the subgroup *hastata* includes *C. hastata*, *C. punjabensis* and *C. raja* distinguished from *kirbyi* sub-group which includes *C. kirbyi*, *C. insignis* and *C. walkeri* in having body dull ochraceous. The species of *C. kirbyi* have body pale or markedly brown.

But it can easily be separated from the same in having lateroposterior spines of pronotum little shorter and continuing with posterior margin and posterior margin of 8th paratergites acutely produced in comparison to *C. punjabensis* in which lateroposterior spines are markedly conspicuous and posterior margins of 8th paratergites round. It is also geographically distributed more widely in Pakistan, Kashmir and Bangladesh than *C. punjabensis*. *C. raja* of the *hastata* subgroup appears to stand out from *C. punjabensis* and *C. hastata* on the basis of 3rd antennal segment shorter than either 1st or 2nd and is found in Sikhim, Mungphui, Assam,

Margherita, Burma, Kerennee and Palon in the Palaearctic region which confirms the above conclusion. *C. punjabensis* and *C. hastata* seem to be most closely related in this subgroup with each other and play sister group relationship on the basis of their synapomorphies of 3rd antennal segment subequal to 1st and body slightly longer but less than 8.5 mm.

REFERENCES

- AHMAD, I., 1986. A fool-proof technique for inflation of male genitalia in Hemiptera (Insecta). *Pakistan J. Ent.*, **1**: 111-112.
- AHMAD, I. AND MCPHERSON, J.E., 1990. Male genitalia of the type species of *Corimelaena* White, *Galgupha* Amyot and Serville, and *Cydnoides* Malloch (Hemiptera: Cydnidae: Corimelaeninae) and their bearing on classification. *Ann. ent. Soc. Am.*, **83**: 162-170.
- AHMAD, I. AND MCPHERSON, J.E., 1998. Additional information on male and female genitalia of *Parabrochymena* Larivi Pre and *Brochymena* Amyot and Serville (Hemiptera: Pentatomidae). *Ann. ent. Soc. Am.*, **91**: 800-807.
- AHMAD, I., SHADAB, M.U. AND KHAN, A.A., 1977. Generic and supergeneric keys with reference to a checklist of coreid fauna of Pakistan (Heteroptera: Coreoidea) with notes on their distribution and food plants. *Suppl. Karachi ent. Soc.*, **2**: 1-49.
- AHMAD, I., RAB, N. AND KAMAL UDDIN, S. 2000. A new species of *Cletomorpha* Mayer (Hemiptera: Coriedae) on vegetables from Punjab, Pakistan with a key to the known species of *Cletomorpha* from Indo-Pakistan subcontinent. *Proc. Pakistan Congr. Zool.*, **20**: 71-76.
- AHMAD, I., 1979. A revision of the super families Coreoidea and Pentatomoidea (Heteroptera: Pentatomomorpha) from Pakistan, Azad Kashmir and Bangladesh. Part-I. Additions and corrections of Coreid and Pentatomid fauna with phylogenetic considerations. *Suppl. Karachi ent. Soc.*, **4**: 1-113.
- DISTANT, W. L., 1902. *The fauna of British India, including Ceylon and Burma. Rhynchota (Heteroptera)*, vol. 438, pp. 1438, London.
- FABRICIUS, J. C., 1787. *Mantissa Insectorum Sistens eorum Species Nuper Detectas adjectis Characteribus Genericis, Differentiis specificis, Edmndationibus, Observationibus*. Vol. III (Proft. Hafnia).
- MAYR, G. L. 1866. Hemiptera. In: *Reise der österreichischen Fregate Novara rund die Erde in den Jahren 1857, 1858, 1859. Zool. Pt.2. Abt. I, B.2. Hemiptera*. Hof und Staatsdruckereri. Karl Gerold's Vienna, 204 pp.

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