INT. J. BIO. BIOTECH., 2(2): 251-254, 2005.

REDESCRIPTION OF AN UNIQUE AND LITTLE KNOWN SQUASH BUG *HOMOEOCERUS SUBJECTUS* WALKER (HETEROPTERA: COREIDAE) WITH REFERENCE TO METATHORACIC SCENT AURICLES, MALE AND FEMALE GENITALIA AND ITS ZOOGEOGRAPHY AND CLADISTIC RELATIONSHIPS

R. Perveen and I. Ahmad

Department of Zoology, University of Karachi, Karachi-75270, Pakistan

ABSTRACT

Homoeocerus subjectus Walker an unique and little known squash bug species from Indian Assam, China and Thailand is redescribed in detail with reference to metathoracic scent auricles and male and female genitalia. In this light and considering its zoogeographical distribution its cladistic relationships are also briefly discussed.

Keywords: *Homoeocerus subjectus* Walker, Hemiptera, Coreidae, redescription, zoogeography, cladistic relationships.

INTRODUCTION

Walker (1871) in his catalogue of the specimens of Hemiptera-Heteroptera presented 24 species of the Homoeocerus Burmeister from Asia. He described *H. subjectus* mostly on colour characters from Thailand. Lethierry and Severin (1894) in their most comprehensive catalogue listed under the genus *Homoeocerus* 81 species including 15 species from the Indo-Pakistan subcontinent. Distant (1902) also recorded it from Assam, India and redescribed it mostly on colour and external morphological characters. Hsiao *et al*., (1977) recorded it from China.

Presently it is redescribed in detail, specially in the light of its important taxonomic characters including metathoracic scent auricles, male and female genitalia. In male genitalia the characters of general shape and apex of paramere, median dilation and ventro-posterior margin of pygophore and shape of conjunctival appendages in the inflated aedeagus are the main characters considered. In female the shape of posterior margin of seventh abdominal venter, first gonocoxae and that of the spermathecal bulb and the length and coiling of distal spermathecal duct are specially highlighted. In this light and considering its zoogeographical distribution its cladistic relationships with its allies are briefly discussed.

MATERIALS AND METHODS

A series of authentically determined specimens of *H. subjectus* Walker borrowed by the courtesy of the authorities and Mr. Mick Web, the Incharge Hemiptera Section, Department of Entomology, Natural History Museum London (BMNH) were examined. The holotype was examined by the present second author during his visit that museum by the courtesy of Mr. Mick Web of the above Museum. The male genitalia was studied and the inflation was made of aedeagus following the technique of the second author (1986) and that used by Ahmad and McPherson (1990 and 1998). The female genitalia was studied including the dissection of spermatheca following the technique of Ahmad and Perveen (1983) and Perveen and Ahmad (1996). The components of the male genitalia including the inflated aedeagus were placed in a micro-vial with a drop of glycerine pinned with the specimen. The female abdomen including the spermatheca was dried with the help of a filter paper and was glued with the specimen. All the measurements are given in millimetre and the illustrations are made to the given scales.

RESULTS

Homoeocerus subjectus Walker
(Figs. 1- 9)

Homoeocerus subjectus Walker 1871: 97; Lethierry and Severin 1894: 38; Distant 1902: 361.
Homoeocerus subjectus Hsiao *et al*., 1977: 236, 548.

Colouration:

Head, pronotum, scutellum, clavus except margins, corium, legs and venter of the body yellowish brown (golden in colour); antennae, basal fascia of the pronotum except yellowish basal margin, outer margins of clavus and inner margins of corium and tibiae reddish; confined to inner angles of corium somewhat large squared spot

yellowish white; eyes silvery golden; ocelli red; membrane light brassy with marginal spot and inner angular region dark brown, dorsally densely punctate, sterna and venter of abdomen scarcely punctate.

Head:

Head moderately declivent; length of anteocular region distinctly shorter than remainder of head, length of anteocular region 0.6 (0.80-0.70), length remainder of head 0.90 (0.90-1.0), length of head distinctly shorter than its width, length of head 1.50 (1.50-1.60), width 1.80 (1.80-2.00); interocular distance 1.0 (1.0-1.10); interocellar distance 0.50 (0.50-0.50); antennae long (more than 3/4th of the body length) and slender, 1st segment subequal to 2nd but distinctly longer than 3rd, length of antennal segments I 5.20, II 5.30, III 3.30, IV mutilated; labium reaching beyond ½ of 1st coxae, 3rd segment shorter, slightly less than 3/4th of 4th segment, length of labial segments I 0.80 (0.80-0.90), II 0.65 (0.65-0.75), III 0.90 (0.90-1.10), IV 1.30 (1.30-1.50), labial formula 2<1<3<4.

Thorax:

Pronotum gradually steeply declivent, anterior angles almost subround, humeral angles prominent, acute, anterior margin concave, posterior margin medially slightly concave, postero-lateral margins slightly sinuate, lateral margins serrate, length of pronotum, slightly less than 3/4th of its width, length of pronotum 3.50 (3.50-3.90), width 4.80 (4.80-5.30); scutellum as long as wide, apex acute, length of scutellum 2.00 (2.00-2.40), width 2.0 (2.0-2.40); length base scutellum-apex clavus 3.30 (3.30-4.10); aepx scutellum-apex abdomen including membrane 8.90 (8.90-10-90); ostiolar peritreme (Fig. **2**) with subprominent, subround anterior projection, lateral projection round, postero-lateral projection subacute, evaporatoria anteriorly and posteriorly slightly developed, laterally moderately developed, antero-laterally slightly narrowed; membrane slightly shorter than the last abdominal segment in both male and female.

Abdomen:

Abdomen slender; posterior margin subround in male; connexiva slightly exposed in both male and female; in female 7th abdominal sternum medially ½ bifurcate, inner angles subacute, posterior margin almost straight, near inner angles very slightly sinuate, lateral angles subacute. Total length, male 16.0, female 18.80 (Fig. **1**).

Male genitalia:

Pygophore (Figs. **3, 4**) broadly oval, pitcher-shaped, outer margin medially prominently round, posteriorly gradually narrowed and then again broadened, dorso-lateral inner rim convex, dorsal rim medially slightly concave, ventro-posterior margin or lip strongly bilobed, with round margins; paramere (Fig. **5**) with outer margin medially straightly sinuate, with moderately long blade, posteriorly gradually broadened, beyond middle dilate, then slightly narrowed, apically oblique, apical margin flattened, depressed in the centre, anteriorly moderately subroundly produced, posteriorly substraight, outer margin straight apically, inner margin substraight, stem squared, with inner margin slightly concave; inflated aedeagus (Figs. **6, 7**) with pair of dorsal membranous conjunctival appendages having subround apex, posterior margin joined, pair of ventro-lateral proximally membranous appendages with subround apex, pair of sclerotized ventral appendages with two prominent or subprominent apices, pair of semisclerotized leaf-shaped lateral appendages; vesica thick with two loose coils.

Female genitalia:

Female terminalia (Fig. **8**) with 1st gonocoxae almost as long as broad, apex prominent, round, lateral margins prominently convex, inner margins sinuate; 2nd gonocoxae with lateral margins very slightly sinuate; 8th paratergites with lateral margins substraight; spermatheca (Fig. 9) with tubular, thick inverted U-shaped bulb, apically slightly narrowed with subacute apex, directed laterad, distal spermathecal duct long, tightly coiled, proximal duct long, median dilation small, conical, proximal flange subprominent.

Material examined:

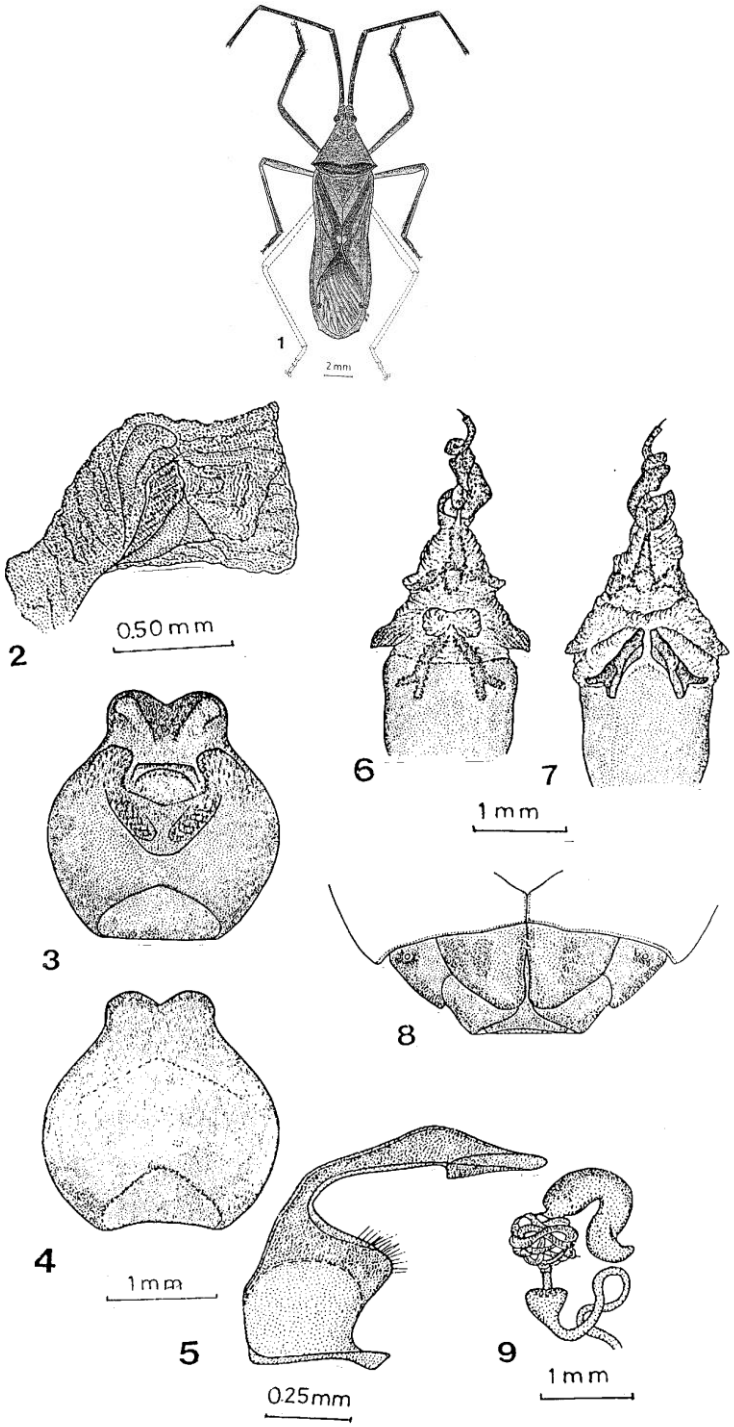
Holotype, female, Thailand, presented by W.W. Saunders Esq., in BMNH.

Other material:

Five males and females, Indian Assam, Subsaugar., "S.E. Peal", "1911-383", "Distant Coll.", in the above museum.

Distribution:

India, China, and Thailand.



Figs. 1-9. *H. subjectus*; 1. Entire specimen, dorsal view; 2. Metathoracic scent auricle, ventral view; 3. Pygophore, dosal view; 4. Same, ventral view; 5. Paramere, inner view; 6. Inflated aedeagus, dorsal view; 7. Same, ventral view; 8. Female terminalia, ventral view; 9. Spermathecae, dorsal view.

Comparative note:

This species is closely related to *fasciolatus*, *albiguttulus* and *javanicus* in having basal antennal segment almost 3 x longer than the head length, connexiva moderately exposed and spermathecal bulb tubular in shape but it could easily be separated by its golden colouration, a large squared spot on the inner angular area of corium, by the subequal 1st and 2nd antennal segment and by prominently roundly bilobed ventro-posterior margin of pygophore. The apex of paramere of this species is typical beak-shaped, with typically oblique blade (Fig. **5**).

DISCUSSION

H. subjectus Walker is known from Indian Assam, Thailand and China. It appears to be having an eastern Palaearctic influence. This is probably why in the light of the presently described characters of immense taxonomic importance like metathoracic scent auricles, male genitalia including inflated aedeagus and female genitalia including spermatheca it appears to be isolated among species of *Homoeocarus* Burmeister from Indian subregion studied by the present first author (1991). However in the light of the present studies it appears to belong to *javanicus* Dallas subgroup of *Homoecerus graminis* (F.) group (Ahmad and Perveen, 2004), on the basis of exceedingly long basal antennal segment which appears to be a very highly derived character shared by Stål's *fasciolatus* and *albiquttatus* and *javanicus* with which it also shares connexiva moderately exposed and spermathecal bulb tubular in shape. Its subgroup is clearly separated from other subgroup *graminis* sensu stricto of the main *graminis* group (including the latter and Westwood's *angulatus* and *biguttatus*) which share a remarkably longer basal antennal segment distinctly 3 x longer than the head length.

It also appears isolated in its subgroup in having metathoracic scent auricles with expanded evaporative area and prominent ridges, its posterior margin of pygophore has two prominent round lobes and the apex of paramere typical beak-shaped with apically oblique blade having apical margins flattened and depressed in the center (Fig. **5**). Its golden colouration, a large squred spot on the inner angular area of corium, first and second antennal segments subequal and prominently, roundly bilobed posterior margin of pygophore all point out in this direction. Probably its cladistic relationships would only be determined after all the palaearctic and oriental species of *Homoeocerus* are fully investigated and these are cladistically analyzed.

REFERENCES

Ahmad, I. (1986). A fool-proof technique for inflation of male genitalia in Hemiptera (insecta). *Pakistan J. Entomol. Karachi*, 1: 111-112.

Ahmad, I. and McPherson (1990). Male genitalia of the type species of *Corimelaena* White, *Cydnoides* Malloch and *Galgupha* Amyot and Serville (Hemiptera: Cydnidae: Caremelaeninae) and their bearing on classification. *Ann. Entomol. Soc. Am*., 83: 162-170.

Ahmad, I. and McPherson (1998). Additional information on male and female genitalia of *Parabrochymena* Larviere and *Brochymena* Amyot and Serville (Hemiptera: Pentatomidae). *Ann. Entomol. Soc. Am*., 91: 800-807.

Ahmad, I. and R. Perveen (1983). Review of the genus *Aschistocoris* Bergeroth with description of two new species from Oriental region (Hemiptera: Coreidae: Coreinae). *Ann. Entomol. Soc. Am*., 76: 858-865.

Ahmad, I. and R. Perveen (2004). Redescription of an unique and forgotten squash bug *Homoeocerus angulatus* Westwood (Hemiptera: Coreidae: Coreinae) with a note on its zoogeography and cladistic relationships. *Pakistan J.Eentomol. Karachi*, 21:

Blote, H.C. (1936). Catalogue of Coreidae in the Rijksmuseum van Natuurlijke Part-III. Coreinae, second part, zool. Meded, 19B: 23-66.

Distant, W.L. (1902). *The fauna of British India including Ceylon & Burma. Rhynchota (Heteroptera).* Vol. 1. Taylor and Francis, 1-438, London.

Lethierry, L. and G. Severin (1894). *Catalogue generale des Hemipteres*. Tome II. Mus. Hist. Nat. Belge. Brussels. 277 pp.

Perveen, R. (1991). *Taxonomic study of the tribe Homoeocerini Amyot and Serville (Heteroptera: Coreidae) from Indo-Pakistan subcontinent*. Ph.D. Thesis, Dept. of Zoology, University of Karachi.

Perveen, R. and I. Ahmad. (1996). *Homoeocerus inornatus* Stål species subgroup of *H. prominulus* Dallas group of sheesham's squash bug species (Hemiptera: Coreidae) with *H. borealis* Distant recorded for the first time from Punjab and NWFP in Pakistan. *Proc. Pakistan Congr. Zool. Islamabad*, 16: 133-142.

Hsiao, T.Y. and L.Y. Cheng and S.Z. Ren (1977). *A handbook for the determination of the Chinese Hemiptera-Heteroptera*. Vol. 1: 330 pp., 52 pls.

Walker, F. (1871). Catalogue of the specimens of Hemiptera: Heteroptera in the collection of the British Museum. *Brit. Mus. Publ. Pt.*, 4: pp. 1-211, London.

Westwood, J.O. (1842). *A catalogue of the Hemiptera in the collection of the Rev. F.W. Hope.* pp. 1-26. London.

(*Accepted for publication March 2005*)