

REDESCRIPTION OF *DYSDERCUS CARDINALIS* GERSTAECKER (HEMIPTERA: PYRRHOCORIDAE) WITH REFERENCE TO ITS PHYLOGENETIC RELATIONSHIPS

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ABSTRACT

Dysdercus cardinalis Gerstaecker is redescribed in detail with special reference to its unknown metathoracic scent auricle, male genitalia including inflated aedeagus. In this light it is compared with its closest allies and its phylogenetic relationship in its subgenus is also briefly discussed.

Key words: Redescription, *Dysdercus, cardinalis*, Relationship, Genitalia, Hemiptera, Pyrrhocoridae.

INTRODUCTION

The representatives of the genus *Dysdercus* Gueren-Menville are the pests of malvacean plants, mainly cotton and distributed in Old and New world. Hussey's (1929) Catalogue comprises three subgenera and 77 new and old-world species in the genus *Dysdercus*. Freeman (1947) revised the genus from old world. He described this species from Congo, Ethiopia, Kenya, Tanzania and Yemen and gave illustrations of parameres, spermatheca and vertical processes. Freeman (*op. cit.*) categorised the genus *Dysdercus* in four groups and placed *D. cardinalis* in group I A with type species of *D. supersticiosus* (F.).

The sub-generic groups of *Dysdercus* were established by Stehlik (1965a &b). He classified it into four distinct sub-genera viz., *Dysdercus sensu stricto*, *Neodysdercus* Stehlik, *Paradysdercus* Stehlik and *Megadysdercus* Breddin. *Dysdercus cardinalis* Gerstaecker is here described in detail with special reference to its unknown metathoracic scent auricle, male genitalia including inflated aedeagus and in this light its relationship within its subgenus is also briefly discussed.

MATERIALS AND METHODS

The specimens of *Dysdercus. cardinalis* were gifted to the authors by the courtesy of Prof. Dr. S. N. H. Naqvi. The measurements were taken and the illustrations were made following the technique of Ahmad *et. al.* (2003). For the study of male genitalia particularly for the inflation of the aedeagus the techniques of Ahmad (1986) and Ahmad and McPherson (1990 and 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 of the pin. The genital capsule (Pygophore) was then removed from the relaxed specimen under a binocular microscope, using very fine watch maker forceps (5 or finer). The genital capsule was placed in 10% KOH and was warmed at 40°C for 5-10 minutes in a cavity block. The capsule was 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 the vesica was pulled out gently. This was done very carefully because the distal tip of vesica is very delicate and breaks off quickly. The components of male genitalia were preserved in glycerin in microvial pinned with the specimens. All the measurements are given in millimeter and all illustrations are to the given scales.

Dysdercus cardinalis Gerstaecker (Figs. 1 & 2)

Dysdercus cardinalis Gerstaecker 1873: 416; Distant 1902: 543; Schouteden 1910: 153; Schouteden 1912: 304, 305; Bergroth 1920: 4; Hussey 1929: 86; Blöte 1931: 118; Schmidt 1932: 277; Freeman 1947: 395.

Colouration:-

Body yellowish grey except head, and callus red with black shade, basal portion of first antennal segment,

lateral margins of pronotum and femora red; antennae, tibiae and tarsi dark brown; transverse fascia black, touching inner margin of corium black; membrane dark hyaline, outer margin opaque.

Head:-

Anteocular distance slightly longer than remainder of head, length of head slightly shorter than its width, length of head 1.8, width, 1.9; antennae with second segment more than 2x the length of third, length of segments I 2.5, II 2.2, III 1.0, IV 2.7, antennal formula $3 < 2 < 1 < 4$; labium just reaching to third abdominal venter, basal segment about 3x as long as length of third, length of segments I 1.4, II 1.5 III 0.5, IV 1.8, labial formula $3 < 1 < 2 < 4$; length anteocular distance 1.0; length remainder of head 0.8; interocular distance 1.1.

Thorax and abdomen:-

Width of pronotum more than $1\frac{1}{2}$ x its length, anterior angles subrounded, lateral margins sinuate, length of pronotum 2.4, width 3.5; scutellum about $1\frac{1}{2}$ as broad as long, length of scutellum 1.0, width 1.5; metathoracic scent gland ostiolar peritreme lobe-like, broadest at base (Fig.2 e); distance base scutellum apex clavus 3.3, apex clavus-apex corium 3.5, apex corium-apex abdomen including membrane 3.5, apex scutellum-apex abdomen including membrane 8.4, Total length male 14.1.

Male genitalia:-

Pygophore (Fig. 2 a) somewhat rounded; broadest at middle; dorsoposterior margin concave; ventroposterior margin concave; capsular lamella crown shaped, raised upward but not longer than ventroposterior margin; paramere (Fig. 2 d) with shaft long, inner margin convex; head rounded; with onehook like, curved spur with, subapical small tooth; inflated aedeagus (Figs. 2 b & c) with pair of conical ventrolateral membranous conjunctival appendages and pair of apically curved third dorsal conjunctival appendages; pair of cylindrical second conjunctival appendages, pair of plate like first conjunctival appendages.

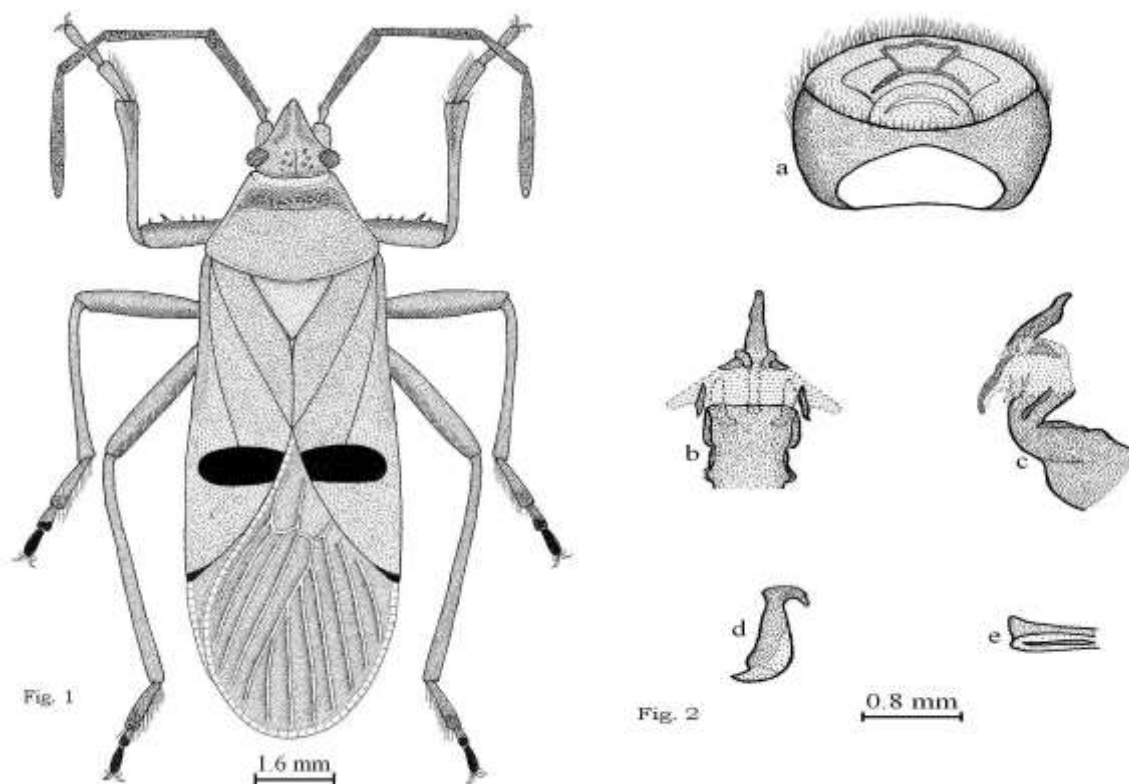


Fig. 1. *Dysdercus cardinalis* Gerstaecker, entire specimen, dorsal view;

Fig. 2. *Dysdercus cardinalis* Gerstaecker, a, pygophore, dorsall view; b, inflated aedeagus, ventral view; c, inflated aedeagus,lateral view; d, paramere, inner view; e, metathoracic sent gland ostiolar peritreme, ventral view.

Material examined:-

One male, Kilizini lodge, dated 01-08-1971, leg. Y-Mumglu, Kenya lodged at Natural History Museum,

Department of Zoology, University of Karachi (NHUK).

Comparative note:-

This species is most closely related to *fasciatus* Signoret in having paramere stout, dorsal side rounded and proximal spur larger than blade but it can easily be separated from it in having both parameral spurs at same axes, proximal spur hammer shaped and pleuron of abdominal segment anteriorly never black in contrast to *fasciatus* in having parameral spur at different axes, proximal spur flat, broadly large and pleuron of abdominal segment anteriorly black.

Discussion:-

This species appear to belong to subgenus *Dysdercus* s. str. on the basis of synapomorphic characters i.e., pygophore rounded without vertical process paramere stout, parameral blade with dorsal spur like projections, spermatheca without separate accessory gland and spermathecal duct with proximal portion swollen with fused accessory gland. This is indeed Ia of Freeman (1947) called by him as *superstitiosus* group and treated by Stehlik (1965a) as *Dysdercus* s. str.. This species appears closely related to *fasciatus*, *flavidus* Signoret, *nigrofasciatus* Stål, *melanoderus* Karsch, *ortus* Distant, and *superstitiosus* on the basis of second gonocoxae flat close together and parameral stem apically setose. In this complex of species *D. cardinalis* and *D. fasciatus* appear to be entirely isolated playing out group relationship with the rest of the subclade and sistergroup relation with each other with apomorphy of paramere not selendrical, dorsal side rounded proximal spur larger than blade with apical half of stem setose. In its group *D. cardinalis* appears to be entirely isolated from *D. fasciatus* in having autapomorphy of both parameral spurs at same axes, proximal spur hammer shaped and pleuron of abdominal segment anteriorly never black in contrast to *fasciatus* in having parameral spur at different axes, proximal spur flat, broadly large and pleuron of abdominal segment anteriorly black.

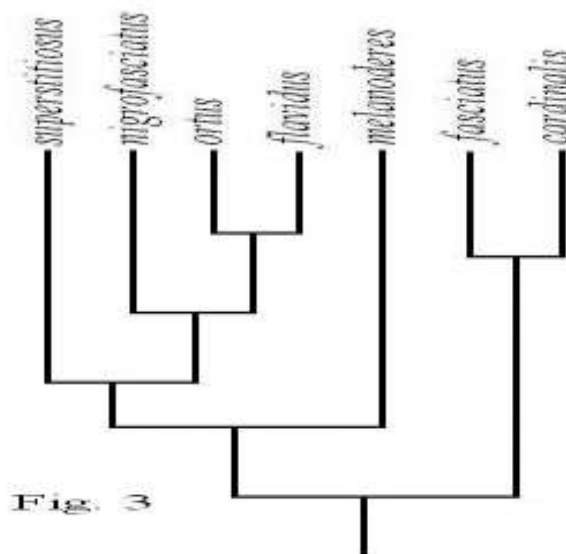


Fig. 3

Fig. 3. Cladogram showing phylogenetic relationship of *cardinalis* with related species.

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