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A CLADISTIC ANALYSIS OF THE GONOCERINE SQUASH BUG GENERA *BRUNSELLIUS* DISTANT AND *PLINACHTUS* STÅL (HEMIPTERA : COREIDAE)

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ABSTRACT

Cladistic analysis of the species of the genera *Brunsellius* Distant and *Plinachtus* Stål from Indopakistan subcontinent are carried out on the basis of their outgroup. A cladogram is constructed on the principle of parsimony. No homoplasies had to be invoked.

Key words: Hemiptera, Coreidae, Cladistic Analysis, Indopakistan, *Brunsellius*, *Plinachtus*

INTRODUCTION

Distant (1902) described the gonocerine squash bug genera *Brunsellius* to accommodate his *earlier (1901)*described species *Homoeocerus smecticus* from Ruby Mines, Burma (and this became its type species by monotypy) and *Plinachtus* Stal (1859) including *P. acicularis* (F.) from Bombay in India, Bhutan and Srilanka and *P. basalis* (Westwood) from Bombay, Nilgri Hills, and Banglore in India, Srilanka and Burma. He recorded this genus from Ethopian and Oriental regions and also from Japan in the eastern Palaearctic. *Distant (1918)* described another species under his above genus *Brunsellius* i.e. *B. elongatus* from Myitta, Tenasserim, Burma.

Ahmad and Rab (2006) for the first time redescribed *Brunsellius* along with its type species *B. smecticus* with special reference to its metathoracic scent auricles and genitalia. *Plinachtus* was for the first time recorded from Kalam in NWFP, Pakistan for *Plinachtus* sp. collected on *Rosa* species in the month of August by Ahmad et al. (1977) but these authors in the key and in their illustrations referred *Plinachtus* species as *P.acicularis* without any comment. Ahmad (1979 and 1980) also listed and keyed *Plinachtus,* species from the above locality in Swat, Pakistan. Ahmad and Rab elsewhere (2007) redescribed *Plinachtus* sp. as *P. acicularis* (F.). The cladistic analyses of these taxa have never been attempted. To fill this gap the present work was undertaken.

MATERIALS AND METHODS

The species from the areas of Indopakistan subcontinent were studied at different museums and collections lodged at different institutes in Pakistan, namely Natural History Museum, Department of Zoology-Entomology, University of Karachi, National Museum of Natural History Islamabad, National Insect Musem earlier at Pakistan Agricultural Research Council, Malir Halt Karachi and now lodged at Insect museum at NARC, Chakshehzad Islamabad, Collections of Pakistan Forest Institute, Peshawar and at Commonwealth Institute of Biological Control, Rawalpindi, by first and second authors. Species of *Brunsellius* and *Plinachtus* were also studied by the courtesy of Mr. Mick Webb incharge Hemiptera section, and other authorities of Natural History Museum, London (BMNH) and at Hope Collections, Oxford Museum, U.K. by the second author.

Different characters of species of *Plinachtus* and *Brunsellius* were scanned from literature of Distant (1902), Ahmad et al. (1977) and Ahmad (1979 and 1980). For cladistic analysis *Cletus* Stal of the tribe Gonocerini was taken as out group for the ancestral characters.

Characters were randomly taken and their polarities were recognized not unreasonably by comparing these with their outgroup. A cladogram was constructed using the principle of parsimony in such a manner that no homoplasies had to be invoked.

Characters and Chracterstates

Ancestral characters deduced from outgroup i.e. (A_o, B_o, C_o, D_o) are not particularly mentioned here.

Head

Head prominently produced infront of antenniferous tubercles in *Brunsellius elongatus* and *B. smecticus* (Fig. 1A) and *P. acicularis* (Fig. 1B) and *P. basilis* shows their more derived synapomorphic condition (A_1).

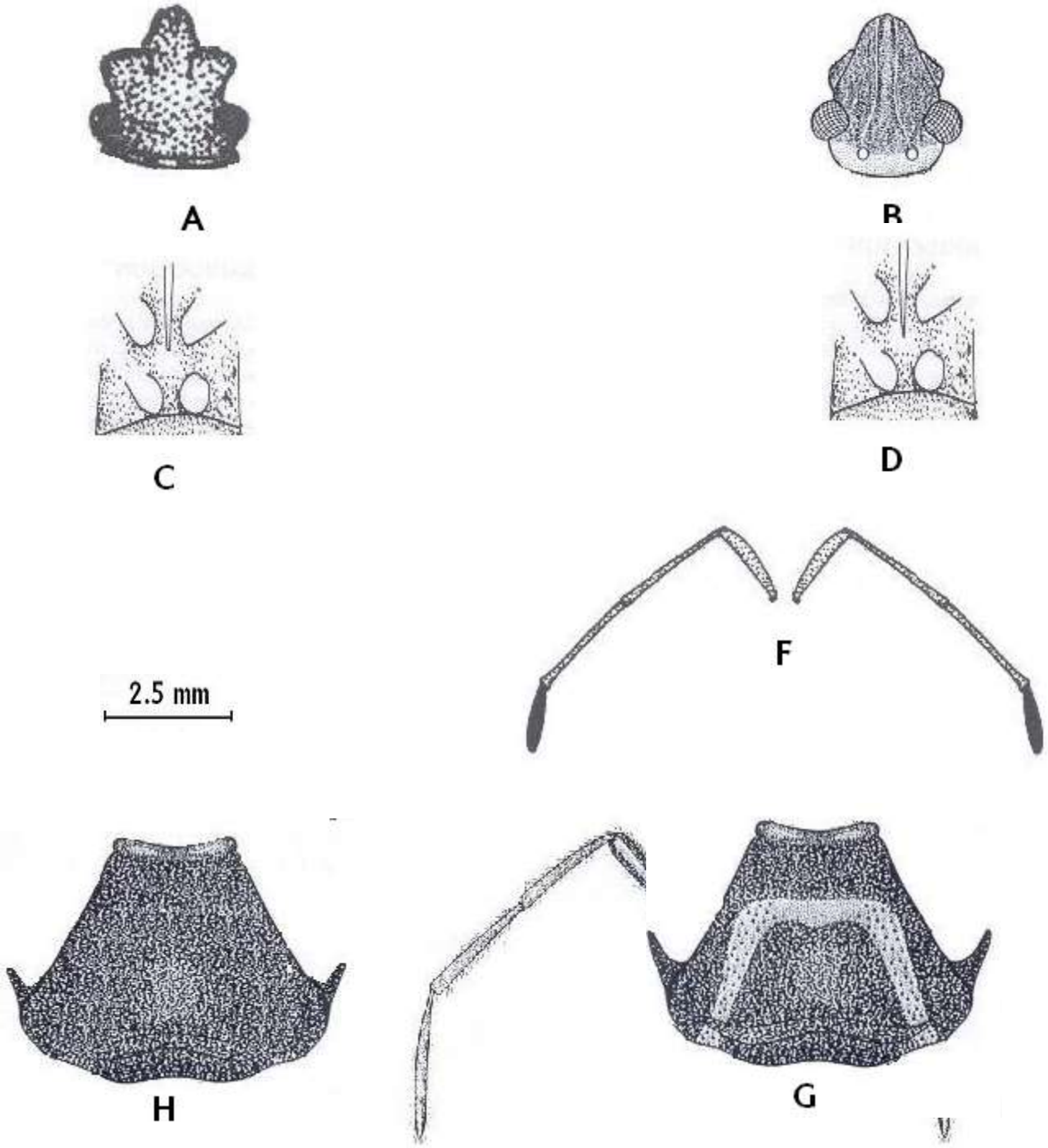


Fig 1. *Brunsellius* A, Head (dorsal view); D, Labial reach ; F, Antennae ; *Plinachtus* B, Head; C, Labial reach; E, Antenna; G, Pronotum *P. ascicularis* ; H, Pronotum *P.basilis*.

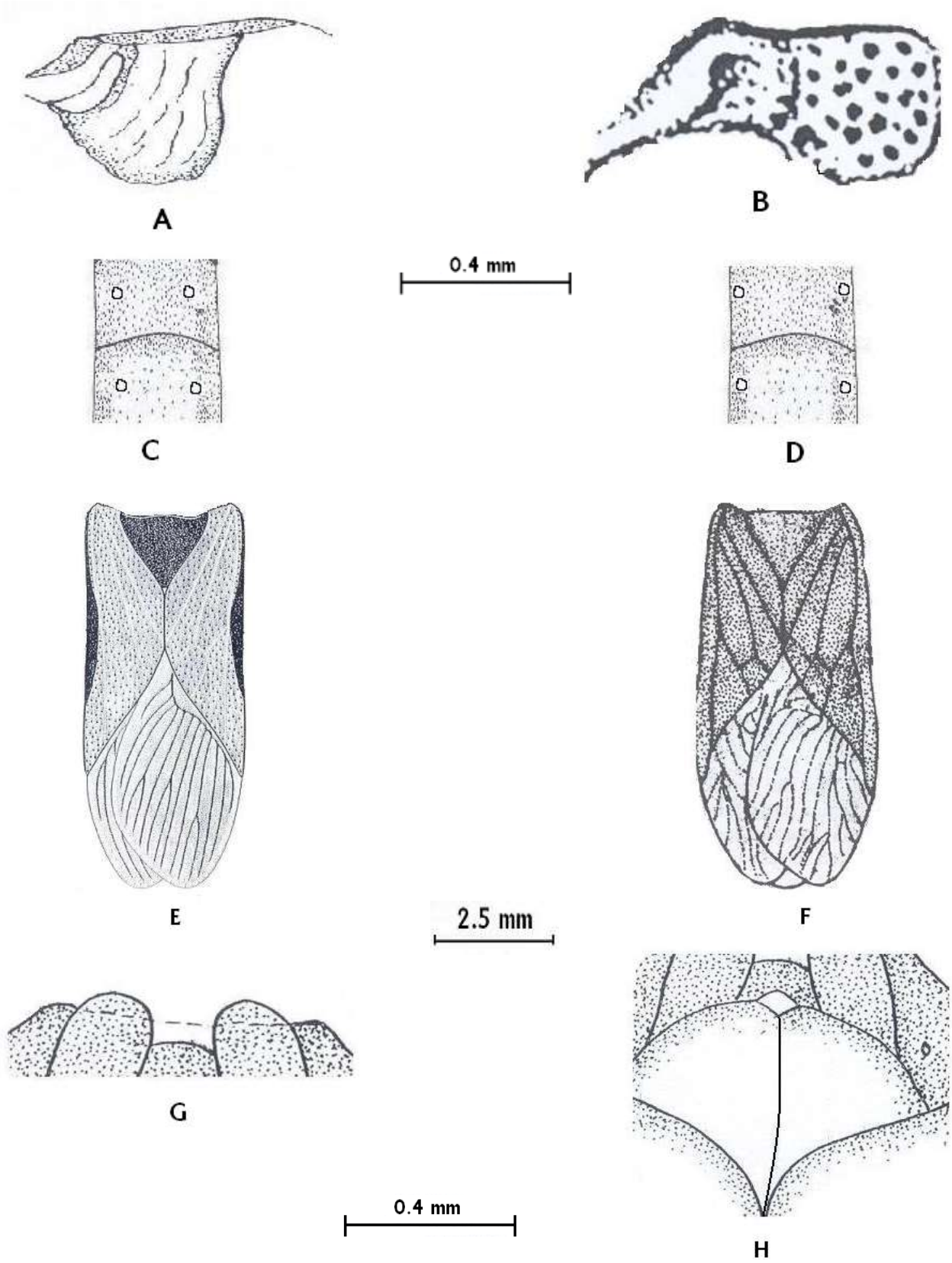


Fig 2. *Plinachtus acicularis* A, Metathoracic scent auricle; C, Abdominal spiracles; E, Connexiva; G, Ninth paratergite ; H, First gonocoxae; *Brunsellius smecticus* B, Metathoracic scent auricle; D, Abdominal spiracles; F, Connexiva.

Labial reach

Labium just passing beyond intermediate coxae in *P. acicularis* (Fig. 1C) appears auotapomorphic (B_1) and labium reaching in between intermediate and hind coxae in *B. smecticus* (Fig. 1D) appears more derived autapomorphic condition (B_2).

Proportion of 4th antennal segment as compared to 3rd

Fourth antennal segment equal to or longer than 3rd in *P. acicularis* (Fig. 1E) and *P.basilis* shows their synapomorphic condition (C_1). Fourth antennal segment shorter than 3rd in *B. elongatus* and *B. smecticus* (Fig. 1F) show their derived synapomorphic state (C_2).

Pronotal colour

Pronotum ochraceous, tinged black in *P. basilis* shows its autapomorphic condition (D_1). In *B. elongatus*, pronotum pale reddish ochraceous shows its derived autapomorphic condition (D_2). In *P. acicularis* pronotum reddish ochraceous shows its more derived autapomorphic condition (D_3).

Pronotal surface

Pronotum coarsely punctuate in *B. elongatus* shows its autapomorphic condition (E_1). In *B. smecticus* pronotum thickly and darkly punctuate shows its derived autapomorphic state (E_2).

Lateral angles of pronotum

Humeral angles produced with large spines in *P. acicularis* (Fig. 1G) shows its autapomorphic condition (F_1). In *P. basilis* humeral angles produced into short spines (Fig. 1H) shows its derived autapomorphic state (F_2).

Metathoracic scent complex

Metathoracic scent auricle complex with large ostiole, large peritreme, directed anteriad and evaporating area distinct in *P. acicularis* (G_1) (Fig. 2A) shows its autapomorphic state. In *B. smecticus* metathoracic scent auricle round ear like with prominent thick boarders (Fig. 2B) shows its derived autapomorphic condition (G_2).

Abdominal spiracles

Abdominal spiracles near but not close to lateral margins of venter of abdomen in *P. acicularis* (H_1) shows its autapomorphic state (Fig. 2C). In *Brunsellius. smecticus* abdominal spiracle much nearer to the lateral than to the apical margin of the segment shows its derived autapomorphic condition (H_2) (Fig 2D).

Connexiva

Connexiva not exposed at repose in *P. acicularis* (I_1) (Fig. 2E) show its autapomorphic state. In *B. smecticus* connexiva without prominent angles and sides concealed by the hemelytra, posteriorly marginally uncovered by the membrane of hemelytra (Fig. 2F) show its derived autapomorphic condition (I_2).

Ninth Paratergite

In *P. acicularis* 9th paratergites passing much beyond fused posterior margins of eighth paratergites and appearing posteriorly remarkably convex and round (J_1) (Fig. 2G) show its autapomorphic state.

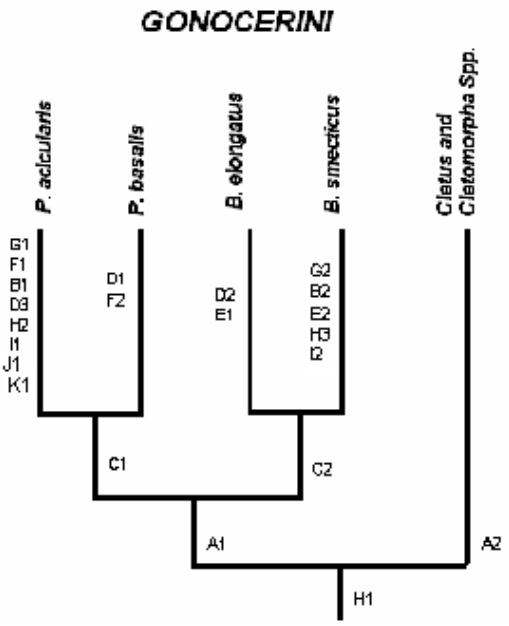
First gonocoxae

In *P. acicularis* 1st gonocoxae posteriorly remarkably convex and overlapping (K_1) (Fig. 2H) appear its autapomorphic condition.

DISCUSSION ON CLADOGRAM

The genera *Plinachtus* and *Brunsellius* have two species each viz. *P. acicularis* and *P. basilis* and *B. elongatus* and *B. smecticus* probably less advanced and playing outgroup relationships with other gonocerine genera i.e. *Cletus* in having head prominently less produced infront of antenniferous tubercles (A_2). Among these four species *P. acicularis* and *P. basilis* appear to play sister group relationships with each other in having synapomorphy of 4th antennal segment equal to or longer than 3rd antennal segment (C_1) while *B. elongatus* and *B. smecticus* play sister group relationship with the former in having synapomorphy of 4th antennal segment shorter, than the 3rd (C_2). Metathoracic scent auriclular complex with large ostiole, peritreme large, directed anteriad and, evaporating area

distinct in *P. acicularis* (G_1)neatly define its taxon. In *B. smecticus* metathoracic scent auricle round ear like with prominent thick boarders neatly separate it from the former taxon (G_2).



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