

A REVIEW OF CAYSTRINE SUBGROUP *CAYSTRUS LANGEI* BREDDIN (1899) WITH SPECIAL REFERENCE TO THE SPECIES DESCRIBED BY LINNAVUORI I.E., *C. HIPPONAX*, *C. NIOKANUS* AND *C. PSEUDOBRUNNESCENS* (HEMIPTERA: PENTATOMIDAE: PENTATOMINAE) FROM ETHIOPIAN AND PALAEARCTIC REGIONS

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ABSTRACT

The component species of *Caystrus langei* Breddin subgroup of *Caystrus nigriventris* Germar of main group including Linnavuori's species *C. hipponax*, *C. niokanus* and *C. pseudobrunnescens* and *C. langei* Breddin are briefly described with special reference to their apomorphic characters and comparative note with keys to each other and their phylogenetic relationships are also briefly discussed. It is also shown that *langei* is not most closely related to either *C. deserticolus* Linnavuori or *C. trivalis* (Gerstaecker).

Key-words: *Caystrus langei*, *C. niokanus*, *C. pseudobrunnescens*, *C. hipponax*, phylogenetic relationship

INTRODUCTION

Ahmad and Zahid (2000 and 2009) re described Linnavuori's species of the genus *Caystrus* Stål i.e., *C. hipponax*, and *C. pseudobrunnescens* which were shown closely related with each other but in this subgroup of the genus *Caystrus* Stål another species *C. langei* Breddin has only been known by superficial characters of coloration. Originally *langei* was described by Breddin (1899) under the genus *Neodius* Stål, followed by Oshanin (1906), Kirkaldy (1909) and Gaedike (1971). Bergroth (1908) cited *langei* under *Caystrus*, followed by Oshanin (1912), Bodenheimer (1937), Linnavuori (1960), Stichel (1961, 1962), Hariri (1971) and Linnavuori (1974 and 1975). Whereas the detailed morphological features of Linnavuori's species of this subgroup (i. e., *C. langei* subgroup) as noted above are fully known and redescribed by Ahmad and Zahid (op. cit.) with special reference to metathoracic scent auricle and male and female genitalia, only superficial, mostly color characters of *C. langei* are known in the literature to date. Presently with the help of original description and those of Linnavuori's (op. cit.) and by the studies of their holotypes the phylogenetic relationships of the included taxa within its subgroup are briefly discussed here. Linnavuori (1974 and 1975) separated *C. langei* with his own species *C. deserticolus* and *C. trivalis* (Gerstaecker) known from Saudi Arabia probably erroneously considering it related to his own species and later.

MATERIALS AND METHODS

Holotypes and paratypes (if any) of Linnavuori's species of *Caystrus* from Zaire, Democratic Republic of Congo of the present subgroup are now mostly lodged at American Museum of Natural History, New York (AMNH) were examined by the present second author during his visit to that museum in 2004. Apomorphic characters of each species were scanned not only from original description (in case of *langei* by using English translation) but also from those by the examination of Holotypes and paratypes when available and redescription by the present authors (op. cit.) and those of Linnavuori (1974 and 1975) in case of *langei*. All the species of the present subgroup are not only briefly described with comparative notes but also keyed and their phylogenetic relationships are also briefly discussed by comparing not only its out group but also by comparing members of its main *Caystrus* group from the work of Zahid (2006).

RESULTS

Key to the close allies of *C. langei* Breddin

1. Humeral angles rounded, scutellum with apex sub rounded having paraclypei enclosing the clypeus in front*langei* Breddin

- Humeral angles distinctly conical, at least slightly projected, scutellum distinctly rounded, if slightly conical clypeus exposed in front2
- 2. Apex of head anteriorly gradually with paraclypei narrowed, fused posterior margin of 8th paratergites markedly concave medially, posterior margins of 1st gonocoxae medially distinctly concave, apex much distinctly conical, parameral blade distinctly bifid apically, Y-shaped*niokanus* Linnavuori
- Apex of head broadly rounded with paraclypei broadly rounded apically, fused posterior margins of 8th paratergites more or less sub straight if at all very weakly medially concave, posterior margin of 1st gonocoxae medially convex or sub convex, apex broadly rounded, parameral blade with apex more or less truncated or weakly sinuate3
- 3. Paraclypei longer than clypeus but not enclosing the later, scutellum with short apical sub acute lobe, metathoracic scent auricle with peritreme lobe like, hemelytra not exposing posterior margin of abdominal tergum, pygophore with ventroposterior margin bidentate medially, parameral blade apically with distal lobe much elongated, dagger like, parameral lobe tooth like, 9th paratergites reaching posterior margins of fused 8th paratergites, apex sub acuta*pseudobrunnescens* Linnavuori
- Paraclypei much longer than clypeus and distinctly enclosing the later, scutellum with short apical but much rounded lobe, metathoracic scent auricle with peritreme thumb like roundly projected, hemelytra exposing posterior margin of abdominal tergum, pygophore with ventroposterior margin medially concave with rounded lobe on either side, parameral blade apically with distal and proximal lobes almost of equal size, 9th paratergites not at all reaching posterior margins of fused 8th paratergites, apex smoothly rounded*hipponax* Linnavuori

***Castrus langei* (Breddin)**
(Figs. 1A and 1B)

Neodius langei Breddin 1899: 80-81; Oshanin, 1906: 85; Kirkaldy, 1909: 42; Gaedike, 1971: 89.
Castrus langei: Bergroth, 1908: 159; Oshanin, 1912: 11; Linnavuori, 1960: 15; 1974: 401; 1975: 36.

Colouration and general shape: Body yellowish brown, densely black punctured all over; antennae with brown apex, dorsal side of abdomen brownish, connexiva rusty-yellowish; membrane hyaline with yellowish tinge; body broadly ovate.

Head: Paraclypei (Fig. 1A) distinctly longer than clypeus and enclosing the clypeus in front; antennae with second segment slightly shorter than third; labium reaching intermediate coxae.

Thorax: Pronotum broader than long, lateral margins slightly reflexed, anterior angles subrounded, humeral angles rounded; scutellum (Fig. 1B) triangular with apex subrounded.

Location of type: Lectotype male (Gaedike, 1971, as holotype), Syria, near Hierosolyma, DEIC.

Comparative note:

This species is most closely related to *C. niokanus*, *C. pseudobrunnescens* and *C. hipponax* in having lateral margins of venter contrastedly pale and puncturing concolourous but it can easily be separated from the same in having humeral angles of pronotum distinctly round and lateral margins of venter contrastedly pale with remote brownish puncturing.

***Castrus niokanus* Linnavuori**
(Figs. 2A-2G)

Castrus niokanus Linnavuori 1974: 402, 409-410.

Colouration and general shape: Body light brown with dark brown punctures, membrane light brown; body ovate.

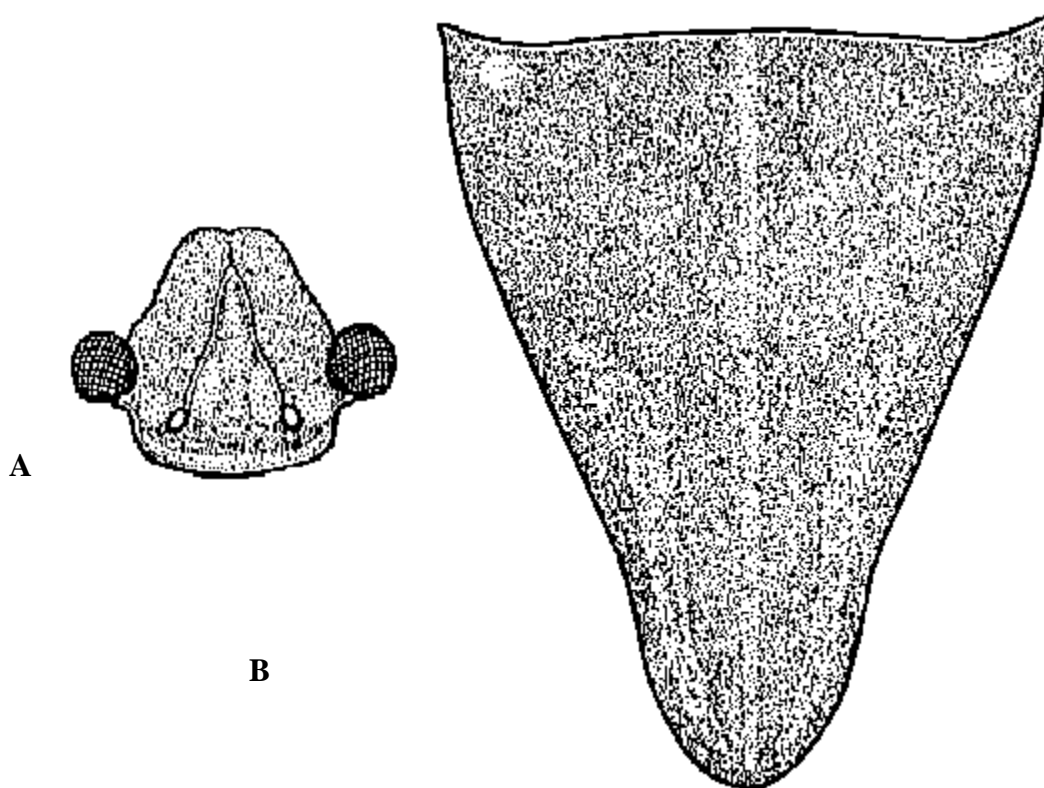


Fig. 1. *Caystrus langei*. A. head; B. scutellum.

Head: Broader (Fig. 2A) than long, apex of head anteriorly narrowed with paraclypei narrowed and enclosing clypeus in front; antennae with 2nd segment distinctly shorter than third.

Thorax: Pronotum (Fig. 2B) broader than its length; lateral margins sinuate, anterior angles toothed, humeral angles sub rounded; scutellum (Fig. 2C) longer than broad with short rounded apical lobe; abdomen (Fig. 2D).

Genitalia: Female terminalia (Fig. 2F) with fused posterior margin of 8th paratergites markedly concave medially, posterior margin of 1st gonocoxae (Fig. 2E) medially distinctly concave, apex much distinctly conical; male genitalia (Fig. 2G) with parameral blade distinctly bifid apically, Y-shaped.

Comparative note:

This species is most closely related to *C. pseudobrunnescens* and *C. hipponax* in having humeral angles of pronotum distinctly conical or subround but it can easily be separated from the same in having parameral blade apically bifid, almost y-shaped, and fused posterior margins of eighth paratergites markedly concave.

***Caystrus pseudobrunnescens* Linnavuori
(Figs. 3A-3I)**

Caystrus brunnescens Linnavuori, 1972: 400, 413.

Caystrus pseudobrunnescens: Linnavuori 1974: 402, 408-409; 1975: 35; 1982: 76; Ahmad and Zahid, 2009: 305-312.

Coloration and general shape: Body pale with thick brown punctures, membrane hyaline; body elongate.

Head: Distinctly (Fig. 3a) broader than long, paraclypei longer than clypeus but not enclosing the later, antennae with 2nd segment shorter than third.

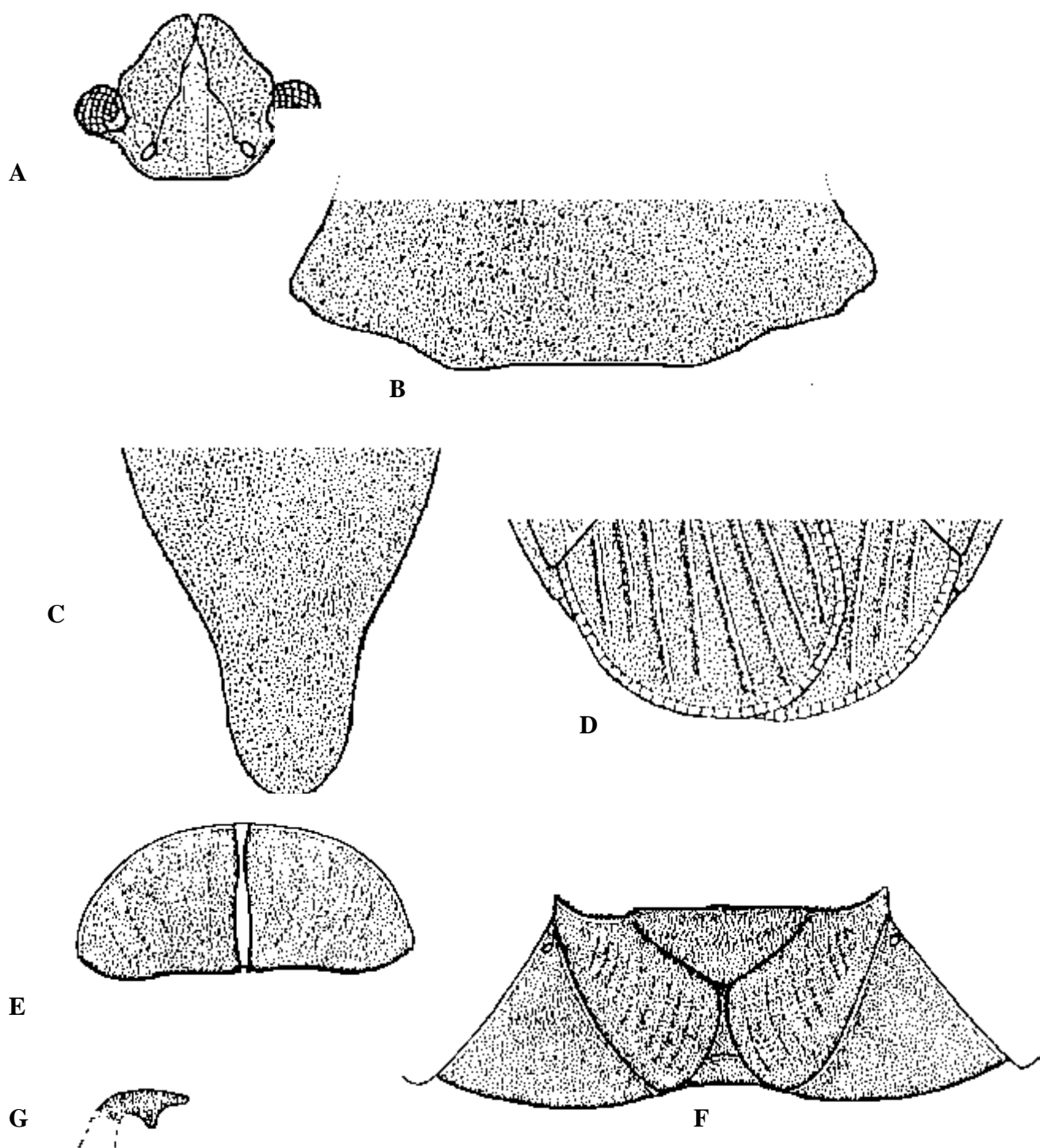


Fig. 2. *Caystrus niokanus*. A. head; B. pronotum; C. scutellum; D. abdomen; E. female terminalia, 1st gonocoxae; F. female terminalia 8th and 9th paratergites; G. male genitalia, parameral blade.

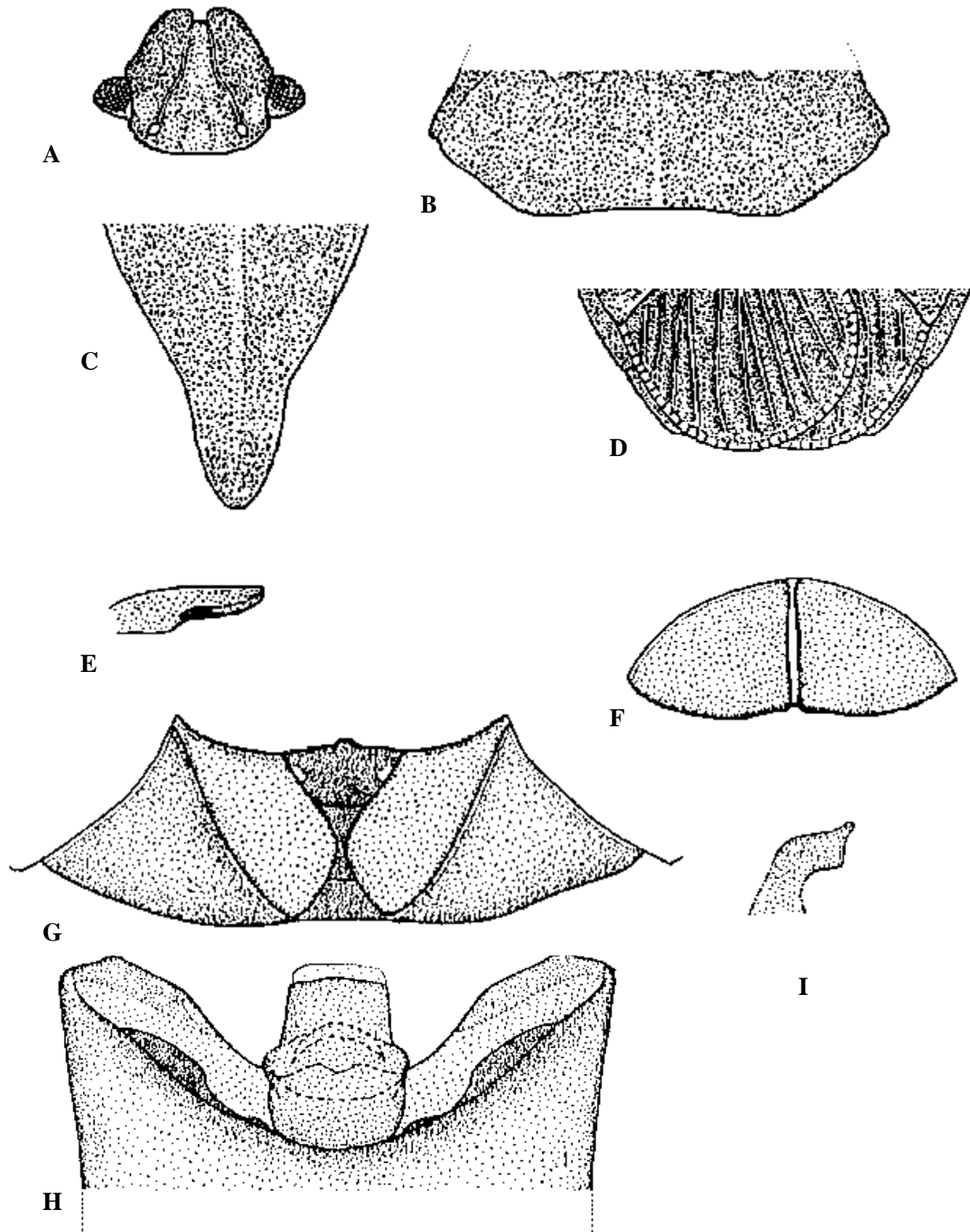


Fig. 3. *Caystrus pseudobrunnecns*. A. head; B. pronotum; C. scutellum; D. abdomen; E. peritreme with auricle; F. female terminalia, 1st gonocoxae; G. female terminalia 8th and 9th paratergites; H. male genitalia with pygophore; I. parameral blade.

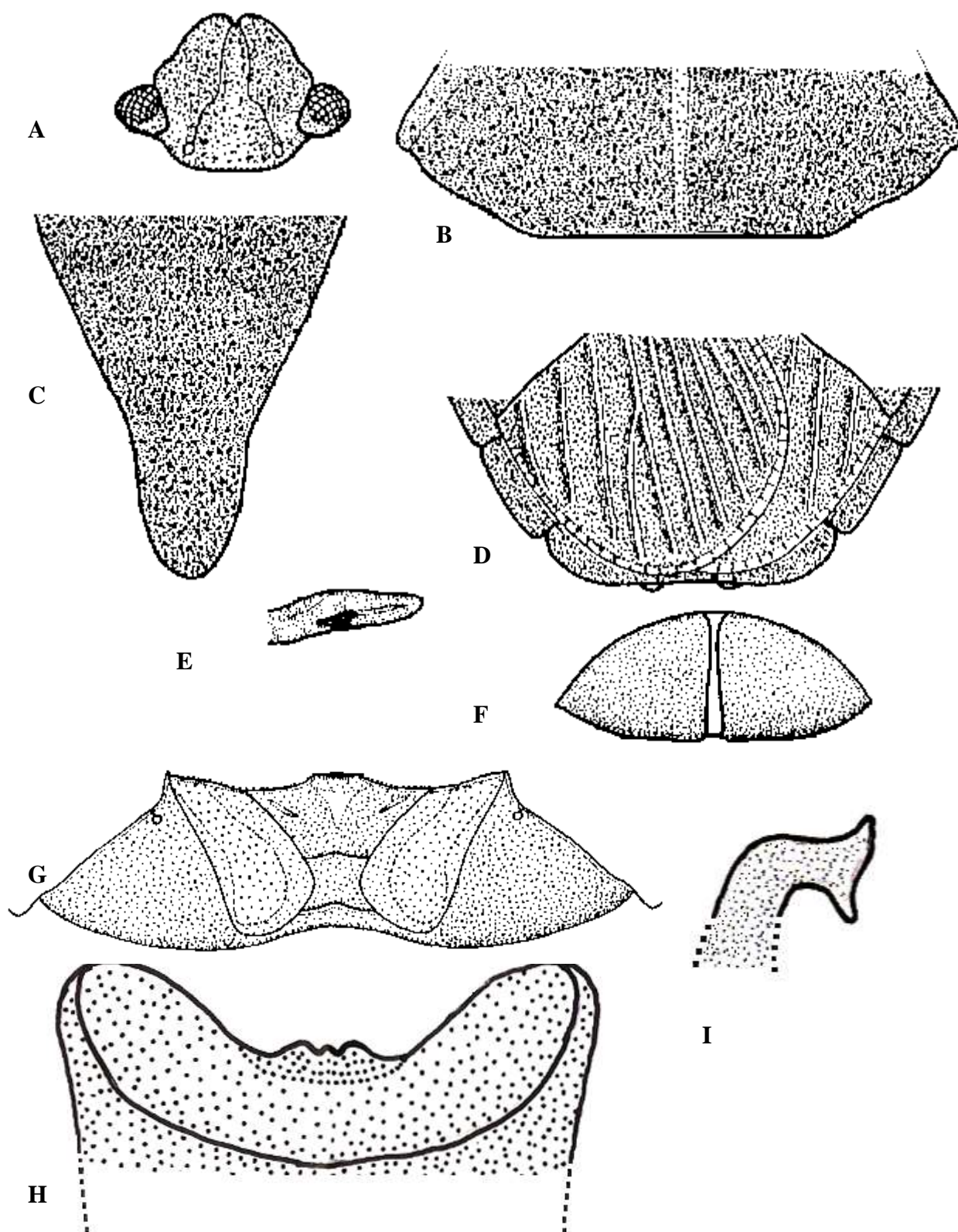


Fig. 4. *Caystrus hipponax*. A. head; B. pronotum; C. scutellum; D. abdomen; E. peritreme with auricle; F. female terminalia, 1st gonocoxae; G. female terminalia 8th and 9th paratergites; H. male genitalia with pygophore; I. parameral blade.

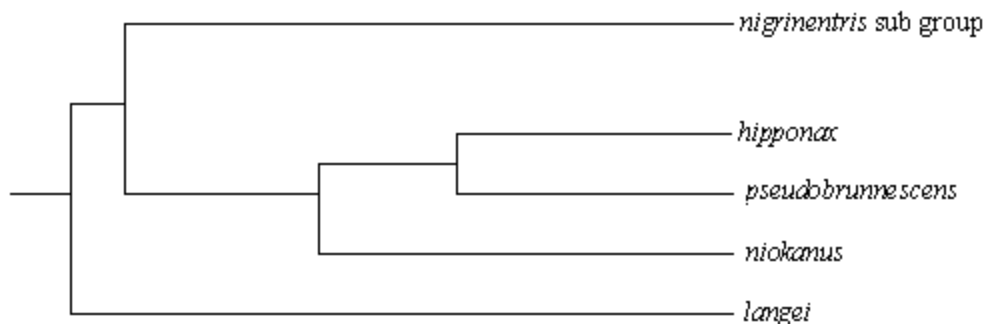


Fig. 5. Cladogram showing phylogenetic relationship of *Caystrus langei* with related species.

Thorax: Pronotum (Fig. 3B) slightly less than 2.5 X broader than its length, lateral margins sinuate, anterior angles toothed, humeral angles sub acutely produced; scutellum (Fig. 3C) with short apical sub acute lobe; Abdomen (Fig.3D); metathoracic scent auricle with peritreme (Fig. 3E) lobe like.

Genitalia: Female terminalia (Fig. 3F & G) with 9th paratergites reaching posterior margins of fused 8th paratergites, apex sub acuta; male genitalia (Fig. H) with pygophore having ventroposterior margin bidentate medially, parameral (Fig. I) blade apically with distal lobe much elongated, dagger like, parameral lobe tooth like.

Comparative note:

This species is most closely related to *C. hipponax* in having paraclypei apically broadly round but it can easily be separated from the same in having parameral blade apically truncated and fused posterior margins of second gonocoxae straight.

***Caystrus hipponax* Linnavuori
(Figs. 4A-4I)**

Caystrus hipponax Linnavuori 1972: 400, 414; 1974: 402, 409; Ahmad and Zahid, 2000: 19-22.

Colouration and general shape: Body light brown with brown punctures; membrane hyaline; body ovate.

Head: Distinctly (Fig. 4A) broader than long, paraclypei much longer than clypeus and distinctly enclosing the later; antennae with 2nd segment shorter than third.

Thorax: Pronotum (Fig. 4B) broader than its length, lateral margins sinuate, anterior angles toothed, humeral angles sub acutely produced; scutellum (Fig. 4C) with short apical but much rounded lobe; abdomen (Fig. 4D); metathoracic scent auricle with peritreme (Fig. 4E) thumb like.

Genitalia: Female terminalia (Fig. 4F & G) with 9th paratergites not at al reaching posterior margins of fused 8th paratergites, apex smoothly rounded; male genitalia (Fig. 4H) with pygophore having with ventroposterior margin medially concave with rounded lobes on either side, parameral blade (Fig.4I) apically with distal and proximal lobe almost of equal size.

Comparative note:

This species is most closely related to *C. pseudobrunnescens* in having fused posterior margins of 8th paratergites medially substraight but it can easily be separated from the same in having fused posterior margins of second gonocoxae convex.

DISCUSSION

Ahmad and Zahid (2000, 2009) redescribed Linnavuori's species of *Caystus*, *C. hipponax*, and *C. pseudobrunnescens* showing that these are most closely related with each other. Linnavuori (1974 and 1975) showed close relationship by keying out *C. langei* from his own species *C. deserticolus* known from South Yemen. (although he did not describe his species in the former year). Linnavuori (1975) also considered *C. trivalis* (Gerstaecker) with his own species and therefore probably a close ally of *C. langei*. Ahmad and Zahid (2009) have shown phylogenetic relationships of *C. trivalis* and considered it most closely related with *C. marginiventris* (Stål). Presently *C. langei* is considered playing outgroup relationship with the rest of the species of *langei* subgroup i.e., *C. neokanus*, *C. pseudobrunnescens*, and *C. hipponax* and the former playing outgroup relationship with the sister group species i.e., *pseudobrunnescens* and *hipponax* as shown in the key and comparative notes of the above taxa (Fig.3) showing cladogram of the included species.

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(Accepted for publication January 2011)