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A revision of the genus Sarju Ghauri (Hemiptera : Pentatomidae : Pentatominae : Halyini) with description of a new species from Pakistan *

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Summary

Sarju Ghauri is revised and redescribed; **S. angulata** sp. n. from Gilgit in the Northern areas is described and **S. enigma** Ghauri and **S. farida** Ghauri are redescribed with special reference to their metathoracic scent gland ostioles and male and female genitalia for the female of **S. farida** and the male of **S. enigma** were unknown in the literature, **S. burmana khasiana** Ghauri and **S. eremica** (Hoberlandt) are newly recorded from various localities of Pakistan and the above, the type species of **Sarju, obscura** Westwood and **S. lata lata** Ghauri and **S. lata quadrata** Ghauri from Pakistan are keyed. All the taxa above described or redescribed are compared with the closely related taxa and a light is thrown on their relationship under the sections «comments», following each «description».

Introduction

During a revision of the genus **Dalpada** Amyot et Serville the present authors (1983a) encountered a large number of specimens which obviously belong to the genus **Sarju** described by Ghauri (1977c) to accommodate the type species **obscura** Westwood placed earlier under the genus **Halys** Stal and **eremica** Hoberlandt and **pavlovskii** Krichenko under **Dalpada**, alongwith five new species from Bengal, Iran, Afghanistan, Tadzhikistan, Pakistan, India, Burma, China and Indo- China. However, the female of **S. farida** Ghauri and male of **S. enigma** Ghauri were not available to him. These two species are now revised and a new species **S. angulata** is described with special reference to

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metathoracic scent gland ostioles and male and female genitalia, from Gilgit, in the Northern areas of Pakistan. **S. burmana khasiana** Ghauri and S. **eremica** (Hoberlandt) are newly recorded from various localities of Pakistan and the above, the type species and **S. lata lata** Ghauri and **S. lata quadrata** Ghauri from Pakistan are also keyed. For the dissection of the genitalia, for measurements and for diagrams the conventional procedures specially those used by the present authors (1981) were generally followed.

Sarju Ghauri

Sarju Ghauri, 1977, 10.

Body elongated oval; usually ochraceous and densely punctate; paraclypei as long as or longer than clypeus, sinuated at apex with distinct inner and outer lobes, lateral margins sinuate and usually angulate infront of eyes; labium passing beyond hind coxae; basal antennal segment not reaching apex of head; lateral margin of pronotum crenulated, humeral angles produced and horny; scutellum acuminate; mesosternum carinated; metathoracic scent gland ostiole well developed, with long curved peritreme and defined evaporatoria; fore tibiae not dilated.

Male genitalia; pygophore with ventral excavation without median deep region, lateral lobe usually broadly rounded; paramere with small setose thumblike inner process and its blade with elongated ridge extended to apex, outer margin without hump, straight or sinuate; inflated aedeagus with moderately long rodlike penial lobes, longer than vesica, dorsal membranous conjunctival appendage usually longer than penial lobes, usually divided into 3 lobes, lateral conjunctival lobes short; theca with a pair of earlike, semisclerotized appendages.

Female genitalia; 1st gonocoxae with posterior margins of 8th paratergites entire; spermathecal bulb with short processes nearly half as long as distance between distal and proximal flanges.

Type species, **Halys obscura** Westwood, 1837, 22; type locality, Bengal. Distribution-Oriental, Australo-Malyan and Palaearctic regions.

Comments. The species of **Sarju** although resemble in the external appearance and colour the species which were earlier placed under the genus **Dalpada** and recently have been demonstrated to be a heterogenous assemblage by Ghauri (1975a, 1975b, 1977a, 1977b and

1977c) and more recently by the present authors (1981, 1983a, 1983b) are most closely related to those of **Cahara** Ghauri for some of the species of the former genus share with the later straight, unbowed second antennal segment and ninth paratergites medially produced. However, the species of **Sarju** appear isolated in the entire tribe Halyini Stal in lacking median lobes in the concave ventral margin of the pygophore, usually having second antennal segment distinctly bowed and appreciably swollen at apex.

Sarju angulata sp.n.

Colour; shining black above except dark eyes and red ocelli, humeral angles of pronotum luteous, impunctate, basal angles of scutellum pale yellow, apical lobes of scutellum fuscous, membrane with veins dark brown and basal, apical and subapical spots dark, anterior and posterior angles of connexiva black, anterior patches on pronotum and scutellum dark ochraceous brown with black and brown punctures.

Structure; head with paraclypei distinctly longer than clypeus tending to enclose latter anteriorly, outer lobes of paraclypei at obtuse angles to inner lobes, angle in front of eyes broadly rounded; labium reaching near posterior margin of 3rd abdominal segment; anterior of head 1.6 mm; posterior of head including eyes 1.1 mm; head width 3.7 mm; interocular distance 1.5 mm; interocellar distance 1.0 mm; length of antennal segments 1, 0.9 mm; 2, 1.7 mm; 3, 1.8 mm; 4, 2.0 mm; 5, 1.95 mm; antennal formula $1<2<3<5<4$; length of labial segments 1, 1.9 mm; 2, 2.1 mm; 3, 2.0 mm; 4, 1.0 mm; labial formula $4<1<3<2$; pronotal length 3.0 mm; width 7.9 mm; scutellar length 5.2 mm; width 4.0 mm; distance base scutellum-apex clavus 4.1 mm; apex scutellum-apex clavus 1.1 mm; apex scutellum-apex abdomen 5.0 mm; ventral abdominal sulcation reaching posterior margin of 4th abdomenal segments; male's pygophore with wide deep v-shaped excavation, lateral lobes posteriorly truncate, not produced inward; paramere with short stem bearing setose, thumbshaped inner process, blade at right angle to stem, narrowing internally with transverse narrow ridged area; inflated aedeagus with small semisclerotized earlike lateral thecal process, vesica shorter than large rodlike strongly sclerotized penial lobes, dorsal membranous conjunctival appendage with two lateral shorter and one median longer lobes, all shorter than penial lobes, lateral conjunctival appendages semisclerotized, broad at base, narrowing apically; female's 1st gonocoxae triangular with posterior angles broadly rounded; triangulin visible along

entire inner margins of 1st gonocoxae but more so at their bases; visible part of 2nd gonocoxae broader than distance between posterior angles of 1st gonocoxae; 8th paratergites triangular with posterior margin sinuate; 9th paratergites distinctly longer than 8th; distal spermathecal duct moderately long, spermathecal bulb with there finger like processes. Length of male ♂ 14.9 mm; length of ♀ 15.90 mm.

Material. Holotype ♂ Pakistan: Northern areas, Gilgit on **Salix** sp., 7-VIII. 1975 **(A.A. Khan)**. Paratype. 1 ♀ Manor on **Populas** sp. 22-VII. 1974 **(A.A. Khan)**, in Natural History Museum, Department of Zoology, University of Karachi.

Comments. S. angulata is related to **S. burmana khasiana** Ghauri and **S. eremica** (Hoberlandt) in shape of paramere, but differs from these and all other known species of the genus **Sarju** Ghauri by ventral excavation of phygophore being v-shaped and dorsal membranous conjunctival appendage being shorter than penial lobes.

Sarju burmana khasiana Ghauri

Sarju burmana khasiana Ghauri, 1977, 14. Type a male.

Material. Pakistan: Northern areas, ASTOR, other data not known, 1 ♂ , 1 ♀ in National Insect Museum PARC, Malir Halt, Karachi, 2 ♂ and 6 ♀ including Holotype and Paratypes from various localities of India given by (Ghauri 1977c, 14) in BM (NH), London.

Comments. This species appears isolated in the entire genus **Sarju** by its green metallic sheen above and by the brigth luteous apex of its scutellum. Its male and female genitalia and other external features have been described in detail by Ghauri (1977c).

Sarju enigma Ghauri

Sarju enigma Ghauri, 1977, 20. Type a female.

Colour; ochraceous brown above except dark eyes and red ocelli, impunctate, irregular reddish yellow spots on inner sides of eyes, irregular ringlike fasciae on anterolateral sides of pronotum, humeral angles of pronotum shining black with reddish brown apices, sparsely punctate, apex of scutellum and disc of corium black, anterior and posterior angles of connexiva uniformely reddish brown, antennal segments dull yellow with dense black punctures, legs and ventral surface

of body with dark brown markings, median area on thoracic and abdominal sterna almost impunctate, pale yellow with slightly reddish tinge, marginal bands clearly defined on thoracic sterna by thick black punctures while less defined on abdominal sterna, except distinct black spots posterior to spiracles, median area on abdominal sternites 5th to 7th with black markings, progressively broadening posteriorly.

Structure; head with paraclypei distinctly longer than clypeus with outer lobes variably produced, angles infront of eyes indistinct; labium reaching near posterior margin of 3rd abdominal segment in ♀ and reaching near middle of 4th abdominal segment in ♂ ; anterior of head 1.7 mm; posterior of head including eyes 1.2 mm; head width 2.6 mm; interocular distance 1.15 mm; inter ocellar distance 0.9 mm; length of antennal segments 1, 1.9 mm; 2, 1.6 mm; 3, 1.8 mm; 4, 1.9 mm; 5, 1.6 mm; antennal formula $1<2 = 5<3<4$; length of labial segments 1, 2.1 mm; 2, 2.2 mm; 3, 1.85 mm; 4, 1.1 mm; labial formula $4<3<1<2$; pronotal length 3.3 mm; width 7.4 mm; scutellar length 5.1 mm; width 4.0 mm; distance base scutellum-apex clavus 4.2 mm; apex scutellum-apex clavus 0.9 mm; apex scutellum-apex abdomen 4.5 mm; ventral abdominal sulcation reaching posterior margin of 4th abdominal segment; male's pygophore with ventral excavation cupshaped having sinuate outline, lateral lobes wide and truncate; paramere with short stem bearing inner thumblike process, blade broad ploughshaped with inner sinuate and outer humped margin, inner posterior half with a transverse ridged area projected inward as knoblike lobe, sclerotized rodlike penial lobes ending apically into broad head, vesica shorter than penial lobes, dorsal membranous conjunctival appendage divided into two smaller, entirely lateral lobes and one long median lobe, multilobuted apically, lateral conjunctival appendages semisclerotized, broad at base, narrowing apically; thecal appendages small simsclerotized, earlike, theca oblong, basal thecal process broad, vedge-shaped; female's 1st gonocoxae quadrangular with posterior outer angles slightly produced; triangulin visible along entire inner margins of 1st gonocoxae and even posterior to it; visible part of 2nd gonocoxae as broad as distance between outer posterior angles of 1st gonocoxae; arcus also partly visible between triangulin and 2nd gonocoxae; posterior margin of 8th paratergites entire; 9th paratergites distinctly longer than 8th paratergites; distal spermathecal duct moderately long, spermathecal bulb with 3 fingerlike processes. Total length of ♂ 12.7 mm; length of ♀ 15.8 mm.

Material. 3 ♂ and **2** ♀ Pakistan: Northern areas, Manor, on **Populas** sp., 22.VII. 1974 **(A.A. Khan)**, 3 ♂ and 2 ♀ , Gilgit on **Salix** sp., VIII-1975 **(A.A. Khan)**, 1 ♂ Kargah, on **Populas** sp. 18-VII 1974 **(A.A. Khan)**, in NHMUK. ♀ Holotype (Ghauri 1977c, 21) in BM (NH).

Comments. S. enigma Ghauri is closely related to **S. lata lata** Ghauri but differs by inner posterior ridged area of paramere not forming a long beak, outer margin of paramere produced into a hump, median lobe of dorsal membranous conjunctival appendage multilobulated apically and basal thecal process broad, vedge-shaped.

Sarju eremica (Hoberlandt)

Dalpada eremica Hoberlandt, 1959, 502. Type a female;

Dalpada eremica Hoberlandt, Beccari and Fenili, 1960, 279-329;

Dalpada eremica (Hoberlandt), Ahmad **et al.** 1974, 55.

Sarju eremica (Hoberlandt), Ghauri 1977c, 15-16; Ahmad 1979, 58.

Material. Pakistan: Punjab, Taxilla, Islamabad, Wahgarden; NWFP, Peshawar, Tarnab, Abbotabad, Mingora, 25 ♂ , 26 ♀ including one Homotype det. by (Mrs. G.M. Black) of BMNH. 12-VI-1970, 4-V-1971, 9-VI, 9-VIII-1972, 30-VI-1974, 21-VI, 13-VIII-1976, 20, 21, 26, 27, 28, 30-VI, I-VII, 22, 23-X-1977 on **Pyrus** sp, grasses, in NHMUK and in Ahmad's collection. Material reported by (Ghauri 1977c, 16) in BM (NH) were also examined.

Comments. This species was studied in detail by Beccari and Fenili (1960) and later was redescribed by Ghauri (1977c). The locality data of Ghauri (op. cit.) have been extended as shown in the present list of material. This species alongwith **angulata** appears isolated in the species of **Sarju** from Pakistan for having projected and pointed humeral horns but broad cupshaped, ventral excavation of pygophore readily separates it from **S. angulata** sp. n.

Sarju farida Ghauri

Sarju farida Ghauri, 1977, 17. Type a male.

Colour; luteous above except dark eyes and red ocelli, impunctate,

basal angles of scutellum shining black, humeral angles of pronotum black, anterior and posterior angles of connexiva, dark fasciae on head and anterior part of pronotum, red markings and dark reddish spots on tibiae and femora ochraceous brown and thickly supplied with brown punctures.

Structures; head with paraclypei little longer than clypeus, fomer near apex as wide as interocular distance, lateral lobes prominent, lateral margins with one large acute tooth on either side in front of eyes; labium reaching near posterior margin of 3rd abdominal segment; anterior of head 1.5 mm; posterior of head including eyes 1.3 mm; head width 2.9 mm; interocular distance 1.5 mm; interocellar distance 0.8 mm; length of antennal segments 1, 1.0 mm; 2, 2.2 mm; 3, 1.6 mm; 4, 2.3 mm; 5, 2.1 mm; antennal formula $1<3<5<2<4$; length of labial segments 1, 2.0 mm; 2, 2.3 mm; 3, 2.1 mm; 4, 1.1 mm; labial formula $4<1<3<2$; pronotal length 3.0 mm; width 6.6 mm; scutellar length 4.2 mm; width 3.3 mm; distance base scutellum-apex clavus 3.7 mm; apex scutellum-apex clavus 0.5 mm; apex scutellum-apex abdomen 4.5 mm, ventral abdominal sulcation reaching to posterior margin of 4th abdominal segment; male's pygophore with ventral margin having wide and deep excavation, lateral lobes inwardly produced as pointed knobs; paramere with stem short having short inner tooth, blade at right angle to stem, apex with thick transverse ridged area culminating into lobular process; inflated aedeagus with theca oblong, lateral thecal processes membranous earlike, vesica shorter than curved sclerozited rodlike penial lobes, dorsal membranous conjunctival appendage divided into two lateral shorter and one median longer membranous lobes, lateral conjunctival appendages broad, membranous, culminating into fingerlike processes; female's 1st gonocoxae large, triangular with posterior angles lobelike; visible part of 2nd gonocoxae as broad as distance between posterior lobes of 1st gonocoxae; 9th paratergites elongated and distinctly longer than 8th paratergites; latter with posterior margin entire; distal spermathecal duct short, spermathecal bulb with four finger like processes of variable size, distal spermathecal flange indistinct. Total length of ♂ 14.5 mm; length of ♀ 15.7 mm.

Material. 2 ♂ Pakistan: NWFP, Haripur, 28-VII-1977. (**M. Moizuddin** and N.A. Rana), 1 ♀ Punjab, Changamanga. In NHMUK. ♂ Holotype from Kulu in India, in BM (NH) London.

Comments. Ghauri (1977c) described **S. farida** based on a single

male from India lodged in the BM (NH), London. Presently both male and female specimens from Pakistan were collected which closely agreed with the description of **S. farida** decribed in detail by Ghauri (1977c). As pointed out by Ghauri (op. cit.) **S. farida** is closely related to **S. eremica** from which it differs in having blunt humeral horns and in the characters of male and female genitalia as studied presently. It also differs by its lobelike posterior angles of 1st gonocoxae and spindleshaped median dilation of spermatheca.

Key to the species of the genus **Sarju** from Pakistan

1. Second antennal segment bowed and somewhat swollen at apex 2

   Second antennal segment straight and not distinctly swollen at apex 6

2. First gonocoxae atleast produced into a lobe or into a fingerlike projection at postoexternal angle 3

   First gonocoxae not as above 4

3. First gonocoxae produced like a finger, inner lobe of the head of the paramere thinly produced ..... **obscura** (Westwood)

   First gonocoxae produced into a lobe, inner lobe of the head of the paramere not produced as a thin point ... **farida** Ghauri

4. Humeral angles produced into short horns at their apices, body above with green metallic sheen ... **burmana khasiana** Ghauri

   Humeral angles projected into long and pointed horns at their apices, green metallic sheen on body above absent 5

5. Ventral excavation of pygophore V-shaped, dorsal membranous conjunctival appendage shorter than penial lobes ..... **angulata** sp.n.

   Ventral excavation of pygophore broad cupshaped, dorsal membranous conjunctival appendage longer than penial lobes ..... **eremica** (Hober.)

6. Apex of head somewhat squarish, ridged area on blade of paramere produced into a long beak, posterior angle of first gonocoxae slightly produced into a knob 7

Apex of head somewhat narrowed, ridged area on blade of paramere only slightly produced into a knob, posterior angle of first gonocoxae broad ..... **enigma** Ghauri

7. External lobe of paraclypeus at an obtuse angle to inner lobe, paramere not extra ordinarily wide below head ..... **lata lata** Ghauri

External lobe of paraclypeus sharply demarcated from internal lobe at almost ligth angle, paramere much wider below head ..... **lata quadrata** Ghauri

Ö z e t

Sarju Ghauri cinsinin (Hemiptera: Pentatomidae: Pentatominae: Halyini) revizyonu ile Pakistan'dan yeni bir türün orijinal deskripsiyonu

Bu çalışmada **Sarju** cinsine bağlı türlerin revizyonu ve bazı türlerinin yeniden deskripsiyonları yapılmıştır. Bu türlerden, Pakistan'ın kuzey kesiminde Gilgit'ten toplanan **S. angulata** n.sp.'nın orijinal deskripsiyonu da verilmiştir. **S. enigma** Ghauri ve **S. farida** Ghauri isimli türlerin yeniden deskripsiyonları yapılmış, ayrıca bunların metathorax'a ait pis koku bezi özellikleriyle genital organları da incelenmiştir. Bu türlerden ayrı olarak, Pakistan'ın değişik yerlerinde yeni olarak bulunmuş **S. burmana khasiana** Ghauri ve **S. eremica** (Hoberlandt) ile **Sarju'nun** tip türü olan **S. obscura** Westwood ve Pakistan'da bulunan diğer iki türün **S. lata lata** Ghauri ve **S. lata quadrata** Ghauri'nin teşhis anahtarları da verilmiştir. Her türün tanıtımından sonra bu türün yakın türlerden farkları da ayrı bir bölüm halinde verilmiştir.

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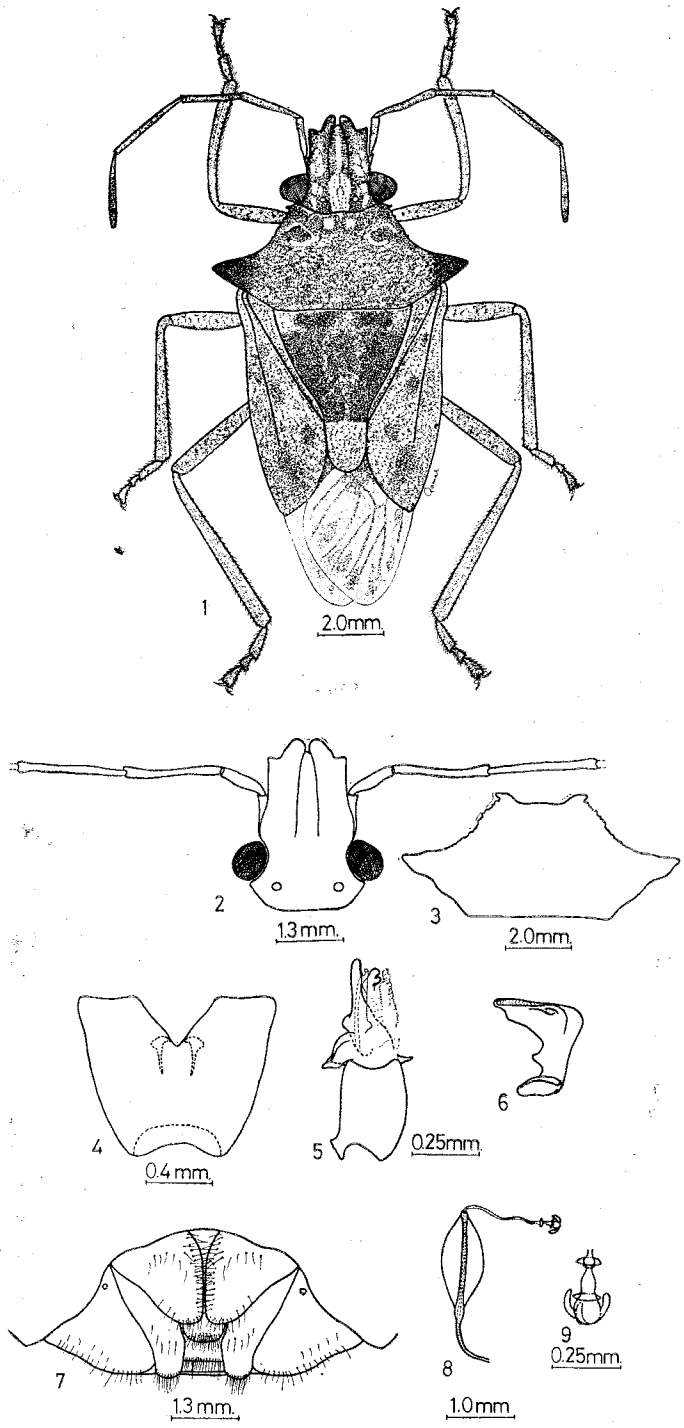
List of figures

Sarju angulata sp.n., fig. 1.9; 1, ♂ dorsal view; 2, head of ♂ dorsal view; 3, pronotum, dorsal view; 4, pygophore, ventral view; 5, aedeagus lateral view; 6, paramere, inner view; 7, terminalia of ♀ , ventral view; 8, spermatheca; 9, bulb of same, enlarged.

Sarju enigma Ghauri, fig. 10-17; 10, head of ♂ dorsal view; 11, pronotom of same, dorsal view; 12, pygophore, ventral view; 13, aedeagus, lateral view; 14, paramere, inner view; 15, terminalia of ♀ , ventral view; 16, spermatheca; 17, bulb of same, enlarged.

Sarju farida Ghauri, fig. 18-25; 18, head of ♂ , dorsal view; 19, pronotum of same, dorsal view; 20, pygophore, ventral view; 21, aedeagus, lateral view; 22, paramere, inner view; 23, terminalia of ♀ , ventral view; 24, spermatheca; 25, bulb of same, enlarged.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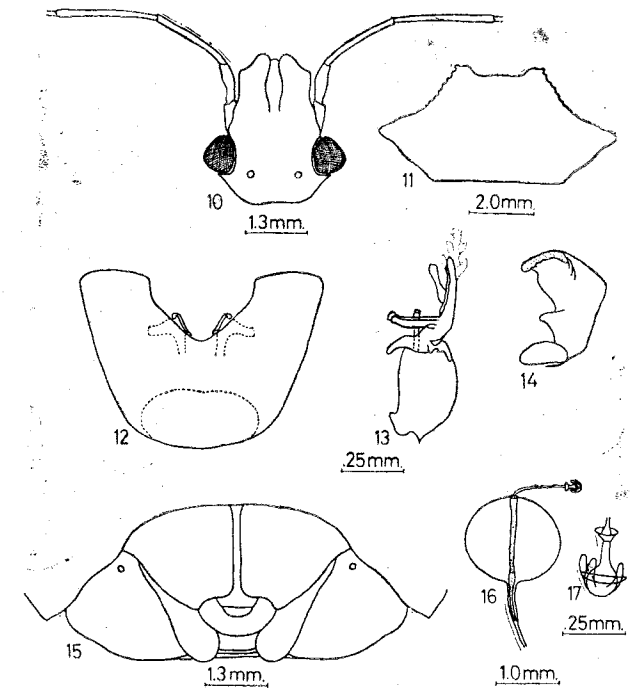
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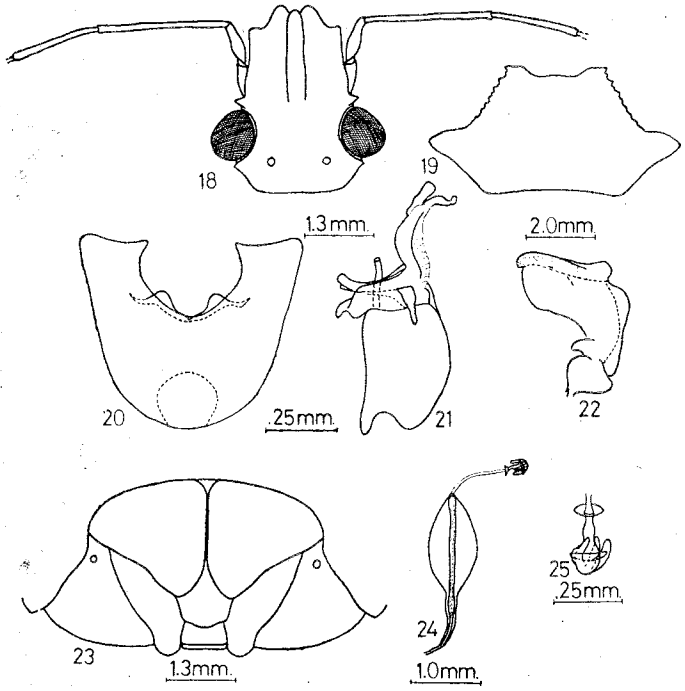
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