

Sarju— a new genus of Halyini (Heteroptera, Pentatomidae, Pentatominae) with new species

by

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Ö z e t

Yeni bir cins olan **Sarju** ve bu cinse bağlı yeni türlerin orijinal deskripsiyonları (Heteroptera, Pentatomidae, Pentatominae, Halyini)

Yeni bir cins olan **Sarju**'nun orijinal deskripsiyonu bunun tip türü olan **Halys obscura** Westwood üzerinden yapılmıştır. **S. obscura** (Westwood) **comb. n.**, **S. burmana** sp. n., **S. burmana khasiana** ssp. n., **S. taungyiana** sp. n., **S. taungyiana chapa** ssp. n., **S. eremica** (Hoberlandt) **comb. n.**, **S. farida** sp. n., **S. pavlovskii** (Kirichenko) **comb. n.**, **S. lata** sp. n., **S. lata quadrata** ssp. n. and **S. enigma** sp. n.'nin orijinal deskripsiyonları verilmiş ve resimlerle gösterilmiştir. **Sarju** cinsine bağlı türler batıda İran'dan başlayarak Afganistan, Rusya, Pakistan, Hindistan, Nepal, Sikkim, Bhutan, Burma ve doğuda Hindi-Çin'e kadar geniş bir yayılma alanına sahiptir. **Sarju** n. gen. anten, baş, erkek ve dişi eşey organlarının yapısına göre 4 gruba ayrılmıştır. 4. Grup bazı özellikleri ile **Sarju** n. gen. ve **Cahara** cinsleri arasında bir halka oluşturmaktadır. Geçmiş yıllarda, şimdi yeni cins içinde yer alan türlerin bazıları **Dalpada** s. l. cinsinin türleri ile karışmaktaydı. Zira bunların renkleri birbirlerine çok benzemekteydi. Gerçekte bunları ayıran esas karakterler, erkek ve dişi eşey organlarıdır. Metin içinde yer alan türlerden **S. eremica** (Hoberlandt) İran'da çok önemli bir turuncgil zararlısıdır. Metin içinde ayrıca **Sarju** n. gen.'ya bağlı türlerin teşhis anahtarı da verilmiştir.

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Introduction

This is the fifth paper of the series of my studies on Halyini particularly Dalpada sensu lato and is based on the type specimens of **Halys obscura** Westwood, **Halys nigricollis** Westwood, **Dalpada eremica** Hoberlandt paratype and authentically determined specimens of **Dalpada pavlovskii** Kirichenko together with other specimens in the collection of the British Museum (Natural History), London. In the previous four papers (Ghauri 1975a, 1975b, 1977a and 1977b, the last one in the press) species of **Jugalpada** Ghauri, **Paranevisanus** Distant, **Apodiphus** Spinola and **Cahara** Ghauri were described and illustrated. The new genus and the new species are defined on the basis of external features as well as male and female genitalia.

Sarju gen. n.

Body elongate oval, thickly punctate, not rugose; colour dull ochraceous brown; most species with black humeral horns and basal angles of scutellum shining yellow, some species with apex of scutellum pale yellow; juga longer than tylus, jugum at apex sinuate, its inner lobe rounded, in some species meeting over tylus, outer lobe at right or obtuse angle to inner lobe, in lateral view tylus partly hidden by jugum, anteroventral angle of bucculae angled but not produced, rostrum exceeding posterior coxae, extended beyond anterior margin of 3rd abdominal segment; pronotum lateral margin markedly concave, humeral angles produced into long or short horns, in most species diverging outwardly, in some raised almost vertically; scutellum, longer than wide at base; mesosternal carina present, auricle of metasternal scent gland long, curved, length between half and one third of metasternum; second antennal segment in most species bowed and with apex swollen, more so in males than in females; fore tibia not expanded.

Male genitalia; pygophore, ventral margin with wide or relatively narrow concavity without median lobes, lateral lobes in most species inwardly produced; paramere, with short stem, setose process short, thumb-like with blunt apex, apex of paramere broad with inner margin produced as a finger-like process or like a thick bill of a bird, with elongate ridged area, outer margin almost straight or gently curved or gently bisinuate; vesica short, tubular, with elongate sclerotised vesical appendages, dorsal conjunctival appendages small, sclerotised or semi-sclerotised, mesal membranous appendage trilobate, lateral lobes short, median longer than lateral but variable in width, ventral conjunctival appendages semi-sclerotised, larger than dorsal pair.

Female genitalia; external plates, external angle of first valvifer usually not produced, when so into a finger-like process, short and narrow, paratergites 9 elongate with inner margin produced or entire; spermatheca proximal part of duct (nearest to opening) bulbous, appreciably wider at distal end, both pump flanges present, bulb small with few and simple tubules, duct outside spermathecal bag, joining bulb, fine.

Type species, *Halys obscura* Westwood, 1837, 22; type locality, Bengal. Distribution-Iran, Afghanistan, Tadzhikistan, Pakistan, India, Burma, China and Indo-China.

Comments. The genus *Sarju* is very closely related to the genus *Cahara*, but unlike the latter is more widely distributed although they overlap to some extent. The exclusive character which definitely separates them is the absence of median lobes in the concave ventral margin of pygophore of the new genus. Within the new genus four groups of species are discernible on the basis of male and female genitalia and the shape of antennal segments. Group I distributed in Darjeeling, West Almora, South Garhwal and Sarju Valley is represented by the type species. In this the second antennal segment is bowed and swollen at the apex, the head is wide across eyes and relatively short in length, the ventral marginal cavity of pygophore is wide, the inner lobe of paramere head is almost pointedly produced, the external angle of first valvifer is thinly produced and the paratergites 9 are almost of uniform width. The species in group II are distributed in Burma, Indo-China, Khasi Hills and Tonkin. This group is characterised by slightly longer head than the group I, inner lobe of paramere not thin, external angle of first valvifer not longly produced, but the shape of the second antennal segment, the cavity of pygophore and the shape of paratergites 9 are similar to group I. Group III is represented by *Dalpada eremica* Hoberlandt and a new species and is distributed in Iran, Pakistan and North India. The species in group III resemble those of group I in the shape of second antennal segment, cavity of pygophore and paratergites 9, but the form of paramere and the shape of first valvifer are similar to those of group II. The IV group is distributed in Afghanistan, Tadzhikistan and Pakistan and is radically different from the other three groups by not having the second antennal segment bowed and swollen at apex and by having paratergites 9 medially produced (cf. fig. 3, 4, 7 and fig. 52, 53, 59), otherwise it has some characteristics which resemble group I (shape of paramere), and others which are similar to group III (almost squarish apex of head). The group IV forms a link between the genus *Sarju* and the genus *Cahara*, to the extent of the shape of straight second antennal segment and the medially produced paratergites 9

Sarju obscura (Westwood) **comb. n.**

Halys obscura Westwood, 1837, 22, paragraphs 9-10. Type a female.

Halys nigricollis Westwood, 1837, 22, paragraphs 11-12. Type a male. Synonymy by Distant, 1902, 111, who validates **H. nigricollis** Westwood and wrongly synonymised **H. obscura** Westwood. Kirkaldy, 1909, 193, rightly synonymised **H. nigricollis** and validates **H. obscura**.

Dalpada nigricollis (Westwood), Distant, 1902, 111.

Dalpada obscura (Westwood), Kirkaldy, 1909, 193 .

Synonymy confirmed during the present investigation by comparing the types of **H. obscura** (female) and **H. nigricollis** (male) with a pair in copula.

Colour; ochraceous brown with black and brown punctures, extensive black patches on head, anterior part of connexivum and on ventral and lateral fascia all along head, thorax and abdomen, small median black spots on last three abdominal segments, pronotal horn black with apex yellow, luteous impunctate basal angles of scutellum small, corium with red patches, eyes dark brown, ocelli red, antennae smoky yellow to dark brown with base of 4th segment luteous and a yellow fascia on 1st segment, femora and tibiae brown spotted, former much more so than latter, terminal segment of tarsi and claws brown, last segment of rostrum brown, mid-ventral surface of thorax and abdomen almost impunctate, yellow. Colour pattern very similar to species of **Cahara**, dorsal surface of body with light and dark streaks resembling tree bark.

Structure; head rather short, triangular, juga slightly exceeding tylus and partly covering it, rostrum reaching middle of 3rd abdominal segment pronotal horns short, lateral margins of pronotum bisinuate; pygophore, median excavation wide, shallow, margin slightly undulating, lateral lobes short with inner margin slightly concave; paramere, external margin sinuate, internal process abruptly narrow, very much drawn out, elongate, slightly undulating with transverse ridged area, setose process small; aedeagus, median conjunctival membranous appendage with all three lobes well differentiated, lateral a little shorter than middle one, other parts of aedeagus same as in generic description. Length of ♂ 13 mm, width across humeral angles of pronotum 6 mm. First valvifer's postero-external angle drawn out into a small, narrow finger, as shown in fig. 7 and 8. Paratergites 9 narrower at apex, elongate, inner margin not produced medially; spermatheca, proximal end bulbous, bulb small with three tubules longest tubule reaching beyond midway to first flange. Length of female 16 mm, width across pronotal angles 7.5 mm.

Material. India: Bengal, with the other following labels, a red margin circular type, Type HEM No. 91 *Halys obscura* Westwood Hope Dept. Oxford, 'obscura Hope', 'Type Westw. (Hope) C. Hemipt. 1837 Part I, page 22 Distant, P.Z.S., 1900, p. 807-825', '*Dalpada nigricollis* Westw.', a ♀, here designated as lectotype; Darjeeling, Gopaldhara, 3.440-4.720ft, 23.x.17(1917) (**H. Stevens**), 3♂1 ♀. ♂A in coupola with ♀ B; 4.720-6.100ft, 1916, (**H. Stevens**), 1 ♀; Rungbong Vy., ix.20 (1920), (**H. Stevens**), 1♀; 4. iv. 1918, (**H. Stevens**), 1♂ on tree trunk, at 3.440-4.720ft; 1903 - 374, 1♂; Nurbong, 950-2.240ft,-14(1914), (**H. Stevens**), 1♀, Namsoo, 2.100ft, 27.v.1918, 4♀1♂ 6.vi.1918, 1 ♀, (**H. Stevens**); Kumaon, Sarju Valley, 4.000ft, (**H.G.C.**), 1♂; S. Garhwall, 6.500 ft. (**H.G.C.**), 1♂; W. Almora Dn., U. Gumti Val., iv.19 (1919). (**HGC**), 1♀; Assam, 1906, (**W.F.Badgley**), 1♀; Lebong 5.000ft, ix. 1918 (**H.M.L.**), 1♀; Sikkim, Gopaldhara, Runbong Vall., (**H.Stevens**), 5♀1♂ Distant Collection, 3 ♀ 1♂; Hardwicke Bequest, 6♀ 1♂ *Dalpada affinis* Walker's Catal., *nigricollis* identi. by Dallas; Nepal, Taplejung Distr. Sangu c.6.000 ft, ix-x. 1961, (**R.L.Coe**), 1♂2♀, on mixed vegetation by stream in gully; Watling, 1.x.65, (**Dept. Agric.**), 1♂, No. 51, CIE A832, on **Citrus**; 1 mile south of Ulleri 5.500 ft, 16.v.1954, (**J. Quinlan**), 1♀. Specimens with incomplete data, G. 3440, 3.v.18 (1918), 1♀; 22.x.18 (1918), 1♂; *Dalpada*, 1♀; 15.ix.1918, 2♀. Bhoutan, 1900. (**R. Oberthür**), 1♂, in Paris Museum.

Male type of *Halys nigricollois* Westwood with the following labels, red margin type label, 'Nepa' (Nepal), 'Type HEM No. 90 *Halys nigricollis* Westwood Hope Dept. Oxford', 'Westw. Type (Hope) C. Hemipt. 1837 Part I page 22, Distant, P.Z.S. 1900, p 807-825', '*Dalpada nigricollis* Westw.', here designated as lectotype. Lectotypes in Hope Museum (Oxford), others in BM (NH), London.

Comments. *S. obscura*, externally looks like *Cahara jugatoria* (Leth.) which occur in the same general area, and some other species of *Dalpada* s.l. with which it has been confused in the past, *vide supra*, but the ventral excavation of the pygophore lacking median processes, readily distinguish it from them. The first valvifer of *S. obscura* is produced somewhat like that of the species of the genus *Cahara*, but this structure in the latter genus is stouter than in this species.

Sarju burmana sp.n.

Colour; ochraceous brown with black and brown punctures and with green metallic sheen, extensive metallic green patches on head, anterior half of pronotum, disc of scutellum, connexivum and narrow ventro-lateral

fascia; apex of pronotal horns yellow, apex of scutellum extensively and basal angles narrowly luteous and almost impunctate; connexivum almost completely dark, each with middle brown spot flanked by metallic green; corium without metallic green and reddish patches; eyes dark brown, ocelli red, antennae, middle area of thoracic and abdominal sterna and legs yellow, latter sparsely spotted brown, sterna almost impunctate, last segment of rostrum brown, remaining yellow, terminal segment of tarsi and claws brown.

Structure; head relatively narrower than *S. obscura*, juga almost meeting at apex and partly covering tylus, rostrum reaching middle of 3rd abdominal segment; pronotal horns short, lateral margin bisinuate; pygophore, with wide ventral excavation, paramere, external margin almost smoothly curving, head of paramere gradually narrowing internally with transverse narrow ridged area, setose process, 'thumb', small, pointed; aedeagus, median conjunctival membranous appendage trilobate, lateral lobes a little shorter than middle one, other parts as described in generic definition. Length of ♂ 12.5 mm, width across humeral angles 6.00 mm. First valvifer not produced posteriorly, but as shown in fig. 18; spermatheca, proximal end bulbous, bulb small with two short and one longer tubules, longer tubule reaching midway to first flange. Length of ♀ 11.5 mm, width across humeral angles 7.00 mm .

Material. Holotype ♂, Burma, Mishmi Hill, Delei River, 1.700ft, 5.ii. 1935, (M. Steele). Paratypes. 1♂³♀, same data as holotype. All in BM(NH), London.

Comments. The new species differs from all others of the genus *Sarju* by the bright luteous apex of its scutellum. From *S. obscura* to which it resembles by the shape of its pygophore, *S. burmana* can be readily distinguished by the shape of paramere and the first valvifer.

Sarju burmana khasiana ssp. n.

The new subspecies differs from the nominal one to which it closely resembles, by the luteous apex of the scutellum which extends narrowly on the median line anteriorly and is not transversely separated from the dark disc by a sharp demarcation. The paramere of this subspecies has also slightly longer head (cf fig. 16 and fig. 25).

Material. Holotype ♂, India: Khasia, 1.500-3.000 ft, (Distant Collection 1911-383). Paratypes. Same data as holotype, 2 ♀; Sadia, (Distant Collection 1911-383), 1♂; Assam, 1906, (W.F. Badgley), 3 ♀; Naga Hills, (Doherty) 1 ♀, det. as *jugatoria* Leth.; Bengal, (Distant Collection 1911-383), 1 ♀. All in BM(NH), London.

Sarju taungyiana sp. n.

Colour; similar to **S. burmana khasiana** ssp. n. except that apex of scutellum not impunctate and yellow fascia on connexivum much wider; in last two points as well as in other respects resembles **S. obscura** (Westwood).

Structure; external body features similar to **S.b. khasiana**; paramere, head much narrower and longly produced; aedeagus similar to that of **S.b. burmana**. Length 12.00 mm, width across humeral angles 6.00 mm.

Material. Holotype ♂, Burma: Taungyi, v. 1934, (A.J. Marshallamory). In the BM (NH), London.

Comments. The new species could be confused with **S. obscura** and **S.b. burmana** or **S.b. khasiana** because of its close resemblance to these species, but the individual shape of its paramere combined with its coloration readily distinguish it from all other species of **Sarju**.

Sarju taungyiana chapa ssp. n.

Colour; similar to nominal species except prominent luteous basal spots of scutellum and a vague spot on apex.

Structure; similar to nominal species but for head of paramere, slightly thicker than in nominal species; aedeagus, similar to **S.b. burmana** ssp. n. Length 12.00 mm., width across humeral angles 6.00 mm.

Material. Holotype ♂, China: Tonkin, Chapa, vi. 1916, (R.V. de Salvaza). Paratype Indo China, (R.V. de Salvaza), 1♂. Both in BM(NH), London.

Comments. The new subspecies closely resembles **S. obscura**, especially by the presence of impunctate luteous spots at the basal angles of the scutellum and general colour and shape of its body, but the form of its paramere is quite different. The new subspecies shows the eastern most limit of the genus **Sarju**.

Sarju eremica (Hoberlandt) comb. n.

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

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

Colour; similar to **S. obscura**, except for lighter apex of scutellum, lighter marginal fascia on venter of abdomen, yellowish instead of reddish tinge on dorsal surface of body and jet black humeral horns.

Structure; head not narrowed at apex as in **S. obscura**, second antennal segment bowed and thickened at apex, juga partly covering tylus, in

some specimens meeting together at apices, rostrum reaching middle of third visible abdominal segment; pronotal horns very long, longer than in any other species of *Sarju*, ascending and extending laterally, as a result lateral margin of pronotum deeply concave, marginal teeth much smaller than in *S. obscura*; pygophore, ventral cavity multi-sinuate, lateral lobes, inner angle produced, paramere, external margin gently sinuate, internal process (head) triangular, broad at base, gradually narrowed towards apex latter in form of a small blunt tooth, transverse ridged area culminating in a round base, setose thumb-like process small, conical; aedeagus, vesica short, tubular, vesical appendages sclerotised, long, dorsal conjunctival appendages small, semi-sclerotised, ventral conjunctival appendages long semi-sclerotised, median conjunctival appendage membranous, trilobate, median lobe short, broad, lateral lobes longer, narrower. Length of ♂ 13.00 mm, width across humeral angles 7.00 mm. First valvifer of female slightly tumid at postero-external angle. Paratergite 9 slightly produced medially; spermatheca bulbous at proximal end, bulb small with two short and one slightly longer tubule, hardly reaching mid-way to first flange. Length of ♀ 14.50 mm, width across humeral horns 8.00 mm.

Material. Iran: Baluchistan, Sarbaz, Dapkor, 22.iii.1949, (**Salavatian**), ♀ holotype, through courtesy of Dr. L. Hoberlandt. Bijanabad, Jiroft, 12.viii. 1960, (**G.A. Fenili**), 2♀, 15. viii. 1960, 2♀. 7. viii. 1960, 1♂, 6. viii. 1960, 1♂; Pakistan: Gilgit, Patay Field, 3,500 ft, 13.ix. 1959, (**A.S.K. Ghouri**), 1♂ 1♀; Saidpur, 18.iv. 1969, (**C.I.B.C. Pakistan**), 3♂3♀, on *Duranta plumeri*. Holotype in Národní Museum, Praha; other specimens in BM(NH), London.

Comments. Although this species was described based on a single female by D. Hoberlandt (1959), later, Beccari and Fenili (1960) found it in large numbers as a serious pest of *Citrus* in Iran. It has now been recorded from two localities in Pakistan. As for the structural details, all the three authors mentioned above have described the species very thoroughly missing out only a few features, for instance, although they mentioned that the second antennal segment is thickened at its apex, yet they did not describe it as 'bowed' which is typical of most species (*supra*) of the genus *Sarju*, this character separates *S. eremica* from its close ally *S. pavlovskii* (*vide infra*) which has straight and uniformly thin second antennal segment. In addition, both these species differ from each other in the shape of their parameres and the ventral cavity of the pygophore. The spinous horns of *S. eremica* are the most characteristic of this species. The ventral cavity of the pygophore being multi-sinuate and the inner corners of the lateral lobes being produced resemble to some extent those of *S. burmana* and *S. taungyiana*.

Sarju farida sp. n.

Colour; ochraceous brown, closely punctate with black and brown punctures, luteous impunctate basal angles of scutellum small, humeral horns of pronotum black, shining, apex of scutellum and disc of corium sparsely punctate, anterior and posterior angles of connexivum black, extensive dark patches on head, anterior part of pronotum and less so on scutellum, median area on thoracic and abdominal sterna almost impunctate, yellow, marginal band clearly defined by thick black punctures, femora and tibiae with red markings and extensive dark reddish brown spots, eyes dark brown, ocelli red.

Structure; apex of head across juga as wide as vertex between eyes, tylus uncovered, outer lobes of juga prominent, angle in front of eye tooth-like, rostrum reaching posterior margin of third abdominal segment; pronotal horns blunt, lateral margins deeply concave; pygophore, ventral excavation deep, lateral lobes produced medially, paramere, external margin straight along most of its length, curving into head almost at a right angle head thick, broad with a terminal lobe, transverse ridged area culminating in a round globular process, setose thumb-like process small, conical; aedeagus, vesica small, tubular, vesical appendages elongate, sclerotised, dorsal conjunctival appendages small, sclerotised, ventral conjunctival appendages long, semi-sclerotised, median membranous conjunctival appendage trilobate, median lobe longer than lateral lobes, all three pointed narrowed at apices. Length 12.00 mm, width across humeral angles 6.50 mm. Female unknown.

Material. Holotype ♂, India: Kulu, 12.vi.1939. In the BM(NH), London.

Comments. The new species is closely related to *S. eremica* from which it differs by its blunt humeral horns, much deeper excavation of its pygophore at ventral margin, much more produced lateral lobes and much wider head of its paramere. It might be confused with *S. pavlovskii* because of its shorter humeral horns, but the shape of the pygophore and paramere are quite different in these two species.

Sarju pavlovskii (Kirichenko) **comb. n.**

Dalpada pavlovskii Kirichenko, 1952, 152.

Colour; similar to *S. eremica* and *S. obscura*, ochraceous with dark streaks and black punctures, pronotal horns shining black; basal angles and apex of scutellum punctate, venter of abdomen with ill-defined lateral dark fascia, black punctures gradually thinning out towards middle of abdomen, first antennal segment with a longitudinal yellow streak, second and third with bases and apices ochraceous and middle brown, fourth and

fifth with about one third basal area ochraceous, remaining dark brown, teeth on lateral margin of pronotum yellow.

Structure; juga exceeding tylus, not meeting in front; marginal tubercles before eyes not well developed; pronotal horns short, conical rather than spinous, lateral margins of pronotum concave; antennal segments uniformly thin, second segment straight; pygophore, ventral excavation almost semi-circular, lateral lobes not produced, paramere, external margin gently bisinuate, turning smoothly into head, internal process gradually produced with transverse ridged area, setose thumb short, blunt, aedeagus, short, tubular, vesical processes sclerotised, not very long, dorsal conjunctival processes short, semi-sclerotised, ventral conjunctival processes long, semi-sclerotised, median process membranous, trilobate, lateral lobes short, round at apex, middle much longer, narrow. Length of body of ♂ 15.50 mm, width across pronotal horns 7.50 mm. First valvifer, postero-external angle slightly produced, but in line with rest of posterior margin, paratergite 9 medially appreciably produced; spermatheca, proximal end bulbous, bulb small with three long tubules, all reaching midway to first flange. Length of ♀ 18.00 mm, width across horns 8.00 mm.

Material. U.S.S.R.: Tadzhikistan, Barzob, Kondara, 20.vii. 1939, (**Gusakooskyi**), 1 ♀ paratype; Gushari, 24.vi.1956, (**Kirianova**), 1 ♂; Ushch. Kondara, 1.vii.1955, (**Kulinitch**), 1 ♂. On loan by the courtesy of Dr. I.M. Kerzhner, Zoological Institute, Leningrad, U.S.S.R. The three specimens bear the determination labels by the author of the species, A.N. Kirichenko.

Comments. The pronotal horns of **S. pavlovskii** are shorter than those of **S. eremica**, but longer than those of **S. obscura**, the semi-circular concavity of the ventral margin of pygophore is distinctly different from all other species of the genus **Sarju**, the paramere is also specific in its configuration, but the most distinctive feature of this species, which distinguishes it from all the other species so far described here, is the straight second antennal segment. This character is not mentioned by previous workers as a difference from its nearest ally in external appearance, **S. eremica**. The straight second antennal segment which is also uniformly thin is typical of the genus **Sarju** whose majority of species have bowed second antennal segment, thickened at apex, but other characters, especially the shape of the pygophore, justify its location in the genus **Sarju**.

Sarju lata sp. n.

Colour; similar to **S. pavlovskii**, dull yellow, heavily punctate with black punctures, even transverse ridges of pronotal horns punctate, only traces of impunctate on scutellar basal angles present, apex of scutellum less punctate than its base, eyes reddish brown, ocelli red, antennal segments unlike **S. pavlovskii**, uniformly reddish brown; connexivum, base

and apex black; legs and ventral surface of body with dull reddish markings, ventro-lateral fascia of black punctures spreading towards middle, femora and tibiae black spotted, base of tibiae minutely and their apex broadly marked with dark brown, basal two segments and basal half of terminal segment of tarsi and basal half of claws dull yellow, remaining dark brown, only tip of rostrum brown.

Structure; head excluding eyes, almost oblong, apex not narrower than vertex between eyes, tylus visible, outer lobes of juga prominent, angle in front of eye not prominent, antennal segments II and III showing slight thickening of their apices compared to that of *S. pavlovskii*, rostrum just passing posterior margin of third abdominal segment; pygophore, ventral excavation deep and narrow, outline not smooth but sinuate, lateral lobes subtransversely rounded, paramere, inner lobe of head produced as a long finger-like process, external margin unlike *S. pavlovskii* deeply emarginate near apex, stem near base relatively much narrower than in *S. pavlovskii*, ridged area transverse, narrow, 'thumb' long, aedeagus, vesica short, tubular, vesical appendages sclerotised, long, dorsal conjunctival appendages small, semi-sclerotised, ventral conjunctival appendages long semi-sclerotised, median conjunctival appendage membranous, trilobate, median lobe broad, lateral lobes long, narrow. Length of body of ♂ 12.50 mm, width across humeral angles 7.00 mm. First valvifer of female at postero-external angle slightly produced. Paratergite 9 slightly produced medially; spermatheca slightly bulbous at proximal end, bulb small with two short tubules, hardly reaching to mid-way to first flange. Length 15.00 mm, width across humeral angles 8.00 mm.

Material. Holotype ♂, Pakistan: between Gilgit and Nagy, British Museum collection 1912-112. Paratypes. Same data as holotype ♂, 1♀. Baltistan, (88,31), 1♀, det. as *Dalpada clavata* (Walker's Catal.). Kashmir, Baltistan Col, 12.viii.1925, (Meinertzhagen), 1♀, det. as *Dalpada confusa* Dist. All in BM(NH), London.

Comments. The new species is very closely related to *S. pavlovskii*, but can be differentiated by its relatively wider apex of head, more prominent outer lobe of jugum, slightly thicker antennal segments, punctate humeral horns, prominent teeth on the lateral margins of the pronotum, narrower apex of first valvifer and by the deep emargination on the postero-external angle of its paramere. The spermathecal bulb of the new species has only two tubules (evidence based on three females) compared to three tubules in all the other species of this genus. The distribution of the new species in Baltistan and Gilgit also reflects its close relationship with *S. pavlovskii* which was described from the neighbouring area of

Afghanistan and Tadjikistan, although their isolation due to geographical features seems to be quite effective to develop the specific distinction. The new species on account of the structure of antennal segments, the pygophore and the paramere belongs to the fourth group of the genus *Sarju*.

***Sarju lata quadrata* ssp. n.**

Colour; similar to nominal species obscured because of specimens being old.

Structure; head excluding eyes, almost rectangular, juga almost as wide as width between eyes, external lobe of jugum at right angle to inner lobe, antennal segments thicker than in *S. pavlovskii*, angles in front of eyes very well developed, humeral horns thicker than in nominal species. Body because of thicker humeral horns, looks more heavily built than *S. lata* sp. n. Length 15.00 mm, width 8.00 mm. Pygophore with deep and narrow excavation of which outline not smooth but sinuate, lateral lobes transverse, not produced laterally, paramere, similar in shape to that of nominal species except that its head relatively wider, aedeagus also similar to nominal species, except that lobes of membranous tripartite conjunctival appendage not very much differentiated.

Female unknown.

Material. Holotype ♂, Pakistan: Jhelam Valley, (Distant Collection 1911-383). Paratype. 1♂ same data as holotype ♂. Both in the BM(NH), London.

Comments. The new subspecies is closely related to the nominal species by the shape of its juga and the slightly thicker antennal segments, but mainly differs by its more prominent humeral horns, more squarish apex of head and the shape of its paramere. It is distributed further south than either *S. pavlovskii* and *S. lata* sp. n., but much more so from Tadjikistan (Type locality of *S. pavlovskii*) than Gilgit/Baltistan (Type locality of *S. lata* sp.n.). This distribution of these three taxa is reflected in their gradual structural differences, as evident from their descriptions as well as from the figures.

***Sarju enigma* sp. n.**

Only a female is known.

Colour; similar to *S. lata* sp. n., antennal segments IV and V not uniformly brown or reddish brown but more than four fifth distal length smoky with basal one fifth ochraceous.

Structure; head narrowed in front as in *S. pavlovskii*, but angles in front of eyes, unlike *S. pavlovskii*, not prominent, antennal segments fine as in *S. pavlovskii*, humeral horns intermediate between *S. lata* sp. n. and *S. pavlovskii*; first valvifer relatively much wider posteriorly than in any other species of *Sarju*, its postero-external angle only broadly convex. Paratergite 9 produced medially, spermatheca bulbous at proximal end, bulb very small (? deformed) with two long and one very long tubules, the longest almost reaching to first flange. Length of body 15.00 mm, width across humeral angles 7.00 mm.

Material. Holotype ♀, Pakistan: Gilgit, 28.vi.1962, (C.I.B.C. Pakistan), adult on *Malus pumilo*; C.I.B.C. Fr-6/62-141/761. Deposited in BM(NH), London.

Comments. The new species closely resembles *S. pavlovskii*, especially in the fineness of its antennal segments, but it is readily distinguished from the latter by the reduced projections in front of its eyes, by the colour of its antennal segments and by the very wide posterior margin of its first valvifer. From *S. lata quadrata* ssp. n., which is only represented by males, at the moment, the new species differs by its narrowing apex of head and smaller outer lobe of jugum, and by its smaller humeral horns. Its close relationship with *S. pavlovskii*, its host plant and its distribution in Gilgit show the possibility of replacement of *S. pavlovskii* in these valleys by this new species, in addition to others which occur in Gilgit and surrounding area. By virtue of its straight II antennal segment, the new species belongs to the IV group of the genus *Sarju*.

Key to the species of *Sarju*

1. Second antennal segment bowed and appreciably swollen at apex 2.
- Second antennal segment straight, linear, not appreciably swollen at apex 8.
2. Inner lobe of paramere head thinly produced; first valvifer produced like a finger at postero-external angle. *S. obscura* (Westwood) comb. n.
- Inner lobe of paramere head not produced as a thin point; first valvifer not produced like a finger 3.
3. Cavity of ventral margin of pygophore wide and relatively shallow (Fig. 5) ; humeral horns not longly produced 4.
- Cavity of ventral margin of pygophore narrow and relatively deep (Fig. 40); humeral horns longly produced 7.

4. Apex of scutellum clearly luteous and almost impunctate; head of paramere thickly produced (Fig. 16) 5.
 Apex of scutellum dark or only obscurely luteous punctate; head of paramere narrowly produced (Fig. 33) 6.
5. Luteous apex of scutellum sharply, transversely demarcated from dark disc; head of paramere relatively short (Fig. 16)
 **S. burmana burmana** sp. et ssp. n.
 Luteous apex of scutellum narrowly continuous on to dark disc; head of paramere relatively long (Fig. 25)
 **S. burmana khasiana** sp. et ssp. n.
6. Apex of scutellum dark, basal luteous spots of scutellum minute; internal process of head of paramere relatively narrow (Fig. 33)
 **S. taungyiana taungyiana** sp. et ssp. n.
 Apex of scutellum obscurely luteous, basal luteous spots of scutellum prominent; internal process of head of paramere relatively thicker (Fig. 37) **S. taungyiana chapa** sp. et ssp. n.
7. Humeral horns very long, pointed at their tips; head of paramere triangular in profile (Fig. 41) **S. eremica** (Hoberlandt) **comb. n.**
 Humeral horns short, thick, blunt at their tips; head of paramere suboblong in profile (Fig. 49) **S. farida** sp. n.
8. Apex of head almost square, external lobe of juga very prominent, almost as wide as internal lobe; postero-external angle of head of paramere with a deep emargination 9.
 Apex of head gently narrowed, external lobe of juga narrower than internal lobe (Fig. 51); postero-external angle of head of paramere rounded 10.
9. Apex of head across external lobes of juga gently diverging, external lobe of jugum at an obtuse angle to inner lobe; paramere not extraordinarily wider below head **S. lata lata** sp. et ssp. n.
 Apex of head squarish across external lobes of juga, external lobe of jugum sharply demarcated from internal lobe at almost right angle; humeral horns large; paramere much wider below head
 **S. lata quadrata** sp. et ssp. n.
10. Angles in front of eyes prominent; antennal segments III-V with broad ochraceous annulation at base; first valvifer at posterior margin much narrower than its base (Fig. 60)
 **S. pavlovskii** (Kirichenko) **comb. n.**
 Angles in front of eyes reduced (Fig. 78); II-V antennal segments only with narrow ochraceous annulation at base; first valvifer much wider relatively than at base (Fig. 82) **S. enigma** sp. n.

Summary

A new genus, *Sarju*, is described based upon *Halys obscura* Westwood as its type species. *S. obscura* (Westwood) comb. n., *S. burmana* sp. n., *S. burmana khasiana* ssp. n., *S. taungyiana* sp. n., *S. taungyiana chapa* ssp. n., *S. eremica* (Hoberlandt) comb. n., *S. farida* sp. n., *S. pavlovskii* (Kirichenko) comb. n., *S. lata* sp. n., *S. lata quadrata* ssp. n. and *S. enigma* sp. n. are described and illustrated. The genus *Sarju* is widely distributed, from Iran in the west, through Afghanistan, Russia, Pakistan, India, Nepal, Sikkim, Bhoutan, Burma and Indo-China in the east. The genus is divided into four groups based on the structure of antennae, head, male and female genitalia. One of the groups, (Group IV) forms a link between the genera, *Sarju* and *Cahara*, by some common characteristics. Some of the species now in the new genus have been confused with others in the genus *Dalpada* s. l., in the past. This was because superficially their coloration is very similar. The distinguishing characters are mainly the male and female genitalia. One of the species, *S. eremica* (Hoberlandt), is a serious pest of *Citrus* in Iran. A key to the species of *Sarju* is provided.

References

- Beccari, F. and Fenili, G.A. (1960). Entomofauna Iraniana. *Dalpada eremica* Hob. (Hemiptera - Heteroptera). I. Contributo alla conoscenza morfo - biologica degli stadi imaginali e prima descrizione della allotipo maschile. *Redia*, **45** : 279-329.
- Distant, W.L. (1902), The Fauna of British India, including Ceylon and Burma. Vol. 1., pp. xi + 438. London. Taylor and Francis.
- Ghauri, M.S.K. (1975a). *Jugapada* - a new genus of Halyini (Pentatomidae, Heteroptera). *J. nat. Hist.*, **9** : 629-632.
- Ghauri, M.S.K. (1975b), Revision of the Himalayan genus *Paranevisanus* Distant (Halyini, Pentatominae, Pentatomidae, Heteroptera), *Zool. Anz. Jena*, **195** : 407-416.
- Ghauri, M.S.K. (1977a), A revision of *Apo-*
diphus Spinola (Heteroptera, Pentatomidae), *Bull. ent. Res.*, **67** : 97-106.
- Ghauri, M.S.K. (1977b), *Cahara* - a new genus of Halyini (Heteroptera, Pentatomidae, Pentatominae) with new species on fruit and forest trees in the subhimalayan region. *J.nat.Hist.* (in press)
- Hoberlandt, L. (1959). Hemiptera-Heteroptera from Iran., II., *Sb. ent. Odd, nar, Mus. Praze.* **33** : 1-523.
- Kirichenko, A. N. (1952), New and little known Hemiptera - Heteroptera of Tadzhistan, *Trud. zool. Inst. Akad. Nauk USRR* **10** : 140-198.
- Kirkaldy, G.W. (1909), Catalogue of the Hemiptera (Heteroptera). pp. XL + 392, Berlin, F.L. Dames,
- Westwood, J.O. (1837). Catalogue of Hemiptera in the Collection of the Rev. F.W. Hope, Part I, pp. 46, London.

List of figures

Sarju obscura (Westwood), fig. 1-10; 1, head of ♂, dorsal view; 2, apex of same, lateral view; 3, II and III segments of antenna of ♂; 4, the same of ♀; 5, pygophore, ventral view; 6, paramere; 7, external plates of ♀; 8, first valvifer; 9, spermatheca; 10, bulb of same, enlarged.

Sarju burmana sp. n., fig. 11-20; 11, head of ♂, dorsal view; 12, II and III segments of antenna of ♂; 13, the same of ♀; 14, scutellum; 15, pygophore, ventral view; 16, paramere; 17, external plates of ♀; 18, first valvifer; 19, spermatheca; 20, bulb of same, enlarged. **Sarju burmana khasiana** ssp. n., fig. 21-28; 21, scutellum; 22, II and III antennal segments of ♂; 23, the same of ♀; 24, pygophore, ventral view; 25, paramere; 26, first valvifer; 27, spermatheca; 28, bulb of same, enlarged. **Dalpada aspersa** Amyot et Serville, fig. 29, paramere. **Sarju taungyiana** sp. n., 30-33; 30, scutellum, 31, II and III antennal segments of ♂; 32, pygophore, ventral view; 33, paramere. **Sarju taungyiana chapa** ssp. n., fig. 34-37; 34, scutellum; 35, II and III antennal segments of ♂; 36, pygophore, ventral view; 37, paramere.

Sarju eremica (Hoberlandt), fig. 38-45; 38, II and III antennal segments of ♂; 39, the same of ♀; 40, pygophore, ventral view; 41, paramere; 42, external plates of ♀; 43, first valvifer; 44, spermatheca; 45, bulb of same, enlarged. **Sarju farida** sp. n., fig. 46-50; 46, head of ♂, dorsal view; 47, pronotum; 48, pygophore, ventral view; 49, paramere; 50, aedeagus, lateral view.

Sarju pavlovskii (Kirichenko), fig. 51-62; 51, head of ♂, dorsal view; 52, II and III antennal segments of ♂; 53, the same of ♀; 54, pronotum of ♂; 55, pygophore, ventral view; 56, paramere; 57, aedeagus, lateral view; 58, median conjunctival process; 59, external plates of ♀; 60, first valvifer; 61, spermatheca; 62, bulb of same, enlarged.

Sarju lata sp. n., fig. 63-72; 63, head of ♂, dorsal view; 64, II antennal segment of ♂; 65, II and III antennal segments of ♀; 66, pronotum of ♂; 67, pygophore, ventral view; 68, paramere; 69, external plates of ♀; 70, first valvifer; 71, spermatheca; 72, bulb of same. **Sarju lata quadrata** ssp. n., fig. 73-77; 73, head of ♂, dorsal view; 74, pronotum; 75, II and III antennal segments of ♂; 76, pygophore, ventral view; 77, paramere.

Sarju enigma sp. n., fig. 78-84; 78, head of ♀, dorsal view; 79, II and III antennal segments of ♀; 80, pronotum; 81, external plates of ♀; 82, first valvifer; 83, spermatheca; 84, bulb of same, enlarged.





