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A revision of the family Largidae (Hemiptera : Pyrrhocoroidea) with description of a new genus from Indo - Pakistan subcontinent and their relationships*

Imtiaz AHMAD** Narjis ABBAS**

Summary

Iphita Stål, **Physopelta** Amyot et Serville and **Lohita** Amyot et Serville are redescribed alongwith their type species and a new genus **Neophysopelta** Ahmad and Abbas is described to accommodate **schlanbuschi** (Fabr.) from Indo-Pakistan subcontinent with special reference to scent gland ostiole and male and female genitalia. The above taxa are keyed and their relationships within the family Largidae is also briefly discussed.

Introduction

Ahmad and Abbas (1985) revised *Lohita* Amyot et Serville, from Indo-Pakistan subcontinent with special reference to their metathoracic scent gland, male and female genitalia. The senior author during his visit to Natural History Museum Basel Switzerland (NHB), British Museum Natural History London (BMNH) and United States National Museum Washington (USNM) got an opportunity to examine the holotypes and many authentically determined specimens of the taxa included presently by the courtesy of Dr. M. Brancucci, Dr. T. J. Henry and Mr. W. R. Dolling respectively of the above museums. A series of specimens of *N. schlanbuschi* were also examined by the courtesy

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** Department of Zoology - Entomology, University of Karachi, Karachi - 32, Pakistan.

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of Dr. T. J. Henry and Dr. R. Froeschner which were found to represent a new genus near *Physopelta*. A key to the genera of the family Largidae is given and in the above light the relationships of the included taxa are briefly discussed . For the description, measurements and inflation of aedeagus the methods of Ahmad and Abbas (1986) were generally followed. All the measurements are in millimetres and the diagrams to the given scales; length was measured from tip of the clypeus to the tip of abdomen; width of the head measured between the outer margins of compound eyes; pronotal width was measured at the widest area of the humeral angles.

Key to the subfamilies, tribes and genera of the family Largidae

1. Lower surface of head not sulcate or grooved longitudinally behind the bucculae, anterior femora terate or slightly sulcate beneath at base, metathoracic scent gland complex not auriculate as below, conjunctiva without any appendange (not represented in the Indo-Pakistan Subcontinent) ... ... Larginae.

— Lower surface of head longitudinally impressed behind bucculae, sulcus often reaching to base of head, anterior femora sulcate beneath for most or all of their length, metathoracic scent gland complex auriculate, conjunctiva with appendages. Physopeltinae 2

2. Antennae very long, 1st joint longer than head and pronotum together, in male about three times as long as head and pronotum together, 1st labial segment distinctly reaching posterior margin of head, sexually dimorphic, pygophore with posterior margin slightly lobed ... ... Tribe Lohitini Ahmad and Abbas, genus **Lohita** Amyot et Serville.

— Antennae not as above, basal segment longer than head lenght but never longer than lengths of head and pronotum to-gether, 1st labial segment usually short of or reaching posterior margin of head, without sexual dimorphism, pygophore with posterior margin without lobe as above ... ... Physopeltini 3

3. Pronotum with anterior disc convex but the convexity not reaching to anterior margin, lateral margins strongly reflexed, 1st tarsal segment more than twice longer than the distal two segments together ... **Iphita** Stål.

— Pronotum with anterior disc convex but the convexity distinctly reaching to anterior margin, lateral margins not strongly reflexed, 1st tarsal segment less than twice longer than the distal two segments together 4

4. Body dull raddish ochraceous, covered with less silvery hairs and without long black stiff hairs, 1st antennal segment distinctly longer than head length, spermatheca with a short duct, paramere with median dorsal lobe more towards the proximal end ... ... **Physopelta** Amyot et Servill.

— Body bright red, covered with more silvery hairs and long black stiff hairs, 1st antennal segment subequal to head length, spermatheca with a long duct having many coils, paramere with median dorsal lobe slightly above the middle portion ... ... **Neophysopelta** gen. nov.

Subfamily Physopeltinae State n.

Physopeltinae Hussey, 1929, 10

Body large, ranging from 12 - 19.5, head longer or as broad as long with lower surface longitudinally impressed behind the bucculae and the ventrolateral sutures often reaching to the base of the head. Pronotum anteriorly narrowed; anterior femora sulcated beneath for most or all of their length, metathoracic scent gland complex peritreme auriculate hemelytra always complete, apical margin of corium elongately produced.

Male genitalia; pygophore slightly broader or as broad as long; parameres with broad base and a median hump; aedeagus with sclerotized conjunctival appendages.

Female genitalia; 1st gonocoxae elongate and lacineate with 7th sternum deeply cleft, 1st gonapophses in form of styles; 8th paratergites small; 9th cup - shaped, completely covering 2nd gonocoxae; spermatheca without distal but with proximal flange and with a bulb and coiled tube.

Type genus *Physopelta* Amyot et Serville.

Comments. This subfamily is allied to Larginae as shown in the present key but it could easily be separated by the presence of auriculate metathoracic scent gland complex and conjunctival appendages in the male aedeagus in contrast to non - auriculate metathoracic scent gland complex and male aedeagus without conjunctival appendages in Larginae.

Tribe Lohitini Ahmad and Abbas 1985 : 14

Genus *Lohita* Amyot et Serville

Lohita Amyot et Serville, 1843, 266; Stål, 1870, 91; Distant, 1904, 94; Hussey, 1929, 34.

Macrocerea Spinola, 1840, 177; Kirkaldy and Edward, 1902, 165; Hussey, 1929, 34.

Lohita grandis (Gray) Ahmad and Abbas, 1985, 14.

Type species *Lohita grandis* (Gray)

Tribe Physopeltini Sensu Stricto

Body large, ranging from 12 - 19.5, head slightly deflected, basal antennal segment longer or subequal to the length of head in both the sexes. Pronotum with anterior area slightly marked by a transverse line, lateral margins

straight without sinuation; membrane of hemelytra almost or completely covering the apex abdomen.

Male genitalia, pygophore with ventroposterior margin plain or slightly convex, aedeagus with long ballon - shaped partly sclerotized partly membranous appendages.

Female genitalia, first gonocoxae with posterior margin plain or sinuate; attached to the 8th paratergite at a single point, spiracle placed more towards the inner margin covered with few short hairs; 9th paratergite convex in the middle completely covering the 2nd gonocoxae; spermatheca with bulb and duct having many short or long coils.

Comments. This tribe at the moment together with the new tribe Lohitini comprises the sub - family Physopeltinae. It therefore shares with Lohitini the characters listed under Physopeltinae. However, it can readily be seperated from Lohitini in lacking sexual dimorphism and in possessing a normal basal antennal segment which is slightly longer or subequal to head length in contrast to sexual dimorphism and remarkably longer basal antennal segment at least much longer than in female and about 3x longer than the lengths of head and pronotum together in male of Lohitini.

Genus *Iphita* Stål

Iphita Stål, 1870, 91 & 99; Hussey, 1929, 33. Ahmad & Abbas, 1986, (M S)

Physopelta Distant, 1904, 96; Breddin, 1909, 296.

Type species *Iphita limbata* Stål

Neophysopelta Gen. n.

Body large sanguineous, head broader than long eyes sessile, basal antennal segment subequal to the length of the head and shorter than 2nd which is equal to 4th, 3rd shortest and labium reaching to hind coxae with basal segment not reaching to the posterior margin of head, basal segment equal or subequal to 2nd, latter longer than 3rd and subequal to 4th; pronotum with lateral margins slightly reflexed, covered with silvery bristles and hairs; fore femora swollen with a series of spines beneath on the ventrolateral margins; hind coxae with silvery hairs; metathoracic scent gland complex half crescent, with ostiolar auricle and flap - like evaporatoria on either side of canal; 4th and 5th incisures of abdominal venter moderately laterally

curved with black markings. Clavus somewhat coarsely, corium much more finely punctate.

Male genitalia, pygophore rounded; parameres short and slender; aedeagus with a basal and pair of dorsolateral appendages.

Female genitalia, first gonocoxae much broader; spermathecal bulb round with tightly coiled and convoluted long spermathecal duct.

Comments. *Neophysopelta* is most closely related to *Physopelta* as reported below under *Physopelta* but could easily be separated by shorter basal antennal segment which is subequal to head length in contrast to longer basal segment in *Physopelta* in addition to a number of characters noted in the description.

Neophysopelta schlanbuschi (Fabr.)
(Fig. 1)

Body, entire head, base of the basal antennal, entire pronotum except two large spots on the posterior half, entire clavus, entire corium except rounded small discal spots, and apex, legs except tibia, entire venter except black markings on the abdominal segments sanguineous, antennae, two lateral spots on the pronotum, discal spots and apex of the corium and membrane black; entire body covered with silvery pubescent and black stiff hairs.

Structure; length of head distinctly shorter than its width ,length 1.80, width 2.30; length of antennal segments I 1.80, II 2.0, III 1.50 IV 2.0, antennal formula $3<1<2 = 4$; length of the labial segments I 1.80, II 1.70, III 1.20, IV 1.10, labial formula $4<3<2<1$; length anteocular region 1.0, length posterior of head including eyes 0.80, interocular distance 1.50. Length of the pronotum 2.5, width 4.4, scutellar length 2.0, width 2.6; with metathoracic scent gland ostiole auriculate with evaporatoria well - developed. Total length ♂ 13.00 - 14.8, ♀ 13.1 - 16.0 .

Male genitalia (Figs. 4 - 8); pygophore slightly broader than long, ventroposterior margin truncate; paramere with apices more or less blunt, lateral lobes broad, placed slightly above the middle, covered with hairs, lateral inner margins medially convex and ridged; aedeagus L-shaped with sclerotized dorso - middle appendages, a baloon - shaped partially sclerotized and partially membranous ventrolateral appendages and a pair of ventral elongated appendages with much pointed apices, vesica with thick spirals.

Female genitalia (Figs. 9 - 10), 1st gonocoxae with posterior margin

plain, spermatheca with spherical bulb and a long duct with thick spirals, the duct gradually narrowed.

Material. 1 male, 1 female, Bangladesh : Sylhet, on F. plant, 8.3.1969, leg. M. Farid, in NHM, Department of Zoology - Entomology, University of Karachi. 1 male 3 female NWFP; Peshawar und Punjab : C. D. Nursery in Islamabad, on *Withania somnifera* by A. A. Khan, lodged in above museum USNM and Lodos Coll. 1 ♀ S. India : Collection 1961, 2 male, India : New Delhi, IARI in Mung field on light trap 16.7.1968, USNM.

Comments. This species is at the moment the only species of the genus but the two black spots on its pronotum probably show its unique features.

Physopelta Amyot et Serville 1843

Physopelta Amyot et Serville, 1843, 271; Stål, 1861, 195; 1866, 91 & 99; Breddin, 1901, 175; Kirkaldy & Edwards ,1902, 165; Distant, 1904, 97; Hussey, 1929, 29; Stichel, 1960 - 62, 351.

Type species *Physopelta albofasciata* DeGeer.

Body large dull reddish or piceous in colour. Head broader than long; eyes sessile, not embracing anterior margin of pronotum; basal antennal segment slightly longer than head and shorter than 2nd, 3rd shortest, 4th equal or subequal to 2nd, labium reaching to hind coxae, basal segment hardly reaching to posterior margin of head, basal and 2nd subequal and longer than 3rd and 4th separately. Lateral pronotal margins not reflexed covered with bristles; fore femora slender, with a few spines beneath on ventroanterior margin; hind coxae without black hairs; metathoracic scent gland complex with comparatively thin ostiolar auricle and flap - like evaporatoria on either side of the canal; 4th and 5th incisures of abdominal venter laterally curved with fuscous margins, clavus and corium densely punctate.

Male genitalia. Pygophore subrounded; parameres short and broad, aedeagus with a pair of dorsal appendages.

Female genitalia. First gonocoxae broad; spermathecal bulb subrounded with loosely coiled short duct.

Comments. *Physopelta* appears closely related to *Iphita* and *Neophysopelta* in having shorter basal antennal segment which is slightly longer or equal to head length but it is closest to *Neophysopelta* in having convexity of pronotum which reaches to anterior margin, but not distinctly as in *Iphita*. It could however readily be separated from *Neophysopelta* by its

longer basal antennal segment which is longer than head in contrast to basal antennal segment subequal to head length in *Neophysopelta*.

Physopelta gutta (Burmeister)
(Fig. 2)

Pyrrochoris gutta Burmeister, 1834, 300 & 424; 1835, 285.

Physopelta gutta Stål, 1861, 195; 1863, 391; 1870, 99; 1871, 665; Scott, 1874, 291; Distant, 1879, 37; 1879, 127; 1883, 417; Lethierry, 1888, 463; Kirby, 1891, 105; Uhler, 1896, 265; Breddin, 1900, 19 & 140; 1901, 139; Distant, 1904, 97; Lefroy, 1909, 325; Matsumora, 1913, 149; Esaki, 1925, 157; Taeuber, 1927, 174.

Colour; entire head except a black patch on the venter, entire antennae except white band on 4th segment, entire pronotum except black middle portion, entire scutellum, entire clavus, entire corium except discal spots and apex, entire legs, entire venter fuscous or reddish ochraceous; discal spots, apex of the corium and membrane black, body covered with silvery pubescence.

Structure; length 2.0, width 2.0, length of antennal segments I 2.40, II 2.80, III 1.50, IV 2.40, antennal formula 3<1 = 4<2; length of the labial segments I 1.60, II 1.80, III 1.50, IV 1.40, labial formula 4<3<1<2; length of anteocular region 1.10, length posterior of head including eyes 0.9, interocular distance 1.40. Length of pronotum 3.0, width 5.0, scutellar length 2.20, width 2.70; metathoracic scent gland opening laterad and elongated with evaporatoria on either side and crescent-shaped ostiolar auricle. Total length male 16.90, female 15.9.

Male genitalia, (Figs. 12-16); pygophore slightly broader than long, ventroposterior margin rounded, paramere short with apices acute, the outer lateral lobes more above the middle, covered with tuft of hairs, inner lateral margin convex and ridged; aedeagus with theca shorter than conjunctiva; conjunctiva with a pair of shoe-shaped sclerotized dorsal appendages and a pair of broad sac-shaped partially sclerotized, partially membranous lateral conjunctival appendages, a pair of short ventral conjunctival appendages with pointed apices, vesica with spiral at the apex.

Female genitalia, (Figs. 17-18) 1st gonocoxae elongated, with posterior margins sinuate; spermatheca with a rounded bulb, and with a short duct, with single spiral.

Material. 10 male, 20 female, Pakistan : Punjab, Murree, Faisalabad, Multan, Ayubia on *Withania somnifera* 16.7.68, 19,28,26.7.,8,1975, 22.6.77

leg. N. Rana, M. Moizuddin and I. Ahmad in USNM, Lodos coll. & NHM, Department of Zoology - Entomology, University of Karachi.

Comments, this species appears wide apart in the entire group of species from the Indo - Pakistan sub - continent in having basal antennal segment shorter than 2nd and in other characters as noted in the key.

Distribution and relationships of the included taxa

Largids possess a large number of generalized characters viz in the female their first gonocoxae are elongate and lacineate with seventh sternum deeply cleft, spermatheca without distal but with proximal flange and with a bulb and a coiled tube, 1st labial segment nearly reaching or reaching the posterior margin of head, scent gland complex moderately developed with prominent usually auricular peritreme and with a distinct evaporatoira but the median sulcus in their head is always absent, their fore femora are deeply sulcate and their 1st antennal segment is longer or at least subequal to their head length which appear to be their advanced traits.

Among them *Lohita* known from the Oriental region including the areas of present Bangladesh (former east Pakistan) appears to have an independent line of evolution having an enormously elongate body and short head which is in the females nearly 1/4th of the basal antennal segment and insexually dimorphic males also distinctly less than half of basal antennal segment with mostly brachypterous froms, males having a shorter hemelytra than that in the female which also does not cover entire abdomen.

Among the three remaining genera from the Indo - Pakistan subcontinent viz *Iphita, Physopelta* and *Neophysopelta,* the former also known from Oriental region including the areas of Indian Assam, Ceylon and Bangladesh appears more advanced with lateral margins of pronotum strongly reflexed and basal tarsal segment more than twice length of the distal two segments together. On the other hand *Physopleta,* has a wide distributional range in the Ethiopian, Oriental, Australian and southern Palaearctic regions including the areas of Indian Assam and Bangladesh together with *Neophysopelta* known from Islamabad in the northern Punjab and Bangladesh. As compared to *Physopelta, Neophysopelta* appears more generalized with basal antennal segment subequal to head length. Its body covered with more silvery hairs and long black stiff hairs could be its adaptations to suit some particular habitat. In contrast to above in *Physopelta* the basal antennal segment is distinctly longer than the head length and body covered with less silvery hairs and without long black stiff hairs.

Özet

Largidae (Hem. : Pyrrhocoroidea) familyasının revizyonu ve Hint - Pakistan Bölgesinden yeni bir cinsin deskripsiyonu

Bu çalışmada **Iphita** Stal, **Physopelta** Amyot et Serville ve **Lohita** Amyot et Serville cinslerinin redeskripsiyonları yapılmakta ve Hint - Pakistan Bölgesinden erkek ve dişi genitalia ve pis koku bezlerine dayanılarak **Neophysopelta** isimli yeni bir cinsin deskripsiyonu verilmektedir. Bu yeni cinsin type - species'i **N. schlanbushi** (Fabr.)tir. Bundan ayrı olarak çalışmada yer alan taksonların teşhis anahtarları verilmekte ve Largidae familyası içindeki akrabalıkları kısaca tartışılmaktadır.

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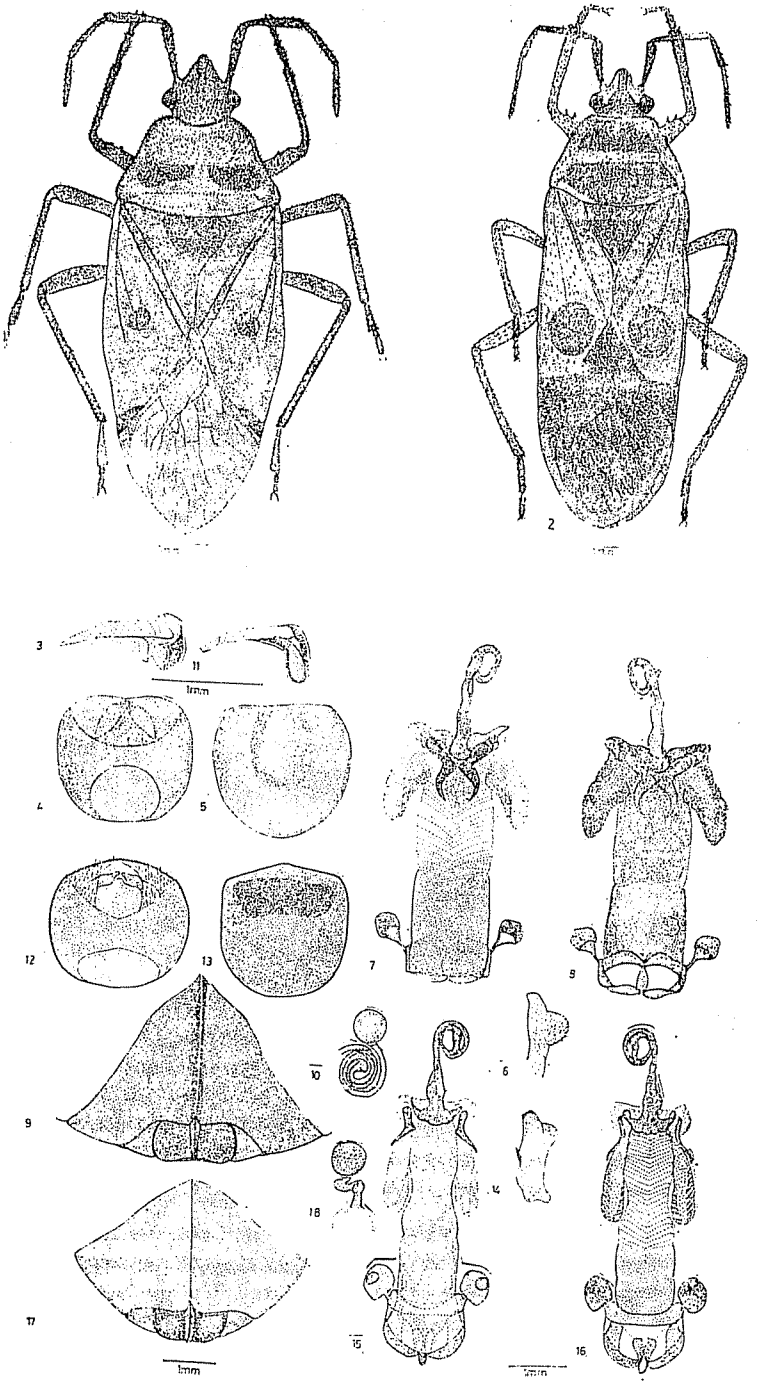
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Illustration of figures

Fig. 1. **Neophysopelta schlanbuschi**, Dorsal view; 2. **Physopelta gutta** *scent* gland, Dorsal view; 3. **Neophysopelta schlanbuschi**, Ventral view; 4. **Physopelta gutta** Pygophore, Ventral view; 5. **Neophysopelta schlanbuchi**, Dorsal view; 6. **Neophysopelta schlanbuchi**, Ventral view; 12. **Physopelta gutta**, Dorsal view; 13. **Physopelta gutta** Parameres, Ventral view; 6. **Neophysopelta schlanbuchi**, Lateral view; 14. **Physopelta gutta** Inflated aedeagus, Lateral view; 7. **Neophysopelta schlanbuchi**, Dorsal view; 8. **Neophysoeplta schlanbuchi**, Ventral view; 15. **Physopelta gutta**, *Dorsal view*; 16. **Physopelta gutta** *Female terminalia*, Ventral view; 9. **Neophysopelta schlánbuchi**, Ventral view; 17. **Physopelta gutta** spermatheca. Ventral view; 10. **Neophysopelta schlanbuchi**; 18. **Physopelta gutta**.