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New record of Lygaeinae (Hemiptera: Heteroptera: Lygaeidae) from Pakistan (Parachinar), Khyber Pakhtunkhwa

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Abstract
Lygaeidae or chinch bugs form a large world wide family of predominantly black or dark brown insects, very little taxonomic work on this family has been done from Pakistan Hamid and Meher (1972, 1976), while Parachinar remain still untouched. Two species of the two genera, *Graptostethus* and *Lygaeus* are described first time from Parachinar. This paper shows detailed description of *Graptostethus servus* and *Lygaeus militaris*. Description of male and female genitalia and their illustration are presented.

Keywords: Lygaeidae, First record, Parachinar, *Graptostethus*, *Lygaeus*.

1. Introduction
Lygaeinae species have been reported from Pakistan previously by Distant (1902, 1904, 1908, 1910, 1918), Slater (1964). Hamid and Meher (1972, 1973) worked on Lygaeinae of Pakistan and added 6 genera to the fauna. Hamid and Meher (1976) recorded 21 species of Lygaeidae from different regions of Pakistan. Lygaeidae are very important insects from agriculture point of view, and some of which are serious agriculture pests. On the other hand predacious bugs reduce the number of agricultural pests and may be used in biological control. Because of these reasons, identification of Heteroptera is important (Linnavuori & Hosseni, 2000). The Heteroptera insects feed on plant juices or live as predators. Many of such insects that feed on the plants are known as serious plants pests (Safavi, 1973). Lygaeide is one of the most important family of Heteropter, head declivent or porrect, body elongate, elliptical and somewhat flattened dorsally, bucculae well developed. The size is variable from minute to large. Lygaeids form a large world wide family of predominantly black or dark brown insects, some marked by black and red warning coloration. Some species are with short wing or wingless. Ocelli almost always present. Rostrum 4-segmented. The membrane of the forewing has only five distinct veins. The abdominal spiracle position is variable from all dorsal to all ventral; tarsi usually three segmented. It is also known as chinch Bugs family. A large family with more than 3000 species from all regions. Most species are plant feeders. *Blissus leucopterus* (Chinch bug) is very destructive to grasses.

2. Materials and Methods
Parachinar 33 56 N, 70 05 E altitudes: 1725 m (5.65 ft) is the capital of Kurram Agency, (FATA). It is situated in the west of Islamabad (Capital of Pakistan), and south of Peshawar. It is one of the coldest regions of Pakistan with heavy snowfall and rains. The Temperature of this region may exceed -15C in December and January.
Lygaeidae species were collected from different localities of the studied area using different methods e.g. sweeping net, hand picking and light trap. All the specimens were mounted according to the standard method of (Ahmad & Kamaluddin 1986-1988). For the inflation of aedeagus standard method of Ahmad (1986), Ahmad and McPherson (1998) were used. Pygophore was removed and boiled in 10% KOH solution for 10-15 minutes on gas burner. It was then washed with tape water and inflated in the same medium under KRUSS OPTRONIC binocular microscope. Fine forceps were used for the inflation of aedeagus, this was done very carefully.
These specimens were identified and confirmed by pertinent literature and exports of the family. All measurements are in millimeter.

3. Key to the genus of subfamily Lygaeinae

Comparatively small size, scutellum beyond middle obtusely carrinated with subrounded apex; vesica tubular, long and much coiled; gonophore short and pointed.....……..…genus *Graptostethus*

Large size, scutellum deeply excavated on either side of the median longitudinal carina, apex pointed; vesica thickly coiled, basally narrow and medially to apex thick tube; gonophore comparatively broad……..…….genus *Lygaeus*

Genus *Graptostethus*, Stal, 1868

***Graptostethus* Stal, 1868, Forh, 1872.**

Reddish brown to sanguineous black, head almost triangular, width of head including eyes greater than its length; antennae of moderate length, second segment nearly half longer than third; labium reaching posterior coxae, 1st joint reaching or passing the anterior margin of prosternum; width of pronotum greater than its length, anterior angles rounded, posterior margins almost straight; central carinae not present; width of scutellum greater than its length, scutellum beyond middle obtusely carinate with apex subrounded; femora unarmed; posterior margin of metasternum obliquely truncate with posterior angles acute and apices rounded.

***Graptostethus servus* Faricius, 1787**

Fig. (1-6)

Cimex servus Fabricius, 1787; Distant, 1901; Leth and Sev, 1894.
Lygaeus incomptus, Herr. Sch, 1848, 1853.
Lygaeus ornatus, Ulher, 1860.
Lygaeus inaequalis, Walker, 1872.
Var. nigriceps, manillensis, Stal, 1874.

Colouration

Black sanguineous or reddish brown; head ventrally and laterally red; vertex, tylus, transverse anterior fascia, two basal fascia to pronotum, scutellum, large oblique subclaval and small marginal (sometimes fused) to corium legs and labium black; antennae brownish black; anterior and posterior halves of pronotum except transverse black band, interior colllor region inner and apical margins of clavus red sanguineous.

Head

Head slightly deflected, width of head greater than its length, head length 1.3 mm; width 1.6 mm; paraclypeae shorter than clypeus; eyes touching anterior margin of pronotum; ocelli closer to eyes than to each other; anteocular distance 0.5 mm; remainder of head including eyes 0.8 mm; interocellar distance 0.9 mm, interocular distance 0.7 mm; basal joint of antennae just reaching apex of head; length of antennal segment: I 0.7 mm, II 1.1 mm, III 0.8 mm, IV 1.4 mm; antennal formula: I < III < II < IV; labium reaching posterior coxae, length of segment I 0.8 mm, II 0.8 mm, III 0.7 mm, IV 0.6 mm, labial formula: IV < III < II = I.

Thorax

Width of pronotum greater than its length; length 2.6 mm; width 3.0 mm ; collar region slightly elevated; anterior and posterior angles of pronotum subrounded; scutellum broader than long with apex rounded, length 1.1 mm, width 1.3 mm; distance base scutellum-apex clavus 2.1 mm, apex clavus-apex scutellum 1.0 mm; apex scutellum-apex abdomen including membrane 4.1 mm.

Abdomen

Hemelytra well developed; membrane exceeding apex of abdomen; connexiva not exposed at repose in both male and female.

Male genitalia

Pygophore (Fig. 2) oval shape, almost as long as broad; posterior margin dorsally convex; paramere (Fig. 3) stout, blade pointed and marking sharp angle with base, outer lobe small but distinct, inner lobe large and pointed; small dorsal lobe present near inner lobe; vesica (Fig. 4) tubular, long and much coiled, gonophore short and pointed.

Female genitalia

(Fig. 5) Two large lateral anteriorly directed processes on eight tergum; spermatheca (Fig. 6) tubular, duct long and with an elongate bulb near base.

Comparative note

G. servus is closely related to *G. collaris* in general taxonomic structure, but it can be easily separated from the same in colour of front half of pronotum, dull colouring, comparatively small size, apical joints of antennae rather thick and distinctly shorter than in *servus* and by the other characters as noted in the description.

Material examined

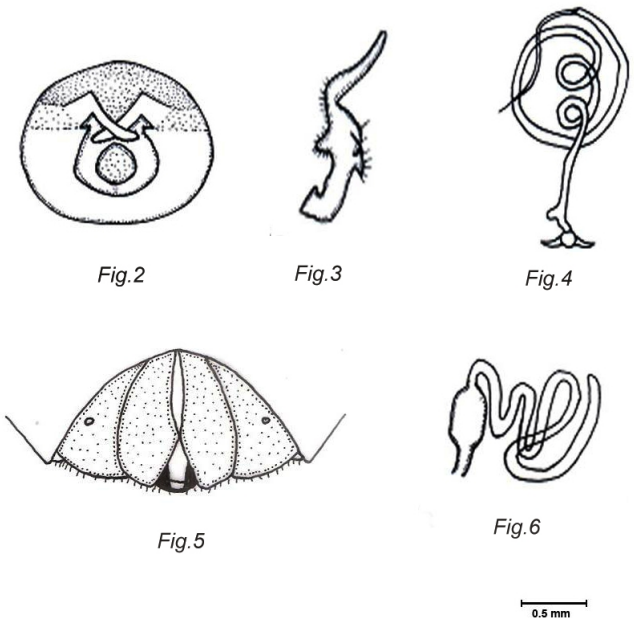
40 male, 33 female Pakistan; Parachinar: Kirman, Ali Zai, Sultan, Norki, Pewar, Sadda, Manduri on 25, 26, 27, 28 04-2008, 11, 12, 13 09-2008, 02, 03, 04, 05, 06-2009 under dead leaves and wild grasses.

Distribution

Africa, Europe, South Pacific Island, china, Burma, Ceylon, Australia, Indonesia, Pakistan, India, Turkey, Syria.

Fig.1 : Graptostethus servus

Fig 1: *Graptostethus servus*



Graptostethus servus

Fig: 2. Pygophore, 3. Paramere, 4.aedeagous, 5. Female terminalia, 6. Spermatheca

***Genus Lygaeus* Fabricius, 1974**
Lygaeus Fabricius, 1974; Stys, 1803; Stal, 1872;
Lygaeosoma Fieb, 1861;
Lygaeodon Puton, 1869;
Subg. *Eulygaeus* Reuter, 1888;
Subg. *Tropidothorax* Bergroth, 1894.

Brightly coloured; elongate, rather large size insects, head broader than long, basal antennal segment stout and passing apex of head, antenniferous tubercles visible from above, eyes touching anterior pronotal margins, ocelli closer to eyes than to each other, pronotum broader than long, having posterior margins without posteriorly expanded lobes, scutellum deeply excavated on either side of the median longitudinal carina, scutellum with a T-shaped elevation, hemelytra well developed, exceeding apex of abdomen; pygophore medium size and simple, paramere having well developed stem and blade; eighth female tergum with three prominent anterior projections, spermatheca tubular, duct long or moderately long.

***Lygaeus militaris* Fabr. 1775**
Fig. (7-12)
Lygaeus militaris Fabr, 1775; Stys, 1794; Leth. & Sev. 1894;
Lygaeus elegans Wolff, 1802;
Var. surinamensis Wolff, 1802;
Var. asiaticus kolenati Melet, 1845.

Colouration
Red and black, head except eyes, antennae, clypeus, anterior margins of eyes, pronotum except posterior margins and longitudinal line on both sides, scutellum except apex, a marginal oval spots to each clavus, oblong spots to each corium and legs red; ocelli reddish, antennae, eyes, anterior margins of eyes, longitudinal line on pronotum, scutellum, spots to corium and clavus,, labium and legs black; membrane brownish black.

Head
Moderately deflected; width of head including eyes greater than its length, anteocular distance 0.7 mm; posterior of head including eyes 0.4 mm; width of head including eyes 1.7 mm; interocular distance 1.1 mm; antenniferous tubercles slightly visible from above; 1st joint of antennae passing apex of head, length of antennal segments: I 0.6 mm, II 1.3 mm, III 0.9 mm, IV 1.1 mm; antennal formula: I < III < IV < II; eyes slightly touching anterior margins of pronotum; ocelli closer to eyes as compared to each other, labium just reaching metacoxae; length of labial segments: I 1.0 mm, II 1.2 mm, III 0.9 mm, 0.8 mm; labial formula: IV < III < I < II.

Thorax
Width of pronotum almost ½ X greater than its length, width of pronotum 2.4 mm, length 1.9 mm, anterior angles subrounded; posterior angles rounded; lateral margins slightly concave; scutellum horizontly constricted at middle, length slightly shorter than width; length of scutellum 1.3 mm, width 1.4 mm; apex pointed; distance base scutellum-apex clavus 2.0 mm; apex clavus-apex scutellum 0.7 mm; apex scutellum-apex abdomen including membrane 4.5 mm.

Abdomen
Oblong cylindrical; connexiva very slightly expose at repose.

Male genitalia
Pygophore (Fig. 8) almost rounded, posterior margin dorsally very slightly sinuate, lateral margins convex; paramere (Fig. 9) with strong and stout stem and finly pilose, blade narrowly tappered, lateral lobe prominently rounded, apex subacute; vesica (Fig. 10) thickly coiled, basally narrow and medially to apex thick tube, gonophore comperatively broad.

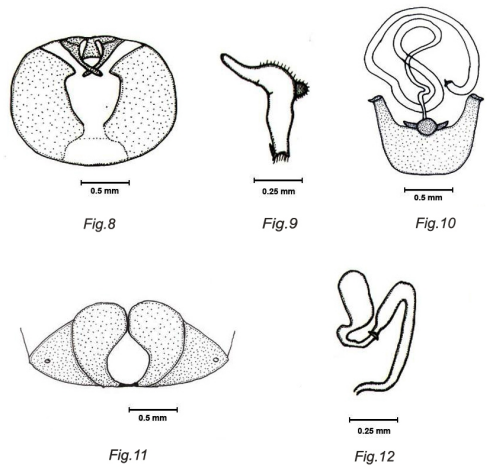
Female genitalia
(Fig. 11) Eighth paratergite square shaped, anteriorly rounded and posteriorly narrowed; ninth gonocxae broadly rounded anteriorly, posteriorly narrowed; spermathecal (Fig. 12) bulb elongately oval, spermathecal duct thick, tubular and moderately long.

Comparative note
L. militaris is closely related to *L. creticus* in general colouration and body structure but is different from creticus in having black marking on anterior side of eyes, absence of round spots to pronotum; shape of paramer, aedeagus and spermatheca and by the other characters noted in the description.

Material examined
50 male, 38 female, Parachinar: Zeran, Malikhel, Bilyamin, Nastikot, Makhizai, Airport, Manduri, Badama, Kharlachi and Boghaki on wild grass, under dead leaves of different plants, lady finger and tomato fields, 11, 12, 13, 14, 15, 06-2009, 22, 23, 24, 25, 08-2009, 27, 28, 29, 30, 07-2010, 02, 03, 04, 05, 08-2010, 11, 12, 13, 14, 09-2010, 01, 02, 03, 04, 08-2011.

Distribution
Palaearctic region, India, Pakistan.

Fig 7: Lygaeus militaris



Lygaeus militaris

Fig: 8. Pygophore, 9. Paramere, 10. Aedeagus, 11. Female terminalia, 12. Spermatheca

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