# OCCURRENCE OF A REDUVIID BUG (HEMIPTERA: HETEROPTERA: REDUVIIDAE) IN INDUS DELTA, SINDH, PAKISTAN

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## ABSTRACT

A male reduviid bug (0.9 cm in size) is reported from the fruits and propagules collection of a mangrove, *Rhizophora mucronata* from Patiani creek of Indus delta, Sindh. This plant material was stored in a nearby village for some time. The external morphology, wing venation and structure of male genitalia are presented. The identification of the bug at species level is underway.

**Key Words:** Reduviid bug, Patiani creek, Indus delta, Pakistan

## INTRODUCTION

Family Reduviidae (Latreille, 1807) (Insecta: Hemiptera: Heteroptera) includes 25 sub families comprising > 6000 species (Maldonado Capriles, 1990). The family includes bugs known by various names - assassin bugs, kissing bugs, ambush bugs, conenose bugs and thread-legged bugs ranging from 4 to 40 mm in size (*Empicoris*, few mm in size and *Arilus*, formidable, 40 mm in size). They are voracious predators and many of them are blood sucking. A good general account of reduviid biology and ecology emphasizing Indian forms is given in Ambrose (1999) and enlisted in a check list in Ambrose (2006). The family Reduviidae includes 126 genera and 443 species from India, Pakistan, Bangla Desh, Azad Kashmir, held or occupied Kashmir, Sikkim, Bhutan, Mayanmar and Sri Lanka (Afzal, 2006). A recent publication of Biswas and Mitra (www.zsi.gov.in/checklist/reduviidae.pdf) reports 144 genera and 465 species from India. Biodiversity, Bioecology and use in biological control of assassin bugs have been investigated by Afzal (2006). Afzal (2006) described 28 genera and 39 species from Pakistan and Azad Kashmir but no any *Triatoma* (Laporte, 1833) species from Pakistan. The key to the identification of reduviids has appeared in Lent and Wygodzinsky (1979) and key to sub families may be seen in Schuh and Slater (1995). Triatominae (Jeannet, 1919), one of the subfamily of Reduviidae, is medicinally important (Krinsky, 2009) as many of the triatomines are vector of *Trypanosoma cruzi*, a parasite of Chagas disease. This is probably the reason that more than 80% of the scientific publications about reduviid concern to Triatominae (Costa and Lorenzo, 2009; Bérenger *et* al., 2009). Most of the triatomines are haematophagous feeding on blood of warm-blooded vertebrates. They are found in Americas, a few species in Asia, Africa and Australia. They possess three-segmented labium which they employ to pierce the skin and suck the blood of their host. Many of them spread Chagas disease. *Triatoma rubrofasciata* (De Gear, 1833) is one of the most important species which is infected with *Trypanosoma cruzi* (Lucena and Magahães Netto, 1939; Brazil *et al*., 1985) and Rickettsia-like bodies (Webb, 1940). The present paper describes a reduviid bug from Patiani creek of Indus delta, Sindh.

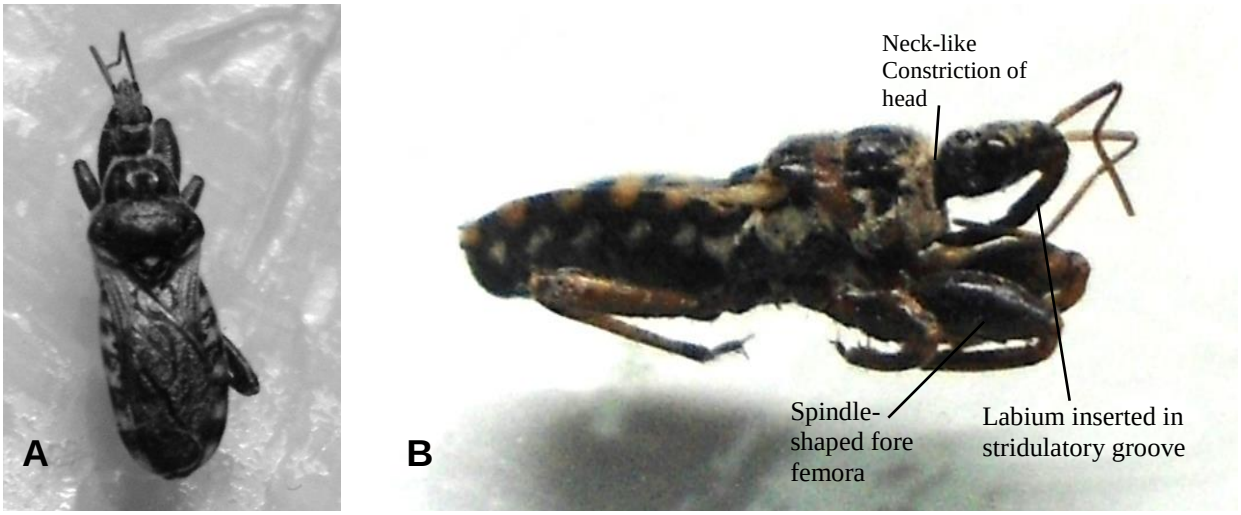


Fig.1. A male reduviid individual collected from lower Southern Sindh. A, Dorsal view; B, Lateral View.

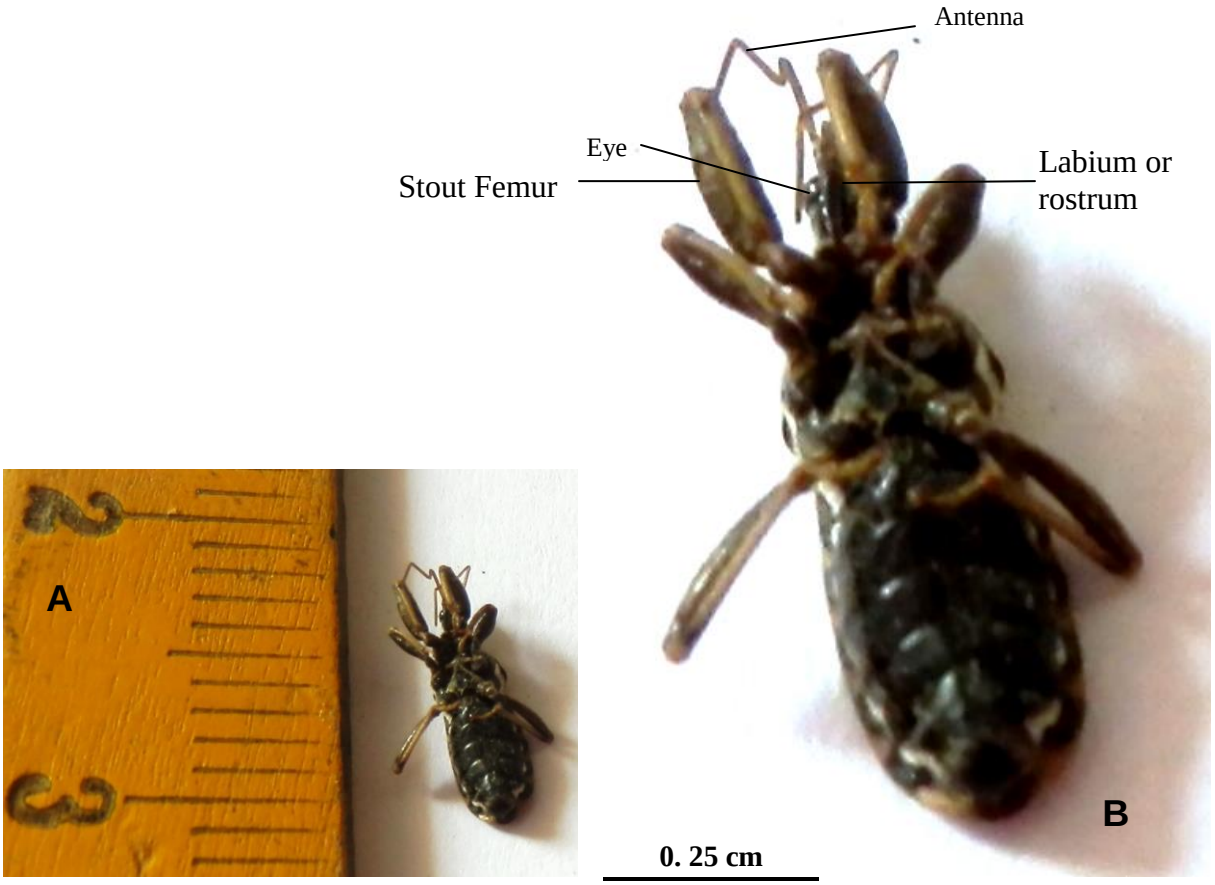


Fig. 2. Reduviid. A. Ventral view. Each division of the scale is 1 mm in size; The organism is c. 0.9 in length; B, Enlarged ventral view.

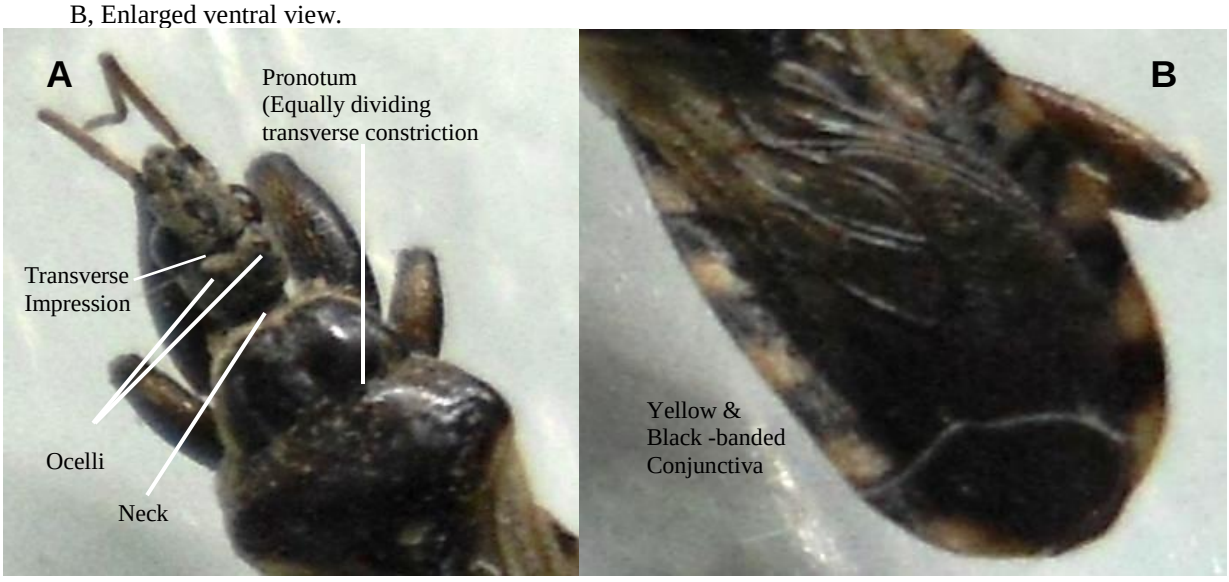


Fig. 3. Head (A) and abdomen (B).

**Collection**

One specimen of the bug was found on July 02, 2012 amongst the *Rhizophora mucronata* fruits collected from Patiani creek of Indus delta, Sindh. The plant material after collection was stored in a nearby coastal village of Sindh for sometime by the team of Sindh Coastal Development Authority before supplying to us for studies.

## MATERIALS AND METHODS

The collected specimen was studied for external morphological characters and photographs were taken on microscope-mounted Nikkon camera in Ecological and Dendrochronological laboratory of Professor Dr. Moinuddin Ahmed at Federal Urdu University of Arts, Science and Technology, Karachi. To study genitalia the insect was plunged in boiling water for 4-5 minutes to soften it and the capsule was extracted and placed in 10% KOH solution 45$^{o}$C) for 15-20 minutes. It was then washed with distilled water and then male genitalia was inflated following Ahmad and McPherson (1990) using a very fine forceps (# 5). The characters studied were compared with relevant available literature.

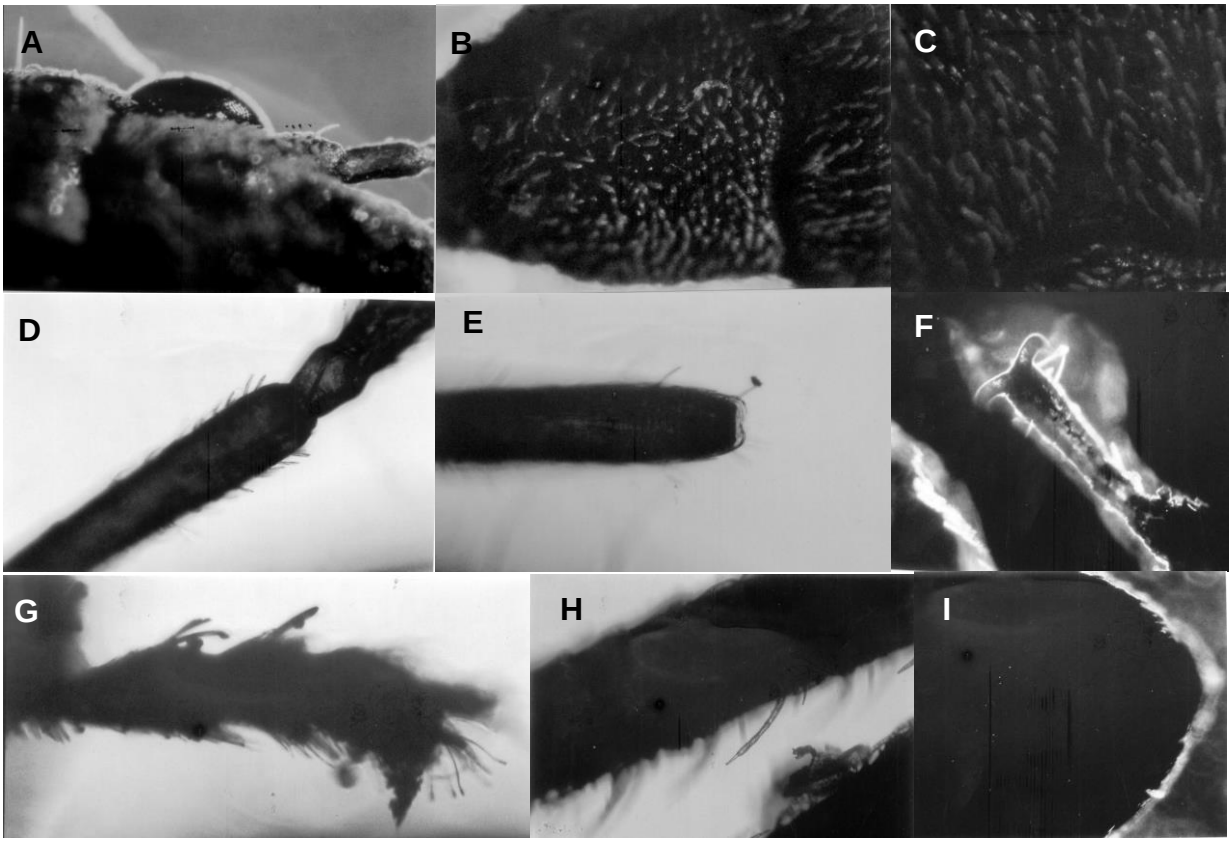


Fig. 4. Origin of antenna near the eye (A) - Note that the first segment of the antenna doesn't come out of the range of the head. Velvety surface of the posterior part Head and thorax (B and C, respectively). Antenna (D). Apical end of antenna (E). Claw showing hook (F). Torso (G). Legs showing microscopic multicellular hairs (H) - hairs are sharply pointed probably to get hold on to the prey. Posterior end of the abdomen (I) - the last abdominal segment rounded (male). All pictures are phase contrast micrographs under 5 x 10 X magnification.

## DESCRIPTION

Body dark blackish brown, elongate (0.9 cm in length), head elongate with prominent neck, eyes large prominent, ocelli present on oblique elevations at postero-lateral angles of the head, transverse impression just anterior to ocelli is present, scutellum prominent, abdomen compressed, connexivum with alternate black and yellow bands, fore femora spindle shaped, pronotum constricted equally and upper half vertically marked with a median depression. Labium apparently three-segmented, slightly passing beyond neck region, Stridulatory groove present and tip of labium inserted into stridulatory groove on prosternum. Labium curved. Antennae inserted in front of eyes, 4-segmented, basal short, delicate hairs on all segments of the antennae. First pair of legs attached to the thorax and two posterior legs arise from the abdomen. Two posterior legs are not so much swollen as the fore legs. Legs with prominent multicellular and sharply pointed spinous hairs (presumably to get hold of the prey), Tarsi 3-segmented, pretarsus with a prominent claw. Fossula spongiosa present (Fig. 1-4).

Wings flat over the dorsum. Hemelytra 5.25 mm in length with basal leathery portion brownish and large membranous area. Having two prominent cells in the middle, distinct V-shaped white streak adjacent to outer cell. At the base of middle cells a small island present below which arising two closely adjacent veins terminating near distal margin. Membranous portion with dense small hairs. Hind wing, 3.0 mm in length, membranous, short, broad, hairy and provided with two elongate cells (Fig. 5). The morphometry of the hemelytra is given in Fig. 6 for record and future comparative study.

Pygophore (Fig. 7-Ao) round ventrally markedly convex, distally medially U-shaped notched with two small spines on either side. Parameres located on either side of Pygophore (Fig. 7 - A1 and C). Inflated aedeagus with cap-like median distoconjunctiva, on either side of which prominent elongate membranous conjunctival appendages present, with elongate basal thecal and median sclerotized conjunctival appendages present. Ejaculatory reservoir is clearly visible. Ventral sclerotized elongate spine like appendages well marked. Paramere (Fig. 7 - A1) with elongate more or less straight stem and c-shaped curved blade markedly hairy.

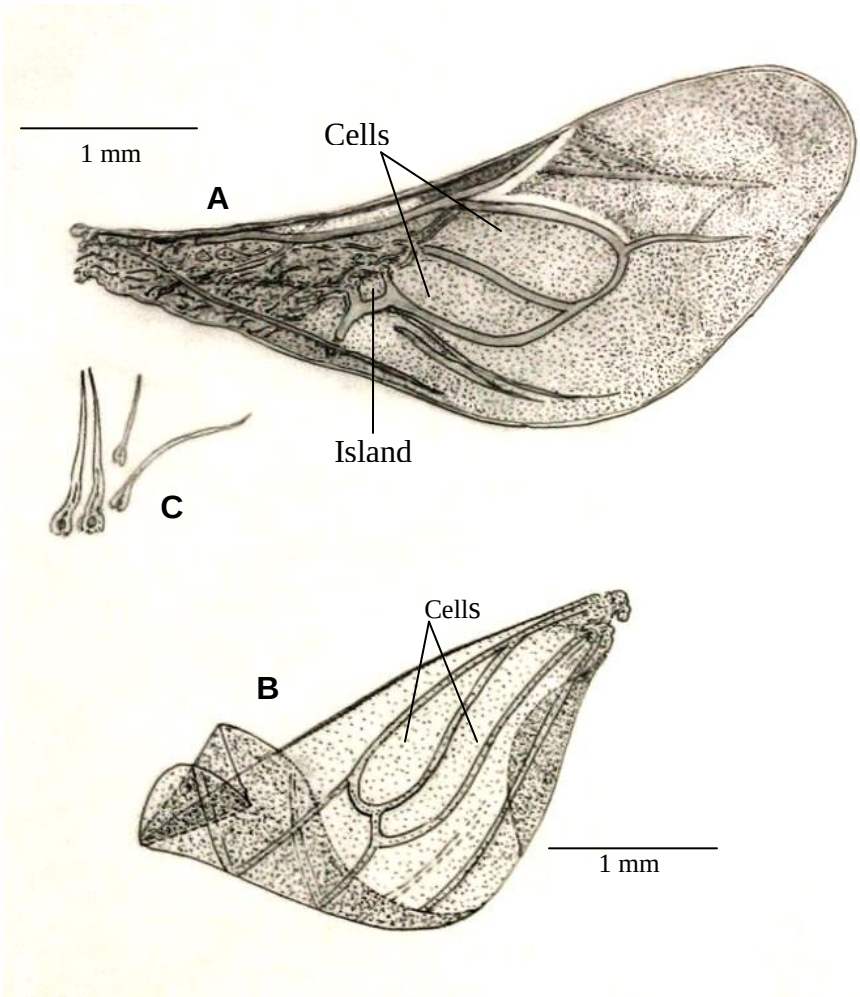


Fig. 5. Wings. A, Forewing; B, Lower wing (folded); C, hairs on the basal part of the membrane.

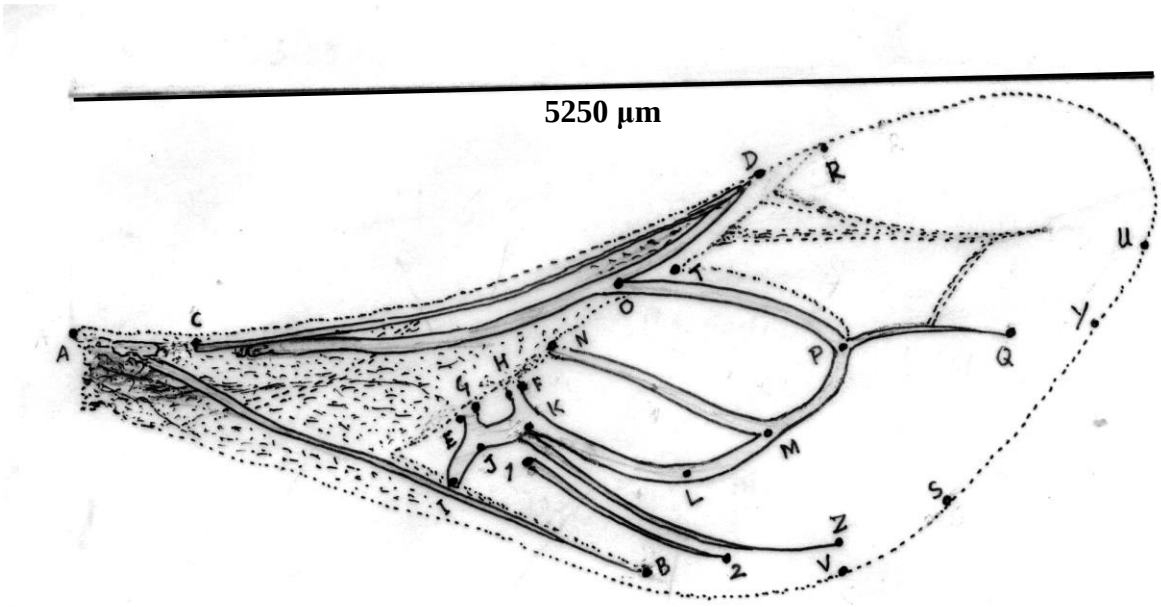


Fig. 6. Morphometry of hemelytra. All measurements in µm. A-B, 2525; A-I, 1500; C-D, 3300; F-F, 300; G-H, 210; I-J, 150; K-L, 975; K-Z, 1755; L-M. 375; M-N, 1050; M-P, 555; M-S, 1005; O-P, 1050; P – Q, 975; T-R, 1050; T-U, 2250; Q-Y, 375; and 1-2, 995.Width at the widest points; R -V. 1815; and the total length of the wing, A-U, 5250 µm.

**DISCUSSION**

Predatory assassin bugs of Family Reduviidae range in size from small to large (4 – 40 mm). Important characters of Reduviidae include large compound eyes, protuberant head usually elongate and constricted behind eyes into neck, the presence of two ocelli, frequently transverse impression anterior to ocelli present, antennae with flagellar segment, labium three-segmented (rarely four), flexible stout curving sometimes slender and nearly straight. Forewing lacking costal structure, membrane usually with two elongate cells and few veins emanating posterior, and the presence of fossula spongiosa (Schuh and Slater, 1995).

Preliminary identification, on the basis of above characters, confirms the fact that the organism in hand belongs to the Family Reduviidae.

The characters such as long cylindrical head, presence of ocelli on oblique elevations at postero-lateral angles of the head which is transversely constricted into neck like structure indicate that the specimen belongs to sub family Triatominae which according to Lent and Wygodzinsky (1979) includes five tribes – Rhodnini, Cavernicolini,, Bolboderini, Alberprosenini, and Triatomini- containing 14 genera and 111 species. Spindle like swollen fore femora, however, makes it formidably unique.

From the pictorial key of H.G. Scott and M.R. Borom (www.cdc.gov/nceh/ehs/docs/pictorial_key/bugs.pdf), it shows resemblance of several characters with *Triatoma neotomae*, a smaller (c 2 cm) *Triatoma* species of USA but our specimen is even smaller than *T. neotomae*. It also resembles *Triatoma rubrofasciata* De Gear in general plan but *T. rubrofasciata* is also much larger in size. Two *Triatoma* species (*T. rubrofasciata* De Gear, 1833 and *T. migrans* Breddin 1903) are reported from India (Ambrose, 1999; Galvão *et al.*, 2003). *T. rubrofasciata*, a tropicopoliton species (Galvão *et al.*, 2003), generally feed on rodents and not very anthropophagous. *It* is, however, not only medically important due to its infection with *Trypanosoma cruzi* (Lucena and Magalhães Netto, 1939; Brazil *et al.*, 1985), but also important from phylogenetic view point. Gorla *et al*, (1997) have suggested a New World origin of the Old World *Triatoma*. Hypŝa *et al.* (2002). Have provided molecular evidence of New World origin of Old World *Triatoma* species. *T. rubrofasciata* seems to have been spread from Americas a few centuries ago via ships and subsequently specialized into seven recognized species of *Triatoma* found in Asian region (Gorla *et al.*, 1997). We know very little about the real identity of this reduviid in hand (alone specimen captured accidentally). The final taxonomic determination of the bug shall, of course, be possible when the male genitalia could be compared with the related species and the key of Lent and Wygodzinsky (1979) is keenly followed. So far, no *Triatoma* species has been reported from Pakistan. The occurrence of the reduviid bug in coastal Sindh, however, substantiates the need of an extensive survey of local Reduviidae, to enlist the reduviids of Pakistan in general and

the province of Sindh in particular. This is very pertinent in view of the presence of several reduviids including *Triatoma* spp. in neighbouring India. This should help in ascertaining the reduviid-related disease (s) in Pakistan as well.

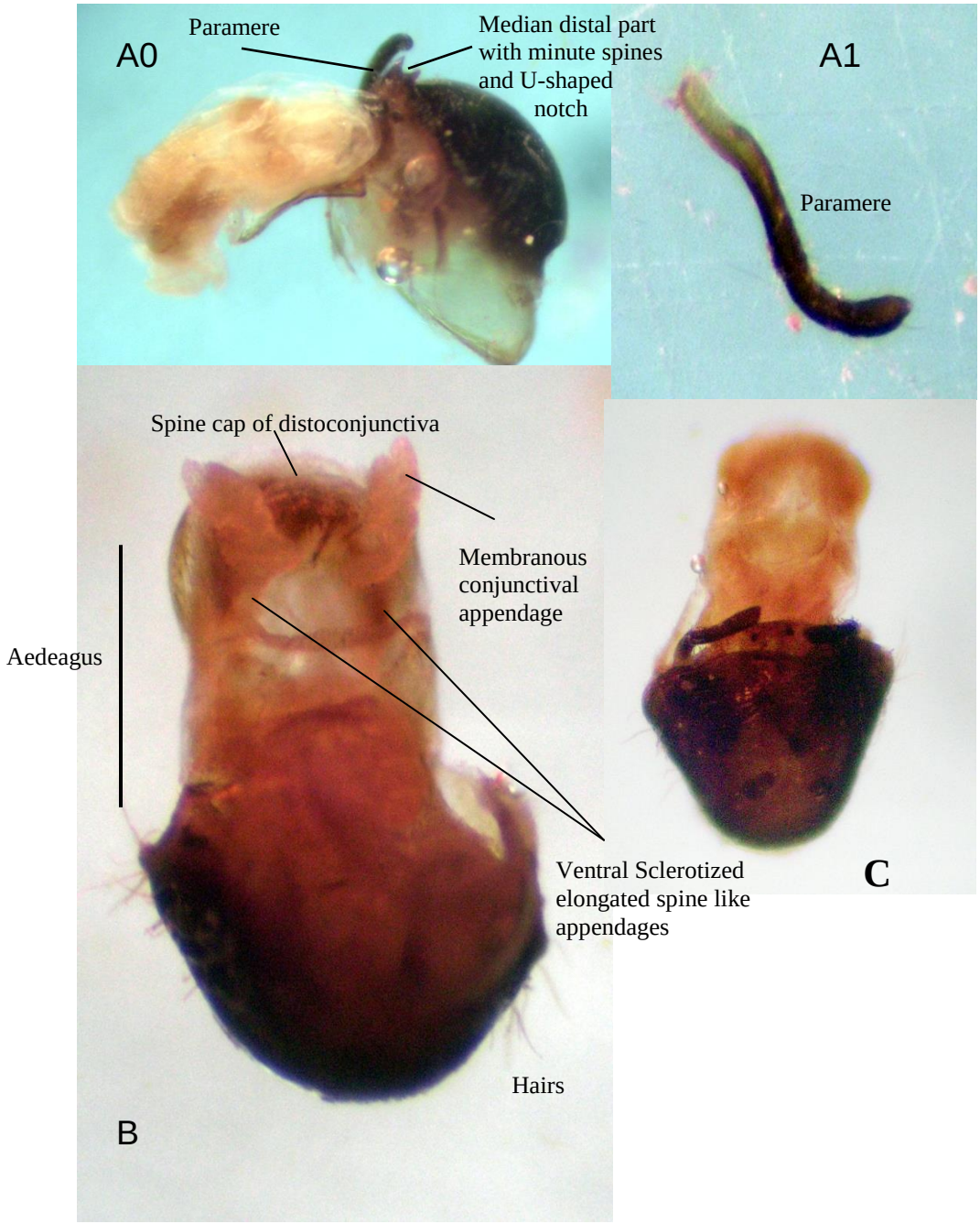


Fig. 7. Pygophore – Ao, Lateral view, $A_1$, Paramere; B, Dorsal view; C, ventral view (wholesome)

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