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SHORT COMMUNICATION

A FIRST REPORT AND ADDITIONAL DESCRIPTION OF THE ASSASSIN BUG *NEOSTACCIA PLEBEJA* (STÅL) (HETEROPTERA: REDUVIIDAE) FROM INDIA WITH COMPARATIVE NOTES ON *STACCIA DILUTA* STÅL FROM ASSAM, INDIA

Balasaheb V. Sarode, Swapnil S. Boyane & Hemant. V. Ghate

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A FIRST REPORT AND ADDITIONAL DESCRIPTION OF THE ASSASSIN BUG *NEOSTACCIA PLEBEJA* (Stål) (HEMiptera: REDUVIIDAE) FROM INDIA WITH COMPARATIVE NOTES ON *STACCIA DILUTA* Stål FROM ASSAM, INDIA

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Abstract: The assassin bug, *Neostaccia plebeja* (Stål, 1866) (Hemiptera: Heteroptera: Reduviidae: Stenopodainae) is being reported for the first time from India. It is redescribed with many illustrations. Comparative photos of the salient characters of *Staccia diluta* Stål, 1859 are also provided.

Keywords: Hemiptera, first report, India, new record, Stenopodainae.

A Stenopodainae bug resembling *Staccia* was collected in Jambut (Sharadwadi), near Shirur, Maharashtra, India. A careful examination of the head of this specimen showed that there are no spines underneath, in antecular part, and the labium is also without two pairs of spines, the characters which are present in *Staccia diluta* (Stål, 1859). The presence of only one (external) row of large and small spines on fore femur and one row of small setiferous tubercles distinguished it further from *S. diluta* Stål which has two rows (external as well as internal) of long spines ventrally on fore femur. The long, sharp, anteriorly directed prosternal process suggested our

species to be similar to what Stål (1866) had described as *Staccia plebeja* on the basis of a specimen from Ceylon (=Sri Lanka), and later placed it in '*Stenopodorum incerti generis*' (Stål 1874). Maldonado Capriles (1990) retained it under *Staccia* with the comment '*incertus generis*'. Distant (1904) recorded that as *Staccia ? plebeja* Stål, with brief diagnosis as translation of Stål's original description, although with a statement 'I have not seen this species which, from the above characters, can scarcely belong to the genus *Staccia*'.

When consulted about the status of *S. plebeja*, Dr. Dávid Rédei (Nankai University, China, personal communication with H.V. Ghate, October 2016), an expert Heteropterist, pointed out that the characters in this species match those of the genus *Neostaccia* Miller, 1940. A further search indicated that Kerzhner & Kwon (1996), who studied a male specimen of *S. plebeja* from Korea and a female from Myanmar (Bhamo), had transferred this species to *Neostaccia* and labelled it as '*Neostaccia*

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plebeja (Stål), new combination'. Actually Nozawa (1990), who recorded it as *Neostaccia plebeja* from Saitama Prefecture, Japan, stated that as a new record for Japan and provided drawings of the head in lateral view. In fact, Nozawa (1990) was the first to place this species under *Neostaccia* stating that 'this species has one row of spines on fore femora and *Staccia* has two rows'; in the same study Nozawa had also examined *Neostaccia aspericeps* Miller, 1940. Because the original description of *N. plebeja* is very brief and even Kerzhner & Kwon (1996) had not given many details or illustrations (especially of pygophore and phallus), we are providing additional character description and illustrations of this species for the benefit of future readers. Since the previous list of Reduviidae from India (Ambrose 2006) does not include this species, its occurrence in Maharashtra State should be considered as the first record of this species from India.

Staccia diluta is, however, known from India (Ambrose 2006) and has been recently recorded from Odisha (former Orissa State), by Mukherjee & Hassan (2016), who only provided a dorsal habitus photo but not a detailed redescription, figures or images of diagnostic characters.

MATERIAL AND METHODS

The collected bugs were preserved in 70% alcohol and subsequently dried for observation. Properly mounted insects were studied and photographed under a Leica SMZ6 stereozoom with attached Cannon PowerShot S50 camera. Several images were taken at different focii and stacked to get the final image using Combine ZM freeware. The images were processed and cleaned using Photoshop CS5. For preparation of male genitalia, the whole insect was briefly warmed in 10% KOH for 15 to 20 minutes and the pygophore was detached using a fine forceps. The dissected insects were subsequently treated with dilute acetic acid and washed in 70% alcohol before dry mounting again. The detached pygophore was boiled in 10% KOH for 2 minutes, cooled and boiled again for 2–3 minutes in fresh 10% KOH. The pygophore was then stored overnight in 5% KOH before further dissection in distilled water. Dissected phallus and parameres were mounted in Polyvinyl Lactic Acid (PVL) mixture with Lignin Pink dye and photographed under a microscope. Methods of SEM preparations are as stated before (Sheth & Ghate 2014).

All measurements given below are in mm. Male and female measurements are separated as male / female and are the average of two males and two females. When there is no difference in measurement of male and female, a single measurement figure is given.

Reduviidae

Stenopodainae

Neostaccia Miller, 1940: 483 [description; type species *Neostaccia aspericeps*, type locality Malaya]

Neostaccia plebeja (Stål, 1866)

Staccia plebeja Stål, 1866: 166 [original description]

Staccia ? plebeja Distant, 1904: 225 [redescription]

Staccia plebeja: Maldonado Capriles, 1990 :540 [listed in Catalogue as 'incertus generis,]

Neostaccia plebeja: Nozawa, 1990: 5 (first treated this species under *Neostaccia*);

Kerzhner & Kwon 1996: 48 (explicitly placed this species in *Neostaccia* and stated as Comb. Nov., redescription).

Additional character description

Total length: 8.5 / 9.0

Head: antocular length, dorsal view 0.55 / 0.65; postocular length, dorsal view 0.30 / 0.37; maximum width across eyes 1 / 1.12; width between eyes 0.50 ; antenna: length of first segment of antenna 0.55 ; length of second segment of antenna 1.12 / 1.12; length of third segment of antenna 0.25 ; length of fourth segment of antenna 0.42 ; labium: total length of labium- 1.70 / 1.65; length of first visible segment of labium 0.80 / 0.75; length of second visible segment of labium 0.50 ; length of third visible segment of labium- 0.40 ; pronotum length dorsally along median line 1.50 / 1.75; pronotum width at anterior angles 0.87 / 1; pronotum width at humeral angles 2.0 / 2.25; scutellum basal width 0.62 / 1; median length along midline 0.62 / 0.52; legs: fore femur length 1.70 / 2.25; fore tibia length 1.62 / 1.75; fore tarsus length, including claw 0.55 / 0.60; mid femur length 1.70 / 1.87; mid tibia length-1.75 ; mid tarsus including claw 0.55 ; hind femur length- 2.62 / 2.80; hind tibia length 2.80 / 3.12; hind tarsus including claw 0.55 / 0.60. Hemelytra length 6.5.

Pygophore: Length to the tip of parameres 1.12, maximum breadth 0.75; total length of everted phallus length excluding articulatory apparatus 1.75; articulatory apparatus length 0.62; paramere length 0.63.

Coloration and vestiture

Dorsal coloration brown with some dark brown areas: such as post ocular part of head, longitudinal stripes on anterior lobe and lateral sides of pronotum, scutellum except central area, antennae, base of clavus and corium. Two dark brown longitudinal lines on top of head in front of ocelli. Antenna: segment I dark brown; segment II shining and darker distally (apical portion almost dark brown); segments III and IV dark brown and densely setose, setae long and golden. Ventral coloration pale brown with a few dark brown areas: such as part of the head, lateral

parts of thoracic sterna (pleura) and a few patches on the abdomen; genital segments darker in both sexes. Legs pale yellow brown with indistinct brownish bands on fore femur and much indistinct brownish bands on hind femur; fore and mid tibia with three annulations - basal, apical and near middle. Hemelytra pale brown, veins slightly darker, corium dull brown and finely granular, membrane dull and almost opaque, with very few indistinct rounded pale spots. In both the females studied, legs are slightly paler than that of males (Image 1A–B). Entire dorsal surface of head and the first antennal segment covered with fine setigerous granules; other antennal segments moderately setose; parts of labium and underside of head also setose. Overall sternum setose on disc and granular on lateral side. Lateral margin of prosternum slightly less setose than that of meso and meta sternum. Legs with fine adpressed sparse setae; tarsus more setose.

Structure

Male

Overall head, pronotum and scutellum finely granular; pronotum with six longitudinal smooth and shining stripes on anterior lobe (Image 1C), other areas dull, this is especially prominent in female (Image 1D). Clavus and corium rugulose in part, but less granular.

Head finely granular; somewhat convex dorsally; longer than broad; antecular longer than postocular excluding neck; anterior part in front of antenniferous tubercle moderately sloping; sides of antecular region more or less parallel. Postocular area laterally rounded, dorsally flattish but raised slightly above than anterior region. Neck distinct, narrowed compared to post ocular rounded region. A distinct transverse curved sulcus in between eyes. Eyes large, semi globular, coarsely faceted; ocelli prominent, situated on slightly elevated, rounded prominence behind transverse sulcus, closer to eyes than to each other. Head width across eyes slightly broader than width between anterior angles of pronotum. Antenna four segmented, I segment slightly curved and incrassate, II segment longer and slender, III segment smallest, IV sub equal with II; III and IV segment very slender. Labium moderately stout, reaching level of procoxae, visible segment I longest, passing beyond anterior margin of eye, moderately thick, visible segment II thick at base and gradually narrowed towards apex, visible segment III shining, thin (Image 1E,F). None of the labial segments show presence of spines ventrally but a row of setae can be seen laterally.

Thorax: pronotum trapezoidal, anterior angles rounded, prominent; very distinct but narrow collar present; lateral margin gently sinuate, posterior margin

sinuate on either side of midline. A distinct transverse sulcus at one third from base, marking anterior and posterior lobes; anterior lobe convex above, posterior lobe flattened; median fine longitudinal sulcus present on anterior lobe, at least in basal two third. Anterior lobe of pronotum with six shining longitudinal areas which are distinct in female than in male; rest of the surface finely punctured and with fine granules, hence dull; humeral angles prominent and shining. Scutellum triangular, moderately convex in median part, almost as long as broad, with truncated tip, laterally with large granules while small, pale triangular area in middle with small granules. Metanotum with small median tubercle, visible immediately behind tip of scutellum.

Prosternum with mid-ventral, sharp triangular process with deep sulcus. Strong, anteriorly directed, spiny prosternal process present at anterior angles (see Image 1E). Mesosternum slightly convex, with two blunt tubercles on either side of mid line; its entire surface dull. A distinct carina in between mesocoxae, lateral areas to this carina sunken; metasternum convex dull, with sparse setae; metacoxae widely separated than mesocoxae. Metathoracic scent gland indistinct. In male, hemelytra just reach abdominal tip. Clavus with transverse wrinkles in distal half; membrane with veins prominent (Image 1G).

Fore legs: coxae moderately long; trochanter with one prominent sub apical spine and two smaller spines in middle part; femora much incrassate, broadest near middle, narrowest at apex, dorsally smooth, with few setae, ventrally with a single row of moderately long spines (internal / anteroventral). There are three sizes of spines, some are very long and some very short; total number of these spines is about eighteen (Image 1H). External margin has no spines but there are four distinct setigerous tubercles, each with a long seta, one of which is intact in SEM picture (left Image 1H). Fore tibia straight, sub equal to femora, slightly compressed. Tarsus compressed. Mid and hind legs slender; posterior femora not surpassing apex of abdomen.

Abdomen more or less parallel sided only slightly narrowed near apex in both sexes. Abdominal tergites three and four with median tubercle (=adult abdominal glands) very close to anterior border. Surface of abdominal sternites finely sculptured, somewhat shining and with indistinct keel on 5th to 7th segment; abdomen slightly laterally compressed overall. (Image 2 A,B).

Female structure identical but with following differences: in total length female is slightly longer; head of female is larger than that of male, especially in its width; ocelli are also slightly larger in female. In female hemelytra do not extend up to tip of abdomen as in male.

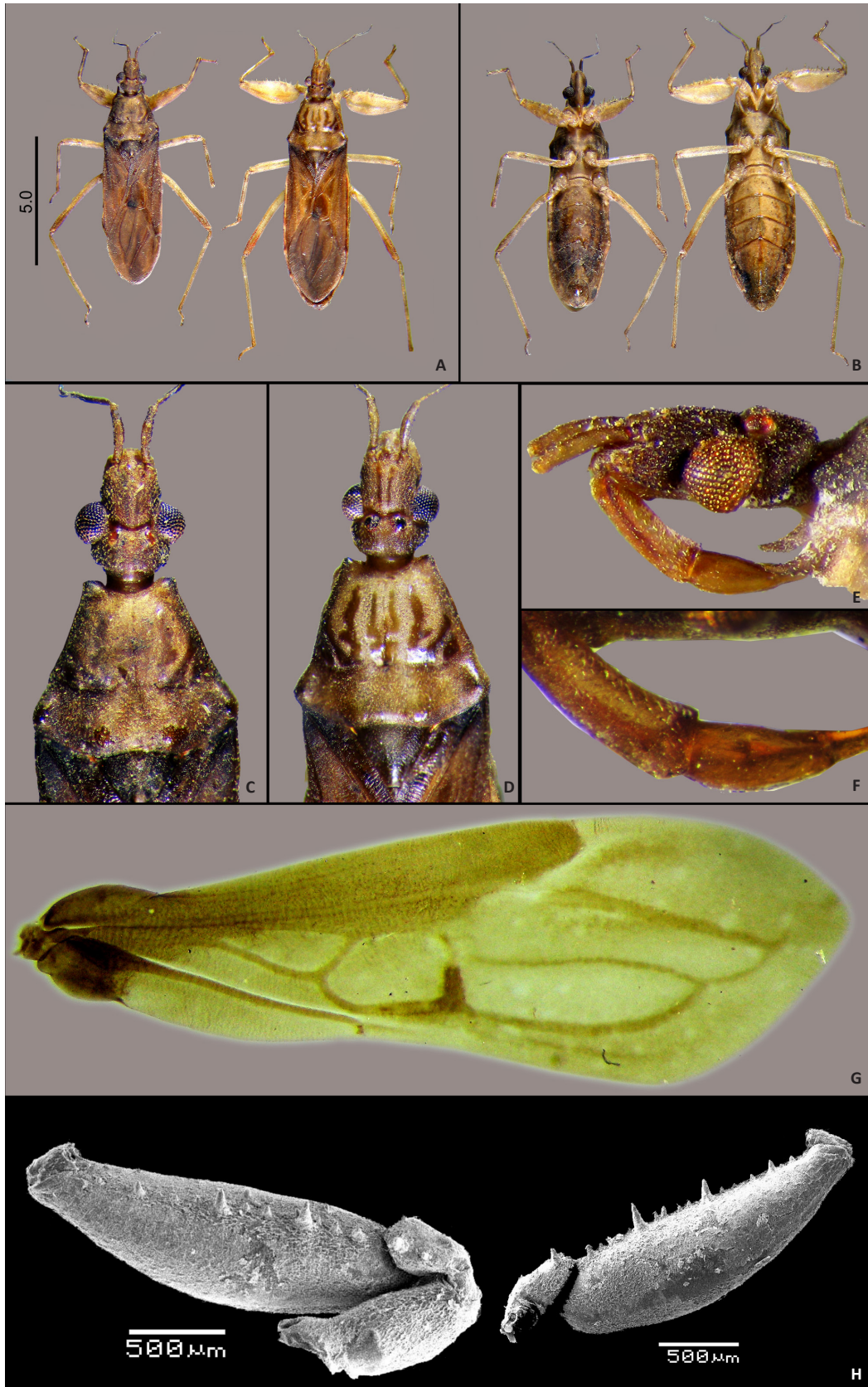


Image 1 A–H. *Neostaccia plebeja*. A - Dorsal habitus of male (left) and female; B - Ventral habitus of male (left) and female; C - Head and pronotum detail of male and D - same of female; E - Lateral view of head and labium; F - Labium details in lateral view; G - Hemelytra (actual length 8.5mm); H. SEM of fore femur.

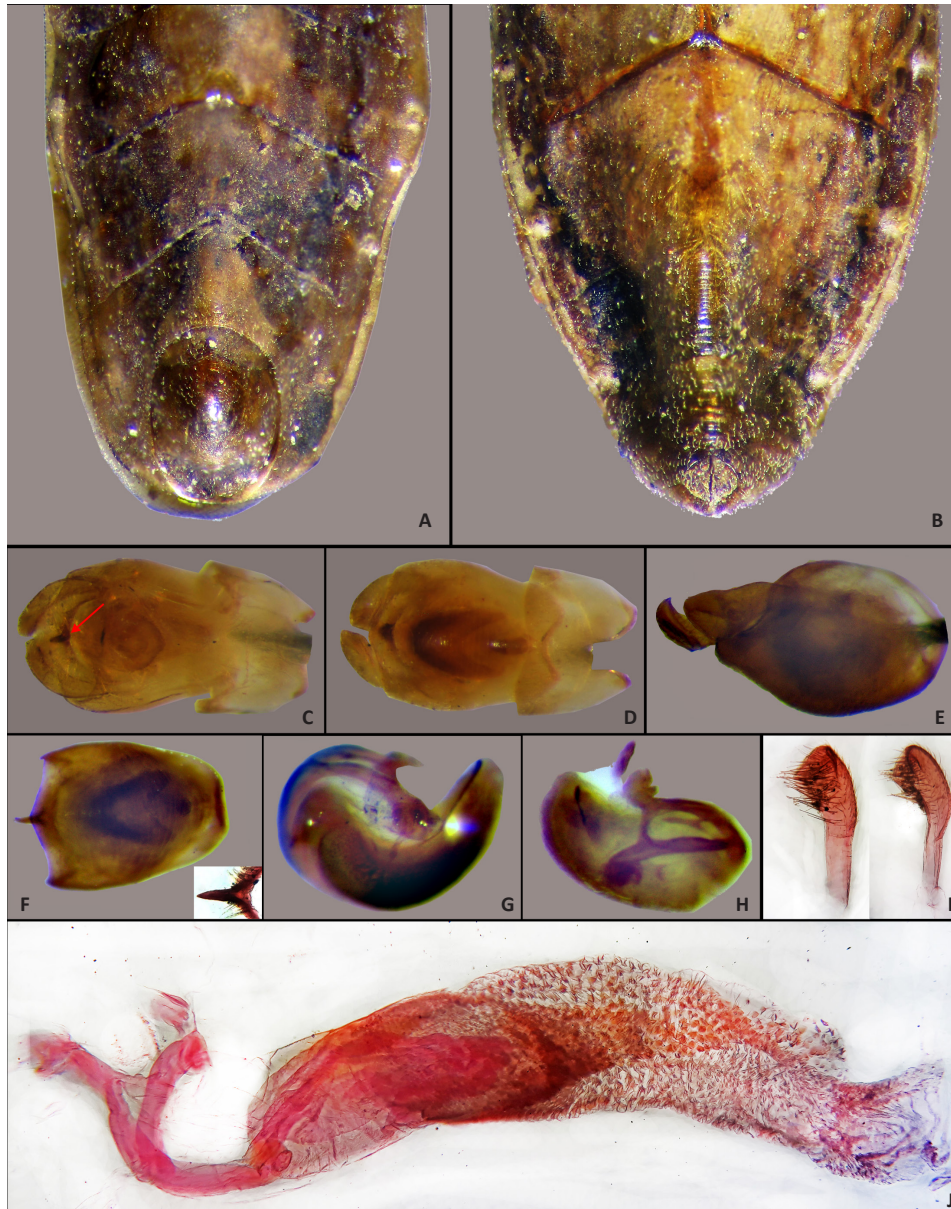


Image 2 A- J. *Neostaccia plebeja*. A - Male abdomen in ventral view showing pygophore; B - Female abdomen in ventral view showing terminalia; C-E - Pygophore in dorsal, ventral (with intact eighth sternite) and lateral view respectively (actual length 1.1mm); F - Pygophore in ventral view without parameres, inset ventral spine; G - Uneverted phallus in lateral view and H-same in dorsal view ; I - Paramere in two views (actual length 0.63mm); J - Everted phallus (length 1.75mm).

In male pygophore convex on ventral side, its shape distinctly oval, as seen in situ (Image 2A). In dorsal view the detached pygophore appears oblong oval, dorsally membranous, laterally and ventrally moderately sclerotized; relatively stout parameres are seen projecting out (Image 2C); the same image shows postero-ventral spine marked with red arrow. Ventral view of intact pygophore (Image 2D) and similar view after removal of parameres (Image 2F, inset: postero-ventral spine in dorsal view) clearly show the spine mentioned above. Lateral view of pygophore is also presented (Image 2E). Phallus

removed from pygophore appears oval in lateral view (Image 2G) with well-developed articulatory apparatus and sclerotized phallosome; the articulatory apparatus is seen in dorsal view (Image 2H). Image 2I shows parameres that are moderately curved, clavate and setose at tip. Everted phallus has endosoma of complex structure with several rows of very fine spinules, as seen here in lateral view (Image 2J).

Material studied: Regd. no. MCZH 13 to 14 (males); MCZH 15 to 16 (females), 2 males and 2 females of *Neostaccia plebeja* were collected when attracted to

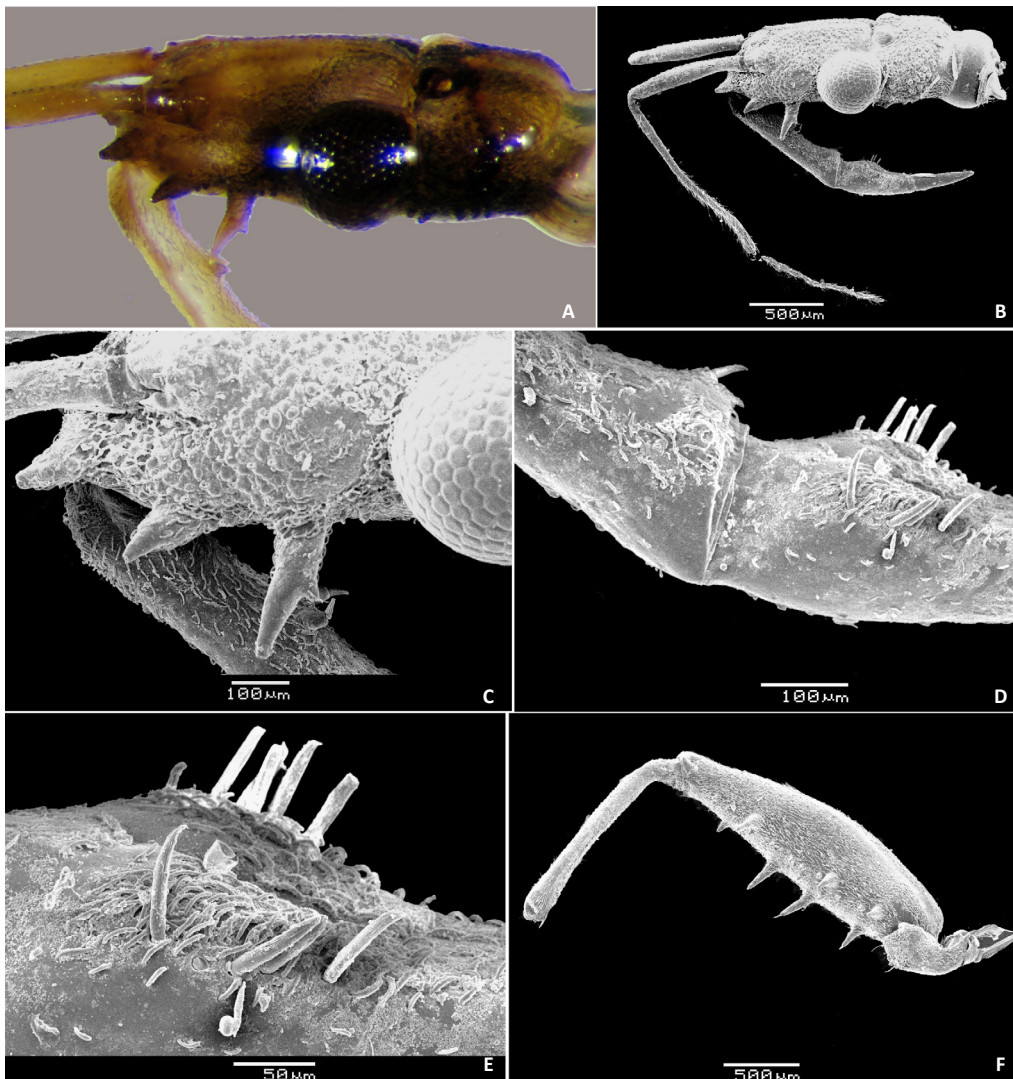


Image 3 A-F. *Staccia diluta*. A. light microscope image and B-F SEM images.

A - Lateral view of head; B - SEM of head; C - Details of head, D - SEM of labium, E - details of labium, F - Fore Femur details.

light from Shirur (coll. B. Sarode, 21.x.2016; 27.x.2016; 16.vi.2017; 25.vi.2017).

Notes on *Staccia diluta*:

***Staccia* Stål, 1874** (type species *Oncocephalus dilutus* Stål, 1859; type locality Philippines)

***Staccia diluta* (Stål, 1859)**

***Staccia diluta*:** Distant, 1904: 159 [redescription, habitus drawing]

***Staccia diluta*:** Nozawa, 1990: 4 [listed, with line drawings]

***Staccia diluta*:** Maldonado Capriles, 1990: 539 [listed]

***Staccia diluta*:** Lee et al., 1999: 79 [Korean J. Entomol., redescrbed with SEM images, in Korean]

***Staccia diluta*:** Ambrose, 2006: xxvi [in checklist supplement]

***Staccia diluta*:** Mukherjee & Hassan, 2016: 503 [in key, diagnosis; distribution in India]

This species was originally placed in *Oncocephalus* by Stål, to which it resembles very much, and subsequently a new genus was erected to accommodate it. Distant (1904) has given brief description with the drawings of habitus and lateral view of head. Since our specimen was a mutilated female we are not giving any redescription. It was identified based on structure of the head and fore leg. Here we are showing lateral view of head under stereozoom microscope (Image 3A) along with SEM images of head and labium (Image 3B-F). The characteristic spines on ventrolateral side of anteocular part are distinct so also the spines on labium. The image of the fore femur shows two clear rows of spines. Image 4 is a composite image of the type specimen of *S. diluta*



Image 4. *Staccia diluta*. Type images: dorsal view (left), ventral view (right), below: fore femur (left) and labels (right).

(dorsal view, ventral view and fore femur), that was obtained from Swedish Museum and is reproduced here with permission. Images of the type are copyright of the Swedish Museum.

Material studied: Not preserved as this specimen was used for SEM, one dead female of *Staccia diluta*, was found in spider web in Assam, coll. P. Pansare, 04.i.2017.

DISCUSSION

Miller (1940) defined *Neostaccia* with the following characters, given verbatim here as: “Basal segment of antennae about as long as antocular. Eyes somewhat large, prominent. Head thick, broadly globose behind eyes, laterally ventrally tuberculate behind eyes. Basal segment of rostrum longer than remaining segments together. Pronotum trapeziform; anterior lobe longer than posterior lobe; prosternum with anterior spinous process. Scutellum triangular, constricted sub-apically. Hemelytra extending to apex of abdomen. Anterior femora incrassate with a single row of long and short spines on lower surface.” Characters of all our *N. plebeja* match well with the diagnosis of the genus and also that of the species, confirming that our identification is correct. We are not aware of any description of pygophore or phallus of any *Neostaccia* and so our figures become an additional information for this genus.

Some additional characters of *N. plebeja* are given here with illustrations. Some observations on *Staccia diluta* are also presented, for comparison, on the basis of a single mutilated specimen found in a spider web at Assam in February 2017.

Of the 10 species of *Staccia*, *S. javanica* is the only other species recorded from India, as per the available literature (Maldonado-Capriles 1990; Ambrose 2006). *Staccia baliensis* Miller, 1940 occurs in Bali and the other eight species are known from Africa. *Staccia diluta* seems more widespread and occurs in ‘Cambodia, Thailand, Sri Lanka, Burma, Malay Peninsula, Vietnam, China, Formosa, Japan’ (Maldonado-Capriles 1990). This species has also been described in greater detail with some SEM images in Korean language by Lee et al. (1999). Mukherjee & Hassan (2016) recorded *S. diluta* from Odisha in India.

REFERENCES

- Ambrose, D.P. (2006). A checklist of Indian assassin bugs (Insecta: Heteroptera: Reduviidae) with taxonomic status, distribution and diagnostic morphological characteristics. *Zoos' Print Journal* 21(9): 2388–2406; <http://doi.org/10.11609/JoTT.ZPJ.871.2388-406>
- Distant, W.L. (1904). *The Fauna of British India, including Ceylon and Burma. Rhynchota, 2 (Heteroptera)*. Taylor & Francis, London, 503pp.
- Kerzhner, I.M. & Y.J. Kwon (1996). On the systematic position of *Staccia plebeja* Stål (Heteroptera: Reduviidae). *Zoosystematica Rossica* 4(1): 48.
- Lee, K.Y., Y.D. Chang, K.R. Choi & Y.J. Kwon (1999). Morphological characteristics of *Staccia diluta* Stål (Hemiptera: Reduviidae), a predaceous natural enemy of delphacid planthoppers. *Korean Journal of Entomology* 29(2): 79–84.
- Maldonado-Capriles, J. (1990). Systematic Catalogue of the Reduviidae of the World (Insecta: Heteroptera). *A Special Edition of Caribbean Journal of Science* 694pp.
- Miller, N.C.E. (1940). New genera and species of Malaysian Reduviidae. *Journal of the Federated Malay States Museum* 18(4) 415–599.
- Mukherjee, P. & M.E. Hassan (2016). Reduviidae (Heteroptera: Hemiptera) recorded as new from Odisha, India. *Munis Entomology & Zoology* 11(2): 501–507.
- Nozawa, M. (1990). The reduviid-bugs (Reduviidae, Heteroptera) distributed in Saitama Prefecture. I. Emesinae, Stenopodainae and Peiratinae. *Bulletin of Saitama Museum of Natural History* 8: 1–10.
- Sheth, S. & H.V. Ghate (2014). A report of an aquatic beetle *Eretes griseus* (Fabricius, 1781) (Coleoptera: Dytiscidae: Dytiscinae: Eretini) from the Western Ghats and other parts of Maharashtra, India. *Journal of Threatened Taxa* 6(12): 6571–6575; <http://doi.org/10.11609/JoTT.04036.6571-5>
- Stål, C. (1866). *Analecta hemipterologica. Berliner Entomologischer Zeitschrift* 10: 151–172.
- Stål, C. (1874). *Enumeratio Reduviidarum Europae, Africae, Asiae, et Australiae*. In: *Enumeratio Hemipterorum, IV. Kongliga Svenska Vetenskaps-Akademiens Handlingar* 4: 3–97.





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Article

Association of grassland birds with *Saccharum-Imperata* patch in a northeastern tea estate of Bangladesh

-- Muntasir Akash, Tania Khan & Sayam U. Chowdhury, Pp. 11831–11843

Communications

Assessment on the impacts of human-tiger conflict and community-based conservation in Bandhavgarh Tiger Reserve, Madhya Pradesh, India

-- Sandeep Chouksey & Somesh Singh, Pp. 11844–11849

Mapping the conflict of raptor conservation and recreational shooting in the Batumi Bottleneck, Republic of Georgia

-- Anna Sándor & Brandon P. Anthony, Pp. 11850–11862

Length-weight relationship and condition factor of *Bangana dero* (Hamilton, 1822) (Actinopterygii: Cypriniformes: Cyprinidae) from northeastern region of India

-- Kamlesh Kumar Yadav & Rani Dhanze, Pp. 11863–11868

An annotated checklist of the birds of upper Chenab catchment, Jammu & Kashmir, India

-- Neeraj Sharma, Suresh Kumar Rana, Pankaj Raina, Raja Amir & Muzaffar Ahmed Kichloo, Pp. 11869–11894

Floristic enumeration of Torna Fort (Western Ghats, India): a storehouse of endemic plants

-- Mayur D. Nandikar, Priyanka T. Giranje & Durga C. Jadhav, Pp. 11895–11915

Short Communications

Parasitological findings and antiparasitic treatment of captive Jaguarundi *Herpailurus yagouaroundi* (Carnivora: Felidae) in a conservation center in Brazil

-- Nárjara Veras Grossmann, Anderson Silva de Sousa, Rebecca Martins Cardoso & Estevam Guilherme Lux Hoppe, Pp. 11916–11919

Pathological and immunohistochemical studies on hemangiosarcoma in tigers *Panthera tigris* and lions *Panthera leo*

-- N. Jayasree, Ch. Srilatha, N. Sailaja, R. Venu & W.L.N.V. Varaprasad, Pp. 11920–11924

Do Black-naped Hares *Lepus nigricollis* (Mammalia: Lagomorpha: Leporidae) have synanthropic association with wind farms?

-- V. Anoop, P.R. Arun & Rajah Jayapal, Pp. 11925–11927

A first confirmed record of the Indian Crested Porcupine *Hystrix indica* (Mammalia: Rodentia: Hystricidae) in the United Arab Emirates

-- Maral K. Chreiki, Mark D. Steer, Sami Ullah Majeed, Swamiti Kakembo & Steve Ross, Pp. 11928–11933

A taxonomic study of six species of the genus *Junonia* Hübner, [1819] (Insecta: Lepidoptera: Nymphalidae) from the northwestern Himalayan region in India

-- Deepika Mehra, Jagbir Singh Kirti & Avtar Kaur Sidhu, Pp. 11934–11947

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A first report and additional description of the assassin bug *Neostaccia plebeja* (Stål) (Heteroptera: Reduviidae) from India with comparative notes on *Staccia diluta* Stål from Assam, India

-- Balasaheb V. Sarode, Swapnil S. Boyane & Hemant. V. Ghatge, Pp. 11948–11954

First definitive record of a whip scorpion *Labochirus tauricornis* (Pocock, 1900) from Goa, India: with notes on its morphometry and pedipalp micro-morphology

-- Manoj Ramakant Borkar, Pp. 11955–11962

Distribution and population status of *Kingiodendron pinnatum* (Angiosperms: Fabaceae) an endemic and endangered legume tree in southern Western Ghats, Kerala, India

-- P.A. Jose, Siju Tom Kuruvila & N.M. Binoy, Pp. 11963–11968

Polytrias indica (Poaceae: Andropogoneae): the name, species identity and its distribution in India

-- Vatsavaya S. Raju & V. Sampath Kumar, Pp. 11969–11972

Notes

Fish fauna of Nandur-Madhmeshwar wetland, Maharashtra, India

-- Prashant Wagh, Sudhakar Kurhade, Shrikant Jadhav & Deepa Jaiswal, Pp. 11973–11979

Biology and distribution of the Clouded Apollo *Parnassius mnemosyne* (Linnaeus, 1758) (Lepidoptera: Papilionidae), a rare butterfly in the Republic of Mordovia, Russia

-- A.B. Ruchin, Pp. 11980–11983

New Lycaenid butterfly records from Jammu & Kashmir, India

-- Shakha Sharma & Neeraj Sharma, Pp. 11984–11987

First record of a trogid beetle (Coleoptera: Scarabaeoidea: Trogidae) from the Western Ghats, India

-- Aparna Sureshchandra Kalawate & S.S. Patole, Pp. 11988–11991

Notes on the taxonomy and distribution of the Bengal Morning Glory *Ipomoea rubens* Choisy (Convolvulaceae) in India

-- J. Swamy & Pragada Venkata Ramana, Pp. 11992–11994

Macrofungus *Nitschkia macrospora* Teng (Ascomycetes: Nitschkiaceae), a new report to India

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