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SHORT COMMUNICATION

WATER STRIDERS, THE GENUS *CYLINDROSTETHUS* MAYR (INSECTA: HETEROPTERA: GERRIDAE) FROM INDIA WITH A NEW RECORD

E. Eyarin Jehamalar, Kailash Chandra & G. Srinivasan

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WATER STRIDERS, THE GENUS *CYLINDROSTETHUS* MAYR (INSECTA: HETEROPTERA: GERRIDAE) FROM INDIA WITH A NEW RECORD

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Abstract: The genus *Cylindrostethus* Mayr, 1865 from India is studied. Prior to this study *C. productus* (Spinola, 1837) and *C. scrutator* (Kirkaldy, 1899) of *Cylindrostethus* were known from India. The record of *C. scrutator* (Kirkaldy, 1899) from India is doubtful. Study of gerrid specimens from Andaman Islands revealed one more additional species, *C. costalis costalis* Schmidt, 1915 new to Indian fauna. So, presently two species of this genus are known from India namely *C. costalis costalis* and *C. productus*, both belonging to the *C. costalis* species group (Polhemus 1994). A detailed study has been made of the male and female genitalia of *Cylindrostethus* known from India.

Keywords: Cylindrostethinae, first record, India, water striders, taxonomy.

The subfamily Cylindrostethinae comprises three genera: *Cylindrostethus* Mayr, 1865, *Platygerris* Buchanan-White, 1883, and *Potamobates* Champion, 1898. The latter two are strictly confined to the Neotropical region. *Cylindrostethus* are very long and slender water striders with body lengths ranging from 8.74–27 mm, inhabiting partial to well-shaded, slow flowing forest streams and sometimes estuaries near river mouths. *Cylindrostethus* can easily be distinguished from *Platygerris* and *Potamobates* by the straight posterior

margin of pronotum, less prolonged eighth abdominal segment of the male, non-rotated abdominal segment VIII and IX of the male, simple postero-median margin of abdominal sternum VII in the female, and mostly visible abdominal sternum VIII of the female. The genus *Cylindrostethus* presently contains 18 species (including two nominotypical subspecies) and three subspecies, distributed in the Neotropical, Ethiopian and Oriental regions (see Hungerford & Matsuda 1962; Linnavuori 1981; Polhemus 1994; Floriano & Cavichioli 2013; Zettel et al. 2017). The Old World species of *Cylindrostethus* were revised by Hungerford & Matsuda (1962) and Polhemus (1994). The present paper provides the first record of *C. costalis costalis* from India (the Andaman Islands) and accompanied by photographs showing detailed morphological characteristics of the two species known from India to facilitate easy identification.

MATERIAL AND METHODS

The studied materials were collected from very cool and well shaded, slow flowing forest streams of India

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by using a D-frame aquatic insect net, and preserved in 75% ethanol. The photographs and measurements were taken through a Leica stereo zoom microscope (Leica M205A), using the software Leica application suite (LAS V3.8). All measurements are given in mm. All the studied specimens are deposited in National Zoological Collection, Hemiptera Section, Zoological Survey of India, Kolkata, India, except that the specimens collected from Madhya Pradesh are deposited in Central Zone Regional Centre, Zoological Survey of India, Jabalpur, Madhya Pradesh, India.

TAXONOMY

Cylindrostethus Fieber, 1861

Notes: For a detailed description of the genus, see Hungerford & Matsuda (1962) and D. Polhemus (1994).

Cylindrostethus costalis costalis Schmidt, 1915 (Images 1A–P)

1915. *Cylindrostethus costalis* Schmidt, Stett. Ent. Zeit., 76: 364.

2017. *Cylindrostethus costalis costalis* Schmidt: Zettel et al. Aquatic insects, 38(1–2): 30.

Material examined: Reg. No. 4048/H15, 6.iii.2012, 2 apt. males, 3 apt. females, India: Andaman & Nicobar Islands, Andaman District, South Andaman Island, Mongulton, 11.79166667°N & 92.73250000°E, 14.02m, coll. E. Eyarin Jehamalar; Reg. No. 4047/H15, 16.xii.2013, 1 apt. male, 2 mac. males, 3 mac. females, North Andaman Island, Saddle Peak National Park, a stream near Forest Camp, 13.47722222°N & 92.17611111°E, 14.6m, coll. G. Srinivasan; Reg. No. 4046/H15, 10.i.2014, 2 mac. females, Saddle Peak National Park, Sindhur Nala, 13.32694444°N & 93.15555556°E, 15m, coll. G. Srinivasan.

Diagnosis: *Cylindrostethus costalis costalis* can readily be identified by the presence of a yellowish costal margin on the forewing (Image 1A,B,F), the absence of spinules on the mesosternum and the presence of spinules on the posterior region of the metasternum (Image 1E), and the presence of a broad longitudinal yellow stripe on the thorax, except on the metanotum; absence of spinules on the pygophore of the male (Image 1K, L); and the shape of the lateral process on the male proctiger (Image 1N).

Descriptive notes: Apterous male: (Image 1C, E, G, H, K–O). Body length 17.01 (range 16.47–17.28); body width (across mesacetabula) 2.83 (range 2.63–2.83).

Colour: Dorsum black and shiny, ventral yellow; head between eyes yellow to orange; yellow median line on thorax continues up to abdominal tergum IV, mostly absent on metanotum and indistinct on abdominal

tergum II (Image 1C); antero-ventral side of fore femur one third from base with a broad black stripe and reaching up to one fourth distance from base and not confluent with ventral black apical ring of fore femur, black stripe on flexor region of fore femur confluent with black apical ring; tibia and tarsus of all legs black except hind tibia orange; mid and hind tibia outer margin with a longitudinal black stripe; dorsolateral region of meso- and metacetabula with black longitudinal stripe; sublateral region of abdominal sterna with a black longitudinal stripe; abdominal terga I–IV with median longitudinal yellow stripe interrupted between joints (indistinct in abdominal tergum II); dorsal connexival margin yellow, connexival spine basolateral region and subapex brown (Image 1G, H), lateral region of tergum VIII yellow.

Structural characters: Body venter clothed with minute silvery-white hairs; head length 1.54, head width 1.89, eyes convergent anteriorly near vertex, dorsal inner margin concave and slightly depressed, minimum interocular width 0.47, eye length 0.96, eye width 0.57; last antennal segment slightly curved (Image 1C), antennal segment lengths I–IV 2.41, 1.03, 0.77, 1.06; posterior region of metasternum to sternum VII clothed with black spinules, except sublateral regions; dorsal thorax length 5.97, pronotal length 1.21, pronotal width 1.91, mesonotal length 3.42, metanotal length 1.45, prosternal length 0.84, mesosternal length 4.13, metasternal length 2.09, metasternal scent channel prominent; flexor region of fore femur with a few dispersed setae, flexor region of fore femur subapically with a short blunt tooth; flexor region of fore tibia fringed with minute setae, fore tibia slightly inwardly curved apically, inner apical process of fore tibia blunt; all legs with prominent claws; mid and hind legs clothed with minute spines; inner margin of hind tibia and tarsus fringed with short curved setae. **Lengths of leg segments:** Fore leg: femur 4.30 (4.16–4.26), tibia 3.87 (3.84–3.87), tarsomeres I–II 0.20 (0.20–0.25), 0.61 (0.52–0.61); mid leg: femur 14.47 (13.86–14.47), tibia 10.23 (9.23–10.23), tarsomeres I–II 4.84 (4.42–4.84), 0.94 (0.83–0.94); hind leg: femur 15.74 (15.23–15.74), tibia 9.92 (9.24–9.92), tarsomeres I–II 0.58 (0.52–0.58), 0.35 (0.30–0.35). Width of fore femur 0.72 (0.68–0.72). Venter of abdominal sterna medially with a faint longitudinal ridge, sublateral region of second abdominal sternum with a longitudinal carinae adjacent to hind coxa and trochanter (Image 1E); length of abdominal terga I–VIII 0.58, 1.08, 1.08, 1.10, 1.08, 1.10, 1.27, 0.75, dorsal proctiger length 0.76; length of abdominal sterna II–VIII 1.18, 1.05, 1.05, 1.12, 1.07, 0.78, 0.91, pygophore length 1.05, ventral proctiger length 0.09; connexival process reached up to level of abdominal tip or little surpassing

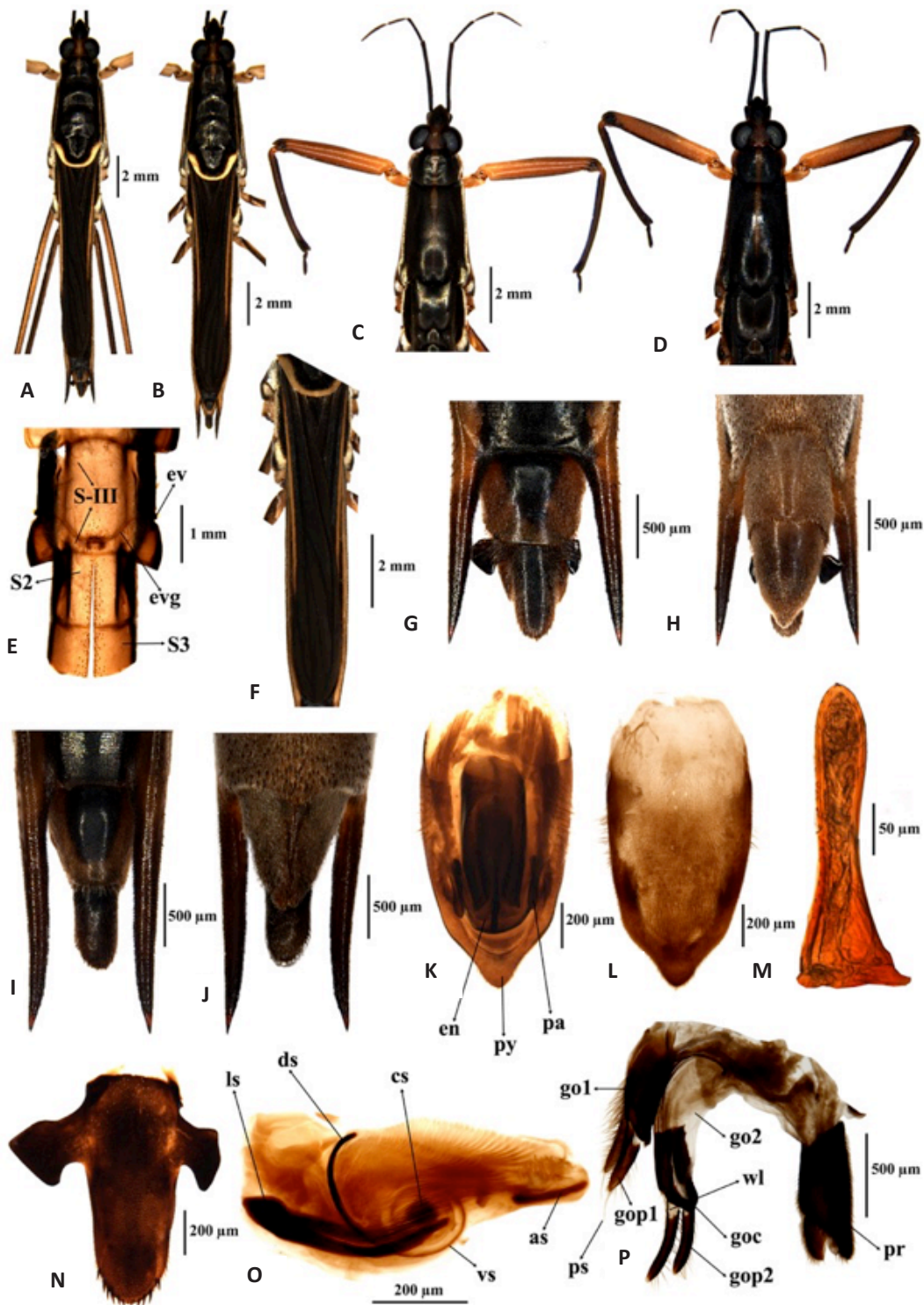


Image 1A–P. *Cylindrostethus costalis costalis* Schmidt (apterous form otherwise mentioned):

A - macropterous male, dorsal view; B - mac. female, dorsal view; C - male head and thorax, dorsal view; D - female head and thorax, dorsal view; E - male metasternum and abdominal sterna II–III, ventral view showing evaporative groove; F - mac. male abdomen, dorsal view showing yellow line on hemelytra; G - male abdominal tip, dorsal view; H - same, ventral view; I - female abdominal tip, dorsal view; J - same, ventral view; K - male pygophore, parameres and endosoma, ventral view; L - male pygophore, dorsal view; M - male paramere, lateral view; N - male proctiger, dorsal view; O - male endosoma, lateral view; P - female gonapophyses and proctiger, lateral view (as - apical sclerite; cs - central sclerite; ds - dorsal sclerite; en - endosoma; ev - evaporatorium; evg - evaporative groove; go1 - first gonapophysis; go2 - second gonapophysis; goc - gonapophysial copulator; gop1 - process of first gonapophysis; gop2 - process of second gonapophysis; ls - lateral sclerite; pa - paramere; pr - proctiger; ps - peg-like seta; py - pygophore; S2 - second abdominal sternum; S3 - third abdominal sternum; S-III - metasternum; vs - ventral sclerite; wl - wavy line).

abdominal tip, length 1.48. Genitalia: pygophore suddenly acuminate near apex, spinules absent, ventrolateral region along midway fringed with setae (Image 1H, K, L); proctiger highly sclerotised, apical margin with eleven short stout spines, sub-basal region with lateral processes, left process broader than right process, base of lateral processes with a few long setae, proctiger produced and tongue-like below lateral processes (Image 1G, N); endosomal sheath highly sclerotised, dorsal and ventral endosomal sclerites united, ventral sclerite less sclerotised coiled and enclosed round central sclerite (cs—term newly proposed here), dorsal sclerite bent forwards but not extending one third distance from base of endosoma, lateral sclerites boat-shaped with apical region appearing as ‘folded hands in prayer’ shape in lateral aspect, single apical sclerite long and linear, placed ventrally, upper region of endosoma in front of dorsal sclerite with ring-like impression up to subapex (Image 1O); parameres slightly visible from outside, symmetrical and narrowed medially (Image 1M).

Macropterous male (Image 1A, F): Similar to apterous male with following exceptions: body length 17.34–17.74, width 2.88–2.95, pronotal lobe length 5.06–5.32, width 2.20–2.24, hemelytral length 9.94–10.30, width 1.20–1.35. Median longitudinal yellow line confined to anterior pronotal lobe; lateral region of posterior pronotal lobe anteriorly with thin and posteriorly with thick yellow border; humeral angle slightly produced; wings dark brown to black, not exceeding posterior margin of tergum VII, two third from the base of hemelytral costal margin with yellow line (Image 1A).

Apterous female (Image 1D, I, J): Similar to apterous male, but a little larger (mostly measurements are given here). Body length 18.29 (range 17.93–18.86), body width (across mesacetabula) 2.91 (range 2.85–3.06), head length 1.65, width 1.93, minimum interocular width 0.43, eye length 1.04, eye width 0.69, antennal segment lengths I–IV 2.55, 1.17, 0.73, 1.11; dorsal thorax length 6.69, pronotal length 1.23, pronotal width 1.94, mesonotal length 3.88, mesonotum without any tubercle on postero sublateral region (Image 1D), metanotal length 1.59, prosternal length 0.87, mesosternal length 4.19, metasternal length 2.01. *Lengths of leg segments*: Fore leg: femur 4.16 (4.16–4.59), tibia 3.93 (3.93–4.20), tarsomeres I–II 0.24 (0.17–0.24), 0.56 (0.56–0.63); mid leg: femur 15.24 (14.59–15.67), tibia 10.58 (10.02–10.98), tarsomeres I–II 4.96 (4.78–4.99), 0.93 (0.89–0.94); hind leg: femur 16.05 (15.79–16.95), tibia 10.62 (10.09–10.77), tarsomeres I–II 0.63 (0.57–0.65), 0.36 (0.35–0.36). Width of fore femur 0.72 (0.70–0.72). Length of abdominal terga I–VIII 0.59, 1.22, 1.29, 1.29, 1.28, 1.25, 1.37, 0.79,

dorsal proctiger length 0.64; length of abdominal sterna II–VII 1.49, 1.23, 1.25, 1.24, 1.28, 1.47, length of gonocoxa 0.79, ventral proctiger length 0.46; connexival process length 1.92, distinctly surpassing tip of abdomen.

Macropterous female (Image 1B, P): Similar to macropterous male with following exceptions: connexival process mostly distinctly surpassing abdominal tip. Body length 18.29–18.83, width 3.04–3.17, pronotal lobe length 5.20–5.50, width 2.21–2.31, hemelytral length 10.02–10.51, width 1.24–1.41. Genitalia: gonapophyses highly sclerotised, first gonapophysis (go1) outer margin fringed with long setae, second gonapophysis (go2) without any characteristic long setae; processes of both first and second gonapophysis (gop1, gop2) clothed with sparse setae, length of gop1 0.36, width 0.11, length of gop2 0.51, width 0.09, tip of first gonapophysial process (gop1) with a long inwardly curved peg-like seta (ps), length of ps 0.19, width 0.02, gop1 1.9 times as long as ps; base of second gonapophysial processes connected each other by gonapophysial copulator (goc—term newly proposed here), a wavy line (wl) originating from outer lateral region of gop2 united with goc at level of origin, non-sclerotised area near wavy line large and prominent, proctiger length 0.86 (Image 1P).

Distribution: India (Andaman Islands, a first record for India); Cambodia, Laos, Myanmar, Thailand, Vietnam (Hungerford & Matsuda 1962; D. Polhemus 1994; Zettel & Chen 1996; Zettel et al. 2017).

***Cylindrostethus productus* (Spinola, 1837)**

(Image 2A–I)

1837. *Gerris productus* Spinola, *Essai sur les Insectes Hémiptères Rhyngotes Hétéroptères*, 64.

1962. *Cylindrostethus productus* (Spinola), Hungerford & Matsuda, *Univ. Kansas Sci. Bull.*, 63: 86–89.

Material examined: Reg. No. 3198/H15, 2.x.2013, 2 mac. males, 1 apt. male, 2 mac. females, 20 nymphs, India: Chhattisgarh, Durg District, Balod Range, Tandola Dam, coll. A. Raha and Party; Reg. No. 2726/H15, 27.v.2012, 4 apt. males, 1 mac. female, 2 apt. females, Jashpur District, Badalkhol WS, Khara Nala, coll. A. Raha and Party; Reg. No. 3425/H15, 22.iii.2014, 5 mac. males, 4 mac. females, 1 apt. female, Awra Nala, coll. E.E. Jehamalar; Reg. No. 2550/H15, 18.xi.2011, 4 males, 5 females, Kabirdham District, Bhoremdev WS, Sunwahi Forest, coll. S.K. Gupta and Party; Reg. No. 3053/H15, 26.viii.2011, 1 apt. male, Chilpighati, coll. S.K. Gupta and Party; Reg. No. 2552/H15, 22.xi.2011, 7 mac. males, 9 mac. females, Jamunpani forest, coll. Angshuman; Reg. No. 3420/H15, 1.iv.2014, 2 mac. males, 7 mac. females, Chilpi, Bagbil, coll. E.E.

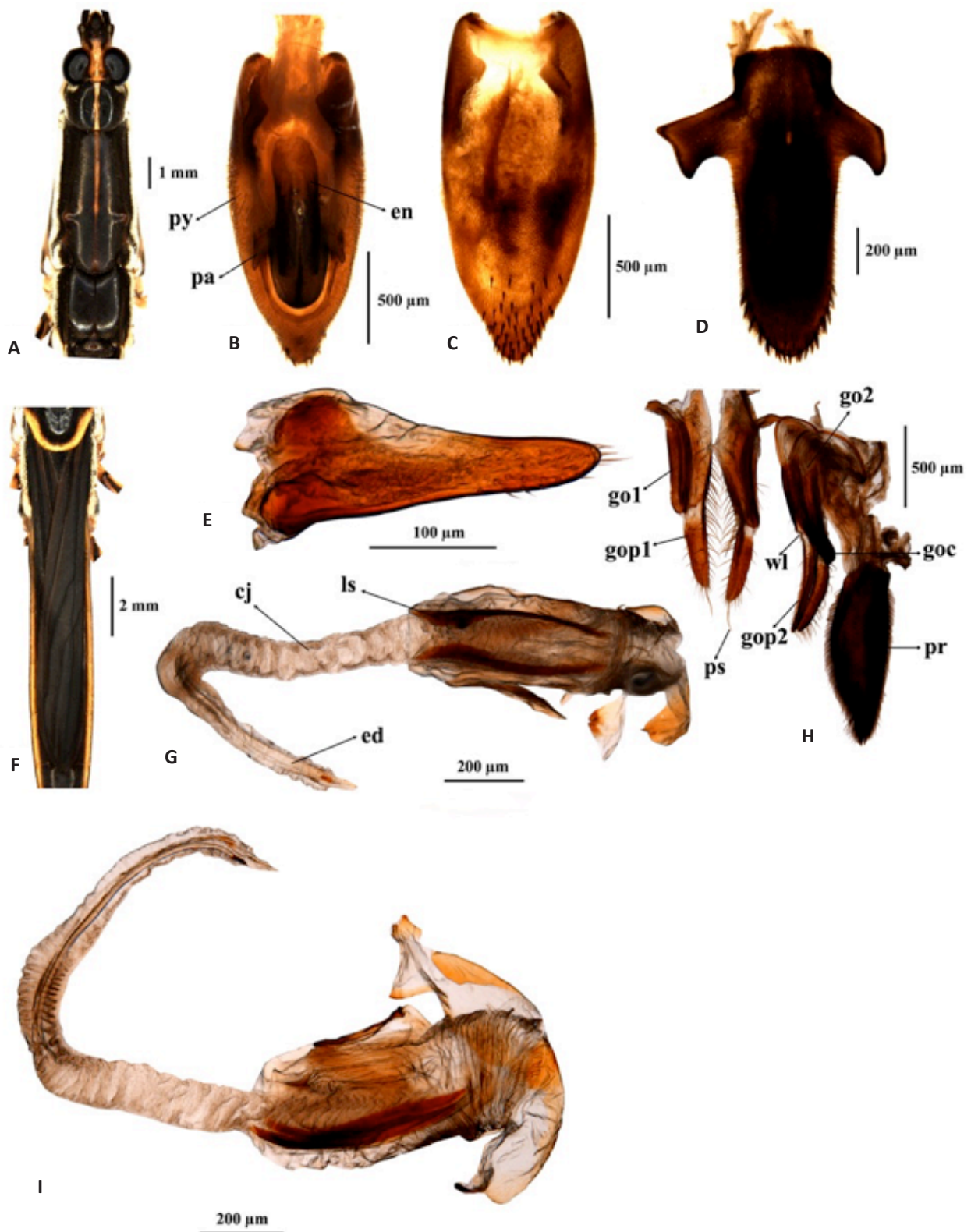


Image 2A–I. *Cylindrostethus productus* (Spinola) (macropterous form otherwise mentioned):

A - apterous female head and thorax, dorsal view; B - male pygophore, parameres and endosoma, ventral view; C - male pygophore, dorsal view; D - male proctiger, dorsal view; E - male paramere, lateral view; F - male abdomen, dorsal view showing hemelytra; G - male endosoma, dorsal view; H - female gonapophyses and proctiger, lateral view; I - male endosoma, lateral view (cj - conjunctivum; ed - ejaculatory duct; en - endosoma; go1 - first gonapophysis; go2 - second gonapophysis; goc - gonapophysial copulator; gop1 - process of first gonapophysis; gop2 - process of second gonapophysis; ls - lateral sclerite; pa - paramere; pr - proctiger; ps - peg-like seta; py - pygophore; wl - wavy line).

Jehamalar; Reg. No. 3431/H15, 27.iii.2014, 1 mac. female, Korba District, Bijakhara Nala, coll. E.E. Jehamalar; Reg. No. 3129/H15, 15.vii.2011, 1 mac. male, Raipur District, Barnawapara WS, Lalbandha Palaca, coll. S.K. Gupta and Party; Reg. No. 3088/H15, 14.v.2013, 1 apt. male, 1 apt. female, 2 nymphs, Surguja District, Ramkola, Tamor-Pingla WS, Pingla Nala, coll. P. Dawn., Reg. No. 3196/H15, 28.viii.2013, 2 apt. males, 2 apt. females, 2 Nymphs, Kerala, Kozhikode District, Nanminda, coll. P. Girish Kumar; Reg. No. 4049/H15, 26.i.1961, 3 apt. males, 6 mac. males, 7 mac. females, Madhya Pradesh, Balaghat District, Muki, coll. B.S. Lamba; Reg. No. A/13417, 22.iii.1990, 26 males, 24 females, Betul District, Katawadi, coll. H.S. Sharma and Party; Reg. No. A/13423, 5.iv.1979, 9 males, 8 females, Hoshangabad District, Apsara Bihar, Pachmari, coll. P.D. Rane; Reg. No. A/13421, 12.vi.1999, 3 males, 8 females, Bori Sanctuary, Churna, Bhaisa Nala, coll. K. Chandra; Reg. No. A/13420, 9.iii.2000, 2 males, 1 female, Pachmari, coll. R.K. Singh; Reg. No. A/13409, 4.iv.2001, 1 female, Panarpani, coll. Y.N. Gupta and Party; Reg. No. A/13412, 14.vii.1964, 3 females, Jabalpur District, Pariat Forest, coll. H.P. Agrawal; Reg. No. A/13411, 29.vi.1965, 4 females, 2km east of Bargi FRH, coll. H. Khajuria; Reg. No. A/13414, 22.i.1969, 10 males, 21 females, Dindori Road, Fagna Nala, coll. V.S. Durve; Reg. No. A/13415, 26.iv.1969, 40 males, 26 females, Rani Durgavathi Samathi Road, coll. V.S. Durve; Reg. No. A/13422, 5.ix.1969, 2 males, 4 Nymphs, Bargi Village, coll. H.P. Agrawal; Reg. No. A/13413, 16.xii.1971, 22 males, 34 females, Bhedaghat, coll. R.K. Singh and Party; Reg. No. A/13418, 5.iii.1983, 10 males, 8 females, Mandla District, Garam Pani Kund, coll. U.A. Gajbe; Reg. No. A/13410, 1.iii.1994, 1 male, 1 female, Seoni District, Patalkot, coll. H.S. Sharma; Reg. No. A/13416, 4.ii.1980, 7 males, 13 females, Shahdol District, Amarkantak, coll. P.D. Rane and Party; Reg. No. A/13407, 5.ii.1980, 28 males, 22 females, Kapildhara, coll. P.D. Rane and Party; Reg. No. 4050/H15, 3.i.1976, 8 mac. males, 3 mac. females, Odisha, Dhenkanal District, Purnakot, coll. D.P. Sanyal and A.K. Sarkar; Reg. No. 4051/H15, 19.iii.1973, 6 mac. males, 10 mac. females, Mayurbhanj District, Meghasani Forest, coll. S.K. Gupta; Reg. No. 4053/H15, 6.i.1974, 3 mac. males, 2 mac. females, Puri District, Berbera, coll. R.L. Chowdhury; Reg. No. 4054/H15, 13.ix.1972, 2 apt. females, 1 Nymph, Sundargarh District, Kurodhi River, Barsuan Village, coll. S. Khera and Party; Reg. No. 4275/H15, 25.ix.2009, 19 apt. males, 17 apt. females, 4 mac. males, 3 mac. females, 7 Nymphs, Tamil Nadu, Kanyakumari District, Manakudy Estuary (near river mouth), coll. J.A. Angelin; Reg. No. 2534/H15, 5.x.2011, 3 apt. males, 5 apt. females, 1 mac. female, Cherukole Village, coll. E.E. Jehamalar; Reg. No. 2825/H15, Chithiramcode, 23.x.2012, 1 mac. female,

coll. E.E. Jehamalar and E.H.R. Deasingh; Reg. No. 3052/H15, Churulode, 26.x.2012, 1 apt. male, 4 apt. females, coll. E.E. Jehamalar and E.H.R. Deasingh; Reg. No. 4052/H15, 15.v.1968, 1 apt. male, 3 apt. females, Uttarakhand, Dehradun District, Kansro Forest, coll. Asket Singh.

Diagnosis: *Cylindrostethus productus* can easily be identified by the absence of a yellow costal margin on the forewing (Image 2F), the presence of the spinules on the mesosternum, metasternum and the abdominal sterna II-VII; the presence of a pair of tubercles on the mesonotum of the apterous female (Image 2A); the presence of the spinules on the pygophore of the male (Image 2B, C); the unique shape of the lateral process on the male proctiger (Image 2D); the basally broad male paramere (Image 2E); the presence of a long stalk-like conjunctivum (ct) coupled with the absence of coiled ventral sclerite, (Image 2G); the shape of the wavy line on the process of second gonapophysis of the female genitalia and the proportion of the process of the second gonapophysis and its peg-like setae (Image 2H).

Descriptive notes: (The detailed description of *C. productus* has been given by Hungerford & Matsuda, 1962, so, only body length, width and characters of genitalia of male and female are given here). Body length, mac. male 22.06–22.67, mac. female 22.42–23.64, apt. male 21.93–22.53, apt. female 23.36–24.47; body width mac. male 3.12–3.24, mac. female 3.22–3.42, apt. male 2.95–3.14, apt. female 3.10–3.44. Male Genitalia: pygophore gradually acuminate near apex, nearly forty spinules present on dorsal apical region (Image 2B, C); proctiger highly sclerotised, produced tongue-like below lateral processes, apical margin with nearly twenty-three short stout spines, sub-basal region with lateral processes, left process slightly broader than right process, outer margin of left process indented, base of lateral processes with a few setae (Image 2D); endosomal sheath highly sclerotised, lateral sclerites well developed, boat-shaped, not appearing as ‘folded hands in prayer’ in lateral aspect, apical region broad, outer margin concave and inner margin convex in dorsal aspect, other sclerites not prominent or absent, conjunctivum of endosoma long, robust, and curved (Image 2G, I); parameres symmetrical with broad base, upper sub-basal region with less sclerotised area, apical region with few spinose setae (Image 2E). Female Genitalia: gonapophyses highly sclerotised, first gonapophysis (go1) outer margin fringed with long setae, second gonapophysis (go2) without any characteristic long setae; processes of both first and second gonapophyses (gop1, gop2) clothed with sparse setae, length of gop1 0.46, width 0.10, length of gop2 0.54, width 0.09, tip of first gonapophysial process

(gop1) with a long curved peg-like setae (ps), length of ps 0.18, width 0.01, gop1 2.5 times as long as ps; base of second gonapophysial processes connected each other by gonapophysial copulator (goc), a wavy line (wl) originating from outer lateral region of gop2 united with lateral margin of go2, non-sclerotised area near wavy line small, proctiger length 1.04 (Image 2H).

Distribution: India (Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal), Nepal, and Sri Lanka (Polhemus 1994; Thirumalai 2002).

DISCUSSION

Prior to the present study, only two species of Cylindrostethinae, *Cylindrostethus productus* and *C. scrutator*, were known from India (Thirumalai 2002). Hungerford & Matsuda (1962) indicated that they had examined two apterous males and one apterous female of *C. scrutator* from India, but did not provide any specific locality data. These specimens were deposited in the British Museum. Polhemus (1994) suspected that the record of *C. scrutator* by Hungerford & Matsuda (1962), was probably from Assam. *C. scrutator*, however, has not been encountered in several surveys conducted by scientists from Zoological Survey of India over the past hundred years and therefore the record of *C. scrutator* from India is doubtful. In the old colonial period, "India" was a term used for a much larger region, including Myanmar. *Cylindrostethus scrutator* is relatively common on the Greater Sunda Islands (Sumatra, Java, and Borneo) and also occurs in southern Myanmar, central Thailand and southern Vietnam within continental Southeast Asia. It appears very unlikely that the species occurs in India (Dr. Herbert Zettel pers. info. 2014). The authors have seen photographs of the specimens of *C. scrutator*, sent by Mr. M.D. Webb, Curator of Hemiptera, Natural History Museum, London, which were examined by Hungerford and Matsuda. It seems one is an apterous male from Tavoy (Myanmar) and another from Tenasserim (Myanmar) and one specimen without locality. So the record of *C. scrutator* from India remains doubtful.

The present record of *C. costalis costalis* from the Andaman Islands adds one more species to the fauna of India. This record is quite interesting and is of zoogeographical importance, because the Andaman Islands are considered as the exposed part of the long Arakan Yoma Mountain range of Myanmar, in the Bay of Bengal. *Cylindrostethus costalis costalis* is widely distributed in Cambodia, Laos, Myanmar, Thailand and Vietnam, but not southern China or Peninsular Malaysia (D. Polhemus 1994; Zettel et al. 2017). *Cylindrostethus*

productus is distributed only in Sri Lanka, Nepal and mainland India (D. Polhemus 1994; Thirumalai 2002). Both *C. costalis costalis* and *C. productus* belong to the same species group, but possess major differences in the male genitalia, particularly in the endosomal sclerites. The posterior region of the pygophore in the males of *C. productus* possess spinules, but such spinules are absent on the posterior region of the pygophore of *C. costalis costalis*. In *C. productus*, only the lateral sclerites are prominent and the other sclerites such as dorsal, ventral and apical sclerites are absent, however all these sclerites are present in *C. costalis costalis*. The absence of endosomal sclerites, except lateral sclerites, in *C. productus* may have evolutionary significance and needs phylogenetic study. The female genitalia of both the species are similar in appearance, but specific differences are seen between the species. The proportion of the peg-like seta and the second gonapophysis and the wavy line on the second gonapophysis (Image 1P, 2H) can be considered as the significant characters for identification of the females, if males are absent in collections. The evaporative channel or groove on the metasternum forms a short segment-like portion on the posterior region of the metasternum, which often creates confusion as to the position of abdominal sternum I, but the detailed study after removing the muscles lying in the metathorax shows that the part above abdominal sternum-II is a part of metasternum (Image 1E).

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Correction

Corrigendum - Butterfly host plant Monograph, P. 11701

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