

Germalus kozari sp. nov.: Description of a new representative of big-eyed bugs from the Indomalayan Region with notes on allied species (Heteroptera: Lygaeoidea: Geocoridae)

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RESEARCH ARTICLE

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ABSTRACT

Germalus kozari sp. nov. (Hemiptera: Heteroptera: Lygaeoidea: Geocoridae) is now described. Comparative notes, keys, diagnoses, and distribution data to allied Indomalayan species is provided. *Germalus greeni* is reported for the first time from outside of India and Sri Lanka.

KEYWORDS

Heteroptera, Geocoridae, big-eyed bugs, new species, Indomalayan Region

INTRODUCTION

The subfamily Geocorinae Dahlbom, 1851 of the family Geocoridae (Hemiptera: Heteroptera) is a moderately species-rich but morphologically heterogeneous taxon of the superfamily Lygaeoidea. Representatives of the subfamily display highly specialized morphological characteristics and several species are known of their agricultural importance as predators of various arthropod pests, e.g., aphids,

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thrips, or caterpillars of harmful moth species (Sweet, 2000; Kóbor, 2020a). *Germalus* Stål, 1862 is its second largest genus with 46 described species and 2 subspecies (Dellapé and Henry, 2023). Representatives of the genus are distributed from the Sub-Saharan Africa to French Polynesia with the greatest diversity in the Indo-Australian Archipelago (Kóbor and Kondorosy, 2022b). After the work on the Micronesian representatives of *Germalus* by Barber (1958) the taxonomic study of these bugs was virtually neglected until the revision of Australian *Germalus* species and allied taxa (Malipatil and Blackett, 2013). More recently the Malagasy (Kóbor and Kondorosy, 2016), Afrotropical (Kóbor and Kondorosy, 2017), French Polynesian (Kóbor, 2020b), and Papuan (Kóbor and Kondorosy, 2022a,b) fauna were revised. The last remaining zoogeographical units whose fauna needs taxonomic revision are the Indomalaya and New Caledonia. The identity and status of many described New Caledonian taxa are problematic due to the cursory descriptions, lost or destroyed type material and taxonomic misunderstandings which need to be investigated thoroughly. The Indomalayan fauna of *Germalus* currently consists of three described species: *Germalus sobrinus* (Stål, 1859) from the Philippines, *Germalus unicolor* (Montandon, 1907) from Borneo and Java, and *Germalus greeni* Distant (1910) distributed in India and Sri Lanka. In course of the processing the collection material of the Entomological Collection of the National Museum, Prague, and the Moravian Museum Brno series of specimens from Thailand were found, which resembled *G. sobrinus* in general facies but differed remarkably in multiple morphological aspects. Here, I present the description of the species.

MATERIAL AND METHODS

Specimens studied were borrowed from the collection of Marcos Roca-Cusachs at University of Barcelona, Spain (MCRC); Moravian Museum, Brno, Czech Republic (MZMB); National Museum, Prague, Czech Republic (NMPC); Natural History Museum, London, United Kingdom (BMNH); Snow Entomological Collections, University of Kansas, Lawrence, Kansas, United States (SEMC); and Swedish Museum of Natural History, Stockholm, Sweden (NHRS). A paratype of *Germalus kozari* sp. nov. is deposited in the collection of the author (PCPK – Personal Collection of Péter Kóbor, Centre for Agricultural Research, Plant Protection Institute, Budapest, Hungary).

Label data was cited verbatim. Lines on labels are separated with ‘/’, content of different labels are separated with ‘//’.

Exoskeletal structures were studied with Kern Optics OZL 466 stereoscopic microscope. Photomicrographs were done using a Keyence VHX 5000 digital microscope.

Morphological terminology was adapted from Tsai et al. (2011), Malipatil and Blackett (2013) (general morphology); Kment and Vilimová (2010) (metathoracic scent efferent apparatus); Slater (1977) (mesothoracic wing); and Slater and Hurlbutt (1957) (metathoracic wing).

Distribution data were recorded in Microsoft Excel program in comma-delimited text format (.csv) and processed with QGIS 3.16 “Hannover software”. WorldClim altitude raster layer (Fick and Hijmans, 2017) and WWF terrestrial ecoregions shape files (Olson et al., 2001) was used to visualise and interpret distribution and habitat data.

RESULTS

Genus *Germalus* Stål, 1862

Type species: *Henestaris kinbergi* Stål, 1860



Diagnosis: Representatives of the genus can be distinguished from other geocorines in the region (*Geocoris* Fallén, 1814; *Geocoroides* Distant, 1920; *Umbrageocoris* Kóbor, 2019) by their moderately stylate eyes with eye stalks either straight or moderately projected (eyes slightly stylate with eye stalks never projected in the other genera); scutellum subequilaterally triangular with well-defined median trifurcate carina (scutellum elongate in other genera, with a variable degree of reduction of triradiate carina); clavus with margins subparallel and claval commissure well-developed (margins of clavus gradually converging towards apex and claval commissure reduced in other genera); peritreme with well-developed dorsal supporting projection (peritreme lacking dorsal supporting projection in other geocorine genera). Detailed generic diagnosis was provided by , 2022b).

Distribution. Representatives of the genera are distributed from the continental Afrotropics to French Polynesia; diversity and species-richness peaks at the Indo-Australian Archipelago (Kóbor and Kondorosy, 2022a, 2022b).

Key to Indomalayan *Germalus* species:

1. Compound eyes with eye stalks projected anteriad. Trifurcate carina of scutellum not flared basally. Clavus completely punctate along corial margin. ... *Germalus greeni* Distant, 1910
- Compound eyes with eye stalks straight. Trifurcate carina of scutellum flared basally. Clavus of hemelytron punctate at base of corial margin. ... 2.
2. Posterior edge of compound eyes not touching anterior edge of pronotum. Pronotum slightly constricted dorsally and ventrally posteriad to pronotal callosities, lateral margins moderately concave (Figs 12–13). Tarsomere I of hind leg nearly twice as long as combined length of tarsomeres II and III. ... *Germalus unicolor* (Montandon, 1907)
- Posterior edge of compound eyes touching anterior edge of pronotum. Lateral margins of pronotum slightly concave, pronotum not constricted dorsally and ventrally posteriad to callosities. Length of tarsomere I of hind leg subequal to combined length of tarsomeres II and III. ... 3.
3. Dorsal supportive projection of peritreme short, curved apically (Fig. 11). ... *Germalus sobrinus* (Stål, 1860)
- Dorsal supportive projection of peritreme moderately elongate, almost straight (Fig. 4). ... *Germalus kozari* sp. nov.

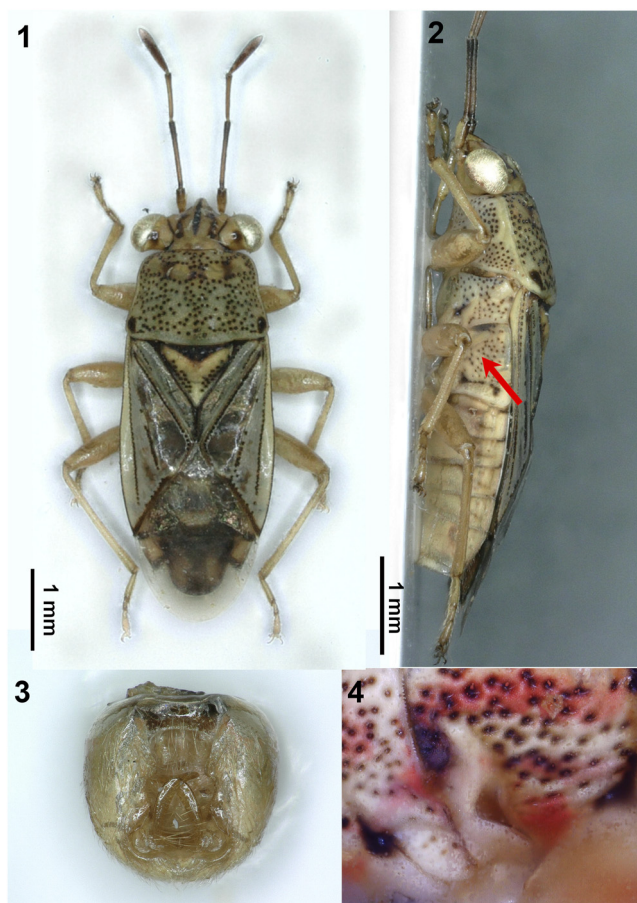
***Germalus kozari* sp. nov.**

Figures 1–4 and 14.

Holotype: “THAILAND bor. 7 - 12 May 1996 / Mae Hong Son, Sappong env. / 19° 27' N; 98° 20' E / J. Horák lgt. 1500 m” (m, NMPC).

Paratypes: “THAILAND bor. 7 - 12 May 1996 / Mae Hong Son, Sappong env. / 19° 27' N; 98° 20' E / J. Horák lgt. 1500 m” (1 f, NMPC); “NW THAILAND 9. – 16. 5. 1991. / Mae Hong Son / Ban Huai Po / 1600 – 2000 m / J. Horák lgt. // EX COLLECTIO / Z. JINDRA” (1 m, NMPC); “NW THAILAND/ 8. – 18. v. 1992. Mae Hong / Son Ban Huai Po 1600 – 2000 m / J. Horák lgt.” (1 m, NMPC); “THAILAND, CHIANG MAI Prov. / Doi Chiang Dao env., 1200 ± 50 m / 19°24'45" N 98°51'30" E, / L. Dembický leg., 9–13 v 2009 / TH 3/2009 MZM Expedition” (1 f, 2 m; MZMB); “THAILAND, CHIANG MAI Prov. / Doi Chiang Dao env., 1200 ± 50 m / 19°24'45" N 98°51'30" E, / L. Dembický leg., 9–13 v 2009 / TH 3/2009 MZM Expedition” (1 m, PCPK).





Figs. 1–4. *Germalus kozari* sp. nov. (paratype male, NMPC): 1. dorsal view, 2. lateral view (red arrow indicates location of peritreme), 3. pygophore, 4. peritreme (scale bar = 1 mm for Figs 1 and 2, Figs 3–4 not to scale)

Description. Colouration. Body dark ochraceous. Head with narrow longitudinal blackish line medially extending from between ocelli to apex of clypeus and a pair of narrow, variably defined, irregular elongate brownish spots anteriad to ocelli. Surroundings of ocelli and ocular sulcus variably dark brownish or black. Ocelli and eyes colourless. Eye stalks with irregular dark brownish spot near posterior edge of eyes. Antennomere I apically dark brownish; antennomere II and III with apex dark brownish; antennomere IV variably fuscous to brownish. Antennomeres occasionally suffused with red. Labiomeres ochraceous, apex of labiomere IV black. Pronotum with punctuation variably dark brownish to black. Pronotal callosities with variably defined, brownish longitudinal lines medially. Humeral angles with rounded dark brownish spots. Occasionally a faded red longitudinal line present near both lateral margins and at median edge of both pronotal callosities. Scutellum with black spot anteriad to median trifurcate carina



and black punctuation; trifurcate carina ochraceous, paler than rest of body. Hemelytra semi-hyaline, ochraceous with dark brown punctuation. Costal and apical margin of corium finely brownish. Membrane hyaline. Thoracic pleurites and sternites with dark brownish punctuation and irregular, variably extended black spots above coxae and anteriorly to dorsal supportive projection of peritreme. Pleurites occasionally with faded, irregular reddish spots of variable extent. Femora and tibiae occasionally with variably defined, irregular reddish lines and spots. Abdominal dorsum with irregular, variably defined brown spots. Abdominal sternites with dark brown spots at posterodorsal edges. Abdominal sternites occasionally with irregular reddish band dorsolaterally.

Structure. Head pentagonal, integument shiny. Eyes moderately stylate with eye stalks straight. Ocelli situated at basal part of the vertex, near ocular sulci; interocellar distance to eye-ocellus distance: 1 : 1.4. Clypeus conspicuously rounded, exceeding well the mandibular plates. Antenniferous tubercle well-developed, visible in dorsal view. Antennomere I shortest; antennomere II longest; antennomeres III and IV subequal in length, shorter than antennomere II. Ratio of antennomeres: 1 : 2.95 : 1.90 : 2.36. Mandibular and maxillary plates clearly separated; bucculae protruding, apex rounded; ventral margin of bucculae forming a V-shaped labial trough, almost reaching base of head. Labiomere I reaching anterior margin of prosternum; labiomeres II and III subequal in length, somewhat shorter than labiomere I; labiomere IV shortest, reaching metacoxae. Ratio of labiomeres I–IV: 1 : 1.10 : 1.17 : 0.87. Thorax. Pronotum trapeziform, integument with deep, dense, and irregular punctuation except two separated spots near anterior margin, pronotal callosities, humeral angles, and posterior margin. Pronotum length to width ratio: 1 : 1.51. Pronotal callosities well defined, sometimes appear to be “constricted” medially by punctures. Scutellum densely punctate except well-developed and basally flared median trifurcate carina. Scutellum length to width ratio: 1 : 1.25. Hemelytron submacropterous. Margins of clavus only punctate basally, claval commissure with 3–4 punctures near scutellar margin. Length of claval commissure to length of scutellum: 1 : 1.79. Corium with punctuation arranged along venation; apical margin punctate between R-M and costal vein. Membrane without conspicuous venation. Thoracic pleurites and sternites with dense and deep punctuation except anterior margin of prosternite, supracoxal lobes, peritreme and metepimeron. Peritreme spout type with a well-developed, moderately elongate, straight dorsal supporting projection and a slight periostiolar depression. Ostiole large, semitriangular. Evaporatorium covering mesepimeron and metepisternum. Femora fusiform, fore femora somewhat flattened laterally. Fore tibiae club-shaped, mid and hind tibiae subcylindrical. Tarsomere I longest, tarsomere II shortest; combined length of tarsomeres II and III subequal to length of tarsomere III on all legs. Claws moderately elongate, evenly curved; unguitractor plates bearing a pair of drop-shaped, fleshy parempodia. Abdomen. Sutures between abdominal tergites 4/5 and 5/6 slightly curved medially with apex truncated. Posterior opening of pygophore rather elongate, bulging on dorsal and ventral margin and indented laterally. Ovipositor bisecting abdominal sternites V–VII.

Measurements (holotype, values given in mm). total body length: 4.11; length of head: 0.50; width of head: 1.30; interocellar distance: 0.35; length of antennomeres I to IV: 0.22 : 0.65 : 0.42 : 0.52; length of labiomeres I to IV: 0.45 : 0.49 : 0.53 : 0.39; length of pronotum: 0.93; width of pronotum: 1.40; length of scutellum: 0.59; width of scutellum: 0.74; length of claval commissure: 0.33.



Differential diagnosis. Among the three other *Germalus* species so far known from the Indomalayan Region, *G. kozari* is most similar to *G. sobrinus*. However, the dorsal supporting projection of the metathoracic scent efferent system is a reliable diagnostic character between these species: in *G. kozari* it is moderately elongate, almost straight (Fig. 4) while in *G. sobrinus* it is short and slightly curved apically (Fig. 11); claval commissure with 3–4 sparse punctures near scutellar margin, whilst claval commissure densely punctate along entire length in *G. sobrinus*; lateral margin of posterior opening of pygphore indented in *G. kozari*, posterior opening not indented laterally in *G. sobrinus*. *G. kozari* sp. nov. differs from *G. greeni* in having straight eye stalks, posterior edge of eyes touching anterior edge of pronotum (in *G. greeni* eye stalks projected, not touching anterior edge of pronotum); trifurcate carina of scutellum is flared (in *G. greeni* trifurcate carina is not flared); scutellar margin of clavus is only punctate basally (in *G. greeni* scutellar margin of clavus is completely punctate); peritreme divided into distinct anterior and posterior lobes with ostiole large and oval (Fig. 4) [in *G. greeni* peritremal lobes indistinct, ostiole smaller and almost rounded (Fig. 7)]. *G. kozari* sp. nov. differs from *G. unicolor* in having trapezoidal pronotum which is not constricted from any direction (in *G. unicolor* pronotum is constricted dorsally, ventrally, and laterally posteriad to pronotal callosities; dorsal supporting projection of peritreme almost straight (in *G. unicolor* dorsal supporting projection is moderately, evenly curved at entire length); and tarsomere I of hind leg subequal to combined length of tarsomeres II and III (in *G. unicolor* tarsomere I of hind leg is almost twice as long as combined length of tarsomeres II and III).

Distribution. *G. kozari* sp. nov. is only known from the Kayah-Karen montane rainforests ecoregion (North-western Thailand, Chiang Mai Province) (Fig. 14).

Etymology. Patronym, named in honour of Ferenc Kozár (1943–2013), excellent Hungarian Hemipterist, renowned specialist of scale insects (superfamily Coccoidea), pioneer of the implication and education of integrated plant protection in Hungary.

Germalus greeni (Distant, 1910)

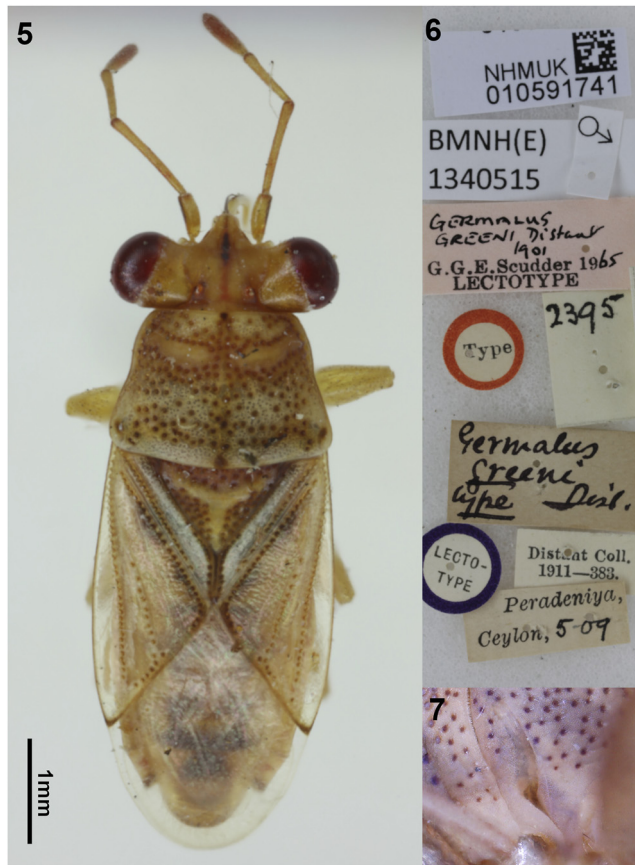
Figures 5–7 and 14.

Material examined:

Lectotype (present designation): circular purple lectotype label // circular red type label // “Peradeniya, / Ceylon, 5 09 // Distant Coll. / 1911–383. // *Germalus / greeni* / type Dist. // 2395 // GERMALUS GREENI Distant / 1901 / G. G. E. Scudder 1965 / LECTOTYPE / BMNH(E) / 1340515 / NHMUK / 010591741” (m, BMNH).

Additional specimens: S-INDIA Tamil Nadu state, / Nilgiri hills / 15 km SE of Kotagiri, / Kunjappani env., 75°56' E / 11°22' N, ca. 900 m, 10–12. vi. 1999, / Z. Kejval & M. Trýzna leg. // EX COLLECTIO / Z. JINDRA” (1 m, NMPC); “THAILAND bor. 7 - 12 May 1996 / Mae Hong Son, Sappong env. / 19° 27' N; 98° 20' E / J. Horák lgt. 1500 m // EX COLLECTIO / Z. JINDRA” (1 m, NMPC); “NW THAILAND / 8. - 18. v. 1992 Mae Hong / Son, Ban Huai Po, 1600- / 2000 m / J. Horák lgt.” (1 m, NMPC); “WEST MALAYSIA, PERAK / MAXWELL HILL, 900 – 1000 m / above TAIPING city / 12. – 16. 1. 1995 / lgt. S. BECVAR j. & s. // EX COLLECTIO / Z. JINDRA” (1 f, NMPC); “MALAYSIA-W: PERAK; –900 m, 40 km SE IPOH; / 4°25' N 101°23' E; Cameron / Highlands, RINGLET / 25. iv.-5.v.2001, M. Říha leg. // EX COLLECTIO / Z. JINDRA” (1 f, NMPC); “MALAYSIA, Sarawak / 3 - 9 March 1994 / Kapit distr., Rumah Ugap env. / Sut riv. Vall. / P. Bílek lgt.” (1 m, NMPC); “MALAYSIA Sarawak / Kapit distr. / 10 - 19 March 1994 / Sebong env. Baleh riv. / Petr Bílek lgt. // EX COLLECTIO / Z. JINDRA” (1 f, 1 m; NMPC);





Figs. 5–7. *Germalus greeni* Distant (1910) (lectotype male, BMNH): 5. dorsal view, 6. lateral view, 7. peritreme (scale bar = 1 mm for Fig. 5, Figs 6–7 not to scale)

“Zamboanga / Mindanao PI // CF Baker / Collector / 1927 // Exchange / USNM-60 // Ashlock Coll’n. / Bequest // *Germalus* / *sobrinus* / Stål / P.D. Ashlock 60” (1 f, SEMC).

Diagnosis. General colouration ochraceous with punctuation variably concolorous to dark brown. Ocular sulcus, surroundings of ocelli, scutellum anterior to median trifurcate carina and apical margin of corium sometimes suffused with dark brown. Antennomere I sometimes with brown decoration laterally; antennomeres II–IV with apex brown. Eye stalks projected. Pronotum slightly constricted laterally. Scutellum with well-developed, but not flared median trifurcate carina. Corial margin of clavus densely punctate at entire length. Ostiole small and oval; peritreme with straight, conspicuously elongate supporting projection.

Distribution. Sri Lanka lowland rain forests ecoregion; South Western Ghats moist deciduous forests ecoregion, India (Slater, 1964, present data). The presence of the species is now recorded from the Kayah-Karen montane rainforests ecoregion (North-western Thailand, Chiang Mai Province), Borneo lowland rain forests, Peninsular Malaysian montane rain forest



(Malaysia: Borneo and Malay Peninsula), and the Mindanao-Eastern Visayas rainforests ecoregions (Philippines, Mindanao Island, Zamboanga Peninsula).

Notes. In the original description of *G. greeni* neither the number of studied specimens nor their sex was specified (Distant, 1910). In the Hemiptera collection of BMNH only a single specimen bearing Distant's handwritten label was found. As the existence of additional syn-type(s) cannot be excluded, this specimen is considered as a syntype. The specimen was provided with a lectotype label by G.G.E. Scudder in 1965, but the designation has remained unpublished so far. In course of the present work the fixing of the identity of this species became



Figs. 8–11. *Germalus sobrinus* (Stål, 1858) (lectotype female, NHRS): 8. dorsal view, 9. lateral view (red arrow indicates location of peritreme), 10. labels, 11. peritreme (scale bar = 1 mm for Figs 8 and 9, Figs 10 and 11 no to scale)



necessary, thus the specimen is here formally designated as lectotype according to the International Code of Zoological Nomenclature (ICZN, 1999, Recommendation 73F).

***Germalus sobrinus* (Stål, 1860)**

Figures 8–11 and 14.

Material examined:

Lectotype (present designation): ‘Manilla // Kinberg // sobrinus / Stål // Typus // NHRS-GULI / 000007372’ (1 f, NHRS).

Further specimens: “Lubuagan, Kalinga, North Luzon / APRIL 2020” (1 f, MCRC); “Sandayong, Zamboanga Del Norte, Mindanao / JANUARY 2020” (1 f, MCRC); “Mt. Makiling / Luzon, Baker // Exchange / USNM-60 // Ashlock Coll’n / Bequest” (1 m, SEMC).

Diagnosis. Colouration generally ochraceous with punctuation either concolorous or brown. Vertex with brown longitudinal line medially extending from base of head to apex of clypeus. Antennomere I with irregular brownish spot laterally, antennomere IV suffused with red. Humeral angles with slightly defined, rounded brown spots. Eye stalks straight, posterior edge of eyes touching anterior edge of pronotum. Punctuation of pronotum rather sparse posteriad to callosities. Median trifurcate carina of scutellum well-developed, basally flared. Scutellar and corial margin of clavus punctate only basally; claval commissure densely punctate at entire length. Ostiole large, semitriangular; peritreme with dorsal supporting projection relatively short, curved. Posterior opening of pygophore lacking conspicuous indentation.

Distribution. Luzon rain forests, Luzon tropical pine forests, and Mindanao-Eastern Visayas rain forests ecoregions (Philippine archipelago) (Slater, 1964, present data).

Notes. In the original description of *G. sobrinus* neither the number of studied specimens, nor their sex was not specified. The presence of another syntypes cannot be excluded, therefore the specimen is considered a syntype and is here designated as lectotype formally according to the International Code of Zoological Nomenclature, 4th ed., recommendation 73F (ICZN, 1999).

***Germalus unicolor* (Montandon, 1907)**

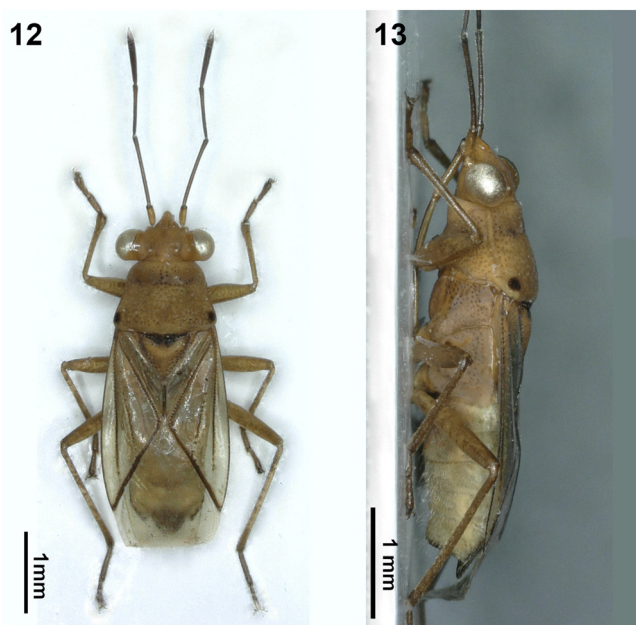
Figures 12–13 and 14.

Material examined: “125W m. v. light / BRUNEI: Temburong / District, ridge NE / of Kuala Belalong, // approx.300m alt. / October 1992 / J.H. Martin coll./ B M 1992-172” (1 m, BMNH); “MALAYSIA, Sarawak / 10 – 19 March 1994 / Kapit distr., Sebang env. Baleh riv. / P. Bilek lgt.” (2 f, 3m; NMPC); “SARAWAK Kapit distr. / 10 – 19 March 1994 / Sebang env. Baleh riv. / Petr Bilek lgt.” (f, NMPC); “INDONESIA Borneo occ. / Ng. Serawai distr. / Tontang env. 14-30 July 1993 / R. Dunda lgt. / (2f, NMPC).

Diagnosis. General colouration ochraceous. Antennomere IV suffused with red. Punctuation of thoracic dorsum brownish anteriorly to pronotal callosities, on scutellum and hemelytron. Humeral angles with a rounded brown spot. Margin of corium costal and apical margin of corium hemmed with brown. Head with eyes moderately stylate. Eye stalks straight, not touching anterior edges of pronotum. Pronotum slightly constricted behind callosities from all direction; pronotal callosities well-developed, but not bulging. Scutellum with trifurcate carina slightly flared basally. Both scutellar and corial margin of clavus punctate only in basal third of length. Peritreme provided with a dorsal supporting projection that is moderately elongate and evenly curved. Length of tarsomere I being almost twice as the combined length of tarsomeres II and III.

Distribution. Borneo lowland rain forests ecoregion (Borneo), and Java (Indonesia) (Slater, 1964, present data). The species was suspectedly introduced to Marquesas Islands (Van Duzee,





Figs. 12–13. *Germalus unicolor* (Montandon, 1907) (male, NMPC): 12. dorsal view, 13. lateral view (scale bar = 1 mm)

1932, 1935), however, according to a recent survey of the French Polynesian Geocoridae fauna, it is apparently not established (Kóbor, 2020b).

Notes. Montandon (1907) described the species based on a single specimen with type locality “Bornéo: Kinabalu”. The holotype was deposited in the Hungarian Natural History Museum, Budapest, Hungary (HNHM) according to the original description. In course of the study of the collection material of HNHM the author was unable to locate the specimen.

DISCUSSION

Germalus kozari sp. nov. is now described as the fourth species of genus *Germalus* distributed in the Indomalayan Region. The new species is closely related to *G. sobrinus* in exoskeletal morphology, but the shape of the dorsal supporting projection of the metathoracic scent efferent system readily separates the two species. From amongst the *Germalus* species outside of the Indomalayan Region, *Germalus australis* Malipatil (2013), *Germalus kinbergi* (Stål, 1860), and *Germalus victoriae* Bergroth (1895) are similar to the new species in skeletal characters (Malipatil and Blackett, 2013; Kóbor and Kondorosy, 2016). Morphologically coherent species groups were found within *Germalus* by Kóbor and Kondorosy (2022a). *G. australis*, *G. kinbergi*, *G. kozari* sp. nov., *G. sobrinus* and *G. victoriae* apparently form such a species group, called here as the *G. kinbergi* group (named after the species that was described first). Representatives of the species group can be distinguished from other *Germalus* species by the arrangement of the



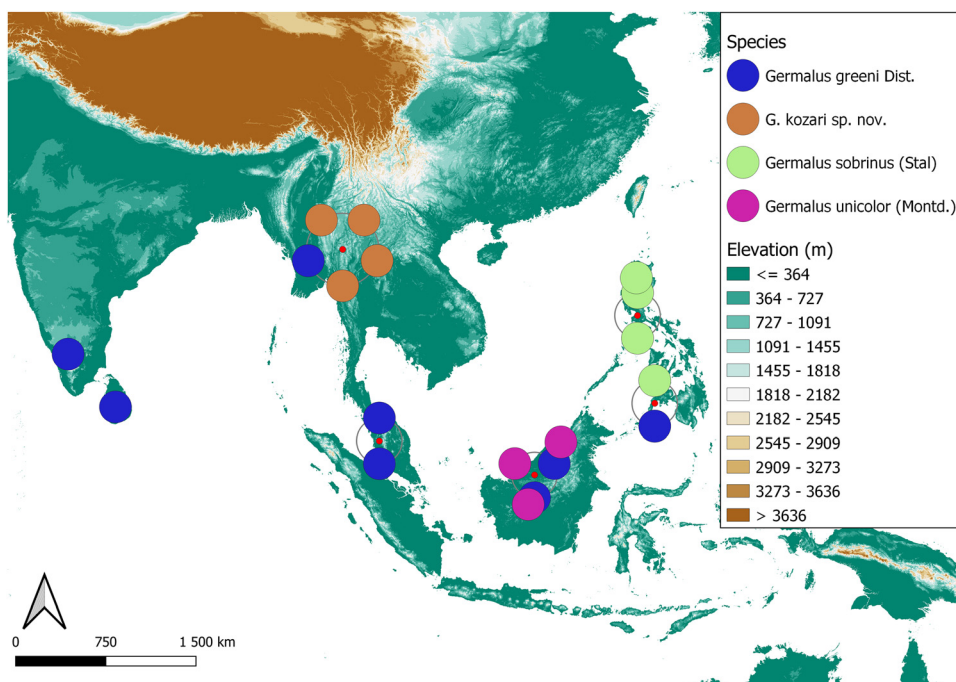


Fig. 14. Distribution map of *Germalus* species discussed in the present paper (smaller red dots indicate locations from where multiple specimens were collected, coloured spots around them representing the species)

ostiole and peritreme of metathoracic scent efferent apparatus: ostiole large, semitriangular; peritreme with anterior lobe conspicuously bulging, periostiole depression well-defined (in other *Germalus* species ostiole is rather small, oval; peritreme equally bulging, periostiole depression shallow or reduced). However, the exact relationship of the representatives of the group to other *Germalus* species should be investigated as part of a revision involving phylogenetic reconstruction.

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