

**A new species of *Sphaeridium*  
from northeastern India and Myanmar  
(Coleoptera: Hydrophilidae: Sphaeridiinae)**

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**Abstract.** A new Oriental species of the genus *Sphaeridium* Fabricius, 1775, *S. daemonicum* sp. nov., is described based on specimens recently collected in the Brahmaputra valley (lowland part of Arunachal Pradesh, India) and historical specimens from southern Myanmar. The new species differs from all other described Oriental species by its wide parameres partly enveloping the median lobe, small body size, and coloration of the body. It is unique among Oriental species by the presence of a series of small spines along the lateral margin of pronotum and elytra. In the latter character, it resembles the members of the Afrotropical *S. simplicipes* group.

**Key words.** Coleoptera, Hydrophilidae, Sphaeridiinae, Sphaeridiini, *Sphaeridium*, new species, taxonomy, India, Myanmar, Oriental Region

### Introduction

The genus *Sphaeridium* Fabricius, 1775 is the only representative of the tribe Sphaeridiini. The clade is sister to the species-rich tribe Megasternini of the mainly terrestrial subfamily Sphaeridiinae (SHORT & FIKÁČEK 2013). The genus currently contains 41 species: the majority of them (24 species) are distributed only or mainly in the Afrotropical Region, 8 species mainly in the Oriental Region, 6 in the Palearctic Region, two species on the islands of Malayan Archipelago and/or New Guinea, and a single species is known from Brazil (HANSEN 1999). Many species are widely distributed. Few western Palearctic species have been introduced to North America where they are now established (SMETANA 1978), and are also occasionally introduced to Afrotropical Region (BERGE HENEGOUWEN 1987). Most species of *Sphaeridium*

are coprophagous (e.g., HOLTER 2004), typically inhabiting dung of large herbivorous mammals (e.g., cow, horse, elephant, buffalo). The New Guinean *S. huijbregtsi* Berge Henegouwen, 1986 is thought to be necrophilous, as it was collected exclusively to carrion-baited pitfall traps (BERGE HENEGOUWEN 1986), and the Oriental coprophilous *S. quinquemaculatum* Fabricius, 1798 is also occasionally found in decaying corpse (F.-L. Jia, pers. comm.). Larvae occur in the same habitats as the adults, and are known to feed on larval Diptera (e.g., SOWIG et al. 1997).

The fauna of the Oriental Region was never revised as a whole, and for most species only original descriptions or old redescriptions exist (e.g., ORCHYMONT 1913, 1919, 1925, 1926, 1929, 1933). Most Oriental species are rather large-bodied with dark elytra and a yellow apical spot. The only small-bodied species, the common and widespread *S. quinquemaculatum*, is easy to recognize by its characteristic spotted color pattern of the elytra. It was hence surprising when the first author collected a small *Sphaeridium* with yellow elytral margins but no spots on the elytral disc in northeastern India. Even more surprisingly, inspection of the unidentified material deposited in the Department of Entomology, National Museum in Prague revealed three additional specimens of the same species from Myanmar. The comparison with known *Sphaeridium* species revealed that the species is undescribed, and we provide its description in this contribution.

### Material and methods

The holotype and three paratypes of the new species were dissected, the genitalia were placed in alcohol-soluble Euparal resin on a small piece of glass attached below the beetle. Label data are cited verbatim, using a slash (/) for dividing separate rows and a double-slash (//) for dividing separate labels. Habitus photographs were taken using Canon D-550 digital camera with Canon MP-E65mm f/2.8 1–5× macrolens. Drawings were prepared using camera lucida attached to an Olympus BX40 compound microscope (aedeagus) or traced from the photographs taken the above camera macrolens (male protarsus, pronotum, abdomen). Superficial structures were examined using a light diffuser. All specimens of the new species are deposited in the collection of the Department of Entomology, National Museum in Prague, Czech Republic (NMPC).

The new species was compared to the specimens in the collection of NMPC identified during last few years by the comparison with specimens loaned from several European museums (Museum für Naturkunde, Humboldt University, Berlin, Germany; Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium; the Natural History Museum, London, UK) identified by A. d'Orchymont or A. van Berge Henegouwen.

### Taxonomy

#### *Sphaeridium daemonicum* sp. nov.

(Figs 1–11)

**Type locality.** India, Arunachal Pradesh State, 3.6 km NW of Bhalukpong, 280 m a.s.l., 27°01'57"N 92°36'24"E.

**Type material.** HOLOTYPE: ♂ (NMPC): "INDIA: Arunachal Pradesh (16) / 3.6 km NW of Bhalukpong / 7.v.2008, 280m / 27°01'57"N 92°36'24"E / Fikáček, Podskalská, Šípek lgt. // cow excrements on the road / in secondary tropical evergreen / forest". PARATYPES: **INDIA:** 1 ♂ (NMPC): same label data as the holotype. **MYANMAR:** 3 ♂♂ (NMPC): "TENASSERIM, Birmania / coll. J. V. Helfer / National Museum Prague".

**Description.** Body widely oval, rather depressed in lateral view. Body length 3.7–4.4 mm (holotype: 4.2 mm), body width 2.7–3.1 mm (holotype: 3.0 mm).

**Coloration.** Dorsal surface of head black, with minute vaguely defined reddish spots anterior to each eye; labrum reddish brown (Fig. 4). Pronotum black, lateral margin with a wide sharply delimited yellowish stripe ca. 4–5× wider than the lateral marginal bead; border of the yellow spot sinuate posteriorly (Fig. 2). Elytra dark brown to black, with a large yellowish spot extending over apical third of elytra and reaching ca. elytral midlength along suture, laterally almost reaching elytral base on lateralmost interval (Figs 1–2, 5); epipleuron yellow. Ventral surface yellowish with the following pattern of darker spots (Fig. 3): head blackish in anterior part of mentum, at anterior margin of submentum and along gular sutures; ventral surface of mesothorax with darker portions laterally of mesoventral elevation; metaventrite with black pentagonal central spot and black stripes along anterior and lateral margins, parallel to posterior margin, and on each side one additional arising posterolaterally of central pentagon and reaching ca. 0.75 of distance towards anterolateral corner (when combined, metaventrite bears an apparent trilobate dark spot); metanepisterna each with dark spot centrally. Abdominal ventrites largely yellow, ventrites 2–5 each with a narrow dark stripe along anterior margin slightly extending laterally (Fig. 11). Maxillary palpi reddish brown. Antennomeres 1–5 brownish, antennal club black. Legs yellow, meso- and metafemur each with a darker (brownish) central rounded spot; tibiae bearing strong dark spines; meso- and metatarsi slightly darker than femora and tibiae, reddish brown; protarsus yellow. Hind wings darkly tinted.

**Morphology. Head.** Dorsal surface with moderately dense uniform punctation consisting of minute sharply impressed punctures mixed with few slightly larger punctures both on clypeus and frons; interstices without microsculpture; frontal sutures distinct as bare stripes lacking punctation. Eyes small, deeply excised on anterior margin, interocular distance 6.8× the maximum width of one eye. Labrum largely exposed, straight on anterior margin, pubescent anteriorly, microreticulate. Mentum ca. 2× wider than long, bisinuate on anterior margin, lateral margins convex; surface with weak moderately dense setiferous punctation, interstices with a sculpture consisting of transverse ridges anteriorly. Antennal club rather compact.

**Prothorax.** Pronotum with a deeply bisinuate posterior margin; posterolateral corners rectangular. Punctation of pronotum uniform, moderately dense, similar to that on head. Pronotal interstices without microsculpture. Marginal bead very wide at lateral margin and extremely narrow along anterior margin, posterior margin without marginal bead. Lateral margin with a series of small but stout spines. Prosternal process wide and slightly convex at the base and long, bearing 6 strong spines mesally, and a large spine on its apex.

**Mesothorax.** Mesoventrite with a rather high median elevation bearing numerous strong spines. Scutellar shield 2.3× longer than wide. Elytra rounded separately at apex, each with a wide marginal bead along lateral and anterior margins; lateral margin with a series of small but stout spines. Each elytron with 10 well developed even though sometimes rather irregular elytral series, series 1 in apical two thirds contiguous with sharply impressed sutural stria; sutural stria connected to marginal elytral bead (Fig. 5). Serial punctures ca. 3× as large as interval punctation and hence easily distinguishable from general punctation, except laterally.

**Metathorax.** Metaventrite with distinct median distrimen; median portion glabrous, bearing sparse punctation, interstices with strong microsculpture consisting of transverse ridges; lateral portions of metaventrite with dense and coarse punctation, densely pubescent. Metathoracic wings well developed.

*Legs.* Procoxa on dorsal surface with numerous long spines. Profemur ventrally densely pubescent except on apical fifth. Protibia with numerous large stout spines. Male protarsus modified, with tarsomeres 1–4 shortened and slightly widened, ca. subequal in length, tarsomere 5 ca. as long as tarsomeres 1–4 combined, ca. 1.5× longer than wide (Fig. 9). Anterior claws unequal; the larger claw wide, strongly bent, blunt at apex in lateral view, with a distinct spine on mesal margin; the other claw small, tiny, regularly arcuate. Mesofemur base with moderately dense spiniferous punctation, intervals with microsculpture consisting of transverse ridges; metafemur with sparse spiniferous punctations, intervals with sculpture as in mesofemur. Both meso- and metatibia with numerous long and stout spines, each with two spines on ventral surface. Meso- and metatarsus with basal tarsomere nearly as long as tarsomeres 2–5 combined, on ventral face bearing a series of stout spines and ventral pubescence; tarsomeres 2–4 with ventral pubescence only; claws simple, regularly curved.

*Abdomen* with 5 ventrites, basal ventrite without median carina; all ventrites completely covered by dense pubescence; abdominal apex entire, without apical emargination.

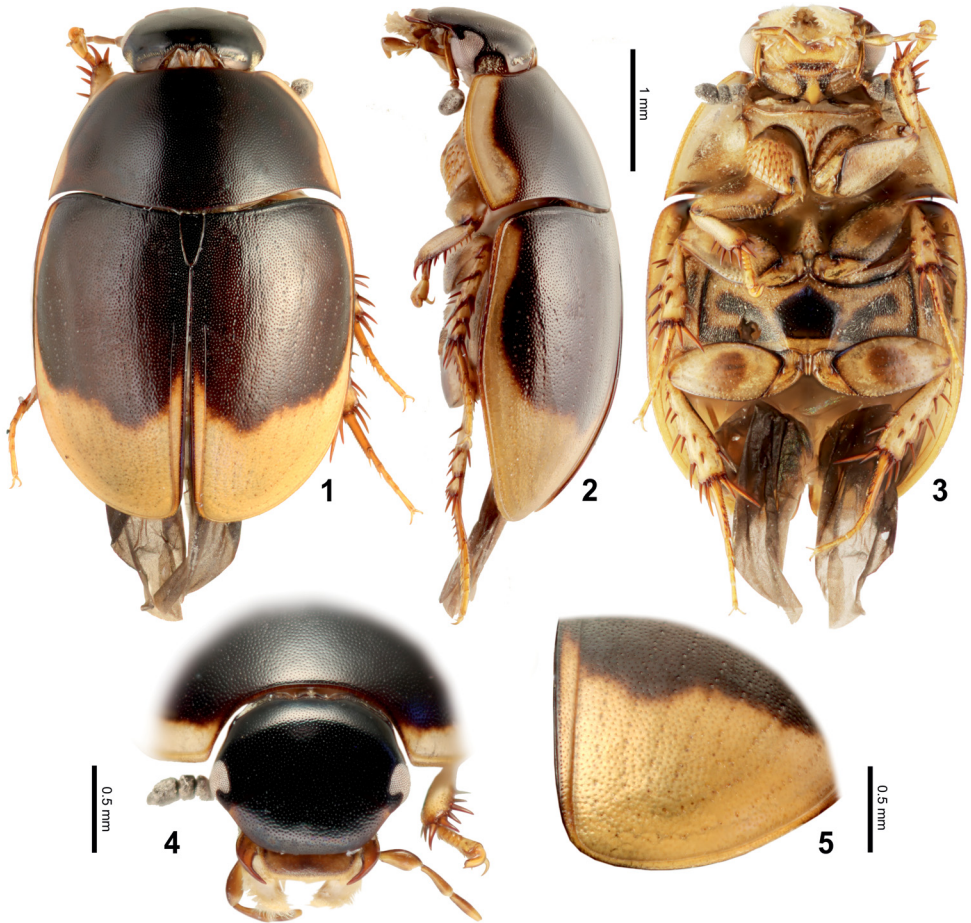
*Male genitalia* (Figs 6–8). Aedeagus 1.35–1.50 mm long (holotype: 1.35 mm). Median lobe much longer than parameres, slightly widening from base to ca. midlength, slightly constricted in apical fourth and then again slightly widened subapically; apex of median lobe arcuate, with apical subrectangular projection, gonopore subapical. Paramere with narrow dorsal portion and wide ventral portion, and hence partly enveloping median lobe; apex with a series of stout setae on the ventral portion. Phallobase very short, asymmetrical.

**Sexual dimorphism.** Female unknown.

**Variation.** All examined specimens are very similar to each other in most characters, with the only variation observed being in the extent of the dark coloration on the base of abdominal ventrites (the dark spot may be very narrow and nearly without the lateral extensions, or with very distinct lateral and smaller sublateral extensions as in Fig. 11), in the number of strong spines on the median portion of the prosternum (4–6 spines are present in examined specimens), and in the intensity of the dark spot on meso- and metafemora (rather inconspicuous in a single slightly teneral specimen).

**Differential diagnosis.** The new species may be easily recognized from other Oriental species of the genus based on its small body size, elytra with sharply delimited yellow spot in apical third (Figs 1–2, 5) and pronotum with a wide yellow lateral stripe on each side (Fig. 2), the yellow coloration of the ventral surface with a characteristic trilobed spot on the metaventrite (Fig. 3), rectangular posterolateral corners of the pronotum, the aedeagus with wide parameres enveloping the median lobe (Figs 6, 8), and the median lobe slightly constricted and then subapically widened (Fig. 6). It is unique among Oriental species also in lateral margin of pronotum and elytra bearing a series of small spines (Fig. 10).

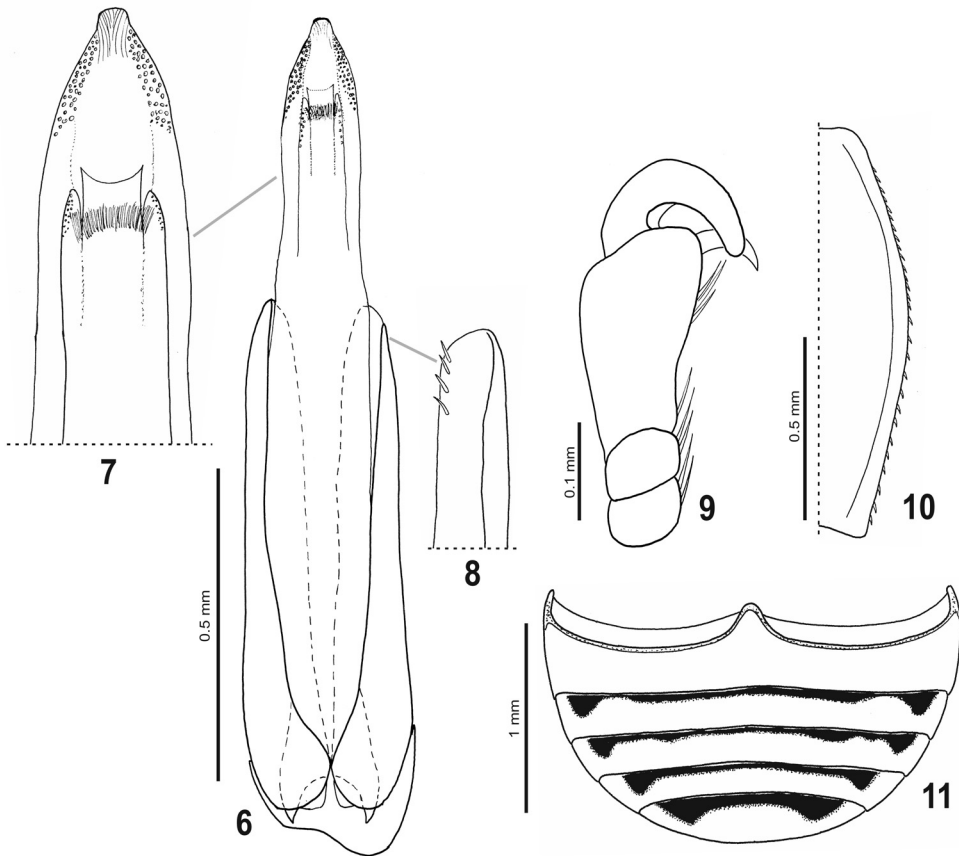
The majority of the Oriental-Australian *Sphaeridium* is characterized by long and very narrow apical portion of parameres, which are not enveloping the median lobe. Of these species, *S. dimidiatum* Gory, 1834 and *S. discolor* Orchymont, 1933 differ from the new species also by obliquely cut off posterolateral corners of the pronotum and the dark general coloration of the ventral surface. The species of the *S. seriatum* species group (*S. seriatum* Orchymont, 1913, *S. reticulatum* Orchymont, 1929, *S. severini* Orchymont, 1919, *S. vitalisi* Orchymont, 1925 and probably also *S. kolleri* Orchymont, 1925) also bear long and very narrow parameres, but otherwise they may resemble the new species by the elytral coloration and the generally



Figs 1–5. Holotype of *Sphaeridium daemonicum* sp. nov. 1 – dorsal view; 2 – lateral view; 3 – ventral view; 4 – detail of head and anterior leg; 5 – elytral apex.

yellow ventral body surface with dark patterns. All these species are however much larger ( $> 6.0$  mm) and can be easily distinguished by the abdominal ventrites bearing alternating yellow and dark patches on each ventrite, which gives the whole abdomen a checkboard pattern. The species of this group in which males are known (*S. seriatum*, *S. reticulatum*, *S. severini*), moreover differ also by the shape of the median lobe. The New Guinean species *S. huijbregtsi* and *S. flavomaculatum* Orchymont, 1924 also differ from the new species by narrow parameres, larger body size, abdominal ventrites with black spots rather than dark on the anterior margin, and also by the yellow anterior portion of the head.

*Sphaeridium quinquemaculatum* is the only Oriental species which is comparable to the new species in size, and has parameres enveloping the median lobe, albeit being rather narrow apically. The species is, however, easy-to-distinguish from *S. daemonicum* sp. nov. based



Figs 6–11. *Sphaeridium daemonicum* sp. nov. (6–10 – holotype, 11 – paratype from Tenasserim): 6 – aedeagus; 7 – apex of the median lobe; 8 – apex of paramere; 9 – protarsus (only tarsomeres 3–5 shown); 10 – lateral margin of pronotum; 11 – abdominal ventrites.

on elytral coloration (with additional set of reddish spots anterior of the yellow apical spot, often merging into a single large yellowish-reddish multilobate spot, rarely these spots are missing), the mostly dark coloration of the ventral surface, meso- and metafemora lacking the dark central spot, and ventral face of metatibia usually bearing a single spine. The aedeagus, albeit rather similar to *S. daemonicum* on the first view, has longer and narrower parameres and its median lobe is more parallel-sided, lacking the subapical constriction characteristic for *S. daemonicum*.

The only other Oriental species similar to *S. daemonicum* seems to be an undescribed species also found among the material from Tenasserim collected by J. V. Helfer in NMPC. This species is very similar to *S. daemonicum* in most aspects including the wide parameres enveloping the median lobe and the general coloration. In contrast to *S. daemonicum*, the spe-

cies has a different median lobe (more parallel-shaped and rounded and apex), the prosternal process bears less and shorter spines, and the ventral portion of the metatibia bears 3 spines. The species is not described here pending the discovery of more recently collected specimens.

When compared to the Afrotropical species of *S. simplicipes* group (with which *S. daemonicum* shares the small body size and presence of small spines on lateral pronotal margin), the new species easily differs from all species but *S. bottegoi* Marcuzzi, 1943 by the presence of two spines on the ventral surface of metatibiae, and from all species by the genital morphology (BERGE HENEGOUWEN 1992).

**Etymology.** The species name is the Latin adjective *daemonicum* (-us, -a, -um) (= demonic, devilish) referring to the characteristic color pattern of the metaventre of the new species, which resembles the horns of a hell's demon.

**Biology.** Both Indian specimens were collected in cow dung in secondary evergreen tropical forest, together with an aberrant specimen of *S. quinque maculatum* (in terms of color pattern of elytra and quite large body size). The area in which the specimens were collected is the part of the lowland Brahmaputra valley. No biology data are known for historical specimens examined.

**Distribution.** Recently collected in the Brahmaputra valley (lowland portion of Arunachal Pradesh, India). Three historical specimens examined by us were collected by the Czech doctor, traveller and entomologist J. V. Helfer in Tenasserim (i.e. the present-day Tanintharyi Region in southern Myanmar), where he worked and collected in years 1837–1838. The specimens were originally deposited in a historical cabinet only containing Helfer's specimens from Tenasserim donated to the National Museum by Helfer's wife Paulina in 1843, which however did not bear any locality labels; these were added recently when the specimens were transferred to modern entomological boxes. Since Helfer collected also around Kolkata where he lived before starting his work in Tenasserim, and to where he was occasionally returning even during the years spent in Tenasserim (HELPER-NOSTITZ 1878), we cannot totally exclude the possibility that the three historical paratypes of *S. daemonicum* sp. nov. were collected in around Kolkata and not in southern Myanmar, despite being labelled as such. On the other hand, since the species occurs in lowlands and all *Sphaeridium* species are quite widespread (HANSEN 1999), the occurrence of *S. daemonicum* sp. nov. in northeastern India and southern Myanmar seems also easily possible.

## Discussion

Very little is known about the taxonomy of the genus *Sphaeridium*, and the phylogenetic relationships between the species were never analyzed and discussed. The genus is not even divided into species groups. The only exception is the *S. simplicipes* group defined by BERGE HENEGOUWEN (1992) for a small-sized species characterized by the presence of stout spines on the prosternum and procoxae and the presence of short spines on the lateral margin of the pronotum. Four Afrotropical species were included into this group: *S. bottegoi*, *S. dolum* Balfour-Browne, 1950, *S. eximium* Berge Henegouwen, 1992 and *S. simplicipes* Marcuzzi, 1943. *Sphaeridium daemonicum* sp. nov. shares all diagnostic characters of the *S. simplicipes* species group, and it is unique among the Oriental species by the presence of the spines on the lateral pronotal margin. At the same time, *S. daemonicum* sp. nov., clearly differs from

the Afrotropical species of this group by the combination of the coloration, number of ventral spines of the posterior tibia and the morphology of the male genitalia. This indicates that *S. daemonicum* sp. nov. may be the first member of the otherwise Afrotropical species group in the Oriental Region. Additional studies are, however, necessary to understand the relationships between Oriental and Afrotropical species of *Sphaeridium*.

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