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Taxonomic notes on *Laccobius*, subgenus *Glyptolaccobius*, with new records and description of four new species (Coleoptera: Hydrophilidae)

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Abstract. Four new species of *Laccobius* Erichson, 1837 in the subgenus *Glyptolaccobius* Gentili, 1989 are described: *L. guttalis* sp. nov. (Nepal), *L. hanka* sp. nov. (India: Arunachal Pradesh), *L. josefi* sp. nov. (India: Arunachal Pradesh) and *L. sipeki* sp. nov. (India: Meghalaya). New records are provided for the following species of the subgenus *Glyptolaccobius*: *L. egregius* Gentili, 1995 (India: Uttarakhand), *L. eliogentilii* Hebauer, 2002 (Bhutan, India: Meghalaya), *L. sharmai* Gentili, 1995 (Nepal), and *L. silvester* Gentili, 2006 (India: Uttaranchal). *Laccobius moriyai* Kamite, Ogata & Hikida, 2007 is compared with the remaining species of the subgenus *Glyptolaccobius* and the male genitalia of *L. pluvialis* Gentili, 2006 are redrawn. An updated identification key of *Glyptolaccobius* species is provided, the male genitalia of all new and some additional species are illustrated and habitus photographs of *L. guttalis* sp. nov., *L. moriyai*, *L. hanka* sp. nov. and *L. sipeki* sp. nov. are provided. Differential diagnosis of the subgenus *Glyptolaccobius* is modified to accommodate the newly described taxa.

Key words. Coleoptera, Hydrophilidae, *Laccobius*, *Glyptolaccobius*, taxonomy, new species, key to species, hygropetric habitat Oriental Region, Palaearctic Region

Introduction

The subgenus *Glyptolaccobius* Gentili, 1989 of *Laccobius* Erichson, 1837 was recently revised by Gentili (2006) who recognized 12 species, most of which inhabit wet rocks and seepage habitats. Since that revision, Kamite et al. (2007) described *L. moriyai* Kamite, Ogata & Hikida, 2007 from Japan, and additional material of *Glyptolaccobius* collected in seepage

habitats has become available for study. Here we describe four new species of the subgenus and provide new and additional records of some described species. Differential diagnosis of the subgenus *Glyptolaccobius* is modified to accommodate the newly described taxa and the biology and distribution of the subgenus is briefly discussed.

Material and methods

We examined 257 specimens of *Glyptolaccobius* in the course of this study. All holotypes, some paratypes and some additional specimens were dissected; the aedeagophores were either placed in dry condition on the same label as the beetle or mounted in dimethyl hydantoin formaldehyde resin (DMHF, a water-soluble mounting medium) on a transparent plastic card pinned below the specimen.

When label data are cited verbatim, we use a slash (/) for dividing separate rows and a double-slash (//) for dividing separate labels; our notes are mentioned in square brackets. The specimens were studied using a Beck Kassel CBS stereo microscope at 40–100× magnifications. Drawings of aedeagophores were traced from photographs prepared using a Nikon Eclipse TS100 compound microscope. Habitus photographs were taken using an Olympus Camedia C-5060 camera attached to an Olympus SZX9 stereo microscope and subsequently edited in Adobe Photoshop 7.0.

The morphological terminology largely follows Gentili (2006). Two types of elytral rows of punctures are recognized in species with serially arranged elytral punctation: 10 longitudinal rows of setiferous, more impressed punctures are called primary elytral rows; these primary rows are alternating with 10 rows (interstriae) of sparser and fainter punctures, which are called secondary elytral rows.

The specimens are deposited in the following collections:

CSHS André Skale collection, Hof / Saale, Germany;
ELEU Entomological Laboratory, Faculty of Agriculture, Ehime University (M. Sakai);
ISNB Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium (P. Limbourg);
KSEM Natural History Museum, University of Kansas (A. Short);
MSNV Museo Civico di Storia Naturale, Verona, Italy (L. Latella);
NHMW Naturhistorisches Museum,Wien, Austria (A. Komarek, M. A. Jäch);
NKME Naturkunde Museum Erfurt, Germany (C. Schmidt);
NMPC National Museum, Praha, Czech Republic (M. Fikáček, J. Hájek).

Differential diagnosis of *Glyptolaccobius*

The examination of new species and specimens allowed further clarification and refinement of the differential characters of *Glyptolaccobius* with respect to other subgenera of *Laccobius* as follows: (1) antennal cupule asymmetrical; (2) eyes not protruding; (3) eyes transverse, oblique, more or less reniform; (4) elytra with parasutural furrow; (5) elytral epipleura and pseudoepipleura more or less oblique; (6) metaventrite and abdominal ventrite 1 without longitudinal carina; (7) legs comparatively short; (8) natatory setae nearly absent on meso- and metatarsi; (9) body shortly oval, not elongate (ratio of total length / total width = 1.6–1.7).

Key to the species of the subgenus *Glyptolaccobius*

1. Hind tibiae straight. Total length 1.9–2.2 mm. Aedeagus as in Gentili (2006: Figs. 30–31. ..... ***L. senguptai*** Gentili, 1979
– Hind tibiae curved. Total length 1.4–2.6 mm. 2
2. Elytra with longitudinal rows of punctures. 3
– Elytra with unordered punctures. 12
3. Rows of punctures sulciform on entire elytra. Mentum rugose. Apices of parameres widely swollen. Total length 2.4–2.6 mm. Aedeagus as in Gentili (2006: Figs. 12–14). .... ***L. celsus*** Gentili, 1989
– Rows of punctures not sulciform or sulciform only near suture. Mentum smooth or microgranulated. Apices of parameres not or scarcely swollen. 4
4. Entire elytra shiny black, without yellow lateral margins. Apex of median lobe widely swollen (Fig. 4). Total length 2.3–2.5 mm. .... ***L. moriyai*** Kamite, Ogata & Hikida, 2007
– At least lateral margins and apex of elytra yellowish. Apex of median lobe swollen or not swollen. Total length less than 2.3 mm. 5
5. Posterior pronotal margin entirely dark (as in Fig. 10). 6
– Posterior pronotal margin yellowish at least laterally (as in Figs. 7, 9). 7
6. Elytral base with indistinct yellowish spot. Last maxillary palpomere symmetrical with acute apex (Fig. 10). Aedeagus as in Fig. 6. Total length 1.8–1.9 mm. .... ***L. sipeki* sp. nov.**
– Elytral base uniformly black. Last maxillary palpomere asymmetrical, with straight inner margin and convex outer margin. Aedeagus as in Gentili (2006: Figs 34–35). Total length 2.2–2.3 mm. ..... ***L. silvester*** Gentili, 2006
7. Head with pale preocular spots (Fig. 9). Last maxillary palpomere asymmetrical, with truncate apex. Apex of median lobe widely swollen (Fig. 3). Total length 2.2 mm. ....***L. josefi* sp. nov.**
– Head entirely black. Last maxillary palpomere symmetrical or asymmetrical. Apex of median lobe swollen or not swollen. 8
8. Median line of abdominal ventrite 1 bearing vertical thorn (best seen on disarticulated abdomen). Last maxillary palpomere symmetrical, with truncate apex. 9
– Abdominal ventrite 1 simple, without vertical thorn or median carina. Last maxillary palpomere asymmetrical. 10
9. Mentum smooth. Elytra with yellowish dots. Parasutural furrow nearly as long as half of elytral length. One or two elytral striae next to parasutural furrow sulciform at midlength. Aedeagus as in Gentili (2006: Figs. 23–26). Total length 1.9–2.2 mm. .... ***L. munus*** Gentili, 1995
– Mentum microgranulated. Elytra with yellowish dots and stripes; parasutural furrow nearly as long as one third of elytral length. Elytral striae next to parasutural furrow not sulciform. Aedeagus as in Gentili (2006: Figs. 32–33). Total length 2.0–2.2 mm. .... ***L. sharmai*** Gentili, 1995

10. Basal fourth of the interval between suture and first elytral punctural row densely microgranulated and covered by oblique transverse lines. Apices of parameres swollen (Fig. 1). Total length 2.1–2.2 mm. ..... ***L. guttalis* sp. nov.**
– Parasutural space without microstructure near elytral base. Apices of parameres not swollen. 11
11. Punctures of secondary elytral rows nearly as large and dense as those of primary rows. Median lobe wide, tongue-shaped, constricted at midlength (Fig. 2). Total length 1.4–1.8 mm. ..... ***L. hanka* sp. nov.**
– Punctures of secondary elytral rows scarcer and smaller than those of primary rows. Median lobe wide at base, then regularly narrowing apicad (Gentili 2006: Figs 36–38). Total length 1.7–2.0 mm. ..... ***L. shorti*** Gentili, 2006
12. Elytral surface with pale stripes and dots. Parasutural furrow short, recognizable barely in the posterior fifth of elytra. 13
– Elytral surface except margins and apex uniformly dark. Parasutural furrow longer, exceeding the posterior fifth of elytra. 15
13. Elytra with distinct yellow stripes and spots along suture. Phallobase distinctly shorter than parameres; median lobe straight, without subapical swelling (Gentili (2006), Figs. 15–16). Total length 1.6–1.8 mm. ..... ***L. eliogentilii*** Hebauer, 2002
– Elytra without distinct yellow stripes or spots along suture. Phallobase nearly as long as parameres, or median lobe with subapical swelling. 14
14. Each elytron with two yellow/white spots basally; apical half of elytra with yellow-white stripes. Phallobase nearly as long as parameres, median lobe without swelling (Gentili (2006: Figs. 20–22). Length 1.7–2.0 mm. ..... ***L. jaechi*** Gentili, 1988
– Each elytron with a slender yellow spot basally; apical half with yellow to chestnut stripes. Phallobase distinctly shorter than parameres, median lobe with subapical swelling (Fig. 5). Length 1.7–2.2 mm. ..... ***L. pluvialis*** Gentili, 2006
15. Parasutural furrow not reaching elytral apex. Head and pronotum with light shagreen at 80× magnification. Inner side of parameres with longitudinal subapical excision (Gentili 2006: Figs. 8–11). Total length 1.8 mm. ..... ***L. egregius*** Gentili, 1995
– Parasutural furrow reaching elytral apex. Head and pronotum smooth, without shagreen at 80× magnification. Parameres without longitudinal excision. 16
16. Anterior apex of mesoventral keel with vertical tooth. Punctures of head and pronotum bearing black setae. Apex of each paramere hooked at interior side (Gentili 2006: Figs. 17–19). Length 1.8–2.1 mm. ..... ***L. incisus*** Gentili, 1989
– Anterior apex of mesoventral keel without apparent vertical tooth. Punctures of head and pronotum bearing pale setae. Apices of parameres not hooked (Gentili 2006: Figs. 5–7). Length 1.7 –2.0 mm. ..... ***L. affinis*** Knisch, 1927

New data and new species

Laccobius (*Glyptolaccobius*) *egregius* Gentili, 1995

Type locality. India, Uttar Pradesh [=Uttarakhand], Kumaon, Gori Valley, 2300 m a.s.l.
Additional material examined. INDIA: Uttarakhand: ca. 55 km north-east of Bageshwar, east of Munsyiari, 2200–2400 m a.s.l., Z. Kejval & M. Trýzna leg., 6–8.vii.2003, 2 ♂♂ 1 ♀ (NMPC, MSNV).

Notes. The longitudinal excision of the parameres as well as sternite 9 (= 'genital segment' sensu Gentili (2006)) are slightly longer in the two males than in the types. The type locality was originally situated in the Himalayan district of Uttar Pradesh State (India), which was fused with those of the former Uttaranchal State into the Uttarakhand State in 2000.

Laccobius (*Glyptolaccobius*) *eliogentilii* Hebauer, 2002

Type locality. Nepal, Annapurna Region (NW of Pokhara), S slope of Krapa Danda, 1800–1900 m a.s.l.
Additional material examined. BHUTAN: Sarpang Province: 14 km SE Dhamphu, ca. 1365 m, 26°56′21″N 90°13′32″E, 26.11.2005, leg. M. Jäch (26), 1 ♂ (NHMW). **INDIA: Meghalaya:** E Khasi Hills, 11 km SW Cherrapunjee, Laitkinsew 25°12′N, 91°40′E, 460 m, Fikáček, Podskalská, Šípek leg. 21–24.iv.2008, wet rock with algae, blue algae and fallen leaves at the side of a waterfall on a small river surrounded by tropical forest, ca. 200 m upstream from living bridge [= bridge made of living roots of large *Ficus* trees], 1 ♂ 1 ♀ (NMPC).

Note. First record of *L. eliogentilii* for India; previously known from Nepal and Bhutan. For details on the Indian locality see *L. sipeki* and Fig. 11.

Laccobius (*Glyptolaccobius*) *guttalis* sp. nov.

(Figs. 1, 7)

Type locality. Central Nepal, Bagmati, Sindhupalchok, Sarmatang, 2500 m a.s.l..
Type material. Holotype: ♂ (NKME): 'C. NEPAL, Bagmati / Sindhupalchok / 2500 m, Sarmatang / 03–08.VI.1989 / leg. C. Holzschuh'.

Description. Total length 2.15 mm, total width 1.25 mm. Maximum length / maximum width ratio 1.7. Body wide oval, convex, maximum width in anterior elytral third.

Head. Coloration entirely black, with rare and inconspicuous punctures; shining, smooth without microsculpture; 'systematic punctures' indistinct; anterolateral branches of frontoclypeal suture conspicuous and punctate at 100×. Labrum black, trapezoid, without specula; anterior margin nearly straight, slightly emarginated medially; lateral margins oblique, posterior margin crescent-shaped. Eyes oblong, oblique, closest to each other posteriorly, not protruding laterad, interocular distance equal to 2.5× of width of one eye; postocular portion of tempora short. Mentum flat, smooth without punctures, emarginated anteriorly. Submentum and gula microgranulate. Maxillary palpi yellow-brown; palpomere 1 thin and short; palpomeres 2 and 3 nearly equal in length; palpomere 3 dilated at apex; palpomere 4 elongate, nearly twice as long as palpomere 3, asymmetrical, inner margin straight and outer margin convex, apex truncate. Eight antennomeres; scape longer than antennomeres 2–4 combined; pedicel cone-shaped; intermediate antennomeres (antennomeres 3–4) very short; cupule asymmetrical, oval in ventral view, crescent-shaped and emarginate in dorsal view; antennal club loose, bearing densely arranged setae, antennomeres 6 and 8 nearly equal in length, antennomere 6 wider, antennomere 7 shorter and narrower.

Thorax. Pronotum transverse, 0.35× as long as wide; black with yellowish lateral margins, yellow margin widened posteriorly and continuing as fine yellow strip along base; surface smooth, without microsculpture, with some sparse and faint punctures. Prosternum black, with longitudinal keel. Scutellar shield equilateral, black, bearing very small punctures. Mesoventrite with longitudinal keel simple, not tuberculate anteriorly. Elytra combined slightly elongate, ca 1.20× as long as wide; shining black with yellowish-brown lateral margins and apices, and pale yellow dots and stripes; 10 longitudinal rows of setiferous, more impressed

punctures alternating with 10 rows (interstriae) of sparser and fainter punctures. Parasutural space covered by oblique lines reaching first punctural row in anterior fourth and then forming a flat and shining stripe separating suture from parasutural furrow, stripe and furrow disappearing just before elytral apex. Epipleura and pseudoepipleura oblique, nearly vertical. Metaventrite setiferous, with median longitudinal glabrous area posteriorly.

Legs. Fore coxae and trochanters granulate, pubescent; fore femora setiferous on basal third, smooth distally, with tibial groove; fore tibiae smooth, with stiff setae and two apical spurs. Middle femora with tibial grooves; ventral face of middle tibiae with three longitudinal rows of stiff setae and sulcus between two longitudinal ridges. Hind trochanters smooth and shining; hind femora smooth, with scarce punctures and tibial grooves; hind tibiae curved, ventral face with three longitudinal rows of stiff setae and longitudinal sulcus between two ridges.

Abdomen. Ventrites 1–4 smooth, with lateral setae; ventrites 5–6 wrinkled.

Aedeagus (Fig. 1). Total length 0.68 mm. Parameres slightly longer than phallobase, slightly overlapping apex of median lobe. Median lobe narrow, slightly widened in apical 0.4, with longitudinal excision ventrally; apical portion broadly rounded.

Differential diagnosis. *Laccobius guttalis* sp. nov. belongs to a group of species with curved hind tibiae, longitudinal rows of elytral punctures and black elytral surface with yellowish dots and stripes (together with *L. josefi* sp. nov., *L. munus* and *L. sharmai*). It differs from the other three species by the presence of transverse lines in the anterior part of the parasutural stripe and the shape of the aedeagus, with the apical portion of the median lobe swollen and the median lobe bearing a longitudinal ventral excavation (Fig. 1).

Etymology. From a drop (Latin: *gutta*), alluding to the preferred seepage habitat of *Glyptolaccobius*.

Bionomics. Unknown.

Distribution. Known only from the type locality in Nepal.

Laccobius (*Glyptolaccobius*) *hanka* sp. nov.

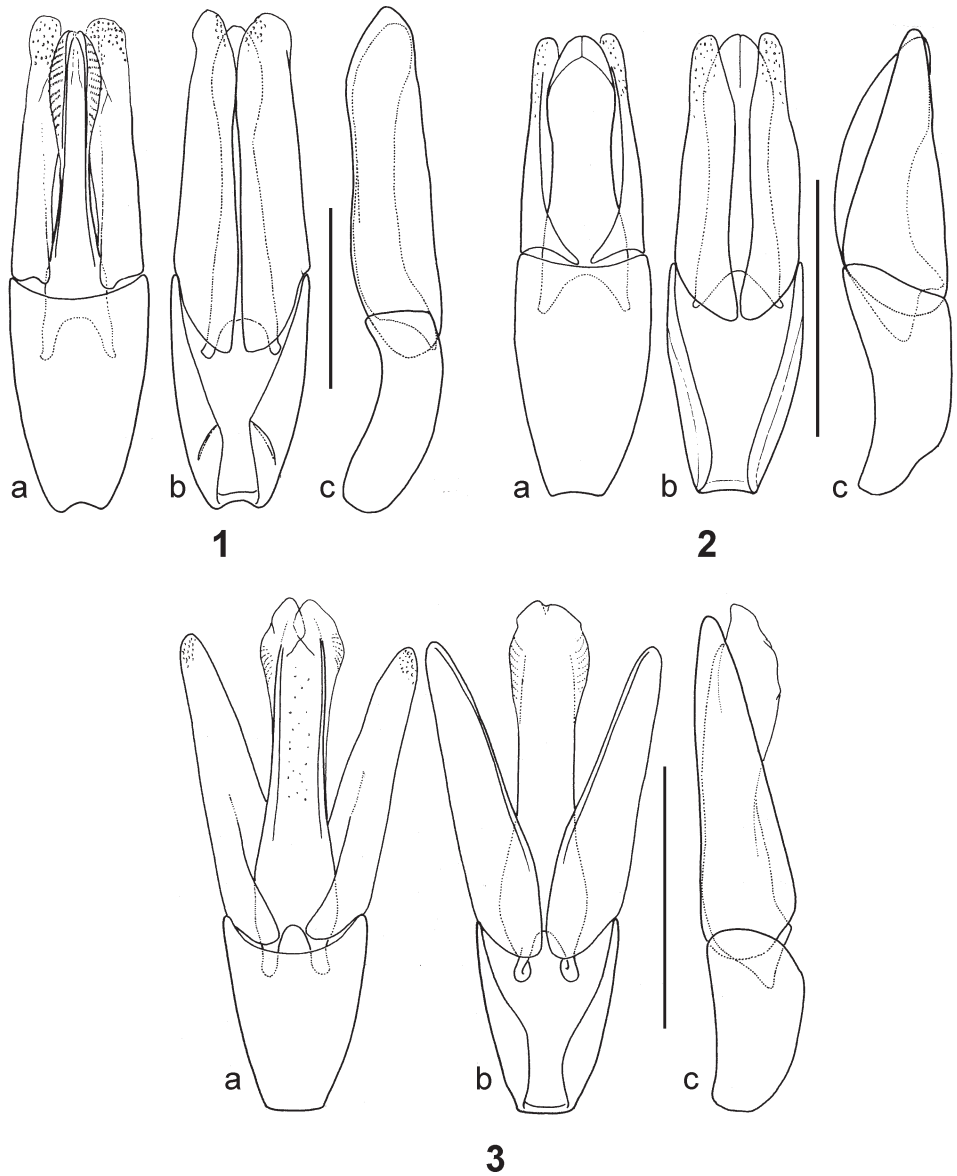
(Figs. 2)

Type locality. India, Arunachal Pradesh, 1 km N of Bhalukpong, 27°01′21″N 92°38′06″E, 240 m a.s.l.

Type material. Holotype: ♂ (NMPC): 'INDIA, Arunachal Pradesh (16a) / 1 km N of Bhalukpong / 7–8.V.2008, 240 m / 27°01′21″N 92°38′06″E / Fikáček, Podskalská, Šípek lgt. // seepage: wet rock with moos [= moss] / and *Nostoc* below steep slope / with tropical evergreen forest'. Paratypes: **INDIA: Arunachal Pradesh:** same data as holotype, 26 spec. (KSEM, MSNV, NMPC).

Description. Total length 1.45–1.85 mm (holotype: 1.60 mm), total width 0.90–1.10 mm (holotype: 1.00 mm). Body widely oval, convex, maximum length / maximum width ratio 1.6; maximum width between anterior elytral third and elytral midlength.

Head. Coloration shining black, with rare and faint punctures, surface smooth without microsculpture; 'systematic punctures' indistinct; anterolateral branches of frontoclypeal suture conspicuous at 100×. Labrum black, trapezoid, without specula; anterior margin nearly straight, slightly emarginated medially; lateral margins oblique, posterior margin straight. Eyes oblong, oblique, closest to each other posteriorly, not protruding laterad, separated by distance



Figs. 1–3. Aedeagus (a – ventral view, b – dorsal view, c – lateral view). 1 – *L. guttalis* sp. nov.; 2 – *L. hanka* sp. nov.; 3 – *L. josefi* sp. nov. Scale bar: 0.25 mm.

equal to 2.5× of one eye; postocular portion of tempora short. Mentum flat or slightly convex, smooth without punctures, emarginated anteriorly. Submentum and gula smooth. Maxillary palpi yellowish; palpomere 1 thin and short; palpomeres 2 and 3 nearly equal in length, both dilated at apex; palpomere 4 elongate, nearly twice as long as palpomere 3, symmetrical, inner and outer margin convex, apex truncate. Eight antennomeres; scape longer than antennomeres 2–4 combined; pedicel cone-shaped; intermediate antennomeres (antennomeres 3–4) very short; cupule asymmetrical, oval in ventral view, crescent-shaped and emarginate in dorsal view; antennal club loose, with densely arranged setae, antennomeres 6 and 8 nearly equal in length, antennomere 6 wider, antennomere 7 shorter and narrower.

Thorax. Pronotum transverse, 0.38× as long as wide, widest at posterior margin; blackish with yellowish, posteriorly widened lateral margins, yellow space reaching width of eye; surface smooth, without microsculpture. Prosternum black, with longitudinal keel. Scutellar shield equilateral, dark, impunctate. Mesoventrite with longitudinal keel, tuberculate anteriorly. Elytra combined ca 1.15× as long as wide; brown to black with yellowish lateral margins and apices; each elytron with indistinct pale yellow dot at base; 10 longitudinal rows of larger setiferous punctures alternating with 10 rows (interstriae) of sparser and fainter punctures; all rows less conspicuous in darker specimens. Black parasutural space forming a flat and shining stripe extended over parasutural furrow. Epipleura and pseudoepipleura oblique, nearly vertical. Metaventrite setiferous with three postero-median, posteriorly converging sulci.

Legs. Fore coxae and trochanters granulate, pubescent; fore femora setiferous on basal third, smooth distally, with tibial groove; fore tibiae smooth, each with stiff setae and two apical spurs. Middle femora with tibial grooves; ventral side of each middle tibia with three longitudinal rows of stiff setae and sulcus between two longitudinal ridges. Hind trochanters smooth and shining; hind femora smooth, with setiferous punctures and tibial grooves; hind tibiae curved, ventral side of each tibia with three longitudinal rows of stiff setae and longitudinal sulcus between two ridges.

Abdomen. Ventrite 1 granulated, ventrites 2–4 smooth, ventrites 5–6 granulated with short setae.

Aedeagus (Fig. 3): Total length 0.37–0.49 mm. Parameres nearly as long as phallobase; medial margin of parameres subparallel, apices slightly diverging in dorsal view. Median lobe wide, tongue-shaped, slightly constricted at midlength, barely rounded apically, nearly as long as parameres.

Differential diagnosis. *Laccobius hanka* sp. nov. belongs to a group of *Glyptolaccobius* species with curved hind tibiae and pubescent elytra with longitudinal rows of punctures (together with *L. silvester*, *L. shorti* and *L. sipeki* sp. nov.). It differs from all three mentioned species by the pale spot on the elytral base and the wide median lobe.

Etymology. The new species is named after Hanka, a diminutive of the first name of Hana Šípková (her maiden name was H. Podskalská), who collected part of the type series of this species. To be treated as a noun in apposition.

Bionomics. All specimens were collected at a seepage site at a roadside below a steep slope covered with moss and a mat of *Nostoc* (Fig. 13). The locality is situated at the margin of the Assam Valley where the first highlands of the Himalaya Range begin to rise.

Distribution. India, lowland border regions of Arunachal Pradesh. So far known only from the type locality.

Laccobius (*Glyptolaccobius*) *josefi* sp. nov.

(Fig. 3, 9)

Type locality. India, Arunachal Pradesh, 1 km N of Bhalukpong, 27°01′21″N 92°38′06″E, 240 m a.s.l.

Type material. Holotype: ♂ (NMPC): 'INDIA, Arunachal Pradesh (16a) / 1 km N of Bhalukpong / 7–8.V.2008, 240 m / 27°01′21″N 92°38′06″E / Fikáček, Podskalská, Šípek lgt." // seepage: wet rock with moos [= moss] / and *Nostoc* below steep slope / with tropical evergreen forest'. Paratypes: 1 ♂ 1 ♀ 2 spec. (NMPC, MSNV): same data as holotype.

Description. Total length 2.20 mm, total width 1.15 mm. Body widely oval, convex, maximum width in anterior elytral third. Ratio total length / total width = 1.9.

Head. Coloration blackish with two pale preocular spots, surface with rare but distinct punctures, without microsculpture; 'systematic punctures' indistinct; periocular sulci distinct and punctate at 100×, reaching anterolateral branches of frontoclypeal suture; metopico-sagittal suture scarcely detectable. Labrum blackish, without specula; anterior margin nearly straight, slightly emarginated medially; posterior margin arched, strongly bent. Eyes oblong, oblique, closest to each other posteriorly, not protruding laterad, separated by distance equal to 2.35× of width of one eye, posterior margin of eye, in dorsal view nearly straight, not reniform; postocular portion of tempora short. Mentum flat, microgranulated and punctured, emarginated anteriorly. Submentum and gula microgranulated. Maxillary palpi yellow-brown; palpomere 1 thin and short; palpomeres 2 and 3 nearly equal in length, palpomere 3 dilated at apex; palpomere 4 elongate, nearly twice as long as palpomere 3, asymmetrical, inner margin straight and outer margin convex, apex truncate. Eight antennomeres; scape (antennomere 1) longer than antennomeres 2–4 combined; pedicel (antennomere 2) cone-shaped; two intermediate antennomeres (antennomeres 3–4) very short; cupule (antennomere 5) asymmetrical, oval in ventral view, crescent-shaped and emarginate in dorsal view; antennal club loose, with dense setae, antennomeres 6 and 8 nearly equal in length, antennomere 6 wider, antennomere 7 shorter and narrower.

Thorax. Pronotum transverse, 0.44× as long as wide; black with yellowish lateral margins; yellow area as wide as posterior margin of eye along the base; surface smooth as that on head, without microsculpture except some sparse and faint punctures. Prosternum black, tectiform, with longitudinal keel. Scutellar shield equilateral, black, with some punctures. Mesoventrite granulate, with longitudinal, anteriorly tuberculate keel. Elytra combined slightly elongate, ca. 1.20× as long as wide, blackish with yellowish lateral margins and apices; each elytron with pale yellow dot near middle of base; 10 longitudinal rows of regularly impressed punctures alternating with 10 rows (interstriae) of sparser and fainter punctures. Parasutural furrow scarcely conspicuous on posterior elytral third, disappearing before elytral apex. Epipleura and pseudoepipleura oblique, nearly vertical. Metaventrite setiferous with median longitudinal glabrous area and three longitudinal sulci converging posteriorly.

Legs. Fore coxae and trochanters granulate, pubescent; fore femora setiferous on basal third, smooth distally, with tibial grooves; fore tibiae smooth, each bearing stiff setae and two apical spurs. Middle femora smooth, with tibial grooves; ventral side of middle tibiae with three longitudinal rows of stiff setae and sulcus between two longitudinal ridges. Hind trochanters smooth and shining; hind femora smooth, each with scarce punctures and tibial grooves; hind tibiae curved, ventral side of each tibia with three longitudinal rows of stiff setae and longitudinal sulcus between two ridges. Natatory setae nearly absent on dorsal surface of tarsi.

Abdomen. All six ventrites smooth, without microsculpture.

Aedeagus (Fig. 3). Total length 0.49 mm. Parameres nearly 1.5× as long as phallobase. Median lobe slightly longer than parameres, its apex widened and separated into two lobes.

Differential diagnosis. *Laccobius josefi* sp. nov. belongs to the group of species with curved hind tibiae, longitudinal rows of elytral punctures and black elytral surface with yellowish basal dots (together with *L. guttalis* sp. nov., *L. munus* and *L. sharmai*). It differs from the other three species by the clear preocular spots and by the shape of the aedeagus with the widely swollen apical portion of the median lobe; from *L. guttalis* sp. nov. it also differs by the lack of transverse lines on the parasutural stripe in anterior elytral third and from *L. munus* and *L. sharmai* by the less convex body.

Etymology. We dedicate this species to Josef Jelínek on the occasion of his 70th birthday.

Bionomics. See *L. hanka* sp. nov.

Distribution. India, lowland border regions of Arunachal Pradesh.

Laccobius (*Glyptolaccobius*) *moriyai* Kamite, Ogata & Hikida, 2007

(Figs. 4, 8)

Type locality. Japan, Honshu Island, Yamagata Prefecture, Asahi-Mura, Arasawa.

Type material (not examined). Holotype: ♂ (ELEU): 'Arasawa, Asahi-Mura, Yamagata Pref., H. Moriya leg. 23-IX-2004'. Paratypes: 4 spec., same data as holotype. Length 2.30–2.50 mm; width 1.40–1.50 mm.

Additional material examined: JAPAN: Honshu Island: Yamagata Pref., Arasawa-dam, Tsuruoka-shi, T. Ikeda leg. 16.viii.2008, 1 ♂ 1 ♀ (MSNV, NMPC).

Differential diagnosis. *Laccobius moriyai* belongs to a group of species with curved hind tibiae, shining black elytra with longitudinal rows of punctures of which only the first one is sulciform. The combination of uniformly black dorsal colouration and apically strongly widened apex of the median lobe is not found in any other species of *Glyptolaccobius*.

Distribution. *Laccobius moriyai* is the first representative of the subgenus *Glyptolaccobius* occurring in the Palaearctic Region. So far the species is known only from the environs of the Arasawa Dam in the Yamagata Prefecture in Japan (Honshu island).

Laccobius (*Glyptolaccobius*) *pluvialis* Gentili, 2006

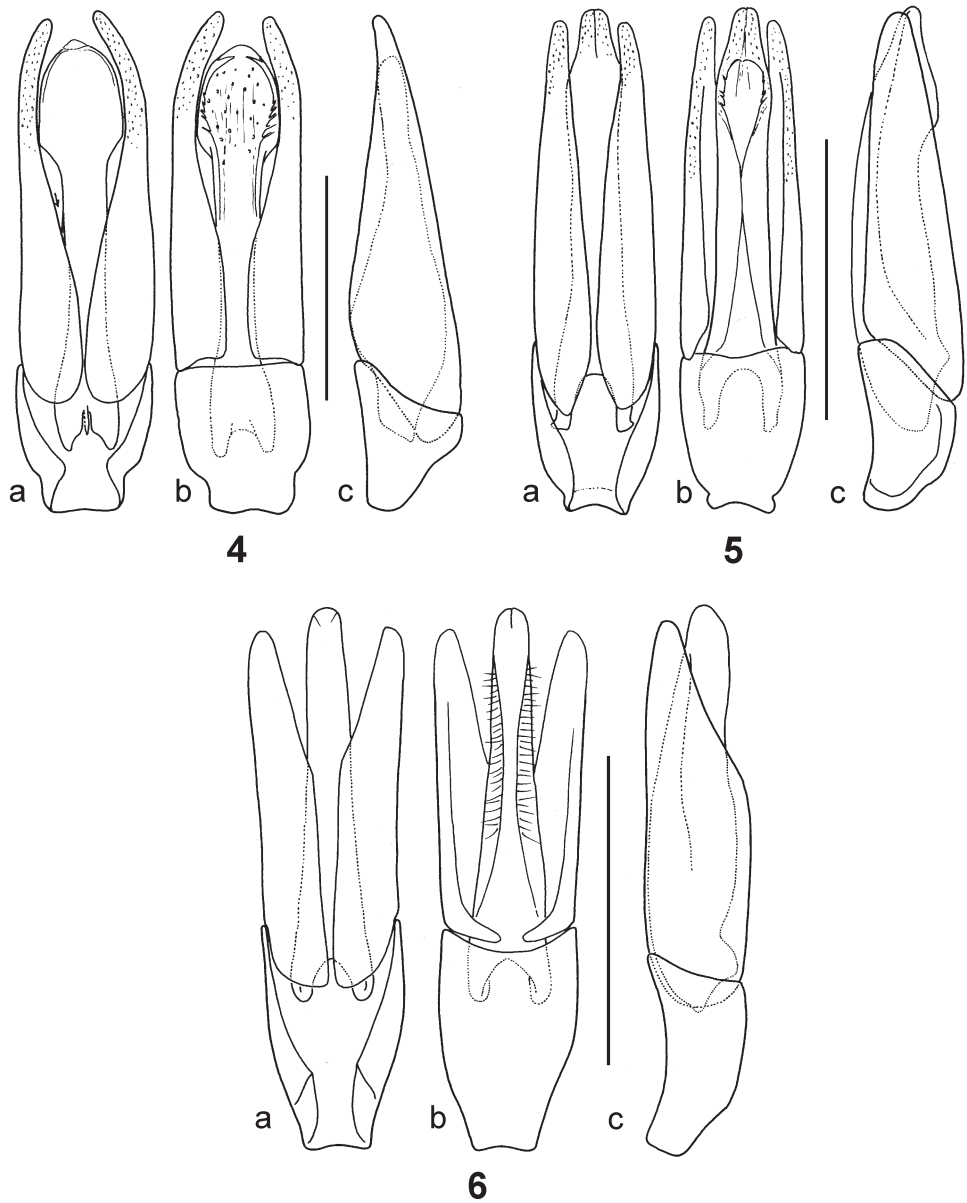
(Fig. 5)

Type locality. INDIA NE, Meghalaya State, SW of Cherrapunjee, 25°13′–14′N 91°40′E, 900 m.

Additional material examined. INDIA: Meghalaya: E Khasi Hills, 11 km SW of Cherrapunjee, Laitkynsew, 25°13′N, 91°39′E, 810 m, Fikáček, Podskalská, Šípek leg., 21.–24.iv.2008, seepage: wet rock with algae, blue algae, moss, ca. 1.5–2 km via rd. from "Cherrapunjee Holid. Resort" in direct. Cherrapunjee, exposed', 109 spec. (KSEM, NMPC, MSNV); E Khasi Hills, 11 km SW of Cherrapunjee, Laitkinsew, 25°12′N, 91°40′E, 460 m, Fikáček, Podskalská, Šípek leg. 21–24.iv.2008, wet rock with algae, blue algae and fallen leaves at side of waterfall on small river surrounded by tropical forest, ca. 200 m upstream from living bridge [= bridge made of living roots of large *Ficus* trees], 1 ♂ (NMPC); SW of Cherrapunjee, 25°13′–14′N 91°40′E, 900 m, P. Pacholátko leg., 5.–24.v.2005 (same data as holotype), 80 spec. (NHMW, MSNV).

Note. The aedeagus was illustrated by Gentili (2006); the illustrations in this paper are based on new slides.

Bionomics. *Laccobius pluvialis* has been repeatedly found in large numbers on loamy seepages as well as wet rocks below these seepages and at sides of small temporary streams on



Figs. 4–6. Aedeagus (a – dorsal view, b – ventral view, c – lateral view). 4 – *L. moriyai* Kamite, Ogata & Hikida, 2007; 5 – *L. pluvialis* Gentili, 2006; 6 – *L. sipeki* sp. nov. Scale bar: 0.25 mm.

the southern slopes of the Meghalaya Plateau. Most of the specimens collected in 2008 were found at sides of roads in exposed microhabitats sparsely covered with moss, algae and blue-green algae (Fig. 12, see also Fikáček & Šípková 2009, Short 2009). Only one specimen of *L. pluvialis* was found on partly shaded wet rocks at the side of a larger waterfall surrounded by a dense secondary rainforest (see Bionomics of *L. sipeki* sp. nov. and Fig. 11 for details).

Laccobius (*Glyptolaccobius*) *sharmai* Gentili, 1995

Type locality. Nepal E, Solukhumbu, Surka La Pass, Karka Khola, 2875 m a.s.l.
Additional material examined. NEPAL: Manasiu Mts., E slope of Ngadi Khola Valley, 2000–2300 m, 28°22′N 84°29′E, 14–16.v.2005, J. Schmidt leg., 17 spec. (NHME; MSNP; MSNV); Manasiu Mts., SE slope W Gupchi Danda, 2200–2300 m, 28°08′37N 84°44′42E, 18.v.2006, J. Schmidt leg., 1 ♂ 1 ♀ (CSHS); Ganesh Himal, NNW Trisuli Bazar, Singhen Khola, 2400–2500 m, 19.iv.1999, Ghalé & Gurung leg., 1 ♂ 1 (NHME); Baglung Lekh, ca. 30 km W Baglung, N Tara Khola, 2500–2700 m, 28°22′N 83°20′E, 18.v.2004, J. Schmidt leg., 3 spec. (NHME, MSNV); Baglung Lekh, ca. 30 km W Baglung, N Tara Khola, 2700–2800 m, 28°22′N 83°20′E, 19.–21.v.2004, J. Schmidt leg., 2 spec. (NHME); Annapurna Mts., Banthanti S Gorapani, 2400 m, 26.v.2004, J. Schmidt leg., 1 spec. (NHME).

Note. This species is known from the foothills of high mountains in Nepal: Manasiu, Annapurna and Everest (Sagarmatha). It is recorded here also from the Dhaulagiri mountains and Langtang National Park (Ganesh Himal).

Laccobius (*Glyptolaccobius*) *silvester* Gentili, 2006

Type locality. India, Uttaranchal [= Uttarakhand], W Loharket Village, 30 km N Bageshwar, 1800–1900 m a.s.l.
Additional material examined. INDIA: Uttarakhand: ca. 55 km NE of Bageshwar, E of Munsyiari, 2200–2400 m, 6.–8.vii.2003, Z. Kejval & M. Trýzna leg., 1 ♂ (NMPC).

Note. This is the second known specimen of the species; the punctures of the primary elytral rows are much more impressed compared with the holotype.

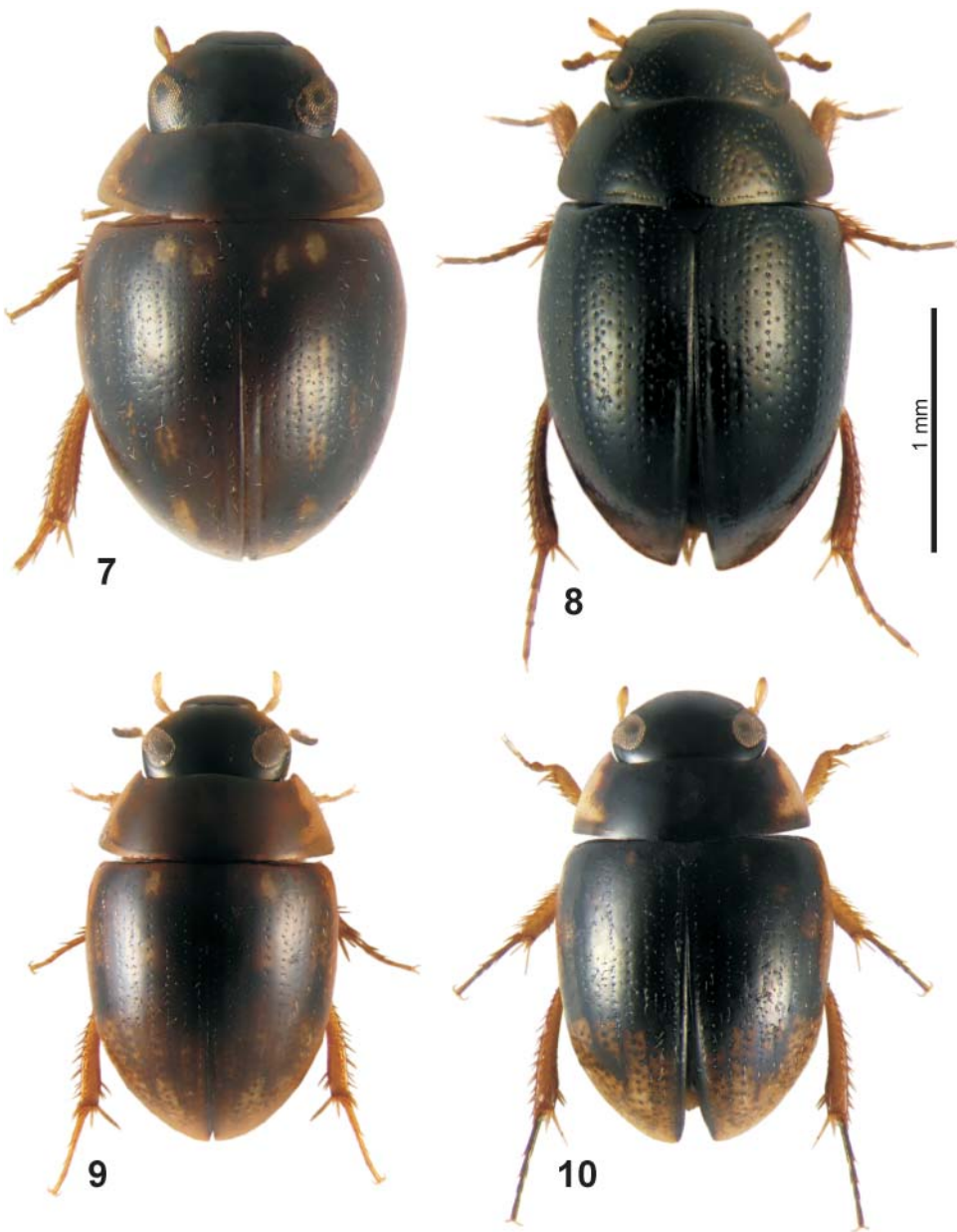
Laccobius (*Glyptolaccobius*) *sipeki* sp. nov.

(Figs. 6, 10)

Type locality. India, Meghalaya, Khasi Hills, Laitkynsew, 11 km SW of Cherrapunjee.
Type material. Holotype: ♂ (NMPC): 'INDIA, Meghalaya State (6) / E Khasi Hills, 11 km SW Cherra- / punjee, Laitkynsew, 21–24.IV. / 2008, 25°12′N, 91°40′E, 460 m / Fikáček, Podskalská, Šípek lgt. // wet rock with algae/ blue algae / and fallen leaves at side of / waterfall on small river surround. / by tropical forest, ca. 200m / upstream from living bridge'. Paratype: **INDIA: Meghalaya:** 1 ♂ (NHMW): 'INDIA: Meghalaya / SW of Cherrapunjee / 25°13′–14′N 91°40′E, 900m / P. Pacholátko leg. / 5.–24.v.2005'.

Description. Small-sized species, body length 1.85 mm, width 1.09 mm. Maximum length / maximum width ratio 1.7. Body oval, moderately convex.

Head. Labrum of males without specula; anteriorly and posteriorly crescent-shaped in dorsal view, shiny black. Clypeus moderately convex, shiny black, with sparse and faint punctures, without distinct 'systematic punctures'. Only terminal branches of frontoclypeal suture conspicuous. Frons shiny black with sparse and faint punctures as those on clypeus. Eyes oblique, weakly convex, not protruding laterad, separated by distance equal to 2.5× of width of one eye, nearly reniform in lateral view, emarginated posteriorly. Maxillary palpi less



Figs. 7–10. Habitus of *Glyptolaccobius* species. 7 – *L. guttalis* sp. nov., male, holotype; 8 – *L. moriyai* Kamite, Ogata & Hikida, 2007, female; 9 – *L. josefi* sp. nov., male, paratype; 10 – *L. sipeki* sp. nov., male, holotype.

Figs. 11–13. Habitats of *Glyptolaccobius* species. 11 – India, Meghalaya, Laitkynsew env., 460 m a.s.l.: type locality of *L. sipeki* sp. nov., locality of *L. pluvialis* and *L. eliogentilii* (arrow indicates the position of the microhabitat where the specimens were collected); 12 – India, Meghalaya, Laitkynsew env., 810 m a.s.l.: exposed seepages at the side of a road, locality with common occurrence of *L. pluvialis*; 13 – India, Arunachal Pradesh, 1 km N of Bhalukpong: seepages at the road side, type locality of *L. hanka* sp. nov. and *L. josefi* sp. nov. Photos by M. Fikáček.

than 0.5× as long as head width; palpomere 2 slightly swollen, nearly as long as palpomere 3; palpomere 4 1.5× as long as palpomere 3, outer and inner margin rounded, with ogival apex. Mentum ca 0.5× as wide as long, almost flat, at least medially, covered with faint punctures. Eight antennomeres; scape longer than antennomeres 2–4 combined; pedicel cone-shaped; two intermediate antennomeres (antennomeres 3–4) very short; cupule asymmetrical, oval in ventral view, crescent-shaped and emarginate in dorsal view; antennal club loose, with antennomeres 6 and 8 nearly equal in length, antennomere 6 wider, antennomere 7 shorter and narrower.

Thorax. Pronotum without distinct 'systematic punctures', covered with sparse and faint punctation, interstices smooth and shining; black in centre and along posterior margin, yellow coloration of lateral margins widening posteriorly. Prosternum well developed, tectiform medially, bearing fine but distinct median carina. Scutellum black, equilateral. Mesoventrite reaching anterior mesothoracic margin at single point, rather flat with longitudinal carina between mesocoxae raised to small acute tooth slightly anterior to mesocoxae. Metaventrite with weakly raised middle portion slightly projecting anteriorly between mesocoxae and posteriorly between metacoxae, bearing hydrofuge pubescence except for posteromedian glabrous area on raised middle portion. Anepisternum 3 ca. 4.5× as long as wide, subparallel. Elytra black, with yellowish lateral margins and apices, each elytron with wide parasutural furrow engraved from base to nearly anterior two thirds of elytral length and with ca. 20 longitudinal series of punctures: 10 primary rows consisting of well-discernible setiferous punctures, 10 alternate, scarcely visible rows, consisting of a small number of punctures; lateral margins neither serrate nor denticulate; epipleura oblique, pseudoepipleura nearly vertical and separated by distinct ridge; their anterior dilated portion ending anterior to metacoxae.

Legs. Fore coxae almost contiguous, pubescent; fore trochanters pubescent; middle coxae separated by median carina of mesoventrite; tip of hind trochanters free, not abutted to hind femora. Femora with distinct tibial grooves distally on inner faces; basal third of ventral side of fore femora covered with hydrofuge pubescence; middle and hind femora nearly glabrous. Tibiae relatively short and stout, progressively wider towards apices, spiny, lacking swimming hairs; hind tibiae curved inwards. Middle and hind tarsi nearly without fine and sparse swimming hairs on dorsal face.

Abdomen. Six distinct ventrites, ventrites 1–5 rather shiny and sparsely pubescent, ventrite 6 more rugose, pubescent and somewhat retractable; ventrite 1 not carinate; posterior margin of ventrite 5 subtruncate.

Aedeagus. Total length 0.44 mm. Parameres shorter than median lobe, 1.3× as long as phallobase, outer side nearly straight, inner side strongly diverging in terminal 0.4. Median lobe slender, slightly narrowing apicad, rounded at apex; margins of longitudinal excision bearing long hairs (Fig. 6).

Differential diagnosis. *Laccobius sipeki* sp. nov. belongs to a group of *Glyptolaccobius* species with curved hind tibiae and elytra bearing longitudinal rows of punctures (together with *L. celsus*, *L. silvester*, *L. shorti*, *L. munus*, and *L. sharmai*). It differs from the other species by the wide parasutural furrow, not strictly corresponding to a single row of punctures, and by

the lack of yellowish dots and stripes near the elytral base and suture; the shape of parameres of this species resembles *L. munus*, but the divergent interior part is longer.

Etymology. The species is dedicated to Petr Šípek, who collected some of the *Glyptolaccobius* species described in this paper.

Bionomics. The holotype was collected on a wet rock with algae, blue algae and fallen leaves at the side of a waterfall on a small river surrounded by dense tropical forest (Fig. 11) together with the following beetles: *Laccobius pluvialis*, *L. eliogentilii*, *L.* (*Cyclolaccobius*) sp., *Oocyclus* sp., *Dactylosternum* sp. (Hydrophilidae), *Hydraena* sp. (Hydraenidae), *Ceradryops* sp. (Dryopidae) and two species of the genus *Hydroscapha* (Myxophaga: Hydroscaphidae) (Fikáček & Šípková 2009).

Distribution. India, Meghalaya.

Discussion

The majority of *Glyptolaccobius* species are distributed in the Himalaya Range at the border between the Palaearctic and Oriental Regions, usually at altitudes above 2000 m a.s.l. (*L. celsus* Gentili, 1989 even at 3800 m a.s.l.). The highest number of species is known from Nepal. Some species are also found at altitudes below 2000 m a.s.l. in the foothills of the Himalaya Range, adjacent mountain areas at the India-Bangladesh border and highlands in Myanmar and Thailand, and some of them occur only at lower altitudes (*L. eliogentilii*, *L. pluvialis*, *L. senguptai*, *L. shorti*, *L. hanka* sp. nov., *L. josefi* sp. nov., and *L sipeki* sp. nov.).

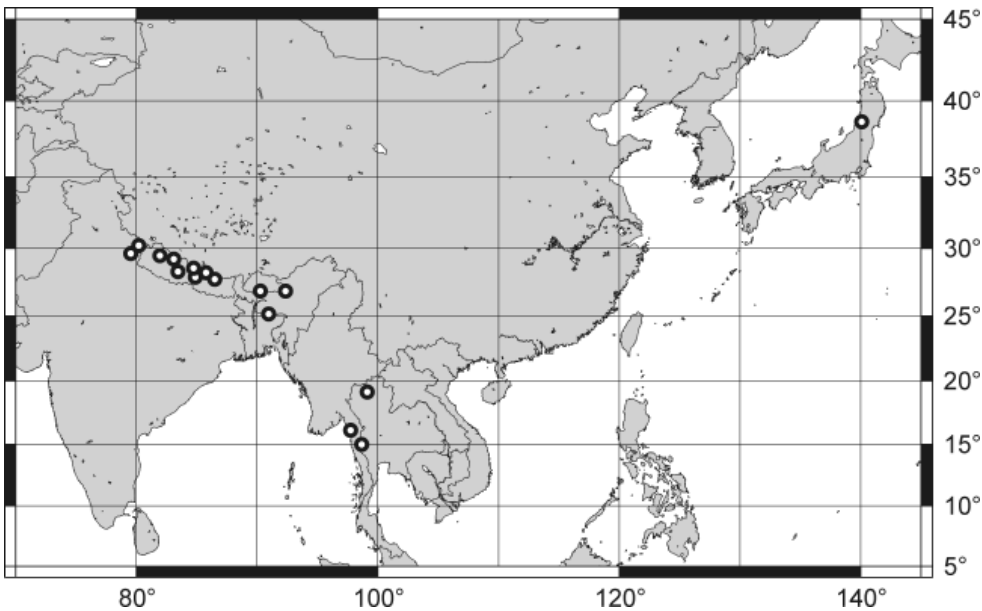


Fig. 14. Known distribution of the Glyptolaccobius species.

One species was described recently from the northern part of the Honshu island (KAMITE et al. 2007), where the subgenus reaches the Palaearctic Region. Known records of *Glyptolaccobius* are summarized in Fig. 14.

Most species of *Glyptolaccobius* seem to inhabit wet rocks close to streams and rivers as well as seepage habitats at steep slopes, often covered with moss, algae or blue-green algae. High altitude species are often recorded from permanent and temporary streams and rivers (HEBAUER 2002, GENTILI 2006).

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