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**A revision of *Geostiba* of the West Palaearctic region. XXIII.
On the *Sibiota* species of the Caucasus region exclusive of Turkey
(Coleoptera: Staphylinidae: Aleocharinae)**

Volker ASSING

A b s t r a c t : Seven microphthalmous species of the subgenus *Sibiota* CASEY, 1906, genus *Geostiba* THOMSON, 1858, from Georgia and Armenia are described and illustrated: *Geostiba (Sibiota) recta* nov.sp. (Georgia: Ratcha and Kvemo-Svanetia provinces); *G. (S.) largata* nov.sp. (Georgia: Imereti and Ratcha); *G. (S.) artistula* nov.sp. (Georgia: Ratcha); *G. (S.) unituber* nov.sp. (North Armenia: Pambaki range); *G. (S.) pambakica* nov.sp. (North Armenia: Pambaki range); *G. (S.) meghruica* nov.sp. (South Armenia: Meghru range); *G. (S.) unicuneata* nov.sp. (South Armenia: environs of Jermuk). The type locality of *G. carinicornis* (EPPELSHEIM, 1878) is revised and *G. medea* PACE, 1996, previously a junior synonym of *G. carinicornis*, is revalidated. Additional records of *G. bituberculata* (EPPELSHEIM, 1878) and *G. kobrisensis* PACE, 1996 are reported, and previous records of *G. kobrisensis* are rectified. A key to the 17 *Sibiota* currently known from the Caucasus region exclusive of Turkey, all of them microphthalmous and micropterous, is provided. Their distributions are mapped.

K e y w o r d s : Coleoptera, Staphylinidae, Aleocharinae, Geostibini, *Geostiba*, *Sibiota*, Caucasus region, Georgia, Armenia, taxonomy, zoogeography, new species, new records, key to species.

Introduction

The subgenus *Sibiota* CASEY, 1906 was previously represented in the Caucasus region exclusive of Turkey by nine microphthalmous species, one of them of doubtful identity: *G. bituberculata* (EPPELSHEIM, 1878) (Georgia: Likhskiy Khrebet); *G. carinicornis* (EPPELSHEIM, 1878) (East Caucasus: Daghestan, Azerbaijan); *G. krzysztofi* ROUBAL, 1913 (Russia: Karatchjay-Tcherkessia, environs of Teberda); *G. kobrisensis* PACE, 1996 (Georgia: Central Caucasus); *G. batumiensis* PACE, 1996 (Georgia: environs of Batumi); *G. uniplicata* ASSING, 2011 (West Caucasus: Russia: Psheashka range); *G. convergens* ASSING, 2011 (West Caucasus: border region between Adygea Respublika and Krasnodarskiy Kray); *G. artcarinata* ASSING, 2016 (Northwest Caucasus: Krasnodarskiy Kray); *G. zerchei* PACE, 1996 (doubtful species whose description is based on a single female from the environs of Bakuriani, Georgia) (ASSING 2005, 2009, 2011, 2016a). In contrast to other Caucasian *Sibiota* species, *G. kobrisensis* seemed to be remarkably widespread across the southern slopes of the Central Caucasus (ASSING 2016a). Species of the subgenus *Sibiota* have never been recorded from Armenia.

Two field trips to the Caucasus region, one of them to Georgia conducted by Volker

Brachat (Geretsried) and Heinrich Meybohm (Großhansdorf) in spring 2016 and the other to Armenia conducted by Michael Schülke (Berlin) and the author in summer 2016 yielded numerous additional specimens of microphthalmous *Sibiota* from various localities. This material not only included several undescribed species, but also provided an opportunity to better understand the distributions of some of the species recorded from Georgia. To this end, some previously studied specimens recorded from Georgia as *G. kobrisensis* recently (ASSING 2016a) were revised.

Material and methods

The material treated in this study is deposited in the following collections:

cAss..... author's private collection

cKoc..... private collection Matúš Kocian, Prague

cPüt private collection Andreas Pütz, Eisenhüttenstadt

MNB Museum für Naturkunde, Berlin (including also the collection of Michael Schülke)

The morphological studies were conducted using a Stemi SV 11 microscope (Zeiss Germany) and a Jenalab compound microscope (Carl Zeiss Jena). The images were created using a digital camera (Nikon Coolpix 995). The maps were created using Map-Creator 2.0 (primap) software.

Body length was measured from the anterior margin of the labrum to the abdominal apex, the length of the forebody from the anterior margin of the labrum to the posterior margin of the elytra, head length along the middle from the anterior margin of the clypeus to the posterior carina of the head, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra, and the length of the median lobe of the aedeagus from the apex of the ventral process to the base of the capsule. The "parameral" side (i.e., the side where the sperm duct enters) is referred to as the ventral, the opposite side as the dorsal aspect.

Results

Including the newly described species, 17 species of *Sibiota* are now known from the Caucasus region exclusive of Turkey (Greater Caucasus, Georgian and Armenian parts of the Lesser Caucasus, and adjacent Armenian mountain ranges) (Map 1). All the species are microphthalmous and micropterous.

Two species groups can be distinguished in the region. The *G. bituberculata* group includes six species (*G. bituberculata*, *G. kobrisensis*, *G. batumiensis*, *G. recta*, *G. largata*, *G. artifistula*) distributed in the southwestern Greater Caucasus including the Suram range, eastwards to the region north of Tbilisi, plus one species endemic to the environs of Batumi. They are characterized by nearly completely reduced eyes without ommatidia, relatively dark coloration, a forebody with rather pronounced microsculpture, the absence of impressions on either side of the pronotal midline, and often a sexual dimorphism of tergite VIII.



Map 1: Distributions of *Geostiba zerchei* PACE (white triangle), *G. medea* PACE (black triangle), and of the species of the *G. bituberculatus* group: *G. recta* nov.sp. (white circles), *G. largata* nov.sp. (black circles), *G. artistifistula* nov.sp. (white asterisk), *G. bituberculata* (EPPELSHEIM) (black squares), *G. kobrisensis* PACE (white squares).

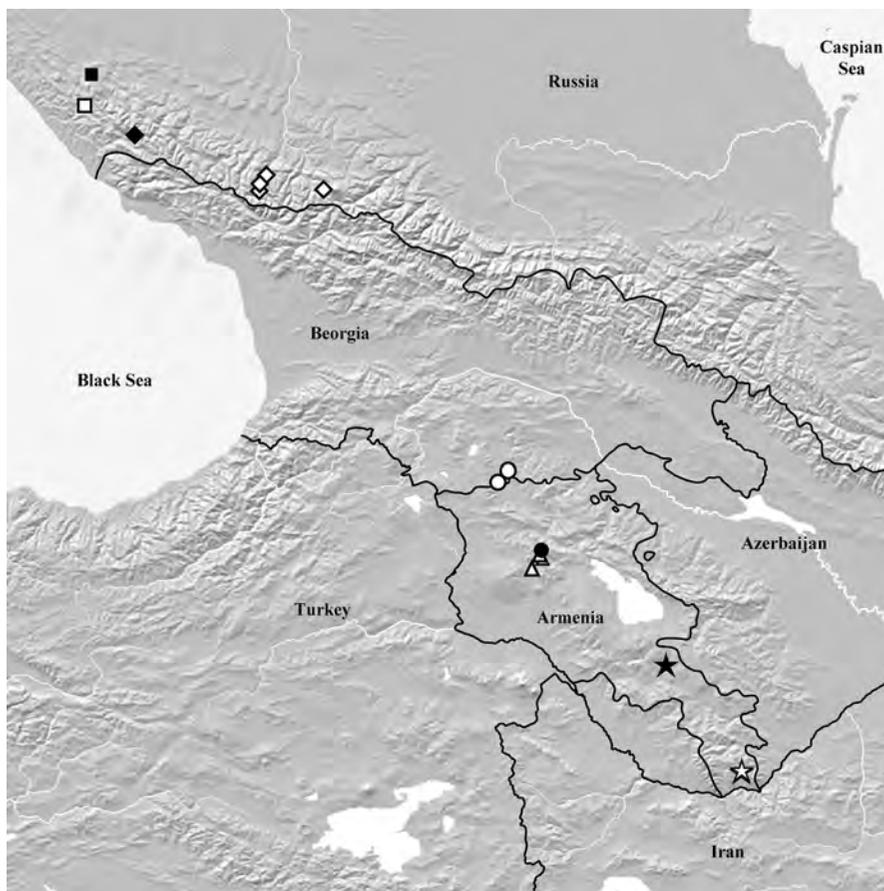
The remaining species belong to the *G. carinicornis* group. They have small eyes composed of approximately 5-10 ommatidia with or without pigmentation and (usually) an oblong impression on either side of the pronotal midline, they are usually of paler coloration, and they lack a distinct sexual dimorphism of tergite VIII. These species are distributed in both the Greater (also in the northern and eastern parts) and the Lesser Caucasus, including all of Armenia. Among the species of this group, *G. carinicornis* and the four species from Armenia (*G. unituber*, *G. pambakica*, *G. meghruica*, *G. unicuneata*) form a distinct lineage characterized especially by the shape of the median lobe of the aedeagus (basal portion of the capsule abruptly convex, nearly pointed, in lateral view). The affiliations of *G. zerchei* and *G. medea* PACE, 1996 (previously a junior synonym of *G. carinicornis*), whose descriptions are based on single females, are uncertain.

The paralectotypes of *G. bituberculata* from "Letschgum" and "Svanetien" (see ASSING 2005) most likely belong to one of the newly described species from Northwest Georgia.

***Geostiba (Sibiota) bituberculata* (EPPELSHEIM, 1878) (Map 1)**

Material examined: Georgia: 3♂♂, 2♀♀, Shida Kartli, 8 km SW Surami, 42°02'N, 43°30'E, 960 m, 14.V.2016, leg. Brachat & Meybohm (cAss); 1♀, Shida Kartli, SE Rikoti pass, 42°03'N, 43°30'E, 1010 m, 14.V.2016, leg. Brachat & Meybohm (cAss).

Comment: The above material was collected close to the type locality. So far, reliable records of *G. bituberculata* are known only from the Likhskiy range (Map 1), which connects the Greater with the Lesser Caucasus. The species is illustrated in ASSING (2005).

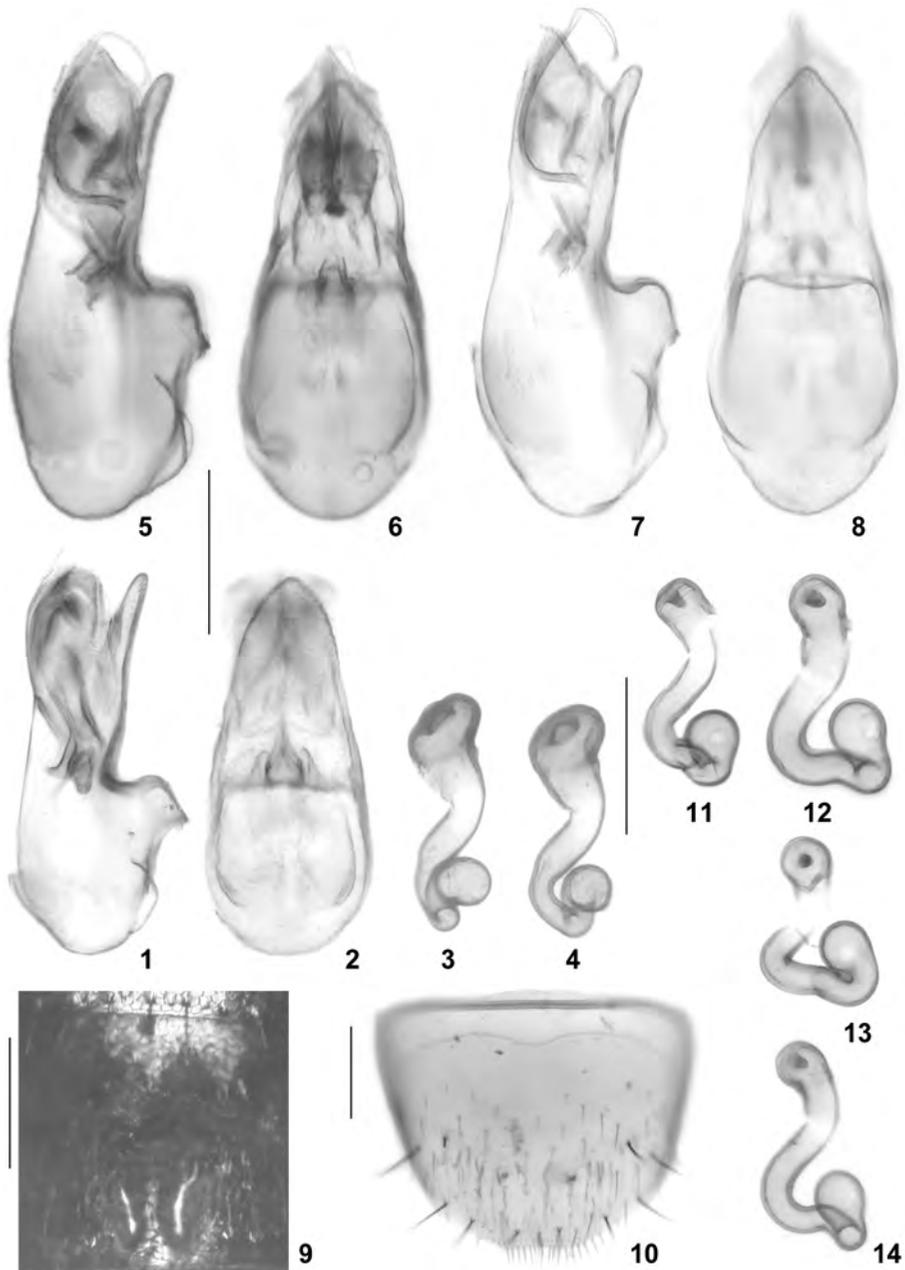


Map 2: Distributions of the species of the *G. carinicolis* group: *G. articularinata* ASSING (black square), *G. convergens* ASSING (white square), *G. uniplicata* ASSING (black diamond), *G. krzysztofi* (ROUBAL) (white diamonds), *G. carinicolis* (EPPELSHEIM) (white circles), *G. unituber* nov.sp. (black circle), *G. pambakica* nov.sp. (white triangles), *G. unicumata* nov.sp. (black star), *G. meghruica* nov.sp. (white star).

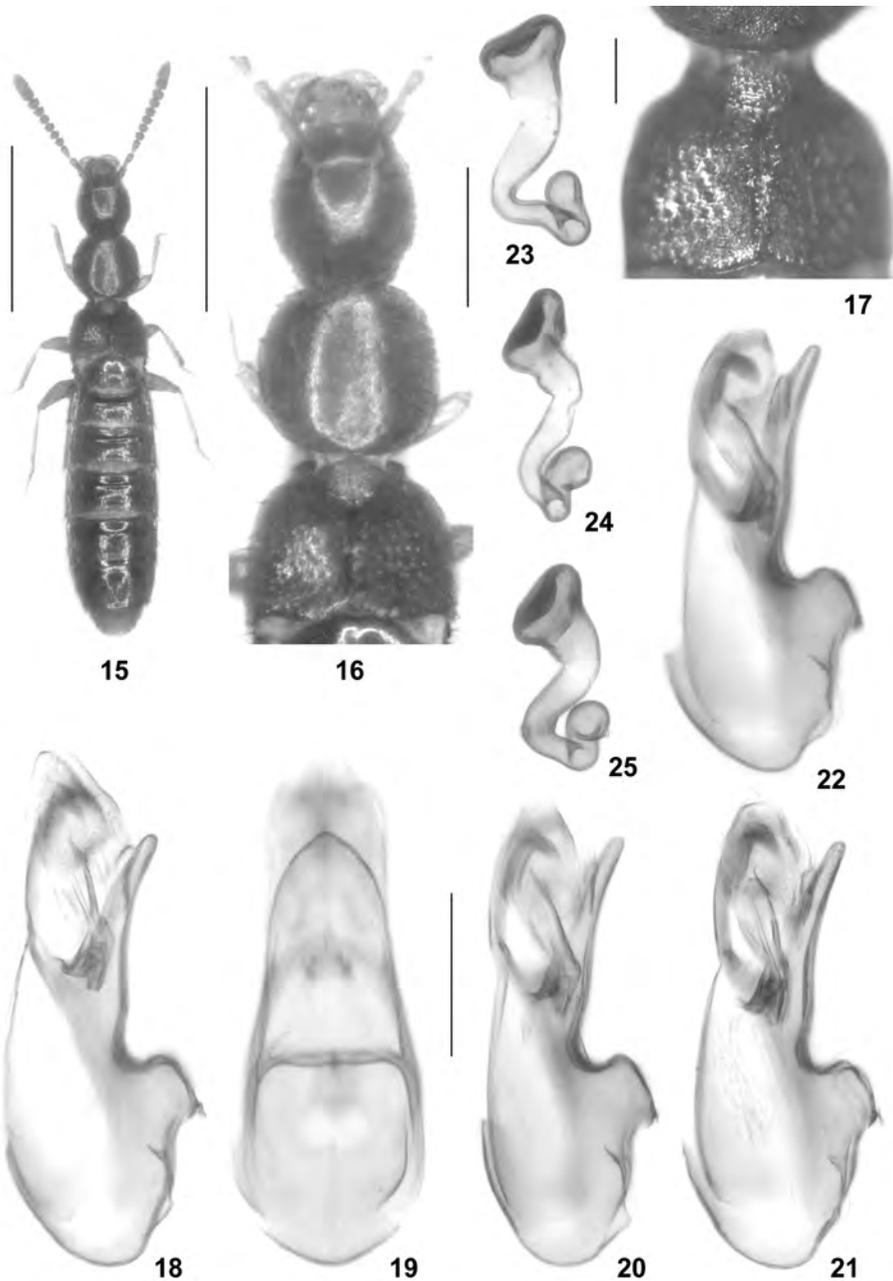
***Geostiba (Sibiota) kobrisensis* PACE, 1996** (Figs 1-4, Map 1)

Material examined: Georgia: 1 ♀, Kvesheti, 42°27'N, 44°32'E, 1500 m, 22.VII.2015, leg. Brachat & Meybohm (cAss); 1 ♂, Kachetia, Tsiv-Gombori Mts., 5 km W Telavi, 41°54'N, 45°24'E, 1090 m, *Fagus orientalis* forest, 8.VII.2015, leg. Pütz (cAss).

Comment: A revision of the specimens previously recorded as *G. kobrisensis* in ASSING (2016a) revealed that, except for the the above male from Kachetia, they belong to other species described below (*G. recta*, *G. largata*, *G. artifistula*). The female from Kvesheti was collected near the type locality. The currently known distribution is shown in Map 1. The genitalia of the revised specimens are illustrated in Figs 1-4.



Figs 1-14: *Geostiba kobrisensis* PACE (1-4) and *G. recta* nov.sp. (5-14); (1-2, 5-8) median lobe of aedeagus in lateral and in ventral view; (3-4, 11-14) spermatheca; (9) median portion of male abdominal tergite VII; (10) female sternite VIII. Scale bars: 0.1 mm.



Figs 15-25: *Geostiba largata* nov.sp.: (15) male habitus; (16) male forebody; (17) male elytra; (18-22) median lobe of aedeagus in lateral and in ventral view; (23-25) spermatheca. Scale bars: 15: 1.0 mm; 16: 0.5 mm; 17-25: 0.1 mm.

Geostiba (Sibiota) recta nov.sp. (Figs 5-14, Map 1)

Type material: Holotype ♂: "N42°47'48" E42°37'56 (18), GEORGIA: Ratscha, Lentekhi 10 km W, 1160 m, Brachat & Meybohm, 20.V.2016 / Holotypus ♂ *Geostiba recta* sp. n. det. V. Assing 2016" (cAss). Paratypes: 2 ♀ ♀: same data as holotype (cAss); 5 ♂ ♂, 8 ♀ ♀: "GEORGIA, Caucasus, [4] (Kvemo-Svanetia), N slopes of Svaneti Mts. rng., nr., NW of Tsanashi vill., pitfall traps, sift, 1356 m, 42°48'26.2"N, 42°39'55.9"E, 04.VII.2015 leg. A. Pütz" (cPüt, cAss); 1 ♀: "GEORGIA, Caucasus, [2] (Kvemo-Svanetia), Lechkhumi Mts. rng., nr., Sasashi vill., Muashi, pitfall traps, sift, 1390 m, 42°47'20.4"N, 42°59'01.1"E, 01.VII.2015 leg. A. Pütz" (cAss).

E t y m o l o g y : The specific epithet (Latin, adjective: straight) alludes to the shape of the ventral process of the aedeagus in lateral view.

Description: Body length 2.2-2.7 mm; length of forebody 0.95-1.15 mm. Coloration: body reddish to dark-reddish. Eyes reduced to minute rudiments without pigmentation and without ommatitida. Pronotum without impressions on either side of midline. Hind wings completely reduced. Highly similar to *G. bituberculata*, except as follows:

♂: elytra and tergite VII (Fig. 9) with similar modifications as in *G. bituberculata*; posterior margin of tergite VIII broadly and weakly convex; posterior margin of sternite VIII rather strongly convex; median lobe of aedeagus (Figs 5-8) 0.28 mm long, with moderately long and curved flagellum, but without semi-transparent spines in internal sac, with weakly pronounced crista apicalis and crista proximalis; ventral process straight in lateral view; paramere not distinctive.

♀: tergite VIII shaped as in male; posterior margin of sternite VIII (Fig. 10) weakly convex, in the middle shallowly concave; spermatheca minute, maximal extension from apex of distal portion 1.1-1.4 mm distal portion not distinctly dilated and with small conical cuticular invagination, proximal portion not particularly stout, but proximally distinctly dilated.

Comparative notes: *Geostiba recta* differs from the highly similar *G. bituberculata* only by the shape of the male tergite VIII (*G. bituberculata*: posterior margin excised in the middle), the morphology of the aedeagus (*G. bituberculata*: median lobe 0.30-0.31 mm long; internal sac with longer flagellum; ventral process and crista apicalis of different shape), and by the shape of the spermatheca (*G. bituberculata*: spermatheca larger, approximately 0.15 mm long, and of completely different shape, with much stouter and relatively shorter proximal portion). For illustrations of *G. bituberculata* and allied species see ASSING (2005, 2009, 2011, 2016a) and PACE (1996).

Distribution and natural history: The species was collected in three localities in Ratscha and Kvemo-Svanetia provinces (Map 1), Northwest Georgia, at altitudes of 1160-1390 m. The specimens from Lentekhi were sifted from rhododendron litter on a south slope (MEYBOHM pers. comm.), those from the other localities were sifted from litter in a montane fir forest and in an old primary beech forest (PÜTZ pers. comm.).

Geostiba (Sibiota) largata nov.sp. (Figs 15-25, Map 1)

Type material: Holotype ♂: "N42°23'11 E42°56'42 (13), GEORGIA: Imereti, Nakerala 6 km W, 1450 m, Brachat & Meybohm, 17.V.2016 / Holotypus ♂ *Geostiba largata* sp. n. det. V. Assing 2016" (cAss). Paratypes: 4 ♂ ♂, 7 ♀ ♀: same data as holotype (cAss, MNB); 5 ♂ ♂, 4 ♀ ♀: "N42°23'48" E43°01'59 (14), GEORGIA: Ratscha, Nakerala 4 km N, 1150 m, Brachat & Meybohm, 18.V.2016" (cAss, MNB); 2 ♀ ♀: "N42°22'37 E43°02'28 (15), GEORGIA: Ratscha, Nakerala Pass 1260 m, Brachat & Meybohm, 18.V.2016" (cAss, MNB); 1 ♂, 4 ♀ ♀: "N42°22'20

E43°02'30 (21), GEORGIA: Ratscha, Nakerala Pass, 1320 m, Brachat & Meybohm, 22.V.2016" (cAss); 2♂♂, 3♀♀: "N42°22'39 E43°02'22 (22), GEORGIA: Ratscha, Nakerala Pass, 1220 m, Brachat & Meybohm, 22.V.2016" (cAss); 1♂: "N42°29'10 E43°06'06 (23), GEORGIA: Ratscha, Nikortsminda 4 km NW, 1395 m, Brachat & Meybohm, 23.V.2016" (cAss); 5♂♂, 4♀♀: "GEORGIA, Caucasus, [8] (Ratcha), Ratschinskyi Mts. rng., 5 km NW, Nakerala pass, nr. Tkibili town, pitfall traps, sift, 42°23'08.1"N, 42°58'46.67"E, 1440 m, 06.VII.2015 leg. A. Pütz" (cPüt, cAss).

E t y m o l o g y : The specific epithet is the past participle of the Latin verb *largare* (to enlarge) and alludes to the strongly dilated distal portion of the spermathecal capsule.

D e s c r i p t i o n : Body length 2.2-3.0 mm; length of forebody 1.0-1.2 mm. Habitus as in Fig. 15. Coloration: body reddish to dark-reddish. Eyes reduced to minute rudiments without pigmentation and without ommatitida. Pronotum (Fig. 16) without impressions on either side of midline. Hind wings completely reduced. Highly similar to *G. bituberculata*, except as follows:

♂: elytra (Fig. 17) (in large males!) with broader and coarsely granulose sutural elevations, these elevations much broader and more pronounced near scutellum than in posterior portion of suture; tergite VII with pair of posteriorly converging carinae of variable length and shape (sharply keeled to convex in cross-section), this pair of carinae practically obsolete in small males; posterior margin of tergite VIII convex, with or without small and shallow median excision; posterior margin of sternite VIII rather strongly convex; median lobe of aedeagus (Figs 18-22) approximately 0.27 mm long, without distinct flagellum and without semi-transparent spines in internal sac; paramere not distinctive.

♀: tergite VIII with broadly and weakly convex posterior margin without median excision; posterior margin of sternite VIII broadly and shallowly concave in the middle; spermathecal capsule (Figs 23-25) with strongly dilated distal portion, with a very broad and flat apical cuticular invagination, and with a relatively short, not distinctly dilated proximal portion.

C o m p a r a t i v e n o t e s : This species is distinguished from the similar *G. bituberculata* and *G. recta*, the geographically closest representatives of the *G. bituberculata* group, by the modifications of the male elytra, by the shape of the ventral process of the aedeagus (lateral view), by the absence of a distinct flagellum in the internal sac of the aedeagus, by the posteriorly distinctly concave female sternite VIII, and by the shape of the spermatheca, especially the much more strongly dilated distal portion of the capsule.

D i s t r i b u t i o n a n d n a t u r a l h i s t o r y : The specimens were collected in several localities in the environs of the Nakerala pass (Map 1), Imereti and Ratcha provinces, Northwest Georgia, at altitudes of 1150-1450 m. They were sifted from leaf litter in a mixed primary forest (fir, beech) with rhododendron, in a beech forest, in a secondary mixed deciduous forest (boxtree, hazelnut, rhododendron), in a deciduous forest (lime, beech, hornbeam, hazelnut), and in an old primary beech forest (MEYBOHM pers. comm., PÜTZ pers. comm.).

***Geostiba (Sibiota) artifistula nov.sp.* (Figs 26-31, Map 1)**

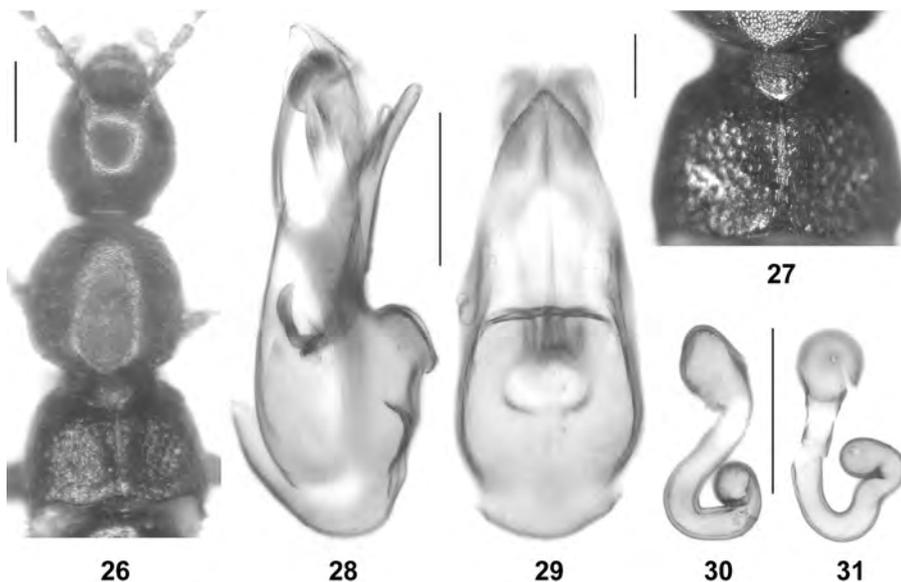
T y p e m a t e r i a l : Holotype ♂: "GEORGIA, Caucasus, [5] (Ratcha), S slopes of Letchkhumskiy Mts. rng., env. of NW of Likhety vill., pitfall traps, sift, 42°35'32.0"N, 43°13'34.9"E, 763 m, 04.VII.2015 leg. A. Pütz / Holotypus ♂ *Geostiba artifistula* sp. n. det. V. Assing 2016" (cAss). Paratypes: 2♂♂, 3♀♀: same data as holotype (cPüt, cAss).

E t y m o l o g y : The specific epithet is a noun in apposition and composed of the Latin adjective *artus* (narrow) and the Latin noun *fistula* (pipe, hose). It alludes to the weakly dilated distal portion of the spermathecal duct, one of the characters distinguishing this species from the similar and geographically close *G. recta*.

D e s c r i p t i o n : Body length 2.7-3.1 mm; length of forebody 1.05-1.20 mm. Coloration: body reddish to dark-reddish. Eyes reduced to minute rudiments without pigmentation and without ommatitida. Pronotum (Fig. 26) without impressions on either side of midline. Hind wings completely reduced. Highly similar to the geographically close *G. recta* and *G. largata*.

♂: elytra (Fig. 27) as in *G. recta* and *G. largata*; tergite VII with the pair of carinae very narrow and of variable length; posterior margin of tergite VIII with small and shallow median excision; posterior margin of sternite VIII rather strongly convex; median lobe of aedeagus (Figs 28-29) approximately 0.3 mm long, without distinct flagellum and without semi-transparent spines in internal sac; ventral process apically very slender in lateral view; paramere not distinctive.

♀: tergite VIII with broadly and weakly convex posterior margin without median excision; posterior margin of sternite VIII broadly and very shallowly concave in the middle; spermathecal capsule (Figs 30-31) with weakly dilated distal portion, with very flat and small apical cuticular invagination, and with rather short and not distinctly dilated proximal portion.



Figs 26-31: *Geostiba artifistula* nov.sp.: (26) male forebody; (27) male elytra; (28-29) median lobe of aedeagus in lateral and in ventral view; (30-31) spermatheca. Scale bars: 26: 0.2 mm; 27-31: 0.1 mm.

Comparative notes: This species is distinguished from the similar and geographically close *G. largata* and *G. recta* by the narrower carinae on the male tergite VII, the larger median lobe with an apically more slender ventral process (lateral view) and by the different shape of the spermatheca (flat and small apical cuticular invagination; shape of distal portion of capsule; indistinctly dilated proximal portion), from *G. recta* additionally by the absence of a distinct flagellum in the internal sac of the aedeagus.

Distribution and natural history: The type locality is situated in the Letchkhumskiy range (Map 1), Ratcha province, Northwest Georgia, at an altitude of approximately 760 m. The specimens were sifted from leaf litter in a young secondary mixed forest (PÜTZ pers. comm.).

***Geostiba (Sibiota) carinicollis* (EPPELSHEIM, 1878) (Map 2)**

Leptusa carinicollis EPPELSHEIM, 1878: 95 f.

Comment: The original description is based on an unspecified number of syntypes, partly from unspecified localities ("im Kaukasus weiter verbreitet"), but "hauptsächlich bei Mamudly ... und auf den Irgan-Tschaisky-gara" (EPPELSHEIM 1878). The type material in the Eppelsheim collection was revised and a male from "Mamudly" was designated as the lectotype by ASSING (2005), who identified the type locality as a place in the Baku region, Azerbaijan, in the East Caucasus. A re-examination of the data indicated in Leder's travel reports in SCHNEIDER & LEDER (1878), however, revealed that Mamudly is situated in the south of Georgia, close to the border with Armenia, and most likely identical to Mtsidziri (=Makhmutlo, =Mamudlo, =Mamutlo; 41°17'12"N, 44°10'08"E) in Kvemo Kartli province. The second specified locality ("Irgan-Tschaisky-gara") are probably the mountains (gara) near Irgani (=Irganchay, =Irganchai, =Irganchaj; 41°12'24"N, 44°08'24"E), which are not far away from the type locality. The revised, currently known distribution is shown in Map 2.

As can be inferred from the morphology of the median lobe of the aedeagus (base abruptly convex in lateral view; see figure 190 in ASSING 2005), *G. carinicollis* is closely allied to the four species described from Armenia below).

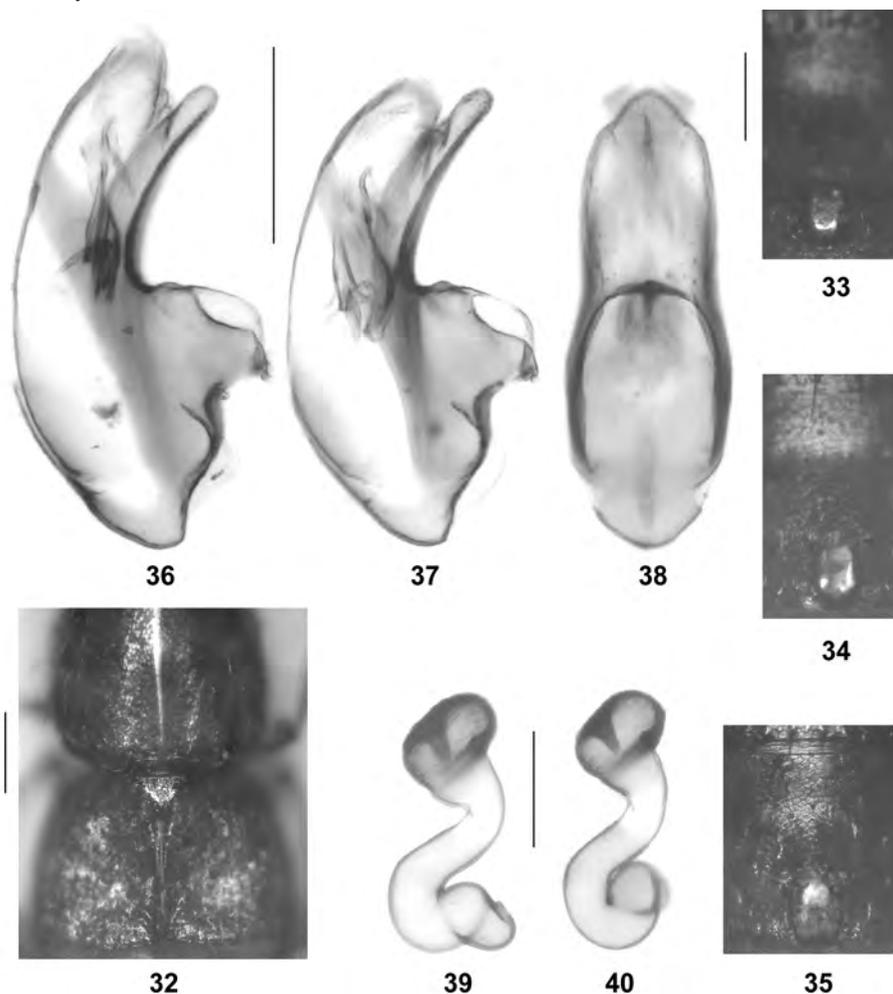
***Geostiba (Sibiota) medea* PACE, 1996, revalidated (Map 1)**

Geostiba (Ditroposipalia) medea PACE 1996: 28

Comment: The original description of *G. medea* is based on a single female in poor condition from "Turchia 'Schellusdag', 3000 m, 8.VII.1989, Hoth leg." (PACE 1996). A revision of the holotype and its labels, however, revealed that the type locality is not in Turkey, but identical to the Schalbusdag (41°20'N, 47°48'E) in the East Caucasus (Map 1) (Russia: Republic of Dagestan) (ASSING 2005).

Since the type localities of both *G. carinicollis* and *G. medea* were believed to be in the East Caucasus and a comparison of the type material revealed no significant morphological differences, *G. medea* was placed in synonymy with *G. carinicollis* by ASSING (2005). This synonymy, as well as the correction of the type locality escaped the notice of SCHÜLKE & SMETANA (2015), who list *G. medea* as a valid species in the subgenus *Sipalotricha* SCHEERPELTZ, 1931 and distributed in the Turkish province Adana.

A re-examination of the type locality of *G. carinicollis* (see the preceding section) revealed that it is not situated in the East Caucasus, but in Kvemo Kartli, South Georgia (Map 2), so that *G. medea* undoubtedly represents a distinct species. In consequence, the name is revalidated. However, its affiliations with other Caucasian *Sibiota* species are currently unclear, as the male sexual characters are unknown.



Figs 32-40: *Geostiba unituber* nov.sp.: (32) male pronotum and elytra; (33-35) median portion of male tergite VII; (36-38) median lobe of aedeagus in lateral and in ventral view; (39-40) spermatheca. Scale bars: 0.1 mm.



Fig. 41: Type locality of *Geostiba unituber* nov.sp.

***Geostiba (Sibiota) unituber* nov.sp.** (Figs 32-41, Map 2)

Type material: Holotype ♂: "ARMENIA [4] - N Yerevan, NW Hrazdan, 40°41'40"N, 44°29'16"E, 2500 m, W-slope, sifted, 26.VI.2016, V. Assing / Holotypus ♂ *Geostiba unituber* sp. n. det. V. Assing 2016" (cAss). Paratypes: 3♂♂, 9♀♀: same data as holotype (cAss); 4♂♂, 6♀♀: same data as holotype, but leg. Schülke (MNB).

Etymology: The specific epithet is a noun in apposition composed of the Latin numeral unus (one) and the Latin noun tuber (bump, protuberance). It alludes to the presence of a median tubercle (as opposed to a pair of carinae) on the male tergite VII.

Description: Body length 2.2-2.5 mm; length of forebody 0.85-1.00 mm. Coloration: body yellowish to pale reddish-yellow. Eyes strongly reduced, with weak pigmentation and composed of approximately five ommatidia. Pronotum with a more or less pronounced longitudinal impression on either side of midline (Fig. 32). Hind wings completely reduced.

♂: elytra (Fig. 32) with narrow, anteriorly slightly broader carina extending along whole suture, disc with usually extensive and more or less pronounced impression, punctuation very fine, barely noticeably granulose; abdominal tergite VII (Figs 33-35) with a rather broad, but variably shaped median tubercle posteriorly, upper surface of this tubercle glossy, flat or weakly excavate; posterior margins of tergite VIII and sternite VIII broadly convex; median lobe of aedeagus (Figs 36-38) 0.24 mm long, without semi-transparent spines in internal sac; ventral process weakly curved in lateral view; paramere not distinctive.

♀: elytra and abdominal tergite VII without modifications; tergite VIII shaped as in male; posterior margin of sternite VIII weakly convex; spermathecal capsule (Figs 39-40) with dilated distal portion and rather stout and short proximal portion.

Comparative notes: *Geostiba unituber* is characterized by the shape of the median tubercle on the male tergite VIII, the morphology of the aedeagus, and the shape of the spermatheca. From most Georgian *Sibiota* species, it is additionally distinguished by paler coloration and less reduced eyes. For illustrations of the sexual characters of the previously described Caucasian *Sibiota* species see ASSING (2005, 2009, 2011, 2016a) and PACE (1996).

Distribution and natural history: The type locality (Fig. 41) is situated in the Pambaki range some 55 km to the north of Yerevan, North Armenia (Map 2). The specimens were sifted from leaf litter and the roots of grass on a slope with scattered *Salix* sp. at an altitude of 2500 m.

***Geostiba (Sibiota) pambakica* nov.sp.** (Figs 42-52, Map 2)

Type material: Holotype ♂: "ARMENIA [6] - N Yerevan, NW Hrazdan, 40°38'07"N, 44°30'05"E, 2010 m, mixed forest, 27.VI.2016, V. Assing / Holotypus ♂ *Geostiba pambakica* sp. n. det. V. Assing 2016" (cAss). Paratypes: 1♂, 4♀ ♀: same data as holotype (cAss); 2♀ ♀: same data, but leg. Schülke (MNB); 4♂♂, 3♀♀: "ARMENIA [5] - N Yerevan, NW Hrazdan, 40°40'07"N, 44°28'22"E, 2100 m, W-slope, sifted 26.VI.2016, V. Assing" (cAss); 1♂, 2♀ ♀: same data, but leg. Schülke (MNB); 1♂, 1♀: "ARMENIA [8] - N Yerevan, NW Hrazdan, 40°33'45"N, 44°23'41"E, 2000 m, forest margin, 28.VI.2016, V. Assing" (cAss); 1♀: same data, but leg. Schülke.

Etymology: The specific epithet is an adjective derived from Pambaki, the name of the mountain range where this species is probably endemic.

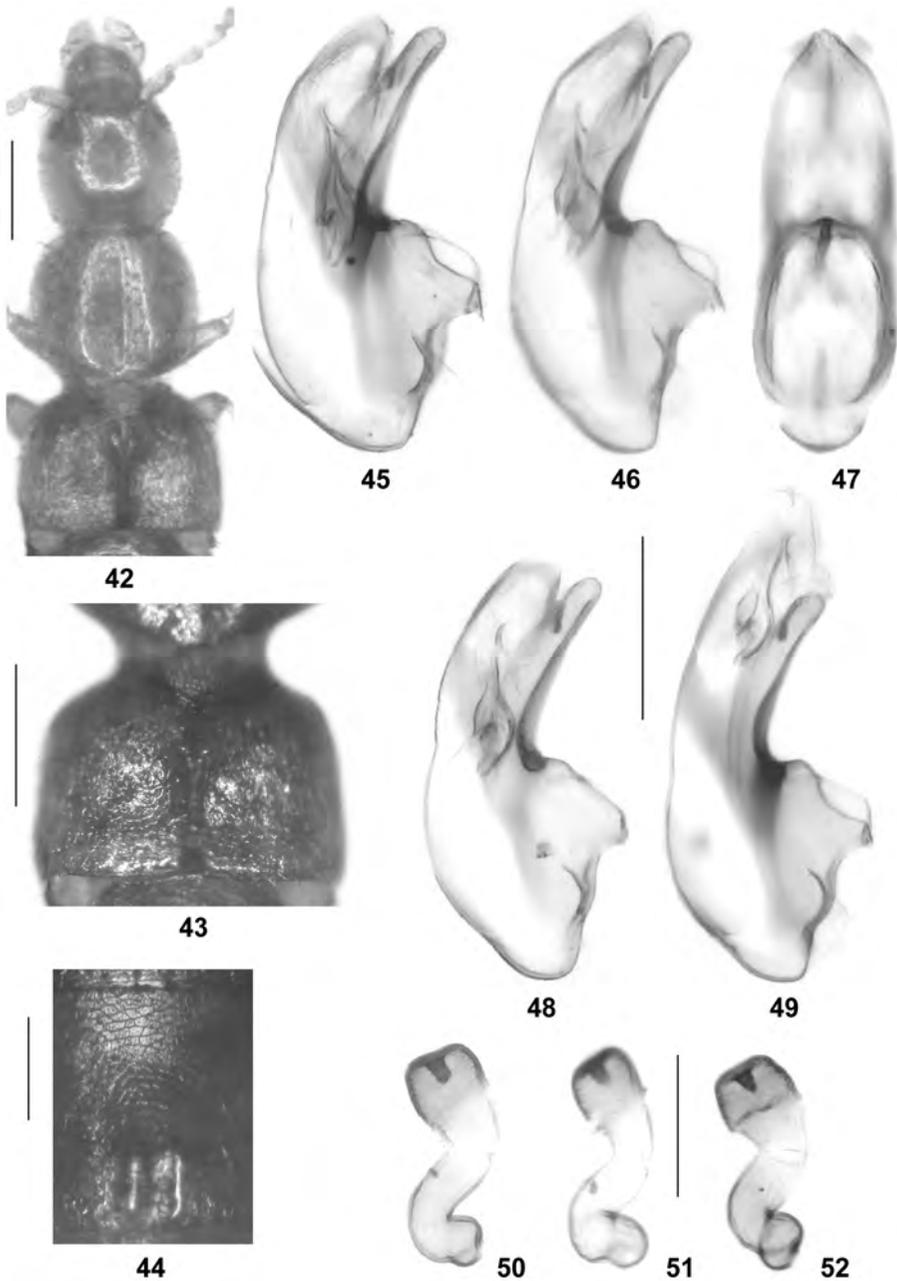
Description: Body length 2.2-2.6 mm; length of forebody 0.85-1.05 mm. Coloration and other characters (Fig. 42) as in *G. unituber*, except as follows:

Pronotum on average with less distinct impression on either side of midline.

♂: elytra (Fig. 43) with narrow, anteriorly slightly broader carina extending along whole suture, disc with usually extensive and more or less pronounced impression, punctuation very fine, barely noticeably granulose; abdominal tergite VII (Fig. 44) with a median pair of more or less pronounced, parallel carinae posteriorly; posterior margin of tergite VIII broadly convex; posterior margin of sternite VIII very obtusely angled in the middle; median lobe of aedeagus (Figs 45-49) 0.22-0.23 mm long, without semi-transparent spines in internal sac; ventral process nearly straight in lateral view; paramere not distinctive.

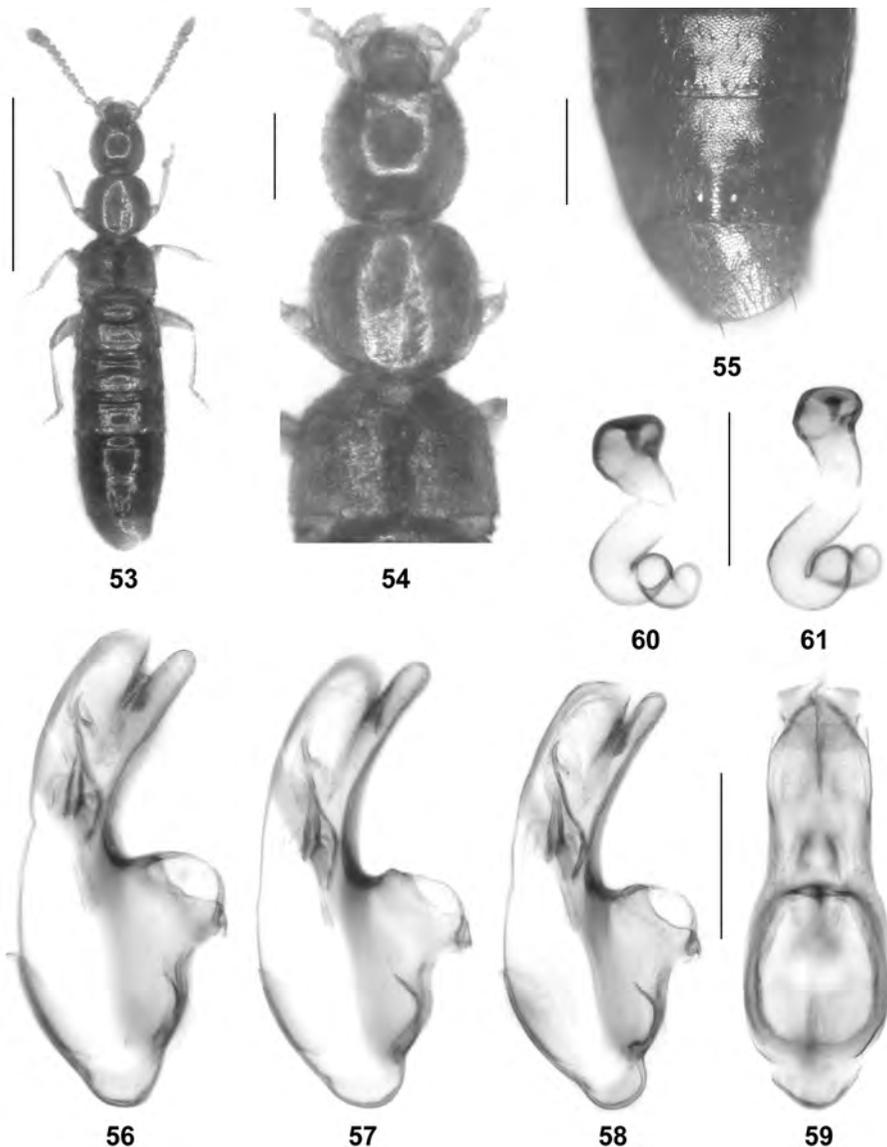
♀: tergite VIII and sternite VIII with broadly convex posterior margins; spermathecal capsule (Figs 50-52) with weakly dilated distal portion and conspicuously stout and short proximal portion.

Comparative notes: Though highly similar in external characters, *G. pambakica* is readily distinguished from the sympatric *G. unituber* by the presence of carinae (rather than one median tubercle) on the male abdominal tergite VII, by a slightly smaller median lobe of the aedeagus with a nearly straight ventral process (lateral view) and a somewhat shorter crista apicalis, as well as by the shape of the spermatheca (smaller; distal portion weakly dilated; proximal portion shorter and stouter).



Figs 42-52: *Geostiba pambakica* nov.sp.: (42) male forebody; (43) male elytra; (44) median portion of male tergite VII; (45-49) median lobe of aedeagus in lateral and in ventral view; (50-52) spermatheca. Scale bars: 42-43: 0.2 mm; 44-52: 0.1 mm.

Distribution and natural history: The type specimens were collected in three localities in the Pambaki range (Map 2), not far from the type locality of *G. unituber* (but at lower altitudes), by sifting litter and grass roots beneath bushes and in, or at the margin of, mixed deciduous forests at altitudes of 2000-2100 m.



Figs 53-61: *Geostiba meghruica* nov.sp.: (53) male habitus; (54) male forebody; (55) male abdominal segments VI-VIII; (56-59) median lobe of aedeagus in lateral and in ventral view; (60-61) spermatheca. Scale bars: 53: 1.0 mm; 54-55: 0.2 mm; 56-61: 0.1 mm.

***Geostiba (Sibiota) meghruica* nov.sp.** (Figs 53-62, Map 2)

Type material: Holotype ♂: "ARMENIA [30] - 25 km S Kapan, Gomarants Ps., 39°01'32"N, 46°21'59"E, 2190 m, oak forest, 7.VII.2016, V. Assing / Holotypus ♂ *Geostiba meghruica* sp. n. det. V. Assing 2016" (cAss). Paratypes: 7♂♂, 3♀♀: same data as holotype (cAss, MNB); 1♀: same data, but leg. Schülke (MNB). 1♀: "ARMENIA [AR16-31] 25 km S Kapan, N Gomarants Pass, 39°02'15"N, 46°22'13"E, 2050 m, oak forest with Acer, Carpinus, and fern undergrowth, litter and dead wood sifted, 7.VII.2016, leg. M. Schülke" (MNB).

E t y m o l o g y : The specific epithet is an adjective derived from Meghru, the name of the mountain range where this species is probably endemic.

D e s c r i p t i o n : Body length 2.2-2.6 mm; length of forebody 0.9-1.1 mm. Habitus as in Fig. 53. Coloration and other characters as in *G. unituber*, except as follows:

Pronotum on average with less distinct impression on either side of midline.

♂: elytra (Fig. 54) with narrow, anteriorly slightly broader carina extending along whole suture, disc with usually extensive and more or less pronounced impression, punctuation very fine, barely noticeably granulose; abdominal tergite VII (Fig. 55) with a median pair of distinct, broad subparallel carinae posteriorly, these carinae less pronounced to practically obsolete in smaller males; posterior margins of tergite VIII and sternite VIII broadly convex; median lobe of aedeagus (Figs 56-59) 0.25-0.28 mm long, without semi-transparent spines in internal sac; ventral process weakly curved in lateral view; paramere not distinctive.

♀: tergite VIII and sternite VIII with broadly convex posterior margins; spermathecal capsule (Figs 60-61) with weakly dilated distal portion and moderately stout, short, and twisted proximal portion.



Fig. 62: Type locality of *Geostiba meghruica* nov.sp.

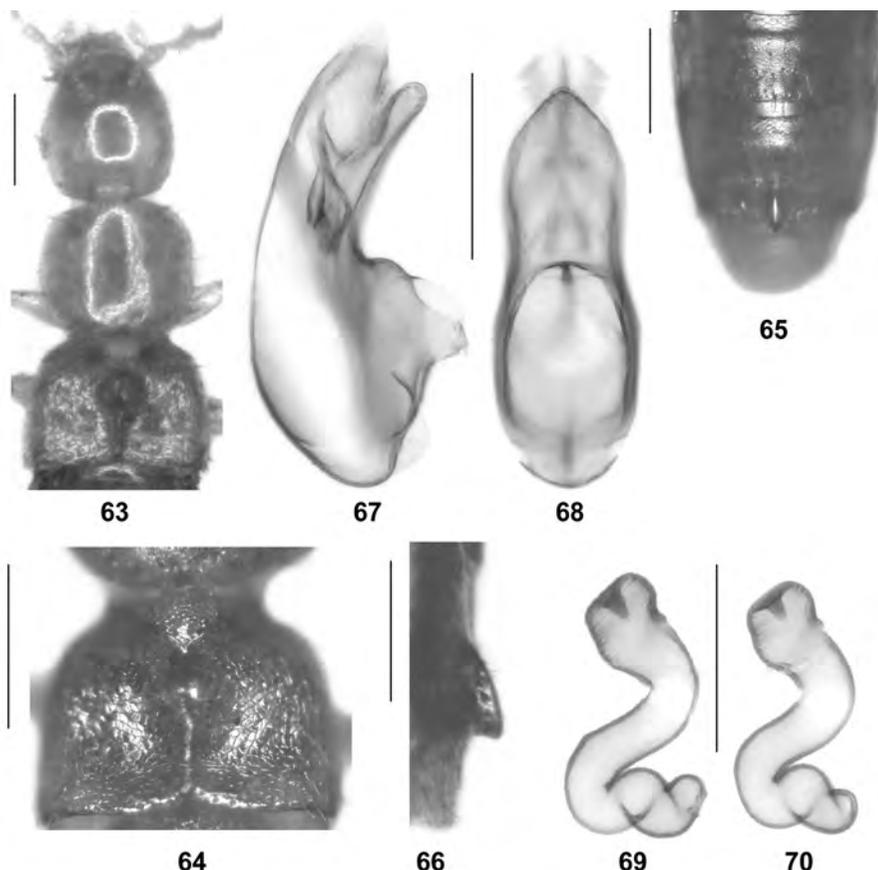
C o m p a r a t i v e n o t e s : *Geostiba meghruica* differs from *G. unituber* and *G. pambakica* by a larger median lobe of the aedeagus and by the shape of the spermatheca, from *G. unituber* additionally by the presence of a pair of carinae on the male tergite VII, and from *G. pambakica* by the broader and less distinctly parallel carinae on the male

sternite VII and by the broadly convex posterior margin of the male sternite VIII.

Distribution and natural history: The type specimens were collected in two geographically close localities in the Meghru range, South Armenia (Map 2), by sifting leaf litter and dead wood in oak forests near the upper tree line (Fig. 62), at altitudes of 2050 and 2190 m.

***Geostiba (Sibiota) uniconeata* nov.sp.** (Figs 63-70, Map 2)

Type material: Holotype ♂: "ARMENIA, above Jermuk, sifting of plant leavings near snow residues, 2400 m, 39.839053N 45.693496E, 21.V.2015 M. Kocian lgt. / Holotypus ♂ *Geostiba uniconeata* sp. n. det. V. Assing 2016" (cAss). Paratypes: 5♂♂, 10♀♀: same data as holotype (cKoc, cAss); 1♂, 3♀♀: ARMENIA [AR16-11] ca. 50 km NW Sisian, Jermuk, 39°50'02"N, 45°40'21"E, 2110 m, oak forest and forest margin, litter and roots sifted, 30.VI.2016, leg. M. Schülke" (MNB, cAss); 1♀: "ARMENIA [AR16-11b] ca 50 km NW Sisian, Jermuk, 39°50'02"N, 45°40'21"E, 2110 m, oak forest, litter and roots sifted, 12.VII.2016, leg. M. Schülke" (MNB).



Figs 63-70: *Geostiba uniconeata* nov.sp.: (63) male forebody; (64) male elytra; (65) male abdominal segments VI-VIII in dorsal view; (66) male tergites VII-VIII in lateral view; (67-68) median lobe of aedeagus in lateral and in ventral view; (69-70) spermatheca. Scale bars: 63-66: 0.2 mm; 67-70: 0.1 mm.

E t y m o l o g y : The specific epithet is an adjective composed of the Latin numeral unus and an adjective derived from the Latin noun cuneus (wedge). It alludes to the conspicuous wedge-shaped median elevation on the male tergite VII.

D e s c r i p t i o n : Body length 2.1-2.5 mm; length of forebody 0.9-1.1 mm. Coloration and other characters as in *G. unituber*, except as follows:

Pronotum without impression on either side of midline.

♂: elytra (Figs 63-64) with narrow, anteriorly strongly elevated and broader carina extending along whole suture, disc with extensive, but shallow impression, punctuation shallow and sparse, not granulose; abdominal tergite VII (Figs 65-66) with a conspicuous, long and strongly elevated, wedge-shaped (lateral view), and dorsally sharp median elevation; posterior margins of tergite VIII convex; posterior margin of sternite VIII indistinctly angled in the middle; median lobe of aedeagus (Figs 67-68) 0.22 mm long, without semi-transparent spines in internal sac; ventral process stout and nearly straight in lateral view; paramere not distinctive.

♀: tergite VIII with convex posterior margin; posterior margin of sternite VIII broadly and weakly convex; spermathecal capsule (Figs 69-70) with weakly dilated distal portion and moderately stout, twisted proximal portion.

C o m p a r a t i v e n o t e s : *Geostiba unicuneata* is distinguished from all its congeners particularly by the shape of the postero-median elevation on the male tergite VII, as well as by the primary sexual characters. It additionally differs from its Armenian consubgenera by the absence of distinct impressions on the pronotum.

D i s t r i b u t i o n a n d n a t u r a l h i s t o r y : The type material was collected in two close localities near Jermuk, South Armenia (Map 2). The specimens from the type locality were sifted from debris near snow fields at an altitude of 2400 m, those from the second locality were sifted from leaf litter and roots in an oak forest at an altitude of 2110 m. For an illustration of the latter locality see ASSING (2016b: figure 43).

Key to the *Sibiota* species of the Caucasus region exclusive of Turkey

Owing to the generally weakly pronounced interspecific variation of external characters, the following key mainly relies on the primary and male secondary sexual characters, as well as on zoogeographic information. A reliable identification may not always be possible when only one sex is available. The male secondary sexual characters may be weakly pronounced or even obsolete in small males.

1. Eyes reduced to minute rudiments without ommatidia and without pigmentation. Distribution confined to the Greater Caucasus, including the Suram range, and the environs of Batumi.....2
- Eyes less reduced, composed of approximately 5-10 ommatidia, with or without pigmentation.....7
2. Aedeagus with a conspicuous flagellum in internal sac (Figs 5, 7 and ASSING 2005: figure 185).....3
- Aedeagus without distinct flagellum in internal sac.....4
3. Posterior margin of male tergite VIII usually with a small median excision. Median lobe of aedeagus and spermatheca as in ASSING (2005: figures 185, 188). Georgia: Likhskiy (Suram) range (Map 1).....*bituberculata* (EPPELSHEIM)

- Posterior margin of male tergite VIII without median excision. Median lobe of aedeagus and spermatheca as in Figs 5-8, 11-13). Northwest Georgia: Kvemo-Svanetia and Ratcha provinces (Map 1)..... *recta* nov.sp.
- 4. Male elytra with conspicuously elevated and narrow sutural carinae. Male tergite VII with median pair of carinae strongly converging posteriorly (PACE 1995: figure 89). Median lobe of aedeagus with ventral process obtusely angled in lateral view (PACE 1995: figure 90). Spermatheca with undilated distal portion and with long and slender proximal portion (PACE 1996: figure 94). Distribution: West Georgia: environs of Batumi (Map 1)..... *batumiensis* PACE
- Male elytra with less elevated and broader sutural carinae. Male tergite VII with median pair of carinae subparallel or weakly converging posteriorly.5
- 5. Distribution: south slope of Central Caucasus (region to the north of Tbilisi; Map 1). Median lobe of aedeagus and spermatheca as in Figs 1-4.....*kobrisensis* PACE
- Distribution: Northwest Georgia (southwest of Greater Caucasus). Aedeagus and spermatheca of different shapes6
- 6. Median lobe of aedeagus approximately 0.28 mm long; ventral process apically moderately slender in lateral view (Figs 18-22). Spermatheca with conspicuously dilated distal portion (Figs 23-25). Distribution: Imereti and Ratcha provinces: environs of Nakerala pass (Map 1).....*largata* nov.sp.
- Median lobe of aedeagus larger, approximately 0.3 mm long; ventral process apically very slender in lateral view (Figs 28-29). Spermatheca with distal portion weakly dilated and with very flat apical cuticular invagination (Figs 30-31). Distribution: Ratcha province: Letchkhumskiy range (Map 1).....*artiststula* nov.sp.
- 7. Distribution: eastern Greater Caucasus: Dagestan (Map 1). Spermatheca as in PACE (1996: figure 105). Male unknown.*medea* PACE
- Distribution different; absent from the East Caucasus.8
- 8. Distribution: environs of Bakuriani in the Lesser Caucasus (Georgia) (Map 1). Male sexual characters unknown. Spermatheca as in PACE (1996: figure 165)..... *zerchei* PACE
- Distribution different.....9
- 9. Male tergite VII with one median tubercle or elevation posteriorly.....10
- Male tergite VII with a median pair of parallel or posteriorly converging carinae posteriorly12
- 10. Tubercle on male tergite VII of subquadrate, subquadrangular, or oval shape (Figs 33-35). Median lobe of aedeagus and spermatheca shaped as in Figs 36-38. North Armenia: Pambaki range (Map 2).....*unituber* nov.sp.
- Tubercle or elevation on male tergite VII on male tergite VII distinctly oblong. Primary sexual different. Species from Georgia and South Armenia.....11
- 11. Forebody with distinct microreticulation and nearly matt. Male elytra with sutural carinae not distinctly broader anteriorly (ASSING 2011: figure 39). Elevation on male tergite VII flattened dorsally (ASSING 2011: figure 41). Median lobe of aedeagus broadly convex at base (lateral view) (ASSING 2011: figure 42). Spermatheca with very stout distal portion and very short and twisted proximal portion (ASSING 2011: figure 45). Russia: West Caucasus: Psheashkha range (Map 2).....*uniplicata* ASSING
- Forebody with very shallow microreticulation and glossy. Male elytra with sutural carinae broader anteriorly (Figs 63-64). Elevation on male tergite VII sharply keeled dorsally (Figs 65-66). Median lobe of aedeagus narrowly convex basally (Figs 67-68). Spermatheca with much smaller distal portion and longer and more slender proximal portion (Figs 69-70). South Armenia: environs of Jermuk (Map 2).....*unicuneata* nov.sp.
- 12. Median lobe of aedeagus in lateral view with abruptly convex or almost pointed base (lateral view). Distribution: Armenia and South Georgia.....13
- Median lobe of aedeagus in lateral view with broadly convex base. Distribution: Greater Caucasus.....15

13. Distribution: South Georgia: Kvemo Kartli (Map 2). Aedeagus and spermatheca as in ASSING (2005: figures 190, 192) *carinicollis* (EPPELSHEIM)
 - Distribution: Armenia. Aedeagus and spermatheca shaped differently 14
14. Male sternite VIII obtusely angled posteriorly. Median lobe of aedeagus smaller (0.22-0.23 mm) and shaped as in Figs 45-49. Spermatheca as in Figs 50-52. Distribution: North Armenia: Pambaki range (Map 2) *pambakica* nov.sp.
 - Male sternite VIII broadly convex posteriorly. Median lobe of aedeagus distinctly larger (0.28-0.30 mm) and shaped as in Figs 56-59. Spermatheca as in Figs 60-61. Distribution: South Armenia: Meghru range (Map 2) *meghruica* nov.sp.
15. Male elytra with pronounced elevations on either side of suture, these elevations converging posteriorly (ASSING 2011: figures 48-49). Male tergite VII with the median pair of carinae contiguous posteriorly, forming a "V" (ASSING 2011: figure 50). Median lobe of aedeagus shaped as in ASSING (2011: figures 51-52); internal sac with semitransparent spines (ASSING 2011: figures 53-54). Spermatheca very slender (ASSING 2011: figure 56). West Caucasus: region to the south of Mt. Fisht (Map 2) *convergens* ASSING
 - Male elytra with narrow carinae on either side of suture. Median pair of carinae less strongly converging posteriorly and not contiguous. Median lobe of aedeagus without semitransparent spines in internal sac and of different shape. Spermatheca of different shape 16
16. Sutural carinae of male elytra broader and distinctly dilated anteriorly (ASSING 2005: figure 194). Median lobe of aedeagus and spermatheca as in ASSING (2005: figures 198, 201). Distribution: northern Central Caucasus (Map 2) *krzysztofi* (ROUBAL)
 - Sutural carinae of male elytra narrow along its entire length (ASSING 2016: figure 2). Median lobe of aedeagus as in ASSING (2016: figures 5-6). Female unknown. Distribution: Northwest Caucasus (Map 2) *artocarinata* ASSING

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Zusammenfassung

Sieben mikrophthalme Arten des Subgenus *Sibiota* CASEY, 1906, Gattung *Geostiba* THOMSON, 1858, aus Georgien und Armenien werden beschrieben und abgebildet: *Geostiba (Sibiota) recta* nov.sp. (Georgien: Ratcha und Kvemo-Svanetia); *G. (S.) largata* nov.sp. (Georgien: Imereti und Ratcha); *G. (S.) artistutula* nov.sp. (Georgien: Ratcha); *G. (S.) uniumber* nov.sp. (Nordarmenien: Pambaki-Gebirge); *G. (S.) pambakica* nov.sp. (Nordarmenien: Pambaki-Gebirge); *G. (S.) meghruica* nov.sp. (Südarmenien: Meghru-Gebirge); *G. (S.) unicumneata* nov.sp. (Südarmenien: Umgebung von Jermuk). Die Typuslokalität von *G. carinicollis* (EPPELSHEIM, 1878) wird revidiert und *G. medea* PACE, 1996, vorher jüngeres Synonym *G. carinicollis*, wird revalidiert. Weitere Nachweise von *G. bituberculata* (EPPELSHEIM, 1878) und *G. kobrisensis* PACE, 1996 werden gemeldet; frühere Nachweise von *G. kobrisensis* werden korrigiert. Für die 17 derzeit aus der Kaukasusregion (ohne Nordost-Anatolien) bekannten, durchweg mikrophthalmen und ungeflügelten *Sibiota*-Arten wird eine Bestimmungstabelle erstellt. Ihre Verbreitung wird anhand von Karten illustriert.

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