On the taxonomy and phylogeography of the *Scopaeus obscuripes* species group from Central Asia and the Middle East (Coleoptera: Staphylinidae: Paederinae)

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Abstract

The *Scopaeus obscuripes* species group is distributed in Central Asia and the Middle East. Two phylogenetic lineages are distinguished, the *S. obscuripes* lineage, comprising *S. asiaticus* Bernhauer, 1915 (Tadzhikistan, Uzbekistan), *S. kabakovi* Gusarov, 1994 (Afghanistan, Pakistan), and *S. obscuripes* Cameron, 1931 (India), and the *S. likovskyi* lineage, comprising *S. likovskyi* Boháč, 1988 (Afghanistan, Kyrgyzstan, Tadzhikistan, Uzbekistan) and five new species from Kyrgyzstan: *S. apiculatus* **n. sp.**, *S. chatkalensis* **n. sp.**, *S. milkoi* **n. sp.**, *S. moriturus* **n. sp.**, and *S. schawalleri* **n. sp.** *Scopaeus caspius* **n. sp.** from Azerbaidzhan and *S. klapperichi* Frisch, 2008 from Afghanistan cannot be assigned to either lineage. A lectotype is designated for *S. asiaticus*, and the subgenus-group taxon *Asiascopaeus* Coiffait, 1984, the type species of which is *S. asiaticus*, is synonymized with *Scopaeus* s. str. Erichson, 1839. *Scopaeus asiaticus*, *S. likovskyi*, and the new species are diagnosed and their habitus and male and female genital characters are figured as well as the female primary genital characters of *S. kabakovi*. The distribution of *S. obscuripes* is revised, *S. kabakovi* is recorded for Kabol for the first time, the first records of *S. likovskyi* from Kyrgyzstan are presented, and records of *S. asiaticus* for Afghanistan, Iran, and Turkmenistan are rejected. The members of the *S. obscuripes* species group are keyed, and their distribution is mapped with consideration of the new and revised records. The previously unknown female primary genital characters corroborate the hypothesis of a monophyletic *S. obscuripes* species group, the phylogeography of which is discussed.

K e y w o r d s : Staphylinidae, Paederinae, *Scopaeus*, Central Asia, Tien Shan, Alai, Pamirs, Himalayas, Azerbaidzhan, new species, distribution, phylogeography.

Zusammenfassung

Die *Scopaeus obscuripes*-Artengruppe ist in Zentralasien und im Nahen Osten verbreitet. Zwei phylogenetische Linien können unterschieden werden, die *S. obscuripes*-Linie, die *S. asiaticus* Bernhauer, 1915 (Tadschikistan, Usbekistan), *S. kabakovi* Gusarov, 1994 (Afghanistan, Pakistan) und *S. obscuripes* Cameron, 1931 (Indien) umfasst, sowie die *S. likovskyi*-Linie mit *S. likovskyi* Boháč, 1988 (Afghanistan, Kirgisistan, Tadschikistan, Usbekistan) und fünf neuen Arten aus Kirgisistan: *S. apiculatus* **n. sp.**, *S. chatkalensis* **n. sp.**, *S. milkoi* **n. sp.**, *S. moriturus* **n. sp.** und *S. schawalleri* **n. sp.** *Scopaeus caspius* **n. sp.** aus Aserbaidschan and *S. klapperichi* Frisch, 2008 aus Afghanistan können keiner dieser Linien zugeordnet werden. Ein Lectotypus wird designiert für *S. asiaticus*, und die Untergattung *Asiascopaeus* Coiffait, 1984, deren Typusart *S. asiaticus* ist, wird mit *Scopaeus* s. str. Erichson, 1839 synonymisiert. Die diagnostischen Merkmale von *S. asiaticus*, *S. likovskyi* und den neuen Arten werden beschrieben. Der Habitus und die männlichen und weiblichen Geschlechtsmerkmale dieser Arten werden abgebildet, ebenso wie die primären weiblichen Geschlechtsmerkmale von *S. kabakovi*. Die Verbreitung von *S. obscuripes* wird revidiert, *S. kabakovi* erstmals für Kabul gemeldet, die ersten Nachweise von *S. likovskyi* aus Kirgisistan werden vorgelegt, und Meldungen von *S. asiaticus* aus Afghanistan, Turkmenistan und dem Iran zurück gewiesen. Ein Bestimmungsschlüssel für die Angehörigen der *S. obscuripes*-Artengruppe wird vorgelegt, und die Verbreitung der Arten wird unter Berücksichtigung neuer und revidierter Daten auf topographischen Karten dargestellt. Die Phylogeographie der *S. obscuripes*-Gruppe, deren Monophylie von Merkmalen der bislang unberücksichtigt gebliebenen primären weiblichen Geschlechtsorgane gestützt wird, wird diskutiert.

Contents

1 Introduction

Both diversity and phylogeographic relationships of the speciose, predominantly riparian paederine genus *Scopaeus* Erichson, 1839 in Central Asia still remains to be seen. While my revisionary works on the genus, which currently comprises 457 valid species worldwide, yielded about 100 species in the Mediterranean and the Middle East alone, only 16 previously named species of *Scopaeus* are hitherto known from Central Asia, four of which I added only recently (Frisch 2014). My studies in the framework of a cooperation of the Museum für Naturkunde Berlin and the Institute of Biology and Pedology of the Academy of Sciences of the Republic of Kyrgyzstan, however, point to a rich diversity of *Scopaeus* in the Central Asian mountains. As far as known presently, the Central Asian mountain systems must be looked upon as the evolution centre of two distinct phylogenetic lineages of *Scopaeus*. While the moderately speciose *S. similis* species group (Frisch 2014) includes the most widespread and commonmost Central Asian species of the genus, the *S. obscuripes* group, subject of this contribution, obviously constitutes a speciose clade with a high percentage of endemics of particular mountain ranges and river systems.

I erected the *S. obscuripes* species group for *S. kabakovi* Gusarov, 1994 from the Hindukush and Kashmir, *S. likovskyi* Boháč, 1988 from the Alai and Hindukush Mountains, and *S. obscuripes* Cameron, 1931 from the Siwalik Range, Lesser Himalayas, and proposed a monophyletic lineage based on the short or vestigial dorsal lobe and the enlarged flagellum of the aedeagus (Frisch 1999a). Later I added *S. klapperichi* from Afghanistan (Frisch 2008). Meanwhile I recognized *S. asiaticus* Bernhauer, 1915 to be another representative of the *S. obscuripes* group and received the first species of that clade from the Middle East. In the course of my expeditions to Kyrgyzstan in recent years, I moreover discovered five close relatives of *S. likovskyi* in the Tien Shan and Alai Mountains.

In this article, I first synonymize the subgenus-group name *Asiascopaeus* Coiffait, 1984, the type species of which is *S. asiaticus*, with the type subgenus *Scopaeus* s. str. Erichson, 1839, followed by contributions to the taxonomy, biogeography, and phylogeny of the *S. obscuripes* species group.

Acknowledgements

I am indebted to the curators and private collectors mentioned in the material chapter, who made this study possible by lending specimens to me. Aleksandr Ryvkin, Moscow, kindly scattered my doubts that the provenance of *Scopaeus caspius* n. sp. is correct. I thank Elke Siebert and Hwa Ja Goetz, Museum für Naturkunde Berlin, for their graphical support. Mary-Alice Small, Manas Recources Limited, Bishkek, kindly funded my search for *S. moriturus* n. sp. in the Isfairam-Say River System in 2013. I sincerely thank Lee Herman, American Museum of Natural History, New York, for the linguistic and scientific improvement of this manuscript and his friendly support over the years. Harald Schillhammer, Naturhistorisches Museum, Wien, kindly proof-read the manuscript. Last but not least, I thank my dear colleagues Nassima Bashirova, Dmitry Milko, and Usubalijew Almasbek Sadygalijewitsch of the Institute of Biology and Pedology of the Academy of Sciences of the Republic of Kyrgyzstan in Bishkek for organizing our successful expeditions and their friendly company in the field. My expeditions to Kyrgyzstan were funded by the Museum für Naturkunde Berlin and the German Academic Exchange Service (DAAD).

2 Material and methods

Material

The specimens referred to in this contribution, including most holotypes of the species described herein, are stored in the Museum für Naturkunde Berlin (MNHB) except otherwise stated (abbreviations in alphabetical order):

ASCD	Private Collection A. Shavrin, Daugavpils
BMNH	The Natural History Museum, London (R. Booth)
FMNH	Field Museum of Natural History, Chicago (A. Newton, M. Thayer)
HNHM	Hungarian Natural History Museum, Budapest (G. Macranczy, O. Merkl, G. Szél)
IBPB	Institut of Biology and Pedology of the Academy of Sciences of the Republic of Kyrgyzstan, Bishkek
MHNG	Muséum d'histoire naturelle, Geneva (G. Cuccodoro, I. Löbl)
MSCB	Private Collection M. Schülke, Berlin
MZLU	Museum of Zoology, Lund University (C. Fägerström)
MZMC	Zoological Museum of the Moscow Lomonosov State University (A. Gusakov)
NHMB	Naturhistorisches Museum, Basel (E. Sprecher)
NHMW	Naturhistorisches Museum, Wien (H. Schillhammer)
NMPC	Národni Muzeum, Prague (J. Hajek, J. Jelinek)
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg (L. Zerche)
SMNS	Staatliches Museum für Naturkunde, Stuttgart (W. Schawaller)
SMTD	Staatliches Museum für Tierkunde, Dresden (O. Jäger, K. Klass)
UZMH	Zoologiska Muset, Helsinki (J. Muona)
ZICP	Zoological Institute, St. Petersburg (A. Kirejtshuk)

In the compilations of type material and additional specimens examined, the label data usually are not cited verbatim but standardized and completed by province or district information to make it easier for the reader to find the respective localities. Old, nowadays uncommon locality names are replaced by the current names, but added in rectangular brackets. Labels cited verbatim stand in quotation marks. Missing GPS-coordinates on locality labels were subsequently taken from Google Earth and are indicated by rectangular brackets to distinguish them from those measured at the exact collecting site.

Methods

The habitus photographs were created with the montage software Helicon Focus based on digital images which were taken with a camera attached to a stereoscopic microscope. Transmitted-light microscopic images were made using the Zeiss Axi-

oscope imaging system and the montage software Picolay. Drawings were made using the drawing attachement U-DA of the transmitted-light microscope Olympus BX50. Laterotergites IX are illustrated without setation. The illustrations were made with the following magnifications: Specimens (Figs. 1–8): 32×; aedeagi, abdominal sclerites VIII (Figs. 9–35): 100×; laterotergites IX, lateral gonocoxal plates, abdominal tergites X (Figs. 36–45): 400×; laterotergite IX and abdominal tergite X of *Scopaeus caspius* n. sp. (Figs. 58, 59), female primary sexual characters including the attached lateral gonocoxal plates: 600× (Figures 46–57, 60, 61).

Specimens were measured magnified 140× using a stereoscopic microscope with an eye-piece linear micrometer. Measurements and ratios, means (Ø) are given in brackets, include both sexes and the maximum range of variation in body size and form. Total length of specimens = interval from apical spines of labrum to the posterior end of abdomen, depending on intensity of contraction of abdomen; forebody length = interval from apical spines of labrum to posterior margin of elytra at suture; head length = interval from anterior margin of clypeus to posterior margin of head; elytral length = interval from posterior tip of scutellum to posterior end of elytra along suture; eye length = interval from anterior to posterior end of ocular suture; both eye length and temporal length are measured in lateral view; length of antennomeres is measured without the thin basal stalk.

The morphological structures of the aedeagus are termed following Frisch et al. (2002: 31–34). The terminology of the primary and secondary sexual characters of the females follows Frisch (2010: 160, 161) except for the spermatheca the structures of which are termed after Frisch (2014: 201) based on De Marzo (2009), who examined the anatomy of the spermatheca of some genera of the Paederinae including *Scopaeus*.

The female genitals often provide species diagnostic characters in the *Scopaeus obscuripes* group and should be examined with a transmitted-light microscope. The shape of the bursa and the distance of the lateral gonocoxal plates can easily be recognized if the gonocoxal plates are folded laterally.

3 *Asiascopaeus* Coiffait n. syn. of *Scopaeus* Erichson

Asiascopaeus Coiffait, 1984: 150; subgenus of *Scopaeus* Erichson, 1839; type species: *S. asiaticus* Bernhauer, 1915; **n. syn.**

In a key to the subgenera of *Scopaeus* in the West Palaearctic only and without a sufficient description, Coiffait (1984: 150, 152) erected *Asiascopaeus* for the Middle Asian species *S. similis* Eppelsheim, 1892 and *S. asiaticus* Bernhauer, 1915, which he designated as the type species. A few years later, Boháč (1988: 441) added *S. likovskyi* from Tadzhikistan, which I already excluded from *Asiascopaeus* (Frisch 1999a: 53). Eventually, Gusarov (1991: 8) revalidated *S. triangularis* Luze, 1904, which was synonymized with *S. similis* by Coiffait (1968: 408), as another species of *Asiascopaeus*. Coiffait (1984: 150) diagnosed *Asiascopaeus* by the "strongly narrowed, stiletto-shaped apical third" of the aedeagus only – a character which does not constitute a synapomorphy of the species included and thus is not suitable to establish a taxon of supraspecific rank. The primary sexual characters of these species rather match those which Frisch et al. (2002: 38) defined as apomorphies of the nominal subgenus of *Scopaeus* Erichson, 1839. These are: Median lobe of aedeagus differentiated in two testaceous apical lobes and dorsal lobe between them; flagellum of aedeagus without surrounding denticles; chamber of sperm pump with terminal process. Hence, *Asiascopaeus* is here synonymized with *Scopaeus* s. str. based on these characters.

The species attributed to *Asiascopaeus* do not show a closer relationship. While *S. asiaticus* shares the apomorphic characters of the herein discussed *S. obscuripes* group (see Frisch 1999a: 47), both *S. similis* and *S. triangularis* belong to the *S. similis* species group, which was defined in a recent contribution (Frisch 2014).

Remark

As the supraspecific classification of the Scopaeina is currently being revised by Lee Herman, New York (pers. comm), I do not present the complete subgeneric classification and synonymy of *Scopaeus* here. While the taxonomic status of the New World subgenera described by Casey still has to be analysed, *Scopaeus* s. str., distributed worldwide, and the Palaeotropical *Hyperscopaeus* Coiffait, 1984 were corroborated as monophyletic by Frisch et al. (2002: 38) and, since *Asiascopaeus* is synonymized, constitute the valid subgenera of *Scopaeus* in the Old World.

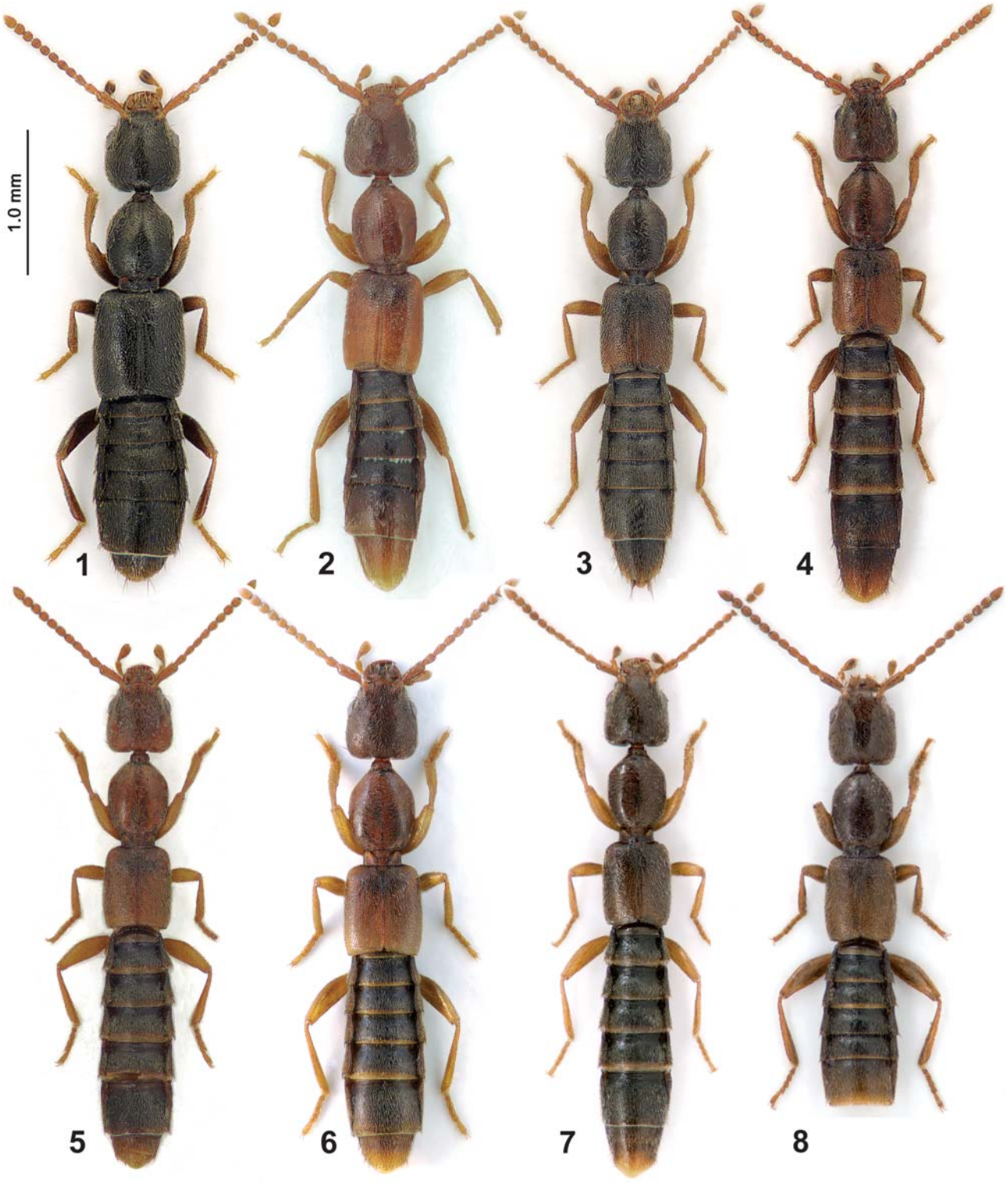
4 *Scopaeus obscuripes* species group

Below, the *Scopaeus obscuripes* species group is diagnosed including biogeographical and bionomical information and comparative notes at the species group level, followed by species chapters comprising diagnoses of the species, compilations of type specimens and additional specimens examined, and biogeographical information. The brief species diagnoses focus on distinguishing characters and do not repeat the general species group characters.

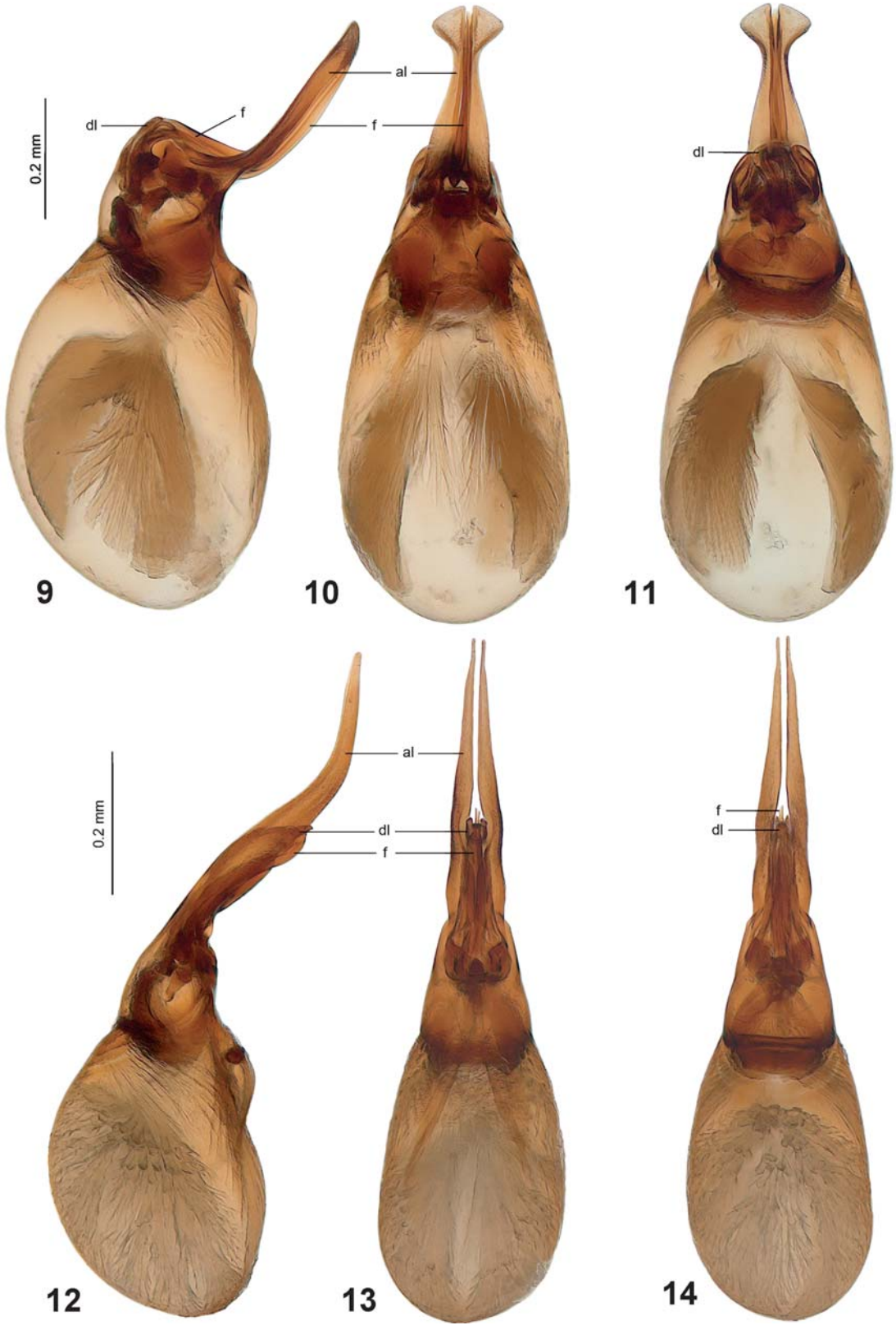
4.1 Diagnosis, distribution, bionomics, and comparative notes

Diagnosis

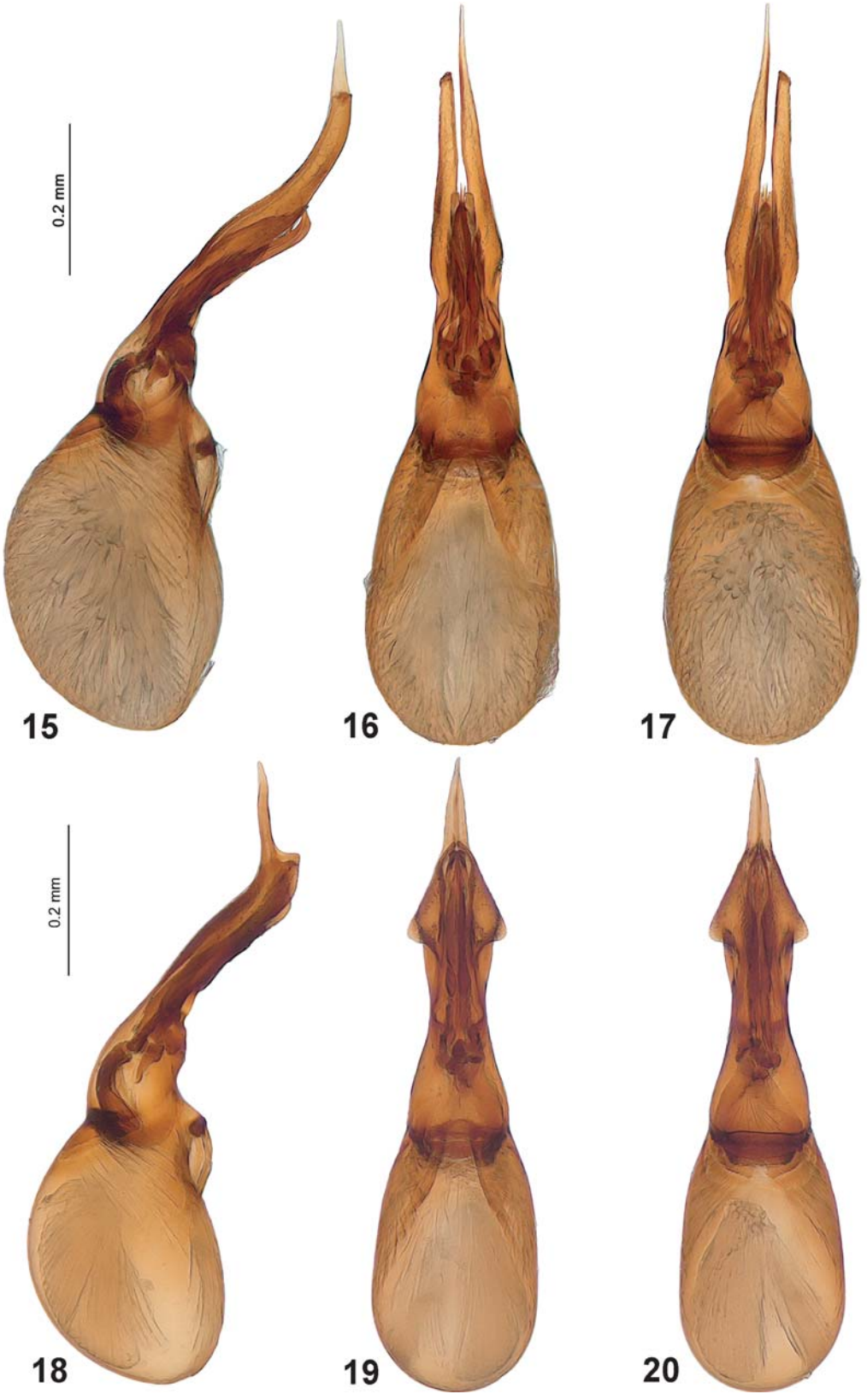
Total length ranging from 3.0–4.4 mm, forebody length from 1.8–2.1 mm. Body coloration varying from light yellowish brown with darker brown abdomen and light yellowish brown antennae, maxillary palpi, and legs to entirely black with somewhat lighter tip of abdomen and dark brown appendages (Figs. 1–8); elytra frequently lighter posteriorly in variable intensity and extent; penultimate segment of maxillary palpi usually somewhat darker brown, particularly in dark coloured specimens. Punctation of body surface typical of *Scopaeus*; forebody distinctly punctate and with intraspecifically variable microreticulation, usually more or less shiny, less frequently dull. Head 1.06–1.17 times as long as wide, across



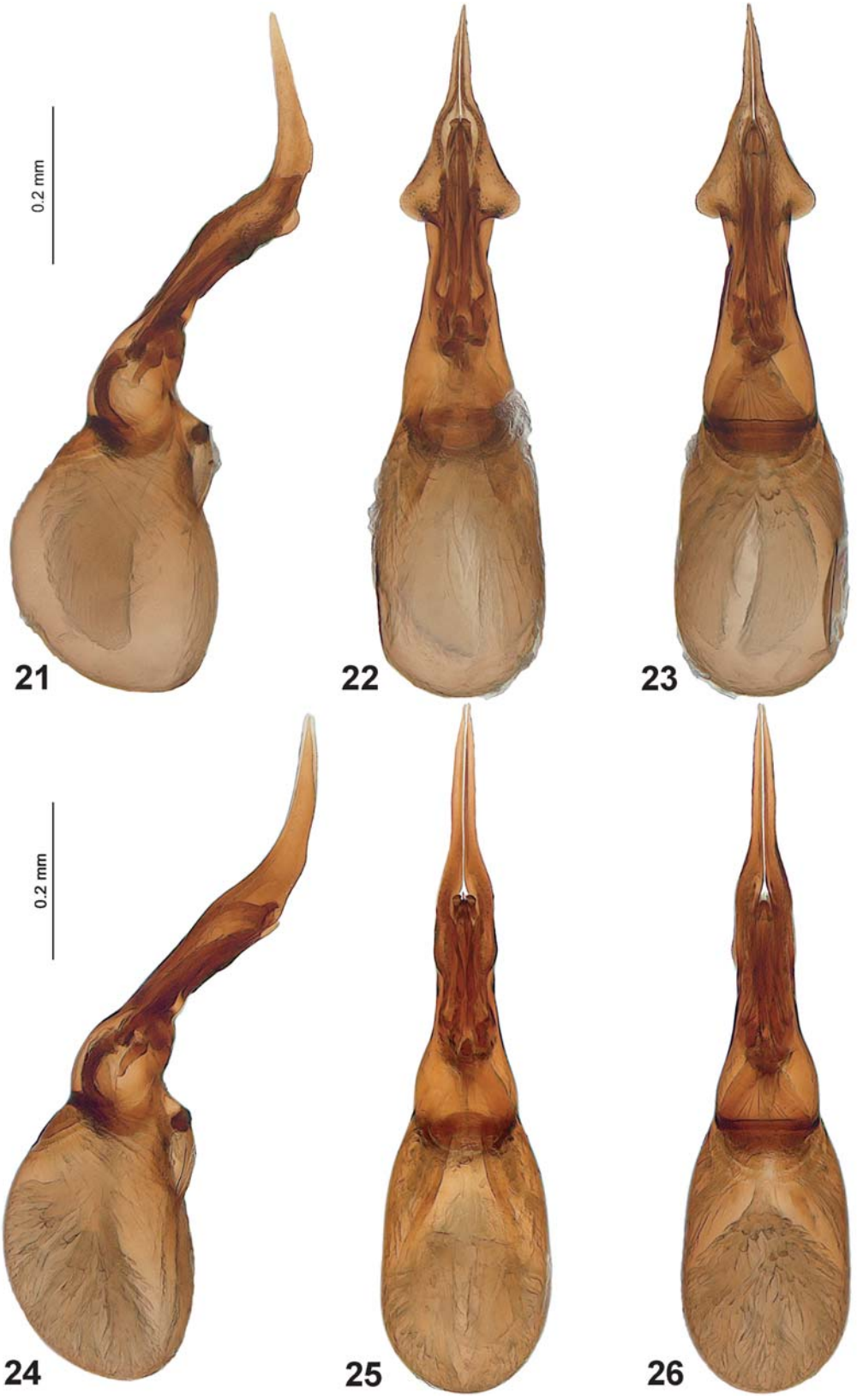
Figs. 1–8. *Scopaeus obscuripes* species group, habitus. – **1**. *Scopaeus asiaticus* Bernhauer (Tadzhikistan, Varzob: Adjuk Cleft). **2**. *S. caspius* n. sp. (holotype). **3**. *S. likovskyi* Boháč (Kyrgyzstan, Batken: Teo-Jailoo Valley). **4**. *S. milkoi* n. sp. (paratype; Kyrgyzstan, Chui, W Yurevka: Karandolot). **5**. *S. apiculatus* n. sp. (paratype; Kyrgyzstan, Jalal-Abad: Kekbel-Pass). **6**. *S. moriturus* n. sp. (paratype; Kyrgyzstan, Batken: Isfairam-Say). **7**. *S. schawalleri* n. sp. (paratype; Kyrgyzstan, Jalal-Abad: Arslanbob NP). **8**. *S. chatkalensis* n. sp. (holotype).



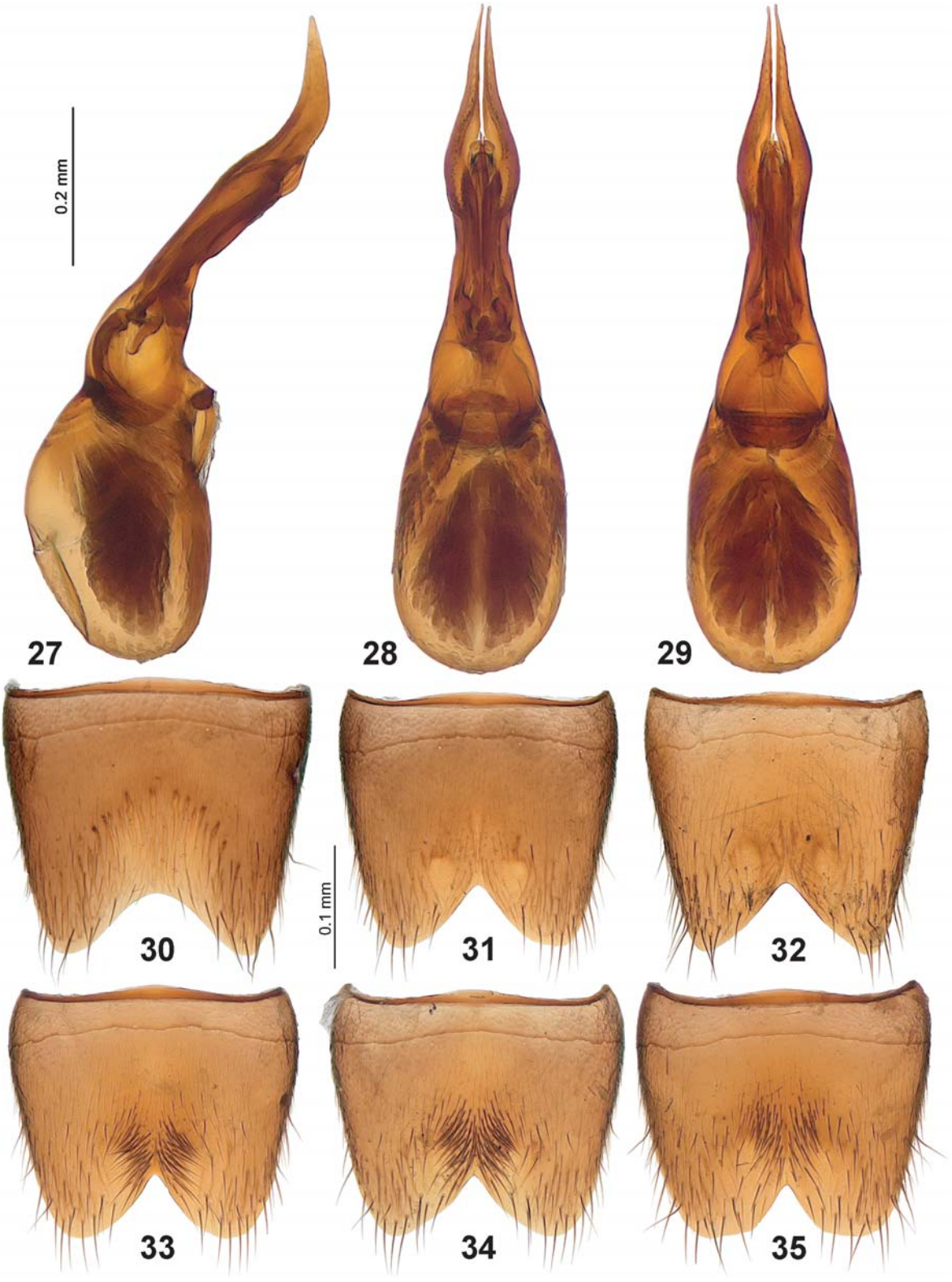
Figs. 9–14. *Scopaeus* spp., aedeagus in lateral (9, 12), ventral (10, 13), and dorsal (11, 14) view. – **9–11**. *S. asiaticus* Bernhauer (Tadzhikistan, Varzob: Adjuk Cleft). **12–14**. *S. likovskyi* Boháč (Kyrgyzstan, Batken: Teo-Jailoo Valley). – Abbreviations: al = apical lobe; dl = dorsal lobe; f = flagellum.



Figs. 15–20. *Scopaeus* spp., aedeagus in lateral (15, 18), ventral (16, 19), and dorsal (17, 20) view. – **15–17**. *S. milkoi* n. sp. (holotype). **18–20**. *S. apiculatus* n. sp. (holotype).



Figs. 21–26. *Scopaeus* spp., aedeagus in lateral (21, 24), ventral (22, 25), and dorsal (23, 26) view. – **21–23**. *S. moriturus* n. sp. (holotype). **24–26**. *S. schawalleri* n. sp. (holotype).



Figs. 27–35. *Scopaeus* spp., aedeagus in lateral (27), ventral (28), and dorsal (29) view, and male abdominal sternite VIII (30–35). – **27–29**. *S. chatkalensis* n. sp. (holotype). **30**. *S. asiaticus* Bernhauer (Tadzhikistan, Varzob: Adjuk Cleft). **31**. *S. likovskyi* Boháč (Kyrgyzstan, Batken: Teo-Jailoo Valley). **32**. *S. milkoi* n. sp. (holotype). **33**. *S. apiculatus* n. sp. (paratype, Kyrgyzstan, Jalal-Abad: Sary-Chelek). **34**. *S. moriturus* n. sp. (holotype). **35**. *S. chatkalensis* n. sp. (holotype).

tempora 0.98–1.08 times as wide as across eyes, usually notably trapezoidal. Eyes 0.44–0.76 times as long as tempora. Length of elytra subject to intra- and interspecific variation; elytra 0.90–1.13 times as long as pronotum. Lateral denticles of labrum usually somewhat shorter than median denticles, sometimes denticles of same length. Length of antennal segments somewhat variable intra- and interspecifically; segments 8 to 10 slightly transverse, quadrate, or somewhat elongate, but increasingly shorter towards end of antenna. Protarsomeres 2–4 dilated, two or three times as wide as long, in females hardly noticeable narrower. Mesotibia slender to moderately dilated, 5.6–7.3 times as long as wide. Metathoracic wings entire, based on a representative number of specimens examined.

Male: Abdominal sternite VIII with almost semicircular (Fig. 30) or triangular (Figs. 31–35) emargination in about posterior fourth to fifth of sternite length, frequently with two round, asetose impressions on either side of anterior end of posterior emargination (Figs. 31–35) and – in some species only – a conspicuous median field of long, dark, latero-posteriad orientated setae between them (Figs. 33–35). Shape of distal lobes of aedeagus (Figs. 9–29, Frisch 2008: figs. 1–12) very variable interspecifically; dorsal lobe vestigial (Figs. 1, 3) or about half as long as apical lobes, more or less widened ventrad in lateral view, and with emarginate apex at either side extended to acute tooth (Figs. 12–29); flagellum either about as long as apical lobes (Figs. 9–10) and frequently with tooth-like or lobiform modifications (Frisch 2008: figs. 1–3, 7–12) or half as long as apical lobes only and moderately curved ventrad with strongly dorsad curved end (Figs. 12–29).

Female: Laterotergite IX with tooth-like demarcation of dorsal, subapical emargination (Figs. 36, 37). Lateral gonocoxal plates variable, 2.5–5.0 times as long as wide (Figs. 38–43). Tergite X about twice as long as wide (Figs. 44, 45). Bursa with distinctly sclerotized, triangular or convex posterior end, but hyaline anteriorly (Figs. 46, 48, 49, 51–57). Length of sclerotized portion of spermathecal duct (between bursa and sperm pump) variable interspecifically, from five (Figs. 46, 48, 49) to 12 times (Figs. 51, 52) as long as sperm pump.

Distribution and bionomics

The *Scopaeus obscuripes* species group is widely distributed in the mountains of Central Asia and also present in the Caspian Plain east of the Talysh Mountains of Azerbaidzhan (Figs. 62, 63). Up to now, the clade is known from the northern Tien Shan at 42°44′N 74°55′E across the western Tien Shan and western Alai Mountains as far south as 34°36′N 69°10′E (Kabol) in the Hindukush Mountains (Frisch 2008: 283) and 30°41′N 77°52′E (Chakrata) in the Siwalik Range, Indian Lesser Himalayas (Cameron 1931: 174). The area of distribution of the *S. obscuripes* group is delimited towards north by the Central Asian steppe, which constitutes a natural distribution barrier for hygrophilous species. The eastern and southern limit of distribution is, however, unknown due to the lack of records from most of eastern and southern Central Asia, but I expect the *S. obscuripes* group to be widespread and speciose in the eastern Tien Shan, Pamirs, and Himalayas.

The species in the foothills of the Talysh Mountains appears to be isolated from the Central Asian distribution centre of the *S. obscuripes* group, since no records became known from the South Caspian and Turkmeno-Khorassanian mountain ranges in between, though I collected there several times. The presence of *S. asiaticus* in the western Koppe Dag (Bernhauer 1915: 266) is unlikely (see chapter Type material under *S. asiaticus* below).

Judging from label data and according to my own field experience, the members of the *S. obscuripes* species group inhabit the banks of flowing waters. Like the majority of *Scopaeus*, they are hygro-thermophilous dwellers of the uppermost interstice of damp, sandy or gravelly soil with poor vegetation and predominantly dwell in riparian habitats (Frisch et al. 2002: 28). Species of the *S. obscuripes* group were collected at elevations from about sea-level in the Caspian Plain up to about 3500 m in the Hindukush Mountains, which is not surprising since the vertical distribution of *Scopaeus* in general depends more on suitable habitats than on the altitude (Frisch et al. 2002: 28).

Comparative notes

Among Central Asian *Scopaeus*, members of the *S. obscuripes* species group can most easily be confused with species of the *S. similis* group (Frisch 2014) according to their general appearance. Members of these sympatric species groups inhabit similar niches, which is why they often live syntopically and samples are frequently mixed. Apart from the fact, that in the *S. similis* group the abdominal tergite VIII of the males lacks latero-posterior depressions and a median field of long, dark setae (Frisch 2014: figs. 28–33), I did not recognize ectomorphological characters which facilitate a reliable distinction of the members of both species groups. Therefore, accurate identification requires the examination of the male and female primary sexual characters. Males of the *S. similis* group can easily be distinguished by the characteristic set of distal lobes of the aedeagus, most of all the apical, triangular enlargement of the thin, straight apical lobes and the long, straight, slender dorsal lobe with two weakly sclerotized, lobiform ends (Frisch 2014: figs. 7–27). Females of the *S. similis* group differ by the obtuse demarcation of the apico-dorsal emargination of laterotergite IX (Frisch 2014: figs. 34–36) and the entirely hyaline bursa without sclerotized posterior end (Frisch 2014: figs. 40–45).

Members of the *S. obscuripes* group can also be confused with species of the Pontomediterranean and Middle

Eastern *S. elegans* species group (Frisch et al. 2002: 41, 42). As far as known presently, both clades live sympatrically in the foothills of the Talysh Mountains in the Caspian Plain of Azerbaidzhan. Males of the *S. elegans* group can easily be distinguished by the remarkable, flagelliform ventral endophallic process of the aedeagus (Frisch 2010: figs. 67–79). Though in this clade the bursa is posteriorly sclerotized as well or even entirely sclerotized, it is considerably smaller. Females of the *S. elegans* group differ moreover by the notably longer, tangled spermathecal duct between bursa and sperm pump (Frisch 2010: fig. 80).

The trans-Palaearctic *S. laevigatus* (Gyllenhal) can easily be distinguished from dark coloured specimens of the *S. obscuripes* group by the deep, wide, round emargination of abdominal sternite VIII of the males, which at either side is delimited by two long, posterior teeth (Frisch 2003: fig. 61), the different shape of the aedeagus with setiferous lateral lobes (Frisch 2003: figs. 1–3), and the entirely sclerotized bursa of the female genital aperture (Frisch 2003: fig. 127).

Central Asian species of the *S. sericans* (Frisch 2012), *S. signifer* (Frisch et al. 2002: 39, 40), and *S. debilis* (Frisch 1999b) species groups strongly differ from the *S. obscuripes* group in their general appearance, most of all in the very finely and densely punctate, mat body surface, the slender head with large eyes, parallel temples and strongly convex posterior angles (except for *S. turkestanicus* with trapezoidal head; Frisch 2012: 291), and the slender protarsomeres 2–4, which are only twice as wide as long in the two former clades and even quadrate in the *S. debilis* species group. Compared to the *S. obscuripes* group, the aedeagus of all of the species of these three basal clades of *Scopaeus* (Frisch et al. 2002: 37, phylogenetic tree) has much shorter distal lobes and setiferous lateral lobes. The females can easily be distinguished by the entirely hyaline bursa, but they moreover differ by the following characters. Females of the *S. sericans* group can be distinguished by the shorter, evenly curved sclerotized portion of the spermathecal duct and the small extension at the junction of the hyaline spermathecal duct with the sperm pump (Frisch 2012: figs. 31–41), which is however subject to intraspecific variation and often lacking. In the *S. signifer* group, the sperm pump is characterized by adjoining junctions of the spermathecal duct (Frisch 2012: figs. 42–44). The sperm pump of *S. debilis*, the only Central Asian species of that group, differs by a septum within the chamber segment (Frisch 2012: fig. 45).

4.2 *Scopaeus asiaticus* lineage

Diagnosis and distribution

The *Scopaeus asiaticus* lineage is here erected for the members of the *S. obscuripes* species group with a vestigial dorsal lobe of the aedeagus and a remarkably lengthened flagellum, which often has tooth-like or lobiform ventral modifications. Further diagnostic characters of this clade are unknown. As far as known presently (Fig. 62), it is distributed from the Alai Mountains (*S. asiaticus* Bernhauer) south to the Hindukush and Kashmir (*S. kabakovi* Gusarov) and the Siwalik Range, Lesser Himalayas (*S. obscuripes* Cameron).

Scopaeus asiaticus Bernhauer
(Figs. 1, 9–11, 30, 37, 42, 44, 46–48, 62)

Scopaeus asiaticus Bernhauer, 1915: 265.
Scopaeus (s. str.) *asiaticus*; Coiffait 1968: 407.
Scopaeus (Asiascopaeus) asiaticus; Coiffait 1984: 152, 176.

Type material

L e c t o t y p e ♂, Tadzhikistan: Voruch Exclave [39°51′19″N 70°33′35″E]: Tschitschantan, 1898, leg. Hauser; labelled "Ost-Buchara. Tschitschantan. Coll. Hauser 1898.", "*asiaticus* Bhn. Typus." (FMNH); here designated (7th abdominal sternite strongly damaged through improper genital dissection).

P a r a l e c t o t y p e s (7 specimens): 2 ♂♂, same locality as lectotype (NHMW); labelled "Ost-Buchara. Tschitschantan. Coll. Hauser 1898.", "*asiaticus* Bernh." (NHMW). 1 ♀, same locality as lectotype; labelled "Ost-Buchara Tschitschantan Nufswald F. Hauser 1898", "*asiaticus* Bnh. Cotypus." (FMNH). 2 ♀♀ (attached to the same pin), Tadzhikistan, Hation, SEE Dushanbe: Baljuvon (Vakhsh Mts.) [38°28′47″N 69°43′07″E], 924 m, 1898, leg. Hauser; labelled "Mts. Karateghin Baldschuan 924 m. F. Hauser 1898", "*Scopaeus asiaticus* Bnh det. Bernh." (NHMW). 1 ♀, Turkmenistan: Kizyl-Arvat; labelled "Transcasp. Kisil-Arvat", "Collect. Hauser" (NHMW). 1 ♀, same locality; labelled "Transcasp. Kisil-Arvat", "*asiaticus* Bnh. Copypus." (FMNH). I attached lectotype and paralectotype labels, respectively.

Additional material examined (65 specimens)

"Buchara Bang-Haas" (BMNH); "Turkestan Buchara" (HNHM). — **Tadzhikistan**: "Hissar Buchara" (NMPC, SMTD, UZMH); "Turkestan Mts. Ghissar F. Hauser 1898" (NHMW). N o h i j a h o i t o b e i D s c h u m h u r i j: NEE Dushanbe, near Garm: Saripul [Sary-pul] (Karategin Mts.) [39°06′00″N 70°45′50″E], 1482 m, 1898, leg. Hauser (NHMW); NE Dushanbe: Romit Gorge [38°44′00″N 69°20′00″E], 18.VII.1984, leg. Wrase (MSCB); N Dushanbe, Varzob: Adjuk Cleft (Gissar Mts.) [38°46′25″N 68°48′00″E], 1200 m, 1.–3.VII.1990, leg. Schülke (MNHB, MSCB); Varzob: Campus Chaika (38°46′24″N 68°49′04″E), 1110 m, 7.–8.VII.2012, leg. Valainis (MNHB, ASCD); NEE Dushanbe, 15–20 km S Garm: Childara [Tshil-Dara] (Peter-I.-Mts.) [38°46′52″N 70°18′22″E], 1700–2300 m, 21.–24.VI.1990, leg. Schülke & Wrase (MNHB, MSCB); 15 km S Norak [Nurek] [38°20′14″N 69°14′29″E], 1000–1300 m, 14.–17.IV.1992, leg. Kasantsev (NHMB). S u g h d: S Panjakent: Rudaky (Zeravshan Mts.), 1500 m, 11.VII.1990, leg. Schülke & Wrase (MSCB); Panjakent-Urmetan, S Navabad: Zavron Valley (Zeravshan Mts.) [39°20′00″N 67°54′46″E], 2100–3000 m, 12./13.VII.1990, leg. Schülke & Wrase (MSCB). — **Uzbekistan**: Q a s h q a r d a r y o: SE Shahrisabz: Igrisu (Katta-Uru River) [38°38′11″N 67°04′30″E], 26.VII.1942, leg. Arnoldi (MZMC). S u r x o n d a r y o: NNE Denov: Karatag [Karatack Buchara] [38°23′16″N 68°07′26″E] (SDEI).

Diagnosis

Total length 3.3–3.8 mm (Ø 3.5), forebody length 1.8–2.0 mm (Ø 1.9). Body usually uniformly dark brown to black with brown antennae, brown maxillary palpi with blackish penultimate segment, and brown to blackish brown legs (Fig. 1); elytra frequently dark reddish brown posteriorly to variable extent; body coloration rarely lighter brown. Head 1.10–1.15 (Ø 1.12) times as long as wide, subquadrate with strongly rounded posterior angles, across tempora only 0.98–1.02 (Ø 1.0) times as wide as across large eyes, which are 0.59–0.76 (Ø 0.66) times as long as tempora. Elytra comparatively long, 1.08–1.17 (Ø 1.13) times as long as pronotum. Lateral denticles of labrum notably shorter than median denticles. Protarsomeres 2–4 moderately transverse, only twice as wide as long. Mesotibia slender, 6.0–7.2 (Ø 6.5) times as long as wide.

Male: Abdominal sternite VIII almost semicircularly emarginate posteriorly, without lateral impressions and median field of dark setae (Fig. 30). Apical lobes and flagellum of aedeagus (Figs. 9–11) at their bases strongly bent ventrad; apical lobes in lateral view extraordinarily thin, flagellum therefore visible for most of its length; apical lobes distally of ventrad pointing bases almost semicircularly curved in longitudinal direction and straight towards subacute ends, in dorsal and ventral view gradually tapered distad, but in almost apical fourth laterally strongly enlarged triangularly; proximal third of flagellum strongly right-angled snapped ventrad and projecting distally from thin, ventrad pointing bases of apical lobes, after that almost semicircularly curved in longitudinal direction and running ventral of apical lobes.

Female: Lateral gonocoxal plates slender, about four times as long as wide (Figs. 42, 46, 48). Bursa slender with round or triangular sclerotized posterior end and very fine, deciduous anterior end usually collapsed in slide preparates (Figs. 46, 48). Sclerotized portion of spermathecal duct, compared to relatives of the *S. obscuripes* group, thick and short, about five times as long as sperm pump only (Figs. 46, 48).

Type series and lectotype designation

Bernhauer (1915: 265, 266) described *Scopaeus asiaticus* from an unknown number of specimens from Tschitschantan (current locality name?) and Baljuvon in the Alai Mountains of Tadzhikistan and Kizyl-Arvat in western Turkmenistan, but he did not communicate the collector and storage of the specimens. Moreover, he did not designate a holotype. The Bernhauer collection at the FMNH holds one male and one female from Tschitschantan collected by Friedrich Hauser and one female from Kizyl-Arvat. These specimens from type localities of *S. asiaticus* are doubtlessly syntypes, because their characters agree with Bernhauer's description and, judging from the example of Bernhauer's identification labels in Horn et al. (1990: 476), Bernhauer himself had labelled the male from Tschitschantan "*asiaticus* Bnh. Typus." and the females "*asiaticus* Bnh. Cotypus.". Specimens from the third type locality, Baljuvon SEE of Dushanbe, are absent from the Bernhauer collection at the FMNH, but two females from Baljuvon are present at the NHMW, which moreover holds additional specimens of *S. asiaticus* from Tschitschantan and Kizyl-Arvat. None of the specimens at NHMW bear identification labels of Bernhauer, but, judging from their locality labels, they originate from the same series as the syntypes at the FMNH collected by F. Hauser in 1898. The two females from Kizyl-Arvat, however, provide no information as regards collecting date and collector, but they are old specimens of the 19th century, and the specimen at the NHMW has a small label "Collect. Hauser" which had certainly been attached after this collection was given to Vienna in 1920 (see Horn et al. 1990: 161). I conclude that Bernhauer based his description of *S. asiaticus* on specimens he studied in the Hauser collection which is why I consider the specimens at the NHMW as syntypes as well. Obviously, Bernhauer subsequently put his type labels only at those three specimens which he kept for his own collection.

A lectotype designation to stabilize the name *asiaticus* Bernhauer, 1915 is necessary, because the conspecificity of the syntype series is not certain. Only the series from Tschitschantan in the Tadzhikian exclave Voruch includes males. They match the interpretation of *S. asiaticus* by Coiffait (1968: 407–409; 1984: 151, 176), who was the first to illustrate the aedeagus of this species. From Baljuvon southeast of Dushanbe and Kizyl-Arvat in western Turkmenistan close to the Caspian Sea, however, only females are available. I have no doubts that the females from Baljuvon are conspecific to those from Tschitschantan, because they look alike, share the characteristic primary and secondary genital characters, and *S. asiaticus* is known to be widespread around Dushanbe (Fig. 62). The conspecificity of the females from Kizyl-Arvat in western Turkmenistan with *S. asiaticus* is, however, doubtful. Even though I cannot distinguish them from females from Tadzhikistan either by ectomorphological or genital characters (Figs. 49, 50), the presence of a relict population of *S. asiaticus* separated from the Alai Mountains by 1000 km steppe is unlikely. The respective specimens are either mislabelled or represent another closely related species.

I select the male syntype from Tschitschantan preserved at the FMNH for the lectotype designation, because it is in accord with the original description and subsequent descriptions (Coiffait 1968: 407, 408; 1984: 176), originates from the Bernhauer collection (recommendation 74D, ICZN 1999: 157), and has already been labelled as type by Bernhauer.

Distribution

As far as known presently, *Scopaeus asiaticus* is endemic to the western Alai Mountains, where it was found as far east as 70°45′E (Fig. 62). Examined specimens originate from Tadzhikistan and Uzbekistan. The source for the record for Uzbekistan in SMETANA (2004: 615) is unknown to me.

In view of the verified distribution pattern of *S. asiaticus*, the record from Iran (Mazandaran: Amol: GHAHARI et al. 2009, SAMIN et al. 2011: 146) is implausible and rejected as well as the dubious origin Kizyl-Arvat, Turkmenistan, of two probably mislabelled female type specimens of *S. asiaticus* (see chapter Type material above). The record for Afghanistan (Qadés: SW Qal'eh Naou: SCHEERPELTZ 1963: 10) is based on a misidentified female specimen of *S. laevigatus* (Gyllenhal) in MZLU, which I examined. SCHEERPELTZ's (1963: 10) erroneous concept of the distribution of *S. asiaticus*, according to which the species occurs throughout southeastern Turkmenistan, northern Iran, and Afghanistan, is reflected in the current Catalogue of Palaearctic Coleoptera (SMETANA 2004: 615).

Remark

BERNHAUER (1923: 180) published distinguishing characters for *S. asiaticus* and *S. schneideri* Bernhauer, 1900. The latter name for the black coloured population of *S. laevigatus* (Gyllenhal, 1827) from Corsica was synonymized by GUSAROV (1994: 434). It is true that *S. asiaticus* resembles the Corsican population of *S. laevigatus* in the general appearance, but it cannot be confused according to the male and female genital characters and the Central Asian distribution.

Scopaeus kabakovi Gusarov
(Figs. 41, 51, 62)

Scopaeus (Hyposcopaeus) kabakovi GUSAROV, 1994: 437.
Scopaeus kabakovi; FRISCH 1999a: 49.

New records

Afghanistan: Kabol: Djaouz (Qorogh Mts.) [34°27′N 68°55′E], 11.VII.1962, leg. LINDBERG. — **Pakistan**: Gilgit-Baltistan, Darel Valley: Jatschot [35°42′N 73°38′E], leg. PIFFL. Khyber Pakhtoon (= Northwest Frontier): Swat Valley: Malam Jabba [34°49′N 72°35′E], 2300–2400 m, 9.V.1983, leg. BESUCHET & LÖBL (MHNG, MNHB); Naran [34°54′N 73°39′], 2600 m, 1.VI.1983, leg. BESUCHET & LÖBL (MHNG, MNHB).

Diagnostic characters

Scopaeus kabakovi was redescribed by FRISCH (1999a: 49–52). While the aedeagus was already illustrated several times (GUSAROV 1994: figs. 16, 17; FRISCH 1999a: figs. 4–6, 2008: figs. 7–9), the female genital characters (Fig. 51) are here presented for the first time based on a specimen from the Swat Valley, Pakistan (MNHB), the identification of which is confirmed by male specimens from the same sample: Lateral gonocoxal plates slender, about four times as long as wide (Fig. 41). Bursa very large, about 0.8 times as long as lateral gonocoxal plates, from long triangular sclerotized posterior end evenly widened towards isosceles-shaped anterior third (Fig. 51). Sclerotized portion of spermathecal duct very long and winding, about 12 times as long as sperm pump (Fig. 51).

Distribution

Scopaeus kabakovi Gusarov is distributed south of the highest chains of the Hindukush and Karakoram (Fig. 62) and hitherto recorded from Afghanistan (Nuristan: Čapadara, GUSAROV 1994: 437) and Pakistan (Gilgit-Baltistan: Haramosh Range, FRISCH 2008: 283; Khyber Pakhtoon: Swat Valley, FRISCH 1999a: 51). The new record for the Kabol Province, Afghanistan, extends the known distribution of *S. kabakovi* about 200 km to the southwest (Fig. 62).

Both the ectomorphological appearance and the primary genital characters of a female *Scopaeus* (Fig. 52) from the Pir Panjal Range in the Indian district Jammu & Kashmir (NW Poonch: Loran, 17.VIII.2010, leg. REUTER) resemble those of *S. kabakovi* (Fig. 51). Because the female genitals of closely related *Scopaeus* species often do not hold species diagnostic characters, it is, however, doubtful if this specimen, collected far southeast of the known area of distribution of *S. kabakovi* (FRISCH 2008: fig. 17), is conspecific. Nevertheless, it represents the first record of the *S. obscuripes* group in the Pir Panchal Range.

Scopaeus obscuripes Cameron
(Fig. 62)

Scopaeus obscuripes CAMERON, 1931: 173.
Scopaeus obscuripes; FRISCH 1999a: 48.

Distribution

Scopaeus obscuripes Cameron was described from a male and a female (BMNH) collected in two different localities in the Siwalik Range, a part of the Lesser Himalayas in Northwest India. Years ago, I designated the male specimen, which originates from the district of Chakrata (30°41′N 77°52′E), Uttarakhand, as the lectotype (FRISCH 1999a: 48). The exact type locality Jadi Gad, however, I could not identify. The female paralectotype was collected in the Shimla Hills (Fagu, 31°02′N 77°17′E), Himachal Pradesh, approximately 100 km northwest of the type locality. Though it does not differ from the lectotype in ectomorphological characters and shows the sclerotized posterior end of the bursa of the *S. obscuripes* group, it is uncertain if this female is conspecific to the lectotype

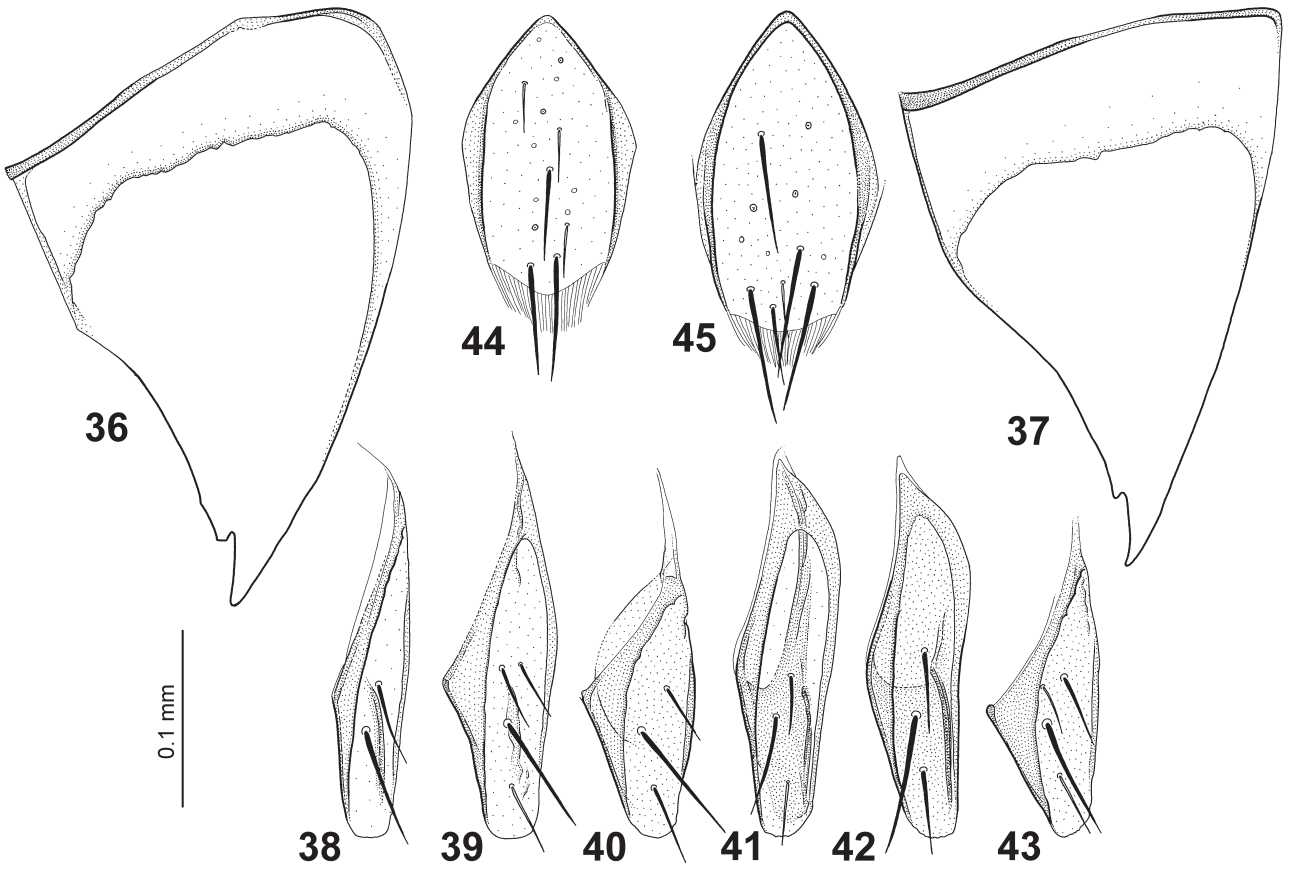
considering the endemic distribution of many members of that species group. In the same publication, I recorded *S. obscuripes* from Gulmarg (34°02′N 74°22′E) in the Pir Panjal Range, Jammu and Kashmir, based on two females (BMNH), which, when I recently examined them again, turned out to be members of the Central Asian *S. similis* species group (FRISCH 2014). Consequently, the type locality Jadi Gad in the Chakrata District is the only doubtless locality of *S. obscuripes* known so far (Fig. 62).

4.3 *Scopaeus likovskyi* lineage
(Figs. 3–8, 12–29, 31–35, 36, 38–40, 43, 44, 53–57, 63)

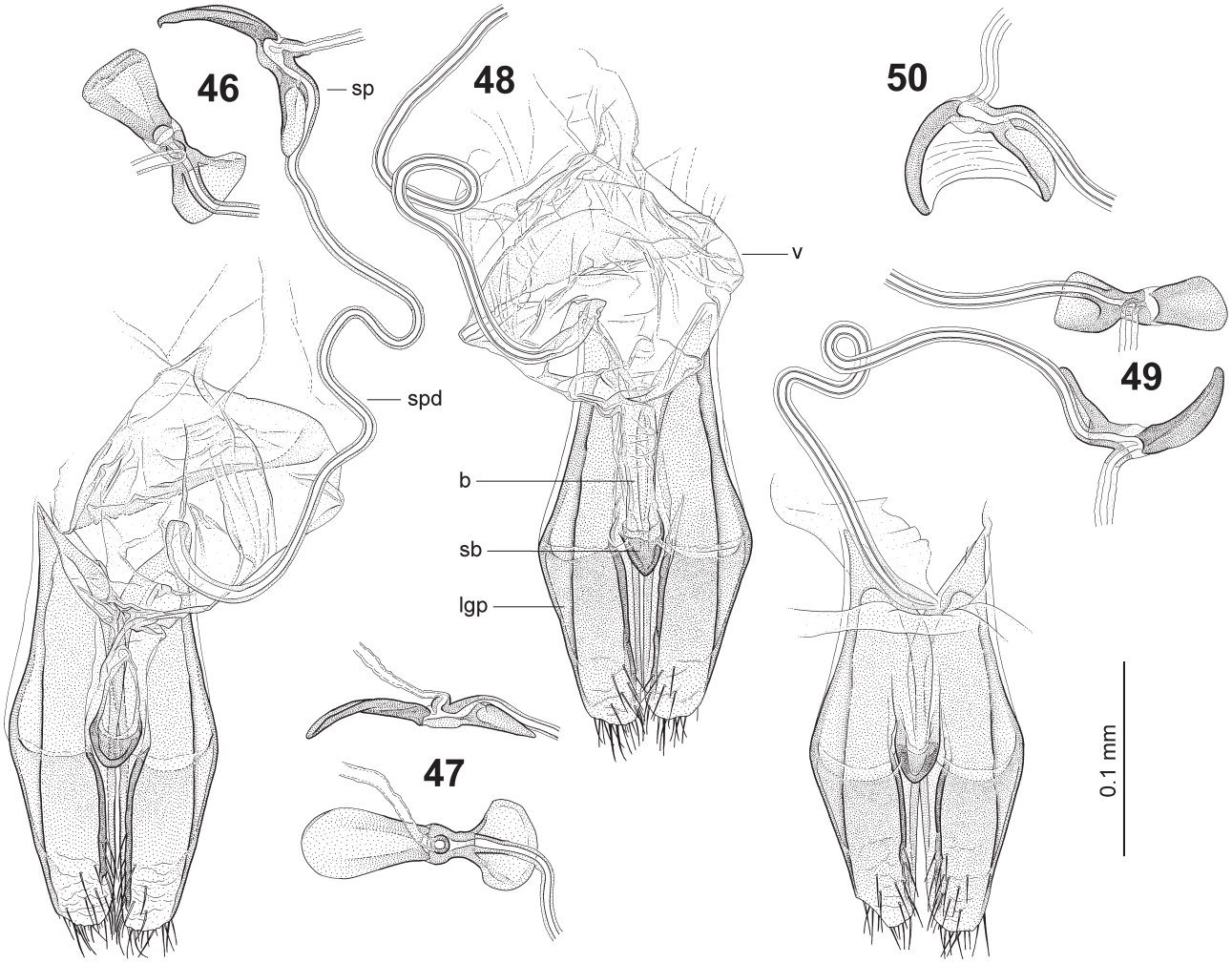
Within the *S. obscuripes* species group, the following six species represent a distinct phylogenetic clade, here named the *S. likovskyi* lineage. Since their ectomorphological characters are very similar and moreover overlap due to the great intraspecific variability of coloration, microreticulation, and body proportions (Figs. 3–8), the included species are briefly diagnosed using their primary and secondary sexual characters only. In the following diagnosis of the *S. likovskyi* lineage I do not repeat the general characters of the *S. obscuripes* species group.

Diagnosis of the *Scopaeus likovskyi* lineage

Total length 3.1–3.9 (Ø 3.6) mm, forebody length 1.8–2.1 (Ø 1.9) mm. Primary body colour (Figs. 3–8) medium or reddish brown to blackish brown, rarely black or orange brown; elytra usually lighter posteriorly to variable extent, with lighter brown posterior margin only up to entirely lighter except for dark scutellar triangle; abdomen darker than forebody except for posterior end, dark brown to black; antennae, maxillary palpi except for usually darker penultimate segment, and legs medium brown. Microreticulation of forebody surface very variable, absent, weak, or distinct, forebody thus shiny to dull. Head 1.06–1.17 (Ø 1.12) times as long as wide, across tempora 1.01–1.08



Figs. 36–45. *Scopaeus obscuripes* species group, genital sclerites of females, laterotergite IX (36, 37), lateral gonocoxal plate (38–43), tergite X (44, 45). – **37**, **42**, **45**. *S. asiaticus* Bernhauer (Tadzhikistan, Varzob: Adjuk Cleft). **36**, **38**, **44**. *S. likovskyi* Boháč (Kyrgyzstan, Batken: Teo-Jailoo Valley). **39**. *S. milkoi* n. sp. (paratype; Kyrgyzstan, Chui, W Yurevka: Karandolot). **40**. *S. moriturus* n. sp. (paratype; Kyrgyzstan, Batken, Isfairam-Say). **41**. *S. kabakovi* Gusarov (Afghanistan, Kabol). **43**. *S. apiculatus* n. sp. (paratype; Kyrgyzstan, Jalal-Abad: Kelbel-Pass).



Figs. 46–50. *Scopaeus asiaticus* lineage, genital characters of females in dorsal view. – **46–48**. *S. asiaticus* Bernhauer (Tadzhikistan, Varzob: Adjuk Cleft). **49**, **50**. *S.* cf. *asiaticus* (paralectotype of *S. asiaticus*; Turkmenistan, Kizyl-Arvat). – Abbreviations: b = bursa; lgp = lateral gonocoxal plate; sb = sclerotized end of bursa; sp = sperm pump; spd = sclerotized portion of spermathecal duct; v = vagina.

(Ø 1.04) times as wide as across eyes, usually distinctly trapezoidal. Eyes small to medium sized, 0.44–0.60 (Ø 0.5) times as long as tempora. Elytra comparatively short, 0.90–1.08 (Ø 0.96) times as long as pronotum. Lateral denticles of labrum somewhat shorter than or as long as median denticles. Antennal segments comparatively slender; segment 8 1.1–1.2 (Ø 1.2) times, segment 9 1.0–1.1 (Ø 1.1) times, and segment 10 1.0–1.1 (Ø 1.0) times as long as wide. Protarsomeres strongly transverse, in both sexes about three times as wide as long. Mesotibia very slender, 6.0–7.3 (Ø 6.6) times as long as wide.

Male: Abdominal sternite VIII in about posterior fourth to fifth triangularly emarginate and with round or slightly elongate, asetose impression close to posterior margin on either side of imaginary longitudinal midline, with or without medio-posterior field of dark, long, latero-posteriad pointing setae (Figs. 31–35). Aedeagus (Figs. 12–29) slender in dorsal and ventral view; apical lobes very slender, about as long as phallobasis, in distal half curved dorsad and gradually tapered towards thin, acute ends; dorsal lobe about half as long as apical lobes, in lateral view often widened in middle or towards apex, in dorsal and ventral view narrow with emarginate apex at either side extended to sharp, disto-ventrad orientated tooth visible in lateral view; flagellum about as long as dorsal lobe, straight or somewhat curved ventrad with strongly dorsad curved apex visible in apical emargination of dorsal lobe.

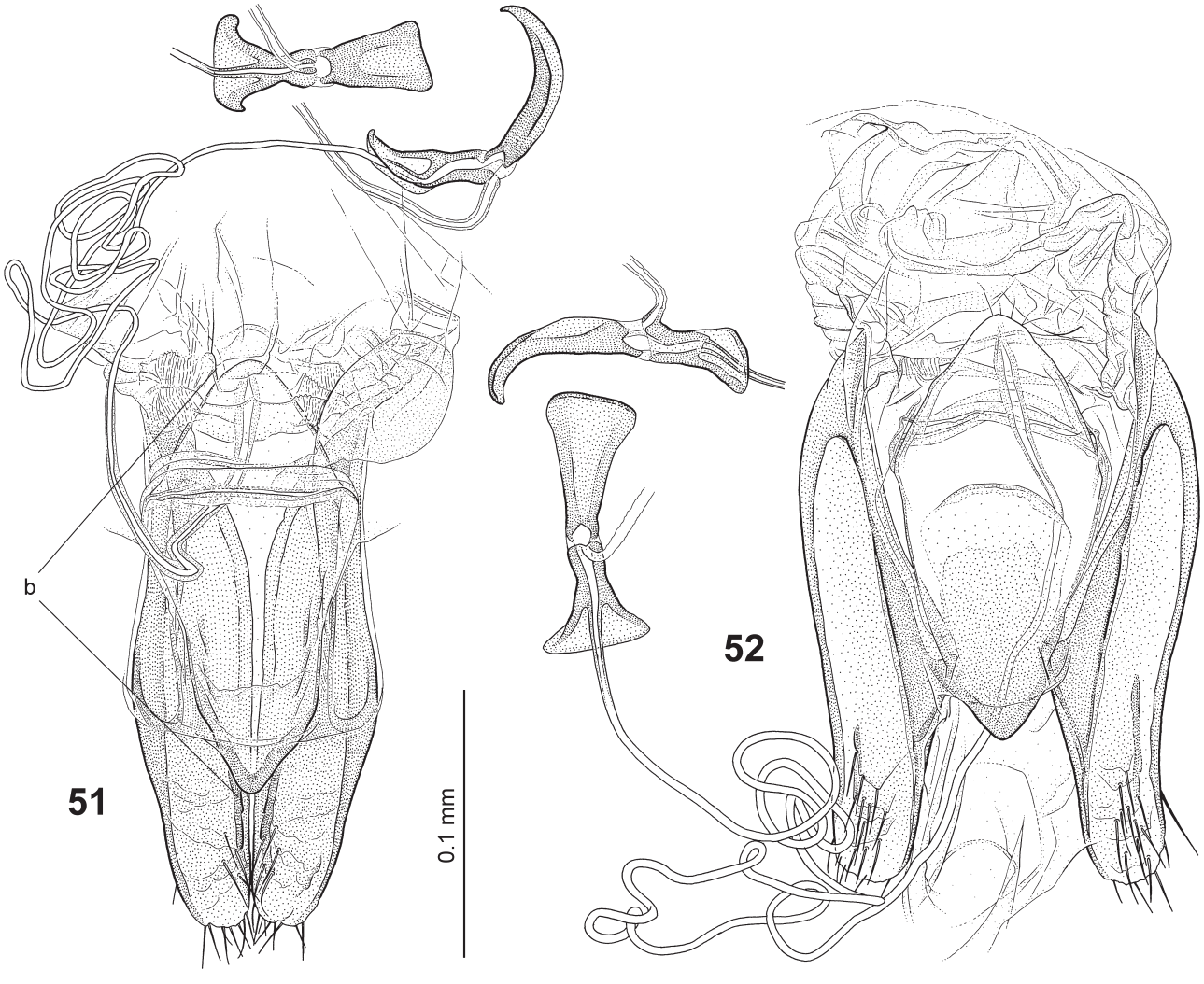
Female: Lateral gonocoxal plates slender to stout, about 2.5–5.0 times as long as wide (Figs. 38–40, 43). Bursa large, about 0.75–1.00 times as long as lateral gonocoxal

plates (Figs. 53–57). Sclerotized portion of spermathecal duct thin, in a few measured specimens 5.6–6.9 times as long as sperm pump (Figs. 53–57).

Distribution and bionomics

The scattered finds from the western Tienshan and the western Alai Mountains south to the northern Hindukush suggest a wide distribution of the *Scopaeus likovskyi* lineage in the Central Asian mountains (Fig. 63). The lack of records east of a line from the northern Tien Shan east of Bishkek (42°44′N 74°55′E), the Arslanbob National Park in the southern Tien Shan (41°19′N 72°57′E), the Turkestan Mountain Ridge at 40°04′N 72°07′E, and the Badakhshan Province in Afghanistan at 36°17′N 70°33′E must be looked upon as an artefact due to the paucity of collecting activity in eastern Central Asia.

Members of the *S. likovskyi* lineage preferably dwell in damp, fine soil, frequently loess, of steep banks of small brooks, even rivulets, where they can reach high abundances compared to riparian habitats along larger brooks and streams, where I happened on single specimens only. They strictly avoid the wide, sterile gravel banks of the large mountain streams, which are inhabited by the members of the *S. similis* group, which however occur on the banks of small running waters as well (Frisch 2014: 219). Unlike other *Scopaeus*, the species of the *S. likovskyi* lineage are moreover adapted to ephemeral waters. I repeatedly collected them under stones and in relatively dry, sandy soil of the banks of dried out brooks and rivulets. Due to this tolerance to dryer habitats, members of the *S. likovskyi* lineage also inhabit brooks within steppe-like environments. They obviously prefer lower eleva-



Figs. 51, 52. *Scopaeus asiaticus* lineage, genital characters of females. – **51**. *S. kabakovi* Gusarov (Pakistan, Swat Valley), dorsal view. **52**. *S.* cf. *kabakovi* (India, Pir Panjal Range: NW Punch), ventral view with lateral gonocoxal plates folded laterally. – Abbreviation: b = bursa.

tions from 600 m to 1500 m, but the vertical distribution extends up to 3500 m in the Hindukush.

Scopaeus likovskyi Boháč
(Figs. 3, 12–14, 31, 36, 38, 44, 53, 54, 63)

Scopaeus (Asiascopaeus) likovskyi Boháč, 1988: 441.
Scopaeus likovskyi; Frisch 1999a: 52.

Type material

Holotype ♂: Tadzhikistan, Nohijahoi tobei Dschumhurij, N Dushanbe: Takob, IV.1983, 3000 m, leg. Boháč (J. Boháč Private Collection, České Budějovice); examined.

Additional material examined (184 specimens)

Afghanistan: Badakhshan, Sarekanda Mts. [36°17′27″N 70°33′10″E], 3500 m, 26.VII.1953, leg. Klapperich (NHMW). — **Kyrgyzstan**: Batken: E Sovetsky (Katrang-Too Mts.) (40°07′19″N 71°22′59″E), 1410 m, 20.VI.2012, leg. Frisch (IBPB, MNHB); Isfana – Isfara: SWW Ozgurush (Lyailek River, Turkestan Mts.) (39°44′25″N 69°59′53″E), 1520 m, 22.VI.2012, leg. Frisch; Isfana – Isfara: SWW Ozgurush (tributary of Lyailek River, Turkestan Mts.) (39°44′26″N 70°00′28″E), 1560 m, 23.VI.2012, leg. Frisch; Isfana – Isfara: Korgon (Lyailek River) (39°54′15″N 69°54′34″E), 1020 m, 23.VI.2012, leg. Frisch; SW Isfana: Dinau (Turkestan Mts.) (39°41′59″N 69°22′30″E), 1770 m, 24.VI.2012, leg. Frisch; NE Isfana, N Suljukta: Bulak-Bashi (39°58′15″N 69°34′37″E), 980 m, 26.VI.2012, leg. Frisch; S Ay-Kol: Teo-Jailoo Valley (Tegir-Malik River) (39°43′09″N

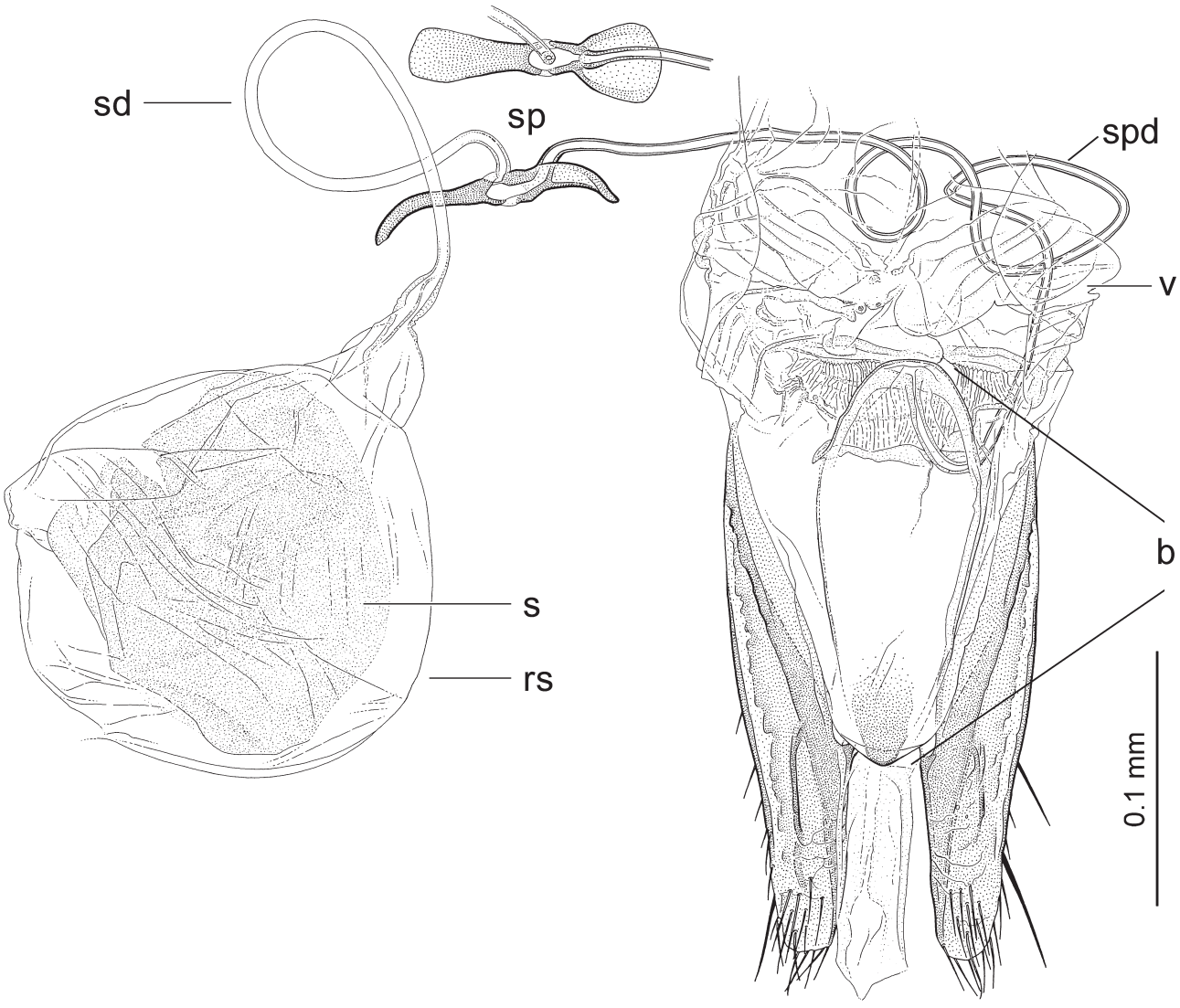


Fig. 53. *Scopaeus likovskyi* lineage, genital characters of *S. likovskyi* Boháč, female (Kyrgyzstan, Batken: Teo-Jailoo Valley) in ventral view with lateral gonocoxal plates folded laterally. – Abbreviations: b = bursa; rs = receptaculum seminis; s = sperm; sd = spermathecal duct; sp = sperm pump; spd = sclerotized portion of spermathecal duct; v = vagina.

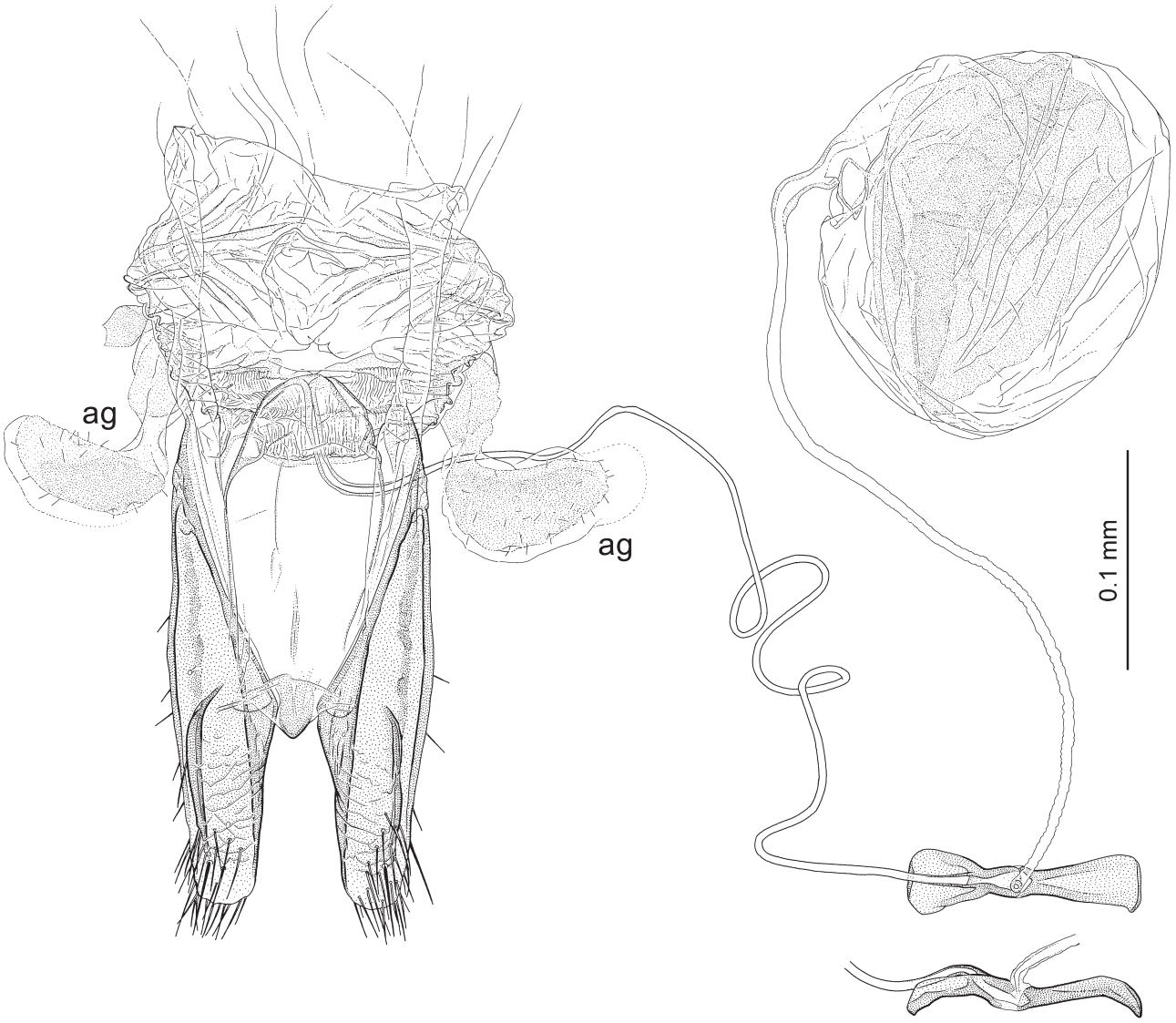


Fig. 54. *Scopaeus likovskyi* lineage, genital characters of *S. likovskyi* Boháč, female (Kyrgyzstan, Batken: Teo-Jailoo Valley) in ventral view with lateral gonocoxal plates folded laterally (specimen different from Fig. 53 showing variability of genital characters). – Abbreviation: ag = accessory gland.

69°41′59″E), 2100 m, 28.VI.2012, leg. Frisch (IBPB, MNHB). — **Uzbekistan**: Kashkadarya: Ishkent (38°50′48″N 66°57′38″E), 1200–1300 m, 27.III.1942, leg. Arnoldi (MZMC); Samarkand [39°39′10″N 67°06′03″E], 28.V.1965 (ZICP). Tashkent, 1200–1300 m, 27.III.1942, leg. Arnoldi. — **Tadzhikistan**: Nohijahoi tobei Dschumhurij: 48 km N Dushanbe: Khoja-Obigarm [Choja-Obigarm] [38°53′50″N 68°47′15″E], 1900 m, 3.–4. VII.2012, leg. Barševskis (ASCD).

Diagnosis

Male: Abdominal sternite VIII triangularly emarginate in posterior fourth and with round, asetose posterior-lateral impression on either side of imaginary midline (Fig. 31). Apical lobes of aedeagus (Figs. 12–14) extraordinarily thin, moderately curved dorsad in lateral view, in dorsal and ventral view tweezers-shaped, in about proximal half notably concave laterally, almost attenuate; dorsal lobe, in lateral view, considerably widened except for acute apex, thus notably projecting from ventral margin of apical lobes; end of flagellum evenly curved dorsad.

Female: Lateral gonocoxal plates slender, about five times as long as wide (Figs. 38, 53, 54). Bursa slender, about 2.2–2.4 times as long as wide, with notably convex lateral margins widened anteriad; sclerotized posterior end narrow, lateral gonocoxal plates thus close to each other (Figs. 53, 54).

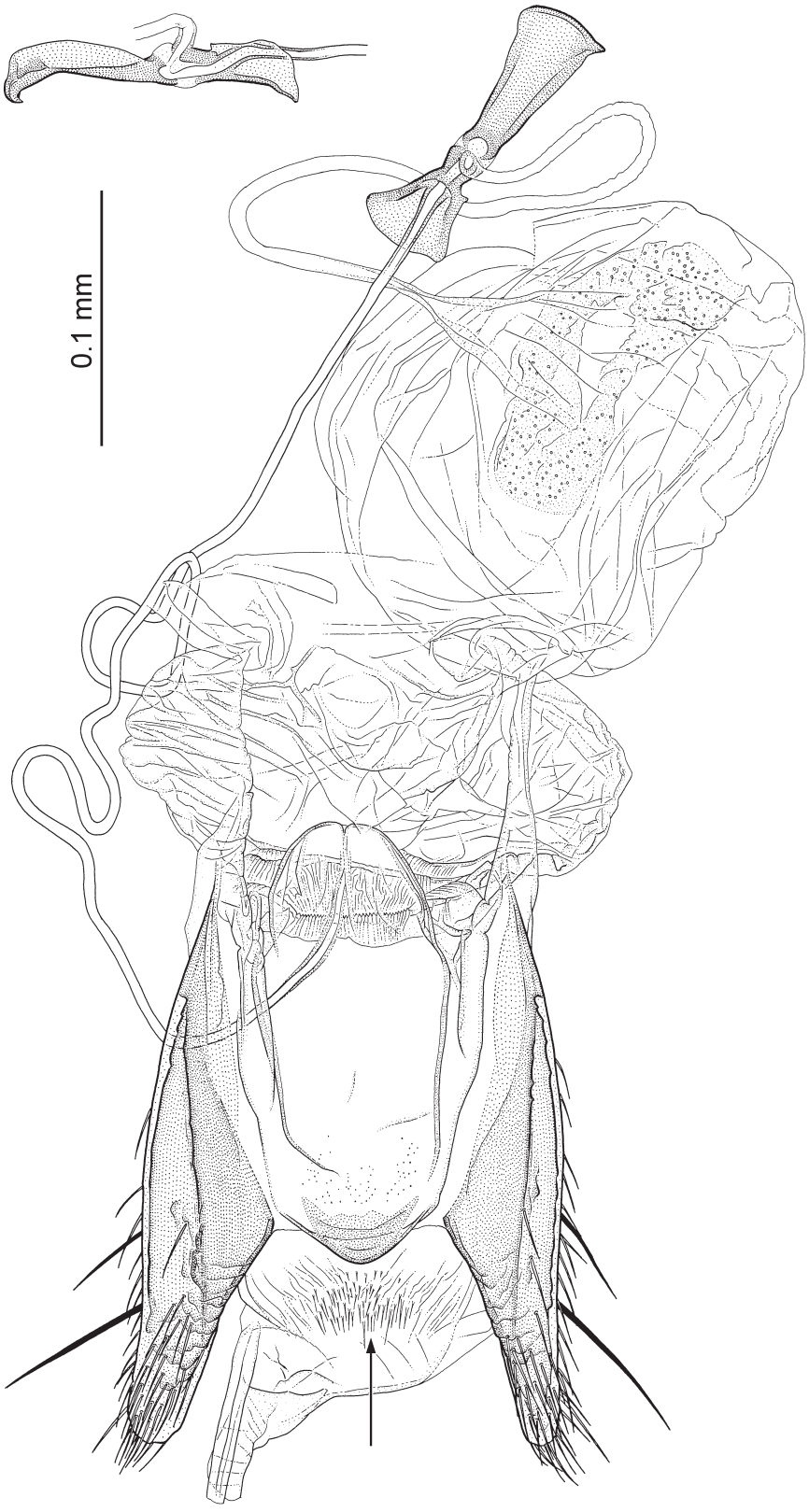


Fig. 55. *Scopaeus likovskyi* lineage, genital characters of *S. milkoi* n. sp., female (paratype; Kyrgyzstan, Chui, W Yurevka: Karandolot) in ventral view with lateral gonocoxal plates folded laterally.

Distribution

Scopaeus likovskyi Boháč is distributed in the west of the Central Asian mountains and the most widespread species of the *S. likovskyi* lineage (Fig. 63). It is known from the western foothills of the Tien Shan at 41°20′N 69°48′E and many localities in the western Alai Mountains from the western foothills at about 67°E eastwards to the Katrang-Too Range (40°07′N 71°22′E), a northern foothill south of the Fergana Basin. The find in southern Badakhshan, Afghanistan, at 36°17′N 70°33′E (Frisch 2008: 283) far south of the localities in the Alai Mountains points to a wide distribution in Southwest Tadzhikistan and the northern Hindukush Mountains. Eastward, *S. likovskyi* is replaced by *S. chatkalensis* n. sp. in the western Tien Shan and *S. moriturus* n. sp. in the northern Alai Mountains (Fig. 63). Due to finds of these allopatric relatives only about 60 km east of the easternmost localities of *S. likovskyi*, the eastern limit of distribution of *S. likovskyi* in the northern part of its areal is known quite precisely. The species is here for the first time recorded for Kyrgyzstan.

Scopaeus milkoi **n. sp.**
(Figs. 4, 15–17, 32, 39, 55, 63)

Type material (all from Kyrgyzstan, Chui)

Holotype ♂: SE Bishkek, 11 km W Yurevka: Karandolot (42°44′24″N 74°55′20″E), 1100 m, 4.VII.2011, leg. Frisch.

Paratypes (6 specimens): 3 ♀♀, same data as holotype; 3 ♀♀, same locality, but (42°44′21″N 74°55′49″E), 1120 m, 21.VI.2013, leg. Frisch (IBPB, MNHB).

Etymology

I dedicate this new species to my colleague Dmitry Milko, entomologist at the Institute of Biology and Pedology of the Academy of Sciences of the Republic of Kyrgyzstan in Bishkek, who took me to the type locality during a joint expedition to the Tien Shan in 2011 and kindly organized a second visit of that place two years later.

Diagnosis

Similar to *Scopaeus likovskyi* Boháč, from which it differs as follows.

Male: Posterior triangular emargination of abdominal sternite VIII somewhat wider (Fig. 32). Apical lobes of aedeagus (Figs. 15–17) in lateral view narrower and parallel in proximal portion of distal half (distal of apex of dorsal lobe) and with somewhat stronger dorsad curved end, in dorsal and ventral view in about proximal third much wider and notably convex laterally; dorsal lobe in lateral view much more slender, less projecting from apical lobes ventrally, and with less ventrad pointing apex; outermost end of flagellum only less evenly, but almost angled curved dorsad.

Female: Lateral gonocoxal plates somewhat broader, about four times as long as wide (Figs. 39, 55). Bursa subparallel with much broader, almost semicircular sclerotized posterior end, lateral gonocoxal plates thus widely separate; membrane posterior of bursa with field of minute setules (arrow in Fig. 55).

Distribution

The distribution of *Scopaeus milkoi* n. sp. is unknown. The species is hitherto known from the type locality approximately 40 km southeast of Bishkek in the northern foothills of the Tien Shan only.

Scopaeus apiculatus **n. sp.**
(Figs. 5, 18–20, 33, 43, 56, 63)

Type material (all from Kyrgyzstan, Jalal-Abad)

Holotype ♂: Sary-Chelek village (41°42′02″N 71°58′53″E), 1020 m, 5.VI.2014, leg. Frisch.

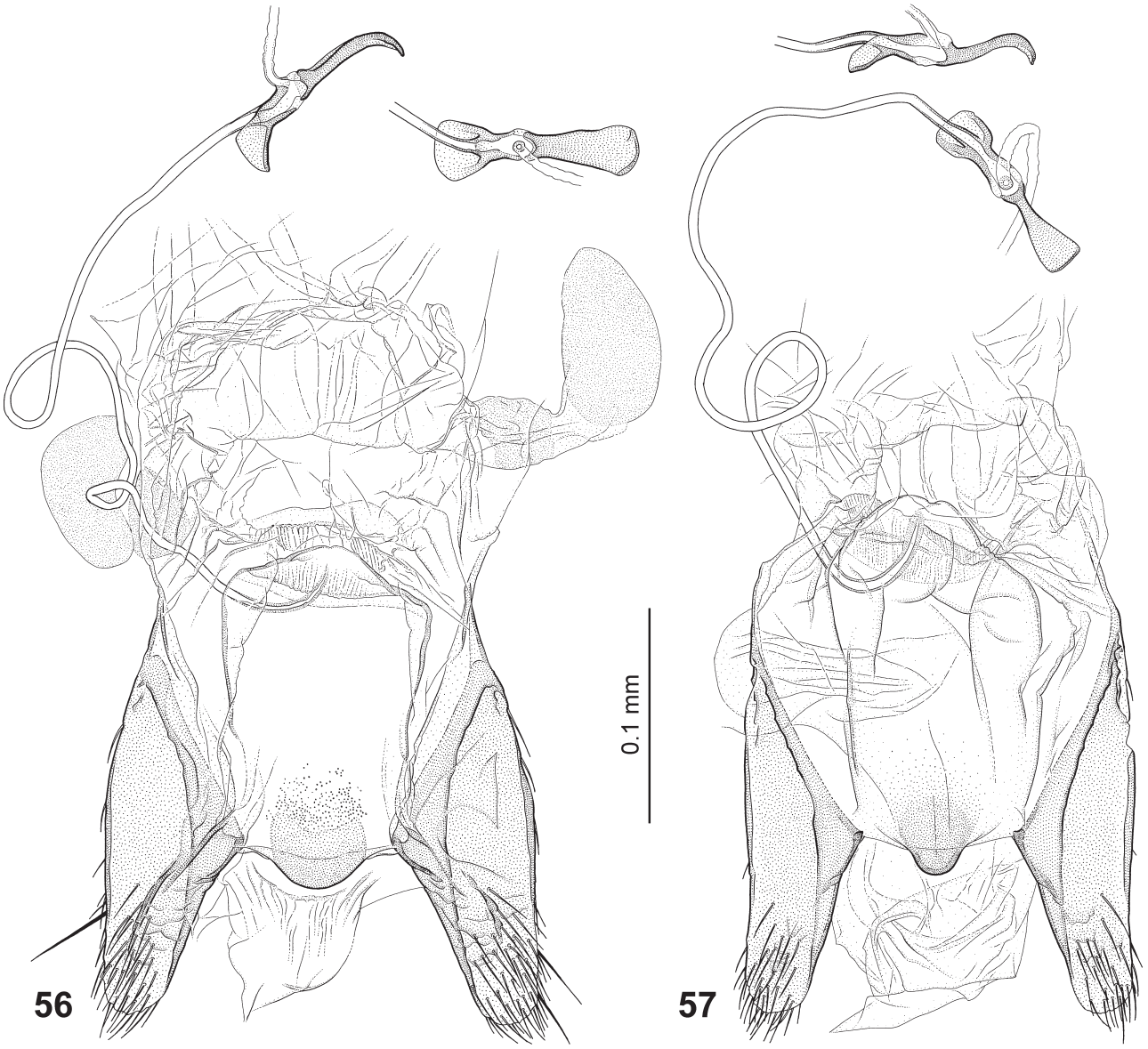
Paratypes (209 specimens): 35 ♂♂, 71 ♀♀, same data as holotype (MNHB, SMNS); 3 ♂♂, 6 ♀♀, Sary-Chelek NR (41°51′30″N 71°56′17″E), 1530 m, 6.VI.2014, leg. Frisch; 1 ♂, 2 ♀♀, NE Kerben: Jerge-Tal (41°35′01″N 71°51′20″E), 1220 m, 8.VI.2014, leg. Frisch; 11 ♂♂, 9 ♀♀, NNW Kerben: Kashka-Suu (41°41′00″N 71°37′56″E), 1660 m, 8.VI.2014, leg. Frisch; 16 ♂♂, 13 ♀♀, preceding locality, but (41°39′02″N 71°38′18″E), 1680 m, 10.VI.2014, leg. Frisch; 1 ♀, SE Toktogul (41°51′41″N 73°02′23″E), 1050 m, 29.V.2014, leg. Frisch; 2 ♀♀, Toktogul – Kara-Kul: Kekbel Pass (41°42′36″N 72°55′29″E), 1420 m, 2.VI.2012, leg. Frisch; 1 ♀, preceding locality, 11.VI.2013, leg. Frisch (MNHB); 1 ♀, Toktogul – Kara-Kul: Kekbel (41°42′09″N 72°55′13″E), 1200 m, 20.VI.2013, leg. Frisch; 1 ♀, preceding locality, 30.V.2014, leg. Frisch; 3 ♂♂, 8 ♀♀, preceding locality, but (41°41′34″N 72°53′43″E), 1160 m, 30.V.2014, leg. Frisch; 1 ♂, 1 ♀, Kara-Kul – Tash-Kumyr (41°29′24″N 72°19′21″E), 640 m, 31.V.2014, leg. Frisch; 3 ♂♂, 2 ♀♀, Tash-Kumyr (E of Naryn River) (41°18′52″N 72°12′17″E), 600 m, 3.VI.2014, leg. Frisch; 1 ♂, NNW Tash-Kumyr, Čat – Jangi-Jol: Tegene (41°31′07″N 72°12′54″E), 950 m, 5.VI.2014, leg. Frisch; 14 ♂♂, 2 ♀♀, Tash-Kumyr – Alcha (41°26′52″N 72°12′46″E), 770 m, 4.VI.2014, leg. Frisch.

Etymology

The epithet "*apiculatus*" (Latin, adjective: "finely apiculate") refers to the needle-thin apical third of the apical lobes of the aedeagus of the new species.

Diagnosis

Male: Abdominal sternite VIII with triangular emargination in about posterior fourth, two latero-posterior impressions and medio-posterior field of dark, long, latero-posteriad orientated setae (Fig. 33). Apical lobes of aedeagus (Figs. 18–20) in posterior two-thirds approximately parallel except for dorsad curved end of ventral margin and ending in right-angled tip because of ventrally extremely narrowed, thin, needle-shaped distal third of apical lobes; in ventral and dorsal view, apical lobes sha-



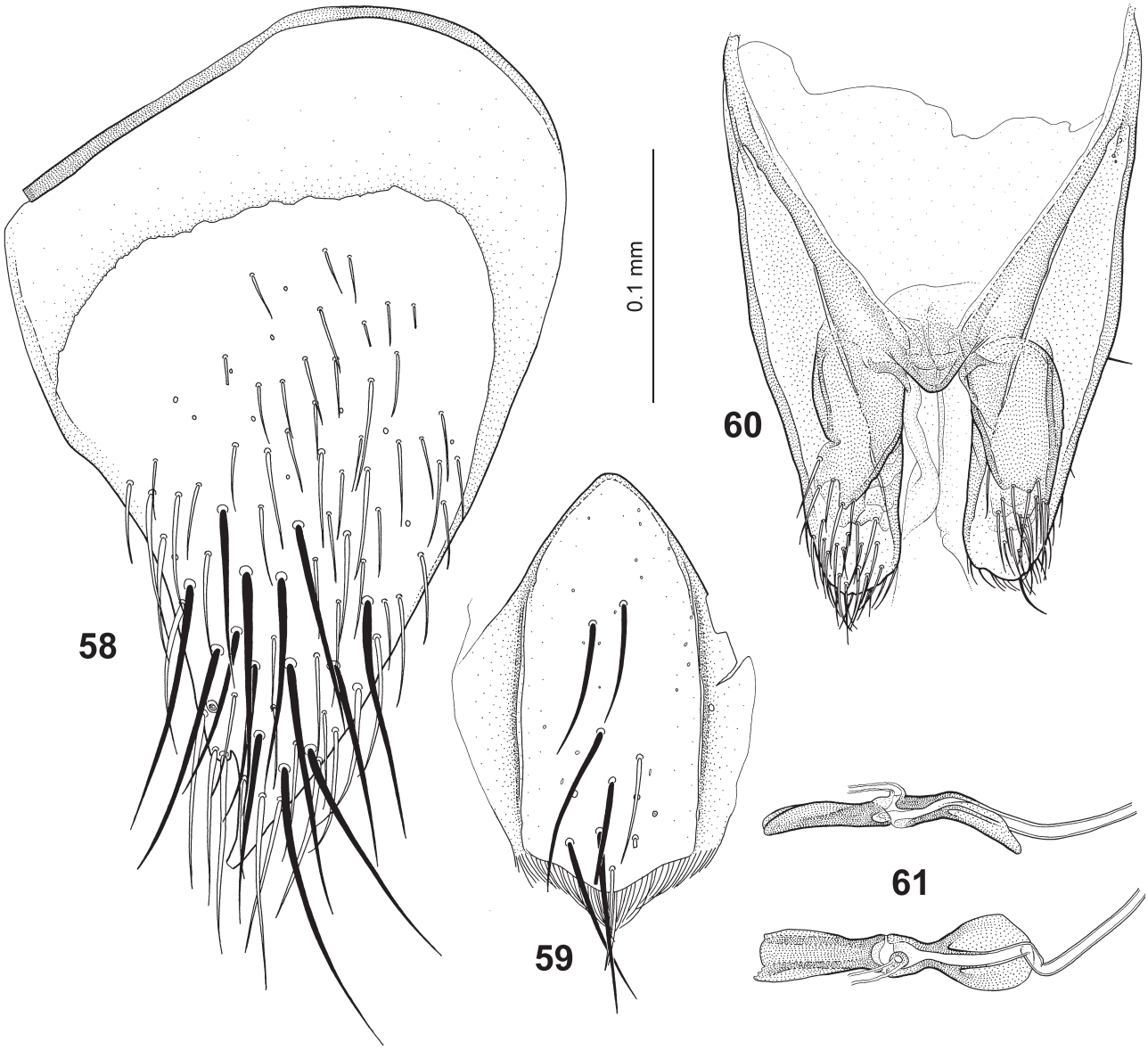
Figs. 56, 57. *Scopaeus likovskyi* lineage, genital characters of females in ventral view with lateral gonocoxal plates folded laterally. – **56**. *S. apiculatus* n. sp. (paratype; Kyrgyzstan, Jalal-Abad, Kekbel-Pass). **57**. *S. moriturus* n. sp. (paratype; Kyrgyzstan, Batken, Isfairam-Say).

ped like end of arrow, moderately widened distad in proximal third, V-shaped in median third, and evenly tapered towards acute apices in distal third; dorsal lobe long, reaching end of median third of apical lobes, in lateral view with short, acute, somewhat ventrad curved apex; flagellum shorter than dorsal lobe, straight with outermost end only curved dorsad.

Female: Lateral gonocoxal plates broad, about 2.5 times as long as wide (Figs. 43, 56). Bursa broad with subparallel lateral margins, about 1.8 times as long as wide, lateral gonocoxal plates thus widely separate; sclerotized posterior end round, usually broad (Fig. 56), but sometimes narrower as in Fig. 57.

Distribution

Scopaeus apiculatus n. sp. is endemic to a small areal in the southwestern Tien Shan, Kyrgyzstan, roughly delimited to the west by the Chatkal Mountain Range and to the east by the Baubashata Range. East and west of these mountain barriers, the species is replaced by allopatric relatives (Fig. 63). *Scopaeus apiculatus* was found from Kashka-Suu (41°41′N 71°37′E) eastwards to the Naryn



Figs. 58–61. *Scopaeus caspius* n. sp. (holotype), genital characters of female. – **58**. Laterotergite IX. **59**. Tergite X. **60**. Lateral gonocoxal plates and bursa in ventral view with lateral gonocoxal plates folded laterally. **61**. Sperm pump.

River from Toktogul (41°51′N 73°02′E) south to Tash-Kumyr (41°18′N 72°12′E). The northern limit of distribution is unknown.

Scopaeus moriturus **n. sp.**
(Figs. 6, 21–23, 34, 40, 57, 63)

Type material (all from Kyrgyzstan, Batken)

Holotype ♂: W Majdan: Tamasha-Say (40°03′55″N 72°03′17″E), 1460 m, 15.VI.2013, leg. Frisch.

Paratypes (149 specimens): 24 ♂♂, 43 ♀♀, same data as holotype (IBPB, MNHB); 4 ♂♂, 3 ♀♀, Majdan: Shambesai Valley (40°04′43″N 72°04′10″E), 1360 m, 13.VI.2013, leg. Frisch; 2 ♂♂, 3 ♀♀, Majdan: Shambesai Valley (40°04′44″N 72°04′09″E), 1370 m, 17.VI.2012, leg. Frisch; 25 ♂♂, 38 ♀♀, 3km NE Majdan: Pum (40°04′39″N 72°07′20″E), 1400 m, 17.VI.2013, leg. Frisch (MNHB, SMNS); 1 ♀, S Majdan, W Karaul: Bant Valley (40°00′30″N 72°02′46″E), 1460 m, 16.VI.2013, leg. Frisch; 1 ♀, W Majdan: Yavan-Say (40°02′06″N 72°04′59″E), 1350 m, 18.VI.2013, leg. Frisch; 1 ♀, N Karadzhigach: Valakish (40°10′34″N 72°06′07″E), 1450 m, 14.VI.2013, leg. Frisch; 4 ♀♀, W Karadzhigach: Karadzhigach-Say (40°06′59″N 72°02′24″E), 1560 m, 13.VI.2013, leg. Frisch.

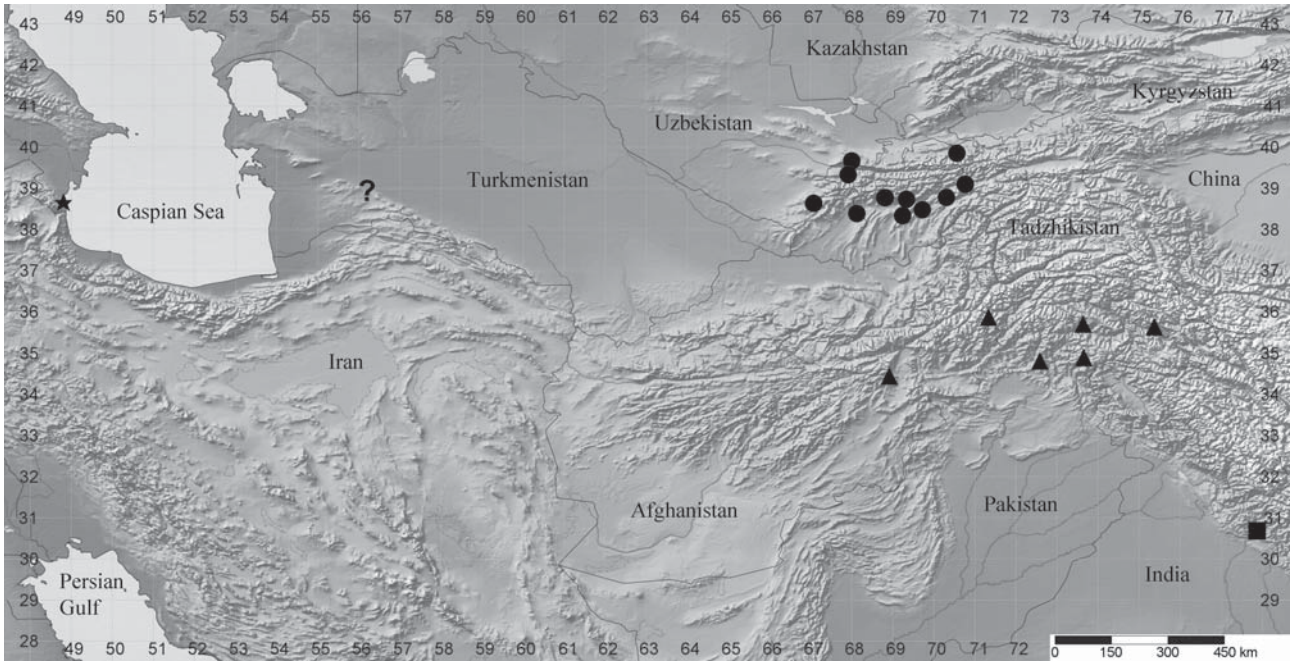


Fig. 62. Distribution of *Scopaeus caspius* n. sp. and the *S. asiaticus* lineage in the Middle East and Central Asia. – ★ *S. caspius* n. sp. ● *S. asiaticus.* **?** dubious locality of paralectotypes of *S. asiaticus.* ▲ *S. kabakovi.* ■ *S. obscuripes.*

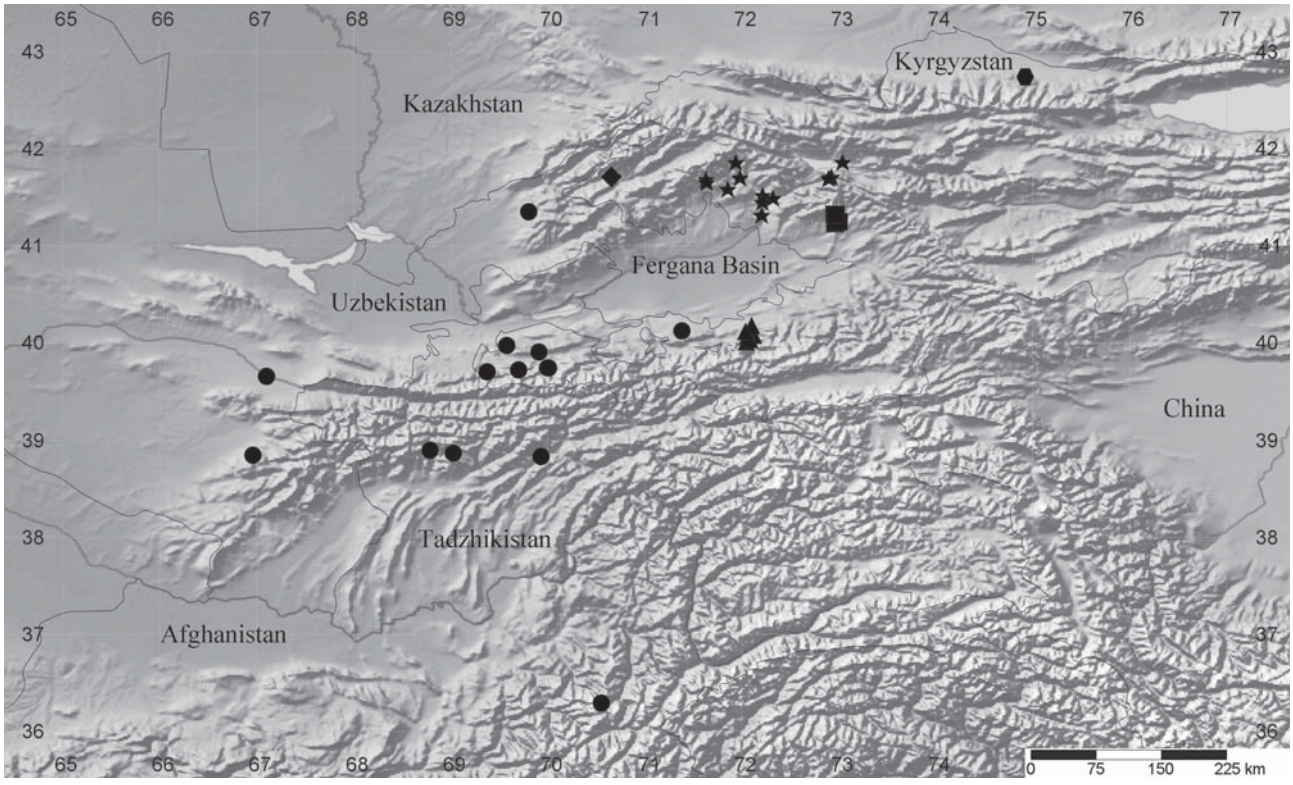


Fig. 63. Distribution of the *S. likovskyi* lineage in Central Asia. – ● *S. likovskyi.* ⬣ *S. milkoi* n. sp. ★ *S. apiculatus* n. sp. ▲ *S. moriturus* n. sp. ■ *S. schawalleri* n. sp. ◆ *S. chatkalensis* n. sp.

Etymology

The epithet "*moriturus*" (Latin, adjective: "dedicated to death") points to the planned gold production with cyanide in the Shambesai Valley, a sidevalley of Isfairam-Say, where I collected the new species for the first time.

Diagnosis

Similar to *Scopaeus apiculatus* n. sp., from which it differs as follows:

Male: Apical lobes of aedeagus (Figs. 21–23) in lateral view somewhat widened in proximal half, in distal half strongly curved towards evenly tapered distal third, in dorsal and ventral view V-shaped median third notably broader; dorsal lobe somewhat widened in lateral view; flagellum moderately curved ventrad with outermost end strongly bent dorsad.

Female: Width of round sclerotized posterior end of bursa variable, usually narrow (Fig. 57), often as wide as in *S. apiculatus* (Fig. 56).

Distribution

Scopaeus moriturus n. sp. is hitherto known only from the Isfairam-Say River System in the eastern Turkestan Mountain Range, the northernmost chain of the Alai Mountains south of the Fergana Basin (Fig. 63). Towards the west, it is replaced by the allopatric *S. likovskyi* Boháč, which was found only about 60 km further west. While the Fergana Basin probably delimits the areal of *S. moriturus* towards the north, the southern and eastern limits of distribution are however unknown.

Scopaeus schawalleri **n. sp.**
(Figs. 7, 24–26, 63)

Type material (all from Kyrgyzstan, Jalal-Abad)

Holotype ♂: SE Arslanbob: Gumkana (Arslanbob NR) (41°19′27″N 72°57′07″E), 1330 m, 1.VI.2014, leg. Frisch.

Paratypes (17 specimens): 3 ♂♂, 7 ♀♀, same data as holotype (IBPB, MNHB); 1 ♂, 2 ♀♀, Pravda (Karaungur Valley at Arslanbob NR) (41°13′41″N 72°57′57″E), 1010 m, 1.VI.2014, leg. Frisch (IBPB, MNHB); 1 ♂, Pravda (Karaungur Valley at Arslanbob NR) (41°14′17″N 72°57′45″E), 1020 m, 1.VI.2014, leg. Frisch; 1 ♂, 1 ♀, NE Bazar-Kurganj: Charbak [Charvak] (Karaungur Valley at Arslanbob NR) [41°14′49″N 73°00′10″E], 900–1000 m, 18.V.1993, leg. Schawaller (SMNS); 1 ♀, SE Arslanbob: Jaradar [Yarodar] (Arslanbob NR) [41°19′18″N 72°58′16″E], 1400–1700 m, 16.–17.V.1993, leg. Golovatch.

Etymology

I name this new species in honour of my dear colleague Dr. Wolfgang Schawaller, Staatliches Museum für Naturkunde Stuttgart, who discovered it first in the Arslanbob Nature Reserve more than 20 years ago.

Diagnosis

Male: Abdominal sternite VIII with triangular emargination in about posterior fourth, two asetose latero-posterior impressions, and medio-posterior field of dark, long, latero-posteriad orientated setae as in Figs. 33, 34. Apical lobes of aedeagus (Figs. 24–26) in lateral view moderately slender and in distal half evenly curved dorsad, in dorsal and ventral view parallel in proximal third and strongly tapered towards extraordinarily thin and parallel apical half; dorsal lobe in lateral view strongly, club-like widened and subtruncate posteriorly with thin, tooth-like apex.

Female: Lateral gonocoxal plates broad, only about 2.5 times as long as wide (as in Figs. 40, 43, 56, 57). Bursa broad and parallel, about 1.8 times as long as wide, lateral gonocoxal plates thus widely separate, and with round sclerotized posterior end as in Figs. 56, 57.

Distribution

Scopaeus schawalleri n. sp. is known only from a small area in the upper Karaungur River Valley including the Arslanbob Nature Reserve in the southern Tien Shan north of the eastern end of the Fergana Basin (Fig. 63). While the Baubashata Mountain Range constitutes the distribution barrier towards the northwest, where *S. schawalleri* is replaced by *S. apiculatus* n. sp., the distribution towards the east and south is unknown.

Scopaeus chatkalensis **n. sp.**
(Figs. 8, 27–29, 35, 63)

Type material

Holotype ♂: Kyrgyzstan, Jalal-Abad, Chatkal River at Ak-Tash (NE Besh-Aral NR) (41°41′13″N 70°39′35″E), 1450 m, 14.VI.2014, leg. Frisch.

Etymology

The epithet "*chatkalensis*" (Latin, adjective: "from Chatkal") points to the type locality in the Chatkal Valley in the western Tien Shan.

Diagnosis

Male: Abdominal sternite VIII with comparatively short triangular emargination occupying about posterior fifth of sternite length, two latero-posterior impressions and medio-posterior field of dark, long, latero-posteriad orientated setae (Fig. 35). Dorsad curved end of apical lobes of aedeagus (Figs. 27–29) comparatively short and stout; apical lobes in dorsal and ventral view evenly convex laterally in more than proximal half and gradually tapered towards acute apices; dorsal lobe moderately widened; apex of flagellum moderately curved dorsad.

Female unknown.

Distribution

Scopaeus chatkalensis n. sp., endemic to the extreme west of the Tien Shan, is hitherto known from the upper Chatkal River in Kyrgyzstan only (Fig. 63). The Chat-

kal Mountain Range presumably constitutes the eastern limit of distribution, east of which the allopatric relative *S. apiculatus* n. sp. occurs, which was found as far west as Kashka-Suu only about 80 km east of the type locality of *S. chatkalensis*. In the western foothills of the Tien Shan, *S. chatkalensis* is replaced by the allopatric *S. likovskyi* Boháč, which was found near Tashkent about 80 km west of the type locality of the new species. The northern and southern limit of distribution is, however, unknown.

4.4 *Scopaeus caspius* **n. sp.**
(Figs. 2, 58–61, 62)

Type material

H o l o t y p e ♀: Azerbaijan, Lenkoran, SSE Lenkoran City: Avrora (Alekseyevka) [38°39′36″N 48°48′24″E], 14.VII.1978, leg. MIKHEECHEV (MZMC).

Etymology

The epithet "*caspius*" (Latin, adjective: "the Caspian") refers to the distribution of *Scopaeus caspius* n. sp. in the Caspian Plain of Azerbaidzhan west of the Caspian Sea.

Diagnosis

Total length 3.4 mm, forebody length 2.0 mm. Head and pronotum medium brown with slight reddish touch; elytra lighter brown except for dark scutellar triangle; abdomen blackish brown, but from posterior half of segment VII to genital segments gradually lighter brown; antennae and maxillary palpi except for slightly darker penultimate segment light reddish brown; legs light brown (Fig. 2). Head 1.08 times as long as wide, across tempora 1.06 times as wide as across eyes, thus notably trapezoidal. Eyes medium-sized, 0.54 times as long as tempora. Elytra 1.05 times as long as pronotum. Lateral denticles of labrum somewhat shorter than median denticles. Protarsomeres 2–4 strongly transverse, three times as wide as long. Mesotibia slender, 5.9 times as long as wide.

Male: Unknown.

Female: Lateral gonocoxal plates slender, 3.7 times as long as wide and with conspicuous, lamellar duplication at dorsal, towards body cavity orientated side (Fig. 60). Setose field of tergite X 2.3 times as long as wide (Fig. 59). Sclerotized posterior end of bursa narrow and triangular (Fig. 60).

Distribution

Scopaeus caspius n. sp. is known only from the easternmost foothills of the Talysh Mountains east of Avrora in the Lenkoran District (Fig. 62).

Remark

The description of a new species based on a single female only might cause criticism. *Scopaeus caspius* n. sp., however, is the first member of the *S. obscuripes* group in the Middle East. It can easily be distinguished from Middle Eastern *Scopaeus* by the shape of the sclerotized posterior end of the bursa (Fig. 60). From the Central Asian relatives, *S. caspius* n. sp. differs by the shape of the posterior end of the bursa or by the light coloured body with long elytra (Fig. 2). The presence of a Central Asian member west of the Caspian Sea is, however, unlikely in view of the endemic distribution patterns in the *S. obscuripes* group (Figs. 62, 63).

The phylogenetic position of *Scopaeus caspius* n. sp. within the *S. obscuripes* species group cannot be determinated, since the male genital characters are unknown.

4.5 Key to the species of the *Scopaeus obscuripes* group

The following key to the *Scopaeus obscuripes* species group summarizes the major distinguishing characters of the phylogenetic lineages of the species group and the species included. It replaces formal comparative notes to the species diagnoses and serves as an introduction to the phylogeographic discussion below.

1 Distributed in Middle East (Talysh). – Male unknown. – Female: Lateral gonocoxal plates with conspicuous, lamellar duplication at dorsal, towards body cavity orientated side (Fig. 60); sclerotized posterior end of bursa triangular. – Forebody light reddish brown, abdomen blackish brown, appendages light brown (Fig. 2)..... ***Scopaeus caspius* n. sp.**

– Distributed in Central Asia. – Female (in two species unknown): Lateral gonocoxal plates without lamellar duplication at dorsal, towards body cavity orientated side..... **2**

2 Male: Apical lobes of aedeagus in lateral view slender, subparallel, and with dorsad curved end, in dorsal view broad and parallel with subtruncate apex; flagellum as long as apical lobes, straight, and with very thin end and strong, subapical, ventral tooth (FRISCH 2008: figs. 1–3). – Hindukush (FRISCH 2008: fig. 17)..... ***S. klapperichi***

– Male: Apical lobes of aedeagus with strong ventral or apicolateral enlargements, or flagellum only half as long as apical lobes..... **3**

3 Male: Dorsal lobe of aedeagus vestigial (Figs. 9, 11). – Female: Sclerotized portion of spermathecal duct thick and short, about five times as long as sperm pump only (Figs. 46–50), or thin, very long and winding, about 12 times as long as sperm pump (Fig. 51)..... *S. asiaticus* lineage **4**

– Male: Dorsal lobe of aedeagus about half as long as apical lobes; apical lobes long, narrow, in about distal half to distal third evenly curved dorsad and with thin, acute apex (Figs. 12–29). – Female: Sclerotized portion of spermathecal duct thin, about six times as long as sperm pump (Figs. 53–57)..... *S. likovskyi* lineage **6**

4 Male: Abdominal sternite VIII semicircularly emarginate (Fig. 30); apical lobes and flagellum of aedeagus (Figs. 9–11) at basis almost right-angled orientated ventrad, after that almost right-angled bent in longitudinal direction and straight towards end; apical lobes very slender with laterally triangularly widened apices; flagellum slender without denticles or lobiform modifications. – Female: Bursa slender with round or triangular sclerotized posterior end and very

fine, deciduous anterior end (Figs. 46, 48); sclerotized portion of spermathecal duct thick and short, about five times as long as sperm pump only (Figs. 46–50). – Dark brown to black species with blackish brown appendages and parallel head with strongly convex posterior margins (Fig. 1). – Alai Mountains. ..... ***S. asiaticus***

– Male: Abdominal sternite VIII triangularly emarginate, in posterior half with strongly sclerotized, elevated midline and two lateral, asetose impressions (Frisch 1999a: figs. 10, 11); apical lobes and flagellum of aedeagus not strongly bent ventrad at basis, less slender with various modifications..... **5**

5 Male: Apical lobes of aedeagus with strong, ventro-proximad curved tooth in middle of length; flagellum strongly, almost semicircularly curved ventrad with apex semicircularly bent dorsad and ventral margin notably serrate (Frisch 1999a: figs. 4–6). – Female: Bursa very large, about 0.8 times as long as lateral gonocoxal plates, from long triangular sclerotized end evenly widened towards isosceles-shaped anterior third (Fig. 51); sclerotized portion of spermathecal duct very long and winding, about 12 times as long as sperm pump (Fig. 51). – Light coloured species with yellowish or reddish brown forebody and appendages and darker brown abdomen. – Hindukush, Kashmir. ..... ***S. kabakovi***

– Male: Apical lobes of aedeagus with remarkable, lobiform, ventro-distal enlargement and broad triangular, dorsad curved, acute end; flagellum somewhat longer than apical lobes, with long and narrow, proximad pointing lobe in middle of proximal half, in distal half strongly curved dorsad (Frisch 1999a: figs. 1–3). – Female unknown. – Blackish brown species with brown appendages. – Siwalik Range (Fig. 62). ..... ***S. obscuripes***

6 Male: Abdominal sternite VIII without modifications (Figs. 31–32). – Female: Lateral gonocoxal plates slender, about 4–5 times as long as wide (Figs. 38, 39), close to each other due to slender, triangular sclerotized end of bursa (Figs. 53, 54) or widely separate due to broad, semicircular end of bursa (Fig. 55). **7**

– Male: Abdominal sternite VIII with posterior field of long, dark, latero-posteriad pointing setae and two lateral, asetose depressions (Figs. 33–35). – Female (female of *S. chatkalensis* unknown): Lateral gonocoxal plates broad, about 2.5 times as long as wide (Figs. 40, 43) and widely separate (Figs. 56, 57); sclerotized end of bursa semicircular (Figs. 56, 57). **8**

7 Male: Apical lobes of aedeagus in almost proximal half notably concave laterally, somewhat attenuate (Figs. 13, 14); end of flagellum evenly curved dorsad (Fig. 12). – Female: Lateral gonocoxal plates slender, about five times as long as wide (Figs. 38, 53, 54); bursa slender, with notably convex lateral margins widened anteriad and narrow sclerotized posterior end, thus lateral gonocoxal plates situated close to each other (Figs. 53, 54). – Very west of Tien Shan and western Alai, Hindukush (Fig. 63). ..... ***S. likovskyi***

– Male: Apical lobes of aedeagus in almost proximal half convex laterally (Figs. 16, 17); outermost end of flagellum angled bent dorsad (Fig. 15). – Female: Lateral gonocoxal plates broader, about four times as long as wide (Figs. 39, 55); bursa subparallel with much broader, almost semicircular sclerotized posterior end, thus lateral gonocoxal plates widely separate (Fig. 55). – Northern incline of Tien Shan (Fig. 63). ..... ***S. milkoi* n. sp.**

8 Male: Apical lobes of aedeagus in median third triangularly extended laterally, in dorsal and lateral view V-shaped like arrowhead (Figs. 19, 20, 22, 23). **9**

– Male: Apical lobes of aedeagus without triangular lateral extension (Figs. 25, 26, 28, 29). **10**

9 Male: Apical third of apical lobes of aedeagus needle-thin in lateral view (Fig. 18). – Southwest Tien Shan between Chatkal and Baubashata Mountain Ranges (Fig. 63). ..... ***S. apiculatus* n. sp.**

– Male: Distal third of apical lobes of aedeagus in lateral view much broader, evenly tapered towards acute apex (Fig. 21). – Turkestan Mountain Range: Isfairam-Say (Fig. 63). ..... ***S. moriturus* n. sp.**

10 Male: Apical lobes of aedeagus in distal half evenly curved dorsad (Fig. 24), in dorsal and ventral view parallel in proximal half, but strongly tapered towards extraordinary thin and parallel apical half (Figs. 25, 26); dorsal lobe in lateral view club-like widened, almost truncate posteriorly with thin, tooth-like apex (Fig. 24). – Southwest Tien Shan: Karaungur Valley (Fig. 63). ..... ***S. schawalleri* n. sp.**

– Male: Apical lobes of aedeagus in apical third only more strongly curved dorsad (Fig. 27), in dorsal and ventral view in proximal half convexly enlarged laterally and in distal half less narrow and evenly tapered, not parallel (Figs. 28, 29); dorsal lobe in lateral view much more slender posteriorly (Fig. 27). – Western Tien Shan: Chatkal Valley (Fig. 63). ..... ***S. chatkalensis* n. sp.**

4.6 Phylogeography

The cladistic analysis of the West Palaearctic Scopaeina performed by Frisch et al. (2002) was confined to the taxa the current distribution pattern of which goes back to the Pleistocene refuges of the arboreal fauna in the Mediterranean and the Middle East sensu De Lattin (1949, 1951) and thus did not include the Central Asian species groups. Nevertheless, the results of this study make it possible to propose a hypothesis on the phylogenetic position of the *S. obscuripes* group. Within *Scopaeus* Erichson, 1839, the *S. obscuripes* species group shares the apomorphic characters of *Scopaeus* s. str., which are the typical set of distal lobes of the aedeagus with two lateral, testaceous apical lobes and a dorsal lobe between them, the simple flagellum of the aedeagus without surrounding denticles, and the terminal process of the chamber segment of the sperm pump (Frisch et al. 2002: 38).

Within that subgeneric clade, the *S. obscuripes* group shows derived characters of modern phylogenetic lineages. It shares the relevant apomorphic characters of the terminal clade of West Palaearctic *Scopaeus* s. str., which in the Mediterranean and the Middle East comprises the *S. sulcicollis* (Frisch 1999c) and *S. elegans* (e. g. Frisch 2010: 163–189) species groups. These characters are the lack of setiferous lateral lobes of the aedeagus (Figs. 8–29) and the long, winding sclerotized portion of the spermathecal duct (Figs. 46, 48, 49, 51–57), which, contrary to Frisch et al. (2002: 41), is also present in the former grouping. The Central Asian *S. similis* group shares these synapomorphic characters as well (Frisch 2014: 218). Within this phylogenetically young clade of monophyletic species groups

in the West Palaearctic, the *S. obscuripes* species group differs by the hyaline bursa with sclerotized posterior end (Figs. 46, 48, 49, 51–57, 60) – a unique sclerotization pattern of the bursa, which I consider as autapomorphy suitable to postulate a monophyletic *S. obscuripes* species group.

Not enough is known about diversity and biogeography of the *S. obscuripes* species group to erect a sound hypothesis on the phylogenetic relationships within this grouping. Two obvious evolutionary clades, the *S. asiaticus* and *S. likovskyi* lineages, are however discernible. Judging from their distribution pattern in the Central Asian mountains, they constitute sympatric clades of strictly allopatric members and are good examples for speciation through multiple radiation. The scattered finds of the three hitherto known species of the *S. asiaticus* lineage from the Alai south to the Hindukush and the Siwalik Range in the Lesser Himalayas (Fig. 62) suggest a more southern distribution of this phylogenetic lineage, while the numerous records from the Tien Shan and the Alai Mountains in contrast to only one record from the Hindukush point to a more northern distribution of the *S. likovskyi* lineage (Fig. 63).

The *S. asiaticus* lineage is a distinct monophyletic group judging from the vestigial dorsal lobe (Figs. 9, 11), a unique character within Palaearctic *Scopaeus*. The three hitherto known species moreover agree in the remarkable flagellum of the aedeagus, which is considerably lengthened and apparently replaces the reduced dorsal lobe. Judging from the very slender apical lobes and the flagellum without modifications (Figs. 9–11), *S. asiaticus* Bernhauer represents a northern lineage in the Alai Mountains, while *S. kabakovi* Gusarov (Frisch 2008: figs. 7–9) and *S. obscuripes* Cameron (Frisch 2008: figs. 10–12) constitute a southern lineage in the Hindukush, Kashmir, and Himalayas with tooth-like or lobiform ventral modifications of the flagellum and, in lateral view, broad, modificate apical lobes of the aedeagus.

The second grouping, the *S. likovskyi* lineage, is mainly characterized by the typical shape of the aedeagus as described in the diagnosis of this clade above (Figs. 12–29), the matching length of the sclerotized portion of the spermathecal duct (Figs. 53–57), and moreover by the adaptation to ephemeral brooks and rivulets, characters which I consider as synapomorphic for the species included. Within the *S. likovskyi* lineage, *S. likovskyi* Boháč and *S. milkoi* n. sp. are obvious sister species according to the similar shape of the aedeagus with extremely slender apical lobes (Figs. 12–17) and the simple abdominal sternite VIII of the males without a medio-posterior field of long, dark setae (Figs. 31, 32). That field of long, latero-posteriorly orientated setae (Figs. 33–35) constitutes the synapomorphy of *S. apiculatus* n. sp., *S. chatkalensis* n. sp., *S. morituru*s n. sp., and *S. schawalleri* n. sp., an eastern clade of the *S. likovskyi* lineage. Judging from the derived triangular median third of the apical lobes of the aedeagus (Figs. 19, 20, 22, 23), *S. apiculatus* and *S. morituru*s constitute another couple of sister species, even though their areals north and south of the Fergana Basin at about the same longitude seem to be widely separate and are interrupted by the areal of *S. schawalleri* east of the basin (Fig. 63).

Scopaeus klapperichi Frisch from the Hindukush with a well developed dorsal lobe and a remarkably lengthened, ventrally dentate flagellum (Frisch 2008: figs. 1–3), however, does not fit either phylogenetic lineage. The relationships of *S. caspius* n. sp. are also unknown since no males have been found yet.

A sound phylogeographic concept of the *S. obscuripes* group requires extensive future investigations in the mountains of Central Asia, where most likely dozens of unknown species still await their discovery.

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