

# Review of Fennoscandian species of *Gimnomera* Rondani (Diptera: Scathophagidae) with description of *Gimnomera freyi* sp. n. and *Ozerovia* subg. n.

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The Fennoscandian species of the genus *Gimnomera* Rondani, 1867 were studied and a new species, *G. freyi*, is described. A new subgenus, *Ozerovia*, is established for *Gimnomera albipila* (Zetterstedt, 1846). *Gimnomera albipila* (Zetterstedt, 1846) is redescribed and a lectotype is designated for it. An identification key for the Fennoscandian species of *Gimnomera* is given.

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## 1. Introduction

The genera *Cordilura* and *Scatomyza* were established by Fallén (1810) and Zetterstedt (1846) included all the species of the family Scathophagidae into these two genera in his Diptera Scandinaviae. The genus *Gimnomera* was established by Rondani (1867) with *Cordilura tarsea* Fallén, 1819 as the type species. In the revision of the family Scathophagidae (as Scatomyzidae), Becker (1894) established a new genus *Cochliarium*, using *Cordilura cuneiventris* Zetterstedt, 1846 as type species, and described two new *Cochliarium* species from Central Europe. In addition to these species only one additional species occurring in Fennoscandia, *Cordilura albipila*, was described by Zetterstedt in 1846.

Šifner (2003: 32) synonymised *Cochliarium* with *Gimnomera*, since the two genera are similar. Further species added into the genus have made the earlier diagnostic key characters (body colours and number of dorsocentrals) unreliable.

There are similarities in the structures of the male genitalia and the female ovipositor of the two genera and there are no good reasons to keep them apart. The exception is *Gimnomera albipila* with different terminalia and the lack of spines on the frontal part of humeral callus. For these reasons, we propose a new subgenus *Ozerovia* with the type species *Cordilura albipila* Zetterstedt 1846.

About 200 species of Scathophagidae have been described from the Palaearctic region (de Jong 2000) and approximately 100 occur in Fennoscandia. Most species of Scathophagidae have northern, arctic or boreo-alpine distribution patterns. This is true also for the Fennoscandian *Gimnomera* species and only the distribution of *G. tarsea* (Fallén, 1819) extends to the southern part of Fennoscandia, the other taxa occur in mountain areas. In addition to *Gimnomera tarsea*, four additional species of *Gimnomera* are currently known from Fennoscandia: *G. dorsata* (Zetterstedt, 1838), *G. cuneiventris* (Zetterstedt,



Fig. 1. The malaise trap by which the female of *Gimnomera freyi* sp. n. was collected on an alpine willow heath at the Muotkatunturi wilderness area in North Finland. Photo: Eerikki Rundgren.

1846), *G. albipila* (Zetterstedt 1846) and *G. hirta* Hendel, 1930.

During our review of the Fennoscandian species of the genus *Gimnomera* we studied a specimen previously identified as a putative species new to science by R. Frey, and we here describe it as *Gimnomera freyi* sp. n. We also provide a description of *Ozerovia* subg. n. as well as a re-description of *Cordilura* (*Ozerovia*) *albipila* Zetterstedt, 1846.

## 2. Materials and methods

### 2.1. Depository institutions and the acronyms

AHPC Antti Haarto personal collection, Mynämäki, Finland

REPC Roger Engelmark personal collection, Umeå, Sweden

NHRM Swedish Museum of Natural History, Stockholm, Sweden

MZLU Museum of Zoology, Lund, Sweden

ZMUT Zoological Museum of the University of Turku, Finland

MZH Finnish Museum of Natural History, Helsinki, Finland

ZMHB Museum für Naturkunde, Berlin, Germany

### 2.2. History and specimens of *Gimnomera freyi* sp. n.

A specimen of *Gimnomera* was collected in 1907 by Bertil Poppius who spent a summer in the area of Sarek in northern Sweden (that area became a National Park in 1910) investigating the insect fauna on behalf of and financed by Axel Hamberg. The collected Diptera material was examined by Carl Lundström, who identified

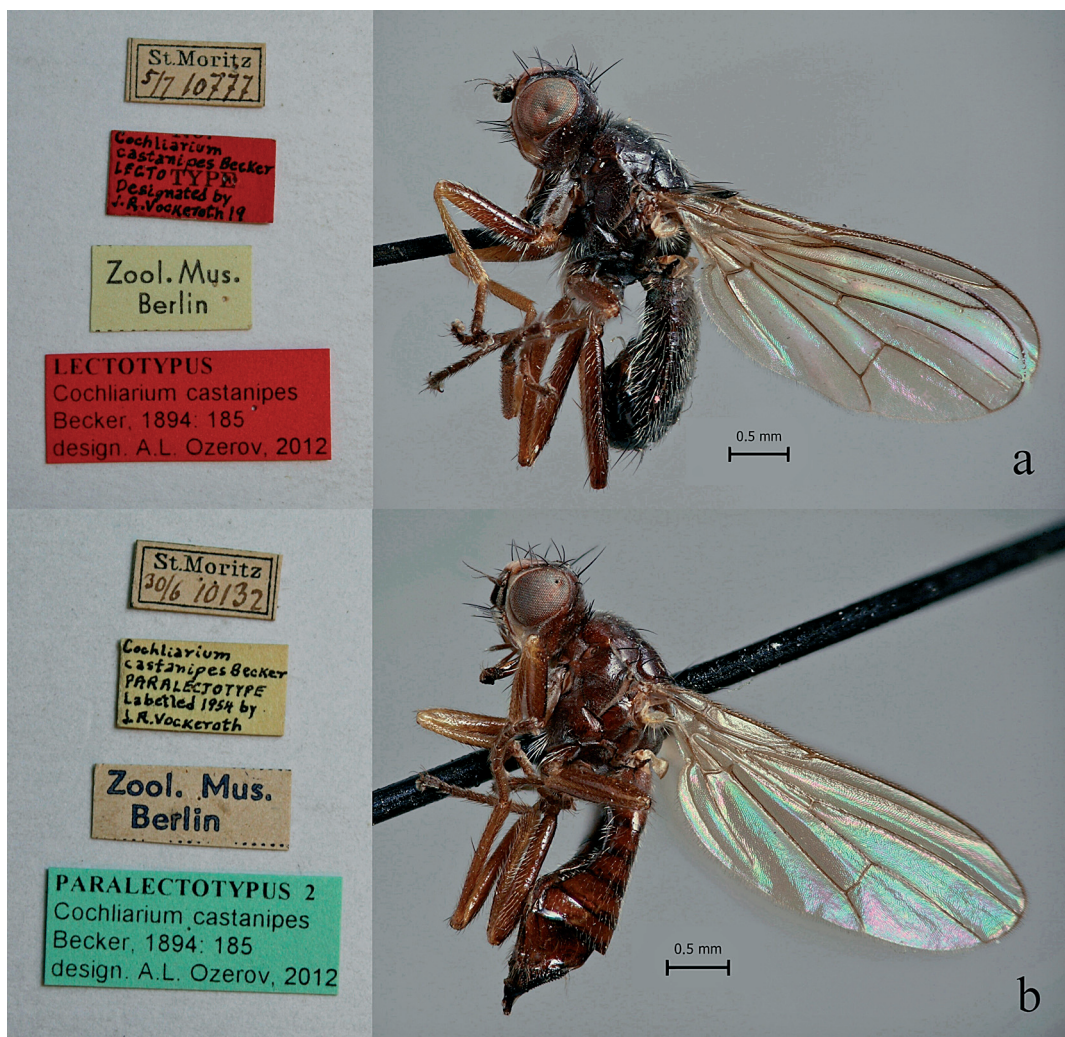


Fig. 2. *Gimnomera castanipes* (Becker, 1894). – a. Male lectotype. – b. Female paralectotype.

Nematocera, and Richard Frey who worked with the rest of Diptera. Frey identified a certain specimen as *Microprosopa* Becker, 1894 and made the following notes on it; “a small obviously new species, unfortunately, there is only a damaged specimen at hand” (our translation) and he never described it (Poppius *et al.* 1917: 693).

Luckily, the damages were restricted to somewhat wrinkled wings and the specimen could be selected as the holotype of *G. freyi* sp. n. described below.

Later another male specimen was collected in the willow shrub along the shore of Paturkårså, a small stream on the southern slope of mountain Tarrekaise in 1997 by one of the authors (R.E.).

The female specimen of *Gimnomera freyi* sp. n. was collected by Eerikki Rundgren in one of his three expeditions for studying insects at the Muotkatunturi wilderness area in years 2013–2015. The specimen was collected by a malaise trap on an alpine willow heath (Fig. 1).

### 2.3. Other studied species and specimens

The coordinates used with the newest Finnish findings are given in Finnish National Coordinate System (yhtenäiskoordinaatisto, YKJ) with additional geographical coordinates (Heikinheimo & Raatikainen 1971) are given in square brackets.

The sampling sites of the older collected specimens are not always precise enough to allow full geographical coordinates.

*Gimnomera castanipes* (Becker, 1894). The studied type specimens were the lectotype male (Fig. 2a) St. Moritz, and paralectotype 2, a female (Fig. 2b) St. Moritz [Switzerland] (see Fig. 2a, b for additional label information). The paralectotype 1, a male (St. Moritz), was also studied but not photographed (all deposited in MNB).

*Gimnomera sibirica* (Engelmark, 1999). We studied the male holotype, labeled Russia, Wrangel Island, 70°58' N 179°34' E, 23.–24.VII.1994, S.-A. Bengtson leg., and the male paratype Russia, delta of Indigirka river, Lopatka, 71°36' N 148°15' E, 14.–15.VII.1994, S.-A. Bengtson leg. (in MZLU).

*Gimnomera dorsata* (Zetterstedt, 1838). A male, collected from Finland: *Le* : Enontekiö, Jogasjärvi, 76860:2806 [69°09'59" N, 21°27'55" E], 11.–16.VII.2007 by R. Jussila, was used for the drawing of the genitalia. The photo of the female terminalia was taken of a similarly labeled specimen. Both specimens are deposited in AHPC.

*Gimnomera hirta* Hendel, 1930. A male from Finland: *Lkor* : Pelkosenniemi, 7453290: 35380-68 [67°09'58"N, 27°52'29" E], 31.VII.–29.IX.2015 by J. Salmela (in ZMUT), was used for the drawing of the genitalia. The photo of the female of terminalia was taken from a specimen collected from Finland: *Ok* : Suomussalmi, Hossa, 72635:36188 [65°26'43"N, 29°33'33"E], 30.VI.2011 by A. Haarto (in AHPC).

*Gimnomera tarsea* (Fallén, 1819). A male, collected from Finland: *Ks* : Kuusamo, Porontima, 73487:36083 [66°12'45"N, 29°24'11"E], 11.VII.2010 by A. Haarto (in AHPC), was used for the drawing of the genitalia. The photo of the female terminalia was taken from a specimen collected in Finland: *N* : Tvärminne, Zool. stat. [59°50' N, 23°14' E], 19.VI.1931 by Alex[ander] Luther (in MZH).

*Gimnomera cuneiventris* (Zetterstedt, 1846). A male, collected in Finland: *Le* : Enontekiö, Urtasjoki, 7692:3263 [69°12' N, 21°01' E], 11.VII.2009 by A. Haarto, was used for the drawing of the genitalia. The photo of the female terminalia was taken from a specimen collected in Finland: *Le* : Enontekiö, Jogasjärvi, 76860:2806

[69°09'59" N, 21°27'55" E], 11.–16.VII.2007 by R. Jussila (both in AHPC).

## 2.4. Images, drawings and terminology

Images of the external morphology and the tips of female abdomens were taken using Quick-PHOTO MICRO software vs 3.1 with Deep Focus module, using a Canon EOS 7D MARK II digital camera and a Olympus SZX16 microscope. The images were composed using CombineZP software vs. 2 (Hadley 2010). Most of the drawings of male genitalia were made with the help of a Euromex Novex RZ trinocular microscope and an Olympus C-5050 Zoom digital camera. The photo of the genitalia of the male paratype of *Gimnomera freyi* **sp. n.** was taken with a Nikon SMZ 1000 microscope and a System camera Canon EOS 7D and composed using CombineZP software.

The characters used in the descriptions, drawings and photos employ the terminology used by Šifner (2003).

## 3. Taxonomy

### 3.1. Genus *Gimnomera* Rondani

In addition to *Gimnomera* (*Ozerovia*) *albipila*, there are 17 species of *Gimnomera* known in the Palaearctic region, but only four species of them are earlier known from Fennoscandia (Šifner 2008). These four species, *G. freyi* **sp. n.** (described below) and *G. (O.) albipila* are included into the key below.

*Differential diagnosis.* *Gimnomera* can be separated from other scathophagid genera by a combination of the following characters: Head is short as well as antennae and palps, katepisternum has one bristle, humeral callus is with small black spines anteriorly (humeral callus of *G. incisurata* Malloch, 1920 is without spines), legs are without rows of spines and strong bristles. They have two pair of scutellar bristles (exceptions *G. alanica* (Ozerov, 1999), *G. lasiostoma* (Becker, 1894 with one pair) and *G. mellina* Becker, 1900) and small hairs on apical part of wing vein R<sub>1</sub> (exceptions *G. dorsata*

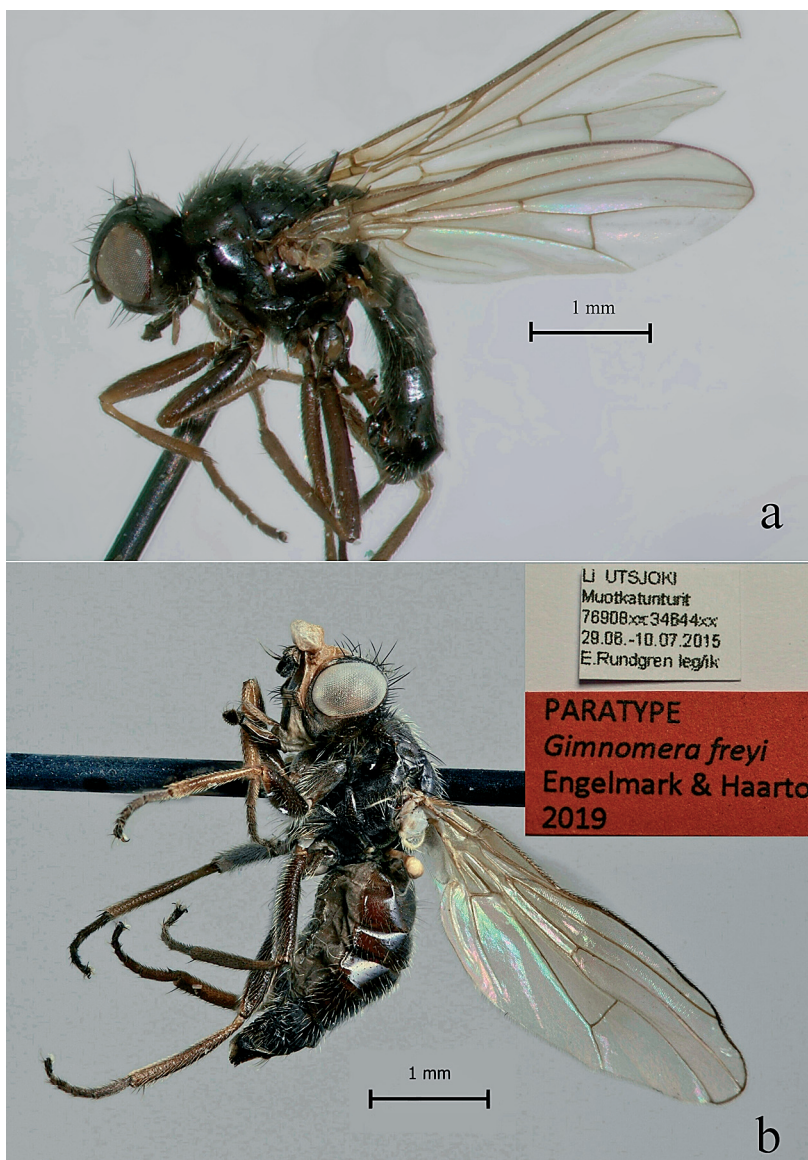


Fig. 3. *Gimnomera freyi* sp. n. – a. Male paratype. – b. Female paratype.

(Zetterstedt 1838) and *G. mellina* Becker, 1900 without small hairs). *Gimnomera* species seem to have quite stable colouration, shape of body and genitalia and the species can be identified reliably.

### 3.2. Description of *Gimnomera freyi* sp. n.

*Type material.* Holotype: Male. Sweden: Lule lappmark: Sarek national park, Kåtokjokk (Gådåkjohkko) [67°10' N, 17°08' E], some 900 m a.

s. l., 22.VII.1907, B. Poppius leg., deposited in NHRM.

Paratype: Male (Fig. 3a). Sweden: Kvikkjokk, Sommarlappa, Paturkårså [67°00'N, 17°23'E] 10.VII.1997, R. Engelmark leg., deposited in REPC.

Paratype: Female (Fig. 3b). Finland: *Li*: Utsjoki, Muotkatunturit, 76908:34644 [69°17'44" N, 26°5'37" E], 29.VI.–10.VII.2015, E. Rundgren leg., deposited in MZH.

*Diagnosis.* The new species, *G. freyi* sp. n., differs by characteristics of its genitalia from the

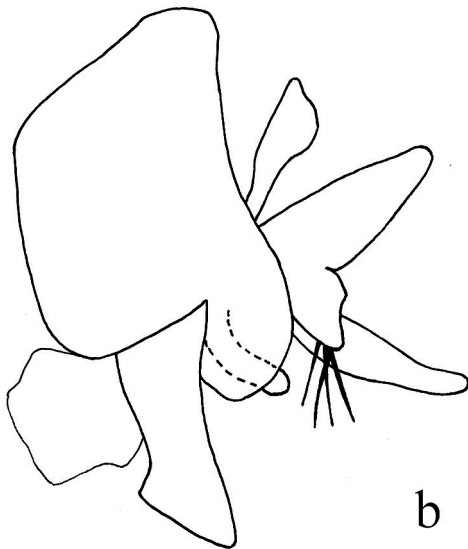


Fig. 4. *Gimnomera freyi* sp. n., epandrium, cerci and surstyli. – a. Dorsal view. – b. Lateral view.

other species of *Gimnomera*. From other Fennoscandian species *G. freyi* sp. n. differs also by the following combination of characters: body dark, two presutural and three (first short) postsutural dorsocentrals and femora dark brown. The combination of these characters are different in the other species.

*Description.* Male. Length: body 3 mm, wing 3 mm.

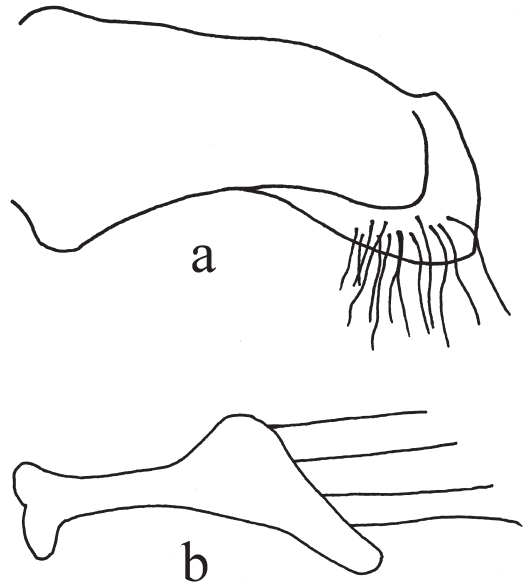


Fig. 5. Pregonites. – a. *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846). – b. *G. freyi* sp. n.

Head. Black, except anterior part of frontal vitta red. Palpus grey. Five black fronto-orbital bristles, two frontal bristles inclinate and orbital bristles mainly lateroclinate. White hairs spread among fronto-orbitals. Inner and outer vertical and ocellar bristles strong, postocellars weak. Dark hairs among ocelli. Upper part of occiput with a thin row of postocular bristles and lower part with whitish hairs. Vibrissae strong with a few sub-vibrissal setulae, one or two only slightly shorter than main vibrissa. Scapus and pedicel reddish black with grey pubescence. First flagellomere black, 1.2 times as long as broad. Arista short, pubescent and thickened in basal third. Second joint of arista as long as wide.

Thorax. Brownish black with light greyish pollinosity and numerous white hairs on scutum. Humeral callus with two black setae, inner one shorter and with short black spines in anterior part. Two presutural dorsocentral setae and three postsutural dorsocentrals, first postsutural pair shorter than others. Two rows of white hairs in acrostichal position. Two notopleurals, one prealar and supra-alar and one presutural intra-alar black bristle. Scutellum with two pairs of strong black erect bristles. Proepisternum with white hair-like bristles and proepimeron with a white or black seta. Proepisternal depression with white

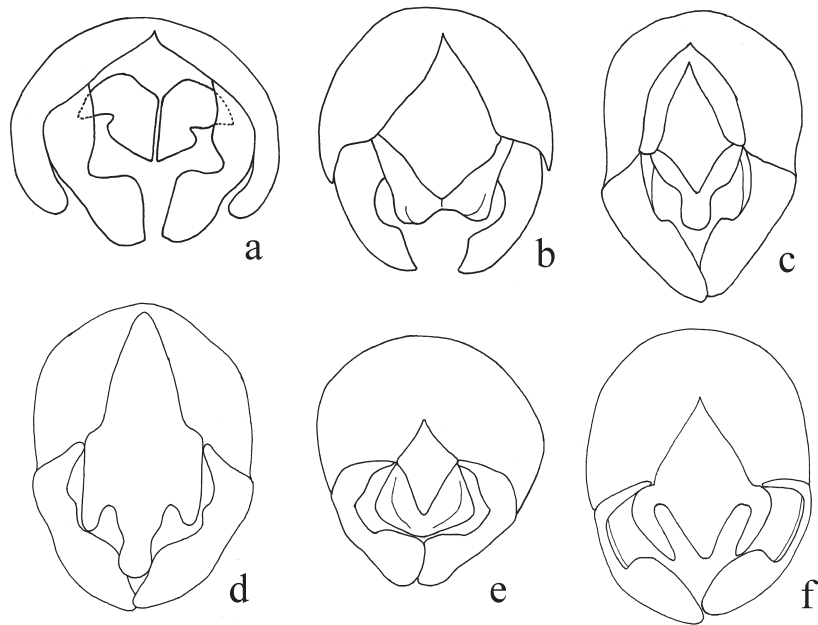


Fig. 6. Epandrium, cerci and surstyli, dorsal view. – a. *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846). – b. *G. freyi* sp. n. – c. *G. cuneiventris* (Zetterstedt, 1846). – d. *G. dorsata* (Zetterstedt, 1838). – e. *G. hirta* Hendel, 1930. – f. *G. tarsea* (Fallén, 1819).

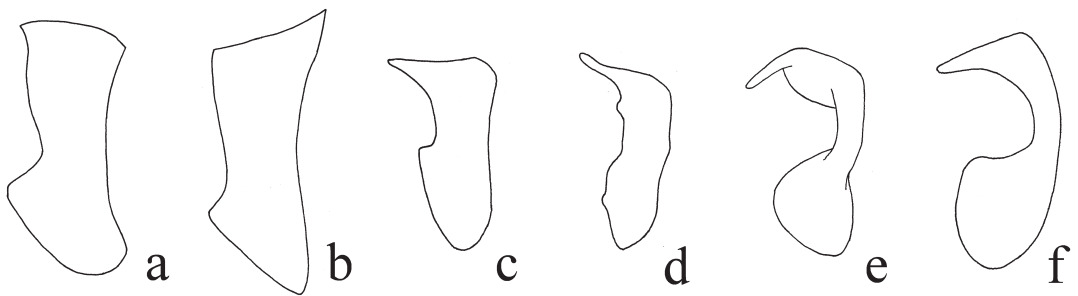


Fig. 7. Surstyli, lateral view. – a. *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846). – b. *G. freyi* sp. n. – c. *G. cuneiventris* (Zetterstedt, 1846). – d. *G. dorsata* (Zetterstedt, 1838). – e. *G. hirta* Hendel, 1930. – f. *G. tarsea* (Fallén, 1819).

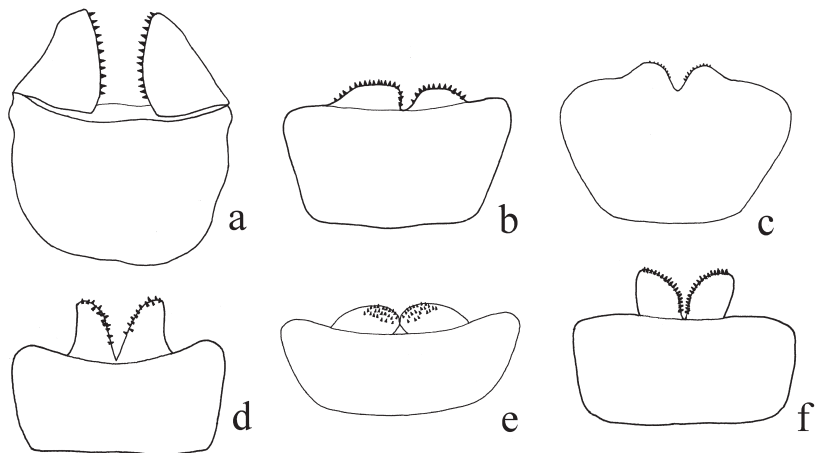


Fig. 8. 5<sup>th</sup> sternite of male. – a. *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846). – b. *G. freyi* sp. n. – c. *G. cuneiventris* (Zetterstedt, 1846). – d. *G. dorsata* (Zetterstedt, 1838). – e. *G. hirta* Hendel, 1930. – f. *G. tarsea* (Fallén, 1819).

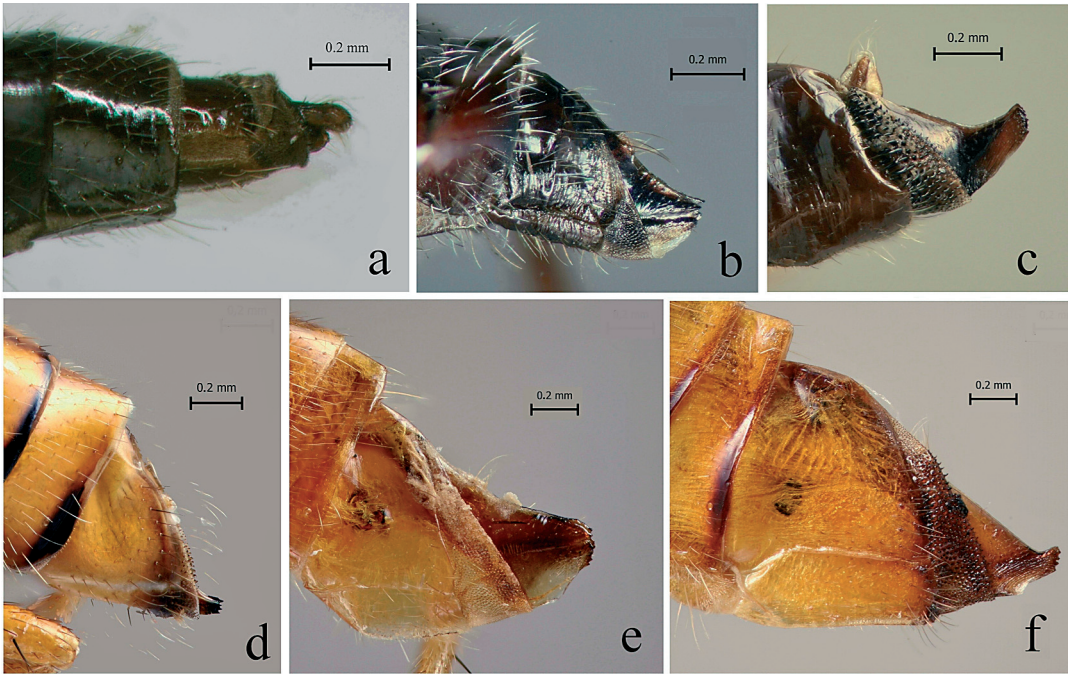


Fig. 9. Terminalia of female abdomen, lateral view. – a. *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846). – b. *G. freyi* sp. n. – c. *G. cuneiventris* (Zetterstedt, 1846). – d. *G. dorsata* (Zetterstedt, 1838). – e. *G. hirta* Hendel, 1930. – f. *G. tarsea* (Fallén, 1819).

hairs. Anepisternum with white setae along posterior margin, only uppermost one or two black and with white hairs in posterodorsal area. Katepisternum with one long black bristle in upper posterior corner and several white hairs. Anepimeron with a few white hairs in lower part. Calypters small, whitish yellow with whitish hairs at rim. Halteres yellowish with darker knob

Legs with all coxae and femora brown, tibiae dirty yellow like tarsi. All tibiae with a weak dorsal preapical seta and mid femur with a posterodorsal preapical seta.

Wings clear with brownish veins. Wing vein  $R_1$  with a few hairs in apical part.

Abdomen. Black with white hairs and no bristles on pregenital segments.

Genitalia: Cerci knob-like (Figs. 4a, b and 6b), surstyli (Figs. 4b, 6b and 7b) and pregonite with four bristles (Fig. 5b). 5<sup>th</sup> sternite nearly square with two small lobes with short spines caudally (Fig. 8b).

Female. As male, except: Length: body 3.5 mm, wing 3.5 mm. Head: Frontal vitta, face and genae yellow. Palpus yellowish. First flagellomere 1.3 times as long as broad. Thorax: Halteres

pale yellow. Legs: Tarsi darker than tibiae. Genitalia: Sternite 7 covered densely with very short spines and terminalia with a laterally compressed and pointed ovipositor (Fig. 9b).

*Etymology.* We name this species in honour of the well-known late Finnish dipterologist Richard Frey.

### 3.3. Description of *Gimnomera* subgenus *Ozerovia* subg. nov.

Type species: *Cordilura albipila* Zetterstedt, 1846

*Cordilura albipila* Zetterstedt, 1846: 2021  
*Cochliarium albipila* (Zetterstedt, 1846): Becker, 1894: 185

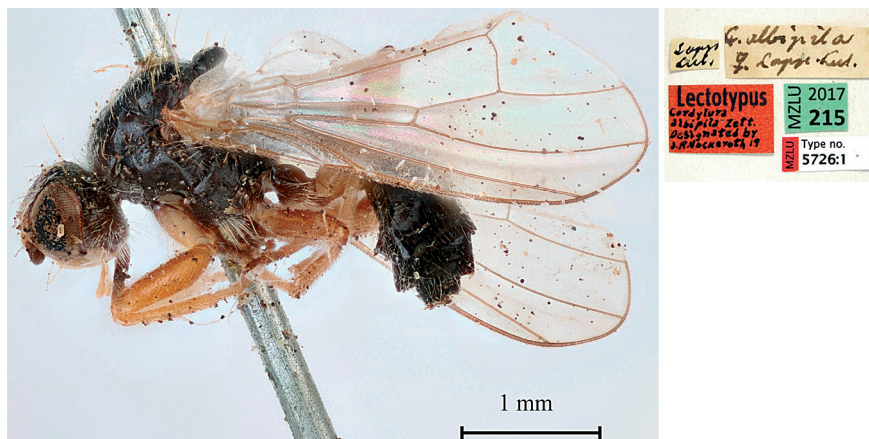
*Gimnomera albipila* (Zetterstedt, 1846): Šifner, 2003: 32

*Microprosopa lucida* Becker, 1900: 53

*Diagnosis.* The subgenus *Ozerovia* differs from other *Gimnomera* (including *Cochliarium*) by a combination of several characters, most importantly by the lack of the small black spines on the anterior part of the humerus, the number of



Fig. 10. *Gimnomera* (*Ozerovia*) *albipila* (Zetterstedt, 1846), female lectotype. Labels are mounted to the figure. Photos: Biological museum, Lund.



fronto-orbital bristles and the presence of a postsutural intra-alar bristle. Then subgenus *Ozerovia* has the above-mentioned characters in common with the genus *Langechristia* (Ozerov, 1999). That genus includes three species in the Far East, but they are familiar to us only by literature and illustrations (Ozerov, 1999, p. 510–512). The genitalia, however, differ considerably between the two genera and especially the female terminalia of *Langechristia* are more like those of other *Gimnomera*. Segment 7 of *Ozerovia* female is laterally compressed and the hypoproct and cerci are displaced dorsally. Segment 8 has the tergite divided into a pair of lateral sclerites fused to the pair of sclerites of the 8<sup>th</sup> sternite forming the terminal part of the ovipositor with a dentated or serrated point, while *Langechristia* has the tergite divided to a pair of lateral sclerites fused to a pointed ovipositor. Both genera have the membrane between segment 7 and 8 enlarged and covered with small spines. Cerci of *Ozerovia* male are divided into two parts and large lateral lobes are connected narrowly to posterior corners of sternite 5 whereas cerci of *Langechristia* are in one part and lobes are connected compactly to sternite 5.

**Description.** Head with 4–5 frontals and 3 orbitals. Anterior part of humerus without black spines. One presutural dorsocentral seta and two postsutural dorsocentral setae, presutural pair shorter than other. Male cerci divided into two parts and sternite 5 with large lobes only narrowly connected to posterior corners of sternite 5. Female terminalia with retractile tubular structure, sternite 7 deeply cleft and sternite 8 transformed

to two sharp projections, Epiproct, hypoproct and cerci with a caudal position. Additional characters included below in the redescription of *Gimnomera albipila* (Zetterstedt, 1846).

**Etymology.** We name the subgenus *Ozerovia* in honour of the well-known dipterologist Andrey Ozerov, who has especially studied the tribe Gimnomerini in the family Scathophagidae. The name is to be considered as feminine.

### 3.4. Redescription of *Gimnomera* (*Ozerovia*) *albipila* Zetterstedt, 1846

**Type material.** Type locality: Sweden, Lapponia Lulensi ad Qvickjock [= Lule Lappmark, Kvikkjock]. Top of the mountain Snjerak, [66°95'00" N, 17°79'12" E], about 800 m a. s. l.

Studied types: Lectotype, female in MZLU, 27.VI.–14.VII.1843, Boheman and Andersson leg. The specimen was studied and labelled as the lectotype by Vockeroth but the designation was never published (Fig. 10). We here designate the same specimen as the lectotype in order to fix the name.

**Paralectotypes:** The three remaining female specimens are conspecific with the lectotype and with the same collecting data and are thus labelled paralectotypes.

**Other material studied.** Male, Finland: *Li*: Utsjoki, Välimaa, 7768185:3518777 [69°59' 27"N, 27°29' 14"E], 14.VI.–13.VII.2016, J. Salmela leg., malaise-trap (AHPC). Female, Sweden: *Nb*: Lu. l. Sommarlappa (REPC). Female, Finland: *Le* : Enontekis, [Kilpisjärvi, Leutsu-

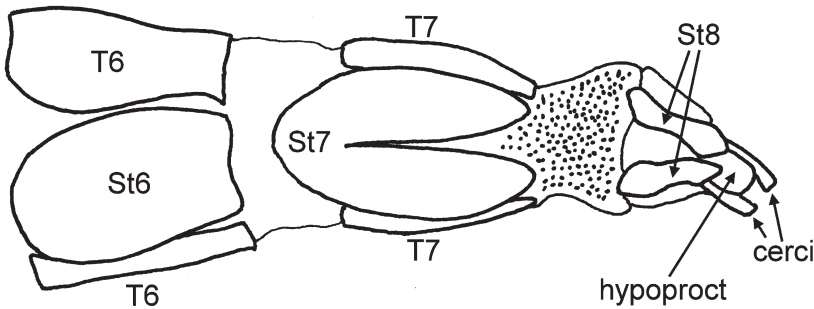


Fig. 11. *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846). Terminalia of female abdomen, ventral view. T = tergite, St = Sternite.

vaara 68°55' N, 20°55' E, 15.VIII.1867], Palmén leg. (MZH). Female, Finland: Pallastunturi, Vatikuru stranden [66°03' N, 24°03' E], 7.VII.1943, R. Frey leg. (MZH). Five females, Sweden: *Nb*: Sarek area, 1 [67°08' N, 17°35' E], 29.VI.–14.VII.1907, B. Poppius leg. (as *Microproposa lucida* Becker) (NHRM). Male, Sweden: *Nb*: Sarek, [67°08' N, 17°35' E], 29.VI.–14.VII.1907, B. Poppius leg. (as *Microproposa lucida* Becker) (MZH).

The holotype female of *Microproposa lucida* Becker from Russia, Kantaika was not now available, but was earlier studied by R. E.

*Description of male and redescription of female.* Since all types are females, we have selected males and some well-preserved females to get a better diagnostic basis for the redescription and illustrations. The female has rather a thin cuticle and in dry mounted specimens the abdomen is often flattened and distorted.

**Head.** Black with yellow face and genae, frontal vitta anteriorly yellow and yellowish area often narrowly reaching ocellar triangle. All setae on head yellow, two ocellars, two small post-ocellars, two inner and two outer verticals, 4–5 inclinate frontals and 3 orbitals, 2 proclinate and uppermost laterocline. A short row of post-ocular setae in upper part of occiput. Lower part of occiput, postgena and gena with yellow hairs. One vibrissa and a row of pseudovibrissae. Scapus and pedicel bright yellow and first flagellomere brown with a rounded upper corner. Arista brown, pubescent and thickened in basal third. Arista, including hairs, as thick as its basal part. Second joint of arista as broad as long. Palps yellow, slightly broadening towards apex with short yellowish setae.

**Thorax.** Dark brown or black with white hairs, slightly glossy on scutum and with thin

grey pollinosity on lateral sides. All setae yellow. 1+2 pairs of dorsocentrals, presutural setae small, hardly detectable among hairs. Hindmost post-sutural pair strong. No prescutellars. Two small yellow setae on anterior margin of scutum (scapular setae). Humeral callus with only one seta, in posterior position, and numerous hairs. Two notopleurals, one presutural and one postsutural intra-alar, two supra-alar and two postalar. Proepisternum and proepimeron with a hair-like yellow bristle. Proepisternal depression with white hairs. Anepisternum with a few setae along posterior margin and with hairs in posteroventral corner. Katepisternum with one strong seta and with several hairs. Anepimeron without hairs. Halteres, including knob, and calypters yellowish with white hairs at rim.

Scutellum with two pairs of setae.

**Legs** yellow, dorsal side of last tarsomeres darker, like second and third pair of coxae. Some specimens with a darker stripe along dorsal side of femora. In addition to preapical small setae and spurs on tibiae, mid tibia with a small pd seta. Hind legs with a preapical pd seta on femur and two setae (ad and pd) on tibiae halfway up. Wings clear with yellowish veins. Wing vein  $R_1$  with hairs in apical third. Anal vein reaching wing margin.

**Abdomen.** Glossy brown to black with white hairs and no bristles.

**Male terminalia:** Sternite 5 with two lateral lobes longer than broad (Fig. 8a). Short cerci and surstylus shown in Fig. 6a. Pregonite laterally flat with hairs apically (Fig. 5a).

**Female terminalia:** Ovipositor with retractile tubular structure, only slightly laterally depressed. Tergite 7 undivided and separated from deeply cleft sternite 7. Sternite 8 transformed into two projections (Fig. 11). Tergite 8 small, undi-

vided and not strongly chitinized. Hypoproct, epiproct and cerci well developed. Three spermathecae developed.

*Notes.* Zetterstedt described *Cordilura albipila* from four female specimens collected in Sweden, Lule Lappmark, Kvikkjokk in 1843. Becker, in his revision of the family Scathophagidae (Scatomyzidae) (1894), included *G. albipila* in his genus *Cochliarium*, because the species has some superficial similarities to *G. cuneiventris*. Becker's description (1894: 185–186) is very brief (it is doubtful if he ever saw the very species), and he refers to Zetterstedt's description 1846 which, however, is mainly based on colour characters and Becker never became aware of the missing humeral spines of *C. albipila*. A few years later, Becker (1899) examined the material collected from Siberia by J. Sahlberg and B. Bergroth and among other species he (op. cit. p. 53) described a female of *Microprosopa lucida* from Kantaika in northern Siberia. In 1917, when Frey examined the Poppius material from the Sarek area, he could identify seven specimens as *Microprosopa lucida* Becker, because he had certainly seen the Siberian material including Becker's type specimen of *M. lucida*, which was deposited in Helsinki (MZH). When Ringdahl (1936: 168) asked NHRM for a loan of *M. lucida* from the Poppius Sarek collection, most of which was deposited in Stockholm, he received two specimens of *Gimnomera cuneiventris*. These were obviously misidentified by Frey, who does not mention any specimens of *G. cuneiventris* in the Sarek material. Ringdahl consequently supposed *M. lucida* was not found in Sweden. Nor did Sack (1937), who in "Die Palaearktischen Fliegen" noted that *C. albipila* and *M. lucida* were the same species. Hackman (1956: 24) was the first to remark that *M. lucida* was "not a *Microprosopa* at all" but a synonym of *C. albipila*.

### 3.5. Key to Fennoscandian species of *Gimnomera*

1 Anterior part of humerus without black spines. Postsutural intra-alar seta present. Male: Cerci divided into two parts (Fig. 6a)

and large lateral lobes connected narrowly to posterior corners of sternite 5 (Fig. 8a). Female: Tip of abdomen slightly compressed laterally and retractile (Fig. 9a).

#### *Gimnomera (Ozerovia) albipila* (Zetterstedt, 1846)

- Anterior part of humerus with black spines. No postsutural intra-alar seta. Male: Cerci in one part. Sternite 5 with a pair of smaller spinous medial projections (Figs. 8b–f). Female: Tip of abdomen with a laterally compressed and pointed solid ovipositor. 2
- 2 Thorax, including pleura, and abdomen black, possibly partly dark brownish. 3
- Pleura yellow. Scutum and abdomen usually yellow or dark (male of *G. dorsata*). 4
- 3 Two presutural and three (first short) postsutural dorsocentrals. Femora dark brown. Male: Cerci apically broad and pointless (Fig. 6b). Surstyli apically pointed (Fig. 7b). Sternite 5 in Fig. 8b. Female: Sternite 7 covered densely with very short spines and terminalia broad and pointed (Fig. 9b).

#### *Gimnomera freyi* sp. n.

- Scutum with short greyish hairs, dorsocentrals not differentiated. Femora yellow. Male: Cerci apically narrowly rounded (Fig. 6c). Surstyli apically rounded (Fig. 7c). Sternite 5 in Fig. 8c. Female: Sternite 7 covered densely with strong spines and terminalia apically narrow (Fig. 9c).

#### *Gimnomera cuneiventris* (Zetterstedt, 1846)

- 4 Vein R1 without hairs. Scutum yellow and dorsally usually blackish. Pleura yellow. Male: Abdomen dark. Cerci with two shallow notches (Fig. 6d). Surstyli apically slightly broadened (Fig. 7d). Lobes of 5<sup>th</sup> sternite long (Fig. 8d). Female: Abdomen yellow. Sternite 7 covered densely with very short spines and terminalia apically narrow (Fig. 9d).

#### *Gimnomera dorsata* (Zetterstedt, 1838)

- Apical part of vein R1 with a few hairs. Scutum, pleura and abdomen yellow. Male: Surstyli apically distinctly broadened (Figs. 7e, f). 5
- 5 First flagellomere yellow. Tarsi yellow. Anepimeron with hairs. Male: Cerci apically broad and pointless (Fig. 6e). Surstyli in Fig. 7e. Lobes of 5<sup>th</sup> sternite short oval (Fig. 8e).

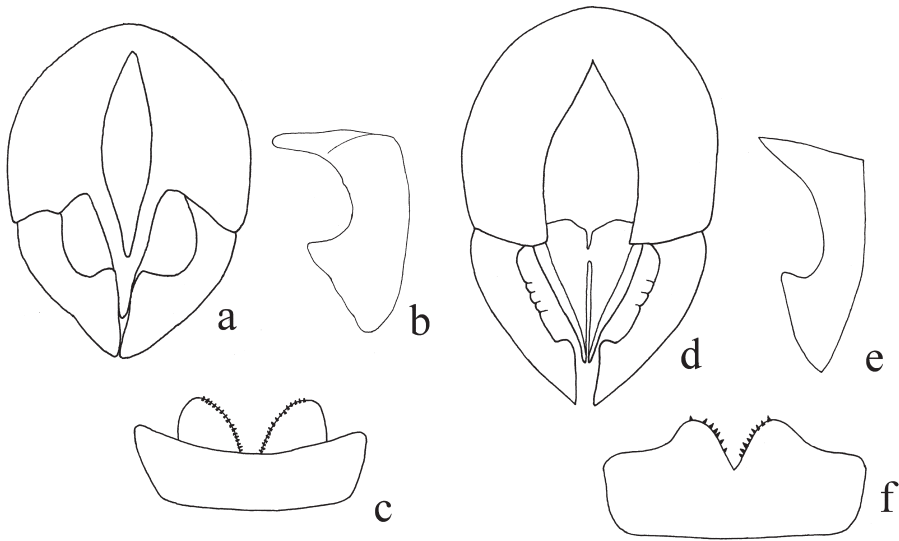


Fig. 12. Epandrium, cerci and surstyli, dorsal view. – a. *Gimnomera castanipes* (Becker, 1894). – d. *G. sibirica* (Engelmark, 1999). Surstyli, lateral view. – b. *G. castanipes*. – e. *G. sibirica*. 5<sup>th</sup> sternite of male. – c. *G. castanipes*. – f. *G. sibirica*.

Female: Sternite 7 covered densely with very short spines and terminalia broad (Fig. 9e).

*Gimnomera hirta* Hendel, 1930

- First flagellomere black. Tarsi black. Anepimeron bare. Male: Cerci with two deep notches (Fig. 6f). Surstyli in Fig. 7f. Lobes of 5<sup>th</sup> sternite long (Fig. 8f). Female: Sternite 7 covered densely with strong spines and terminalia apically narrow (Fig. 9f).

*Gimnomera tarsea* (Fallén, 1819)

#### 4. Discussion

Besides the six species recorded from Fennoscandia, another seven species of *Gimnomera* are known from the Palaearctic region (Šifner 2008) and Vockeroth (1987) mentions five *Gimnomera* spp. from the Nearctic area.

The following species are distributed in Central Europe: *Gimnomera castanipes* Becker, 1894, *G. lasiostoma* Becker, 1894 (the only species within the genus with only one pair of scutellar bristles), *G. alpina* Šifner, 2003, *G. slovacca* Šifner, 2003, and *G. tatica* Šifner, 2003 (for descriptions and key, see Šifner 2003: 32–36). Of the *Gimnomera* species occurring in Fennoscandia, *G. tarsea*, *G. dorsata* and *G. cuneiventris* are boreo-montane species also known

from Central Europe. Taxa recently described or with retrieved status in the Eastern Palaearctic area are *Gimnomera mellina* Becker, 1900, *G. alanica* (Ozerov, 1999), *G. tukuringra* (Ozerov, 1999), *G. sibirica* (Engelmark, 1999), *G. novgorodovae*, Ozerov, 2006, *G. sorokinae* Ozerov, 2006, *G. kirgizica* Ozerov, 2008 and *G. montana* Ozerov & Krivosheina, 2013. To date, altogether 18 species of *Gimnomera* have been recorded from the entire Palaearctic area.

*Gimnomera sibirica* and *G. castanipes* are species, which could possibly be found in Fennoscandia. Both are dark species and can only be mixed with *G. freyi* sp. n. and *G. cuneiventris* of the Fennoscandian *Gimnomera* species. *Gimnomera sibirica* and *G. castanipes* can easily be differentiated by their well-developed dorsocentrals from *G. cuneiventris*, which lacks the dorso-central setae.

*Gimnomera sibirica* is rather similar with *G. freyi* sp. n. The male genitalia of these species, however, are distinctly different. The cerci of *G. sibirica* are apically narrow (Fig. 12d) whereas they are apically broad and pointless in *G. freyi* sp. n. (Fig. 6b).

Genitalia of the Central European *G. castanipes* (Becker, 1894) are very similar to *G. sibirica*. Both species have the shape of surstyli quite similar, but the surstyli of *G. castanipes* are rela-

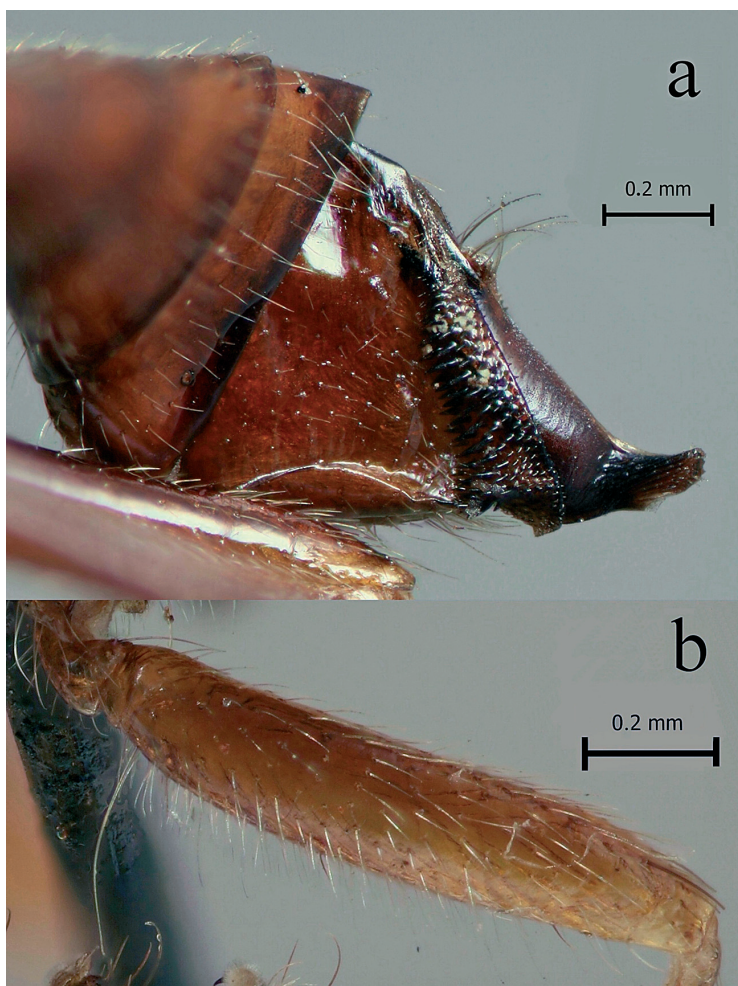


Fig. 13. *Gimnomera castanipes* (Becker, 1894). – a. Terminalia of female abdomen, lateral view. – b. Right front femur of male, posterior view.

tively broader and shorter (Fig. 12b) than those of *G. sibirica* (Fig. 12e). The shape of cerci are quite similar, too, but cerci of *G. castanipes* are fused completely (Fig. 12a) while the cerci of *G. sibirica* are fused only partly (Fig. 12d). The structures of the lobes of 5<sup>th</sup> sternites are also slightly different (Fig. 12c, f). Terminalia of *G. sibirica* female are not known, but those of *G. castanipes* female are shown in Fig. 13a. These species differ distinctly in the structure of the dorsocentral setae. *Gimnomera sibirica* has two presutural dorsocentral setae and three postsutural dorsocentrals of which the first postsutural pair is shorter than the other pairs, whereas *G. castanipes* has short dark dorsocentral setae anterior to the suture and long black dorsocentral setae in front of the scutellum and two additional short and indistinct brownish dorsocentral setae in

front of and six ones behind the suture. Both sexes of *G. castanipes* have also exceptionally long whitish tuft of hairs at the base of all femora (Fig. 13b).

It has been to a large extent misleading that both Latin and vernacular names of the family Scathophagidae have referred to dung. Actually, only few scathophagids live in dung, instead, the larvae of most species are phytophagous. The larvae may also be predatory in later developmental stages. The imagoes are predators of smaller Diptera, including other Scathophagidae species.

The ecology of *Gimnomera* is not well-known, but the larval host plants are known for some species, which feed in seed capsules of the family Scrophulariaceae, e.g. *Gimnomera tarsea* in *Pedicularis palustris* (Chandler 1975), *G. dorsata* in *Bartsia alpina* and *Pedicularis alpina*

(Molau *et al.* 1989) and *G. hirta* in *Pedicularis sceptrum-carolinum* (Rydén 1933).

The type locality of *G. hirta* is Åre, Jämtland, Sweden and that of *G. dorsata* northern Norway. The type materials of both *G. albipila* and *G. cuneiventris* were collected on the small mountain Snjäräk (about 800 m a. s. l.) close to Kvikkjokk in Swedish Lapland in the summer 1843 by Carl Henrik Boheman, Peter Wahlberg and Nils Johan Andersson. All Fennoscandian species, except *G. tarsea* and *G. dorsata*, are rare and few specimens have been collected in modern time, despite the use of traps and searches in the type localities. In comparison with older museum material, a possible population decline should be assessed in all Fennoscandian species. *Gimnomera freyi* sp. n. is obviously especially rare, recorded only three times during a century.

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