

On the Psocodea (Insecta) of Sakar Mts (SE Bulgaria): new records and published data

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Abstract. This study reports 20 new species records of Psocodea (Insecta) from the Sakar Mountains (SE Bulgaria), raising the total known fauna to 23 species. Collected across various habitats (2017–2022), the data establish strong microhabitat associations. Species of Liposcelididae and Trogiidae were primarily found in dry bark and detritus (*Pinus nigra*, *Quercus* sp.). Widespread species (*Graphopsocus cruciatus*, *Ectopsocus petersi*) utilized a broad host range of dry branches with leaves. Several species were associated with lichen-covered branches.

Key words: biodiversity, insects, Balkan Peninsula.

Introduction

The knowledge of the psocids (Insecta: Psocodea) from the Sakar Mountains is scarce. Only two papers by the author have been published, reporting a total of three species: *Liposcelis bostrychophila* Badonnel, 1931 (Georgiev 2017), *Mesopsocus helveticus* Lienhard, 1977, and *Hyalopsocus contrarius* (Reuter, 1893) (Georgiev 2022).

In the present paper, 20 additional psocid species are reported from the area, along with new localities for two of the previously recorded species.

Material and Methods

Barkflies were collected by the author irregularly between 2017 and 2022 from different habitats and localities of the Sakar Mountains. Sieving of leaf litter and beating the vegetation were mainly used. The material was preserved in 96% ethanol and examined in the laboratory. Species identifications were based mainly on Lienhard (1998).

Results

A total of 23 species are known from the Sakar Mountains, from which 20 were new records to the area:

Trogiidae

Cerobasis guestfalica (Kolbe, 1880)

Material examined: 14.11.2021, near Sladun vill., *Pinus nigra* forest, N41 50 58.9 E26 27 04.9, 200 m a.s.l., 1♀, from *P. nigra*, 1♀, from branches of bushes with a lot of lichens, collected by beating the vegetation.

***Lepinotus reticulatus* Enderlein, 1904**

Material examined: 11.11.2021, E of Cherepovo vill., scattered bushes and trees, N42 00 13.2 E26 10 13.4, 405 m a.s.l., 1♀, from detritus *Quercus* sp., collected by sieving; 14.11.2021, near Dimitrovche vill., *P. nigra* forest, N41 48 37.1 E26 15 26.5, 163 m a.s.l., 2♀, from dry and living branches of *P. nigra*, collected by sieving; 21.11.2021, SW of Troyan vill., *Quercus* sp. forest, 1♀, from bark of dead trunk of *Quercus* sp., collected by beating over plastic container; 21.11.2021, near “Malkata Zvezda” winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 1♀, from dry bark of *P. nigra*, collected by sieving; 06.05.2022, between Dobroselets and Chukarovo villages, *P. nigra* forest, N42 09 27.6 E26 21 18.3, 175 m a.s.l., 1♀, from dry bark of *Quercus* sp., collected by beating.

Liposcelididae

***Liposcelis bostrychophila* Badonnel, 1931**

Reported by Georgiev (2017): “30.4.2017, banks of Sokolitsa River near Obruchishte vill., forest of *Salix* sp., *Ulmus* sp., and *Acer negundo*, under bark of dry branches of living *Prunus cerasifera*, N42 08 09.9 E25 57 13.6, 116 m a.s.l., 1♀, coll. by sieving”.

New material examined: 21.11.2021, near “Malkata Zvezda” winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 1♀, from dry bark of *P. nigra*, collected by sieving.

***Liposcelis corrodens* (Heymons, 1909)**

Material examined: 21.11.2021, near “Malkata Zvezda” winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 1♀, from dry bark of *P. nigra*, collected by sieving.

***Liposcelis pearmani* Lienhard, 1990**

Material examined: 06.05.2022, between Dobroselets and Chukarovo villages, *P. nigra* forest, N42 09 27.6 E26 21 18.3, 175 m a.s.l., 1♀, from dry branches with leaves of *P. nigra*, collected by beating the vegetation.

***Liposcelis rufa* Broadhead, 1950**

Material examined: 30.4.2017, banks of Sokolitsa River near Obruchishte vill., forest of *Salix* sp., *Ulmus* sp., and *Acer negundo*, N42 08 09.9 E25 57 13.6, 116 m a.s.l., 1♀, under a bark of dry branches of living *P. cerasifera*, collected by sieving; 11.11.2021, near Izvorovo vill., river bank forest, N41 58 13.0 E26 08 39.1, 255 m a.s.l., 2 ♀, from dry branches with lichen, collected by beating the vegetation.

***Liposcelis silvarum* (Kolbe, 1888)**

Material examined: 21.11.2021, near “Malkata Zvezda” winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 1♀, from dry bark of *P. nigra*, collected by sieving, 3♀, from dry branches with leaves of *P. nigra*, collected by beating the vegetation.

Stenopsocidae

***Graphopsocus cruciatus* (Linnaeus, 1768)**

Material examined: 07.11.2021, NW of Simeonovgrad town, *Quercus* spp. forest, N42 03 54.1 E25 47 44.4, 106 m a.s.l., 2♀, 2♂, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 11.11.2021, near Izvorovo vill., river bank forest, N41 58 13.0 E26 08 39.1, 255 m a.s.l., 1♀, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 11.11.2021, E of Cherepovo vill., scattered bushes and trees, N42

00 13.2 E26 10 13.4, 405 m a.s.l., 1♂, 3♀, found dead, collected by brush; 11.11.2021, near Glavan vill., *Cedrus* sp. plantation, N42 03 39.6 E26 07 03.1, 426 m a.s.l., 4♀ from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 11.11.2021, W of Matsa vill., *Pinus nigra* and *Quercus* sp. forest, N42 12 56.3 E26 08 38.1, 220 m a.s.l., 1♂, from dry branches with leaves of *Acer tataricum*, collected by beating the vegetation; 21.11.2021, N of Ovcharovo vill., small wood along a stream, N42 00 55.5 E25 59 22.7, 142 m a.s.l., 1♀, from *Quercus* sp., collected by beating the vegetation; 21.11.2021, NW of Ovcharovo vill., *Quercus* sp. forest, N42 01 30.9 E25 58 14.5, 186 m a.s.l., 3♀, from *Quercus* sp., collected by beating the vegetation; 21.11.2021, E of Harmanli town, E bank of Maritsa River, river bank forest (*Populus alba*, *Salix* sp.), N41 55 48.0 E25 55 56.8, 78 m a.s.l., 2♀, from dry branches with leaves, collected by beating the vegetation; 21.11.2021, SW of Troyan vill., bushes and trees along stream, N42 02 35.0 E25 52 43.9, 80 m a.s.l., 1♀, from dry leaves of *Humulus lupulus*, collected by beating the vegetation; 06.05.2022, between Dobroselets and Chukarovo villages, *P. nigra* forest, N42 09 27.6 E26 21 18.3, 175 m a.s.l., 1♂, from dry branches with leaves of *P. nigra*, collected by beating the vegetation; 04.06.2022, W of Tundzha River, near Kolhida Hut, *Quercus* sp., *P. nigra*, *Robinia pseudoacacia* forest, N42 04 43.3 E26 30 39.0, 72 m a.s.l., 1♂, from *Quercus* sp., collected by beating the vegetation.

Amphipsocidae

***Kolbia quisquiliarum* Bertkau, 1882**

Material examined: 07.11.2021, NW of Simeonovgrad town, *Quercus* spp. forest, N42 03 54.1 E25 47 44.4, 106 m a.s.l., 1♀, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 07.11.2021, E of Svirkovo vill., bushes near a pond and pine forest, N42 01 19.1 E25 56 24.5, 168 m a.s.l., 1♂, collected by beating the vegetation.

Lachesiliidae

***Lachesilla bernardi* Badonnel, 1938**

Material examined: 06.05.2022, near Sinapovska Reka River at Chukarovo village, tall grasses and scrubs, N42 09 07.7 E26 23 36.1, 132 m a.s.l., 1♂, 1♀, from dry *Dipsacus* sp., collected by beating the vegetation; 03.06.2022, near Sinapovska River at Sinapovo vill., bushes and trees, N42 07 42.0 E26 27 14.0, 66 m a.s.l., 1♀, from dry branches with leaves of *Populus alba*, collected by beating the vegetation; 04.06.2022, W of Tundzha River, near Kolhida Hut, *Quercus* sp., *P. nigra*, *Robinia pseudoacacia* forest, N42 04 43.3 E26 30 39.0, 72 m a.s.l., 1♂, 2♀, from dry pods of *R. pseudoacacia*, collected by beating the vegetation.

***Lachesilla quercus* (Kolbe, 1880)**

Material examined: 07.11.2021, NW of Simeonovgrad town, *Quercus* spp. forest, N42 03 54.1 E25 47 44.4, 106 m a.s.l., 1♀, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 07.11.2021, W of Svirkovo vill., resting area near a spring with various vegetation, N42 02 00.1 E25 54 20.7, 62 m a.s.l., 2♀, 1♂, from dry branches with leaves of *Cupressus* sp., collected by beating the vegetation; 14.11.2021, near Dimitrovche vill., *P. nigra* forest, N41 48 37.1 E26 15 26.5, 163 m a.s.l., 2♀, from dry and living branches of *P. nigra*, collected by beating the vegetation; 06.05.2022, near Sinapovska Reka River at Chukarovo village, tall grasses and scrubs, N42 09 07.7 E26 23 36.1, 132 m a.s.l., 1♀, from dry *Dipsacus* sp., collected by beating the vegetation.

***Lachesilla pedicularia* (Linnaeus 1758)**

Material examined: 14.11.2021, E of Svilengrad town, river bank forest, N41 47 30.8 E26 14 58.3, 89 m a.s.l., 1♂, 1♀, from dry leaves of *Sambucus ebulus*, collected by beating the vegetation; 21.11.2021, E of Harmanli town, E bank of Maritsa River, river bank forest (*Populus alba*, *Salix* sp.), N41 55 48.0 E25 55 56.8, 78 m a.s.l., 3♂, 7♀, from dry branches with leaves, collected by beating the vegetation.

Ectopsocidae

***Ectopsocus briggsi* McLachlan, 1899**

Material examined: 11.11.2021, near Glavan vill., *Cedrus* sp. plantation, N42 03 39.6 E26 07 03.1, 426 m a.s.l., 1♀ from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 14.11.2021, E of Shtit vill., bushes near farmland, N41 49 37.7 E26 22 10.0, 220 m a.s.l., 1♂, from dry leaves of *S. ebulus*, collected by beating the vegetation.

***Ectopsocus petersi* Smithers, 1978**

Material examined: 11.11.2021, near Izvorovo vill., river bank forest, N41 58 13.0 E26 08 39.1, 255 m a.s.l., 1♀, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 11.11.2021, near Glavan vill., *Cedrus* sp. plantation, N42 03 39.6 E26 07 03.1, 426 m a.s.l., 2♀ from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 11.11.2021, W of Matsa vill., *Pinus nigra* and *Quercus* sp. forest, N42 12 56.3 E26 08 38.1, 220 m a.s.l., 2♀, from dry branches with leaves of *Pyrus* sp., 1♀ from *Cornus sanguinea*, collected by beating the vegetation; 14.11.2021, E of Svilengrad town, river bank forest, N41 47 30.8 E26 14 58.3, 89 m a.s.l., 1♂, 1♀, from dry leaves of *Sambucus ebulus*, collected by beating the vegetation; 14.11.2021, E of Shtit vill., bushes near farmland, N41 49 37.7 E26 22 10.0, 220 m a.s.l., 2♂, 3♀, from dry leaves of *S. ebulus*, collected by beating the vegetation; 21.11.2021, E of Harmanli town, E bank of Maritsa River, river bank forest (*Populus alba*, *Salix* sp.), N41 55 48.0 E25 55 56.8, 78 m a.s.l., 1♂, 5♀ from dry branches with leaves, collected by beating the vegetation; 21.11.2021, SW of Troyan vill., bushes and trees along stream, N42 02 35.0 E25 52 43.9, 80 m a.s.l., 3♂, 1♀, from dry branches with leaves of *Salix* sp., 1♀, from dry *Eryngium campestre*, collected by beating the vegetation; 06.05.2022, between Dobroselets and Chukarovo villages, *P. nigra* forest, N42 09 27.6 E26 21 18.3, 175 m a.s.l., 7♂, 4♀, from dry branches with leaves of *P. nigra*, collected by beating the vegetation; 03.06.2022, near Sinapovska River at Sinapovo vill., bushes and trees, N42 07 42.0 E26 27 14.0, 66 m a.s.l., 1♂, 2♀, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 04.06.2022, W of Tundzha River, near Kolhida Hut, *Quercus* sp., *P. nigra*, *Robinia pseudoacacia* forest, N42 04 43.3 E26 30 39.0, 72 m a.s.l., 2♀, from dry branches with leaves of *Fraxinus* sp., collected by beating the vegetation.

***Ectopsocus vachoni* Badonnel, 1945**

Material examined: 14.11.2021, near Dimitrovche vill., *P. nigra* forest, N41 48 37.1 E26 15 26.5, 163 m a.s.l., 2♀, from detritus (dry bark and needles) of *P. nigra*, collected by sieving; 21.11.2021, near "Malkata Zvezda" winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 3♀ (1 macropterous, 2 micropterous), from dry branches with leaves of *P. nigra*, collected by beating the vegetation, 2♀ (apterous), from dry bark of *P. nigra*, collected by sieving.

Peripsocidae

***Peripsocus alboguttatus* (Dalman, 1823)**

Material examined: 07.11.2021, NW of Simeonovgrad town, *Quercus* spp. forest, N42 03 54.1 E25 47 44.4, 106 m a.s.l., 1♀, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 07.11.2021, W of Svirkovo vill., resting area near a spring with various vegetation, N42 02 00.1 E25 54 20.7, 62 m a.s.l., 1♀, from dry branches with leaves of *Cupressus* sp., collected by beating the vegetation; 03.06.2022, near Sinapovska River at Sinapovo vill., bushes and trees, N42 07 42.0 E26 27 14.0, 66 m a.s.l., 1♀, from dry branches with leaves of *Ulmus* sp., collected by beating the vegetation.

Elipsocidae

***Cuneopalpus cyanops* (Rostock, 1876)**

Material examined: 11.11.2021, near Glavan vill., *Cedrus* sp. plantation, N42 03 39.6 E26 07 03.1, 426 m a.s.l., 1♂, 2♀ from *Cedrus* sp., collected by beating the vegetation; 11.11.2021, W of Matsa vill., *Pinus nigra* and *Quercus* sp. forest, N42 12 56.3 E26 08 38.1, 220 m a.s.l., 1♂, from dry branches with leaves of *P. nigra*, collected by beating the vegetation; 14.11.2021, near Dimitrovche vill., *P. nigra* forest, N41 48 37.1 E26 15 26.5, 163 m a.s.l., 1♂, 1♀, from dry and living branches of *P. nigra*, collected by beating the vegetation; 14.11.2021, near Sladun vill., *Pinus nigra* forest, N41 50 58.9 E26 27 04.9, 200 m a.s.l., 2♀, from *P. nigra*, collected by beating the vegetation; 21.11.2021, near “Malkata Zvezda” winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 4♂, 1♀, from dry branches with leaves of *P. nigra*, collected by beating the vegetation; 06.05.2022, between Dobroselets and Chukarovo villages, *P. nigra* forest, N42 09 27.6 E26 21 18.3, 175 m a.s.l., 2♂, from dry branches with leaves of *P. nigra*, collected by beating the vegetation.

***Elipsocus hyalinus* (Stephens, 1836)**

Material examined: 14.11.2021, near Sladun vill., *Pinus nigra* forest, N41 50 58.9 E26 27 04.9, 200 m a.s.l., 1♀, from *P. nigra*, collected by beating the vegetation.

***Elipsocus moebiusi* Tetens, 1891**

Material examined: 07.11.2021, NW of Simeonovgrad town, *Quercus* spp. forest, N42 03 54.1 E25 47 44.4, 106 m a.s.l., 2♀, 1♂, from dry branches with leaves of *Quercus* sp., collected by beating the vegetation; 07.11.2021, E of Svirkovo vill., bushes near a pond and pine forest, N42 01 19.1 E25 56 24.5, 168 m a.s.l., 4♀, collected by beating the vegetation; 11.11.2021, E of Cherepovo vill., scattered bushes and trees, N42 00 13.2 E26 10 13.4, 405 m a.s.l., 1 ♀, found dead, collected by brush; 14.11.2021, N of Mladinovo vill., bushes near a road, N41 57 07.5 E26 13 53.6, 360 m a.s.l., 2♀, from branches of bushes with a lot of lichens, collected by beating the vegetation.

***Hemineura dispar* Tetens, 1891**

Material examined: 11.11.2021, near Izvorovo vill., river bank forest, N41 58 13.0 E26 08 39.1, 255 m a.s.l., 1♂, 1♀, from dry branches with lichen, collected by beating the vegetation; 11.11.2021, E of Cherepovo vill., scattered bushes and trees, N42 00 13.2 E26 10 13.4, 405 m a.s.l., 1♂, 1♀, from *Quercus* sp., collected by beating the vegetation; NW of Ovcharovo vill., *Quercus* sp. forest, N42 01 30.9 E25 58 14.5, 186 m a.s.l., 1♀, from *Quercus* sp., collected by beating the vegetation; 21.11.2021, near “Malkata Zvezda” winery, *P. nigra* and *Cedrus* sp. forest, N41 58 10.5 E25 59 54.2, 227 m a.s.l., 4♂, 3♀, from dry branches with leaves of *P. nigra*, collected by beating the vegetation.

Hemineura sp.

Material examined: 14.11.2021, near Sladun vill., *Pinus nigra* forest, N41 50 58.9 E26 27 04.9, 200 m a.s.l., 1♂, from branches of bushes with a lot of lichens, collected by beating the vegetation; 14.11.2021, N of Mladinovo vill., bushes near a road, N41 57 07.5 E26 13 53.6, 360 m a.s.l., 1♂, from branches of bushes with a lot of lichens, collected by beating the vegetation.

Mesopsocidae

***Mesopsocus helveticus* Lienhard, 1977**

Reported by Georgiev (2022): “14.11.2021, E of Shtit vill., bushes near farmland, N41 49 37.7 E26 22 10.0, 220 m a.s.l., 1♀, from dry leaves of *S. ebulus*, collected by beating the vegetation; 14.11.2021, N of Mladinovo vill., bushes near a road, N41 57 07.5 E26 13 53.6, 360 m a.s.l., 1♀, from branches of bushes with a lot of lichens, collected by beating the vegetation.”

New records: 04.06.2022, W of Tundzha River, near Kolhida Hut, *Quercus* sp., *P. nigra*, *Robinia pseudoacacia* forest, N42 04 43.3 E26 30 39.0, 72 m a.s.l., 1♀, from *Quercus* sp., collected by beating the vegetation.

Mesopsocus sp.

Material examined: 06.05.2022, near Sinapovska Reka River at Chukarovo village, tall grasses and scrubs, N42 09 07.7 E26 23 36.1, 132 m a.s.l., 2 nymphs, from dry branches of *Populus* sp. with lichens, collected by beating the vegetation.

Psocidae

***Amphigerontia contaminata* (Stephens, 1836)**

Material examined: 07.11.2021, E of Svirkovovo vill., bushes near a pond and pine forest, N42 01 19.1 E25 56 24.5, 168 m a.s.l., 1♂, collected by beating the vegetation; 03.06.2022, near Sinapovska River at Sinapovo vill., bushes and trees, N42 07 42.0 E26 27 14.0, 66 m a.s.l., 1♂, from *Crataegus* sp., 1♀, from *Prunus spinosa*, collected by beating the vegetation.

***Hyalopsocus contrarius* (Reuter, 1893)**

Reported by Georgiev (2022): 14.11.2021, N of Mladinovo vill., bushes near a road, N41 57 07.5 E26 13 53.6, 360 m a.s.l., 1♀, from branches of bushes with a lot of lichens, collected by beating the vegetation.

Species belonging to the families Trogiidae (e.g., *Lepinotus reticulatus*), Liposcelididae (e.g., *Liposcelis corrodens*, *L. silvarum*), and Ectopsocidae (*Ectopsocus vachoni*) were recorded primarily from dry bark, detritus, and needles of *Pinus nigra* and *Quercus* sp. Conversely, the most widely distributed species, such as *Graphopsocus cruciatus* and *Ectopsocus petersi*, were found on dry branches with leaves of a broad spectrum of host plants. These included *Quercus* sp., *P. nigra*, *Salix* sp., *Populus alba*, *Acer tataricum*, *Pyrus* sp., and *Cornus sanguinea*, suggesting high ecological plasticity. Several species, including *Cerobasis guestfalica*, *Elipsocus moebiusi*, *Hemineura dispar*, and *Hyalopsocus contrarius*, show a notable association with lichen-covered branches.

Specific associations were established for *Cuneopalpus cyanops* on *Cedrus* sp. and *Pinus nigra*, as well as for *Lachesilla* species, which were frequently linked to woody debris

and dead herbaceous plants (*Dipsacus* sp., *Sambucus ebulus*, *Humulus lupulus*, *Robinia pseudoacacia* pods).

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