

Ants (Hymenoptera, Formicidae) of Sarnena Sredna Gora Mountains (Bulgaria)

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Abstract. A list of 61 ant species from the Sarnena Sredna Gora Mountains (Bulgaria), based on 32 studied localities is provided. Two morphospecies from each of the *Messor semirufus* group and *Tetramorium caespitum* complex were also found. There have been only two species – *Stigmatomma denticulatum* Roger, 1859 and *Formica pratensis* Retzius, 1783 reported so far from the region, the latter confirmed here. The ant species found in this survey belong to three zoogeographical classes as Euro-Caucasian and Mediterranean zoogeographical elements prevail. Despite the significant increase in the number of recorded species, we expect that their number should be higher in a long-term study.

Key words: faunistic data, new records, insect fauna, Bulgaria

Introduction

The ants (Hymenoptera, Formicidae) in Bulgaria are relatively well studied and about 180 species are known. However, a number of areas in the country remain poorly known or unexplored (Lapeva-Gjonova *et al.* 2010). So far, only two species are known from the Sarnena Sredna Gora Mountains – *Stigmatomma denticulatum* Roger, 1859 and *Formica pratensis* Retzius, 1783 (Gateva 1975; Atanassov & Dlussky 1992). The presence of a variety of natural habitats (Georgiev 2020), especially in the higher parts of the mountain, as well as semi-natural xerothermic habitats in the lower parts, suggests the existence of a rich myrmecofauna.

The aim of the present study is to summarize the results for the ant fauna from short-term ant collections in the area.

Material and Methods

The present study is based on the ant material collected in the period 10.08.-14.08.2020 and on 27.09.2020 from 18 localities in the western and central parts of the mountain. There are also additional data from 14 localities collected on 05.08.2014, 10.06.-12.06.2016, and 19.04.-30.05.2018 (Table 1). The collected material by A. Lapeva-Gjonova and I. Gjonov were identified by A. Lapeva-Gjonova and were deposited in the Sofia University collection (BFUS). Material collected by V. Antonova, T. Ljubomirov, V. Peneva and R. Bańkowska were identified by V. Antonova, unless otherwise noted, and were deposited in IBER's collection, Sofia. Specimens collected by R. Bańkowska (Museum and

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Institute of Zoology, Warsaw) were included but some information for sampling from Kazanlak and Stara Zagora is not available and they are not included in Table 1. The main applied collection method was by hand, but sweeping, Tullgren funnel extraction and Moerike traps (blue, red and yellow) were also used. The following abbreviations in the results are used: for ant castes – q. - queen/s, m. - male/s, w. - worker/s; for collectors – ALG – A. Lapeva-Gjonova, IG – I. Gjonov, RB – R. Bañkowska, TL – T. Ljubomirov, VA – V. Antonova, VP – V. Peneva.

Table 1. Studied localities (in alphabetical order).

locality name	GPS coordinates	altitude	type of habitat / collecting method
Cherganovo vill.	N42.5854 E25.4652	339 m	field with essential oil crops / sweeping
Domlyan dam, near Domlyan vill. 1	N42.5408 E24.9407	369 m	xerothermophilous grassland / hand collecting
Domlyan dam, near Domlyan vill. 2	N42.5408 E24.9407	369 m	the edge of a forest of <i>Carpinus</i> / hand collecting
Hrishteni vill.	N42.4567 E25.7342	211 m	ruderal grassland with trees of <i>Quercus</i> , <i>Carpinus</i> / hand collecting, sweeping
Kalofer (S)	N42.5959 E24.9756	602 m	forest edge of <i>Picea abies</i> (L.) H.Karst. / hand collecting
Kriva krusha vill.	N42.5477 E25.8782	435 m	grassland with single trees of <i>Quercus</i> , <i>Carpinus</i> / hand collecting, sweeping
Momino vill. 1	N42.2919 E24.8805	175 m	oilseed rape (<i>Brassica napus</i> L.) field at the margin of the crop plantation / sweeping
Momino vill. 2	N42.2942 E24.8836	175 m	pasture land next to oilseed rape field / sweeping
Momino vill. 3	N42.2950 E24.8836	175 m	grassland / Tullgren funnel extraction
Mrachenik vill.	N42.5054 E24.9403	577 m	near road, grassland with single trees of <i>Carpinus</i> , <i>Quercus</i> / hand collecting, sweeping
Mrachenik vill., the grave of Hadzhi Dimitar	N42.5177 E24.9877	939 m	forest of <i>Quercus</i> , <i>Carpinus</i> / hand collecting
Novo selo vill.	N42.4867 E25.5102	481 m	xerothermophilous <i>Quercus</i> forest / hand collecting
Pryaporets vill.	N42.4508 E25.521	356 m	xerothermophilous <i>Quercus</i> forest / hand collecting, sweeping
Rozovets vill. 1	N42.4946 E25.0868	1062 m	grassland along a road / hand collecting
Rozovets vill. 2	N42.4975 E25.1105	978 m	along a road, mixed deciduous forest / hand collecting
Rozovo vill.	N42.5722 E25.4132	339 m	field with essential oil crops / sweeping
Sarnevets vill.	N42.4177 E25.3487	411 m	xerothermophilous <i>Quercus</i> forest / hand collecting, sweeping

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Srednogorovo vill.	N42.5207 E25.3363	442 m	along a small river, <i>Ulmus</i> trees / hand collecting, sweeping
Svezhen hut 1	N42.5135 E25.0546	1088 m	grassland among <i>Fagus</i> forest / hand collecting
Svezhen hut 2	N42.5151 E25.0491	1054 m	forest of <i>Picea</i> and <i>Pinus</i> / hand collecting
Svezhen hut 3	N42.5074 E25.0696	1081 m	grassland / hand collecting
Svezhen vill. 1	N42.5077 E25.0003	435 m	grassland near a <i>Quercus</i> forest / hand collecting, sweeping
Svezhen vill. 2	N42.4894 E25.0407	797 m	near a marsh / hand collecting, sweeping
Turiya vill.	N42.5686 E25.1717	460 m	along a small river and <i>Quercus</i> forest / hand collecting
Zelenikovo vill. 1	N42.4168 E25.0796	339 m	field with essential oil crops / sweeping
Zelenikovo vill. 2	N42.3889 E25.0592	289 m	pasture land next to oilseed rape field / sweeping, Moerike trap
Zelenikovo vill. 3	N42.3805 E25.0786	290 m	pasture land next to oilseed rape field / Moerike trap
Zelenikovo vill. 4	N42.3867 E25.0475	281 m	oilseed rape (<i>Brassica napus</i> L.) field at the margin of the crop plantation / sweeping
Zelenikovo vill. 5	N42.3792 E25.0811	288 m	oilseed rape (<i>Brassica napus</i> L.) field at the margin of the crop plantation / sweeping
Zelenikovo vill. 6	N42.3805 E25.0786	290 m	grassland / Tullgren funnel extraction

Results

Subfamily Amblyoponinae

***Stigmatomma denticulatum* Roger, 1859**

Literature data: the slopes of Sredna Gora Mts by Stara Zagora (Atanassov & Dlussky 1992).

Subfamily Ponerinae

***Ponera coarctata* (Latreille, 1802)**

Material examined: Rozovets vill. 1, 12.08.2020, 4 w., leg. ALG; Novo selo vill., 13.08.2020, 1 w., leg. ALG; Sarnevets vill., 14.08.2020, 1 w., leg. ALG; Pryaporets vill., 14.08.2020, 2 w., leg. ALG.

***Ponera testacea* Emery, 1895**

Material examined: Rozovets vill. 1, 12.08.2020, 3 w., leg. ALG.

Subfamily Myrmicinae

***Myrmica rugulosa* Nylander, 1849**

Material examined: Srednogorovo vill., 13.08.2020, 5 w., leg. ALG; Turiya vill., 13.08.2020, 26 w., leg. ALG.

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***Myrmica speciodes* Bondroit, 1918**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 6 w., leg. ALG.

***Myrmica scabrinodis* Nylander, 1846**

Material examined: Zelenikovo vill. 2, 26.04.2018, 3 w., leg. TL; Svezhen vill. 2, 11.08.2020, 2 w., leg. ALG; same locality, 11.08.2020, 1 w., leg. IG; Novo selo vill., 13.08.2020, 11 w., leg. ALG.

***Myrmica sabuleti* Meinert, 1861**

Material examined: Svezhen vill. 2, 11.08.2020, 4 w., leg. IG; Sarnevets vill., 14.08.2020, 10 w., leg. ALG.

***Myrmica lonae* Finzi, 1926**

Material examined: Domlyan dam, near Domlyan vill. 1, 11.08.2020, 3 q., 2 m., 28 w., leg. ALG.

***Myrmica curvithorax* Bondroit 1920**

Material examined: Zelenikovo vill. 2, 27-28.05.2018, 1 m., 3 w., leg. TL.

***Myrmica lobicornis* Nylander, 1846**

Material examined: Svezhen hut 1, 12.08.2020, 11 w., leg. ALG.

***Aphaenogaster subterranea* (Latreille, 1798)**

Material examined: Domlyan dam, near Domlyan vill. 2, 11.08.2020, 9 q., 50 m., 55 w., leg. ALG; Pryaporets vill., 14.08.2020, 10 q., 46 m., 47 w., leg. ALG; Hrishteni vill., 27.09.2020, 22 w., leg. ALG.

***Messor structor* (Latreille, 1798)**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 10 w.; Svezhen vill. 1, 11.08.2020, 4 w.; Novo selo vill., 13.08.2020, 11 w.; Kriva krusha vill., 27.09.2020, 6 w..

***Messor semirufus* group**

Material examined: Stara Zagora, 1959, leg. RB; Momino vill. 2, 30.05.2018, 7 w., leg. TL.

***Crematogaster schmidti* (Mayr, 1853)**

Material examined: Zelenikovo vill. 1, 11.06.2016, 1 w., leg. IG; Mrachenik vill., 11.08.2020, 3 w., leg. ALG; same locality, 11.08.2020, 3 w., leg. IG; Turiya vill., 13.08.2020, 15 w., leg. ALG; Sarnevets vill., 14.08.2020, 8 w., leg. ALG; Hrishteni vill., 27.09.2020, 3 w., leg. IG; Kriva krusha vill., 27.09.2020, 4 w., leg. ALG.

***Crematogaster sordidula* (Nylander, 1849)**

Material examined: Sarnevets vill., 14.08.2020, 3 w., leg. IG.

Pheidole* cf. *pallidula

Material examined: Kriva krusha vill., 27.09.2020, 70 w., leg. ALG.

Recently Seifert (2016) distinguished 3 cryptic species with sympatric ranges in the Balkans and Asia Minor, namely *Ph. pallidula* (Nylander, 1849), *Ph. balcanica* Seifert, 2016 and *Ph. koshevnikovii* Ruzsky, 1905, the first two recorded for Bulgaria. The standard comparative morphology is not sufficient for their reliable distinction.

***Solenopsis fugax* (Latreille, 1798)**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 6 w., leg. ALG; Domlyan dam, near Domlyan vill. 2, 11.08.2020, 41 w., leg. ALG; Sarnevets vill., 14.08.2020, 9 w., leg. ALG; Hrishteni vill., 27.09.2020, 8 q., 3 m., 57 w., leg. ALG; Kriva krusha vill., 27.09.2020, 11 m., 26 w., leg. ALG.

***Myrmecina graminicola* (Latreille, 1802)**

Material examined: Sarnevets vill., 14.08.2020, 2 w., leg. ALG.

***Temnothorax affinis* (Mayr, 1855)**

Material examined: Pryaporets vill., 14.08.2020, 2 w., leg. ALG.

***Temnothorax interruptus* (Schenck, 1852)**

Material examined: Turiya vill., 13.08.2020, 1 w., leg. ALG.

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***Temnothorax parvulus* (Schenck, 1852)**

Material examined: Mrachenik vill., 11.08.2020, 1 m., 7 w., leg. ALG; Svezhen vill. 1, 11.08.2020, 30 q., 8 m., 63 w., leg. ALG; Novo selo vill., 13.08.2020, 5 w., leg. ALG; Turiya vill., 13.08.2020, 23 q., 11 m., 16 w., leg. ALG; Sarnevets vill., 14.08.2020, 1 m., 7 w., leg. ALG.

***Temnothorax helenae* Csösz, Heinze & Mikó, 2015**

Material examined: Srednogorovo vill., 13.08.2020, 1 w., leg. ALG.

***Temnothorax lichtensteini* (Bondroit, 1918)**

Material examined: Novo selo vill., 13.08.2020, 2 w., leg. ALG.

***Temnothorax semiruber* (André, 1881)**

Material examined: Sarnevets vill., 14.08.2020, 9 w., leg. IG.

***Tetramorium caespitum* complex**

Material examined: Momino vill. 3, 21.04.2018, 1 w., leg. VP; Domlyan dam, near Domlyan vill. 1, 10.08.2020, 30 w., leg. ALG; Domlyan dam, near Domlyan vill. 2, 11.08.2020, 65 w., leg. ALG; Rozovets vill. 1, 12.08.2020, 26 w., leg. ALG; Srednogorovo vill., 13.08.2020, 2 w., leg. ALG; Turiya vill., 13.08.2020, 24 w., leg. ALG; Pryaporets vill., 14.08.2020, 13 w., leg. ALG; Sarnevets vill., 14.08.2020, 15 w., leg. ALG; Kriva krusha vill., 27.09.2020, 19 w., leg. ALG.

***Tetramorium impurum* (A. Förster, 1850)**

Material examined: Rozovets vill. 2, 12.08.2020: 1 q., 8 m., 13 w., leg. ALG.

The presence of all castes from the studied nest sample and especially morphology of the male genitalia allowed to delimit this species from the *T. caespitum* complex.

***Tetramorium moravicum* Kratochvíl, 1941**

Material examined: Svezhen vill. 2, 11.08.2020, 4 w., leg. IG; Novo selo vill., 13.08.2020, 11 w., leg. ALG; Pryaporets vill., 14.08.2020, 3 w., leg. ALG; Sarnevets vill., 14.08.2020, 14 w., leg. ALG; Hrishteni vill., 27.09.2020, 40 w., leg. ALG; Kriva krusha vill., 27.09.2020, 30 w., leg. ALG.

***Tetramorium chefketi* Forel, 1911**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 12 w., leg. ALG; Mrachenik vill., 11.08.2020, 2 w., leg. ALG; Hrishteni vill., 27.09.2020, 2 w., leg. IG.

Subfamily Dolichoderinae

***Dolichoderus quadripunctatus* (Linnaeus, 1771)**

Material examined: Mrachenik vill., 11.08.2020, 1 w., leg. IG; Mrachenik vill., the grave of Hadzhi Dimitar, 3 w., leg. ALG; Svezhen vill. 1, 11.08.2020, 2 w., leg. ALG; same locality, 11.08.2020, 3 w., leg. IG; Novo selo vill., 13.08.2020, 1 w., leg. ALG; Turiya vill., 13.08.2020, 1 q., 3 w., leg. ALG; Pryaporets vill., 14.08.2020, 17 w., leg. ALG; same locality, 14.08.2020, 2 w., leg. IG.

Tapinoma* cf. *erraticum

Material examined: Zelenikovo vill. 2, 26.04.2018, 2 w., leg. TL; same locality, 27-28.05.2018, 5 w., leg. TL; Zelenikovo vill. 3, 26-27.04.2018, 2 w., leg. TL; Momino vill. 2, 27.04.2018, 2 w., leg. TL; same locality, 30.05.2018, 1 m., 6 w., leg. TL; Svezhen vill. 1, 11.08.2020, 1 w., leg. IG; Novo selo vill., 13.08.2020, 1 w., leg. ALG; Sarnevets vill., 14.08.2020, 1 q., 17 w.; 54 w., leg. ALG.

In Wagner *et al.* (2018) is noted that a species close to *T. erraticum* (Latreille, 1798) is widespread in the southern Balkans and its description is forthcoming.

***Tapinoma subboreale* Seifert, 2011**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 24 w., leg. ALG; Svezhen vill. 1, 11.08.2020, 6 w., leg. ALG.

***Liometopum microcephalum* (Panzer, 1798)**

Material examined: Kazanlak, 1964, 5 w., leg. RB.

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***Plagiolepis pygmaea* (Latreille, 1798)**

Material examined: Zelenikovo vill. 2, 27-28.05.2018, 2 w., leg. TL; Zelenikovo vill. 3, 26-27.04.2018, 2 w., leg. TL; Zelenikovo vill. 5, 28.05.2018, 1 w., leg. TL; Momino vill. 2, 30.05.2018, 5 m., leg. TL; Domlyan dam, near Domlyan vill. 1, 10.08.2020, 22 w., leg. ALG; Novo selo vill., 13.08.2020, 3 w., leg. ALG; Srednogorovo vill., 1 w., leg. IG; Turiya vill., 13.08.2020, 1 w., leg. ALG; Pryaporets vill., 14.08.2020, 5 m., 12 w., leg. ALG; same locality, 14.08.2020, 1 w., leg. IG; Sarnevets vill., 14.08.2020, 16 w., leg. ALG; same locality, 14.08.2020, 2 w., leg. IG; Kriva krusha vill., 27.09.2020, 1 q., 10 w., leg. ALG.

***Prenolepis nitens* (Mayr, 1853)**

Material examined: Zelenikovo vill. 6, 11.06.2018, 2 m., leg. VP, det. T. Ljubomirov.

***Camponotus herculeanus* (Linnaeus, 1758)**

Material examined: Svezhen hut 1, 12.08.2020, 5 w., leg. ALG.

***Camponotus vagus* (Scopoli, 1763)**

Material examined: Sarnevets vill., 14.08.2020, 1 w., leg. IG.

***Camponotus lateralis* (Olivier 1792)**

Material examined: Sarnevets vill., 14.08.2020, 20 w., leg. ALG; Hrishteni vill., 27.09.2020, 9 w., leg. ALG; Kriva krusha vill., 27.09.2020, 2 q., 1 m., 16 w., leg. ALG.

***Camponotus piceus* (Leach, 1825)**

Material examined: Zelenikovo vill. 2, 27-28.05.2018, 1 w., leg. TL; Zelenikovo vill. 5, 28.05.2018, 1 w., leg. TL; Momino vill. 2, 30.05.2018, 3 w., leg. TL; Svezhen vill. 1, 11.08.2020, 1 w., leg. ALG; Novo selo vill., 13.08.2020, 5 w., leg. ALG.

***Camponotus atricolor* (Nylander, 1849)**

Material examined: Mrachenik vill., 11.08.2020, 3 w., leg. IG; Svezhen vill. 2, 11.08.2020, 1 w., leg. IG; Turiya vill., 13.08.2020, 2 w., leg. ALG; Pryaporets vill., 14.08.2020, 1 w., leg. IG; Sarnevets vill., 14.08.2020, 4 w., leg. IG.

***Camponotus aethiops* (Latreille, 1798)**

Material examined: Stara Zagora, 1959, 6 w., leg. RB; Zelenikovo vill. 2, 27-28.05.2018, 2 w., leg. TL; Zelenikovo vill. 3, 26-27.04.2018, 2 w., leg. TL; Zelenikovo vill. 5, 28.05.2018, 1 w., leg. TL; Mrachenik vill., 11.08.2020, 2 q., 2 m., 8 w., leg. ALG; Svezhen vill. 1, 11.08.2020, 2 w., leg. ALG; same locality, 11.08.2020, 1 w., leg. IG; Novo selo vill., 13.08.2020, 5 w., leg. ALG; Turiya vill., 13.08.2020, 1 w., leg. ALG; Sarnevets vill., 14.08.2020, 1 w., leg. IG; Hrishteni vill., 27.09.2020, 12 w., leg. ALG; same locality, 27.09.2020, 1 w., leg. IG.

***Camponotus samius* Forel, 1888**

Material examined: Hrishteni vill., 27.09.2020, 2 w., leg. ALG.

***Colobopsis truncata* (Spinola, 1808)**

Material examined: Zelenikovo vill. 1, 11.06.2016, 1 w., leg. IG; Mrachenik vill., 11.08.2020, 1 w., leg. IG.

***Lasius alienus* (A. Förster, 1850)**

Material examined: Momino vill. 3, 21.04.2018, 1 w., leg. VP; Momino vill. 2, 27.04.2018, 2 w., leg. TL; same locality, 30.05.2018, 7 w., leg. TL; Zelenikovo vill. 4; 27.05.2018, 3 w., leg. TL; Zelenikovo vill. 5, 28.05.2018, 3 w., leg. TL; Mrachenik vill., 11.08.2020, 15 w., leg. ALG; Svezhen hut 1, 12.08.2020, 1 q., 7 m., 12 w., leg. ALG; Rozovets vill. 1, 13.08.2020, 35 q., 24 m., 10 w., leg. ALG.

***Lasius psammophilus* Seifert, 1992**

Material examined: Svezhen vill. 1, 11.08.2020, 11 w., leg. ALG; Novo selo, 13.08.2020, 7 w., leg. ALG; Turiya vill., 13.08.2020, 7 w., leg. ALG.

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***Lasius paralienus* Seifert, 1992**

Material examined: Zelenikovo vill. 4, 28.05.2018, 3 w., leg. TL; Novo selo vill., 13.08.2020, 5 w., leg. ALG; Srednogorovo vill., 1 w., leg. IG.

***Lasius bombycina* Seifert & Galkowski, 2016**

Material examined: Turiya vill., 13.08.2020, 7 w., leg. ALG; Pryaporets vill., 14.08.2020, 2 w., leg. IG; Sarnevets vill., 14.08.2020, leg. IG; Kriva krusha vill., 27.09.2020, 15 w., leg. ALG.

***Lasius niger* (Linnaeus, 1758)**

Material examined: Cherganovo vill, 10.06.2016, 1 w., leg. IG; Zelenikovo vill. 2, 26.04.2018, 12 w., leg. TL.

***Lasius platythorax* Seifert, 1991**

Material examined: Mrachenik vill., 11.08.2020, 12 m., 7 w., leg. ALG; Novo selo vill., 13.08.2020, 4 w., leg. ALG.

***Lasius emarginatus* (Olivier, 1792)**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 23 w., leg. ALG.

***Lasius brunneus* (Latreille, 1798)**

Material examined: Stara Zagora, 1959, 1 w., leg. RB; Mrachenik vill., the grave of Hadzhi Dimitar, 11.08.2020, 12 w., leg. ALG; Srednogorovo vill., 13.08.2020, 2 w., leg. ALG; Pryaporets vill., 14.08.2020, 2 w., leg. IG.

***Lasius myops* Forel, 1894**

Material examined: Mrachenik vill., 11.08.2020, 7 w., leg. ALG.

***Lasius meridionalis* (Bondroit, 1920)**

Material examined: Pryaporets vill., 14.08.2020, 20 w., leg. ALG.

***Lasius fuliginosus* (Latreille, 1798)**

Material examined: Mrachenik vill., the grave of Hadzhi Dimitar, 11.08.2020, 9 w., leg. ALG.

***Cataglyphis nodus* (Brullé, 1832)**

Material examined: Zelenikovo vill. 2, 27-28.05.2018, 1 w., leg. TL; Domlyan dam, near Domlyan vill. 1, 10.08.2020, 1 w., leg. ALG; Kriva krusha vill., 27.09.2020, 1 w., leg. ALG.

***Proformica* sp.**

Material examined: Kriva krusha vill., 27.09.2020, 1 w., leg. IG.

A single minor worker was collected by sweeping net and the lack of sufficient specimens did not allow correct species identification.

***Formica fusca* Linnaeus, 1758**

Material examined: Mrachenik vill., the grave of Hadzhi Dimitar, 11.08.2020, 10 w., leg. ALG.

***Formica gagates* Latreille, 1798**

Material examined: Hrishteni vill., 27.09.2020, 1 w., leg. ALG; same locality, 27.09.2020, 1 w., leg. IG.

***Formica cunicularia* Latreille, 1798**

Material examined: Zelenikovo vill. 2, 27-28.05.2018, 1 w., leg. TL; Momino vill. 1, 29.05.2018, 1 w., leg. TL; Domlyan dam, near Domlyan vill. 1, 10.08.2020, 6 w., leg. ALG; Svezhen vill. 1, 11.08.2020, 1 w., leg. ALG; Svezhen vill. 2, 11.08.2020, 1 w., leg. IG; Svezhen hut 1, 12.08.2020, 8 w., leg. ALG; Rozovets vill. 1, 12.08.2020, 5 w., leg. ALG; Kriva krusha vill., 27.09.2020, 4 w., leg. ALG.

***Formica rufibarbis* Fabricius, 1793**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 8 w., leg. ALG; Svezhen vill. 1, 11.08.2020, 3 w., leg. ALG; Novo selo vill., 13.08.2020, 5 w., leg. ALG; Turiya vill., 13.08.2020, 2 w., leg. ALG; Sarnevets vill., 14.08.2020, 1 w., leg. IG.

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***Formica cinerea* Mayr, 1853**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 13 w., leg. ALG; Svezhen vill. 2, 11.08.2020, 3 w., leg. IG; Rozovo vill., 12.06.2016, 1 w., leg. IG; Srednogorovo vill., 13.08.2020, 4 w., leg. ALG; same locality, 13.08.2020, 3 w., leg. IG; Turiya vill., 13.08.2020, 5 w., leg. ALG.

***Formica pratensis* Retzius, 1783** (Fig. 1: 1)

Literature data: Stara Zagora (Gateva 1975)

Material examined: S from Kalofer, 05.08.2014, 10 w., leg. VA; Svezhen hut 1, 12.08.2020, 8 w., leg. ALG; Svezhen hut 3, 12.08.2020, 10 w., leg. ALG; Rozovets vill. 1, 12.08.2020, 3 w., leg. ALG.

***Formica rufa* Linnaeus, 1761** (Fig. 1: 2)

Material examined: Mrachenik vill., the grave of Hadzhi Dimitar, 11.08.2020, 15 w., leg. ALG; Svezhen hut 2, 12.08.2020, 10 w., leg. ALG.

***Polyergus rufescens* (Latreille, 1798)**

Material examined: Domlyan dam, near Domlyan vill. 1, 10.08.2020, 2 w., leg. ALG.



Fig. 1. 1: nest of *Formica pratensis* (Svezhen hut 1 locality), 2: nest of *Formica rufa* (Svezhen hut 2 locality).

Discussion

In total, 61 ant species from 32 localities were found with different sampling methods. They are about 30% of the Bulgarian myrmecofauna (Lapeva-Gjonova *et al.* 2010). We consider the number of ants should be higher in long-term studies as the geographical location, relief and climate are favourable for their high diversity. Additionally, few more species could exist in *Tetramorium caespitum* complex and *Messor semirufus* group. According to Wagner *et al.* (2017) there are 10 species in the *T. caespitum* complex in Europe, for the correct determination of some of which the study of the male genitalia is also necessary. The studied nest samples belong to at least two morphospecies, but none of them contained males to be identified. The *Messor semirufus* group from the Balkans needs thorough modern revision, given the large number of names of various rank (Bračko *et al.* 2016; Salata & Borowiec 2019).

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Sarnena Sredna Gora Mts has a significant conservation value as *Formica rufa* and *F. pratensis* are considered as species of special conservation measures in Europe (IUCN 2021). They are recognized as Lower Risk /Near Threatened species and included in CORINE biotopes checklist (Annex 4). In addition, *F. rufa* is protected by the Bulgarian Biodiversity Act (2002), Annex 2 and 3.

The ant species found in this survey belong to three zoogeographical classes (according to Czechowski *et al.* 2012): Coniferous forest zone (9.8%), Mixed and deciduous forest zone (45.9%) and a zone of Semi-arid and arid areas (39.3%). The zoogeographical elements in Coniferous forest class are represented only by two: Boreo-montane (2 species) and North-Palaeartic (4 species). The rest elements are highly heterogenous and are shown on Fig. 2.

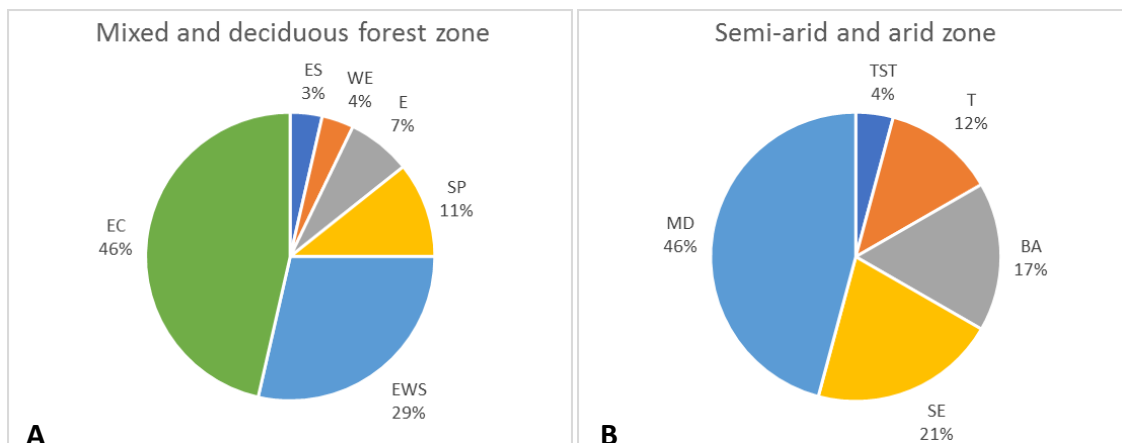


Fig. 2. Ant species by zoogeographical categories (in percentage). **A** - Mixed and deciduous forest class: EC (Euro-Caucasian), EWS (Euro-West-Siberian), SP (South-Palaeartic), E (European forests), WE (West-European) and ES (Euro-Siberian); **B** - Semi-arid and arid class: MD (Mediterranean), SE (South-European), BA (Balkan-Anatolian), T (Tethyan) and TST (Turano-Steppic).

Most of the species are Euro-Caucasian and Mediterranean. As the climate of Sarnena Sredna Gora Mts is transitional-continental, with strong submediterranean influence (Georgiev 2020), the findings of Mediterranean, South-European, South-Palaeartic and Balkan-Anatolian elements are expected. The high participation of Euro-Caucasian and Euro-West Siberian elements is related to the forests, mainly of oak and hornbeam, and in the higher parts of beech. Most likely, the mountain shares a common ant fauna with that of the neighboring Central Stara Planina Mts and Sashtinska Sredna Gora Mts.

Conclusion

The myrmecofauna of Sarnena Sredna Gora Mts is highly diverse of faunistical and zoogeographical aspect. Nevertheless, the number of ants should be higher in long-term research on larger area. The region contains two ant species with conservation significance.

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