

Three Species of *Aphaenogaster* Mayr, 1853 (Hymenoptera: Formicidae) New to the Bulgarian Fauna

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Abstract: Three new species of the family Formicidae (Hymenoptera) are recorded for the first time from Bulgaria: *Aphaenogaster festae* Emery, 1915 (East Rhodopes), *Aphaenogaster radchenkoi* Kiran & Tezcan, 2008 (South Pirin and Struma Valley) and *Aphaenogaster subterraneoides* Emery, 1881 (North Black Sea coast, Eastern Rhodopes and Sakar Mt.). The present record of *A. radchenkoi* is the first for Europe and the occurrence of *A. festae* establishes its northern range border in Bulgaria. A list of 23 species recorded in Bulgaria after publishing its catalogue of ant species in 2010 is presented.

Key words: Formicidae, *Aphaenogaster*, Bulgaria, new records

Introduction

The Bulgarian ant fauna has been summarised in the catalogue by LAPEVA-GJONOVA et al. (2010) and is considered relatively well studied. The cited catalogue includes 163 species but, due to recent revisions, the records of some of the listed taxa are doubtful and probably based on misinterpretations. Twenty species have been recorded as new for Bulgaria in papers published after the catalogue (see below). Recent studies indicate that at least 20 further species can be expected in this country (BOROWIEC 2014, CSŐSZ et al. 2014, 2015, 2018, KIRAN et al. 2017, LAPEVA-GJONOVA 2010, 2017, LAPEVA-GJONOVA et al. 2014, LAPEVA-GJONOVA & KIRAN 2012, SEIFERT 2016, SEIFERT & CSŐSZ 2015, SEIFERT & GALKOWSKI 2016, STEINER et al. 2018, WAGNER et al. 2017, BRAČKO et al. 2019 and LAPEVA-GJONOVA, unpublished data). Thus, Bulgaria is among the most ant species-rich countries on the Balkan Peninsula. Only Greece, with 315 species and morphospecies, has a more diverse ant fauna (BOROWIEC & SALATA, unpublished data).

The Bulgarian catalogue of ants (LAPEVA-GJONOVA et al. 2010) lists four members of the

genus *Aphaenogaster* Mayr, 1853: *A. epirotes* (Emery, 1895), *A. gibbosa* (Latreille, 1798), *A. pallida* (Nylander, 1849) and *A. subterranea* (Latreille, 1798). However, only the occurrence of *A. epirotes* in Bulgaria seems to be certain. Records of *A. gibbosa* and *A. pallida* are undoubtedly based on misidentifications. A recent revision proved that both taxa are distributed only in the western part of the Mediterranean Basin (SALATA & BOROWIEC 2018). The status of the eastern populations of *A. subterranea* is currently being studied, with biometric and molecular data suggesting that this widely distributed taxon is probably a group of at least four cryptic species (BRAČKO et al. 2019, GALKOWSKI et al. 2019, BOROWIEC & SALATA in preparation). It is not yet certain if the species found in Bulgaria is *A. subterranea* or an undescribed species within this complex. Recent material collected from Bulgaria has revealed the presence of three other species of *Aphaenogaster*, not previously recorded from the country. Each of these species was previously known from neighbouring areas.

Materials and Methods

All ants were collected between 1988 and 2011. They are preserved in the following collections: L. Borowiec, University of Wrocław, Poland (DBET), A. Lapeva-Gjonova, Sofia University, Bulgaria (ALG) and P. Werner, Prague, Czech Republic (PW).

Results

New records

Aphaenogaster festae Emery, 1915 (Fig. 1)

Material examined: Eastern Rhodopes, Kardzhali District, Kardzhali vic., 25.04.1988, 10w, leg. P. Bezděčka (DBET, PW). *Comments:* A member of the *Aphaenogaster splendida* species group (sensu SCHULZ 1994), known from Greece (East Aegean Islands and Dodecanese) and western Turkey. A record from Iraq of this species requires confirmation (BOROWIEC 2014). In Greece, *Aphaenogaster festae* is a common ant. It nests in various habitats, mostly under stones in unshaded pine forests but has also been observed in suburban areas overgrown by macchia, ruderal areas in tourist resorts and in stream valleys with plane-tree or other deciduous forest stands. These ants are likely nocturnal, as workers have never been observed during the day. The Bulgarian record is the northernmost record in Europe of *A. festae*.

Aphaenogaster radchenkoi Kiran, Aktaç & Tezcan, 2008 (Fig. 2)

Material examined: South Pirin Mts., Sandanski District, near Kalimantsi Vill., SE slope of St. Ilija hill, soil traps, *Quercus coccifera* L. plant community, 06.04.-10.05.2002, 1w, leg. M. Langourov (ALG); South Pirin Mts., Sandanski District, Sandanski vic., 10.06.1984, 5w, leg. P. Bezděčka (DBET); Struma Valley, Strumyani District, 2 km S from Kamenitsa Vill., N41.650 E23.167, 170-240 m a.s.l., soil traps, *Q. coccifera* L. plant community, 31.05.-23.06.2002, 6w, leg. M. Langourov (ALG, DBET); Struma Valley, Strumyani District, Mikrevo Vill., N41.613 E23.188, 235 m a.s.l., grassland, 12.02.2011, 11w, leg. A. Lapeva-Gjonova (ALG); Pirin Mts., Strumyani District, Ilindentsi Vill., N41.654 E23.260, 538 m a.s.l., grassland, 12.02.2011, 4w, leg. A. Lapeva-Gjonova (ALG). *Comments:* A recently described species, this ant was known from collections in İzmir Province in western Turkey. It is a member of the *A. pallida* species group (sensu SCHULZ 1994).

In its original description, this species was only compared with *A. subterraneoides* Emery, 1881 (terra typica: Greece), the most common *pallida* group member from the Balkans. These authors overlooked another species of the *pallida* group known from this region: *A. finzii* Müller, 1925 (terra typica: Dalmatia). *Aphaenogaster finzii* is very similar to *A. radchenkoi* and was recorded from Bosnia and Herzegovina, Greece (Peloponnese), NE Italy, North Macedonia, Montenegro and Serbia (BOROWIEC 2014). Both species are characterised by the presence of distinct propodeal spines. In *A. finzii* the spines are thorn-shaped, moderately large, with fairly wide bases and thin apices, while in *A. radchenkoi* they are claw-shaped, large with a very broad base. In order to clarify if these ants are vicariant species or merely represent geographical variation of a single widely distributed taxon, further research examining more samples from the southern Dinaric area and Western Balkan Peninsula are required. *Aphaenogaster finzii* is a nocturnal species. In Greece, nests were observed under large stones in shaded coniferous and oak forests, between 600 and 840 m a.s.l. *Aphaenogaster radchenkoi* has been observed in Turkey and Bulgaria, mostly in open habitats such as grasslands, *Quercus coccifera* woodlands, chestnut forests and oak forests. The records noted above are the first for Bulgaria and Europe.

Aphaenogaster subterraneoides Emery, 1881 (Fig. 3)

Material examined: Eastern Rhodopes, Ivaylovgrad District, Svirachi Vill., N41.477 E26.108, 340 m a.s.l., grassland, 04.05.2009, 1w, leg. A. Lapeva-Gjonova (ALG); North Black Sea coast, Kavarna District, Kaliakra Cape, N43.368 E28.466, 24 m a.s.l., steppe grassland, 25.04.2011, 7w, leg. A. Lapeva-Gjonova (ALG, DBET); Sakar Mt., Svilengrad Distr., Matochina Vill., N41.852 E26.547, 168 m a.s.l., steppe grassland, 30.04.2011, 3w, leg. A. Lapeva-Gjonova. *Comments:* This is the most widespread species of the *A. pallida* species group. It has been recorded from Armenia, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Italy, North Macedonia, Russia (Caucasus), Serbia, Turkey and Ukraine. It is possible that records of *A. pallida* from Bulgaria (VASILEV 1984) are misidentified specimens of *A. subterraneoides*. Both species are very similar and differ only in the structure of propodeum. In *A. pallida* the propodeum is rounded, lacking propodeal spines, while in *A. subterraneoides* minute propodeal spines are present.



Figs. 1-3. Workers in lateral view. **1.** *Aphaenogaster festae*, specimen from Kardzhali. **2.** *Aphaenogaster radchenkoi*, specimen from Kamenitsa. **3.** *Aphaenogaster subterraneoides*, specimen from Kaliakra Cape (scale bar = 1mm).

List of ant species recorded from Bulgaria after 2010

Oxyopomyrmex krueperi Forel, 1911 (LAPEVA-GJONOVA & KIRAN 2012);
Stenamma striatulum (Emery, 1895) (LAPEVA-GJONOVA & KIRAN 2012);
Camponotus tergestinus Müller, 1921 (LAPEVA-GJONOVA & KIRAN 2012);
Camponotus universitatis Forel, 1890 (LAPEVA-GJONOVA & KIRAN 2012);
Crematogaster gordani Karaman, 2008 (BOROWIEC 2014);
Temnothorax flavicornis (Emery, 1870) (LAPEVA-GJONOVA et al. 2014);
Temnothorax lichtensteini (Bondroit, 1918) (Csősz et al. 2014);
Temnothorax crasecundus (Seifert & Csősz, 2015) (SEIFERT & Csősz 2015);
Temnothorax helenae Csősz, Heinze & Mikó, 2015 (Csősz et al. 2015);
Temnothorax tergestinus (Finzi, 1928) (Csősz et al. 2015);
Lasius bombycina Seifert & Galkowski, 2016 (SEIFERT & GALKOWSKI 2016);
Pheidole balcanica Seifert, 2016 (SEIFERT 2016);
Teleutomyrmex buschingeri Lapeva-Gjonova, 2017 (KIRAN et al. 2017);
Tetramorium immigrans Santschi, 1927 (WAGNER et al. 2017);
Tetramorium impurum (Förster, 1850) (WAGNER et al. 2017);
Tetramorium indocile Santschi, 1927 (KIRAN et al. 2017);
Tetramorium staerckei Kratochvíl, 1944 (WAGNER et al. 2017);
Temnothorax strymonensis (Csősz et al. 2018);
Messor ibericus Santschi, 1925 (STEINER et al. 2018);
Messor ponticus Steiner, Csősz, Markó, Gamisch, Rinnhofer, Folt-erbauer, Hammerle, Stauffer, Arthofer & Schlick-Steiner, 2018 (STEINER et al. 2018);
Aphaenogaster illyrica Bračko, Lapeva-Gjonova, Salata, Borowiec & Polak, 2019 (Bračko et al., 2019)
Aphaenogaster festae Emery, 1915 (this paper);
Aphaenogaster radchenkoi Kiran, Aktaş & Tezcan, 2008 (this paper);
Aphaenogaster subterraneoides Emery, 1881 (this paper).

Discussion

Recent faunal and taxonomic studies have greatly improved our knowledge on the diversity of the family Formicidae in Bulgaria as well as within the encompassing region. This broader and more informed foundation allows to make finer distinctions and, as we have shown here, opportunities to further improvement of our understanding of Bulgaria's ant fauna.

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