

**CONTRIBUTION TO THE KNOWLEDGE OF THE MYRMECOFAUNA
(HYMENOPTERA: FORMICIDAE) OF POMORIE, BULGARIA**

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ABSTRACT

In July 2021, the myrmecofauna of Pomorie City (Bulgaria) was studied. From the Formicidae family 15 species were recorded: *Cardiocondyla bulgarica*, *C. elegans*, *Crematogaster schmidtii*, *Formica cunicularia*, *F. sanguinea*, *Lasius niger*, *Messor barbarus*, *M. capitatus*, *M. structor*, *Plagiolepis pygmaea*, *Tapinoma erraticum*, *Temnothorax sp.*, *Tetramorium caespitum*, *T. chefketi* and *T. ferox*.

Keywords: Pomorie, Black Sea, Formicidae, *Messor capitatus*.

INTRODUCTION

Bulgarian myrmecofauna is well studied and with 163 species is one of the richest fauna of southern Europe (Lapeva-Gjonova et al. 2010). However, not all parts of Bulgaria have been explored equally. The study of the ant fauna of Pomorie is connected to the beginnings of the research of the ant fauna of Bulgaria by the Swiss myrmecologist Auguste Forel. Forel (1892) recorded 10 species of ants for Pomorie. Then, Atanassov & Dlusskij (1992) confirm the findings for three species (*Temnothorax recedens*, *Cardiocondila bulgarica* and *C. stambuloffii*). Sciefert (2003) from the museum material of the Forel's research, confirms the species *Cardiocondila bulgarica* and *C. stambuloffii*. The territory of the Black Sea coast region is the smallest among all natural regions of Bulgaria and it is sufficiently studied: 75 ant species from ca. 27 localities are recorded (Lapeva-Gjonova et al. 2010). Therefore requires additional research.

This paper aims to contribute to a better knowledge of ants of Pomorie and the southern parts of the Bulgarian Black Sea coast.

STUDY AREA

Pomorie (42°34'6" N, 27°37'0" E) is a town in southeastern Bulgaria, located on a narrow rocky peninsula in Burgas Bay on the southern Bulgarian Black Sea coast (Fig. 1). The climate is temperate continental with increased influence of the Black Sea. Winters are mild. The temperature averages 13,7 ° C. With an average of 24,3 ° C, August is the warmest month. Pomorie has a significant amount of rainfall during the year with averages 637 mm. The driest month is August (31 mm). With an average of 65 mm, the most precipitation falls in December. The lowest value for the relative humidity is measured in August (68 %). The relative humidity is highest in January (78 %). On average, the fewest rainy days are measured in August (5,2 rainy days). The month with the rainiest days is December (9,6 rainy days). Around 2956 hours of sunshine are counted in Pomorie throughout the year (<https://no.climate-data.org/>).



Fig. 1. Bulgaria, showing the geographical location of Pomorie (black square). Fig. 2. Collection locations in Pomorie (red circles).

MATERIAL AND METHODS

Ants were collected at the locations "Stari grad", "Centar" and the coastal belt of Pomorie, in the period from July 16 to 26, 2021 (Fig. 2). The primary goal of this study was to record as many species as possible. Therefore, the active sampling method (direct sampling) was used. Many species inhabiting an area can be recorded in a relatively short time by direct sampling (Romero & Jaffe, 1989). Direct or hand sampling is particularly useful for a short-term faunal inventory and involves the collecting of ants in various microhabitats within the study area (Lattke, 2000). The search was performed on bare ground, in the litter, on twigs, under and on bushes and trees, at the base and at the root of grass clumps, under stones, on the bark of trees, on walls and sidewalks. I also used the method of Hölldobler & Wilson (1990). Small plots are cleared of fallen leaves and twigs, to reveal bare soil. Then, the plots were observed for a few minutes to find small and hidden specimens of ants. The ants were collected at different times of the day, which aimed to collect different species of ants. Material was preserved in 70% ethyl alcohol (Collingwood & Prince, 1998) and kept in the author's collection.

Determinations were made using stereomicroscope (BTC STM-1 x20). The identification of the species was based on currently available keys: Wilson (1955), Collingwood (1979), Agosti & Collingwood (1987), Collingwood & Prince (1998), Seifert (2003), Seifert & Schultz (2009). Also, the on-line key (<https://www.antweb.org>).

RESULTS AND DISCUSSION

In this study, 15 species from three subfamily were registered (Table 1). From the subfamily Myrmicinae, 10 species (*Messor barbarus*, *M. capitatus*, *M. structor*, *Crematogaster schmidtii*, *Temnothorax sp.*, *Cardiocondyla bulgarica*, *C. elegans*, *Tetramorium caespitum*, *T. chefketi*, *T. ferox*), subfamily Formicinae, four species (*Plagiolepis pygmaea*, *Lasius niger*, *Formica cunicularia*, *F. sanguinea*), and from subfamily Dolichoderinae, one species (*Tapinoma erraticum*).

Table 1. List of Pomorie ant fauna.

Species	References	This study
Myrmicinae		
<i>Messor barbarus</i> Linnaeus, 1767	Forel, 1892	+
<i>M. capitatus</i> Latreille, 1798	-	+
<i>M. structor</i> Latreille, 1798	-	+
<i>Crematogaster schmidtii</i> Mayr, 1853	-	+
<i>Temnothorax recedens</i> Nylander, 1856	Forel, 1892; Atanassov & Dlusskij, 1992	
<i>Temnothorax sp.</i>	-	+
<i>Cardiocondyla bulgarica</i> Forel, 1892	Forel, 1892; Atanassov & Dlusskij, 1992; Scifert, 2003	+
<i>C. elegans</i> Emery, 1869	-	+
<i>C. stambuloffii</i> Forel, 1892	Forel, 1892; Atanassov & Dlusskij, 1992; Scifert, 2003	
<i>Tetramorium caespitum</i> Linnaeus, 1758	Forel, 1892	+
<i>T. chefketi</i> Forel, 1911	-	+
<i>T. ferox</i> Ruzsky, 1903	-	+
Dolichoderinae		
<i>Tapinoma erraticum</i> Latreille, 1798	Forel, 1892	+
Formicinae		
<i>Plagiolepis pygmaea</i> Latreille, 1798	-	+
<i>Lasius niger</i> Linnaeus, 1758	-	+
<i>Camponotus piceus</i> Leach, 1825	Forel, 1892	
<i>Formica cunicularia</i> Latreille, 1798	-	+
<i>F. gagates</i> Latreille, 1798	Forel, 1892	
<i>F. rufibarbis</i> Fabricius, 1793	Forel, 1892	
<i>F. sanguinea</i> Latreille, 1798	-	+
<i>Cataglyphis aenescens</i> Nylander, 1849	Forel, 1892	

New species for Pomorie are: seven species from the subfamily Myrmicinae (*M. capitatus*, *M. structor*, *C. schmidtii*, *Temnothorax sp.*, *C. elegans*, *T. chefketi*, *T. ferox*) and four species from the subfamily Formicinae (*P. pygmaea*, *L. niger*, *F. cunicularia*, *F. sanguinea*). For four species known from previous research (Forel, 1892; Atanassov & Dlusskij, 1992; Scifert, 2003), the findings were confirmed. These are: *M. barbarus*, *C. bulgarica*, *T. caespitum* and *T. erraticum*. Most new species are expected. A similar fauna of ants has been registered in the surrounding towns. Of the 23 species registered in Burgas (Lapeva-Gjonova et al. 2010), 13 species are the same as in Pomorie. From this research, new species common to the ant fauna of Burgas are: *M. structor*, *C. schmidtii*, *T. chefketi*, *T. ferox*, *P. pygmaea*, *L. niger* and *F. cunicularia* (Table 2). Of the 16 species registered for Sozopol (Lapeva-Gjonova et al. 2010), half are the same as in Pomorie. Common species with ant fauna of Nessebar are *M. structor*, *C. elegans* and previously *T. caespitum* (Barrett, 1970).

Table 2. New species for Pomorie, previously registered in places on the southern Bulgarian Black Sea coast.

Species	Places and References
<i>M. structor</i>	Nesebar (Barrett, 1970), Burgas (Atanassov & Vassileva, 1976)
<i>C. schmidtii</i>	Burgas (Forel, 1895), Rezovo (Atanassov, 1934)
<i>C. elegans</i>	Nesebar, Primorsko (Atanassov & Dlusskij, 1992)
<i>T. chejketi</i>	Primorsko (Atanassov & Vassileva, 1976; Hubenov et al. 1998), Maslen Nos (Atanassov & Vassileva, 1976), Burgas (Csösz et al. 2007)
<i>T. ferox</i>	Burgas (Csösz & Schulz, 2010)
<i>P. pygmaea</i>	Burgas (Forel, 1892)
<i>L. niger</i>	Burgas, Sozopol (Forel, 1892)
<i>F. cunicularia</i>	Burgas (Forel, 1892)

The record of *M. capitatus* from Pomorie is only the second record for Bulgaria. The previous record was from the northern coast: Kavarna, Kaliakra (Marko & Csosz, 2002). Nests of *M. capitatus* were found on the shores of the Black Sea and nearby Lake Pomorie, on the sandy soil with dry sparse vegetation. Determination of the species *M. capitatus* (Fig. 3-4) was performed according to Collingwood & Prince (1998) and on-line key (<https://www.antweb.org>).

Only one worker from the genus *Temnothorax* was found (different from *T. recedens*), which was not sufficient to determine the species (Fig. 5). This specimen had characteristics very similar to the species *Temnothorax flavicornis*: yellow body, head significantly longer than width, long propodeal spines, deviating from the longitudinal axis of the mesosome more than 25°.

According to IUCN Red List of Threatened Species, one species *Temnothorax recedens* is cited in the category Lower Risk/least concern: “Taxa which do not qualify for Conservation Dependent or Near Threatened”.



Fig. 3-4. *M. capitatus* - dorsal, lateral and head view.



Fig. 5. *Temnothorax* sp.

CONCLUSION

The current list of the myrmecofauna of Pomorie has been compiled on the basis of personal research from July 2021 and available publications on Bulgarian ants. As a result, the list contains 21 species of ants, belonging to 11 genera of 3 subfamilies:

Subfamily Myrmicinae – 5 genera, 12 species;

Genera: *Messor* (3 sp.), *Crematogaster* (1 sp.), *Temnothorax* (2 sp.), *Cardiocondyla* (3 sp.), *Tetramorium* (3 sp.).



Subfamily Dolichoderinae – 1 genera, 1 species;

Genera: *Tapinoma* (1 sp.).

Subfamily Formicinae – 5 genera, 8 species;

Genera: *Plagiolepis* (1 sp.), *Lasius* (1 sp.), *Camponotus* (1 sp.), *Formica* (4 sp.), *Cataglyphis* (1 sp.).

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