

# Myrmecofauna of Mesta river valley (Bulgaria) with report of eighteen new species for the region

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## INTRODUCTION & AIM

The myrmecofauna of Bulgaria is diverse, including Central and Northern European species, as well as thermophilic and xerophilic Mediterranean. The potential corridors for thermophilic fauna penetration include the Black Sea Coast and the valleys of the rivers Struma, Maritsa and Mesta.

Here, we consider the diversity of the ant species and the availability of thermophilic species in the valley of Mesta river. The Bulgarian myrmecofauna consists of about 195 published species (Lapeva-Gjonova & Antonova, 2022). Of them, only five species were reported in the literature for the region of Mesta Valley till our study.

**Published species:**  
- *Formica pratensis* Retzius, 1783 - Yakoruda (Gateva 1975);  
- *Tetramorium caespitum* (Linnaeus, 1758) - Petrelik vill. (Gotse Delchev) (Lapeva-Gjonova 2004);  
- *Lasius mixtus* (Nylander, 1846) - Gotse Delchev district (Atanassov & Dlusskij 1992);  
- *Proformica piloscapus* Dlussky, 1969 - Dolno Dryanovo vill. (Atanassov & Dlusskij 1992), thermophilous;  
- *Messor atanassovii* Atanassov, 1982 - Dolno Dryanovo vill. (Atanassov & Dlusskij 1992), thermophilous.

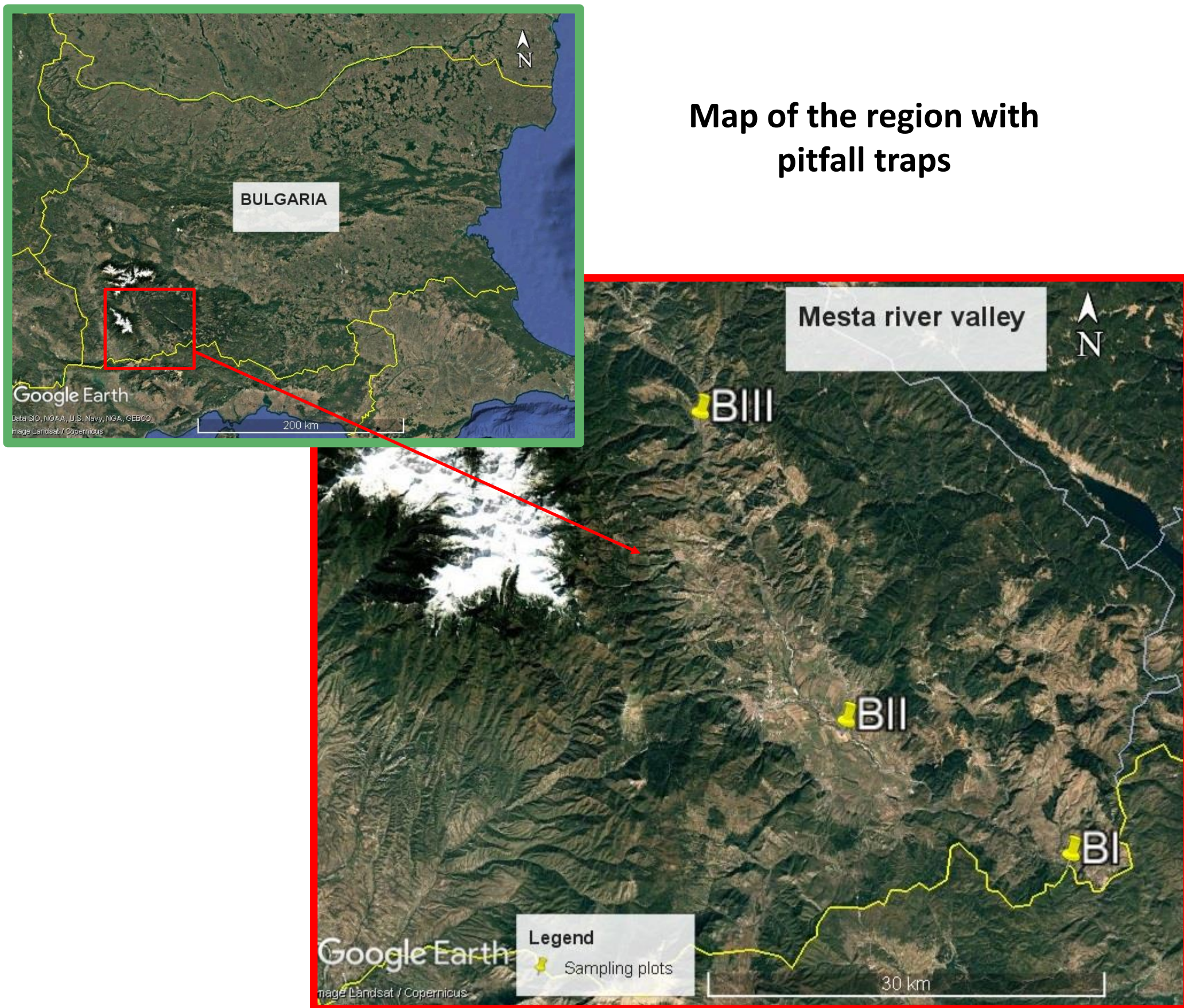
The recent project aims to establish the species composition of various animal groups, including ants, which are crucial for ecosystems and act as bioindicators. Indicator species will be identified to monitor the long-term effects of global climate change. We combine different research approaches and various field methods.

## METHOD

The Mesta river is situated in the southwestern part of Bulgaria. Its length is 230 km, of which 126 km flows through Bulgaria and the rest in Greece. It is situated on the north-south direction.

Three sampling plots were situated in the Mesta river bio corridor, from the southernmost point (BI) on Bulgarian territory north to where the Mediterranean influence is still significant (BII and BIII). A total of 30 pitfall traps and 3 mesovoid shallow substratum (MSS) traps were set. Ten pitfall traps were placed in each plot. They were exposed from February 2023 to February 2025. The MSS traps were modified for the needs of the present study and provide simultaneous capture at the surface, at a depth of 30-40 cm and a depth of 60-70 cm for collecting underground fauna as well.

The myrmecofauna was additionally sampled by hand collecting, leaf litter sifting and sweep netting. The sampling period for manual collecting was two hours per sampling plot. The collected specimens were preserved in 70-80% ethanol and deposited in the Institute of Biodiversity and Ecosystem Research collection at the Bulgarian Academy of Sciences (IBER).



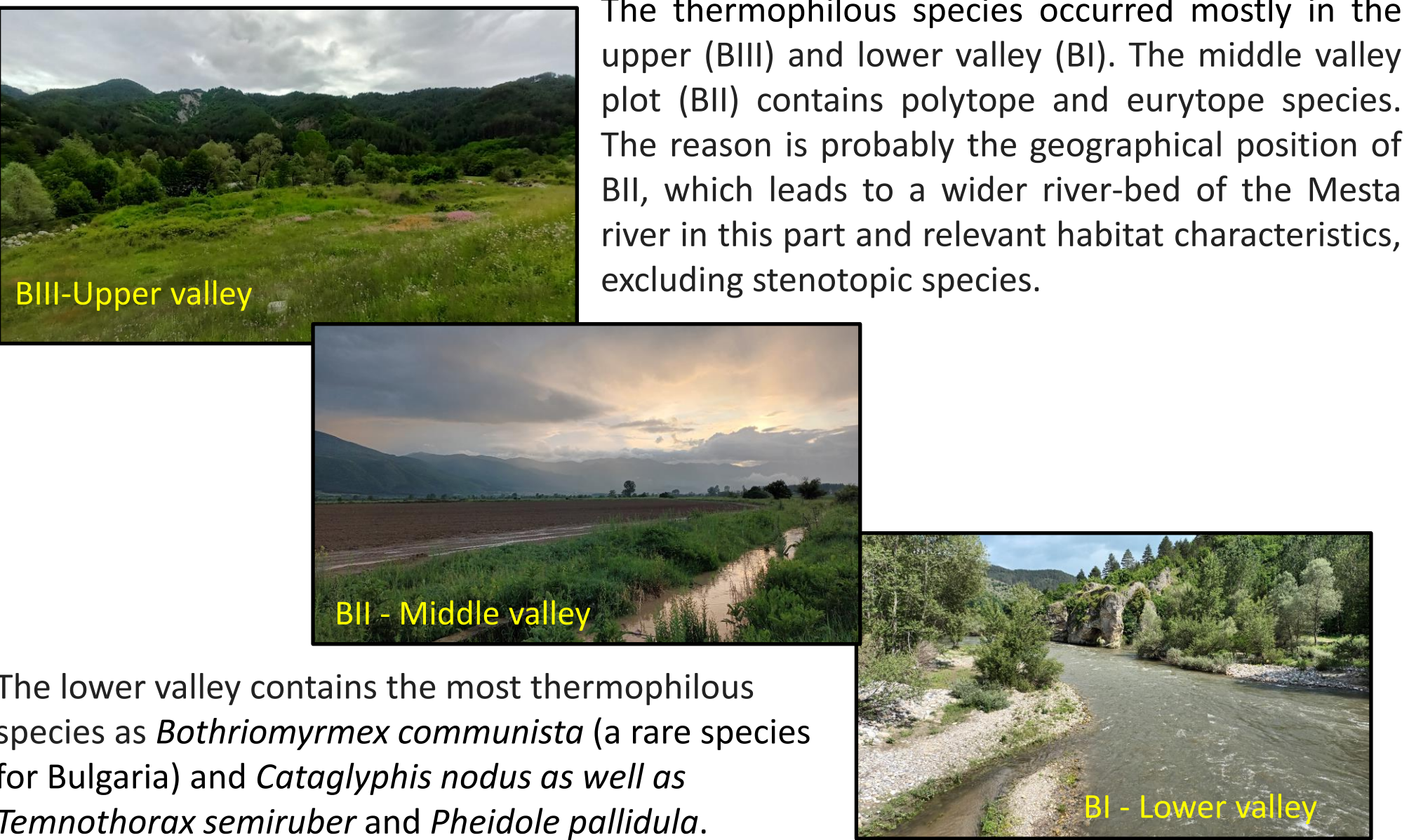
## RESULTS & DISCUSSION

Since the beginning of 2023 over 561 pitfall trap samples and over 100 MSS trap samples were collected in Mesta river valley. More than 50 samples were collected manually, with about 320 ant specimens. Nineteen species were recorded in total during the recent survey in the Mesta valley. Among them, 18 species are new to the area, and 14 are thermophilic species.

Collected species in the sampling plots till 2024:

| Sampling plot | Species                          | Ecological group                                  | New for the region |
|---------------|----------------------------------|---------------------------------------------------|--------------------|
| BI            | <i>Bothriomyrmex communista</i>  | very thermophilous (Borowiec & Salata, 2021)      | Yes                |
| BIII          | <i>Camponotus aethiops</i>       | thermophilous (Seifert, 1996)                     | Yes                |
| BIII          | <i>Camponotus piceus</i>         | thermophilous (Seifert, 1996)                     | Yes                |
| BI            | <i>Cataglyphis nodus</i>         | extremely thermophilous (Borowiec & Salata, 2021) | Yes                |
| BI            | <i>Crematogaster schmidtii</i>   | thermophilous (Borowiec & Salata, 2021)           | Yes                |
| BIII          | <i>Formica cunicularia</i>       | thermophilous (Seifert, 1996)                     | Yes                |
| BIII          | <i>Lasius fuliginosus</i>        | polytope (Seifert, 1996)                          | Yes                |
| BII           | <i>Lasius niger</i>              | eurytope (Seifert, 1996)                          | Yes                |
| BI, BIII      | <i>Lasius paralienus</i>         | xerothermic (Borowiec & Salata, 2022)             | Yes                |
| BI, BIII      | <i>Messor structor group</i>     | thermophilous (Seifert, 1996)                     | Yes                |
| BIII          | <i>Myrmica constricta</i>        | xerothermic (Seifert et al. 2009)                 | Yes                |
| BII           | <i>Myrmica rubra</i>             | eurytope (Seifert, 1996)                          | Yes                |
| BI            | <i>Pheidole pallidula</i>        | thermophilous (Borowiec & Salata, 2021)           | Yes                |
| BI, BIII      | <i>Plagiolepis pallescens</i>    | thermophilous (Borowiec & Salata, 2021)           | Yes                |
| BI, BIII      | <i>Tapinoma erraticum</i>        | thermophilous (Seifert, 1996)                     | Yes                |
| BIII          | <i>Temnothorax parvulus</i>      | thermophilous (Seifert, 1996)                     | Yes                |
| BI            | <i>Temnothorax semiruber</i>     | polytope (Salata et al. 2018)                     | Yes                |
| BII           | <i>Temnothorax unifasciatus</i>  | thermophilous (Seifert, 1996)                     | Yes                |
| BI, BII, BIII | <i>Tetramorium cf. caespitum</i> | thermophilous (Seifert, 1996)                     |                    |

Based on the literary and original data, a total of 23 species of ants are registered in the Mesta river valley. One of them – *Formica pratensis* is included in the IUCN Red List with conservation status Low Risk/NT and in Corine (Annex 4). Two other species – *Messor atanassovii* and *Temnothorax semiruber* are Balkan endemic species. Eighteen species are new for the region.



The lower valley contains the most thermophilous species as *Bothriomyrmex communista* (a rare species for Bulgaria) and *Cataglyphis nodus* as well as *Temnothorax semiruber* and *Pheidole pallidula*.

## CONCLUSION

A total of 23 ant species are currently known in the Mesta valley. Among them, 16 ant species (70%) are thermophilous. Eighteen species are new for the region. The river is rich of various biotopes and we suppose the species richness is much higher and the future searching and pitfall samples will prove this. Despite the proximity of the river and the presence of hygrophites, the Mesta river valley is a gateway for thermophilic Mediterranean species that enter the interior of the country.

## FUTURE WORK / FUNDING

Additional studies will clarify the rates of penetration of thermophilic species after qualitative and quantitative comparison of the composition of the myrmecofauna, along the south-north gradients. This study is a part of the Project “Monitoring the effects of global climate changes through qualitative and quantitative analysis of model animal groups in selected corridors of thermophilic fauna penetration in Bulgaria” (funded by the National Science Fund of Bulgaria under Grant contract number KP-06-N61/6 – 14.12.2022).