



## SHORT NOTE

### First Records of Two *Strumigenys* Ant Species (Hymenoptera: Formicidae) from Bulgaria

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#### Abstract

The *Strumigenys* ant species (Hymenoptera: Formicidae) are poorly studied in Bulgaria due to their small size and cryptic lifestyles. To date, only one species, *S. baudueri* (Emery, 1875), has been reported from a collecting site in the East Rhodopi Mountains (South Bulgaria). Herein we provide the first records of another two species in Bulgaria: *S. argiola* (Emery, 1869) (Northeast Bulgaria) and *S. tenuipilis* Emery, 1915 (South Pirin Mountain). Scanning electron microscope micrographs of both species are also provided.

*Strumigenys* F. Smith, 1860 is a genus of minute Attini ants (the former Dacetini) that live mostly in the tropics and subtropics, consisting of 850 species (Bolton, 2020). Only nine species are known in the western Palaearctic (*S. argiola* (Emery, 1869), *S. baudueri* (Emery, 1875), *S. emmae* (Forel, 1909), *S. lewisi* Cameron, 1886, *S. membranifera* Emery, 1869, *S. rogeri* Emery, 1890, *S. tenuipilis* Emery, 1915, *S. tenuissima* (Brown, 1953), and *S. silvestrii* Emery, 1906), mainly distributed in the Mediterranean, Southern Europe, and the Middle East (MacGown et al., 2012; Borowiec, 2014). Four of these species, *S. emmae*, *S. membranifera*, *S. silvestrii* and *S. rogeri*, are widespread tramp ants, which are transported around the world through human commerce (Wetterer, 2011).

The genus includes small, slow-moving cryptic ants the length of a worker ant's body, spanning a range from 2-5 mm. Species differ greatly and a combination of characteristics are used for genus definition. For workers, these characteristics include the presence of an anterior transverse ridge on the first gastral tergite (limbus), ventrolateral position of the eyes, often spongiform tissue on the postpetiole (Baroni Urbani & de

Andrade, 2007). The *Strumigenys* species usually nest in soil and under leaf litter, where they feed as predators on springtails and other tiny arthropods (Wilson, 1953; Wetterer, 2011).

There is only one recorded species in Bulgaria, *S. baudueri* (Bezděčka & Bezděčková, 2009, given as *Pyramica baudueri*), found in a site in the East Rhodopi Mountains. In the current study two *Strumigenys* species that have not been previously known in Bulgaria, *S. argiola* and *S. tenuipilis*, are reported.

The sampling was carried out during routine entomological research using Moericke traps and leaf litter sifting. The Moericke traps, which are also known as pan traps, represent a lethal sampling technique designed to survey active flyers, nectar, or host-shelter searching insects. The traps were deposited at five pan trap stations and placed at straight line at a distance of 50 meters. Each trap station held three trapping units (plastic bowls that were blue, red, and yellow), set on the ground and filled with water and detergent, which acted as a collecting medium. The area is characterized as a plateau of dry grassland that includes elements of the Ponto-Sarmatic steppes. A common plant in this area is *Festuca valesiaca*



Schleich. ex Gaudin. There is also a characteristic presence of *Paeonia tenuifolia* L. A single male belonging to *Strumigenys argiola* was captured in the third trap station. The color of the trap was not accounted for.

Three workers of *S. tenuipilis* were extracted after leaf litter sifting near Kalimantsi village (Southwest Bulgaria). This locality is situated on the southern slopes of the Pirin Mountain where southern European and Mediterranean ant species occur due to the increased sub-Mediterranean climate impact.

In preparation for the scanning electron microscopy (SEM) the specimens were dehydrated in a graded series of

ethyl alcohol, then air-dried and mounted on double-sided adhesive carbon tape. They were gold-coated in a vacuum unit and then images were taken using the microscope LYRA/ TESCAN 5007, operating at 10 kV. The signals used to produce the SEM images were secondary electrons.

Material examined:

***Strumigenys argiola* (Emery, 1869)** (Fig 1)

**Material examined:** Northeast Bulgaria, SW from Balchik, N43°23'40" E28°06'34", 210 m, landfill site, Moericke trap, 18.-20.VII.2018, 1 male, leg. T. Ljubomirov

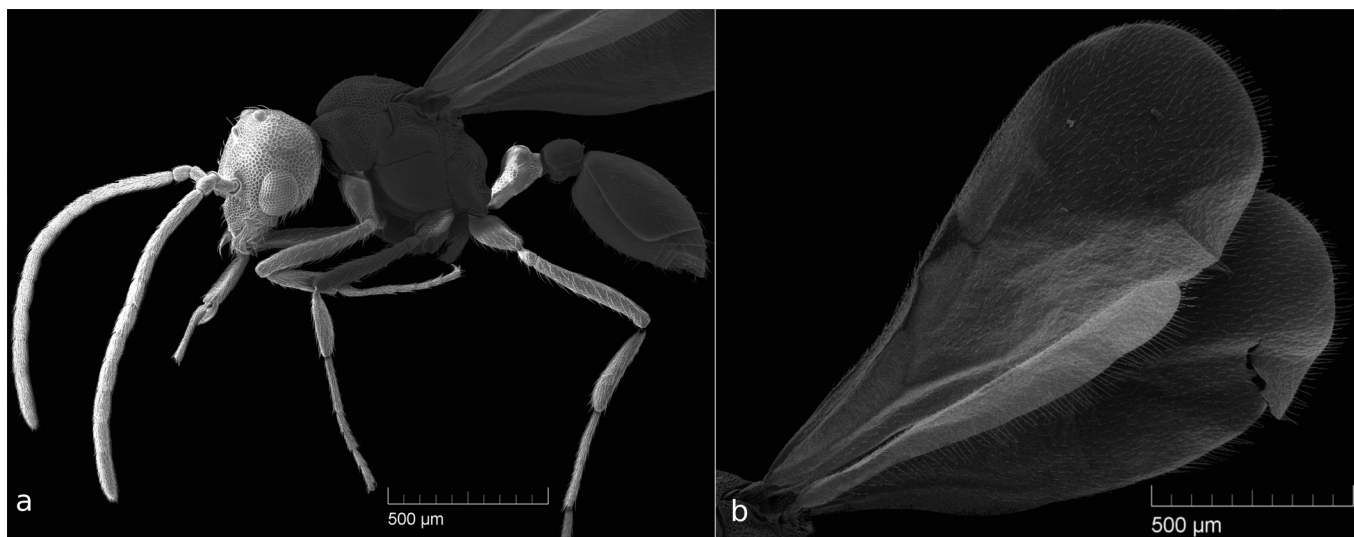


Fig 1. Male of *Strumigenys argiola* – a. body in profile, b. wings.

***Strumigenys tenuipilis* Emery, 1915** (Fig 2)

**Material examined:** Southwest Bulgaria, South Pirin Mountain, E from Kalimantsi village, N41°27'56" E23°29'53", 340 m, gully, sifting, 10.04.2019, 3 workers, leg. R. Bekchiev

The Bulgarian ant fauna currently consists of about 186 species and more than 10 have not yet been reported (Lapeva-Gjonova, unpubl.). Geographic location and diverse topography determine the presence of diverse faunal elements and the significant occurrence of southern European and Mediterranean ant species, especially in the southern regions

and the Black Sea coast. The application of varying collecting techniques has resulted in the finding of species that are less commonly obtained by methods such as direct hand sampling. The Moericke traps and leaf litter sifting used in this study have been reported as suitable for the detection of *Strumigenys* species (Holecová et al., 2015; Tăușan & Pintilioaie, 2016; Tang et al., 2019). As a result, two very rarely-found species are reported for the first time from Bulgaria – *S. argiola* and *S. tenuipilis*. These species, like the previously recorded *S. baudueri*, belong to the specific subterranean ant fauna.

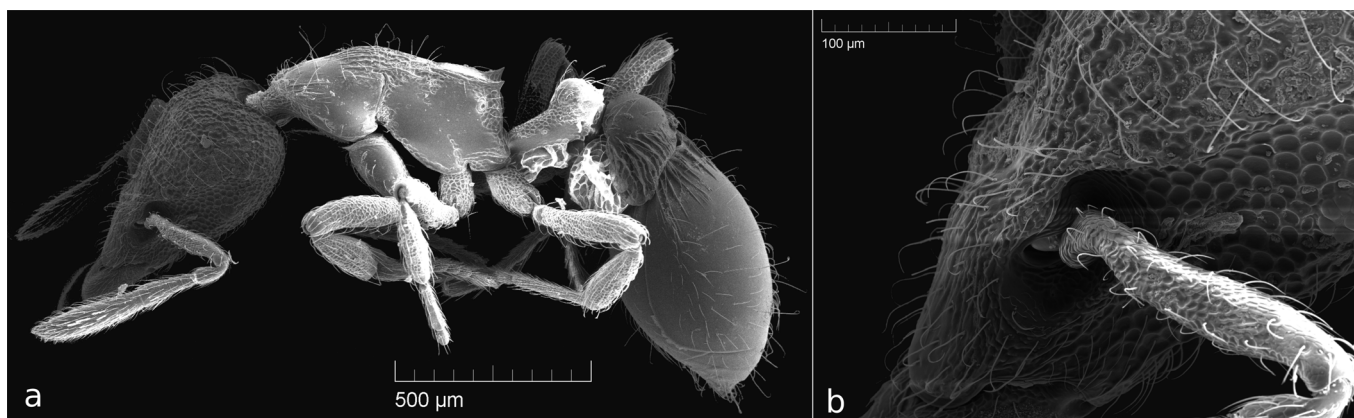


Fig 2. Worker of *Strumigenys tenuipilis* – a. body in profile, b. clypeal area.

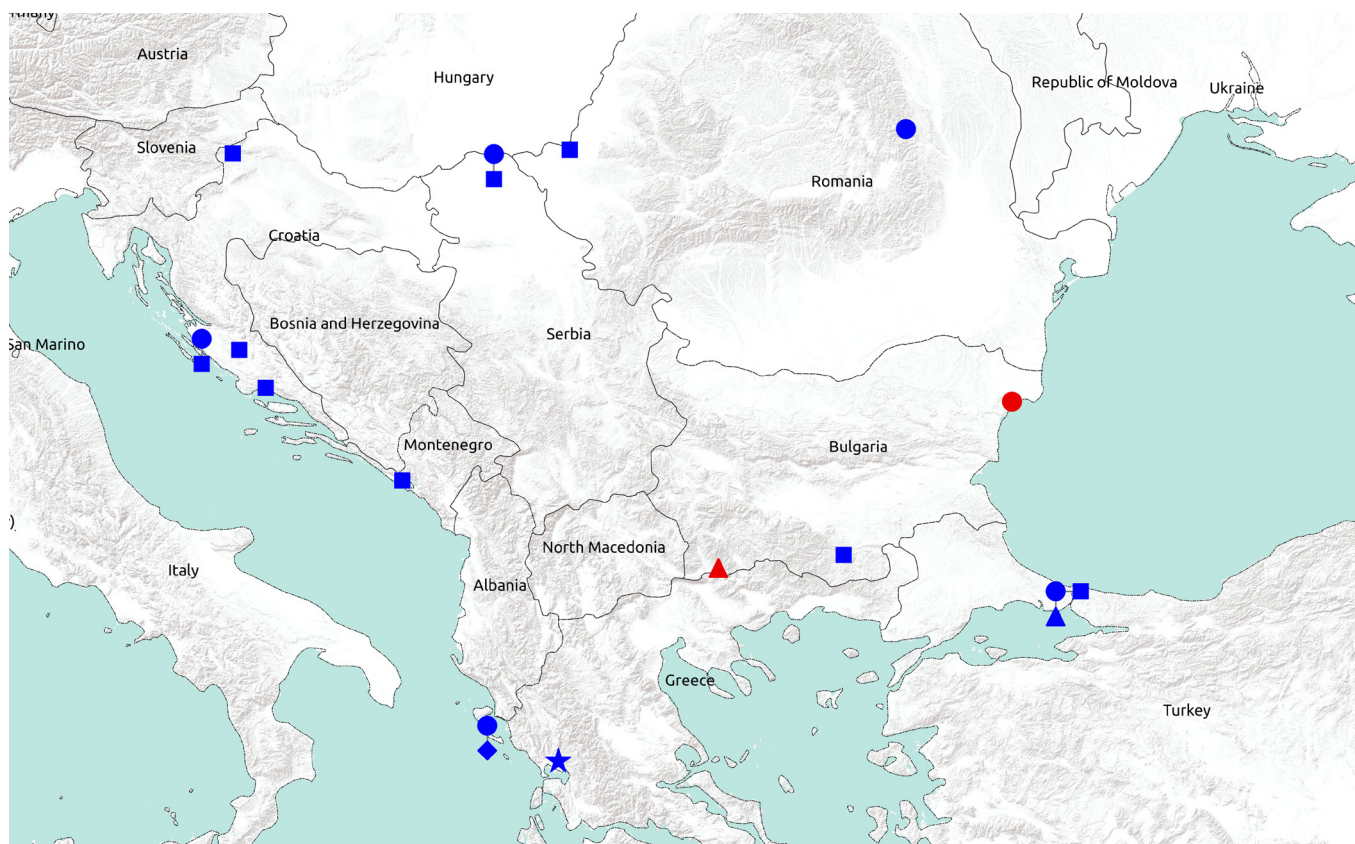
Although *Strumigenys tenuipilis* has been described by Emery (1915) as *S. baudueri* var. *tenuipilis*, it is well distinguished from *S. baudueri* by its clypeal hairs that are non-spatulate, directed anteriorly and distinctly curved apically. Additionally, it occurs in a wide variety of preserved natural habitats, whereas *S. argiola* is common in highly disturbed environments as well as urban and suburban open habitats (Holecová et al., 2015).

The material found from *Strumigenys argiola* consists of a single male that exhibits the characteristic coloration of the body with a dark brown head and metasoma, as well as light brown mesosoma, petiole, and appendages. Its finding in August correlates with the swarming period in Europe, which usually occurs in July and August (Fellner et al., 2009; Holecová et al., 2015).

*Strumigenys argiola* is spread more widely in Europe and North Africa than *S. tenuipilis*. In the Balkans *S. argiola*

is recorded in Croatia (Müller, 1921), Serbia (Petrov & Collingwood, 1992), and Turkey (Istanbul: Karaman et al., 2014) (Fig 3). In Greece there is a record of this species in Corfu (Finzi, 1930). *Strumigenys tenuipilis* is a more thermophilic species and has restricted Mediterranean distribution. The nearest known location to the Balkan Peninsula where this species has been recorded is Istanbul (Bernard, 1967). It is listed in Borowiec (2014) for Greece based on the first edition of on-line Fauna Europea project (Borowiec, pers. comm.).

Only three *Strumigenys* species are supported by collection data from the Balkans – *S. argiola*, *S. baudueri* and *S. membranifera* (Fig 3). The individual reports from Istanbul regarding *S. argiola*, *S. baudueri* and *S. tenuipilis* are completely devoid of collection details (Emery, 1916; Karaman et al., 2014).



**Fig 3.** Map with collecting sites of *Strumigenys* ant species in Bulgaria and the countries in the Balkan Peninsula. In red are new data, in blue – literature data: *S. argiola* (circle), *S. baudueri* (square), *S. membranifera* (star), *S. tenuipilis* (triangle), *S. tenuissima* (diamond).

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