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AUTHORS: Celal KARAMAN,Kadri KIRAN,Volkan AKSOY

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NEW RECORDS OF THE GENUS *Strumigenys* SMITH, 1860 (HYMENOPTERA, FORMICIDAE) FROM BLACK SEA REGION OF TURKEY

Celal KARAMAN*, Kadri KIRAN, Volkan AKSOY

Trakya University, Faculty of Sciences, Department of Biology, Balkan Campus, Edirne

*Corresponding author: e-mail: celalkaraman78@gmail.com

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Abstract: *Strumigenys* is one of the most speciose genera in the world. Although the genus is speciose, still they are recorded occasionally because of their small size, cryptic lifestyle and slow movements of its members which also stand still when disturbed. We report here two species of the genus, *S. argiola* and *S. baudueri*, from Eastern Black Sea Region of Turkey, which, until now, were only recorded from İstanbul in the first half of the 20th century. Diagnostic characteristics, details of the localities, photographs of both species, and an identification key for Turkish *Strumigenys* species are given.

Key words: Turkey, Black Sea Region, *Strumigenys*, new records, key.

Doğu Karadeniz Bölgesi'nden *Strumigenys* Smith, 1860 (Hymenoptera, Formicidae) Cinsi İçin Yeni Kayıtlar

Özet: Tüm Dünya'da en fazla tür içeren cinslerden biri olan *Strumigenys* cinsi çok tür ile temsil ediliyor olmasına rağmen, çok küçük vücutlu, yavaş hareketli olmaları, kriptik yaşam tarzları ve rahatsız edildiklerinde hareketsiz kalmaları nedeni ile çok nadiren kayıt edilirler. Bu çalışmada 20. yüzyılın ilk yarısında İstanbul'dan kayıt edilmiş, cinse ait iki tür, *S. argiola* ve *S. baudueri*, Türkiye'nin Doğu Karadeniz Bölgesi'nden kayıt edilmiştir. Saptanan iki türe ait diagnostik karakterler, detaylı lokalite bilgileri ve fotoğraflar ile Türkiye'den bilinen *Strumigenys* türlerine ait tür tayin anahtarları verilmiştir.

Anahtar kelimeler: Türkiye, Doğu Karadeniz Bölgesi, *Strumigenys*, yeni kayıtlar, tayin anahtarları.

Introduction

Strumigenys Smith, 1860 is one of the speciose genus in the World with 836 actual and 4 fossil species (Bolton 2014). The members of the genus are very common but their records are rather rare because of the small body, cryptic habits and slow movements of workers (Bharti and Akbar 2013). It is also hard to determine members of this species in nature because they stand still when disturbed. They are specialized predators on small arthropods (Diplura, Araneae, Acarina, Pseudoscorpiones, Isopoda etc.) and many other small Insecta members which are mainly foraging and nesting in leaf litter, top layer of the soil and rotten woods and stumps embedded in soil.

Strumigenys is classified under the tribe Dacetini and its members are distributed worldwide from the tropics to subtropics and warm temperate regions (Sharaf et al. 2014). The internal taxonomic classification of the tribe was unstable and many generic shuffling and reshufflings had been made by many authors till 2013 (Bharti and Akbar, 2013). Bharti and Akbar (2013) summarized briefly the complicated taxonomic history of the genus.

The identification of the members of *Strumigenys* are based on mainly: numbers of antennal segments; shape of mandibles and location of mandibular teeth; shape and frequency of pilosity on body; presence of spongiform appendages on waist and first gastral sternite.

Alike other ant species, i.e. *Linepithema humile* Mayr, 1868, *Nylanderia vividula* (Nylander, 1846), *N. jaegerskioeldi* (Mayr, 1904), and *Pheidole teneriffana* Forel, 1893, several *Strumigenys* species are known as "invasive species" which have gained their wide distribution through human commerce (McGlynn, 1999). *S. membranifera* Emery, 1869 and *S. rogeri* Emery, 1890 are the most successful invasive species of the genus in the Palearctic Region. Moreover, *S. silvestrii* Emery, 1906, which has wide distribution in Argentina, Brazil, Cuba, Louisiana, Bahamas, Dominican Republic, Florida and California has been recently recorded from Portugal-Madeira (Wetterer et al. 2007) and Portugal-mainland (Boieiro et al. 2009).

In the western Palearctic the genus is represented by 8 species, including the recent records: *S. membranifera* Emery; *S. rogeri* Emery; *S. silvestrii*

Emery; *S. argiola* (Emery, 1869); *S. baudueri* (Emery, 1875); *S. lewisi* Cameron, 1886; *S. tenuipilis* Emery, 1915; *S. tenuissima* (Brown, 1953).

Among these, 1 invasive (*S. membranifera*) and 3 native Palearctic species (*S. argiola*, *S. baudueri* and *S. tenuipilis*) of the genus have been recorded from Turkey so far. These 4 species were only recorded from İstanbul or without exact locality information by several authors generally in the first half of the 20th century, and since then, almost more than 50 years, no members of the genus have been recorded from Turkey.

In this study, we report 2 Palearctic species of the genus from Eastern Black Sea Region of Turkey.

Materials and Methods

The study was performed in Eastern Black Sea Region of Turkey between the years 2012 and 2013. The specimens were collected via aspirator in the field. The taxonomic studies were performed using an Olympus SZ51 stereomicroscope and digital images were prepared using Nikon D70s digital SLR camera with 4x microscope objective and Combine-Z (2008) free software. The images were cleaned with Adobe Photoshop CS5.

Results

Strumigenys argiola (Emery, 1869)

Material examined: 1 worker: Turkey-Giresun, N 40°53'52" E 38°25'46", 102m a.s.l., 13.6.2012, leg. Kiran, K., Karaman, C., Aksoy, V.

General distribution: Austria, Azerbaijan, Croatia, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Morocco, Portugal, Russia (Caucasus), Sardinia, Serbia, Sicily, Spain, Switzerland, Tunisia, Turkey (Markó 2008; Borowiec 2014).

Remarks: The species is characterized by the following characters: head with spatulate hairs except clypeus in frontal view; mandibles elongated, not triangular; apical mandibular teeth extremely long, much longer than preapical teeth (Fig. 1A); antennae with 4 segments, inner edge of scapae with spatulate hairs; mesonotal groove distinct (Fig. 1B).

The species was recorded from a *Corylus avellana* Linnaeus orchard (Fig. 2) in Giresun at 102m elevation. Giresun has a subtropical weather type and the mean temperature and mean total rainfall in June was 20.2°C and 78.11/sqm, respectively. In the *Corylus* orchard, trees are located far from each other and stones and sun-exposed areas are abundant on the orchard ground. Orchard ground flora is constituted mainly by *Pteridium* sp., *Fragaria* sp., *Taraxacum* sp., *Lolium* sp., *Dactylis glomerata* Linnaeus, *Sanguisorba* sp., *Lapsana communis* Linnaeus and Poaceae species. The ant species sampled in the same habitat with *S. argiola* in this locality are *Aphaenogaster subterranea* (Latreille, 1798), *Camponotus candiotus* Emery, 1894,

Crematogaster schmidtii (Mayr, 1853), *Formica gagates* Latreille, 1798, *F. cunicularia* Latreille, 1798, *Lasius alienus* (Foerster, 1850), *L. niger* (Linnaeus, 1758), *L. paralienus* Seifer, 1992, *Myrmecina graminicola* (Latreille, 1802), *Myrmica hellenica* Finzi,

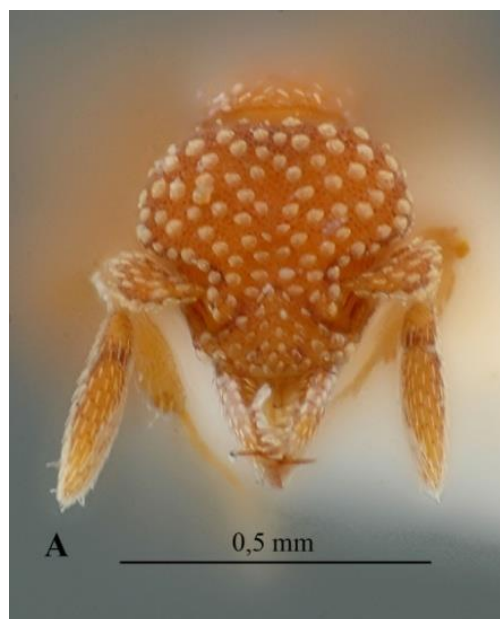


Fig. 1. *Strumigenys argiola* worker, A, head (frontal view); B, head, meso- and metasoma (profile view).



Fig. 2. A general view of the habitat in Turkey-Giresun locality where *S. argiola* was sampled.

1926, *Plagiolepis pallescens* Forel, 1889, *Ponera coarctata* (Latreille, 1802), *Solenopsis fugax* (Latreille, 1798), *Tapinoma erraticum* (Latreille, 1798), *T. simrothi* Krausse, 1911, *Temnothorax unifasciatus* (Latreille, 1798), *Tetramorium* cf. *caespitum* (Linnaeus, 1758) and *T. chefketi* Forel, 1911.

***Strumigenys baudueri* (Emery, 1875)**

Material examined: 1 worker: Artvin-Yusufeli-Erenköy, N 40°53'50" E 41°50'38", 1464m a.s.l., 26.6.2013, leg. Kiran, K., Karaman, C., Aksoy, V.

General distribution: Algeria, Armenia, Balearic Is., Bulgaria, Channel Is., Corsica, Croatia, France, Greece, Hungary, Italy, Macedonia F.Y.R., Malta, Montenegro, Morocco, Romania, Sardinia, Serbia, Sicily, Spain, Switzerland, Tunisia, Turkey (Markó 2008; Borowiec 2014).

Remarks: *S. baudueri* is the most common and widespread species among the 8 species of the genus in West Palearctic Region. This species is characterized by: pyriform head; triangular mandibles with one serially dentate masticatory margin (Fig. 3A); almost same sized apical tooth with preapical tooth; clypeus with spatulate or spoon-like shaped hairs; inner edge of scape without spatulate hairs; very slight metanotal groove (Fig. 3B).

S. baudueri was recorded from an old (more than 100 years) *Pinus sylvestris* Linnaeus forest (Fig. 4) at 1464m elevation. The species was recorded so far generally from elevations lower than 500m a.s.l. except an Armenian record at 1600m. Our record is the second highest elevation information of the species from West Palearctic Region. The Artvin locality where *S. baudueri* was sampled is more arid region than the subtropical Giresun locality and the mean temperature and mean total rainfall in June was 18.6°C and 48.2l/sqm, respectively. The forest ground is stony and sun-exposed areas abundant. Forest ground flora is constituted mainly by *Hypericum* sp., *Helianthemum* sp., *Trifolium* sp., *Plantago* sp., *Astragalus* sp., *Sanguisorba* sp., *Onobryhis* sp., *Juniperus* sp., *Pichris* sp. and *Campanula* sp. The ant species sampled in the same habitat with *S. baudueri* in this locality are *Aphaenogaster subterranea*, *Camponotus aethiops* (Latreille, 1798), *C. piceus* (Leach, 1825), *Cataglyphis aenescens* (Nylander, 1849), *Formica sanguinea* Latreille, 1798, *Lasius alienus*, *Myrmica hellenica*, *M. ravausii* Finzi, 1923, *M. schencki* Viereck, 1903, *Solenopsis fugax*, *Tapinoma erraticum*, *Temnothorax crassispinus* (Karavaiev, 1926), *T. interruptus* (Schenck, 1852), *Temnothorax* sp., *T. tuberosum* (Fabricius, 1775), *T. unifasciatus*, *Tetramorium chefketi*, *T. impurum* (Foerster, 1850) and *T. moravicum* Novák & Sadil, 1941.

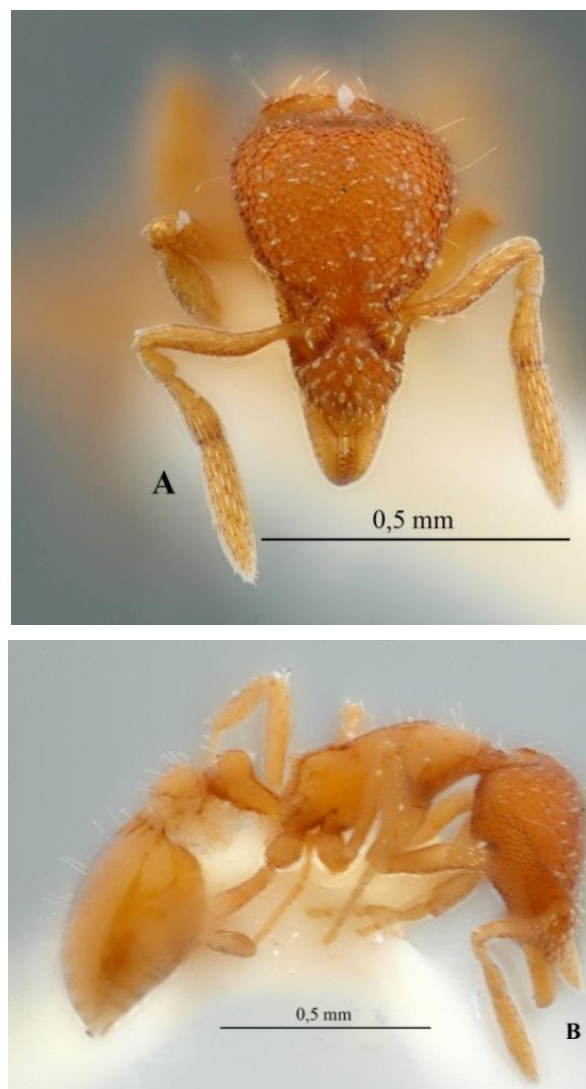


Fig. 3. *S. baudueri* worker, **A.** head (frontal view); **B.** head, meso- and metasoma (profile view).



Fig. 4. A general view of the habitat in Artvin-Yusufeli-Erenköy locality where *S. baudueri* was sampled.

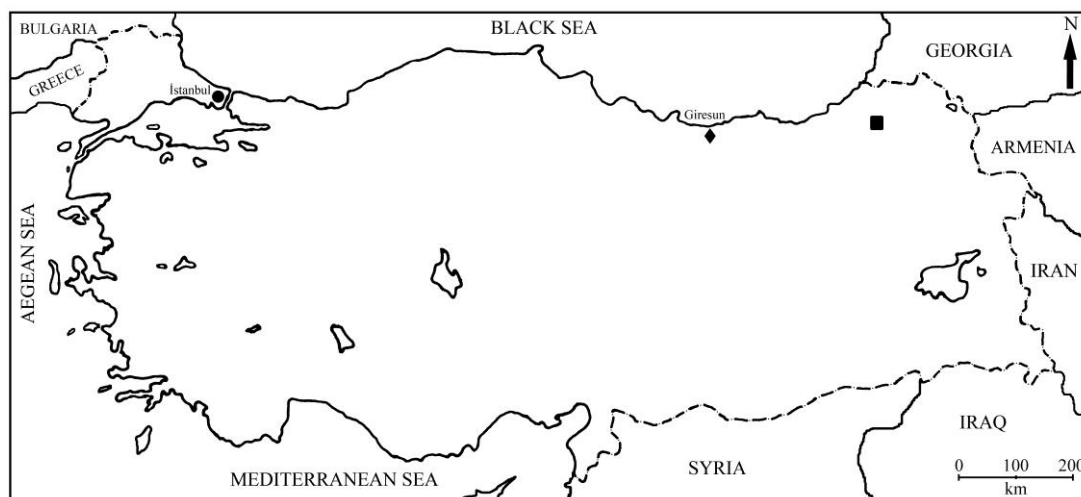


Fig. 5. The map showing known localities where *Strumigenys* was recorded in Turkey (●: old records of *Strumigenys* spp.; recent records ◆: *S. argiola*, ■: *S. baudueri*)

A key for Turkish *Strumigenys* species

1. Mandibles fine, elongated and with big teeth apically; antennae 4 segmented ***S. argiola***
 - Mandibles short and wide, triangular shaped; antennae 6 segmented, sometimes 2nd and 3rd or 3rd and 4th funicular segments fused and in this case antennae 5 segmented **2**
2. Head from front view with spatulate hairs ***S. baudueri***
 - Head without spatulate hairs **3**
3. Mesosoma without mesonotal groove; scape with spatulate hairs ***S. membranifera***
 - Mesosoma with mesonotal groove; scape without spatulate hairs ***S. tenuipilis***

Discussion

Turkey contains a pronounced biodiversity due to the fact that it lies at the junction point of three different biogeographical regions – the Caucasian, the Irano-Anatolian, and Mediterranean regions – while also connecting two continents – Asia and Europe. Turkey is also of paramount importance by serving as a refugium in glacial and postglacial periods. Moreover, Turkey's highly variable topography, climate and habitat types are root cause of high degree of ant diversity (Karaman and Aktaş 2013). Consequently, 306 ant taxa have been recorded from Turkey according to recent Turkish ant checklist (Kıran and Karaman 2012). In the last two years, this number was increased to 352 (unpublished data). In spite of the high taxa number recorded from Turkey, Turkish ant fauna is poorly studied and only Turkish Thrace, Central Anatolia, and Eastern Anatolia Regions have been studied in detail and Eastern Black Sea Region has been studied by the authors recently. Many new species for Turkish ant fauna are recorded from this region (unpublished data). In this study the authors recorded two very rare species of the genus

Strumigenys from Eastern Black Sea Region for the first time. The *S. argiola* record from Giresun and *S. baudueri* record from Artvin contribute to fill the distributional gap of these species which are only known from İstanbul in Turkey (Fig. 5) and from Azerbaijan and Georgia, and Armenia in the East of Turkey, respectively. It is very difficult to record the species of the genus *Strumigenys* with classic collection method (hand collecting with aspirator) because of their cryptic habits, slow movements and also their sudden movement stops to be motionless when disturbed. The real Turkish distribution of these cryptic species and other cryptic species is thought to be revealed by addition of new records from Turkey using alternative collecting methods which were explained in detail by Bestelmeyer and colleagues (Bestelmeyer et al. 2000).

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