

First records of the dacetine ant species *Pyramica argiola* (EMERY, 1869) (Hymenoptera: Formicidae) from Austria

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Abstract

Records of *Pyramica argiola* (EMERY, 1869) are presented from three localities in eastern and southern Austria. The species is new to the Austrian ant fauna. Four workers were collected in litter samples during a survey of the myrmecofauna in the National Park Donau-Auen, 25 km east of Vienna, in May 2008. In Klagenfurt (Carinthia) several swarming gynes and males of *Pyramica argiola* were observed in recent years, which indicate the first discovery of a colony of this species in Austria. The currently known European distribution of *Pyramica argiola* is documented.

Key words: *Pyramica*, cryptic leaf-litter ants, Winkler method, new record, Austria.

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Introduction

Species of the tribe Dacetini (Myrmicinae) are diminutive ants which live in a cryptic way in leaf litter, topsoil or rotten wood. From what is known today all Dacetini species are predatory, mainly hunting Collembola but also other small insects. The structure of their mandibles reflects these specializations concerning prey seizure (BOLTON 1999). BOLTON (1999, 2000) re-defined dacetine genera and re-named *Pyramica* as a valid genus from synonymy with *Strumigenys*. With over 300 described species *Pyramica* has a world-wide distribution; the vast majority of species occur in the tropics or subtropics. Distinctive features of *Pyramica argiola* (EMERY, 1869) workers are their highly modified head shape, 4-segmented antennae and characteristic body pilosity. So far *P. argiola* has been recorded from eight southern European countries (including southern Switzerland), but never from Austria. There is also one record from western Germany (City of Cologne: BUSCHINGER 1997), but it remains to be proven that this observation relates to a native population.

The discovery of *P. argiola*, a new genus and species for the Austrian ant fauna, is here reported for Lower Austria and Carinthia. This increases the list of Austria's native ant fauna to 128 free living species (SCHLICK-STEINER & STEINER 2007).

Results

Location in Lower Austria: The vouchers from Lower Austria were found in the National Park Donau-Auen (i.e., Danube flood plain), located 25 km east of Vienna (Lower Austria). Two workers of *Pyramica argiola* were obtained from one leaf-litter sample collected near Stopfenreuth (48° 08' 44" N, 16° 52' 53" E, 160 m above sea level) on 9 May 2008. The location at a flood-prevention dam ("Marchfeld-

dam") is characterised by semidry grassland mown once or twice a year with floodplain forest (largely made up of poplar trees) adjacent to the north. The litter sample was taken at the north exposed side of the dam (35° slope angle) from a 1 × 1 m² quadratic plot. This sample consisted mainly of remains from former mowings (litter depth 2 cm, wet mass 842 g). Seven other ant species were found in this sample. In all, 15 species (including *Myrmecina graminicola* (LATREILLE, 1802), *Myrmica sabuleti* MEINERT, 1861, *Plagiolepis vindobonensis* LOMNICKI, 1925, *Ponera coarctata* (LATREILLE, 1802), *Solenopsis fugax* (LATREILLE, 1798), *Tapinoma ambiguuum* EMERY, 1925, *T. erraticum* (LATREILLE, 1798), and *Proceratium melinum* (ROGER, 1860)) were encountered in all five samples from that location. Two further *P. argiola* workers were obtained in a litter sample from a section of the same dam between Orth and Eckartsau (48° 08' 00" N, 16° 44' 46" E, 160 m above sea level) on 23 May 2008. The litter sample (3.8 cm, 1308 g) was taken at the south exposed side (21.5° slope angle) which is sunlit all day long. This section of the dam is much drier than the other location because there is no forest but grassland adjacent to its sides; it is covered also by semidry grassland.

The Winkler sifting and extracting method applied to the litter samples is a collection technique commonly used in tropical rainforests but is also appropriate for use in other habitats (for detailed information, see BESTELMEYER & al. 2000). In all, 160 litter samples were taken at 32 sites, distributed across 23 km in the Danube flood plain. However, from over 100 sorted-out litter samples only these four workers in two samples were thus far uncovered. Other small litter-inhabiting species like *Ponera coarctata*, *Stenammina debile* or *Myrmecina graminicola* were detected far more

often (incidence between 8 - 28% of the analysed Winkler samples). Identification of *P. argiola* was based on available taxonomic keys (SEIFERT 2007). Specimens are currently in the first author's collection.

Location in Carinthia: The site of observation in Klagenfurt is a rock garden in a private area, situated at the outskirts of the town (46° 37' 53" N, 14° 17' 47" E, elevation: 447 m). The habitat is located on a southeast exposed slope of a mound consisting of gravel and crushed stone, representing excavated material from a more than 100 year old well. The mound has barely been altered in the last few decades and is quite natural. Vegetation cover is incomplete, with naturally growing *Carex caryophylla*, *Luzula campestris* and *Viola odorata* and cultivated cushion plants (for example *Iris pumila*, *Dianthus* sp., *Pulsatilla* sp., *Alyssum* sp., *Potentilla* sp., *Gentiana* sp., or *Teucrium chamaedrys*).

The ants were first observed in August 2005. Several alate gynes and males (Fig. 1) were sampled during their swarming in late summer 2007, and were sent to Prof. A. Buschinger (Darmstadt, Germany) for identification. In the last four years observations of several display rituals of adult males and swarming gynes were done in the first half of August. In spite of intensive searching no workers could be found there until now. The syntopic ant fauna near the nest area is represented by *Solenopsis fugax*, *Tapinoma erraticum*, *Formica cunicularia* LATREILLE, 1798, *Plagiolepis pygmaea* (LATREILLE, 1798) and two species of *Temnothorax*. Voucher specimens are in Prof. Buschinger's collection and were committed to the collection of the Natural History Museum of Vienna.

Discussion

Sampling methods: Some ant species, notably small and ecologically cryptic ones, are difficult to detect with common methods of ant sampling. Litter sampling techniques have seen limited systematic use for ant surveys in Central Europe. Therefore ant species that inhabit litter microhabitats remain under-sampled. This clearly applies to *Pyramica argiola*, a diminutive predatory species that can be encountered almost exclusively in litter.

As far as we are aware, the survey in the Danube flood plains represents the first attempt ever for applying the Winkler litter-sifting method to the ant fauna of Austria. The poor knowledge concerning the distribution and abundance of litter ant species in many parts of the otherwise rather well-explored fauna of central Europe is certainly due to insufficient sampling methodology. We presume that inadequate sampling is the reason why *Pyramica* had not been found earlier in Austria, and we hypothesize that the species will show up at far more sites once looked for.

Distribution and habitat: *Pyramica argiola* has so far been verified for the European countries Portugal (BOIEIRO & al. 1999), Spain (TINAUT 1988), France (BONDROIT 1918), Corsica (CASEVITZ-WEULERSSE 1990), Switzerland (KUTTER 1973, BORCARD & al. 1997), Italy (EMERY 1869), Hungary (GALLÉ & al. 1998), former Yugoslavia (PETROV & COLLINGWOOD 1992), and Greece (BOLTON & al. 2007).

Furthermore a record exists from Germany where a single gyne has been found in the zoo of Cologne (BUSCHINGER 1997). The currently known geographical distribution of *Pyramica argiola* in Europe is summarised in Figure 2.

The distribution area of *P. argiola* is centred around the Mediterranean basin (BERNARD 1968), which implies that



Fig. 1: Two males of *Pyramica argiola*, courting a gyne. Mating only happens on the ground near the area of the courtship display (photo by V. Borovsky).

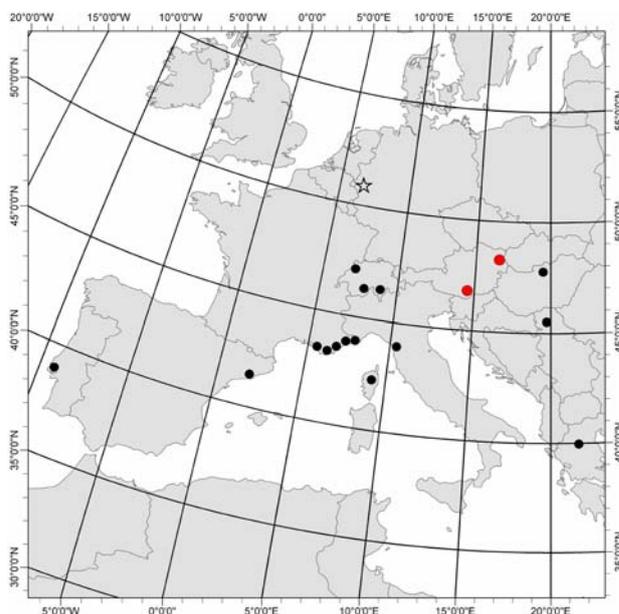


Fig. 2: Geographical distribution of *Pyramica argiola* in Central Europe. Hitherto localities are marked black, the new ones in Austria red. The place of discovery in the zoo of Cologne (BUSCHINGER 1997) is marked with a star.

it is a thermophilic species mainly of open landscapes (see localities in southern Switzerland and Hungary). In Switzerland, for example, *P. argiola* was found in calcareous lean grassland (canton Jura) and in a dry pine forest (Pfywald, canton Wallis). The new records from the extreme east and south of Austria fit rather well into the known distributional pattern: the nearest records approximately 200 km to the east of Lower Austria are from Central Hungary and the records from Carinthia parallel those from the southern Alps in Switzerland. As detailed above, the Austrian localities are also characterized by rather warm microclimatic conditions during the vegetation period.

While we cannot exclude for certain the possibility that the occurrence of *P. argiola* in a garden in Klagenfurt may represent an anthropogenic introduction, such is most unlikely for the two localities on the flood-prevention dam in

the Danube floodplain. This dam is regularly mown, and mown biomass is left on site, but its vegetation is not managed by deliberate planting. The dam slopes carry semi-dry grasslands as they also naturally occur at slightly elevated outcrops ("Heissländen") in the area (ROTTER 2006). We assume that the new records of *P. argiola* in Austria, where it is the sole currently known Dacetine representative, do not relate to a recent spread. Rather *P. argiola* with its highly cryptic life habits is most likely a native, but long overlooked member of the Austrian ant fauna. We expect that further localities will be recorded on dry grassland sites, if litter samples are surveyed more systematically.

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Zusammenfassung

Erste Nachweise von *Pyramica argiola* (EMERY, 1869) in Österreich, von drei verschiedenen Fundorten, werden präsentiert. Die Art ist neu für die österreichische Ameisenfauna, die nunmehr 128 nachgewiesene Arten umfasst. Vier Arbeiterinnen wurden im Mai 2008 im Zuge einer Erhebung der Ameisengemeinschaft des Nationalparks Donau-Auen in zwei Bodenstreu-Proben entdeckt. Des Weiteren konnten in den letzten Jahren in Klagenfurt (Kärnten) mehrere schwärmende Geschlechtstiere (Gynen und Männchen) von *P. argiola* beobachtet werden. Dies deutet auf den ersten Nestfund dieser Art in Österreich hin. Die aktuelle Verbreitung von *Pyramica argiola* in Europa wird dokumentiert.

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