



First record of *Eresus sandaliatus* (MARTINI ET GOEZE, 1778) (Araneae: Eresidae) in Poland

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Abstract: *Eresus sandaliatus* (Martini & Goeze, 1778) is a very rare spider species found in Northern, Central and Western Europe. This study presents the first recorded occurrence of this species in Poland, specifically in the Pińczów area (south-central Poland). It also describes differences in habitat preferences and morphological features that contribute to distinguish *E. sandaliatus* from *E. kollari* Rossi, 1846.

Key words: Pińczów, xerothermic grasslands, rare species, *Eresus kollari*, ladybird spider

Genus *Eresus* Walckenaer, 1805 includes 22 species and 5 subspecies living in Europe, North Africa and Asia (World Spider Catalog 2024). These spiders inhabit in dry, sun-exposed areas (Kovács et al. 2015, Nentwig et al. 2024, Rezáč et al. 2008). Most males of *Eresus* species are characterized by red opisthosoma with black spotting, resembling the colors of ladybirds; while females are typically uniform in colour – black or dark brown (Bellman 2006, Kůrka et al. 2015, Nentwig et al. 2024, Rozwółka et al. 2019, Fig. 1, 3a–b). Among the species of the genus *Eresus* occurring in Europe, to date, only *E. kollari* Rossi, 1846 has been recorded in Poland (Rozwółka et al. 2019, Gierlasiński & Rutkowski 2024). In this study, we present the first documented occurrence of *Eresus sandaliatus* (Martini & Goeze, 1778) in Poland, making it the second species of the genus *Eresus* to be recorded in the country.

Wandering males of *Eresus sandaliatus* were observed on xerothermic grassland with a gypsum substrate (Fig. 2) within an 11 ha area, situated on the southern slope of a hill on the north-western edges of Pińczów [UTM Grid = DA 69] ca 244-250 m a.s.l.; 1♂ – 23.04.2019, doc. phot. G. Kolago; 1♂ – 9.05.2020 – leg. G. Kolago, det. R. Rozwółka. Specimens were identified using the identification key provided by Rezáč et al. (2008). The voucher specimen was deposited in the private collection of Robert Rozwółka. The main external morphological features that allow macroscopic differentiation between the males of *E. sandaliatus* and *E. kollari* are presented in Table 1.

The distribution range of *Eresus sandaliatus* is divided into two distinct areas (Fig. 4). The first includes Latvia (Rustanoviča 2014, Cera 2018), southern Sweden (Almquist 2005), Denmark (Scharff, Gudik-Sørensen 2006, Lissner 2024), southern England (Rezáč et al. 2008), northern Germany (Arachnologische Gesellschaft 2024), Belgium and the Netherlands (Rezáč et al. 2008, Vam Helsdingen 2021, Van Keer & Brys 2022, Tutelaers 2024), northern France (Le Peru 2011, Rezáč et al. 2008), northwestern Austria (Kovács et al. 2015, Rezáč et al. 2008)

and northern Italy (Steinwandter et al., 2022). The second area, located in Central Europe, includes Southern Germany (Arachnologische Gesellschaft 2024) and West Bohemia (Rezáč et al. 2008). Although some data have been reported from Turkey and other European regions, it has been suggested that they are erroneous and actually refer to other morphologically close species (Rezáč et al. 2008). In Poland, this species has been discovered in a locality more than 500 km away from the closest known localities of *E. sandaliatus* in the Czech Republic (Rezáč et al. 2008) (Fig. 4), yet it is likely part of the Central European population of the species.

The grassland where *Eresus sandaliatus* was found is relatively sparse, with exposed bare patches of compact soil. Unfortunately, no nests of this species could be located. It is also worth noting that the presence of *Eresus kollari* have been recorded in several localities in the vicinity of Pińczów (Rozwalka et al. 2019, Kolago 2021), although there is no information on the coexistence of both species despite their similar macrohabitat preferences (e.g. Almquist 2005, Nentwig et al. 2024, Rezáč et al. 2008). Therefore, the niche segregation must be linked to some microhabitat characteristics. While both species inhabit open, warm environments, *E. kollari* prefers localities with sand or loose soil such as sandy heathlands, overgrown dunes and xerothermic grasslands. *Eresus sandaliatus*, on the other hand, prefers more compact soils and avoids unconsolidated sediments, such as sand and loess (Rezáč et al. 2018).

Considering the limited dispersal ability of *Eresus sandaliatus*, with no documented cases of ballooning (Rezáč et al. 2018); the discovery of this species in Pińczów suggests that this population has existed there (unnoticed) for a long time, rather than representing a recent range expansion. Furthermore, this record not only contributes to the knowledge of the Polish arachnofauna, but also enriches our knowledge of the species' distribution across Europe.

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STRESZCZENIE

[Pierwsze stwierdzenie *Eresus sandaliatus* (MARTINI ET GOEZE, 1778) (Araneae: Eresidae) w Polsce]

Jedynym gatunkiem z rodziny Eresidae wymienianym z Polski był dotychczas *Eresus kollari* Rossi, 1846. W pracy przedstawiono informację o pierwszym w Polsce stanowisku *Eresus sandaliatus* (Martini & Goeze, 1778), które odkryto w rejonie Pińczowa (Polska centralno-południowa). Autorzy przedstawili cechy diagnostyczne samców obu gatunków, różnice w preferowanych biotopach oraz zilustrowali rozmieszczenie *E. sandaliatus* w Europie. Stwierdzone w Polsce stanowisko *Eresus sandaliatus* ma charakter dysjunktywny i jest oddalone o ponad 500 km na wschód od najbliższych obszarów występowania tego gatunku w Czechach.

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Table 1. External morphological features that allow to macroscopic differentiation between the males of *Eresus kollari* and *E. sandaliatus*. Table based on Rezáč et al. (2008), expanded.

Features	<i>Eresus sandaliatus</i>	<i>Eresus kollari</i>
Spots on abdomen	2 pairs of large black spots without a white margin and always well pronounced 3 rd pair of smaller spots in the rear part of opisthosoma (Fig. 3a)	2 pairs of large black spots margined white and hardly visible 3 rd pair of small spots on the rear part of opisthosoma (Fig. 3b), sometimes the 3 rd pair of spots is not present.
Leg pairs I and II	Leg segments black in colour with white wide rings in joint areas, sometimes the femur of the II pair with reddish hairs (Fig. 3a)	Leg segments black in colour with white narrow rings in joint areas, sometimes the femur of the II pair with reddish hairs (Fig. 3b)
Leg pairs III and IV	Femora with scarce red hairs, patellae and tibiae with a well pronounced white stripe on the dorsal side. Well-pronounced white rings in the joint area (Fig. 3a)	Femora, patellae and sometimes tibiae with numerous orange hairs. Patellae and tibiae without the white line on the dorsal side. Joints without white rings within the joint area or with slightly pronounced rings (Fig. 3b)
Phenology (adult)	IV–VI	VIII–XII



Fig. 1. Male of *Eresus sandaliatus* observed in Pińczów. Photo by G. Kolago.



Fig. 2. General view of habitat *Eresus sandaliatus* in Pińczów. Photo by G. Kolago.



Fig. 3. Comparison of colours of males of *Eresus sandaliatus* from Pińczów (3a) and *E. kollari* from Wola Zagojska (3b). Photo by G. Kolago.

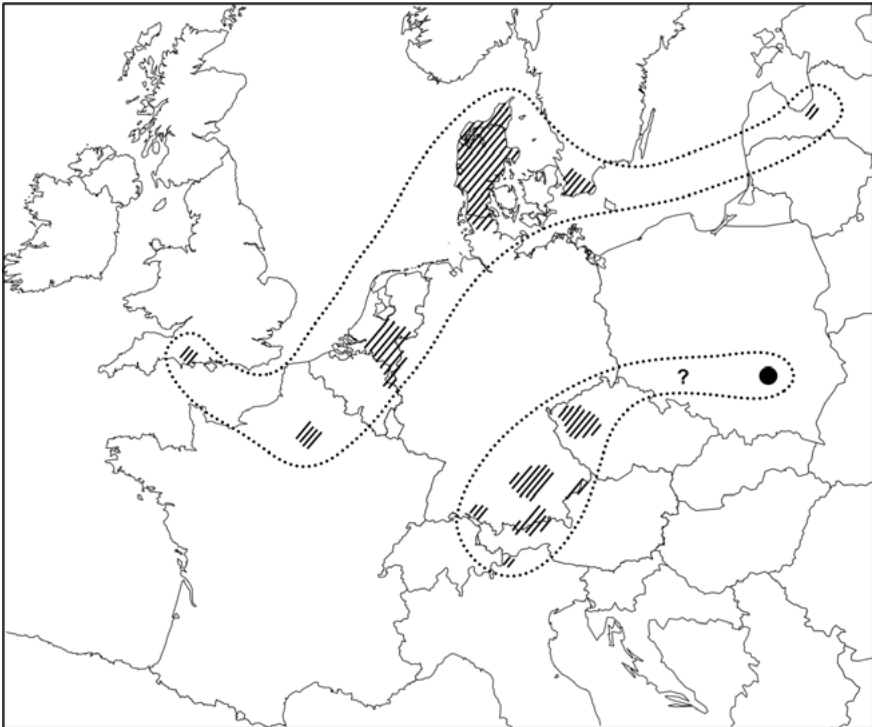


Fig. 4. Distribution of *Eresus sandaliatus* in Europe. Hatched area represents known localities from literature, encircled by a dotted line to delineate populations. Black dot indicates new locality and “?” symbol signifies an area of potential affiliation with the population of species.