Prinerigone vagans new to Poland (Araneae: Linyphiidae), with comments on taxonomy and distribution

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Source: Arachnologische Mitteilungen: Arachnology Letters, 55(1) : 75-78

Published By: Arachnologische Gesellschaft e.V.

URL: https://doi.org/10.30963/aramit5513

Prinerigone vagans new to Poland (Araneae: Linyphiidae), with comments on taxonomy and distribution

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Abstract. The first record of the hygrophilous linyphiid spider *Prinerigone vagans* (Audouin, 1826) for Poland, collected on a bank of the River Olza near the Czech Border, is presented together with a discussion of known habitats of the species. A review of the taxonomic literature revealed that some characters of the male palp are highly variable within the distribution and even single populations of *P. vagans*. Future investigations should clarify the status of populations in Europe, the Near and Middle East as well as North Africa including Macaronesia.

Keywords: Erigoninae, new record, pedipalpus, spider

Zusammenfassung. *Prinerigone vagans* neu für Polen (Araneae: Linyphiidae), mit Kommentaren zur Taxonomie und Verbreitung. Der Erstnachweis der hygrophilen Linyphiide *Prinerigone vagans* (Audouin, 1826) für Polen, gesammelt am Ufer des Flusses Olza nahe der tschechischen Grenze, wird vorgestellt und zusammen mit den bekannten Habitaten diskutiert. Eine Durchsicht der taxonomischen Literatur zeigte auf, dass verschiedene Merkmale des männlichen Pedipalpus innerhalb des Verbreitungsgebiets und selbst einzelner Populationen sehr variabel sind. Zukünftige Untersuchungen sollten daher den Status der Populationen in Europa, dem Nahen und Mittleren Osten sowie Nordafrika inklusive Makaronesien klären.

Reporting the newly revealed presence of a species in a given country is one of the first steps towards overcoming the "Wallacean Shortfall" (Lomolino 2004) and represents important information for local biodiversity conservationists and nature conservation authorities. However, the distribution of many European spider species is still insufficiently known, especially in parts of Eastern and Southern Europe. While the biodiversity of Poland may be the highest in Central Europe (Convention on Biological Diversity 2017), currently only about 845 spider species are listed for the country (Nentwig et al. 2017). However, new country records of widespread European species are frequently published (e.g. Kronestedt 2006, Hajdamowicz 2009, Hajdamowicz et al. 2014, Rozwałka & Stachowicz 2015, Wiśniewski & Wesołowska 2015, Rozwałka et al. 2016, Wiśniewski & Dawidowicz 2017), indicating a large knowledge gap concerning the distribution of sometimes even relatively widespread species. Over 300 spider species currently known from Poland are Linyphiidae, which is comparable to the number in adjacent countries like Germany, the Czech Republic or Ukraine (Nentwig et al. 2017). *Prinerigone vagans* (Audouin, 1826), a linyphiid repeatedly found in Germany (Arachnologische Gesellschaft 2017) and distributed in the area of Berlin (Kielhorn 2010, 2016), was never collected in Poland before.

Material and methods

The specimen was collected by hand and preserved in 75% ethanol. Photographs were made with a NikonD300 attached to a Novex RZ stereomicroscope. The map was created using the mapping system of the Arachnologische Gesellschaft (Arachnologische Gesellschaft 2017) and the records presented on the recording scheme of the Czech Arachnological Society and the cited literature (Czech Arachnological Society 2017). The drawing was made by TB, the material is deposited at the private collection of JG.

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submitted 19.11.2017, accepted 26.3.2018, online 30.4.2018

Results

Prinerigone vagans (Audouin, 1826) (Figs 1–3)

Material. POLAND, Silesia, The Silesian Beskids mountain range, Istebna, bank of the river Olza, 49.57397° N, 18.90317° E (WGS 84), 1♂, 552 m a.s.l., collected by hand, 16.viii.2015, leg. Luis Guttenberger.

Fig. 1: Live male of *Prinerigone vagans* (Audouin, 1826) from Poland, dorsal view

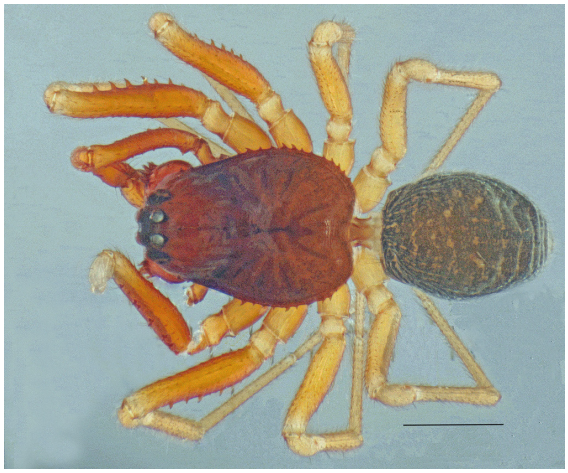

Fig. 2: Male of *Prinerigone vagans* (Audouin, 1826) from Poland, dorsal view (Scale line = 0.5 mm)

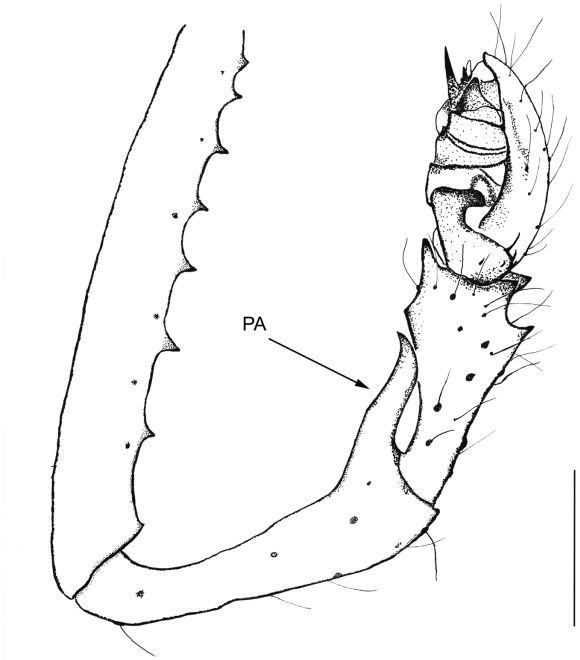

Fig. 3: *Prinerigone vagans* (Audouin, 1826) from Poland, left male pedipalp, retrolateral view (Scale line = 0.2 mm; PA = patellar apophysis)

Fig. 4: Locality of *Prinerigone vagans* (Audouin, 1826), Isdebna, Bank of river Olza, Poland

Habitat. The male was found on a bank of the river Olza (Figs 4–5) near the village of Istebna on wet mud with small water-filled pits and without vegetation. The river is enclosed by shrubbery, tree lines and a street. The landscape is dominated by forested areas along the hillsides and agriculture in the valleys. Other linyphiids found at the bank of the river were *Agyneta rurestris* (C. L. Koch, 1836) and *Bathyphantes gracilis* (Blackwall, 1841).

Habitat and distribution

Prinerigone vagans prefers humid, open habitats (Entling et al. 2007) and is often found at ground level near water (e.g. our record, Helsdingen 1997, Manderbach & Framenau 2001, Armbruster 2003, Bosmans 2007). A very detailed review of the habitat affinities in Europe can be found in Knülle (1954: p. 101), who also mentioned a strong association of *P. vagans* with small and saturated or still water-filled ground pits ("[…] Solche kleinen Bodenauskolbungen von 3-5 cm Tiefe, oft noch mit Wasserresten gefüllt, sind die Vorzugshabitate der Art."), which could also be found at the river Olza (Fig. 5). However, several other records in Central Europe were made on annual cropland with pitfall traps (Blick et al. 2000), possibly due to aeronautic activities. It is questionable whether this species is able to build larger populations in cropland dominated landscapes, since harvest, tillage and crop rotation induce fast changes in abiotic conditions, which lead to a very ephemeral distribution of suitable habitats for this species (e.g. areas with waterlogging; Kielhorn 2016) and often to domination by only a few agrobiont species (Blick et al. 2000, Samu & Szinetár 2002). In the Mediterranean, *P. vagans* was collected near ponds (Morano et al. 2012), but also in a variety of other habitats (Buchholz 2013). In the Maghreb, *P. vagans* was recorded in similar habitats with temporary or permanent water, e.g. on stones along a river bed, marshy areas or in an irrigated garden (Bosmans 2007).

Prinerigone vagans has been frequently found in Great Britain, France, Germany and the Benelux (Le Peru 2007, Tutelaers 2012, Arachnologische Gesellschaft 2017, British Arachnological Society 2017), and records exist from nearly all European Mediterranean countries (Nentwig et al. 2017), but the species seems to be rare in the Czech Republic, from which only two localities are known (Czech Arachnological Society 2017). Our single male was found in a typical habitat, which supports the hypothesis that (at least along the river Olza) Polish populations of the species exist. The species is probably absent from Scandinavia (except Denmark, Vangsgård et al. 1997) and other northern parts of Eastern Europe (Nentwig et al. 2017). It seems to be widely distributed in North Africa (Audouin 1826, Jocqué 1981, Bosmans 2007) and the Near East through to Iran (Pickard-Cambridge, 1872, Tanasevitch 2009). Interestingly, *P. vagans* is considered as the most common linyphiid in the Maghreb by Bosmans (2007). Other records were made, e.g., in Chinese parts of Central Asia (Zhou et al. 1983) and Marion Island in the southern Indian Ocean (Lawrence 1971).

Based on the known distribution in Germany, the Czech Republic and Poland (Fig. 5) it is possible that *P. vagans* is sensitive to continental climates with low winter temperatures, as already pointed out by Knülle (1954), and that the species already benefits or will benefit from climate change in Central Europe. However, this remains speculative since wide parts of eastern parts of Europe can still be seen as arachnological "Terra incognita".

Taxonomic notes

Prinerigone vagans was described by Audouin (1826, sub. *Erigone*) from Egypt, Northern Africa, based on a male. Denis (1948) noted that the drawings of the male pedipalp in Audouin (1826) fit relatively well to an Algerian specimen, especially in the length of the tibia and patella, but not to his French specimens, which all had a longer and more slender patella and tibia and a differing patellar apophysis. He used a younger synonym, *Erigone spinosa* O. Pickard-Cambridge, 1872, to name this variation and delimit it from the variation described by Audouin (1826). Unfortunately, *E. spinosa* was originally used for specimens collected from a variety of localities in different countries (Egypt, Palestine, Italy) and it is not clear on which specimen the original drawing by O. Pickard-

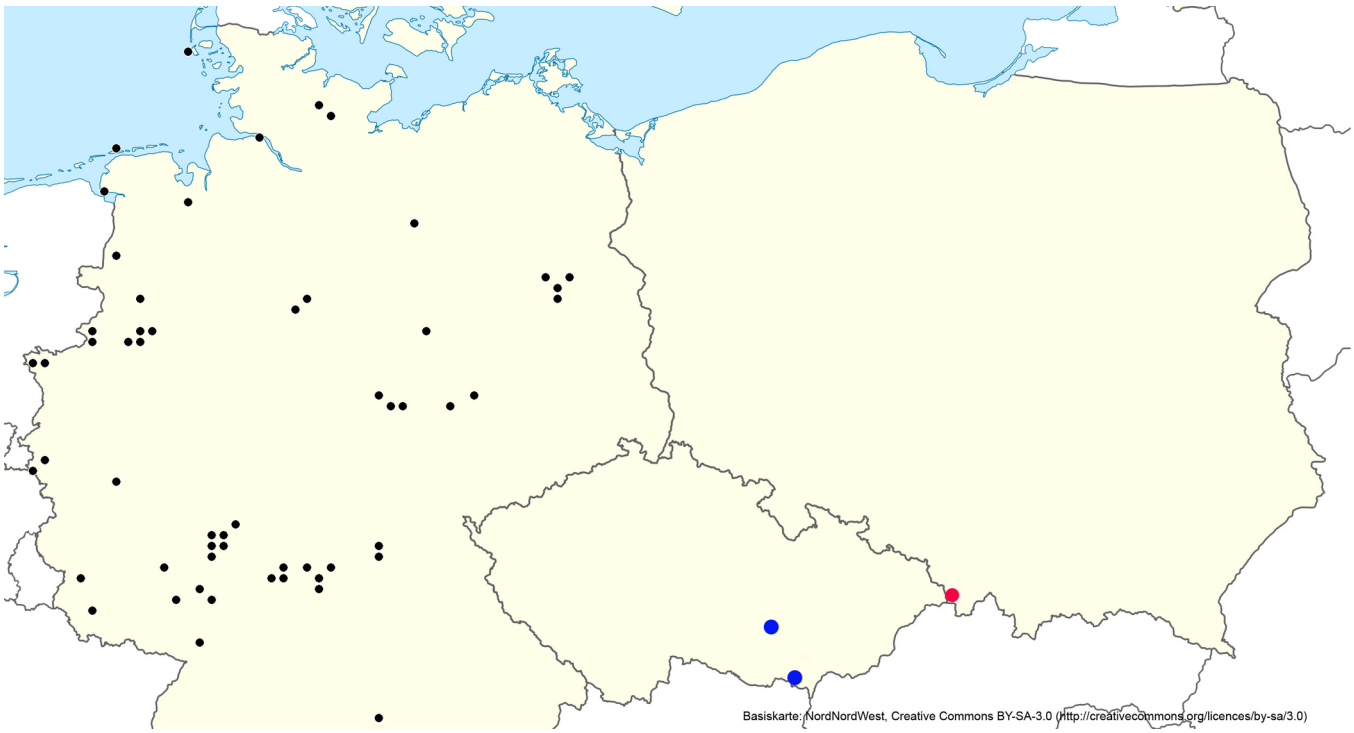

Fig. 5: Records of *Prinerigone vagans* (Audouin, 1826) in Poland (red), Germany (black) and the Czech Republic (blue)

Cambridge (1872) was based. Denis (1948), not satisfied with the quality of the drawings in the first description, referred to the drawings of *E. spinosa* in O. Pickard-Cambridge (1910), which on the other hand were based on English specimens and correspond well to his French males. Our male from Poland possesses a long and slender patella and tibia and the typical patellar apophysis described by O. Pickard-Cambridge for *E. spinosa* (O. Pickard-Cambridge 1872, 1910). However, the length of the palpal segments seems to vary considerably within populations in Europe, as Knülle (1954) and Locket & Millidge (1953) pointed out. This hypothesis is also supported by assemblages from Hautes-Pyrénées (France) by Denis, which contained specimens of both variants (Denis 1950). Knülle (1954) mentioned two specimens from Northern Germany which fit the original drawings by Audouin (1826), without having visible differences in the more difficile structures of the bulbus compared to numerous specimens of the other variant. Locket & Millidge (1953) explained the variations in the segment lengths with the presence of allometric growth in males of *P. vagans*. Bosmans (2007) illustrated a male from the Maghreb, which seems to present a more intermediate form between the two variations of Denis (1948). However, the accompanying illustration of a male *P. vagans* palp (sub. *P. vagans vagans*) in Jocqué (1981) based on a specimen from the central Sahara is partially similar to the *spinosa*-variety, possessing a long and slender patella and tibia, but also a shorter and more robust patellar apophysis, better fitting the drawing by Audouin (1826) and hardly explained by allometric growth (Locket & Millidge 1953). Already Jocqué (1981) pointed out that there are considerable morphological variations between isolated populations in the Sahara region, which can be considered as relicts of a once vast distribution in a more humid past. On the other hand, Tanasevitch (2009) demonstrated that even within single populations in Iran very noticeable variations of the teeth on the palpal tibia occur. Future investigations should therefore target the genetic diversity of *P. vagans* throughout its distribution and clarify the situation and the relationships especially between the North African, Near/Middle East and European populations including *Prinerigone pigra* (Blackwall, 1862) from Madeira, which seems to be only separable by the length of the patella and tibia of the male palp and possesses no visible differences in the structure of the bulbus (Wunderlich 1995). If some populations will be revealed as unrecognized species, their names must be chosen with care, since the younger synonym *Erigone spinosa* O. Pickard-Cambridge, 1872 refers to specimens from Europe and the Near East. However, it seems possible that *E. vagans* is a single polymorphic species and includes *P. vagans arabica* and *P. pigra*, as already pointed out by Tanasevitch (2009).

Acknowledgements

We are grateful to Konrad Wiśniewski for information on the Polish spider fauna and a constructive review. We would also like to thank Karl-Hinrich Kielhorn and Michael Schäfer for help with literature, Florian Raub for proofreading an earlier draft of the manuscript, the members of spinnen-forum.de for fruitful arachnological discussions, Marzena Stańska for reviewing the manuscript and Theo Blick for valuable comments. JG would like to thank fam. Kaluza und fam. Urbaczka for their support and the pleasant accommodation during the collecting activities in Poland.

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