

# Review of the Distribution of the Genus *Dolomedes* Latreille, 1804 (Araneae: Pisauridae) on the Balkan Peninsula, with New Records from Bulgaria

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**Abstract:** *Dolomedes plantarius* and *D. fimbriatus* are among the few European spiders that are closely related to water and represent an important but insufficiently studied component of wetlands (especially on the Balkans). This study is a first attempt to summarising data for the genus *Dolomedes* on the Balkan Peninsula. Available literature data on the distribution of the genus on the peninsula are analysed and mapped. New data from Bulgaria are presented. Methods for determining species and methods of material collection are commented. The habitats and possibilities for syntopy between *D. plantarius* and *D. fimbriatus* are reviewed. It is suggested that the only reliable localities for *D. fimbriatus* on the Balkan Peninsula are Dragonja (Slovenia) and Zasavice (Serbia) and for *D. plantarius*: Staniševac (Serbia), Belovo, Staro Selo, the Tsibar Island and the Voynishka and Topolovets Rivers (Bulgaria). For the other published localities for the genus *Dolomedes* on the Balkan Peninsula, there is not enough information to attribute them to a particular species.

**Key words:** raft spiders, wetlands, mapping, syntopy, Balkans

## Introduction

The genus *Dolomedes* Latreille, 1804 includes 98 species, widespread across the world without Antarctica (WSC 2017). There are only two species in Europe: *Dolomedes plantarius* (Clerck, 1757) and *D. fimbriatus* (Clerck, 1757). Morphologically, they are very close to one another and are differentiated reliably only based on the shape of the copulatory organs; the correct differentiation by immature specimens is not possible (HELSDINGEN 1993, DUFFEY 1995). *Dolomedes plantarius* is distributed in Europe and Russia (WSC 2017), and is listed in the Red List of IUCN as vulnerable (IUCN 2017) and in the Red Data Book of Bulgaria as extinct (DELTSHEV 2015). The range of *D. fimbriatus* is wider: from Europe through Caucasus and Russia to Central Asia and Japan (WSC 2017). The distribution and status of both species in Europe have been repeatedly discussed, especially of *D. plantarius* (see HELSDINGEN 1993, DUFFEY 1995, 2012, LEROY

et al. 2013, LECIGNE 2016, IVANOV et al. 2017) but in these publications the Balkans are hardly mentioned. This is probably because most of the publications containing information on the subject are in Bulgarian and are hence inaccessible for most of the arachnologists in the world. Together with *Argyroneta aquatica* (Clerck, 1757), *Dolomedes* spp. are the only European spiders that are closely related to water and represent an important but insufficiently studied component of wetlands.

The aim of this work is to map and analyse the distribution of the genus *Dolomedes* on the Balkan Peninsula as well as to present new data from Bulgaria.

## Materials and Methods

### Study area

The Balkan Peninsula is the easternmost of the three major peninsulas in Southern Europe. In an orograph-

ic sense, it is not clearly separated from mainland Europe. The western, southern and eastern borders of the Balkan Peninsula are defined by the coastline but the northern border is controversial and there is still no single opinion about it (REED et al. 2004). In the present work, the northern border of the Balkan Peninsula is defined by the rivers of Socha, Vipava, Krka, Sava and Danube. Within the boundaries so described, the peninsula falls within the territories of 13 countries (including the partially recognised state of Kosovo). Eight of them are entirely on the Balkan Peninsula and the others have different parts of their territory falling within the peninsula.

### Data sources and collecting methods

The analysis of the published data was based on a detailed review of available scientific literature on the spiders of the Balkan Peninsula. The presented new data from Bulgaria were collected during field studies (2011-2017) along the Danube River, in connection with the implementation of several projects focused on the conservation of biodiversity. Spiders were harvested by hand (on the land), by dip-netting (in the water) and in some cases the specimens (immature) were observed from the shore without catching them.

### Mapping

The new localities were mapped on the basis of exact geographic coordinates, taken in the field with a GPS-receiver (in the text, coordinates are represented as decimal degrees). The data from the literature (except those from GRBIĆ et al. 2011, for which the authors have given exact coordinates) were mapped on the basis of the location of the settlements (or other geographic objects), which names are given as localities of the species. Localities were visualised on the political map of the Balkan Peninsula in the projection coordinate system „WGS 84 UTM 34N“. In accordance to the year of publication, the localities were conditionally separated to old (until 1971) and new (after 2002). In the cases, when two (or more) localities were very close to each other, they were artificially separated (during the map visualisation process) to enable a clearer presentation on the map. Mapping and visualisation of the map were done by the program ArcGIS 10.1 (ESRI, Redlands, California, USA).

## Results

Original data about the genus *Dolomedes* on the Balkan Peninsula were found in 16 publications (DAMIN 1896, BRESJANČEVA 1907, DRENSKY

1913, 1915a, 1915b, 1929, 1936, DOFLEIN 1921, STOJICEVIĆ 1929, HADJISSARANTOS 1940, FUHN 1971, KOSTANJŠEK 2003, BUCHHOLZ 2007, MELOVSKI et al. 2008, GRBIĆ et al. 2011, METCHEVA et al. 2016). The total number of records (species/locality) in these publications is 35, of which 25 refer to *D. fimbriatus* and ten to *D. plantarius*. During the field research on the territory of Bulgaria in the last years, 14 localities of *Dolomedes* have been recorded, 13 of which are given here for the first time. The mapping of the known and new localities of the genus *Dolomedes* on the Balkan Peninsula (Fig. 1) is accompanied by a review of available country-specific data within the geographic borders of the peninsula.

### Slovenia

Only the southern part of the country (to the south of Ljubljana and the Krka River) is located within the Balkan Peninsula. For this area, a single locality of *D. fimbriatus* is known: Dragonja (KOSTANJŠEK 2003; Fig 1: 1). *Dolomedes plantarius* has not been reported for this part of the country. The other known localities of both species in Slovenia (POLENEC 1992, KOSTANJŠEK 2014) are located outside the Balkan Peninsula.

### Croatia

The western and southern parts of the country fall within the Balkan Peninsula. DAMIN (1896) reports seven localities for *D. fimbriatus* from the Croatian Adriatic coast: “S. Filip i Jakov, Vrana, Novigrad, Arbanasi, Tajer, Starigrad (Hvar) and Lokrum“ (Fig 1: localities 4, 6, 5, 3, 2, 7 and 8, respectively). *Dolomedes plantarius* is known from a single locality in the north-eastern part of the country, outside of the Balkan Peninsula – Diakovar (CHYZER & KULCZYNSKI 1891).

### Serbia

Most of the country is located south of the Sava and Danube Rivers, falling within the Balkan Peninsula. *Dolomedes fimbriatus* has been initially reported for Moravishte and Negotin Swamp (STOJICEVIĆ 1929; Fig 1: 15 and 16), while *D. plantarius* – for Belgrade (BRESJANČEVA 1907) and Negotin Swamp (STOJICEVIĆ 1929; Fig 1: 14 and 17). In recent years, both species have been found in the Zasavica Reserve (west of Belgrade): *D. fimbriatus* at Jovača, Trebljevine, Batar and Poljane and *D. plantarius* at Staniševac (GRBIĆ et al. 2011; Fig 1: localities 9, 11, 12, 13 and 10, respectively).

### Bulgaria

*Dolomedes fimbriatus* is reported from “the thermal springs near Belovo” (DRENSKY 1915b; Fig 1: 30)

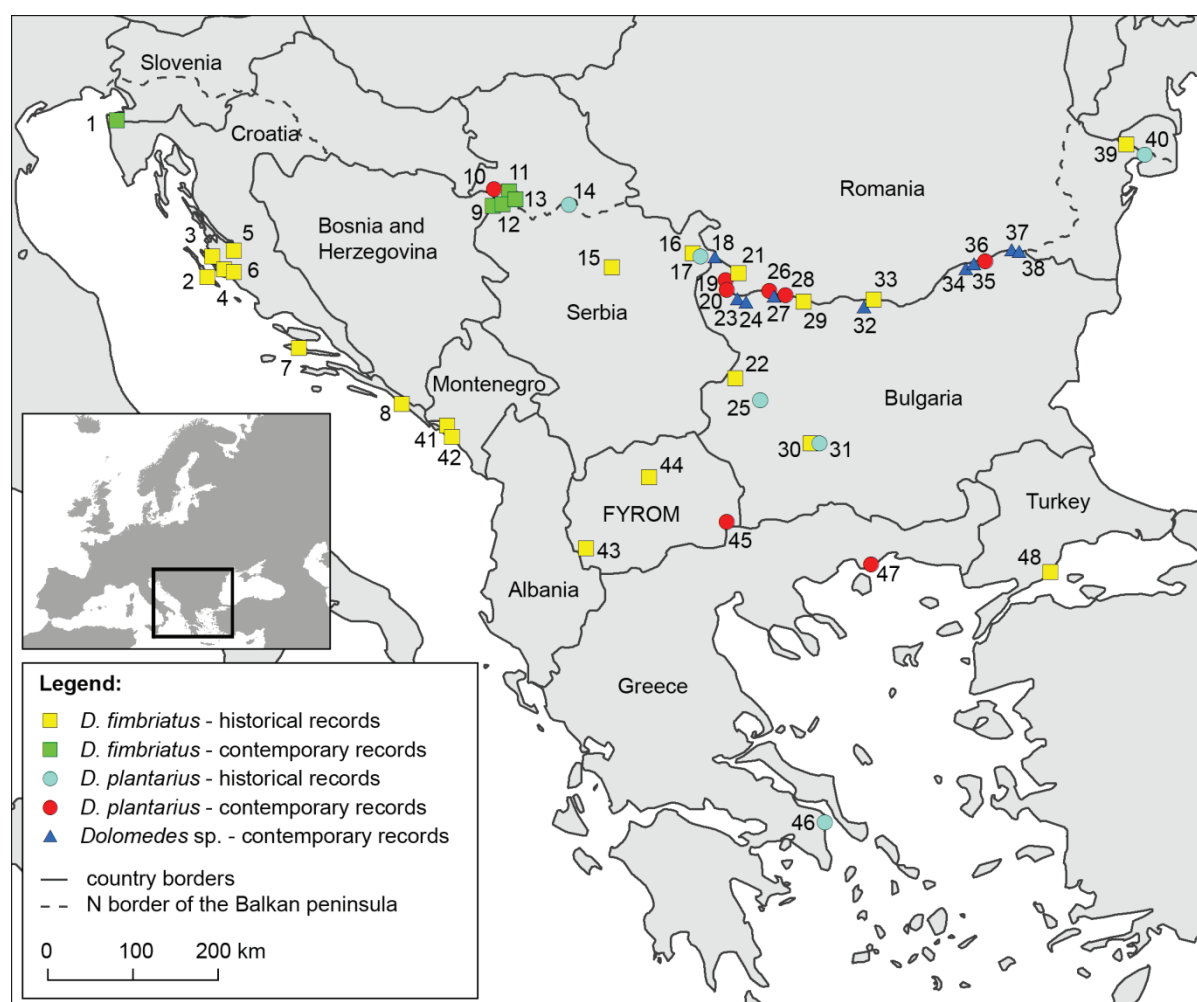


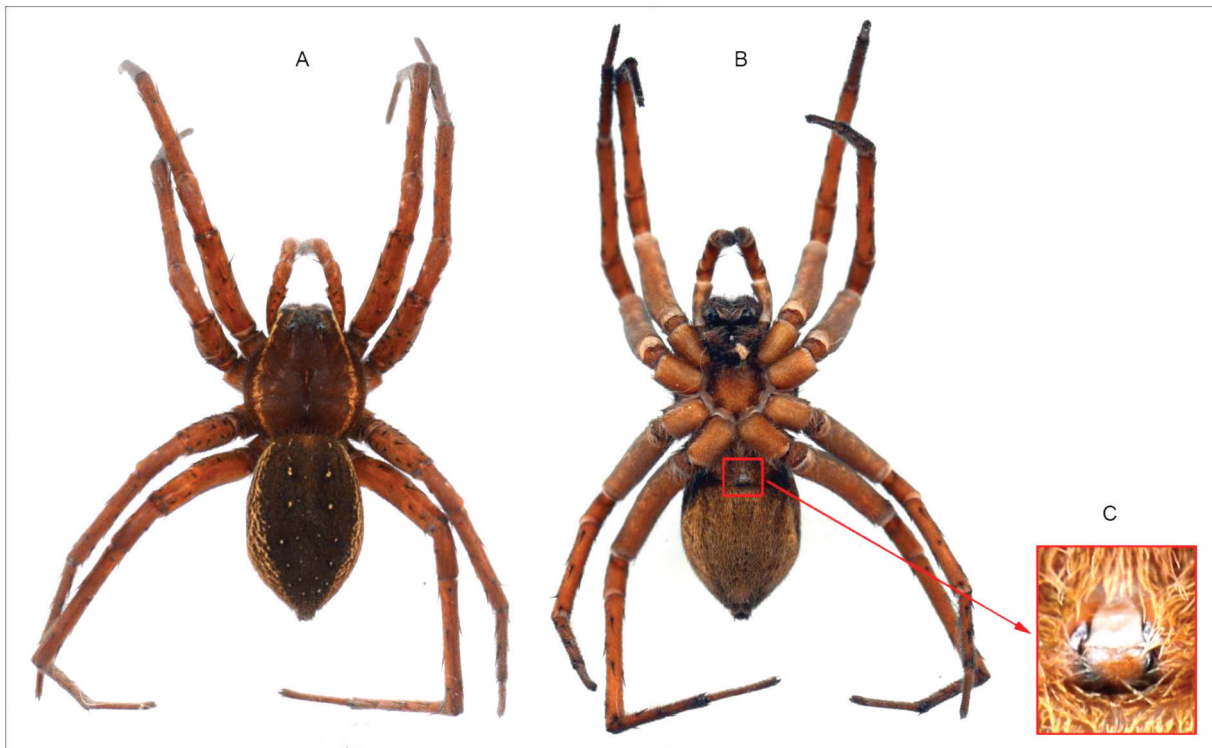
Fig. 1. Distribution of the genus *Dolomedes* Latreille, 1804 on the Balkan Peninsula.

and for Dragoman, Vidin, Kozloduy and Nikopol (DRENSKY 1936; Fig 1: localities 22, 21, 29 and 33, respectively). *Dolomedes plantarius* is found at “the thermal springs, an hour away from Belovo” (DRENSKY 1913) and in “Sofia behind Lagera” (DRENSKY 1915b; Fig 1: localities 31 and 25, respectively). After these studies, both species have not been reported for the country until 2015, while in the Bulgarian Red Data Book *D. plantarius* has been listed as “Extinct” (DELTSHEV 2015). METCHEVA et al. (2016) have reported a finding *D. plantarius* in the Ibisha Reserve (Fig. 1: 28), without any details. In recent years (2011–2017), 27 specimens from the genus *Dolomedes* have been found along the bank of the Danube River and data from these observations is published for the first time here:

*Dolomedes plantarius*: 1) Topolovets River, north-east of Dunavtsi Town (in the river, N43.94131° E22.83861°, 33 m a.s.l.), 1 female, collected by dip-netting, 17.06.2015 (leg. M. Todorov; Fig 1: 19); 2) Voynishka Reka River, east of Dunavtsi Town (in the river, N43.91464° E22.83986°, 30 m a.s.l.), 3

females, collected by dip-netting, 21.08.2015 (leg. M. Todorov; Fig 1: 20; see also Fig. 4); 3) Tsibar Island (south-west shore), north-west of Kozloduy Town (on the river bank, N43.82596° E23.51966°, 30 m a.s.l.), 1 female, collected by hand, 28.06.2014 (leg. B. Naumov; Fig 1: 26; see also Figs. 2, 3); 4) to the north of Staro Selo Village (in a drainage canal, N44.02652° E26.51706°, 12 m a.s.l.), 1 male, 1 subad. female and 7 juveniles, collected by dip-netting, 06.06.2016 (leg. M. Todorov; Fig. 1: 36).

*Dolomedes* species: 1) Kudelin Village (in a flooded quarry, N44.20018° E22.68179°, 41 m a.s.l.), 1 subad. male, 26.09.2016 (leg. M. Todorov; Fig 1: 18; see also Fig. 5); 2) near Archar Village (in a drainage canal, N43.80571° E22.94924°, 30 m a.s.l.), 1 subad. female, collected by dip-netting, 31.03.2012 (leg. M. Naumova; Fig 1: 23; see also Fig. 6); 3) Dobri Dol Village (in a drainage canal, N43.7799° E23.00909°, 30 m a.s.l.), 1 subad. male, 12.11.2016 (leg. M. Todorov; Fig 1: 24; see also Fig. 7); 4) Tsibar Island (eastern part), north-west of Kozloduy Town (in a flooded forest, N43.82513°



**Fig. 2.** *Dolomedes plantarius* – adult female specimen from the south-western shore of the Tsibar Island, Bulgaria (Fig. 1: 26): A – dorsal view, B – ventral view, C – Epigyne.

E23.52244°, 34 m a.s.l.), 1 juvenile, collected by hand, 28.06.2014 (leg. B. Naumov; Fig 1: 27); 5) near Muselievo Village (in a swamplot, N43.61208° E24.84864°, 30 m a.s.l.), 1 subad., collected by dip-netting, 09.06.2011 (captured, photographed and released by R. Tsonev; Fig 1: 32); 6) near Nova Cherna Village (in a drainage canal, N44.02010° E26.48899°, 12 m a.s.l.), 1 subad., recognised by the specific behaviour: diving into the water from a stalk of water plant, 22.05.2014 (observed by D. Dobrev; Fig 1: 34); 7) to the north-west of Staro Selo Village (in a drainage canal, N44.02319° E26.50530°, 12 m a.s.l.), 1 subad., recognised by the same behaviour, 22.05.2014 (observed by M. Naumova; Fig 1: 35); 8) the Srebarna Lake (western part; N44.10314° E 27.06365°, 10 m a.s.l.), 1 subad. male and 1 subad. female, collected by dip-netting, 08.06.2016 (leg. M. Todorov; Fig 1: 37); 9) the Srebarna Lake (southern part; N44.09022° E27.07419°, 10 m a.s.l.), 4 juveniles, 22.03.2017 (observed and photographed by J. Kutsarov; Fig 1: 38).

### Romania

Only the most south-eastern part of the country falls within the Balkan Peninsula. From this region, FUHN (1971) reports *D. fimbriatus* for St. George branch of the Danube River (without exact locality; the mark on Fig. 1: 39 is approximate) and *D. plantarius* for

Murighiol (Fig 1: 40). In the vicinity, but north of St. George (accepted here as a boundary for the Balkan Peninsula) are registered two localities for *D. fimbriatus* – Caraorman and Marchelova (FUHN 1971) and one for *D. plantarius* – Babina Island (WEISS et al. 1998).

### Montenegro

DAMIN (1896) reports two localities for *D. fimbriatus* from the Adriatic coast: Kotor and Budva (Fig 1: 41 and 42). *Dolomedes plantarius* is not known from this country.

### Macedonia (FYROM)

*Dolomedes fimbriatus* has been reported for the Katlanovsko Lake by DOFLEIN (1921) (as *D. limbatus*) and by DRENSKY (1935: the locality is presented as “Katlanovo”; Fig 1: 44) and for Ohrid by DRENSKY (1929; Fig 1: 43). For the last decade, a single locality from the Monospitovsko Swamp is known for *D. plantarius* (according to MELOVSKI et al. 2008; Fig 1: 45).

### Greece

*Dolomedes fimbriatus* is mentioned for the country by PAVESI (1878) but without exact localities. Later BRISTOWE (1935) seemingly cites the same study. *Dolomedes plantarius* is reported for Kato Souli by HADJISSARANTOS (1940) and in recent years for



**Fig. 3.** The south-western shore of the Tsibar Island, Bulgaria (Fig. 1: 26).



**Fig. 5.** The flooded quarry at Kudelin, Bulgaria (Fig. 1: 18).



**Fig. 4.** The Voynishka Reka River, Bulgaria (Fig. 1: 20).



**Fig. 6.** The drainage canal near Archar, Bulgaria (Fig. 1: 23).

the Nestos River Delta by BUCHHOLZ (2007; Fig 1: 46 and 47, respectively). The same author transfers the report by PAVESI (1878) to *D. plantarius*, probably relying on the catalogue of Spiders of Greece (BOSMANS & CHATZAKI 2005). In this catalogue, data on *Dolomedes* by PAVESI (1878) and BRISTOWE (1935) are transferred to *D. plantarius* but with no argumentation. According to Robert Bosmans (pers. comm.) “in Pavesi’s time (1878), the species of *Dolomedes* of Europe were not clearly diagnosed. SIMON (1876) considers *D. fimbriatus* and *D. plantarius* as synonyms. Pavesi’s citation is only two years later. In this way, we chose to consider the citation of Pavesi referring to *D. fimbriatus*, as *D. plantarius* was considered a junior synonym at that time. BRISTOWE (1935) repeats the citation of Pavesi. This is not a new record; it is just a part of his list of species recorded in Greece.”

### Turkey

Only the most north-western part of the country falls within the borders of the Balkan Peninsula. There is a single record of *D. fimbriatus* (as *D. ornatus*) from the north-west coast of the Marmara Sea given



**Fig. 7.** The drainage canal near Dobri Dol (Fig. 1: 24).

by DRENSKY (1915a): “the road between Merefle and Ganos” (the current names of the settlements are Mürefte and Gaziköy, respectively; Fig 1: 48). There are no other known localities of the genus *Dolomedes* from the territory of Turkey.

### Italy, Bosnia and Herzegovina, Kosovo (R Kosovo) and Albania

Only an insignificant part of Italy falls within the Balkan Peninsula (the area between Monfalcone

and Trieste). There are no known reports of the genus *Dolomedes* from this area. For the other three countries (entirely within the borders of the Balkan Peninsula) there are no published data for *Dolomedes*.

## Discussion

Available data on the genus *Dolomedes* from the Balkan Peninsula can be provisionally divided into old and new, with all reports from the 19<sup>th</sup> and the 20<sup>th</sup> century (11 publications) classified as old, and those after 2000 (six in total, including the present study) as new. There is an interesting time gap between the last of the old publications (FUHN 1971) and the first of the new ones (KOSTANJŠEK 2003). During this period (more than 30 years), no new data on *Dolomedes* distribution on the Balkans were published. This, as well as the generally low number of known localities for the genus from the Balkans, can be attributed to the lack of dedicated studies and the methods used for collecting the specimens. Several problems were outlined during the review of the available literature for the genus on the Balkans:

### Reliability of species identification

Regarding *D. fimbriatus*, most of the old publication neither mention the method of determination, nor provide the specimens number, age and description. In his study, DRENSKY (1915a) states that the found specimens are immature. DRENSKY (1915b) also provides description of a single specimen but since it too is immature, the description has no diagnostic value. Both localities in the study of STOJICÉVIĆ (1929) are also based on immature specimens. In newer studies, the situation is mixed: the four localities from Serbia are based on adult female specimens (GRBIĆ et al. 2011), while age, sex and number of specimens are not provided for the locality in Slovenia (KOSTANJŠEK 2003). Both publications state the guides used for spider species determination: both studies cite the online guide by NENTWIG et al. (2017); KOSTANJŠEK (2003) also cites the studies by HEIMER & NENTWIG (1991) and ROBERTS (1995).

Regarding *D. plantarius*, a study by DRENSKY (1913) is the single old publication that provides descriptions of the found specimens (from the locality at Belovo, Bulgaria): 1 adult female – "...Epigyne with greater length than width, with a large pale, oval spot in the middle; the spot is narrower at its center, with broad dark bands around its edges and is paler at its base"; 1 adult male – "...Patte machoire: tibia continues forward into several prongs; the two outer prongs are pronouncedly elongated, sharp-

ened and carrying long bristles"; the third specimen from the locality is immature and its description has no diagnostic value. In the other old publications, specimen descriptions are not provided but some of them present age and sex: BRESJANČEVA (1907) for Belgrade, Serbia – 1 adult female; STOJICÉVIĆ (1929) for Negotin Swamp, Serbia – 1 immature specimen (presented as "f. juv."); HADJISSARANTOS (1940) for Kato Souli, Greece – 1 adult male and 2 juveniles. In the new studies: the locality from the Nestos River, Greece (BUCHHOLZ 2007) is based on a single adult male with no description and without references to guides used for determination; for the locality from Monospitovsko Swamp, Macedonia (MELOVSKI et al. 2008) only a single photograph is provided (insufficient for species determination), with neither guide nor specimen number, age or sex; the locality from Staniševac, Serbia (GRBIĆ et al. 2011) is based on a single adult female and the online guide by NENTWIG et al. (cited here as Nentwig et al. 2017) has been used for species determination.

Regarding the new data for Bulgaria presented in this study, adult specimens were determined to species level by genital structures according characteristics provided in NENTWIG et al. (2017).

### Review of collection methods

In all of the old literature sources (incl. FUHN 1971), there are no specified methods for collecting the material. It could be hypothesised that, at least in the majority of cases, hand collecting has been used. Most of the newer literature sources (KOSTANJŠEK 2003, BUCHHOLZ 2007, MELOVSKI et al. 2008, GRBIĆ et al. 2011, METCHEVA et al. 2016) presented the general methods used for spider collection in the respective localities but without providing the separate methods for each species. Only BUCHHOLZ (2007) stated that *D. plantarius* was collected using pitfall traps. Regarding the new data for Bulgaria presented in this study, *D. plantarius* was established by dip-netting (13 specimens) and hand collecting (one specimen) and the other specimens (immature *Dolomedes* sp.) were sampled by dip-netting (six specimens), observations from distance (six specimens) and hand collecting (one specimen).

### Review of habitat data

In most of the old reports, there are no details on the habitats with several exceptions: for *D. fimbriatus* – "thermal springs" (Belovo, Bulgaria) and "on high swamp plants" (Ohrid, Macedonia; DRENSKY 1915b, 1929, respectively); for *D. plantarius* – "a pond" (Belgrade, Serbia), "thermal springs" (Belovo, Bulgaria), and "on the sand to the water"

(Kato Souli, Greece; BRESJANČEVA 1907, DRENSKY 1913 and HADJISSARANTOS 1940, respectively). New publications for *D. fimbriatus* present: “river bank” (Dragonja, Slovenia) and “flooded forest” (Trebljevine and Poljane, Serbia; KOSTANJŠEK 2003 and GRBIĆ et al. 2011, respectively); for *D. plantarius* – “salt meadow” (Nestos Delta, Greece) and “non-flooded forest” (Staniševac, Serbia; BUCHHOLZ 2007 and GRBIĆ et al. 2011, respectively). Regarding the new data for Bulgaria presented in this study, *D. plantarius* was found in small rivers with slow current (four specimens), on the river bank (one specimen) and in a drainage canal (ninespecimens) and the rest specimens of the genus *Dolomedes* (immature) – in drainage canals (four specimens), an abandoned fishpond (one specimen), a flooded quarry (one specimen), a flooded forest (one specimen) and in a lake (six specimens).

### Review of the opportunities for syntopy

According to DUFFEY (1995), there is no reliable proof for syntopy between *D. fimbriatus* and *D. plantarius*. According to the old literary data for the Balkan Peninsula, both species have been found in syntopy (the same locality according to the provided descriptions) at Belovo, Bulgaria (DRENSKY 1913, 1915b) and at Negotin, Serbia (STOJIĆEVIĆ 1929). In both cases all specimens presented as *D. fimbriatus* are immature (i.e. species determination is unreliable), with two adult *D. plantarius* reported from Belovo. Consequently, in both cases syntopy remains unproven. In the new publications, only the study by GRBIĆ et al. (2011) reports finding both species in nearby localities (Trebljevine and Staniševac), with distance between the two localities about 2 km. This cannot be viewed as syntopy but suggests such a possibility in this region. The new data for Bulgaria presented in this study do not allow for syntopy to be discussed, as all adult specimens belong to a single species and the others are only determined at the generic level.

The new localities for *D. plantarius* are at a considerable distance from the old ones and indicate that the range of the species in Bulgaria probably is significantly wider, as well as that the species cannot be considered extinct within the country. All localities are in close proximity to the Danube River, collaborating the model suggested by LEROY et al. (2013).

Although they cannot be assigned to either species, the rest of the new localities complement the data on the general distribution of *Dolomedes* species in Bulgaria and on the Balkan Peninsula as a whole, presenting territorial guidance for future studies.

## Conclusions

In view of the above, it could be summarised that the only reliable localities for *D. fimbriatus* on the Balkan Peninsula are at Dragonja, Slovenia and at Zasavice, Serbia. The only reliable localities for *D. plantarius* are the ones near Staniševac (Serbia), near Belovo and Staro Selo, the Tsibar Island and the Voynishka and Topolovets Rivers (Bulgaria). In regards to the other published localities for the genus *Dolomedes* (as a whole) on the Balkan Peninsula, my personal opinion is that there are not enough reasons to attribute them to a particular species.

For a more detailed clarification of the genus distribution, a wider array of collection methods are recommended, especially purposeful studies on wetlands by dip-netting, underwater funnel traps, etc. For example, the first record of *D. plantarius* for Spain (BELLVERT et al. 2013) is a side result of collecting amphibian larvae.

Finally, it can be concluded that *D. fimbriatus* should be excluded from the list of spider species for the following countries: Bulgaria, Croatia, Macedonia, Montenegro and Turkey.

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## References

- BELLVERT A., CASALS A., FONOLLOSA A., DALMAU G. & TOBELLA C. 2013. First record of *Dolomedes plantarius* (Clerck, 1758) (Araneae: Pisauridae) from the Iberian Peninsula. *Revista Ibérica de Aracnología* 23: 109-111.
- BOSMANS R. & CHATZAKI M. 2005. A catalogue of the spiders of Greece. *Newsletter of the Belgian Arachnological Society* 20 (2): 1-124.
- BRESJANČEVA J. 1907. Prilog za poznavanje srpske aranejske faune. *Travaux Faits au Laboratoire de Zoologie à l'Université de Belgrade* 1(2-3): 1-16. (In Serbian)
- BRISTOWE W. S. 1935. The spiders of Greece and the adjacent islands. *Proceedings of the Zoological Society of London* 1934: 733-788.
- BUCHHOLZ S. 2007. A First Contribution to the Arachnofauna (Arachnida: Araneae) of the Nestos Delta (NE Greece). *Acta Zoologica Bulgarica* 59 (3): 241-252.
- CHYZER C. & KULCZYNSKI W. 1891. *Araneae Hungariae*. I. *Academiae Scientiarum Hungaricae, Budapest*, 170 p.
- DAMIN N. 1896. Prilog fauni dalmatinskih i istarskih pauka. *Glasnik Hrvatskoga Naravoslovnoga Društva* 9 (1-6): 298-342. (In Croatian)

- DELTSHEV C. 2015. Fisher spider *Dolomedes plantarius* (Clerck, 1757). – In: GOLEMANSKI, V. et al. (eds.): Red Data Book of the Republic of Bulgaria. Vol. 2. Animals. Sofia: Bulgarian Academy of Sciences & Ministry of Environment and Waters, p. 61.
- DOFLEIN F. 1921. Beobachtungen an mazedonischen Spinnen. In: Mazedonien. Erlebnisse und Beobachtungen eines Naturforschers im Gefolge des Deutschen Heeres. Jena: Verlag von Gustav Fischer, pp. 301-318.
- DRENSKY P. 1913. Contribution à la faune d'araignée de la Bulgarie. Sbornik na Balgarskata akademija na naukite, 2 (1): 1-146 (In Bulgarian, French summary).
- DRENSKY P. 1915a. Contribution à l'étude des Arachnides de la Trace du sud-est. – *La Revue de l'Académie Bulgare des Sciences*, 12 (5): 127-140. (In Bulgarian, French summary)
- DRENSKY P. 1915b. Arachnides nouveaux ou peu connus de Bulgarie. *La Revue de l'Académie Bulgare des Sciences* 12 (5): 141-176 (In Bulgarian, French summary).
- DRENSKY P. 1929. Spinnen (Araneae) aus Mittel- und Süd-West Mazedonien. *La Revue de l'Académie Bulgare des Sciences* 34 (19): 1-80 (In Bulgarian).
- DRENSKY P. 1935. Über die von Dr. Stanko Karaman in Jugoslawien und besonders in Mazedonien gesammelten Spinnen (Araneae). *Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten in Sofia* 8: 97-110.
- DRENSKY P. 1936. Katalog der echten Spinnen (Araneae) der Balkanhalbinsel. *Sbornik na Balgarskata Akademija na Naukite* 32: 1-223.
- DUFFEY E. 1995. The distribution, status and habitats of *Dolomedes fimbriatus* and *Dolomedes plantarius* in Europe. *Proceedings of the 15th European Colloquium of Arachnology České Budějovice. European Journal of Entomology* 92: 54-65.
- DUFFEY E. 2012. *Dolomedes plantarius* (Clerck, 1757) (Araneae: Pisauridae): A Reassessment of its Ecology and Distribution in Europe, with Comments on its History at Redgrave and Lopham Fen, England. *Arachnology* 15 (8): 285-292.
- FUHN I. 1971. Aranee din Delta Dunarii si Razelm. *Peuce, Muzeul Delta Dunarii Tulcea* 1: 365-368.
- GRBIĆ G., GALIĆ I. & STANKOVIĆ M. 2011. Preliminary notes on the spider fauna (Arachnida, Araneae) of the special nature reserve Zasavica. *Acta Entomologica Serbica* 16 (1/2): 127-138.
- HADJISSARANTOS H. 1940. Les Araignées de l'Attique. Athens. 130 p. (In Greek, French summary)
- HEIMER S. & NENTWIG W. 1991. *Spinnen Mitteleuropas: Ein Bestimmungsbuch*. Verlag Paul Parey, Berlin, 543 p.
- HELSDINGEN P.J. VAN 1993. Ecology and distribution of *Dolomedes* in Europe (Araneida: Dolomedidae). *Bollettino Accademia Gioenia di Scienze Naturali* 26: 181-187.
- IUCN 2017. The IUCN Red List of Threatened Species. 1996: e.T6790A12806270. <http://dx.doi.org/10.2305/IUCN.UK.1996.RLTS.T6790A12806270.en>. Downloaded on 18 December 2017.
- IVANOV V., PRISHEPCHIK O. & SETRAKOVA E. 2017. *Dolomedes plantarius* (Araneae, Pisauridae) in Belarus: records, distribution and implications for conservation. *Arachnologische Mitteilungen/Arachnology Letters* 54: 33-37.
- KOSTANJŠEK R. 2003. Araneološka skupina. In: FERLETIČ U. & ŽIBRAT U. (eds.): Pomladni biološki raziskovalni dnevi (2003; Sv Peter nad Dragonjo). Društvo študentov biologije, Ljubljana, pp. 6-11.
- KOSTANJŠEK R. 2014. Poročilo o delu araneološke skupine. In: SIVEC N. (ed.): Raziskovalni tabor študentov biologije (2009; Mokronog). Ljubljana: Društvo študentov biologije, pp. 30-33.
- LECIGNE S. 2016. Redécouverte de *Dolomedes plantarius* (Clerck, 1758) (Araneae, Pisauridae) en région Nord - Pas-de-Calais (France), actualisation de sa distribution en France et aperçu de la situation en Europe. *Revue Arachnologique* 2 (3): 28-41.
- LEROY B., PASCHETTA M., CANARD A., BAKKENES M., ISAIA M. & YSNEL F. 2013. First assessment of effects of global change on threatened spiders: Potential impacts on *Dolomedes plantarius* (Clerck) and its conservation plans. *Biological Conservation* 161: 155-163.
- MELOVSKI L., IVANOV G., ANGELOVA N., VELEVSKI M. & HRISTOVSKI S. (Eds.) 2008. *Monospitovsko Blato. The last swamp in Macedonia*. Opshtina "Bosilovo", 56 p. (In Macedonian)
- METCHEVA R., BELTCHEVA M., NAUMOV B., YANKOV Y., MICHEV T., PROFIROV L., MITOV P., KENDEROV L., GEORGIEVA E., PETROV P. & GORANOV S. 2016. Faunistic Study of the Tsibar Danube Island. *Forum geografic. Studii și cercetări de geografie și protecția mediului* 15 (2): 152-161.
- NENTWIG W., BLICK T., GLOOR D., HÄNGGI A. & KROPF C. Spiders of Europe. [www.araneae.unibe.ch](http://www.araneae.unibe.ch). Version of 07 December 2017. doi: 10.24436/1
- PAVESI P. 1878. Nuovi risultati aracnologici delle Crociere del "Violante". Aggiunto un catalogo sistematico degli Aracnidi di Grecia. *Annali del Museo Civico di Storia Naturale di Genova* 11: 337-396.
- POLENEC A. 1992. The Red List of Endangered Aranea in Slovenia. *Nature Conservation*, 17:: 173-176 (In Slovenian, English summary).
- REED J., KRYŠTUFEK B. & EASTWOOD W. 2004. The Physical Geography of the Balkans and Nomenclature of Place Names. In: GRIFFITHS H., KRYŠTUFEK B. & REED J. (Eds.): *Balkan Biodiversity. Pattern and Process in the European Hotspot*. Kluwer Academic Publishers, pp. 9-22.
- RENNER F. 1987. Revision der europäischen *Dolomedes*-Arten (Araneida: Pisauridae). *Stuttgarter Beiträge zur Naturkunde. Serie A (Biologie)*, 406: 1-15.
- ROBERTS M. J. 1995. *Collins Field Guide: Spiders of Britain & Northern Europe*. HarperCollins, London, 383 p.
- SIMON E. 1876. *Les arachnides de France. Tome troisième*. Roret, Paris, 364 p.
- STOJICÉVIĆ D. 1929. Les Araignées de Serbie. *Musée d'Histoire Naturelle de Beograd* 19: 1-65. (In Serbian).
- WEISS I., SCHNEIDER E. & ANDRIESCU I. 1998. Die Spinnen des Biosphärenreservats Donau-Delta, Rumänien (Arachnida, Araneae). *Linzer biologische Beiträge* 30 (1): 263-275.
- WSC 2017. World Spider Catalog. Natural History Museum Bern, online at <http://wsc.nmbe.ch>, version 18.5, accessed on 7 December 2017. doi: 10.24436/2

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