# *Zelotes erebeus* (Thorell, 1871) (Araneae: Gnaphosidae) in Poland and its distribution in Europe

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*Zelotes erebeus* (Thorell, 1871) is a thermophilic species occurring in southern, western and central Europe. It was excluded from the checklist of Polish spiders because of synonymization issues. This paper corrects the published data and lists new localities in western and central Poland. The sites of *Z. erebeus* discovered near Świnoujście, Czarnków and Toruń, move northwards the northern range limit of this thermophilous species in Europe. Data on the distribution of this species in eastern Europe and the Caucasus are also corrected – these records relate to the closely related species *Z. khostensis* Kovblyuk & Ponomarev, 2008. Figures of female and male genitalia of *Z. erebeus* are presented.

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## 1. Introduction

*Zelotes erebeus* (Thorell, 1871) is a European spider species reported from most countries in southern, western and central Europe (Grimm 1985, van Helsdingen 2015, Nentwig *et al.* 2015, Staudt 2015). This thermophilous species inhabits a variety of warm and dry open habitats, scrub and open forests (Miller 1967, 1971, Grimm 1985, Roberts 1998, Nentwig *et al.* 2015). Many records of *Z. erebeus* are located relatively close to the Polish borders, i.e. in eastern Germany (Staudt 2015), northern Bohemia (Buchar & Růžička 2002) and northern Slovakia (Gajdoš *et al.* 1999). Because historical records from Poland (Łuczak 1953, Czajka 1966, Woźny 1975) were assessed as concerning other species, this species is not included in the Polish checklists (Prószyński & Staręga 1971, Staręga 1983, Blick *et al.* 2004, van Helsdingen 2015).

This paper analyses bibliographic data and provides a number of new records of *Z. erebeus* in Poland. Published data on the distribution of *Z. erebeus* in Eastern Europe and the Caucasus (Spassky 1936, 1937, Tyshchenko 1971, Ovtsharenko 1982, Mikhailov & Mikhailova 2002) are

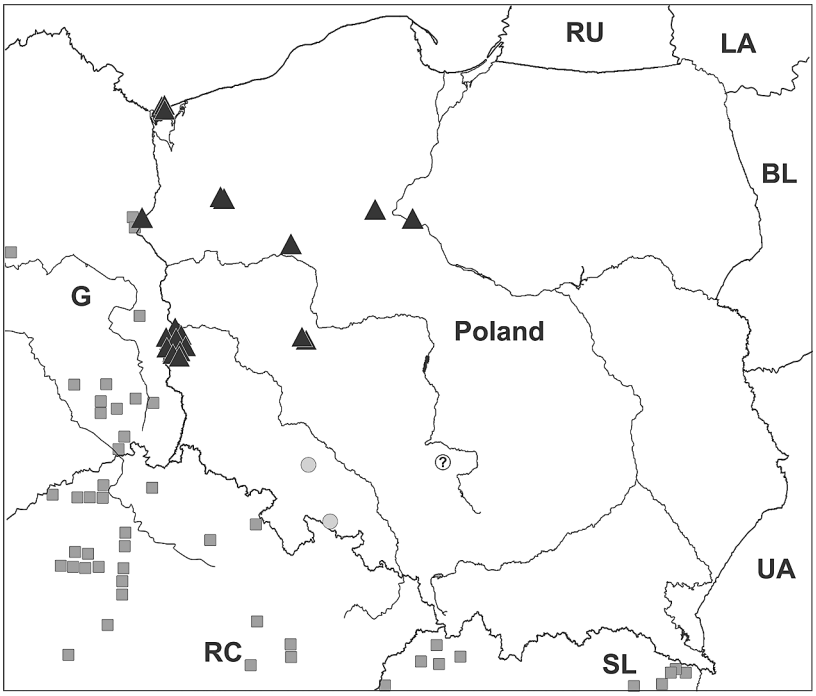


Fig. 1. Distribution of the spider *Zelotes erebeus* (Thorell) in central Europe. White circle with "?" – doubtful locality in Poland; grey circle – literature data in Poland; triangle – new record in Poland, square – record in Germany, Czech Republic or Slovakia.

corrected as *Z. khostensis* Kovblyuk & Ponomarev, 2008. Furthermore, figures of female and male genitalia are provided, because of mix-up in some earlier publications.

## 2. Material examined

A total of 40 males, 17 females and 1 juvenile specimen (subadult female) were examined. They were collected at 25 sites in Poland (Fig. 1), located in 13 UTM squares. The list of the sites is given below (UTM grid squares in square brackets):

Bielinek Nature Reserve [VU 46], 52°55’37’’N; 14°09’45’’E, 28 m a.s.l., xerothermic grassland (Potentillo-Stipetum), pitfall traps, P. Sienkiewicz leg., R. Rozwałka det., 07.VII.–01.VIII.2009 – 1♂; 01.VIII.–01.IX.2009 – 2♂♂, 2♀♀; 01.IX.–06.X.2009 – 2♀♀; 28.VI.–29.VII.2010 – 1♂; 29.VII.–30.VIII.2010 – 1♂.

Bieżyce [VT 85], 51°56’52’’N; 14°47’21’’E, 85 m a.s.l., old gravel pit, pitfall traps, T. Rutkowski leg. & det., 10.VII.–24.VII.2011 – 1♂.

Chobielin [XU 78], 53°06’00’’N; 17°38’47’’E, 77 m a.s.l., xerothermic grassland, pitfall traps, P. Sienkiewicz leg., R. Rozwałka det., 27.VI.–04.VIII.2012 – 1♀; 1 juv. (subadult ♀); 04.VIII.–01.IX.2012 – 1♂.

Czarnowice [VT 84], 51°53’56’’N; 14°45’40’’E, 58 m a.s.l., old railway track, pitfall traps, T. Rutkowski leg. & det., 23.VII.–07.VIII.2011 – 1♂.

Datyń [VT 84], 51°48’57’’N; 14°46’08’’E, 70 m a.s.l., marginal zone of xerothermic grassland, pitfall traps, T. Rutkowski leg. & det., 09.VII.–23.VII.2011 – 1♂.

Gębice [VT 84], 51°52’18’’N; 14°47’55’’E, 62 m a.s.l., ruderal plant association, pitfall traps, T. Rutkowski leg. & det., 08.VIII.–21.VIII.2011 – 1♂.

Głusko [WU 67], 53°01’39’’N; 15°54’00’’E, 76 m a.s.l., clear-cut area of beech forest ravaged by hurricane winds, pitfall traps, P. Sienkiewicz leg., T. Rutkowski det., 31.VII.–03.IX.2013 – 2♂♂, 1♀.

Głusko [WU 67], 53°01’43’’N; 15°53’56’’E, 74 m a.s.l., clear-cut area of beech forest ravaged by hurricane winds, pitfall traps, P. Sienkiewicz leg., T. Rutkowski det., 31.VII.–03.IX.2013 – 1♂.

Gręzawa [VT 82], 51°42’54’’N; 14°50’49’’E, 91 m a.s.l., dry sandy grassland, pitfall traps, T. Rutkowski leg. et det., 09.VII.–23.VII.2011 – 2♂♂; 23.VII.–06.VIII.2011 – 1♂.

Jeziory Wysokie [VT 83], 51°47’07’’N; 14°45’35’’E, 111 m a.s.l., dry beech forest, hand-collected, T. Rutkowski leg. & det., 17.VIII.2011 – 1♀.

Kujawa [VT 84], 51°52’28’’N; 14°46’11’’E, 67 m a.s.l., mixed forest edge, pitfall traps, T. Rutkowski leg. & det., 09.VII.–23.VII.2011 – 1♂.

Luboszyce [VT 84], 51°51’50’’N; 14°43’11’’E, 56 m a.s.l., 80-year old pine forest, pitfall traps, T. Rutkowski leg. & det., 17.IX.–12.X.2011 – 1♀.

Mielno [VT 73], 51°47’54’’N; 14°39’19’’E, 79 m a.s.l., under oaks at the cemetery, pitfall traps, T. Rutkowski leg. & det., 23.VII.–07.VIII.2011 – 1♀.

Mielno [VT 73], 51°47’56’’N; 14°39’23’’E, 84 m a.s.l., dry meadows, pitfall traps, T. Rutkowski leg. & det., 23.VII.–06.VIII.2011 – 1♂.

Pianówka near Czarnków [XU 05], 52°52’42’’N; 16°29’43’’E, 68 m a.s.l., thermophilous oak forest, pitfall traps, G. Wojtaszyn leg., T. Rutkowski det., 28.VI.–21.VII.2013 – 2♂♂.

Proszów [VT 83], 51°44’39’’N; 14°49’51’’E, 81 m a.s.l., ecotone between alder and pine forest, pitfall traps, T. Rutkowski leg. & det., 09.VII.–23.VII.2011 – 2♂♂.

Przytor Peninsula near Świnoujście [VV 57], 53°54’25”N; 14°17’46”E, 9 m a.s.l., 20-year old pine plantation, pitfall traps, A. Zawal leg., R. Rozwałka det., 28.VII.–12.VIII.2007 – 1♂.

Przytor Peninsula near Świnoujście [VV 57], 53°54’38”N; 14°17’40”E, 14 m a.s.l., 100-years old coastal pine forest with crowberry (Empetro nigri-Pinetum), pitfall traps, A. Zawal leg., R. Rozwałka det., 27.V.–12.VI.2007 – 1♂.

Przytor Peninsula near Świnoujście [VV 57], 53°55’00”N; 14°17’41”E, 7 m a.s.l., grey dune with lyme grass – coverage of pines ca 50%; pitfall traps, A. Zawal leg., R. Rozwałka det., 28.VII.–12.VIII.2007 – 2♂♂.

Strzegów [VT 74], 51°48’36’’N; 14°38’20’’E, 97 m a.s.l., 40-year old dry pine forest, pitfall traps, T. Rutkowski leg. & det., 11.VI.–28.VI.2011 – 1♂; 28.VI.–09.VII.2011 – 2♂♂.

Toruń [CD 47], 52°58’35’’N; 18°38’45’’E, 51 m a.s.l., military training area, xerothermic grassland (Potentillo-Stipetum), pitfall traps, P. Sienkiewicz leg., R. Rozwałka det., 07.VII.–03.VIII.2011 – 1♂, 3♀♀; 03.VIII.–30.VIII.2011 – 1♀; 30.VIII.–03.X.2011 – 1♀.

Trzcinica Wołowska [XT 20], 51°26’21’’N; 16°43’47’’E, 119 m a.s.l., protected area, sandy grassland, pitfall traps, T. Rutkowski leg. & det., 24.VII.–12.VIII.2013 – 1♂; 12.VIII.–31.VIII.2013 – 1♂.

Trzcinica Wołowska [XT 20], 51°26’25’’N; 16°44’12’’E, 119 m a.s.l., complex of old gravel pits, sandy grassland, pitfall traps, T. Rutkowski leg. & det., 10.VII.–24.VII.2013 – 1♂; 11.VIII.–31.VIII.2013 – 1♂; 31.VIII.–03.X.2013 – 2♀♀.

Zasieki [VT 73], 51°46’10’’N; 14°40’32’’E, 78 m a.s.l., dry birch forest, pitfall traps, T. Rutkowski leg. & det., 28.VI.–09.VII.2011 – 1♂; 09.VII.–23.VII.2011 – 1♂; 23.VII.–06.VIII.2011 – 2♂♂; 06.VIII.–21.VIII.2011 – 1♂.

Zawada [VT 85], 51°55’52’’N; 14°49’20’’E, 56 m a.s.l., clearing under a power line, pitfall traps, T. Rutkowski leg. &t det., 07.VIII.–20.VIII.2011 – 1♂; 20.VIII.–04.IX.2011 – 1♀.

## 3. Phenology and habitat preferences

The sparse bibliographical data on the phenology of *Zelotes erebeus* indicate that this spider reaches maturity in the second half of the growing season, from August to September and occasionally to October (Grimm 1985, Nentwig *et al.* 2015). The dates of catches of the specimens in Poland show that this species has a much longer period of maturity. Adults of *Z. erebeus* were found from late May to late September (see Material examined), with most specimens collected in July (Fig. 2).

According to the literature data, *Z. erebeus* is a xero- and thermophilous species which inhabits a variety of warm and dry open habitats, some-

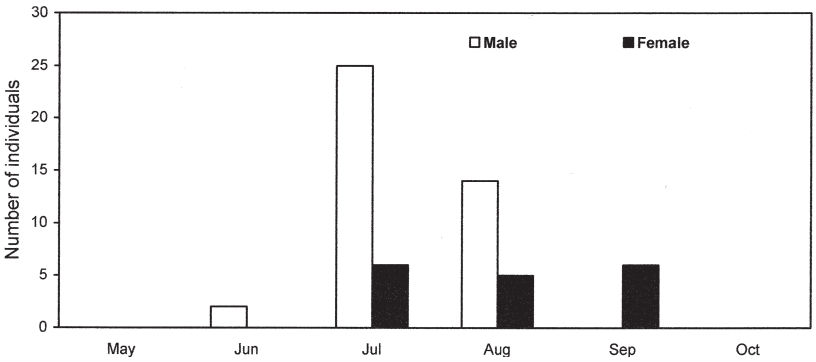


Fig. 2. Seasonal records of males and females of *Zelotes erebeus* in Poland.

times also scrub and open dry forests (Miller 1967, 1971, Grimm 1985, Hänggi *et al.* 1995, Roberts 1998, Nentwig *et al.* 2015). These environmental preferences were also confirmed by the data collected in Poland (see Material examined).

## 4. Discussion

Various lists of spiders species recorded in Poland (Prószyński & Staręga 1971, Staręga 1983, Kupryjanowicz 2008) and central Europe (Blick *et al.* 2004, van Helsdingen 2015, Nentwig *et al.* 2015, Staudt 2015) do not name *Z. erebeus* from Poland. However, meticulous analysis of the bibliographical data indicates that *Z. erebeus* has been reported from Poland three times (Łuczak 1953, Czajka 1966, Woźny 1975). All existing information on this species was treated as referring to *Z. longipes* (L. Koch, 1866) (Prószyński & Staręga 1971, Staręga 1983), owing to the former unclear taxonomic position of *Z. longipes*, *Z. aeneus* (Simon, 1878), *Z. erebeus* and *Z. serotinus* (L. Koch, 1866) (cf. Miller 1967, Grimm 1985). This problem was solved by Grimm (1985), but synonymization in Poland took place long before this work (Prószyński & Staręga

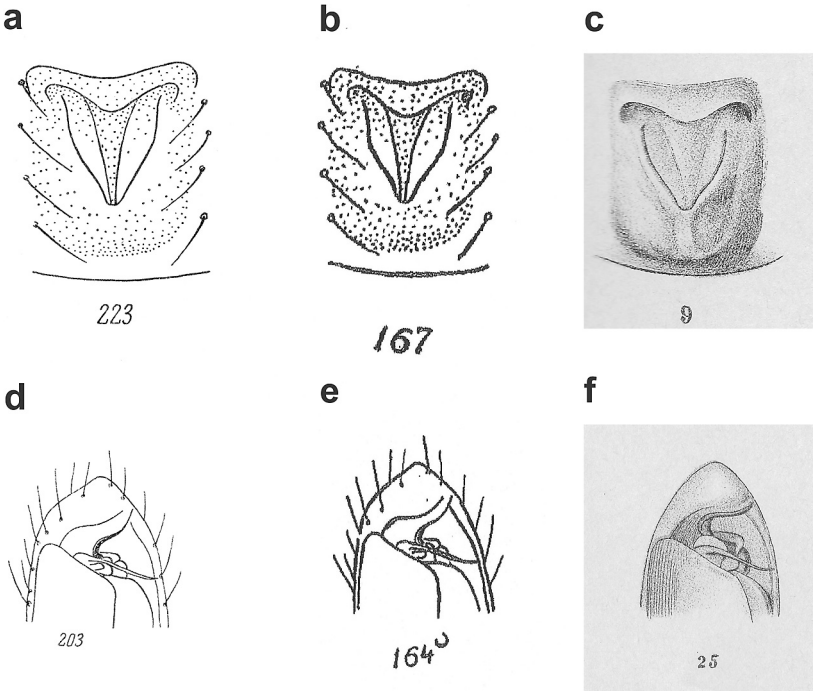


Fig. 3. Genitalia of *Zelotes erebeus*, all as *Z. serotinus* in original publications. – a, b, c. Female. – d, e, f. Male. Figures a and d from Tyshchenko (1971), b and e from Mcheidze (1997), c and f from Chyzer and Kulczyński (1897).

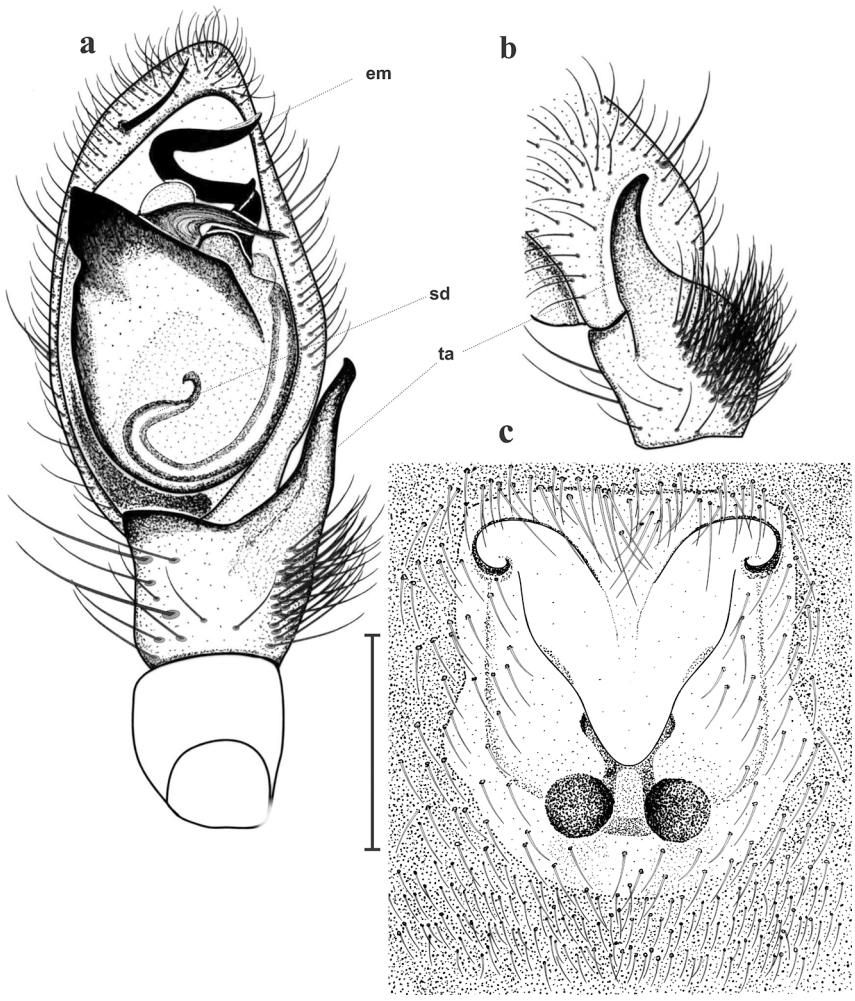


Fig. 4. *Zelotes erebeus*. – a. Male palp, ventral view. – b. Tibial apophysis, lateral view. – c. Female epigyne. Abbreviations: em – embolium, sd – sperm duct, ta – tibial apophysis. Scale bar: 0.5 mm.

1971), and all localities of the synonyms used at the time (*Z. longipes*, *Z. serotinus* and *Z. erebeus*) were automatically transferred to *Z. longipes*. Analysis of the publications indicates that the reports of Czajka (1966) and Woźny (1975) are reliable. These authors report *Z. erebeus* on the basis of the females, the identification of which has never been in doubt (Miller 1967). Also the environments in which *Z. erebeus* was caught, i.e. a warm quarry (Czajka 1966) and rubble (Woźny 1975), are amongst the biotopes known to be inhabited by this species (Grimm 1985, Nentwig *et al.* 2015). However, the report of *Z. erebeus* in a pine forest near Kłobuck by Łuczak (1953) should be treated as very doubtful. That the spider was properly identified cannot be ruled out, but in the light of the large numbers of obvious mistakes in the work, this does seem unlikely. In the same paper there are more "surprising" data from pine forests: for example, the occurrence of *Phrurolithus pullatus* Kulczyński, 1897 or *Heliophanus patagiatus* Thorell, 1875 in these forests should be recognized as misidentifications.

When discussing the distribution of *Z. erebeus* in Europe, an error which occurs in the World Spider Catalog (2015) and in several other studies on the distribution of this species in Europe (Grimm 1985, van Helsdingen 2015, Nentwig *et al.* 2015, Staudt 2015) must be corrected. According to these authors, *Z. erebeus* occurs in southern, eastern and central Europe, in Georgia and in southern Russia (lit. cited). This error is a result of the publications by Spassky (1936, 1937), Tyshchenko (1971), Ovtsharenko

(1982) and Mikhailov and Mikhailova (2002). The information about the localities of *Z. erebeus* from the Caucasus and southern Russia, cited in those publications, in fact refers to a closely related species, *Zelotes khostensis* Kovblyuk & Ponomarev, 2008 (Kovblyuk & Ponomarev 2008). This information was either overlooked or misunderstood by other authors (van Helsdingen 2015, Nentwig *et al.* 2015, Staudt 2015, WSC 2015), perhaps because it was written in Russian. In their description of *Z. khostensis*, Kovblyuk and Ponomarev (2008) made only a general statement that existing information referring to *Z. erebeus* from the Caucasus and southern Russia is in fact related to *Z. khostensis*. However, they did not make the explicit point that the descriptions of the alleged females of *Z. erebeus* in Mcheidze (1997: p. 116, fig. 167) and Tyshchenko (1971: p. 100: fig. 232) also refer to *Z. khostensis*. The misidentification of *Z. erebeus* in Mcheidze (1997) was noticed only recently by Otto and Tramp (2015). However, Otto and Tramp (2015) and other authors did not notice that the figures from the publication of Mcheidze (1997: fig. 167) are copies of drawings from the publication by Tyshchenko (1971: fig. 232), and that these, in turn, are copies of drawings from Chyzer and Kulczyński (1897: fig. 9) (Fig. 3a, b, c).

Moreover, the authors of the recent revisions (Kovblyuk & Ponomarev 2008, Otto & Tramp 2015, World Spider Catalog 2015) failed to notice that the drawings and descriptions of males of *Zelotes serotinus* (Chyzer & Kulczyński 1897: p. 201; pl. 8, fig. 25), copied by Tyshchenko (1971: p. 99, fig. 203) and then copied by Mcheidze (1997: p. 116, fig. 164), are in fact pictures of a male of *Zelotes erebeus* (Fig. 3d, e, f). Accordingly, we included in the present paper detailed morphology of male and female genitalia of *Z. erebeus* as depicted in Fig. 4.

A map of the distribution of *Z. erebeus* in Poland and neighbouring countries shows that this species occurs in western Poland, especially along the middle and upper Oder, in the Neisse valley and in the Toruń-Eberswalde glacial valley (Fig. 1). New sites in the Toruń-Eberswalde glacial valley and known sites in Germany (Staudt 2015) form a fairly clear latitudinal belt (Fig. 1), which is now the northern limit of the known distribution of this species in Europe. Findings in the neighbourhood of the city of Świnoujście are located more than 100 km to the north of this range limit and are likely to be detached from the compact range of this species in Europe. It is possible that they arose as a result of the movement of specimens with floodwater. *Zelotes erebeus* has not yet been found in southern and south-eastern Poland, although quite a number of localities are known in northern Bohemia (Buchar & Růžička 2002) and northern Slovakia (Gajdoš *et al.* 1999, Svatoň *et al.* 2003) (Fig. 1). Climatic factors may prevent it from crossing the main spine of the Carpathians. Despite several studies conducted in this region (Staręga 1971, 1976, Rozwałka 2012, 2014a,b, and unpubl.), it has never been found there.

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## References

Blick, T., Bosmans, R., Buchar, J., Gajdoš, P., Hänggi, A., van Helsdingen, P., Růžička, V., Staręga, W. & Thaler, K. 2004: Checkliste der Spinnen Mitteleuropas. Checklist of the spiders of Central Europe. (*Arachnida*: *Araneae*). Version 1. Dezember 2004. — [www document]. URL http://www.arages.de/checklist.html. (Site visited on 28 March, 2014).

Buchar, J. & Růžička, V. 2002: Catalogue of spiders of the Czech Republic. — Praha. 351 pp.

Chyzer, C. & Kulczyński, W. 1897: Araneae hungariae. — Budapest 2, 151–366. [In Latin.]

Czajka, M. 1966: Einige Angaben über die Spinnen (*Araneae*) von Ślęża Massiv. — Polskie Pismo Entomologiczne 36: 365–376.

Gajdoš, P., Svatoň, J. & Sloboda, K. 1999: Catalogue of Slovakian spiders. — Bratislava. 337 pp.

Grimm U. 1985: Die Gnaphosidae Mitteleuropas (*Arachnida*, *Araneae*). — Abhandlungen des naturwissenschaftlichen Vereins in Hamburg (NF) 26: 1–318.

Hänggi, A., Stöckli, E. & Nentwig, W. 1995: Habitats of central European spiders. — Miscellanea faunistica Helvetiae 4: 1–460.

van Helsdingen, P. 2015: Fauna Europaea: Araneae: Fauna Europaea. Version 2.6.2. — http://www.faunaeur.org (Site visited on 19 June, 2015).

Kovblyuk, M. M. & Ponomarev, A. V. 2008: New and interesting spiders (Aranei: Agelenidae, Corinnidae,

Gnaphosidae, Nemesiidae, Thomisidae) from the west Caucasus. — Caucasian Entomological Bulletin 4: 143–154.

Kupryjanowicz, J. 2008: Pająki, Araneae. — In: Bogdanowicz, W., Chudzicka, E., Pilipiuk, I. & Skibińska, E. (eds), Fauna of Poland, Characteristics and checklist of species: 223–239. MiIZ PAN Warszawa. 603 pp.

Łuczak, J. 1953: Zespoły pająków leśnych. — Ekologia Polska 1: 57–94. [In Polish with summary in English.]

Mcheidze, T. S. 1997: Sakartvelos Obobebi – Sistematika, Ekologia, Zoogeograpiuli Mimokhilva. — Tbilisi University, 390 pp. [In Georgian, English version published by Otto (2014): Spiders of Georgia: Systematics, Ecology, Zoogeographic Review. Available at http://publikationen.ub.uni-frankfurt.de/frontdoor/index/index/docId/32536.]

Mikhailov, K. G. & Mikhailova, E. A. 2002: Altitudinal and biotopic distribution of the spider family Gnaphosidae in North Ossetia (Caucasus major). — In: Toft, S. & Scharff, N. (eds), Proceedings of the 19th European Colloquium of Arachnology: 261–265. Edinburgh. 358 pp.

Miller, F. 1967: Studien über die Kopulationsorgane der Spinnengattung Zelotes, Micaria, Robertus und Dipoena nebst Beschreibung einiger neuen oder unvollkommen bekannten Spinnenarten. — Acta Scientiarum Naturalium Academiae Scientiarum Bohemoslovacae 1: 251–298. [In Czech.]

Miller, F. 1971: Pavouci–Araneida. — Klíc zvíreny CSSR 4: 51–306.

Nentwig, W., Blick T., Gloor, D., Hänggi, A., Kropf, C. 2015: Spinnen Mitteleuropas – Bestimmungsschlüssel. — [www document]. URL http://www.araneae.unibe.ch/index.html. (Site visited on 18 January, 2015).

Otto, S. & Tramp, S. 2015: Caucasian Spiders – A faunistic Database on the Spiders of the Caucasus. Version 1.4.2. — (www document). URL http://db.caucasus-spiders.info/Document/Checklists.html. (Site visited on 18 January, 2015).

Ovtsharenko, V. I. 1982: Systematic list of spiders of the family Gnaphosidae (Aranei) of the European part of the USSR and the Caucasus. — Russkoe entomologicheskoe obozrenie (Revue russe d'entomologie) 61: 830–844.

Reimoser, E. 1937: Spinnentiere oder Arachnoidea, VIII. 16: Familie Gnaphosidae oder Plattbauchspinnen. — Die Tierwelt Deutschland 33: 1–41.

Prószyński, J. & Staręga, W. 1971: Pająki–Aranei. — Katalog Fauny Polski 33. PWN, Warszawa. 382 pp. [In Polish.]

Roberts, M. J. 1998: Spinnengids. — Tirion, Baarn, Netherlands. 397 pp. [In Dutch.]

Rozwałka, R. 2012: Materiały do znajomości pająków *Araneae* Bieszczadzkiego Parku Narodowego. — Roczniki Bieszczadzkie 20: 156–195. [In Polish with summary in English.]

Rozwałka, R. 2014a: Materiały do znajomości pająków Araneae Beskidu Wschodniego. — Roczniki Bieszczadzkie 22: 239–350. [In Polish with summary in English.]

Rozwałka, R. 2014b: Pająki Araneae Magurskiego Parku Narodowego. — Roczniki Bieszczadzkie 22: 351–370. [In Polish with summary in English.]

Spassky, S. A. 1936: New spider species from the USSR. — Trudy Zoologicheskogo instituta AN SSSR (Travaux de l'Institute Zoologique de l'Académie des Sciences de l'URSS) 3: 533–536.

Spassky, S. A. 1937: Some facts on the spider fauna of the Black Sea coast. — Travaux de l'Institut Agricole d'Azow-Mer Noire 5: 131–138.

Staręga, W. 1971: Pająki (*Aranei*) Bieszczadów. — Fragmenta Faunistica 17: 53–126. [In Polish with summaries in German and Russian.]

Staręga, W. 1976: Pająki (*Aranei*) Pienin. — Fragmenta Faunistica 21: 233–330. [In Polish with summaries in German and Russian.]

Staręga, W. 1983: Wykaz krytyczny pająków (*Aranei*) Polski. — Fragmenta Faunistica 27: 149–268. [In Polish with summaries in German and Russian.]

Staudt, A. 2015: Nachweiskarten der Spinnen Deutschlands. — [www document]. URL http://www.spiderling.de/arages. (Site visited on 18 January, 2015).

Svatoň, J., Tomka, V. & Gajdoš, P. 2003: Pavúky (Araneae). — In: Mašán, P. & Svatoň, J. (eds), Pavúkovce Národného Parku Poloniny: 21–113. Štátna ochrana prírody SR, Banská Bystrica a NP Poloniny, Snina, Humenné. 241 pp. [In Slovac with summary in English.]

Tyshchenko, V. P. 1971: An identification guide to the spiders of the European part of the USSR. — Nauka, Leningrad. 281 pp.

World Spider Catalog 2015: World Spider Catalog. — Natural History Museum Bern, online at http://wsc.nmbe.ch, version 16. (Site visited on 18 January 2015).

Woźny, M. 1975: Pająki (*Aranei*) południowej Opolszczyzny. — Prace Opolskiego Towarzystwa Przyjaciół Nauk, Wydz. III Nauk Przyr., PWN Wrocław–Warszawa 50: 1–100. [In Polish with summary in English.]