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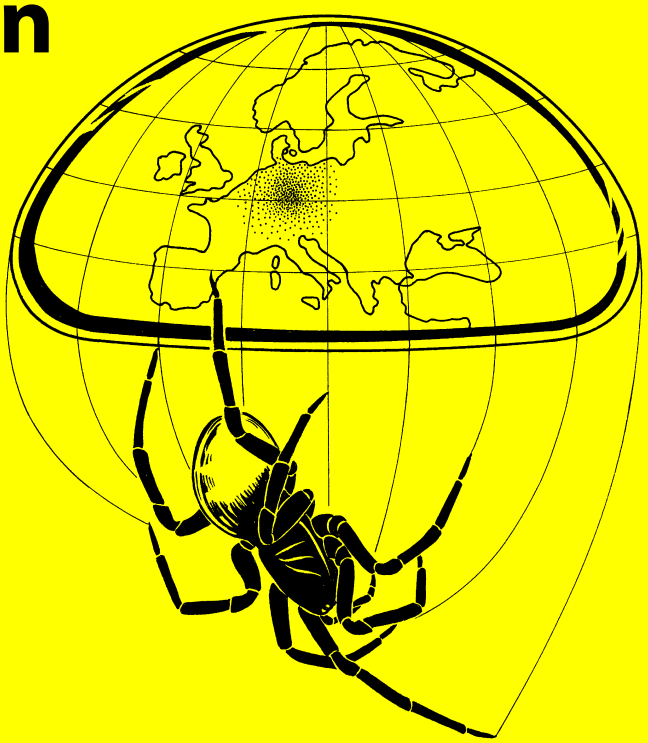

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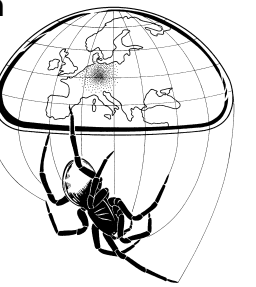

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First record of *Sauron rayi* (Araneae, Linyphiidae) in Austria

Norbert Milasowszky & Martin Hepner

doi: 10.5431/aramit4801

Abstract. *Sauron rayi* (Simon, 1881) is recorded in Austria for the first time. Male and female specimens of this rare European spider were found in two "Austrian pine forests" in Lower Austria. Data on distribution, habitat, phenology and Red List status from the Austrian localities and from published records in other countries are presented.

Keywords: arachnology, Austrian pine forest, distribution, Europe, faunistics, habitat, phenology, rare spider, Red List status

Zusammenfassung. Erstnachweis von *Sauron rayi* (Araneae, Linyphiidae) in Österreich. *Sauron rayi* (Simon, 1881) wurde in Österreich zum ersten Mal nachgewiesen. Männchen und Weibchen dieser seltenen Europäischen Spinne wurden in zwei Schwarzföhrenwäldern in Niederösterreich gefunden. Daten zur Verbreitung, zum Habitat, zur Phänologie und zur Gefährdung dieser Art aus den österreichischen Fundorten und von bereits publizierten Nachweisen aus anderen Ländern werden präsentiert.

Sauron rayi was originally described by Simon (1881) under the name *Erigone rayi*. The description was based on male specimens only. Simon (1881) named the species after one of its collectors, Mr. Jules Ray, who was a curator at the Museum in Troyes at that time. Later, Simon (1894) placed the species in the genus *Metopobactrus* where it remained until Marusik et al. (2001) transferred it to the genus *Sauron*, which was established some years before by Eskov & Marusik (1995). Miller (1966) initially described the female of *S. rayi* under the name *Trichopterna fratrensis*. Miller (in Weiss & Marcu 1979: 253) synonymised *Trichopterna fratrensis* (Miller, 1966) with *Metopobactrus rayi* (Simon, 1881). For a detailed overview of the taxonomic history of *S. rayi*, see Platnick (2014).

Identification

Male and female specimens of *Sauron rayi* (Simon, 1881) were identified by the present authors using keys for (Central) European spiders (Heimer & Nentwig 1991, Nentwig et al. 2013). Excellent drawings of both sexes of *S. rayi* can be found in Miller & Žitňanská (1976) and in Thaler (1993). Bosmans & Kekenbosch (2007) published copies of the drawings from Simon (1881), Miller (1966) and Miller & Žitňanská (1976).

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First records in Austria

Sauron rayi has now been found in two Austrian pine forests (Seslerio-Pinetum nigrae) on Rendzina soil. Twelve males were found by means of pitfall traps in the Nature Forest Reserve "Merkenstein-Schöpfeben" near Bad Vöslau (47°59'39"N, 16°07'42"E) at 588 m a.s.l. in the year 2004 (between 25 April and 20 November) (Fig. 1), and two males and one female were obtained by means of pitfall traps between 26 May and 23 June 2006 in the study site Stampftal near Oed (47°53'18"N, 16°01'59"E) at 640 m a.s.l. within the framework of the research programme "Soil diversity in Austrian natural forests" (DIANA) (http://bfw.ac.at/300/2197.html).

Distribution

Sauron rayi is a rare spider species with a scattered distribution pattern in Europe (Fig. 2). It lives in the grass and moss of open non-forest, as well as forest habitats (Svatoň et al. 2010). *S. rayi* has been reported from 14 European countries: Austria (this study), Belgium (Bosmans 2009), Bulgaria (Deltshev 2005), Croatia (Nikolić & Polenec 1981), France (e.g. Simon 1926), Germany (Staudt 2014), Greece (Buchholz 2007), Hungary (Samu & Szinetár 1999), Italy (Noflatscher 1994), Macedonia (Komnenov 2011), Poland (Staręga & Kupryjanowicz 1996), Romania (Weiss & Urák 2009), Russia (Mikhailov 2013), Slovakia (Gajdoš et al. 1999), Slovenia (Nikolić & Polenec 1981) and the Ukraine (Mikhailov 2013). A map of records of *S. rayi* was compiled by Bosmans & Kekenbosch (2007, fig. 6). Nationwide distribu-

Fig. 1: Locality "Merkenstein-Schöpfeben", an Austrian pine forest, where *Sauron rayi* was found in the year 2004. – Photo by Alexander Pernstich, taken on 8 June 2004.

tion maps for this species are available for Germany (Staudt 2014, five records) and Slovakia (Gajdoš et al. 1999, 14 records).

Belgium: One population of *S. rayi* was found in calcareous grassland on a rocky substrate in a limestone quarry in Olloy-sur-Viroin (part of the village of Viroinval) in the Department of Namur. Specimens were collected by means of pitfall traps in May and June. In 2004, five males were found in May, 17 males and five females in June; in 2005, nine males and three females were found in May, two males in June (see Bosmans & Kekenbosch 2007, fig. 4).

Bulgaria: *S. rayi* was reported from three localities in the Sashtinska Sredna Gora Mountains (Lazarov 1998, Lazarov et al. 2001, fig. 1, Deltshev 2005). One male was found by means of pitfall traps in the area of the Chivira hut (1450 m a.s.l.) in a mountain meadow. According to Lazarov et al. (2001, fig. 1) this site is situated SW of Koprivshtitsa, a town in in the Sofia Province. One male was found by means of pitfall traps in the area of Klisura (900 m a.s.l.) in a forest dominated by *Prunus cerasifera*, *Pinus nigra* and *Carpinus orientalis*. Four males and one female were collected by hand in the area of Fetentsi (880 m a.s.l.) in a forest dominated by *Quercus robur*, *Fagus sylvatica* and a meadow characterized by *Trifolium* sp., *Medicago* sp., *Vicia* sp. and *Thymus* sp. According to Lazarov et al. (2001, fig. 1) this site is situated halfway between the towns of Panagyurishte and Koprivshtitsa.

Croatia: The only record of *S. rayi* was made in Bakar [Buccari], Dalmatia, in July and was published under the name of *Metopobactrus rayi* by Chyzer & Kulczyński (1894, p.95). The collector of this single male specimen was Prof. Narcis Damin, who later also reported the record in his book of spiders from Dalmatia, Croatia, Slavonia and Istria (Damin 1900, p. 26).

France: The only records of *Sauron rayi* in France are those given in the first description of the species (Simon 1881) (see above). Accordingly, only male specimens are reported from the communes Gyé-sur-Seine and Villemaur-sur-Vanne [Villemaure] in the Aube department in north-central France.

Germany: According to Staudt (2014), there are five known records of *S. rayi*. The species is also mentioned in the check-lists and Red Lists of Baden-Württemberg (Nährig et al. 2003), Bavaria (Blick & Scheidler 2004) and Lower Saxony (Finch 2004). Joger (1997, Tab. 25) found two male specimens in a semi-dry grassland on the Weper, about 10 km west of Northeim and about 15 km north of Göttingen (Lower Saxony). Stubbemann (1980) found one male of *S. rayi* in June in the "Lorenzer Reichswald" near Nuremberg in a pine forest with grassy understorey. The second record from this area came from Kilg (2006). Bauchhenß (pers. comm.) summed up the data from Kilg (2006) as follows: *S. rayi* occurred in a pine forest on dry and nutrient poor sand in the Natural Forest Reserve "Grenzweg"/Altdorf at an elevation of 400-420 m a.s.l. Overall, three female specimens were found in June, two male and two female specimens in July and one male and one female in August by means of pitfall traps and hand sieving of litter in close vicinity to tree stems. The third record in Bavaria was made near Amberg (Oberpfalz) in an open sand habitat (Blick pers. comm.). Blick (pers. comm.) provided data for at least one male specimen which was found by Helge Uhlenhaut in 1997 at 280 m a.s.l.

Greece: Buchholz (2007) reported *S. rayi* from two localities in the Nestos Delta, which is situated in the eastern Macedonia region of north-east Greece. Buchholz (2007, Tab. 1) found one specimen in a floodplain and six specimens in forests by means of pitfall traps at an elevation of 1 to 18 m a.s.l.

Hungary: Loksa (1966) reported *S. rayi* from two areas: (i) the Bükk Mountains and (ii) the Aggtelek Karst [Tornaer Karst] both of which are part of the north Hungarian Mountains of the Inner

Western Carpathians. In the Bükk Mountains, *S. rayi* was found at the localities Molnár rock, Bélkõ and Szarvaskõ. In the Aggtelek Karst area [Tornaer Karst], S. rayi was found at the localities Alsó hill and Nagyoldal. Loksa (1966, Tables 55 and 61) reported *S. rayi* exclusively from xerothermic oak wood (Ceraso mahaleb-Quercetum clematidetosum nigrae) on limestone and Gabbro-Rendzina at an altitude between 280 and 600 m a.s.l.

Italy: Noflatscher (1993) as well as Thaler (1993) reported *S. rayi* from South Tyrol (Alto Adige) on southern slopes between Naturns and Mals at an elevation between 700 and 1350 m a.s.l. *S. rayi* was found in three habitats at the "Vinschgauer Sonnenberg": (i) a chestnut (*Castanea sativa*)-forest, (ii) a dry grassland and (iii) a rock steppe. Furthermore, Thaler (1993) reported five males and two females in June and one male in July.

Macedonia: Komnenov (2011) found two male and two female specimens of *S. rayi* in a xerothermic oak-hornbeam forest (Querco-Carpinetum orientalis) by means of pitfall traps between 3 May and 12 June at 889 m a.s.l. near Leshki in the Osogovo Mountains.

Poland: Staręga & Kupryjanowicz (1996) reported *S. rayi* from the Gorce Mountains which are situated in Małopolska Province at the western tip of the long Carpathian range. Here, one male specimen was found in June in an abandoned ant-nest in a spruce forest (Piceetum tatricum) located in the Studniska slope in the Jaszcze valley at 850 m a.s.l.

Romania: Weiss & Marcu (1979) reported *S. rayi* from the river dune reserve of Hanu Conachi (district Galati). Here, one male specimen each was found in an oak-forest (Quercetum pedunculiflorae) and dry grassland (Achilleo (kitaibelianae)-Secalinetum silvestris). The two specimens were found in April and June.

Russia: Ponomarev & Dvadnenko (2012, p. 47) provided the following data concerning records of *S. rayi* from Russia: three females, Rostov region, Razdorskaya village, locality "Atamanskaya balka", 25 May-16 June 2001; one female, locality "Pukhlyakovskiye sklony (= Puhlyakovsky slopes), in a steppefied meadow with bushes, 15-20 May 2004, two males, ibid., in a forest belt, 31 May-9 June 2004; one male, Krasnodar region, Kushchovskaya village, in a tree plantation, 22 April-4 May 2004, six males, three females, ibid., 4 May-1 June 2004; two males, one female, Krasnodar region, Anapa village, locality "Bolshoy Utrish" (= Big Utrish), Vodopadnaya Valley, in an oak-hornbeam-forest (*Quercus* sp., *Carpinus orientalis*), in forest litter along the stream, 2 May 2010; the latter records from the locality "Bolshoy Utrish" are also mentioned in Ponomarev & Volkova (2013, p. 236).

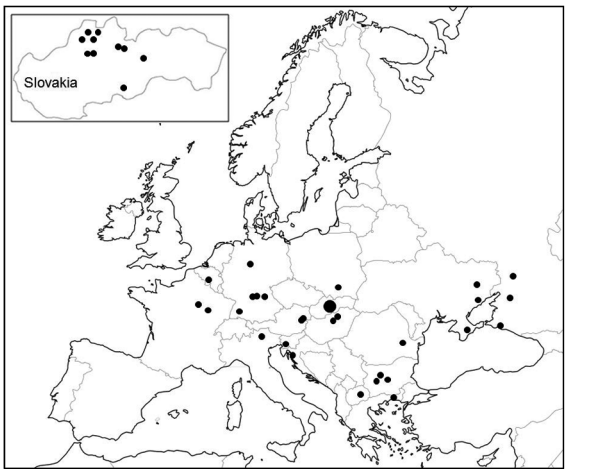

Fig. 2: Distribution map of *Sauron rayi*. Small black dots represent records of *Sauron rayi*; the single large black dot comprises several localities in Slovakia shown in insert (upper left corner).

Slovakia: Miller (1966) found two females of *S. rayi* on 1 September 1935 on Malý Kriváň in the Malá Fatra Mountains (near Liptovská Mara) in grassland above the tree line. Additionally, Miller & Žitňanská (1976) reported the record of one male on a south-orientated grassy slope (forest edge, Žitňanská 1981) of Váh near Vlašky on 23 May 1972. On 10 July 1974, the two authors additionally found three males and eight females on a south-west-orientated slope of Ostrá (Suchý Jasienok) in the Veľká Fatra. Miller & Žitňanská (1976) considered *S. rayi* to be a species that is bound to sunny submontane mountain slopes which are covered with grass. The habitat of the locality Vlašky is a xerophilous mountain meadow mainly covered with *Brachypodium pinnatum*, the locality Suchý Jasienok is a steep limestone slope covered sparsely with scattered grass cushions and lichens on rock boulders and stones. Thus, Miller & Žitňanská (1976) classified *S. rayi* as photophilic-hemiombrophilic. Svatoň (1983a) found several specimens of *S. rayi* on a grassy hillside below the summit of the Čierny kameň in the State Nature Reservation Čierny kameň in the Veľká Fatra

Mountains. Svatoň (1983b) reported *S. rayi* from the Nízke Tatry [Low Tatra], where he found two males and three females on 25 August 1980 by means of pitfall traps in Ohnište, Pod Mníchom, in a limestone forest steppe on a south-orientated slope. The same record is mentioned by Svatoň (1989) with more detailed information on the forest stand that consists of *Pinus silvestris*, *Pinus nigra* and *Larix decidua*. Additionally, Svatoň (1989) also reported *S. rayi* from a second study site in the nature protection area Ohnište: on 9 July 1981, he found one male at the edge of a rock steppe islet, just above the Púchalky valley. Svatoň (1985) reported *S. rayi* from a grassy hillside in the Suchý Nature Reserve in the Malá Fatra [Little Fatra]. Previously, Miller (1966) reported *S. rayi* from the Malý Kriváň [Little Kriváň] in the Malá Fatra. Žitňanská (1988) recorded *S. rayi* from Dedinky, about 4 km north of Dobšiná in the protected landscape area Slovenský Raj. Here, she found one male by means of pitfall traps at 850 m a.s.l. at the border of a mixed forest with and an adjacent SW slope covered by a thin growth of young *Picea excelsa*, *Juniperus communis* and deciduous trees on Mesozoic limestone and dolomite ground. Franc & Hanzelová (1995a, b, 1997) reported *S. rayi* from the Pohanský hrad Nature Reserve near Hajnáčka. Here, one male was found at 29 May 1995 in a pseudocarst cave of a south-orientated boulder scree slope at about 500 m a.s.l. Gajdoš et al. (1999, p. 110) assembled all records of *S. rayi* (Nr. 2910), i.e. 14 records of *S. rayi* from eight different geomorphological units. Later, Krajca & Svatoň (1999) reported *S. rayi* from rock (dolomite and limestone) forest-steppes in the National Nature Reserve Roszutec in Mala Fatra Mountains. One male specimen was collected in the locality Poludňové skaly at 965 m a.s.l. and three females were found in the locality Medziholie at 1170 m a.s.l.

Slovenia: Polenec (1978) found six male specimens of *S. rayi* in a xerothermic hophornbeam-forest (Seslerio autumnalis-Ostryetum carpinifoliae) near Podgorje village (510 m a.s.l.) at the SW slope of the Slavnik, which is the highest peak (1028 m a.s.l.) of the North Istrian Karst-Mountains in Slovenia. Unfortunately, Polenec (1978) failed to report the exact position and elevation of the study site.

Ukraine: In the Ukraine, *S. rayi* was mentioned from the Crimean Peninsula (Gnelitsa 2004, Kovblyuk et al. 2008) and from Eastern Ukraine (Prokopenko, pers. comm.: left-bank Ukraine: Polchaninova & Prokopenko 2013, Polchaninova & Prokopenko 2006, sub *Sauron fissocornis* Eskov, 1995; Prokopenko 2003, sub *S. fissocornis*). In the Crimean Peninsula *S. rayi* has recently been reported from the Karadag Nature Reserve (Gnelitsa 2004, Kovblyuk et al. 2008). Kovblyuk (pers. comm.) reported that he and Nicolai N. Yunakov collected seven males and three females of *S. rayi* in the Karadag Nature Reserve by sifting between 28 and 31 May 2010. In left-bank Ukraine, data on numbers of *Sauron rayi* specimens are only given in Prokopenko (2003, sub *S. fissocornis*). Prokopenko (pers. comm.) provided full information about these records which were obtained in two different localities: (i) one female from the Donetsk region, in an artificial tree plantation ("Rakovka") in the city of Donetsk, between 14 and 21 June 2001; (ii) one male, five females between 11 and 22 June 2001 and one female between 19 and 22 June 2008 in a forest belt in the Bilosaraiska Kosa village of the Pershotravnevyi district.

Habitat

S. rayi has been reported from forests and open non-forest habitats. It can be considered a thermophilic spider due to its occurrence in xerothermic habitats, such as xerothermic oak wood (e.g. Loksa 1988), dry pine-forest (e.g. Stubbemann 1980), chestnut (*Castanea sativa*) forest (e.g. Noflatscher 1993) or xerothermic hophornbeam forest (e.g. Polenec 1978). The open non-forest habitats also include a variety of xerothermic sites, such as calcareous grassland, dry grassland, rock steppe, xerophilous mountain meadow and even a limestone slope covered sparsely with scattered grass cushions and lichens. Accordingly, the soils of these habitats are poor in nutrients, and the prevalent soil type is Rendzina mostly associated with limestone or dolomite bedrock. Due to its occurrence in a cave, Franc & Hanzelová (1995b, 1997) considered *S. rayi* to be a glacial relict. Interestingly, the temperature in the lowest parts of pseudocarst caves never exceeds 9-10°C and the air has a high humidity (Franc & Hanzelová 1995b). However, the surface of the scree slope is covered by xerothermic forests and rocky steppes, and this area hosts thermophilic spider species (Franc & Hanzelová 1995b). Therefore, Svatoň (2000) classified *S. rayi* as a trogloxene species, because it is not a permanent cave inhabitant, but accidentally enters caves through the cracks and crevices of the surrounding bedrock.

Altitude

S. rayi was found from nearly sea level at 1-18 m a.s.l. in the Nestos Delta in Greece (Buchholz 2007) to a maximum of 1450 m a.s.l. in the Sredna Gora Mountains in Bulgaria (Lazarov et al. 2001). On the one hand, there are many records from other Mountain areas, such as the Eastern Alps (Austria), the Southern Alps (Italy), the Bükk Mountains (Hungary), the Osogovo Mountains (Macedonia), the Gorce Mountains (Poland), the Big and Little Fatra mountains and the Low Tatra Mountains (Slovakia), the North Istrian Karst-mountains (Slovenia) and the Caucasus (Russia). On the other hand, *S. rayi* was also found in lowland areas, such as the Russian Plain (Mikhailov 2013).

Phenology

In the literature, males of *S. rayi* are reported from April to August, females from May to September. The activity peak of males and females is in June (Fig. 3). Thus, *S. rayi* can be considered a stenochronous species with an activity peak the late spring and early summer (main activity period May, June and July). The two males and the one female in Austria perfectly fit into this picture as they were caught in a sampling period between 26 May and 23 June.

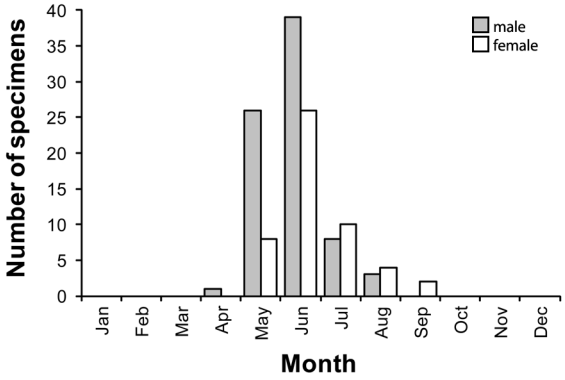

Fig. 3: Phenology of *Sauron rayi*. Grey bars = males (N=77), white bars = females (N=50). All available data from the literature and the present study are represented.

Red List

In the Red List of spiders of Baden-Württemberg (Germany), *S. rayi* is classified as extremely rare (Nährig et al. 2003). In Bavaria (Germany) it is categorized as Endangered (Blick & Scheidler 2004). In the new Red List of German spiders the species is categorized as Endangered and Very Rare (Blick et al. in press). In Lower Saxony, *S. rayi* is placed in the category Data Deficient (Finch 2004). In South Tyrol (Italy), Noflatscher (1994) also classified *S. rayi* as Endangered (Category 2). In Slovakia, Gajdoš et al. (1999) categorized *S. rayi* under LC (Least Concern)/NT (Near Threatened), due to its occurrence in at least 11 square grids across the whole country. Currently, Slovakia is the country with the most records of *S. rayi*.

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Erstnachweis von *Evarcha michailovi* in Deutschland (Araneae: Salticidae) sowie weitere für Mecklenburg-Vorpommern neue Spinnenarten

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Abstract. First record of *Evarcha michailovi* in Germany (Araneae, Salticidae) and further spiders new to Mecklenburg-Western Pomerania. The jumping spider *Evarcha michailovi* Logunov, 1992 was recorded as new to Germany from a nature reserve in the south of Mecklenburg-Western Pomerania in a dry heathland habitat. Furthermore, the first records of the jumping spiders *Evarcha laetabunda* (C. L. Koch, 1846), *Philaeus chrysops* (Poda, 1761) and *Sitticus inexpectus* Logunov & Kronestedt, 1997, the comb-footed spider *Crustulina sticta* (O. P.-Cambridge, 1861) and the crab spider *Heriaeus graminicola* (Doleschall, 1852) in Mecklenburg-Western Pomerania are reported.

Keywords: comb-footed spiders, crab spiders, faunistics, jumping spiders

Zusammenfassung. Die Springspinne *Evarcha michailovi* Logunov, 1992 wird erstmalig für Deutschland von einem ehemaligen Truppenübungsplatz im Süden Mecklenburg-Vorpommerns gemeldet. Gleichzeitig werden Erstnachweise der Springspinnen *Evarcha laetabunda* (C. L. Koch, 1846), *Philaeus chrysops* (Poda, 1761) und *Sitticus inexpectus* Logunov & Kronestedt, 1997, der Haubennetzspinne *Crustulina sticta* (O. P.-Cambridge, 1861) sowie der Krabbenspinne *Heriaeus graminicola* (Doleschall, 1852) erbracht.

Evarcha michailovi Logunov, 1992 – Erstnachweis für Deutschland

Die Checkliste der Spinnen Deutschlands (Blick et al. im Druck) enthält drei etablierte Arten der Gattung *Evarcha* Simon, 1902: *Evarcha falcata* (Clerck, 1757) ist in 524 MTB flächendeckend in Deutschland nachgewiesen (Staudt 2014). Mit 472 belegten MTB ist *Evarcha arcuata* (Clerck, 1757) ebenfalls weit verbreitet, weist jedoch offenbar eine Nachweislücke in Nordwestdeutschland auf. Die mit 68 MTB-Belegen seltenste Art ist *Evarcha laetabunda* (C. L. Koch, 1846), welche in Norddeutschland bislang weitgehend fehlt. Darüber hinaus wurde in Gießen (Hessen) die mit importiertem Obst eingeschleppte mediterrane *Evarcha jucunda* (Lucas, 1846) gefunden (Ludy & Niechoj 2005).

Auf einem ehemaligen Truppenübungsplatz in Mecklenburg-Vorpommern konnte nunmehr der Erstnachweis der bislang für Deutschland nicht verzeichneten *Evarcha michailovi* Logunov, 1992 erbracht werden. Die Art wurde durch Logunov (1992) von *E. laetabunda* getrennt und ist nach Nentwig et al. (2014) leicht von den genannten Arten zu differenzieren (Abb. 2 - 6). Nach Platnick (2014) wurde *E. michailovi* einerseits aus Russland, Zentralasien und China, andererseits aber auch aus der Türkei und Frankreich gemeldet. Hinzu kommen Nachweise aus Slowenien (Fišer & Kostanjšek 2001) und den Niederlanden (Vogels 2012).

Material: 1 ♂, 18.6.2014, Bodenfalle (Fangzeitraum 4.6.-18.6.2014), 1 ♂, 1 ♀, 3.7.2014, Bodenfalle (Fangzeitraum 18.6.-3.7.2014), 1 ♀, 14.8.2014, Bodenfalle (Fangzeitraum 31.7.-14.8.2014). Ein weiteres ♀ wurde bei einer Nachsuche am 3.7.2014 gemeinsam mit einem ♀ von *Evarcha falcata* mit dem Kescher erbeutet. Alle Funde stammen vom selben Standort. Die Belege befinden sich in der Sammlung des Verfassers.

Fundort: Naturschutzgebiet „Marienfließ", MTB 2639, 53°21'23" N, 12°11'05" E, 76 m NN

Biotop: Das NSG „Marienfließ" erstreckt sich auf einem ehemaligen Truppenübungsplatz grenzüberschreitend zwischen Brandenburg (1228 ha) und Mecklenburg-Vorpommern (610 ha). Das Untersuchungsgebiet befindet sich im Anteil von Mecklenburg-Vorpommern in der Nähe von Retzow im weichseleiszeitlichen Sandergebiet (Parchim-Meyenburger Sandflächen). Es handelt sich vorwiegend um xerotherme Sandstandorte auf einem

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Abb. 1: Lebensraum von *Evarcha michailovi* (27.8.2014)
Fig. 1: Habitat of *Evarcha michailovi* (27.8.2014)

brachliegenden ehemaligen Flugfeld, auf dem sich ein von Besenheide (*Calluna vulgaris*) und Schafschwingel (*Festuca ovina*) bzw. Rotstraußgras (*Agrostis capillaris*) dominierter Magerrasen entwickelt hat. Die *Calluna*-Sukzession wird durch Schafbeweidung sowie in mehrjährigem Turnus flächenweises Abbrennen kurz gehalten (Steinhäuser 2013).

Der Fundort von *Evarcha michailovi* (Bodenfallen) wurde im März 2014 abgebrannt und hatte zum Fangzeitpunkt eine sehr lückige Vegetation (Abb. 1). Der Kescherfang erfolgte in einer kleinen *Calluna*-Insel, die den Flammen entgangen war.

Begleitarten
Agelena labyrinthica, Agyneta affinis, Alopecosa barbipes, Alopecosa schmidti, Asagena phalerata, Drassodes pubescens, Haplodrassus dalmatensis, Micaria dives, Pardosa monticola, Philodromus collinus, Sitticus saltator, Theridion uhligi, Xerolycosa miniata, Xerolycosa nemoralis, Xysticus ninnii, Zelotes electus, Zelotes longipes

Auch für Frankreich (Ledoux et al. 1996), die Niederlande (Vogels 2012) und Slowenien (Fišer & Kostanjšek 2001) werden xerotherme Heide-, Mager- und Trockenrasen-Biotope als Lebensraum von *E. michailovi* benannt, während die Art in der Türkei aus annuellen Fluren gekeschert wurde (Yağmur et al. 2009).

Für Mecklenburg-Vorpommern neue Spinnenarten

***Evarcha laetabunda* (C. L. Koch, 1846)**
3 ♀♀, 3 subadulte ♂♂ (gekeschert), Leisterförde, ehemaliger Grenzstreifen („Grünes Band"), MTB 2530, 53°28'39" N, 10°42'08" E, 26 m NN

Biotop: *Calluna*-Heide, Sukzession auf dem bis 1990 völlig vegetationsfrei gehaltenen Grenzstreifen, Pflege durch Entnahme von Großgehölzen (Kniep mdl.).

Von *E. laetabunda* existieren in Norddeutschland nur sehr wenige Nachweise (Staudt 2014). Ihre weite Streuung ließ allerdings weitere Vorkommen erwarten. Der vorliegende erste Fundort in Mecklenburg-Vorpommern befindet sich unmittelbar an der Landesgrenze zu Schleswig-Holstein, wo die Art seit 2007 nachgewiesen ist (Lemke 2008).

Abb. 2: *Evarcha michailovi* Männchen, Habitus
Fig. 2: *Evarcha michailovi* male, habitus

Abb. 3: *Evarcha michailovi*, Bulbus ventral, Embolus
Fig 3: *Evarcha michailovi*, male palp, ventral view, embolus

Abb. 4: *Evarcha michailovi*, Tibialapophyse
Fig. 4: *Evarcha michailovi*, male palp, lateral view, tibial apophysis

Abb. 5: *Evarcha michailovi*, Weibchen, Habitus
Fig. 5: *Evarcha michailovi*, female, habitus

Abb. 6: *Evarcha michailovi*, Epigyne
Fig. 6: *Evarcha michailovi*, epigynum

***Philaeus chrysops* (Poda, 1761)**

Fundmeldung mit Fotobeleg von Christian Winkler, Bordesholm

1 ♂, 25.5.2014, ehemaliger Schießplatz Lübtheen, Sandpiste, MTB 2733, 53°17‘06.0“ N, 11°12‘23.2“ E, 44 m NN

Biotop: offene Sandfläche

Philaeus chrysops wurde nach Staudt (2014) in Deutschland nur in 25 MTB belegt. Laut Bundesartenschutzverordnung (2013) steht sie als streng geschützte Art in Deutschland unter Naturschutz. In der Roten Liste Deutschlands (Blick et al. im Druck)

wird sie in die Gefährdungskategorie 2 (stark gefährdet) eingestuft.

Den bislang einzigen norddeutschen Nachweis vermeldet Finch (2005) aus einer Sandgrube in Niedersachsen aus dem Jahr 1986. Der vorliegende Fund ist demnach der bisher nördlichste in Deutschland und erste in Mecklenburg-Vorpommern.

***Sitticus inexpectus* Logunov & Kronestedt, 1997**

1 ♂, 1 ♀, 7.7..2014, auf Feuchtgrünland gekeschert (leg. F. Joisten), NSG „Altwarper Binnendünen, Neuwarper See und Riether Werder", Riether Werder, MTB 2251, 53°42'14" N, 14°15'16" E, 1 m NN

Biotop: Feuchtgrünland

Die europäisch bis zentralasiatisch verbreitete Art (Platnick 2014) wurde in der Vergangenheit mit *Sitticus rupicola* (C. L. Koch, 1837) konfundiert und erst durch Logunov & Kronestedt (1997) als eigenständige Art beschrieben. Während *rupicola* eine Gebirgsart ist, wird *inexpectus* im Flachland in der Nähe von Gewässerufern gefunden (Kronestedt 1998, Nentwig et al. 2014).

Aus Deutschland liegen bislang nur sehr wenige Nachweise aus Brandenburg und Sachsen-Anhalt vor (insgesamt 6 MTB, Staudt 2014). Blick (1998) vermutet allerdings, dass sich außeralpine *rupicola*-Nennungen sämtlich auf *inexpectus* beziehen.

Der Erstnachweis für Mecklenburg-Vorpommern auf der Insel Riether Werder im Stettiner Haff reiht sich in das Lebensraumschema mit Bevorzugung küstennaher Biotope ein.

***Crustulina sticta* (O. P.-Cambridge, 1861)**

1 ♀, 6.3.2014, aus Binsen geschüttelt (leg. F. Joisten), NSG „Altwarper Binnendünen, Neuwarper See und Riether Werder", Riether Werder, MTB 2251, 53°42'14" N, 14°15'16" E, 1 m NN

Biotop: Feuchtgrünland

Crustulina sticta wurde nur extrem selten ausschließlich im norddeutschen Raum gefunden (Staudt 2014). Ein Nachweis aus Mecklenburg-Vorpommern fehlte bislang.

Nentwig et al. (2014) nennen Moore und Sümpfe als Lebensraum. Dem entspricht auch der vorliegende Fund in Binsen im Feuchtgrünland auf dem Riether Werder. Andererseits werden mehrfach Vorkommen in Dünen (Finch 2005) und Sandtrockenrasen (Martin 2009) gemeldet.

***Heriaeus graminicola* (Doleschall, 1852)**

1 subadultes ♂, 29.7.2014, Rothenklempenow, Latzigsee, Orchideenwiese, gekeschert (leg. H. Lemke), MTB 2451, 53°32'29" N, 14°12'18" E, 2 m NN

Die Artbestimmung erfolgte nach habituellen Merkmalen (Körperform, Zeichnung) sowie dem Lebensraum (Feuchtwiese).

Biotop: hochstaudenreiche Feuchtwiese

Diese sehr selten nachgewiesene Krabbenspinnenart wurde nach Staudt (2014) vorwiegend im Bereich des Rheingrabens nachgewiesen. Der bislang einzige in den Nachweiskarten verzeichnete Fund nördlich der Mittelgebirge stammt aus dem Kremmener Luch in Brandenburg aus dem Jahr 1954 (Platen et al. 1999). Die Art gilt hier mittlerweile als ausgestorben (Rote Liste Kategorie 0). Darüber hinaus verweist Finch (2005) auf einen von Bonn et al. (1997) erfassten Einzelfund in einem Elb-Auewald in Niedersachsen, wo die Art in der Roten Liste als Vom Aussterben bedroht (Kategorie 1) eingruppiert wird (Finch 2004). Der vorliegende Fund belegt damit das nördlichste Vorkommen der Art in Deutschland und ist gleichzeitig ein Neunachweis für Mecklenburg-Vorpommern.

Heriaeus graminicola besiedelt mehr oder weniger dichte Vegetation in Feuchtbiotopen (Loerbroks 1983, Nentwig et al. 2014). Dem entspricht auch der vorliegende Fund.

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New record of a parasitoid worm (Mermithidae, Nematoda) in a spider of the genus *Trochosa* (Lycosidae)

Michael Meyer

doi: 10.5431/aramit4803

Abstract. A nematode from the family Mermithidae (Nematoda) was recorded parasitizing a spider of the genus *Trochosa*. The subadult *Trochosa*-female was found in a semi-dry calcareous grassland in the valley Leutratal, south of the city of Jena, Thuringia, Germany.

Keywords: wolf spider, mermithid worm, parasitism

Zusammenfassung. Neuer Nachweis eines parasitischen Fadenwurms (Mermithidae, Nematoda) in der Spinnengattung *Trochosa* (Lycosidae). Ein Fadenwurm der Familie Mermithidae (Nematoda) wurde als Parasit der Gattung *Trochosa* festgestellt. Das subadulte *Trochosa*-Weibchen wurde im mäßig trockenen Kalkgrasland des Leutratals südlich von Jena (Thüringen) gefangen.

Although spiders are often described as top-predators in arthropod communities, there are nonetheless various invertebrate animals that feed on spiders. In this context, Pompilidae (spider wasps) are often cited, a hymenopteran family comprising of about 100 species in Central Europe, which have specialized on spiders as a source of food for their offspring (Bellmann 2010). Also larvae of other hymenopterans, such as some Ichneumonidae and Sphecidae (Eberhard 2000, Bellmann 2010), some larvae of dipterans such as species of the genus *Ogcodes* (Acroceridae) and of the family Tachynidae (König 1894, Allard & Robertson 2003, Bellmann 2010, Kehlmaier et al. 2012) are known as parasites in or on spiders, or in their cocoons (see e.g. Finch 2005, Helsdingen 2011 for a review). Little is known about the relevance of nematode parasitism in spiders. All known natural nematode parasitoids of spiders belong to the family Mermithidae, namely the genera *Agamermis*, *Arachnomermis*, *Aranimermis*, *Hexamermis* and *Mermis* (Poinar 1985, 2000, Penney & Bennett 2006). A fossil species, *Heydenius araneus*, was also described (Poinar 2000). Mermithids can also be found in mosquitoes, grasshoppers, butterflies, damselflies or cockchafers. For many mermithids, the host species is still unknown (Nickle 1972).

Until now, there is little knowledge about their systematic classification due to difficulties in identification. Also, information about the life history of individual species is very fragmentary (Penney & Bennett 2006). Juvenile mermithids leave their host and then move on to soil or mud; some even live in freshwater, where they mature (Nickle 1972, Allard & Robertson 2003). Mating and development of the larvae into their first stadium occur in the soil. Afterwards, the larvae develop in arthropods (Hartwich 1992), in spiders usually after being ingested through a paratenic host or, rarely, through direct penetration by an infective larva after hatching out of an egg (Penney & Bennett 2006). The problem is that reliable identification of these animals is only possible having adult individuals, namely males (Allard & Robertson 2003). However, they are very difficult to find in soil and the rearing of post-parasite juvenile individuals in the laboratory is still difficult (Penney & Bennett 2006). Infected spiders often show an enlarged and deformed opisthosoma, deformed copulation structures or deformed legs. Moreover, they show changes in behaviour such as sluggishness, slower reaction times to predators and a tendency to move towards water (Allard & Robertson 2003, Pizzi 2009).

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Study area, material and methods

The infected *Trochosa*-spider was found amongst contents of pitfall traps used during a biodiversity study in a semi-dry grassland near the motorway A4 in the valley Leutratal, south of the city of Jena (Germany). The investigated area is characterized as mesophilic grassland in the lower part which then changes to semi-dry calcareous grassland in the upper part of the slope. Above the grassland, the area is

Fig. 1: Place of discovery of the infected spider: Grassland, dominated by tor-grass (*Brachypodium pinnatum*), which is interspersed with dogwood (*Cornus sanguinea*). – Photo: M. Meyer, June 2013

characterized by pine-forests, shrubs or barren calcareous sunny slopes.

As a preservative, we used 1.2-propandiol (VWR International GmbH, Darmstadt, Germany) (dilution 1:2) which was mixed with quinine sulphate (4 gram per litre) (VWR International GmbH, Darmstadt, Germany) to deter small mammals from entering and eventually perishing in the traps. To reduce surface tension, we used some drops of a surfactant (common washing liquid). The traps were installed at the end of April and emptied approximately every two weeks from April to September.

The infected spider was detected in one trap installed on June 11 and emptied on June 24, 2013. The plot where it was found is located in the northwest of the village "Leutra" near a pine-forest edge (50.8703, 11.5625 WGS84). The plant community is dominated by tor-grass (*Brachypodium pinnatum*) which is interspersed with dogwood (*Cornus sanguinea*) (Fig. 1). The female spider had only reached a subadult developmental stage such that identification to species level was impossible. Due to the maculation on the prosoma (two dark longitudinal stripes on a bright median stripe, Heimer & Nentwig 1991), the spider belongs to the genus *Trochosa*. As nearly all other identifiable individuals of the genus *Trochosa* caught during this study belonged to *Trochosa terricola* Thorell, 1856, it is highly likely that this individual belongs to this species as well. Other species of the genus *Trochosa* that are known from the locality are *Trochosa ruricola* (De Geer, 1778) and *Trochosa spinipalpis* (F. O. P.-Cambridge, 1895) (Malt & Schäller 1998), but both do not usually occur on dry grasslands (Engelhardt 1964, Bellmann 2010). The spider and the mermithid have been deposited at the Institute of Ecology, Friedrich-Schiller-Universität Jena.

Results and discussion

The mermithid was obviously in the act of emerging from the spider. A part of it, with a length of about one centimetre, was already visible between the spinnerets. After extracting the worm surgically, it was found to have a length of about 19 cm (Fig. 2). The opisthosoma of the spider was approximately 3 mm long. The worm was white, ivory-coloured to pale brownish in colour and had an irregular surface structure. Especially at the tapered ends, it was slightly transparent. The ends were rounded. Because the mermithid had not reached an adult stage, identification to species level was not possible.

Parasitism of spiders by mermithids is obviously not uncommon – in some spider populations, the infection rate reaches more than 8 %. The infection rate is higher in populations near streams, which may be due to the fact that most adult mermithid worms live in mud or freshwater (Nickle 1972, Allard & Robertson 2003). In general, parasitism by mermithids can occur in most spider families, as well as harvestmen (Poinar 1985), but also in scorpions and pseudoscorpions (Poinar & Ćurčić 1992). The wolf spiders (Lycosidae) exhibit the highest number of species (22) known for being infected by mermithids (Engelhardt 1964, Penney & Bennet 2006). This applies in particular to the genus *Pardosa*, but also to various species of the genera *Alopecosa*, *Arctosa*, *Geolycosa*, *Hygrolycosa*, *Rabidosa*, *Schizocosa* and *Sossipus* (Penney & Bennett 2006). For the genus *Trochosa*, only one case of parasitism by mermithids was known in an individual of *Trochosa robusta* (Simon, 1876) (Engelhardt 1964). For the remaining species of the genus *Trochosa*, no parasitism by mermithids has been described until now. However, parasitism of spiders by mermithids also occurs in most other spider families (see Penney & Bennett 2006 for a review). This could probably be because most of these mermithids undergo an indirect developmental process, i.e. they use insects as paratenic hosts which, for their part, then get consumed by spiders afterwards. This may explain the parasitism of spider species with different feeding habits (Poinar & Benton 1986).

Mermithid worms continue to be a mystery, especially because identification is still problematic. Since detection is more or less a matter of chance (e.g. individuals emerging of the spider) it is difficult to gain an overall view of this group.

Acknowledgements
I thank Dr. Winfried Voigt and Mary Gizzie-Voigt for helpful suggestions on earlier versions of this article and improvement of the English. I also want to thank Prof. Dr. Günter Köhler and Dr. Simone Cesarz for fruitful discussions and providing literature. Petr Dolejš, Torbjörn Kronestedt and the editor are gratefully acknowledged for their critical comments which helped to improve the manuscript.

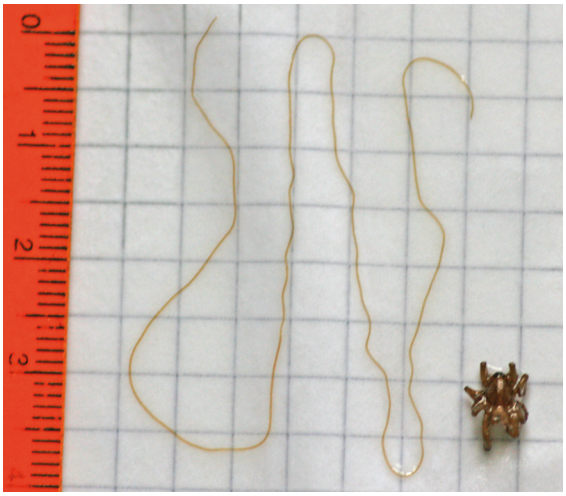

Fig. 2: The infected spider (opisthosoma slightly damaged) and the mermithid. – Photo: M. Meyer, February 2014, edited by T. Kronestedt.

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Carinostoma elegans new to the Slovakian harvestmen fauna (Opiliones, Dyspnoi, Nemastomatidae)

Anna Šestáková & Ivan Mihál

doi: 10.5431/aramit4804

Abstract. A new genus and species of small harvestman was found for the first time in Slovakia – *Carinostoma elegans* (Sørensen, 1894). One male and two females were collected in the Mlyňany arboretum of the Slovak Academy of Science (western Slovakia). Descriptions and photographs of both sexes of *C. elegans* are provided. Additional comments, and a map of distribution of all species of this genus, are provided.

Keywords: arboretum, faunistics, harvestmen, new record, western Slovakia

Zusammenfassung. *Carinostoma elegans* neu für die Weberknechtfauna der Slowakei (Opiliones, Dyspnoi, Nemastomatidae). Eine neue Weberknechtgattung und –art wurde erstmals in der Slowakische Republik nachgewiesen – *Carinostoma elegans* (Sørensen, 1894). Ein Männchen und zwei Weibchen wurden im Mlyňany Arboretum der Slovakischen Akademie der Wissenschaften nachgewiesen. Beide Geschlechter sowie die Verbreitung der Art werden beschrieben und abgebildet.

Altogether five species in three genera from the family Nemastomatidae are known to occur in Slovakia. During a brief zoological investigation into the arachnid fauna in the arboretum Mlyňany of the Slovak Academy of Science three specimens of a harvestman so far not known as a member of the Slovakian opilionid fauna were found. The specimens were identified as *Carinostoma elegans* Sørensen, 1894. The genus *Carinostoma* Kratochvíl, 1958 comprises three closely related European species (Schönhofer 2013). They are small, black colored, short-legged with silver spots and dorsal ornamentation forming rows of bridgethorns. Males have a bifid and spined penial glans and chelicera with a single excretion porus (Schönhofer & Martens 2012). The authorship of *Carinostoma elegans* is officially assigned to William Emil Sørensen, but the species was published thanks to Adolf Lendl. Sørensen was very busy that time, so Lendl asked him for permission to publish his descriptions (Lendl 1894). The presence of this species was expected in Slovakia due to its occurrence close to the border with Hungary and Ukraine (e.g. Kratochvíl 1935, Šilhavý 1956, Martens 1978, Stašiov 2004, Mihál et al. 2009). With this new record of *Carinostoma elegans* the number of the harvestmen species known from Slovakia reaches 35 and the number of genera increases to 25 (Bezděčka & Bezděčková 2011, Mihál & Astaloš 2011). As the species is new to the Slovakian harvestmen fauna, we provide a description of its morphology and compare its distribution to other species of the genus.

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submitted: 4.10.2014, accepted 11.12.2014, online 23.12.2014

Methods

Specimens were extracted from samples using Berlese funnels and by individual collection. Microphotographs were made using EOS Utility software and a digital camera (Canon EOS 1100D) connected to a Zeiss Stemi 2000-C. Microslides of the ovipositor and penis were photographed using a Leica ICC50 camera connected to a Leica DM1000 using LAS EZ 1.8.0 software. Digital images were combined and edited using Photoshop CS6. Description of the species is based on mature specimens obtained in Slovakia. Material is deposited in 70% ethanol and as permanent microscope slides in Swann's medium in the collection of the Western Slovakia Museum in Trnava.

Results and Discusion

Nemastomatidae Simon 1872

Carinostoma Kratochvíl, 1958

Carinostoma elegans (Sørensen, 1894)

Taxonomy references

Nemastoma elegans Sørensen 1894: in Lendl 1894: 29-30, pl. 1, fig. 3 (♀); Roewer 1914: 164-165, fig. 32; Roewer 1919: 155-156; Roewer 1923: 671, fig. 836; Šilhavý 1939: 110, fig. 10 (♀); Cîrdei 1958: 1-2, fig. 1.

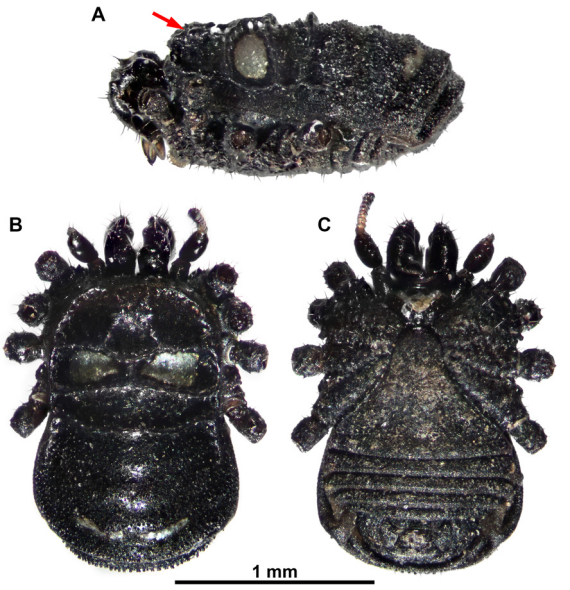

Fig. 1: Male habitus of *Carinostoma elegans*. A: lateral view, B: dorsal view, C: ventral view. Arrow points to eyes.

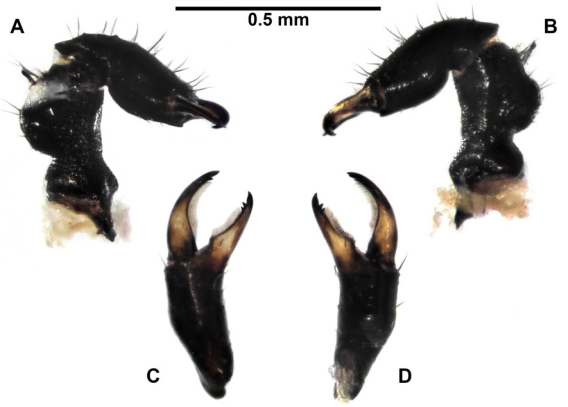

Fig. 2: Male left chelicera of *Carinostoma elegans*. A: prolateral view, B: retrolateral view, C: dorsal view, D: ventral view.

Nemastoma e. var. *batorligetiense* Szalay, 1951: in Szalay 1951: 307-309, figs 1-3 (♂♀).

Mitostoma e. (Sørensen 1894): in Šilhavý 1939: 110, fig. 10; Kratochvíl 1958: 572.

Carinostoma e. (Sørensen 1894): in Dumitrescu 1972: 73-74; Staręga 1976: 54-56, fig. 42 (♂♀); Martens 1978: 137, figs 201-207 (♂); Karaman 1995: 36, fig. 8a; Băbălean 2001: 24, 26, figs a, b; Băbălean 2011: 47, figs 13-14.

Carinostoma e. batorligetiense (Szalay, 1951): in Loksa 1991: 685, fig. 2 (♂).

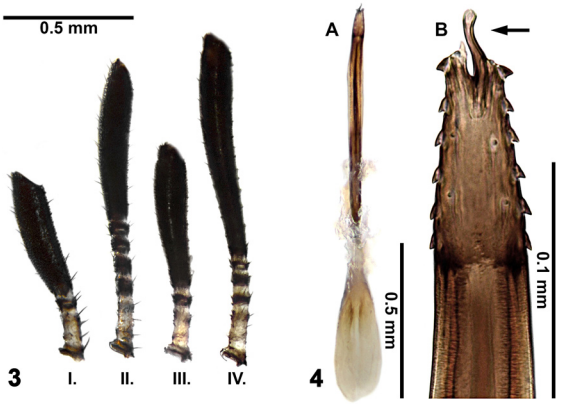

Fig. 3: Male femora with pseudoarticulation of *Carinostoma elegans*.

Fig. 4: Male penis of *Carinostoma elegans*. A: dorsal view, B: detail of penial glans, ventral view. Arrow points to stylus.

Misidentification and errors

Šilhavý (1966): fig. 19 (♂). Misidentification, the figure refers to *C. carinatum* (Roewer 1914). Schönhofer & Martens (2012): figs 5-6. Mixed up figures; figure 6 refers to *C. carinatum* and figure 5 to *C. elegans*.

Material examined

1♂,1♀, extracted from bracket fungi and moss sample; 1♀, under old log: SLOVAKIA, the Mlyňany arboretum of Slovak Academy of Science, N48.32265° E18.36348°, 170 m a.s.l., 10 October 2013, leg. A. Šestáková, J. Christophoryová & K. Krajčovičová.

Diagnosis

Within *Carinostoma* only *C. elegans* has two transverse dorsal ridges with the upper one connected to the round post-ocular ridge; *C. carinatum* (Roewer, 1914) differs by an additional transverse ridge and *C. ornatum* (Hadži, 1940) lacks connection to the post-ocular ridge and dorsal spots; however, Karaman (1995) observed specimens, living in sympatry with *C. carinatum*, with dorsal spots as in *C. elegans*. Unlike *C. carinatum* and *C. ornatum*, males of *C. elegans* have a longer slender stylus of the penial glans (not thick and curved), and the excretion porus of the cheliceral apophysis is positioned within the cheliceral grove (not outside) (e.g. Hadži 1940, fig. 6g, Martens 1978, fig. 195, Raspotnig et al. 2014, fig. 2).

Characteristics of the Slovakian *Carinostoma elegans* sample

Body ovoid and black, ornamented with crests of bridgethorns; anteriorly with two large silver spots,

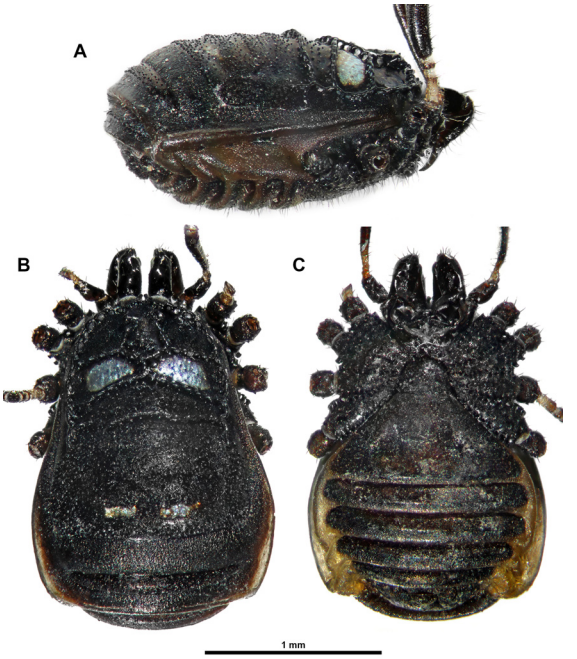

Fig. 5: Female habitus of *Carinostoma elegans*. A: lateral view, B: dorsal view, C: ventral view.

Fig. 6: Female left chelicera of *Carinostoma elegans*. A: prolateral view, B: retrolateral view, C: dorsal view, D: ventral view.

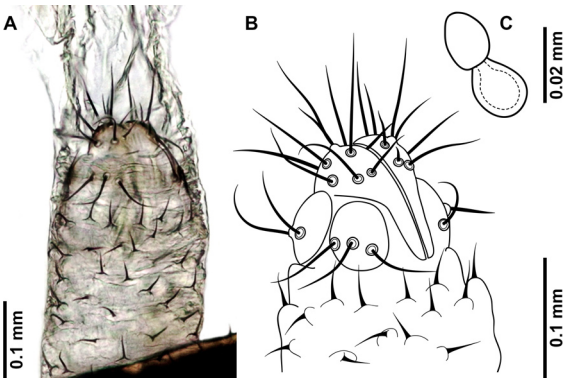

Fig. 7: Female ovipositor of *Carinostoma elegans*. A–B: ventral view, C: right receptaculum seminis.

posteriorly with two golden spots (Figs 1, 5). Legs relatively short; femora with typical pseudoarticulations as follows I=1-2, II=4, III=1-2, IV=3-4 (Fig. 3).

Male. Total length of body 1.5 mm. Basal segment of chelicerae has a small depression with excretion porus (Fig. 2). Penis as in Fig. 4; glans terminally bifid, slender stylus slightly curved, laterally on the margin covered with six pairs of short spines.

Female. Total length of body 1.8-2.0 mm. Chelicerae lack excretion porus on the basal segment (Fig. 6). Ovipositor with two terminal lobes and four subterminal ones; each of the subterminal ones with three spines (Fig. 7). A pair of subtle, two-segmented seminal receptacles (globular terminal segment and short tubular basal one) (Fig. 7C).

Comments

The number of posterior spots varies from one ellipsoid to two small ovals (var. *bartoligetiense*) (Băbălean 2011). Description of the variety *bartoligetiense* was based on eastern Hungarian specimens from locality of Bátorliget (Szalay 1951). Later it was categorized as a subspecies by Loksa (1991). Nowadays it is treated as a variety based on the recent taxonomic revision by Schönhofer (2013). Slovakian species represent var. *bartoligetiense*. Although one of Slovakian females has only one posterior spot, this is an abnormal absence of the left one. In addition no posterior spots were observed in one female from Romania by Cîrdei (1958).

Biological and ecological notes

The genus *Carinostoma* comprises edaphic thermophilous forest species found in the litter, under tree remnants, stones or in deep humus soil (Avram & Dumitrescu 1969, Băbălean & Ilie 2003, Mitov & Stoyanov 2004, Mitov 2008). Although, caves are not a typical habitat for this genus; several females of *C. elegans* were recorded near their entrances (Avram & Dumitrescu 1969, Ilie 2002). All species occur in forests, preferring higher altitudes in the southern populations (Schönhofer 2014).

Carinostoma adults seem to be most active around October (e.g. Oltean & Dumitrescu 1973, Novak & Gruber 2000, Raspoting et al. 2014), which corresponds to our discovery in Slovakia. Adults of *Carinostoma elegans* reach two peaks of maximum activity. The first peak is in autumn (from September to October) and the second in spring (from April to May) (Weiss 1988, Loksa 1991). In *C. ornatum* fe-

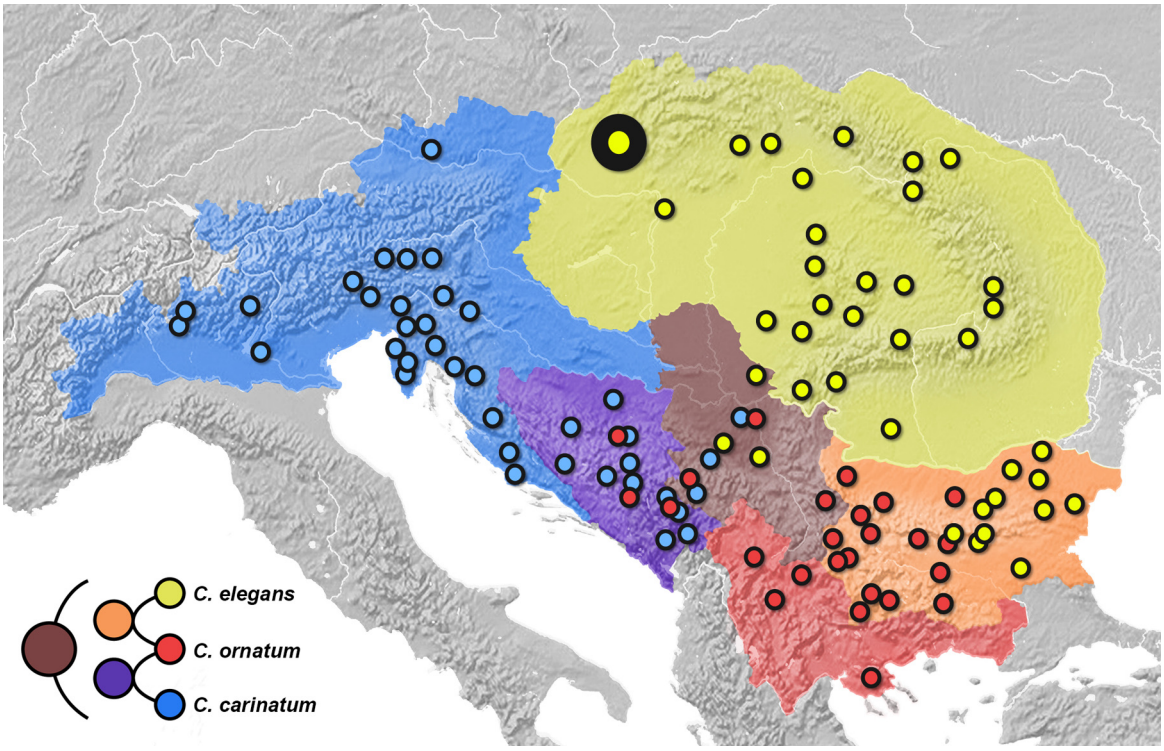

Fig. 8: Schematic map of distribution of the genus *Carinostoma*; disputable records omitted (for detailed information see Appendix). Yellow: *C. elegans*, Red: *C. ornatum*, Blue: *C. carinatum*. The Slovakian record marked with the largest character.

males with eggs were found in spring and autumn (from September to October and from April to June) (Mitov 2004, Mitov & Stoyanov 2004), which is probably similar in *C. elegans*.

Distribution

Carinostoma elegans is a south-east European species. It is the most eastern species of the genus, and its distribution is enclosed by the Carpathian Mountains. An isolated population was found in the east of Bulgaria (Fig. 8, yellow color). In comparison to the other species the most western one, *C. carinatum*, occurs from the Eastern Alps, following the Dinaric Alps to Serbia (Fig. 8, blue), and *C. ornatum* occupies the south-east along the Balkan Mountains and the Rhodopes (Fig. 8, red). According to Staręga (1976) *C. elegans* seems to be vicariant with *C. ornatum*, so their distribution may be limited somewhere in the central Balkans, between the "Šipka" through "Iskyr". However, Mitov (2004) predicted *C. elegans* in the Eastern Rhodopes. All three species of the genus *Carinostoma* occur in Serbia; moreover *C. elegans* co-occurs with *C. ornatum* in Bulgaria and *C. carinatum* with *C. ornatum* in Bosnia and Herzegovina and Montenegro (Fig. 8, Tab. 1). According to the presented map there are some blank places, e.g. Albania, Moldavia, which is probably due to limited research activity.

The recent mention of *C. elegans* in Slovakia (Raspotnig et al. 2014), was clarified as the expected occurrence according to Martens (1978) (Raspotnig 2014, pers. comm.). However, *C. elegans* has been expected in Slovakia even earlier (e.g. Kratochvíl 1935, Mihál et al. 2009), but remained either very rare or hard to find. Our records from the arboretum could be caused by human activity. In the years 2011 and 2012 a few plants were imported from Hungary (Tanakajd) (Barta 2013, pers. comm.). Although all plants were placed into a garden nursery, two specimens of *C. elegans* were found in the oldest part of the arboretum near the castle. Other very recent records of *C. elegans* in the Aggteleki National Park from Hungary were situated very close to the Slovakian border (Komposch 2004), so it is probably pres-

Tab. 1. Distribution of the genus *Carinostoma* in Europe

	C. carinatum (Roewer, 1914)	*C. elegans* (Sørensen, 1894)	*C. ornatum* (Hadži, 1940)	References
Albania	probably			Pavićević et al. (2012), Mitov (2000)
Austria	+			Komposch (2011)
Bosnia and Herzegovina	+		+	Novak (2005a)
Bulgaria		+	+	Mitov (2004, 2008)
Croatia	+			Novak (2004)
Greece			+	Staręga (1976)
Hungary		+		Lengyel & Murányi (2006)
Italia	+			Stoch (2003)
Kosovo			+	Hadži (1940)
Macedonia	probably		+	Pavićević et al. (2012), Raspotnig et al. (2014)
Montenegro	+			Pavićević et al. (2012)
Romania		+		Băbălean (2005)
Serbia	+	+	+	Pavićević et al. (2012), Raspotnig et al. (2014)
Slovakia		+		present paper, Stašiov (2004)
Slovenia	+			Novak et al. (2006)
Ukraine		+		Bartoš (1939)

ent in the neighboring NP Slovenský kras (=Slovak Karst National Park) as well.

Disputable and dubious records

Although Roewer (1919) mentioned distribution of *C. carinatum* in Romania, this could not be confirmed by recent faunistic studies (e.g. Babalean 2001, 2002, 2011, Babalean & Ilie 2003, Mitov 2008). On the contrary, *C. ornatum* should be expected in Dalmatia (Novak 2004), as was presented by Hadži (1973), but this record has not been confirmed up to the present.

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Tab. 2. References used in the distribution map of the genus *Carinostoma*

Species	State	Reference
C. carinatum (Roewer, 1914)	Austria	Aurenhammer & Komposch 2013, Kofler 1968, Kritscher 1956, Martens 1978, Raspotnig et al. 2014, Roewer 1919
	Bosnia-Herzegovina	Martens 1978, Novak 2005a, Raspotnig et al. 2014, Roewer 1914, 1917, 1919, 1923, Šilhavý 1939
	Croatia	Martens 1978, Roewer 1919, 1923
	Italy	Martens 1978, Roewer 1919, 1951, Schönhofer & Martens 2010
	Montenegro	Karaman 1995, Martens 1978, Roewer 1919
	Serbia	Hadži 1973, Pavićević et al. 2012, Raspotnig et al. 2014, Roewer 1923
	Slovenia	Martens 1978, Novak 2005b, Novak et al. 2002, 2006, Raspotnig et al. 2014, Roewer 1919
C. elegans (Sørensen, 1894)	Bulgaria	Martens 1978, Mitov 1995, Staręga 1976,
	Hungary	Komposch 2004, Lengyel, Muranyi 2006, Loksa 1991, Martens 1978, Szalay 1952
	Romania	Avram 1978, Avram & Dumitrescu 1969, Băbălean 2001, 2002, 2011, Băbălean & Ilie 2003, Băncilă & Plăiaşu 2009, Cîrdei 1958, Dumitrescu 1972, Kolosvary 1963, Mitov 2008, Oltean & Dumitrescu 1973, Schönhofer & Martens 2010, Weiss 1975, 1980, 1984, 1988
	Ukraine	Bartoš 1939, Cîrdei 1960, Kolosváry 1929, Roewer 1919
C. ornatum (Hadži, 1940)	Bosnia-Herzegovina	Novak 2005a, Raspotnig et al. 2014
	Bulgaria	Martens 1978, Mitov 2004, Staręga 1976
	Greece	Martens 1978
	Kosovo	Hadži 1940
	Macedonia	Raspotnig et al. 2014
	Montenegro	Karaman 1995
	Serbia	Karaman 1995, Martens 1978, Raspotnig et al. 2014

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Holocnemus pluchei (Araneae, Pholcidae) in Getränke- und Baumärkten in Deutschland

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Abstract. *Holocnemus pluchei* (Araneae, Pholcidae) in beverage stores and do-it-yourself stores in Germany. Some colonies of spiders belonging to the Mediterranean cellar spider *Holocnemus pluchei* (Scopoli, 1763), were found in both beverage and do-it-yourself stores in Germany. Among these are the first records of *H. pluchei* in Berlin, Hamburg, Lower Saxony and Mecklenburg-Western Pomerania.

Keywords: imported species, synanthropic spider

Zusammenfassung. Einige Vorkommen der mediterranen Zitterspinnenart *Holocnemus pluchei* (Scopoli, 1763) wurden in Deutschland in Getränkemärkten und Baumärkten gefunden. Neu nachgewiesen wurde die Art für Berlin, Hamburg, Niedersachsen und Mecklenburg-Vorpommern.

Im Oktober 2012 wurde in einem Getränkemarkt in Neubrandenburg eine etwa 30 Tiere umfassende Population der ursprünglich mediterranen Zitterspinnenart *Holocnemus pluchei* (Scopoli, 1763) entdeckt. Im selben Monat konnten in zwei Berliner Baumärkten mehrere Tiere der Art nachgewiesen werden. Im Rahmen einer Bachelorarbeit (Reiser 2013) wurden daraufhin deutschlandweit mehrere Getränkemärkte und Baumärkte auf das Vorkommen von *H. pluchei* untersucht. In diesem Beitrag sollen nun die Ergebnisse vorgestellt, als auch über mögliche Einschleppungswege diskutiert werden.

Methoden

Im Zeitraum von Oktober 2012 bis Juni 2013 wurden deutschlandweit insgesamt 32 Getränkemärkte von sieben verschiedenen Anbietern sowie 33 Baumärkte von zehn verschiedenen Anbietern auf das Vorkommen von *H. pluchei* untersucht. Alle Örtlichkeiten wurden dabei einmalig besucht. Sämtliche Individuen wurden per Handfang gesammelt. Um die gezielte Suche nach *H. pluchei* zu erleichtern, erfolgte in der Regel eine vorherige Absprache mit den jeweiligen Geschäftsleitungen.

Gesammelte Tiere wurden mit Hilfe eines Novex-Stereomikroskop (RZ-Reihe) bestimmt und befinden sich zu Teilen in den Privatsammlungen der Autoren.

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Ergebnisse

Im Folgenden werden die Ergebnisse der Untersuchung chronologisch geordnet in je einer Tabelle für Getränkemärkte und Baumärkte präsentiert (Tab. 1, Tab. 2). Die Angaben beziehen sich auf die Gesamtzahl der in der jeweiligen Lokalität gefundenen Individuen. Die Fänge sind in ♂, ♀ und Jungtiere unterteilt. Bei sehr großen Individuenzahlen handelt es sich lediglich um Beobachtungen (minimale Schätzwerte, gekennzeichnet mit „insgesamt >X"). Falls nichts anderes angegeben, wurden die Individuen vom Erstautor dieser Arbeit gesammelt bzw. bestimmt (leg. & det. N. Reiser). Die Funde aus der vorliegenden Arbeit sind in Abb. 1 markiert.

Von den insgesamt 32 untersuchten Getränkemärkten konnten in 19 Lokalitäten Individuen von *H. pluchei* nachgewiesen werden (59%). Dabei wurde die Art in Örtlichkeiten von sechs der sieben Getränkemarktanbietern gefunden. Die überwiegende Zahl der Tiere wurde an den Fenstern und an der Decke der jeweiligen Märkte nachgewiesen, wobei Einzeltiere auch öfters direkt in Getränkekisten beobachtet wurden bzw. dort ihre Netze angelegt hatten (keine feststellbare Tendenz zu bestimmter Ware).

Auch in vielen Baumärkten ist *H. pluchei* fest etabliert. In 14 der 34 insgesamt untersuchten Lokalitäten konnte die Art nachgewiesen werden (41%). Ein Großteil der Tiere wurde in den jeweiligen Gartenabteilungen der Örtlichkeiten und hier insbesondere an den Fenstern und (Glas-)Türen gefunden. Erwähnenswert sind hier insbesondere die häufig beobachteten sehr großen Individuenzahlen von bis über 1000 Tieren.

Tab. 1: *Holocnemus pluchei* in Getränkemärkten in Deutschland
Tab. 1: *Holocnemus pluchei* in beverage stores in Germany

Anzahl Tiere	Datum	Fundort (MTB/TK25), Details	Koordinaten, m ü. NN
7♂, 3♀, ca. 20 juv.	23.10.2012	Neubrandenburg (2445), Fenster Eingangsbereich, in Gebäudeecken und an einer Lagertür	53.5236°N, 13.2625°E, 65 m
3♂, 3♀, 7 juv.	28.12.2012	Spaichingen (7918), Fenster und Decke an verschiedenen Stellen im Markt	48.0680°N, 8.7505°E, 673 m
3 juv.	15.02.2013	Berlin Treptow-Köpenick (3546), Fenster, leg. J. Neumann	52.4908°N, 13.4580°E, 35 m
5♂, 5♀, 8 juv.	15.02.2013	Berlin Treptow-Köpenick (3547), Fenster und Decke an verschiedenen Stellen im Markt, leg. J. Neumann	52.4250°N, 13.5277°E, 37 m
2♂, 6♀, 8 juv.	10.03.2013	Winsen (Luhe) (2627), Fenster Eingangsbereich, Decke an verschiedenen Stellen im Markt	53.3622°N, 10.1944°E, 4 m
1♂	11.03.2013	Berlin Charlottenburg-Wilmersdorf (3445), Decke	52.5072°N, 13.3177°E, 35 m
1♀	11.03.2013	Tempelhof-Schöneberg (3446), Decke	52.5011°N, 13.3441°E, 34 m
1♂, 3♀, 2 juv.	11.03.2013	Berlin Mitte (3446), Decke	52.5200°N, 13.3416°E, 36 m
2♀	11.03.2013	Berlin Charlottenburg-Wilmersdorf (3545), Decke	52.4922°N, 13.3075°E, 38 m
2♂, 5♀, 3 juv.	11.03.2013	Berlin Tempelhof-Schöneberg (3546), Fenster und Decke an verschiedenen Stellen im Markt	52.4755°N, 13.3408°E, 40 m
6♂, 8♀, 10 juv.	11.03.2013	Berlin Tempelhof-Schöneberg (3546), Fenster und Decke an verschiedenen Stellen im Markt	52.4805°N, 13.3444°E, 39 m
1 juv.	12.03.2013	Berlin Charlottenburg-Wilmersdorf (3445), Fenster	52.5113°N, 13.3141°E, 35 m
1♀	12.03.2013	Berlin Charlottenburg-Wilmersdorf (3445), Decke	52.5191°N, 13.2572°E, 56 m
1♂, 1 juv.	12.03.2013	Berlin Charlottenburg-Wilmersdorf (3445), Fenster	52.5111°N, 13.3147°E, 37 m
3♂, 4♀, 19 juv.	12.03.2013	Berlin Tempelhof-Schöneberg (3445), Decke und Regale an verschiedenen Stellen im Markt	52.5075°N, 13.2986°E, 35 m
2♂, 2♀, 3 juv.	12.03.2013	Berlin Wilmersdorf (3545), Fenster	52.4952°N, 13.3241°E, 35 m
2 juv.	02.04.2013	Rottweil (7917), Fenster	48.0716°N, 8.6294°E, 720 m
3♂, 2♀, 7 juv.	02.04.2013	Rottweil (7817), Fenster	48.1597°N, 8.6302°E, 595 m
insgesamt >20	03.04.2013	Singen (Hohentwiel) (8219), Fenster	47.7530°N, 8.8458°E, 428 m

Diskussion

Holocnemus pluchei ist ursprünglich eine im Mittelmeerraum, wahrscheinlich mehr mittel- und ostmediterran als holomediterran, verbreitete Art (Brignoli 1971a). Dort lebt sie vor allem zwischen Steinblöcken in trockenem Gelände (Nentwig et al. 2014), ist aber auch häufig zwischen Feigenkakteen zu finden (Bellmann 2001). Für Kreta berichten Eikamp & Kluge (2007), dass *H. pluchei* dort häufig im Eingangsbereichen von Höhlen (siehe auch Brignoli 1971b), Kellern oder verfallenen Gebäuden anzutreffen ist. Häufig findet man die Art in Südeuropa zudem auch synanthrop in Häusern lebend (Brignoli 1971b).

Der erste Fund von *H. pluchei* in Deutschland gelang nach Staudt (2014) bereits in den 1960er Jahren (Beleg von E. Kullmann in der Sammlung des Forschungsmuseum Alexander Koenig, Bonn). Der erste publizierte Fund stammt allerdings aus einem Parkhaus in Köln (Jäger 1995). Weitere Tiere wurden in den Folgejahren in Parkhäusern in Mannheim und Mainz festgestellt. Im Jahre 2012 wurde zudem eine weitere Population im Parkhaus am Mainzer Theater nachgewiesen (Senckenberg Gesellschaft für Naturforschung 2012). In jüngster Zeit wurden Funde von *H. pluchei* vor allem aus dem Südwesten Deutschlands verstärkt gemeldet (Staudt 2014, Abb. 1). Den

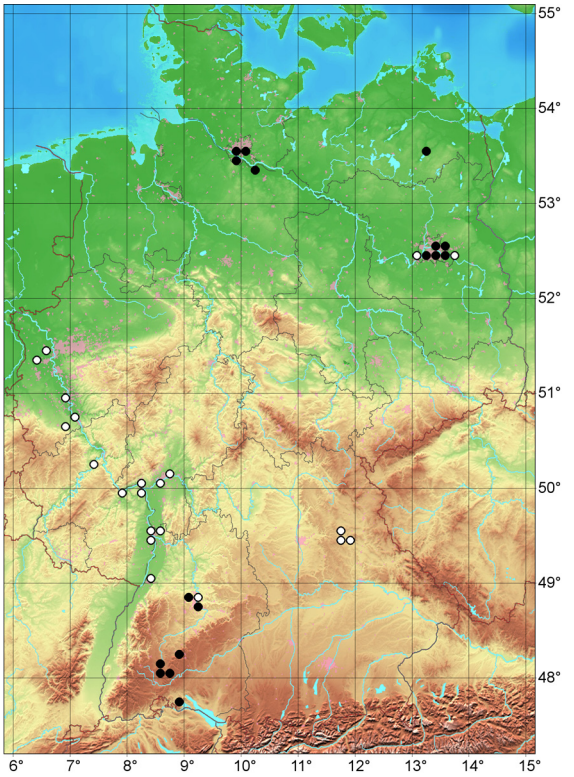

Abb. 1: Nachweise von *Holocnemus pluchei* in Deutschland (nach Staudt 2014) (schwarze Punkte: neue Nachweise aus dieser Arbeit, weiße Punkte: sonstige Nachweise)
Fig. 1: Records of *Holocnemus pluchei* in Germany (after Staudt 2014) (black dots: new records presented here, white dots: other records)

bislang nordöstlichsten Fundort in Deutschland stellte der Botanische Garten in Potsdam dar (Kielhorn 2009). Für Berlin, Hamburg, Niedersachsen und Mecklenburg-Vorpommern sind die hier präsentierten Funde daher jeweils Erstnachweise. Neben Deutschland liegen seit einigen Jahren auch aus anderen mitteleuropäischen Ländern wie z. B. Österreich, Belgien (Le Peru 2011), Polen (Rozwałka & Stachowicz 2010) und den Niederlanden (van Helsdingen 2010) Nachweise von *H. pluchei* vor.

Die genauen Einschleppungswege in die untersuchten Getränke- und Baumärkte sind bislang nicht bekannt. Unter Umständen könnten die Tiere durch Getränkelieferungen aus mediterranen Gebieten (bspw. Wein) in Getränkemärkte immer wieder neu eingeschleppt werden. Es ist sicher, dass in vielen Märkten zudem eine Reproduktion stattfindet, da oftmals Tiere in allen Größenstadien gefunden wurden. Für mindestens drei der untersuchten Getränkemarktketten ist bekannt, dass zentrale Getränkesammellager genutzt werden. Es wäre möglich, dass dort ebenfalls bereits eine Population von *H. pluchei* besteht und von dort aus immer wieder Tiere in die entsprechenden Filialen eingeschleppt werden. Im Gegensatz zu Getränkemärkten ist ein Fund von *H. pluchei* in einem Baumarkt bereits dokumentiert (Rozwałka & Stachowicz 2010). Wie die Tiere in die Märkte gelangen ist allerdings auch hier nicht weiter dokumentiert worden. Rozwałka & Stachowicz (2010) vermuten, dass *H. pluchei* womöglich mit Topfpflanzen oder Gartenzubehör eingeschleppt werden. Jäger (2000) gibt an, dass auch eine Einschleppung durch Gemüse, Obst oder Zierpflanzen aus mediterranen Region wahrscheinlich ist. Unsere Funde zeigen, dass *H. pluchei* oftmals in den Gartenabteilungen der jeweiligen Baumärkte gefunden wurde, weshalb Zierpflanzen als Einschleppungsmedium eine besondere Bedeutung zukommen könnte. Da die meisten Individuen in unmittelbarer Fensternähe gefunden wurden, könnten die vermehrten Funde in den Gartenabteilungen allerdings auch darauf zurückzuführen sein, dass hier oftmals der einzige Bereich ist, in dem eine natürliche Lichtquelle vorhanden ist. Dies stützt die Beobachtung von Jäger (2000), der daraus schlussfolgerte, dass *H. pluchei* photophil ist. Die im Rahmen der Untersuchung in einem Großteil der Märkte gefundenen sehr großen Individuenzahlen sowie Jungtiere lassen auch hier keinen Zweifel zu, dass sich die Art erfolgreich in Baumärkten reproduziert. Da in allen Märkten in der Regel nur sehr wenige Stellen der Gebäudewände und -ecken frei einsehbar waren, ist zu vermuten, dass die jeweiligen vorhandenen Populationen noch weit mehr Tiere umfassen.

Danksagung
Wir danken Herrn Dr. sc. Dieter Martin, Theo Blick sowie den Gutachtern der Arachnologischen Mitteilungen für die Beratung und kritische Durchsicht des Manuskriptes. Herrn Aloysius Staudt möchten wir für das Erstellen der Nachweiskarte unseren Dank aussprechen.

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Tab. 2: Holocnemus pluchei in Baumärkten in Deutschland
Tab. 2: *Holocnemus pluchei* in do-it-yourself stores in Germany

Anzahl Tiere	Datum	Fundort (MTB/TK25), Details	Koordinaten, m ü. NN
1 juv.	27.10.2012	Neubrandenburg (2445), Fenster Eingangsbereich	53.5247°N, 13.2666°E, 62 m
insgesamt >400	30.10.2012	Berlin Treptow-Köpenick (3547), Fenster und Regale an verschiedenen Stellen im Markt, leg. J. Neumann.	52.4300°N, 13.5505°E, 35 m
2♂, 3♀, 5 juv.	24.11.2012	Berlin Tempelhof-Schöneberg (3446), Erdgeschoss an Türe zu Außenbereich	52.5036°N, 13.3438°E, 35 m
1 juv.	01.12.2012	Neubrandenburg (2445), Regalfuß Baustoffabteilung	53.5863°N, 13.2708°E, 17 m
2 juv.	07.12.2012	Berlin Lichtenberg (3447), Regal Baustoffabteilung, Fenster Pflanzenabteilung	52.5333°N, 13.5008°E, 58 m
insgesamt >300	09.12.2012	Berlin Treptow-Köpenick (3647), Türen und Regale an verschiedenen Stellen im Markt, leg. J. Neumann	52.3977°N, 13.5447°E, 48 m
2♀, 2 juv.	22.12.2012	Balingen (7719), Fenster	48.2625°N, 8.8513°E, 530 m
insgesamt >50	22.12.2012	Mannheim Käfertal (6417), Fenster an verschiedenen Stellen im Markt, Decke Holzabteilung	49.5161°N, 8.5086°E, 99 m
insgesamt >300	28.12.2012	Rottweil (7817), Fenster, Pflanzen und Regale Gartenabteilung	48.1441°N, 8.6375°E, 596 m
insgesamt >1000	31.12.2012	Villingen-Schwenningen (7917), Fenster, Pflanzen und Regale Gartenabteilung	48.0825°N, 8.5002°E, 765 m
insgesamt >15	23.01.2013	Berlin Friedrichshain (3446), Fenster und Regale, leg. J. Neumann	52.5222°N, 13.4652°E, 48 m
insgesamt >200	08.02.2013	Hamburg Wandsbek (2426), Fenster und Regale an verschiedenen Stellen im Markt	53.5769°N, 10.0808°E, 14 m
insgesamt >20	08.02.2013	Hamburg Harburg (2525), Türen an verschiedenen Stellen im Markt	53.4597°N, 9.9936°E, 5 m
2 juv.	02.04.2013	Zimmern ob Rottweil (7817), Regal in Gartenabteilung	48.1702°N, 8.5738°E, 707 m

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Cave-inhabiting pseudoscorpion species of the genus *Roncus* (Pseudoscorpiones: Neobisiidae) from western Greece, including the Ionian Islands

Volker Mahnert & Giulio Gardini

doi: 10.5431/aramit4806

Abstract. Three new species of the genus *Roncus* L. Koch, 1873 are described and figured: *Roncus gasparoi* **n.sp.** from Corfu (Spilaio Anthropograva), *Roncus pieperi* **n.sp.** from Kefalonia (caves Fitidi and Drogarati) and *Roncus giachinoi* **n.sp.** from continental Greece, Arkanania (Megalo Spilio).

Keywords: Arkanania, Corfu, Kefalonia, new species, taxonomy

Zusammenfassung. **Höhlenbewohnende Pseudoskorpionarten der Gattung *Roncus* (Pseudoscorpiones: Neobisiidae) aus West-Griechenland, einschließlich der Ionischen Inseln.** Drei neue Arten der Gattung *Roncus* L. Koch, 1873 werden beschrieben und abgebildet: *Roncus gasparoi* **n.sp.** von Korfu (Spilaio Anthropograva), *Roncus pieperi* **n.sp.** von Kefalonia (Grotten Fitidi und Drogarati) und *Roncus giachinoi* **n.sp.** vom kontinentalen Griechenland, Arkanania (Megalo Spilio).

Speleological investigations of the Ionian Islands and the western part of Greece started quite recently, compared to the efforts applied to adjacent regions. Schawaller (1985) presented a list of Greek Neobisiidae including the cave-dwelling species and indicated for the region five species and subspecies of the genus *Roncus* L. Koch: *Roncus c. corcyraeus* Beier, 1963 (Corfu, cave Peristerograva; but also from the cave Megali Grava no.3553 near Loutses: Gardini 1988); *Roncus (Parablothrus) peramae* Helversen, 1969 (Perama cave near Ioannina, Epirus, continental Greece); *Roncus corcyraeus minor* Mahnert, 1973a (Levkas, cave Karoucha); *Roncus giganteus* Mahnert, 1973b (Zakynthos, cave tou Chajoti: Mahnert 1975); *Roncus lubricus* auct. (Peloponnese, cave Ton Limnon, 20 km south Kalavrita, and Kefalonia, cave Phytidi (=Fitidi), Sami: Mahnert 1975), but this identification is doubtful and should be revised.

The results obtained during the intensive speleological investigations on the Ionian Islands and adjacent mainland regions carried out over years by Dr P. M. Giachino (Torino) and Dr F. Gasparo (Trieste) and the collections obtained by Dr and Mrs H. Pieper (Schwentinental) are filling up some gaps. They indicate, furthermore, that more fascinating discoveries are waiting to be made in the caves of this region.

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Material and methods

Specimens are conserved in 75% ethanol alcohol. Dissected parts are conserved in microvials together with the specimen. Proportions are given in length/breadth for pedipalps and carapace, in length/depth for legs; measurements are given in mm. The holotypes of the new species are deposited in the collections of the Natural History Museum Geneva (Switzerland), paratypes are in the collections of the Natural History Museum Geneva, of the Museo Civico di Scienze Naturali "E. Caffi" Bergamo and in the collection Giulio Gardini (Genova).

Arrangement of the species is in alphabetic order of their geographical origin.

Taxonomy

***Roncus giachinoi* n.sp.** (Fig. 1a-h)

Specimens studied

Holotype, 1♀ (Mus. Geneva), GREECE, Akarnania, Oros Serekas Mt., Monastiraki, 980 m, cave Megalo Spilio (N 38°46'06.1"/E 20°57'22.3"), in cheese-baited traps, 2.VI.1992, leg. P.M. Giachino. Paratypes, 3♀ (Mus. Geneva, Bergamo, coll. Gardini), same data; 4♀ (Mus. Geneva, coll. Gardini), same cave, 1.VI.1993, leg. P.M. Giachino; 1♀ (Mus. Bergamo), same cave, 1000 m, 1.VI.1994, leg. P.M. Giachino; 1♂ (Mus. Geneva), same cave, 1000 m, 30 meters from entrance, under concretion, 1.IX.2004, leg. F. Gasparo.

Etymology
Named in honour of Dr Pier Mauro Giachino, entomologist and biospeleologist of the Museo regionale Torino.

Diagnosis
Morphologically close to *R. peramae* and *R. pieperi* **n.sp.**, but is characterized by the combination of the following characters. Troglobiont habitus. Carapace with an acute triangular epistome, subbasal transverse furrow indistinct, eyes absent, with 20 setae (4/8/4/4) (6 in *pieperi* **n.sp.** and *peramae*); tergites I-IV: 4/4-5 /6/6 (I-II 6/6-7 in *pieperi* **n.sp.** and *peramae*); anterior process of coxa I finger-like, apex indistinctly dentate; chelicera with 5-6 setae on hand, movable finger with large triangular tooth in the tooth row, spinneret absent. Pedipalps slender, femur with a few indistinct granula in basal half, 6.9-7.6 times longer than broad, patella smooth, 5.7-6.5 times, club 1.3 times longer than pedicel, hand with pedicel 2.2-2.6 times, chela with pedicel 6.4-7.0 (♂ 7.5) times longer than broad, finger 1.8-1.9 times longer than hand with pedicel (1.5-1.6 times in *pieperi* **n.sp.**); 1-3 fine setae distal of *eb–esb*; tibia of leg IV shorter than femur+patella.

Description
General colouration yellowish, last abdominal segments whitish. Carapace (Fig. 1a) 1.1-1.3 times longer than broad, with a small triangular, acute epistome, subbasal transverse furrow indistinct, eyes absent, with (19)20 setae (4/(7-)8/4/4). Tergal chaetotaxy: I-IV 4/4-5/6/6-7, following ones mostly with 7(8) setae, XI 6-7 (4 tactile setae). Manducatory process: 4 setae (1♀ 3 on left side), pedipalpal coxa itself with 7-8 setae, coxa I with finger-like anterior lobe, rounded apex indistinctly dentate, medial process rounded, rectangular (Fig. 1f), smooth, 6-7 setae, II 6-8, III 4-5, IV 6-8; genital operculum with 10-11 short setae arranged in two rows in female, in male with 20 long setae arranged in two semicircular rows, median cribriform plate small, rounded, lateral plates not observed; entrance of male genital opening with 2/2 short internal setae; genital organ without particularities; sternal chaetotaxy: III 12-15 marginal setae (male with 6 medial discal setae) + 3-4 suprastigmal setae on each side, IV 8-10 + 2x2-3, IV -X mostly 12-13 setae, XI 4-6(?) (2 tactile setae). Anal conus 2+2 setae. Pleural membranes granular.

Chelicera (Fig. 1b) with 5-6 setae on hand (3 out of 12 chelicera with 5 setae), fixed finger with about 10 acute or rounded, worn teeth (partly indistinct), movable finger with a large triangular tooth (rounded or dentate) in the tooth row, with about 6 rounded teeth proximal to it, subgaleal seta reaching finger tip, spinneret absent, but three glandular ducts visible; serrula exterior with 38-40, serrula interior with 30-33 lamellae; rallum (Fig. 1c) with 8 dentate setae, the proximal one 1/4 of length of the preceding one.

Pedipalps (Fig. 1d) of female (male) slender, trochanter with an indistinct ventral hump in distal half, smooth, femur club-shaped, in basal half scarcely and indistinctly granular, 6.9-7.5 (7.6) times, patella 5.7-6.5 (6.3) times longer than broad, club 3.3-3.6 (3.6) times longer than broad and 1.3-1.4 (1.3) times longer than pedicel, hand with pedicel 2.2-2.6 (2.6) times, chela with pedicel 6.4-7.0 (7.5), without pedicel 6.1-6.7 (7.0) times longer than broad, movable finger 1.8-1.9 (1.9) times longer than hand with pedicel; fixed finger with 135-147 small cusped teeth, movable finger with 139-155 cusped teeth (but in basal third of finger rounded); sensillum p_2 near trichobothrium *st* and indistinctly distal of p_1, two ventral glandular pores present between *b/sb* and below *sb*; venom ducts very short. Trichobothria (Fig. 1e): *eb–esb–ib* in a straight line, 0-3 fine setae distal of *eb/esb*; *sb* distinctly nearer *b* than *st*.

Leg I (♂♀): femur 6.3-6.8 times longer than deep and 1.4-1.5 times longer than patella, patella 4.8-5.4 times longer than deep, tibia 8.8-9.0 times, basitarsus 5.3-6.0, telotarsus 8.3-9.6 times longer than deep, telotarsus 1.3-1.4 times longer than basitarsus; leg IV (Fig. 1g 1h): femur+patella 6.6-7.1 times longer than deep, patella slightly shorter than femur, tibia 10.4-11.3 times, tactile seta near middle (TS=0.41-0.61), basitarsus 4.8-5.4 times, tactile seta near base (TS=0.14-0.17), telotarsus 7.5-9.5 times longer than deep, tactile seta near middle (TS=0.38-0.44), telotarsus 1.3-1.4 times longer than basitarsus; arolia short, claws smooth, subterminal seta in distal half finely dentate on both sides.

Measurements of females (holotype, paratypes) and male paratype (in brackets). Total length 3.3-4.1 (3.3). Carapace 1.15-1.19/0.87-1.07 (1.06/1.05). Pedipalps: trochanter 0.93-1.04/0.26-0.28 (0.91/0.24), femur 1.93-2.09/0.27-0.28 (1.84/0.24), patella 1.78-1.91/0.29-0.34 (1.72/0.27), length of pedicel 0.74-0.84 (0.74), hand with pedicel 1.21-1.34/0.50-0.57 (1.17/0.45), length of pedicel 0.20-0.21 (0.19), of movable finger 2.26-2.38 (2.23), of chela with pedicel 3.40-3.60 (3.33). Leg I: femur

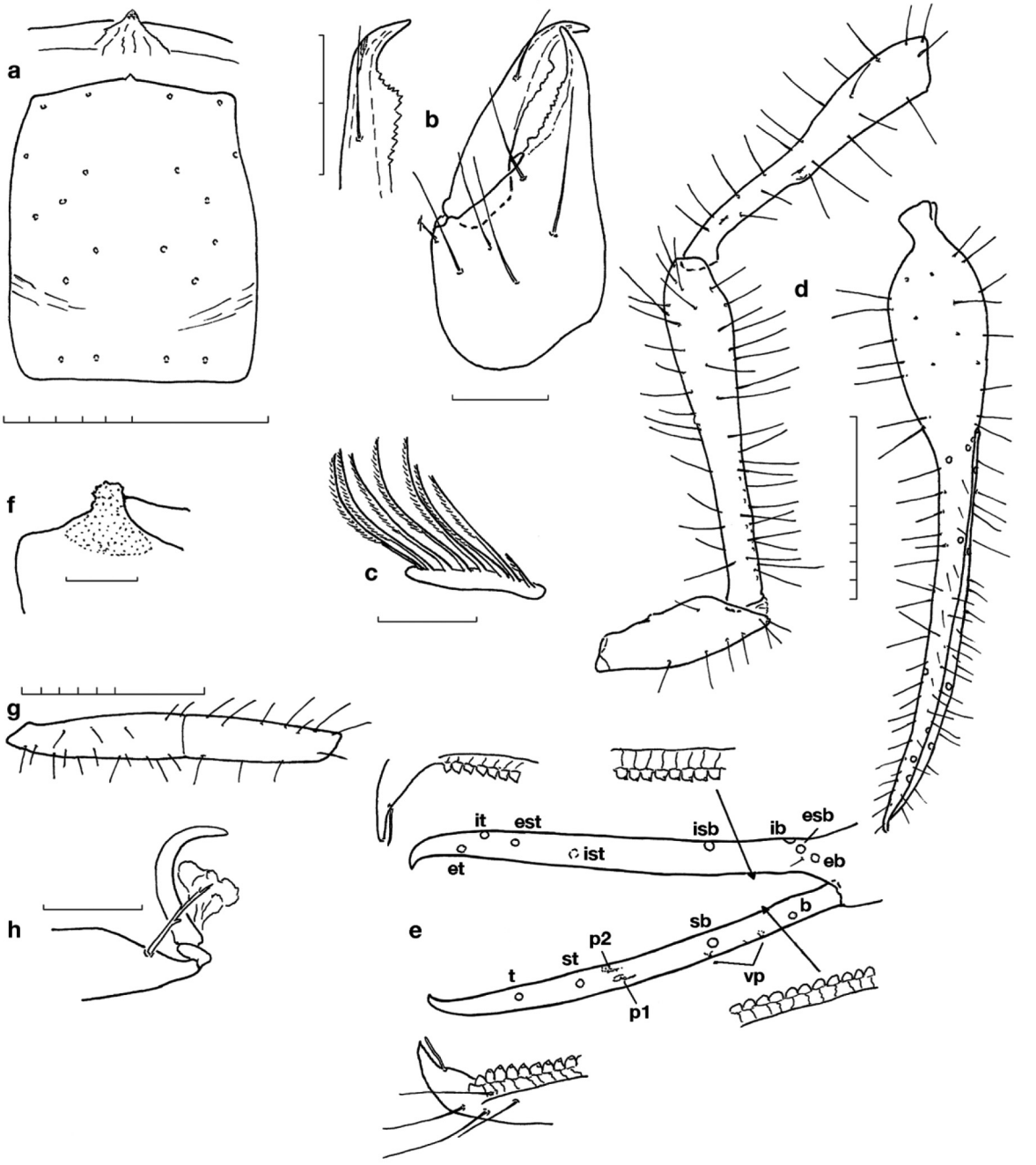

Fig. 1: *Roncus giachinoi* **n.sp.**, holotype. a: Carapace, with enlarged epistome; b: Left chelicera, dentition of movable finger of a paratype enlarged; c: Rallum; d: Left pedipalp; e: Trichobothrial pattern (without scale) (p_1, p_2: sensilla; vp: ventral (glandular) pores); f: Coxa I, anterior corners; g: Leg IV, femur+patella; h: Telotarsus IV, claws and subterminal seta. Scale units 0.1 mm; scale 1.0 mm: figs a, d, g.

1.11-1.22/0.18 (1.03/0.16), patella 0.74-0.80/0.15-0.16 (0.73/0.15), tibia 1.01-1.06/0.12 (0.92/0.10), basitarsus 0.56-0.60/0.10-0.11 (0.54/0.09), telotarsus 0.73-0.81/0.08-0.09 (0.72/0.09); leg IV: femur+patella 1.75-1.89/0.26-0.28 (1.68/0.24), tibia 1.71-1.82/0.16-0.17 (1.64/0.14), basitarsus 0.66-0 .70/0.13-0.14 (0.62/0.12), telotarsus 0.86-0.91/0.10-0.12 (0.87/0.10).

Discussion

The species had already been recorded from this cave as *Roncus* sp. cfr *R. peramae* Helversen, det. G. Gardini (Casale et al. 2013). *Roncus giachinoi* **n.sp.** shares with *R. peramae* similar pedipalpal proportions and measurements, the presence of a large triangular (dentate) tooth in the tooth row on the cheliceral movable finger, a similar trichobothrial pattern (*ist* at level of *st* on movable finger, *isb* nearly at level of *sb* on movable finger), but differs mainly by the presence of only 4 setae (vs. 6) on the posterior border of carapace and on tergites I (and II) and the shape of the anterior lateral corner of coxa I being finger-like and indistinctly dentate in *giachinoi* and acute triangular in *peramae*. The pedipalpal hand seems to be more slender in *giachinoi* **n.sp.** than in *peramae* (2.3-2.6 vs. 2.2-2.3). It differs from *pieperi* **n.sp.** by a more slender pedipalpal femur (max. 6.4 vs. min. 6.9 times) and its indistinct granulation, by a more slender club of patella (3.25-3.63 vs. 2.45-2.61 times) and a relatively shorter patellar pedicel (1.28-1.39 vs. 1.09-1.16 times) compared to club length. *Roncus giachinoi* is furthermore differentiated from *R. pieperi* by relatively longer chelal fingers compared to hand length (1.77-1.91 vs. 1.53-1.58 times).

Faunistic research in the cave Megalo Spilio yielded up to now nine described species of Acari (1), Araneae (2), Orthoptera (1) and Coleoptera (6), representing an elevated number of endemic taxa (Casale et al. 2013). Our current knowledge about pseudoscorpions from Greece is too poor to elaborate interesting biogeographical models, but it is already possible to finds analogies to results emphasized by Casale et al. (2013) or to results obtained for the genus *Dolichopoda* (Orthoptera) by Rampini et al. (2008).

***Roncus gasparoi* n.sp.** (Fig.2 a-f)

Specimens studied

Holotype, 1♀ , GREECE, Ionian Islands, Corfu, Klimatia, Spilaio Anthropograva n. 562, alt. 250 m, 39.7431°N, 19.7868°"E; under stones 20 meters from entrance, 29.VI.2000, leg. F. Gasparo. Paratype, 1♂ (coll.Gardini), same locality, same date, leg. F. Gasparo.

Etymology

The new species is dedicated to Dr Fulvio Gasparo, who spent a life-time contributing towards a better knowledge of speleology and biospeleology in the South European region.

Diagnosis

Morphologically near *Roncus giachinoi* **n.sp.** and *R. peramae*, but it is characterized by the combination of the following characters. Troglobiont species characterized by feeble sclerotization, by the absence of eyes and by the elongated pedipalps and legs. Carapace with a small epistome with rounded apex, a subbasal transverse furrow present; with 4 or 6 setae on posterior border (4 in *giachinoi* **n.sp.**, 6 in *peramae*); tergites I/II with 4-5/5-6 setae (4/4-5 in *giachinoi* **n.sp.**, 6/6-7 in *peramae*); chelicera with 5 or 6 smooth setae on hand, movable finger with an enlarged triangular and dentate tooth in the tooth row, rallum with 10-11 dentate setae (7-8 setae in the other species), two proximal setae short; pedipalpal femur and hand smooth, pedipalpal femur club-shaped, 8.8-9.1 times longer than broad (length 2.29-2.40) (at most 7.6 times in *giachinoi* **n.sp.** and *peramae*), patella 7.9-8.2 times (length 2.20-2.31), club 1.1-1.2 times longer than pedicel, finger 1.8 times longer than hand with pedicel (length 2.68-2.82/1.46-1.53) and distinctly longer than femur, chela with pedicel 9.7-9.9 times longer than broad; 1-3 fine setae distal of trichobothria *eb-esb*; tibia of leg IV longer than femur+patella.

Description

General colouration yellowish. Carapace 1.1-1.2 times longer than broad, epistome small with rounded apex, no subbasal transverse furrow observed, with 20 (holotype) or 23 (paratype) setae: 4/6-7/6/4 (holotype)-6. Tergites undivided, chaetotaxy: 4-5/5-6/6-7/6-7, V-X 7, XI 7 (4 tactile setae) (holotype: I 4, II 5). Manducatory process with 3-4 (holotype) or 3 (paratype) setae, pedipalpal coxa itself with 8 setae, coxa I 6-7 setae, lateral corner finger-like with apex finely dentate, medial corner rectangular, rounded, II 7-9, III 5-6, IV 8-9; genital operculum with about 20 medial discal setae, genital entrance with 2/2 smooth, slightly curved setae; genital organs not ob-

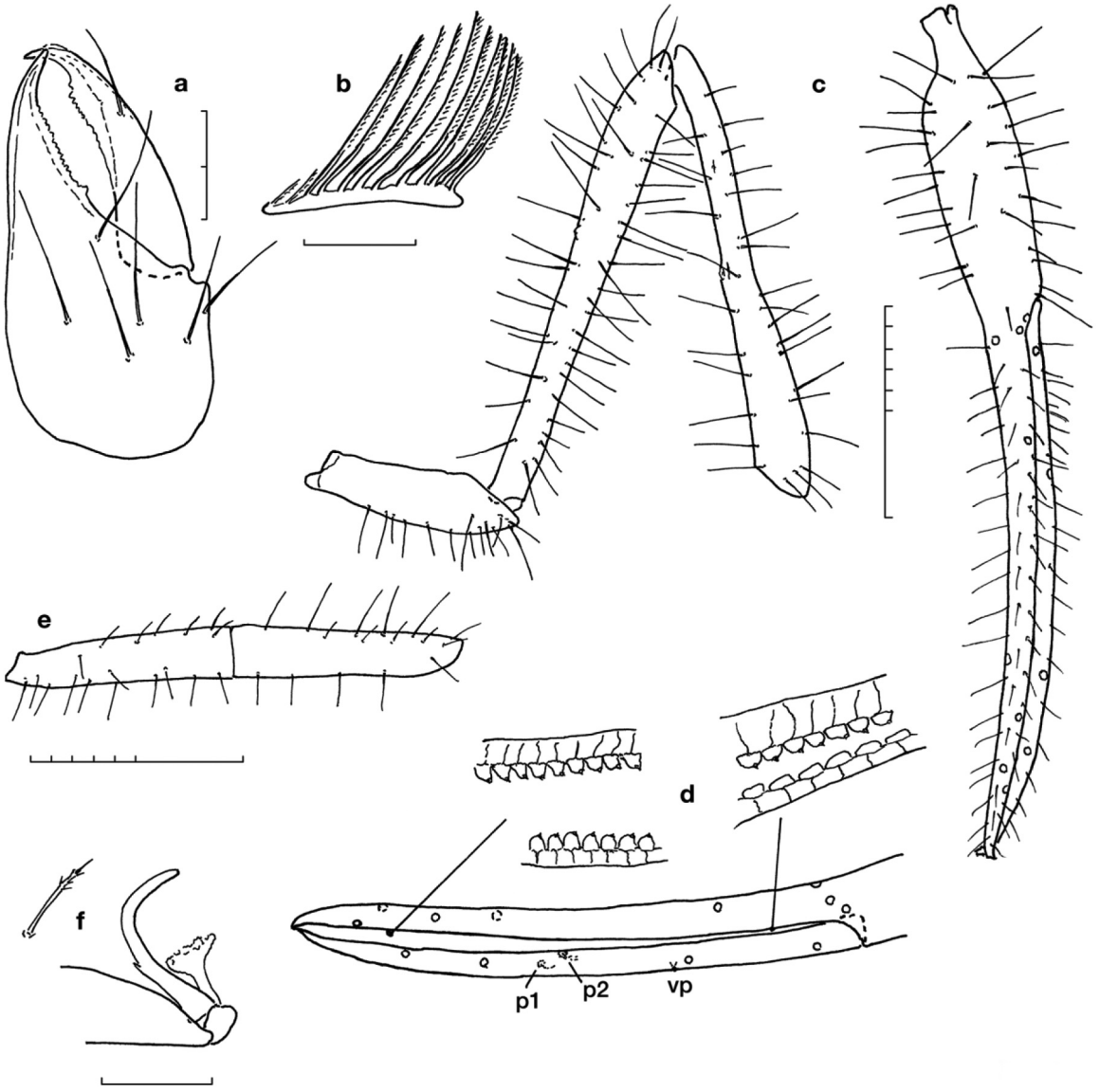

Fig. 2: *Roncus gasparoi* **n.sp.**, holotype. a: Right chelicera; b: Rallum; c: Left pedipalp; d: Trichobothrial pattern (without scale) (p_1, p_2: sensilla; vp: ventral (glandular) pore); e: Leg IV, femur+patella; f: Telotarsus IV, claw and subterminal seta. Scale units 0.1 mm; scale 1.0 mm: figs c, e.

served; sternal chaetotaxy: III with 11-12 marginal and 6 medial discal setae + 2x3-4 suprastigmal setae, IV 10+2x3, V-X 11 or 12 setae, XI 3-4 (2 tactile setae). Pleural membranes granular.

Chelicera (Fig. 2a) with 6 (holotype) or 5 (paratype) setae on hand, subgaleal seta on movable finger reaching tip of finger, fixed finger with about 15-17 rounded, partly indistinct teeth, movable finger with 6-9 basal teeth, one broad large dentate tooth and a few distal rudimentary ones, spinneret absent, serrula exterior with 39-40, s. interior with 32-33 lamellae, rallum (Fig. 2b) with 10 (holotype) or 11 dentate setae, two proximal ones short.

Pedipalps (Fig. 2c) smooth, trochanter with small, indistinct ventral hump in distal half, 3.9 (holotype) (paratype 3.9) times longer than broad, femur slen-

der club-shaped, 9.1 (8.8) times, patella 7.9 (8.2) times, club 4.2 (4.5) times longer than broad and 1.1 (1.2) times longer than pedicel, hand with pedicel 3.5 (3.6) times, chela with pedicel 9.7 (9.9) times, without pedicel 9.3 (9.3) times longer than broad; finger 1.8 (1.8) times longer than hand with pedicel; fixed finger with 175 (176) small cusped teeth, movable finger with 175 (169) teeth, those in basal finger third rounded. Trichobothria (Fig. 2d): *ib* indistinctly distal of *esb*, 1-3 fine setae distal of *eb*/*esb*; trichobothrium *sb* nearer to *b* than to *st*, *st* distinctly nearer to *t* than to *sb*, sensillum p_2 at base of tooth lamella on movable finger nearer to *st* than to *sb*, sensillum p_1 between p_2 and *st*, apparently only one ventral glandular pore distal *sb*; venom ducts very short.

Leg I: femur 7.9 (7.5) times longer than deep and 1.4 times longer than patella, patella 6.7 (6.6) longer than deep, tibia 11.7 (12.1) times, basitarsus 7.6 (6.6) times, telotarsus 10.4 (9.5) times longer than deep, telotarsus 1.2 times longer than basitarsus; leg IV (Fig. 2e, 2f): femur+patella 8.8 (9.0) times longer than deep, femur as long as or indistinctly shorter than patella, tibia 14.8 (14.6) times, one tactile seta near middle (TS=0.43/0.31), basitarsus 7.0 (6.8) times, tactile seta basal (TS=0.11/0.13), telotarsus 9.9 (9.7) times longer than deep, tactile seta near middle (TS=0.49/0.51), telotarsus 1.2 (1.2) times longer than basitarsus. Subterminal seta finely dentate in distal half, claws slender, with a tiny dorsal denticle in proximal half, arolia short.

Measurements of holotype (paratype). Total length 3.67 (4.31). Carapace 1.16/1.05 (1.26/1.05). Pedipalps: trochanter 1.04/0.27 (1.10/0.28), femur 2.29/0.25 (2.40/0.27), patella 2.20/0.28 (2.31/0.28), length of pedicel 1.04 (1.03), hand with pedicel 1.46/0.41 (1.53/0.42), pedicel 0.21 (0.23), length of finger 2.68 (2.82), of chela with pedicel 4.03 (4.16). Leg I: femur 1.39/0.18 (1.41/0.19), patella 1.01/0.15 (1.04/0.16), tibia 1.33/0.11 (1.44/0.12), basitarsus 0.80/0.11 (0.77/0.12), telotarsus 0.92/0.09 (0.93/0.10); leg IV: femur+patella 2.21/0.25 (2.31/0.26), tibia 2.29/0.16 (2.44/0.17), basitarsus 0.91/0.13 (0.94/0.14), telotarsus 1.13/0.11 (1.12/0.12).

Discussion

This new species is differentiated from all other species from this geographical region by the very slender pedipalpal segments (e.g. femur 8.8-9.1 times; patella 7.9-8.2 times longer than broad), but it shares with the here recorded species the presence of a large triangular (dentate, but frequently worn) distal tooth in the tooth row on movable cheliceral finger, the general structure of the rallum (the proximal seta very short compared to the preceding one), even if the number in *gasparoi* is distinctly higher (10-11 vs 7-8) and a similar trichobothrial pattern. It shares with *R. giachinoi* **n.sp.** the presence of only 4 setae on posterior border of carapace and anterior tergites, even if some variability is observable in *R. gasparoi* **n.sp.** *Roncus gestroi* Beier, 1930 from Northern Italy is characterized by somewhat less slender pedipalps (femur 6.1-8.3 times, patella usually 6.1-6.6 times longer than broad, but in a few populations 4.7-4.9 times, e.g. from Sprugola di Campastrino, Liguria), but differs by a longer patellar pedicel (in most cases longer than club or as long as club, but in some populations the club is 1.1-1.2 times longer than pedicel: e.g. Tanna de Strie, Liguria) and measurements (e.g. femur length max. 1.93 mm vs. min. 2.29 mm) (Gardini & Rizzerio 1986, Gardini 1993: 420-421).

***Roncus pieperi* n.sp.** (Fig. 3a-g)

Specimens studied

Holotype ♂, GREECE, Ionian Islands, Kefalonia, cave "Fitidi" (Phytidi) near Karavolymos near Sami, (coordinates unknown), 24. IV. 1998, leg. H. Pieper; ESE (=Hellenic Speleological Society HSS) number 3500, "grotte aux vestiges préhistoriques" (Google maps Kefalonia 83). Paratypes, 2♂ (Mus. Geneva, coll. Gardini), Greece, Kefalonia, Sami, Spilaio Drogarati, no. 72, 38.2270°N, 20.6284°E, 40-50 meters from entrance, 15.VI.2004, leg. F. Gasparo.

Etymology

Named in honour of Dr Harald Pieper who first collected the species and who has been interested in pseudoscorpion taxonomy and faunistics for many years.

Diagnosis

Morphologically near *Roncus peramae*, but it differs by the combination of the following characters. Troglobiont species characterized by feeble sclerotization, the absence of eyes and by the elongated pedipalps and legs; carapace with a small, but distinct triangular epistome, subbasal transverse furrow present; lateral corner of coxa I spine-like; chelicera with 6 smooth setae on hand, movable finger with a large triangular dentate tooth in the tooth row, rallum with 7-8 den-

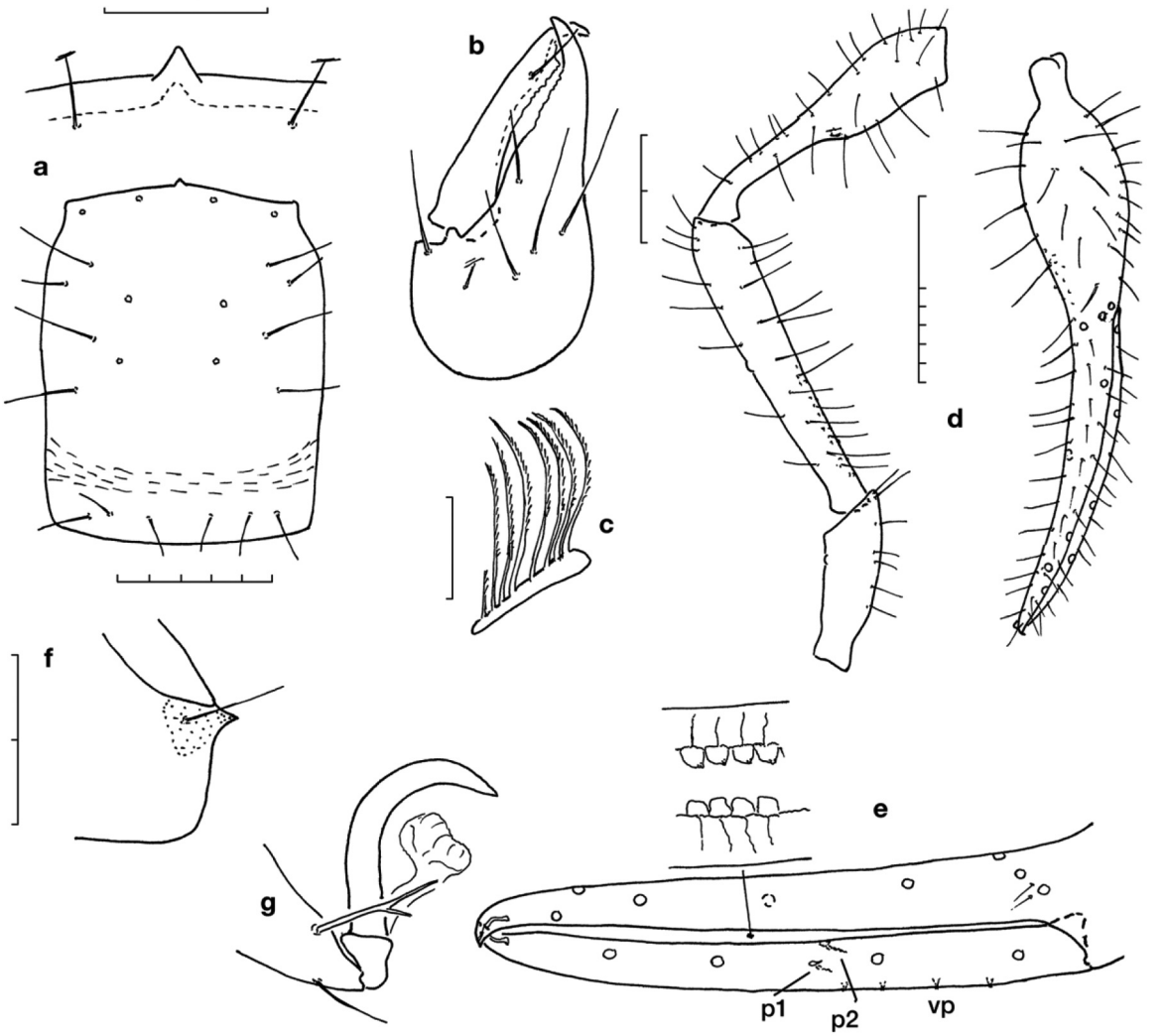

Fig. 3: *Roncus pieperi* **n.sp.**, holotype. a: Carapace, epistome enlarged; b: Left chelicera; c: Rallum; d: Left pedipalp; e: Trichobothrial pattern (without scale) (p_1, p_2: sensilla; vp: ventral (glandular) pore); f: Coxa I, anterior corners; g: Telotarsus IV, claw and subterminal seta (without scale). Scale units 0.1 mm; scale 1.0 mm: d.

tate setae, the proximal short. Pedipalpal femur and hand partly granular, pedipalpal femur club-shaped, 5.90-6.4 times longer than broad (length 1.73-1.93), patella 4.2-4.9 times (length 1.63- 1.71) (5.7-6.1 times in *R. peramae*), pedicel nearly as long as club, finger 1.5-1.6 times longer than hand with pedicel (length 1.94-2.00/1.26-1.27) and as long as or distinctly longer than femur, chela with pedicel 5.5-6.0 times longer than broad; 2 fine setae present distal of trichobothrium *eb*; tibia of leg IV shorter than femur+patella.

Description

Carapace and pedipalps reddish brown, segments and legs yellowish. Carapace (Fig. 3a) without eyes or eye-spots, 1.1-1.2 times longer than broad, epistome distinct, small triangular, a subbasal transversal furrow present, with 22-23 setae (4/8-10/4/6). Tergites undivided, chaetotaxy: 6/6-7/8-9/8-9/9-10 /8-9/10/10/11/9/6-7(4 tactile setae). Manducatory process with 4 marginal setae (1♂ with 5 on right lobe), pedipalpal coxa itself with 5-9 setae (including 1 tactile seta), coxa I smooth, with a short spine-

like lateral corner, medial corner nearly rectangular, rounded (Fig. 3f), 4-7 setae, II 6-7, III 4-5, IV 5-7; sternite II with about 16-20 setae, arranged in 2 semicircular rows; genital opening with 2-3/2-3 internal smooth setae, sternite III with 8-10 marginal and 7 medial discal setae, 3 suprastigmal setae (1♂ with 2 on left side); IV 10+ 2x3-4 suprastigmal setae, V-X: with about 12-13 setae (4 tactile setae), XI 6-8 (4 tactile setae). Pleural membranes granular.

Chelicera (Fig. 3b): hand with 6 setae, fixed finger with about 12-18 partly indistinct and worn teeth, movable finger with one larger triangular distal tooth in the tooth row and about 11 indistinct and worn teeth; spinneret absent; serrula exterior with 37-40 blades; rallum (Fig. 3c) with 8 (1♂ 7) setae, finely dentate in distal half of anterior margin, the most proximal seta one forth of the length of the preceding one.

Pedipalps of holotype (Fig. 3d)) (paratypes): trochanter 3.3 (3.3-3.5) times longer than broad, a small ventral hump present, femur club-shaped, finely granular medially in basal half (one paratype over the whole length), but without coarser granula, holotype 6.4 (5.9-6.0) times longer than broad, patella smooth, 4.2 (4.9) times longer than broad, club 1.1 (1.1-1.2) times longer than pedicel and 2.5 (2.6) times longer than broad, hand medio-distally near finger base granular, with pedicel 2.3 (2.4) times, chela with pedicel 5.5 (5.9-6.0) times, without pedicel 5.1 (5.5) times longer than broad, finger 1.5 (1.5-1.6) times longer than hand with pedicel; fixed finger with 121 (114-122), movable finger with 131 (125-129) small, uniform teeth, the basal ones on movable finger partly without cusp. Trichobothrial pattern (Fig. 3e): two fine setae distal of trichobothria *eb*/*esb*, *eb*–*esb*–*ib* in a straight line, *isb* slightly nearer to *ib* than to *ist*, *est*–*it*–*et* nearly equidistant near finger tip; *sb* on movable finger halfway between *b* and *st*, *st* nearer to *t* than to *sb*; sensillum p_2 nearer *sb* than *st*, sensillum p_1 slightly distal of it; two ventral glandular pores between *b* and *sb*, but apparently two more distal of *sb*; venom ducts very short.

Leg I: femur 4.9 (4.8-5.0) times longer than deep and 1.4 (1.4-1.5) longer than patella, patella 4.3 (4.0-4.2) times, tibia 6.9 (6.7-7.4) times, basitarsus 3.4 (4.0-4.45) times, telotarsus 6.7 (6.6-7.1) times longer than deep, basitarsus 1.1 (1.5) times longer than telotarsus; leg IV: femur+patella with vertical suture, 4.2 (4.4-5.2) times, patella indistinctly longer than femur, tibia 7.1 (8.6-10.0) times, basitarsus 3.6 (3.6-3.9) times, telotarsus 5.7 (6.9-7.0) times longer than deep, telotarsus 1.52 (1.54-1.55) times longer than basitarsus; tibia with a pseudotactile seta (TS=0.41/0.52-0,57), basitarsus with a basal tactile seta (TS=0.17/0.14-0.18), telotarsus with one tactile seta near segment middle (TS=0.41/0.37-0.39); undivided arolia shorter than smooth claws, subterminal seta smooth, forked (Fig. 3g).

Measurements of holotype (paratypes). Total length 3.6 (3.8-4.5); carapace 1.14/0.98 (1.09-1.12/0.92-0.98). Pedipalps: trochanter 0.99/0.29 (0.96-0.99/0.28-0.30), femur 1.93/0.30 (1.73-1.76/0.29-0.30), patella 1.67/0.36 (1.63-1.71/0.34-0.35), length of pedicel 0.79 (0.76-0.82), hand with pedicel 1.26/0.56 (1.26-1.27/0.53), length of pedicel 0.23 (0.24), length of chela with pedicel 3.09 (3.12-3.17), length of finger 1.94 (1.98-2.0). Leg I: femur 0.89/0.18 (0.90-0.92/0.18-0.19), patella 0.62/0.14 (0.62-0.63/0.15), tibia 0.79/0.12 (0.81-0.86/0.12), basitarsus 0.36/0.11 (0.39-0.41/0.09-0.10), telotarsus 0.68/0.10 (0.59-0.63/0.09); leg IV: femur+patella 1.45/0.35 (1.39-1.41/0.27-0.32), tibia 1.40/0.20 (1.40-1.41/0.14-0.16), basitarsus 0.47/0.13 (0.45-0.48/0.12), telotarsus 0.71/0.12 (0.70-0.74/0.10-0.11).

Discussion

The species had been already mentioned from the Drogarati cave by Gasparo (2004) as "una nuova specie ultraevoluta del genere *Roncus* (det. G. Gardini)". *Roncus pieperi* **n.sp.** is morphologically near to *Roncus peramae* Helversen, 1969 described from the Perama cave near Ioannina, Epirus (Greece). The new species has a similar size, but differs from *peramae* by the presence of a distinct subbasal transversal furrow on the carapace, a stouter pedipalpal patella (4.2 times vs. 5.7-6.1 times), with stouter patellar club (2.5 times vs. 3.3-3.5 times longer than broad) and relatively longer pedicel (club 1.1 times longer than pedicel vs. 1.3-1.4 times), and relatively shorter chelal fingers (1.5 times vs. 2.0 times longer than hand with pedicel); the trochanteral hump is smaller and less distinct than in *peramae*.

The new species seems to be related to an adaptive group of species having, like *Roncus gestroi* (from caves in northern Italy), a club-shaped pedipalpal femur, granulation is present on the femur and hand, and the pedicel of the patella is nearly as long as its club. It differs clearly from *gestroi* by stouter pedipalps (e.g. femur 5.9-6.4 vs 6.1-8.3 times, patella 4.2-4.9 vs 6.1-

6.6 times (4.7-4.9 in a few populations of *R. gestroi*) and other characters. *Roncus gestroi* takes a particular position within all these species having the pedicel of patella distinctly longer than or as long as the club (ratio club length/pedicel length 0.8-1.0 times, but in a few populations 1.1-1.2 times). *Roncus insularis* Beier, 1939 (from the Dalmatian island Brazza) is smaller in size, possesses stouter pedipalps and has no distinct epistome on the carapace; *Roncus beieri* Caporiacco, 1947 from a cave near Siena (Toscana, Italy) has similar slender pedipalpal proportions, but is smaller (femur length 1.60 mm vs. 1.93 mm), the patellar pedicel is relatively shorter (Gardini & Rizzerio 1986). Some recently described species (e.g. *Roncus talason* Ćurčić et al, 1993 from Vaskova Dupka Cave, southeastern Serbia, *Roncus jarevid* Ćurčić in Ćurčić et al. 2013 from the Gornja Lenovacka Pécina Cave, Lenovac, or *R. crnobog* Ćurčić in Ćurčić et al. 2013 from the Ogorelicka Pécina Cave, Sicévo, from eastern Serbia) might also belong to this group, but differ clearly from all the new species by stouter pedipalps (femur at most 5.4 times, patella 3.42 times longer than broad vs. at least 5.9 times and 4.2 times longer than broad) and lesser size. Their affinities to *Roncus giganteus* and *R. corcyraeus* ssp. should be verified. In the last three decades about 58 species or subspecies of *Roncus* have been described from the Balkan region by Ćurčić and co-workers, most of them being of epigean morphology. Relationships of all those species must be clarified.

Additional records

***Roncus giganteus* Mahnert, 1973**

Roncus (R.) giganteus Mahnert 1973b: 32-33, Figs 25-34.

Specimens studied

2♀ 1♂, (coll. Gardini, 1♀ Mus. Geneva), GREECE, Zakynthos, Jiri, Spilia tou Chajoti, 37.7956°N, 20.7630°E, 400m, 28.VI.1999, leg. F. Gasparo.

The species has been described from epigean habitats on Zakynthos (Mahnert 1973b) and subsequently recorded from the Spilia tou Chajoti by Mahnert (1975). The specimens correspond perfectly to the original description; two fine setae between the trichobothria *eb-esb;* sensillum p_2 nearly halfway between *sb* and *st*, p_1 slightly distal of it; apparently only one ventral glandular pore present, nearer to *sb* than to *b*.

Key to the *Roncus* species recorded from caves in Western Greece

1 Species without troglomorphic adaptations; patella of pedipalps stout, at most 2.9 times longer than broad. 2
- Species with distinct troglomorphic adaptations; patella of pedipalps more slender, at least 4.2 times longer than broad 5
2 Small species, length of pedipalpal femur 0.73-0.93 mm, of patella 0.59-0.77 mm; femur 3.56-3.92 times, patella 2.26-2.49 times, chela with pedicel 3.19-3.52 times longer than broad; carapace without eyes . . . . . *Roncus lubricus* auct.
- Species of larger size, length of pedipalpal femur at least 1.06 mm, of patella at least 0.85 mm, pedipalps more slender (femur at least 3.9 times longer than broad). 3
3 Carapace without eyes or with two small indistinct ones. 4
- Carapace with two distinct eyes; pedipalpal femur 4.3-5.0 times (length 1.46-1.70 mm), patella 2.5-2.9 times longer than broad (length 1.10-1.20 mm) . . . . . .*Roncus giganteus* Mahnert
4 Length of pedipalpal femur 1.28-1.44 mm, of patella 1.10-1.20 mm, of chela with pedicel 2.59-2.77 mm; serrula exterior of chelicera with 39-41 blades . . . . . .*Roncus c. corcyraeus* Beier
- Length of pedipalpal femur 1.06-1.07 mm, of patella 0.85-0.93 mm, of chela with pedicel 1.92-1.97 mm; serrula exterior of chelicera with 33-35 blades . . . . . *Roncus corcyraeus minor* Mahnert
5 Pedipalps very slender, pedipalpal femur at least 6.9 times, patella 5.7 times, chela with pedicel 6.4 times longer than broad 6
- Pedipalps less slender, femur 5.9 -6.4 times (length 1.76-1.93 mm), patella 4.2-4.9 times (length 1.67-1,71 mm), chela with pedicel 5.5-6.0 times longer than broad (length 3.09-3.19 mm) . . . . . .*Roncus pieperi* **n.sp.**
6 Species of large size and very slender pedipalps, femur 8.8-9.1 times (length 2.29-2.40 mm), patella 7.9-8.2 times (length 2.20-2.31 mm), chela with pedicel 9.7-9.9 times longer than broad (length 4.03-4.16 mm) . . . . . *Roncus gasparoi* **n.sp.**
- Smaller species with slightly stouter pedipalps, femur at most 7.6 times (length at most 2.09 mm), patella at most 6.5 times (length at most 1.91 mm), chela with pedicel at most 7.5 times longer than broad (length at most 3.60 mm) . . 7

7 Posterior border of carapace and tergite I with only 4 setae, tergite II with 4-5 setae; lateral corner of coxa I finger-like and indistinctly dentate . . . . . *Roncus giachinoi* **n.sp.**

- Posterior border of carapace and tergite I with 6 setae, tergite II with 6-7 setae; lateral corner of coxa I acute, triangular . . . . . *Roncus peramae* Helversen

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On the identity of the genera *Anagraphis* Simon, 1893 and *Macedoniella* Drensky, 1935 with two new synonyms (Araneae: Gnaphosidae)

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Abstract. Examination of the type material of the forgotten species *Liocranum ochraceum* Simon, 1867 reveals this species has to be transferred to the genus *Anagraphis* **comb. nov.** and that *Anagraphis pallida* (Hadjissarantos, 1940) is its junior synonym (**syn. nov.**). Furthermore, the monotypic genus *Macedoniella* Drensky, 1935 is a junior synonym of *Anagraphis* and *M. karamani* a junior synonym of *Anagraphis ochraceum* (L. Koch, 1867) (**syn. nov.**).

Keywords: Balkan fauna, spiders

Zusammenfassung. Zur Identität der Gattungen *Anagraphis* Simon, 1893 und *Macedoniella* Drensky, 1935 mit zwei neuen Synonymen (Araneae: Gnaphosidae). Die Untersuchung des Typus-Materials von *Liocranum ochraceum* L. Koch, 1867 ergab, dass diese Art zur Gattung *Anagraphis* **comb. nov.** gehört. *Anagraphis pallida* (Hadjissarantos, 1940) ist ein jüngeres Synonym (**syn. nov.**). Die monotypische Gattung *Macedoniella* Drensky, 1935 ist ein Synonym der Gattung *Anagraphis* und *M. karamani* ein Synonym der Art *Anagraphis ochraceum* (L. Koch, 1867) (**syn. nov.**).

Although the arachnofauna of Europe has become better and better known, many species described in the 19th century remain species inquirendae. These are still valid names and investigation of type material of these species must be a priority. Examination of type material in the Natural History Museum, London and a study of the papers where the species were published, provided the opportunity here to reveal the identity of the enigmatic genus *Macedoniella* Drensky, 1935 and its relationships to *Anagraphis pallida* (Hadjissarantos, 1940).

All reference material cited was collected by the author, unless indicated otherwise and is stored in his collection. Abbreviations: CRB: Collection Robert Bosmans. NHMB: Natural History Museum, London. ZMUA: Zoological Museum of the University of Athens.

Systematics

***Anagraphis* Simon, 1893**

Type species: *Anagraphis pallens* Simon, 1893

***Macedoniella* Drensky, 1935 syn. nov.**

Type species: *Macedoniella karamani* Drensky, 1935

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***Anagraphis ochracea* (L. Koch, 1867) comb. nov.**

Liocranum ochraceum L. Koch, 1867: 864 (description female)

Macedoniella karamani Drensky, 1935: 109, fig. 6 (description female); Deltshev 2003: 143; Wunderlich 2011: 42, figs. 150-152; World Spider Catalogue 2014: nomen dubium; **syn. nov.**

Talanites pallidus Hadjissarantos, 1940: 79, fig. 23-25 (description male, female), **syn. nov.**

Anagraphis pallida; Chatzaki, Thaler & Mylonas 2002: 605, fig. 3-8 (transfer from *Talanites*); Deltshev et al. 2011: 136 (citation)

Type material

Holotype female of *Liocranum ochraceum* from GREECE, Corfu (BM b842); examined.

Two female syntypes of *Macedoniella karamani* from Skopje, mount Vodno, Republic of MACEDONIA; not present in Drensky's collections in the Bulgarian Museum, probably lost during the Second World War (Deltshev 2003).

Holotype male, paratype female of *Talanites pallidus* from GREECE, Attiki, Pendeli-Dyonisos; Coll. Hadjissarantos (ZMUA); examined by Chatzaki et al. (2002).

Remarks on synonymy

Liocranum ochraceum was described by L. Koch in 1867 from the Greek Island of Corfu. The descripti-

on of the female is without any figure and the epigyne was described as "eine hufeisenförmige Wulstung, welche vorne offen ist, in diese Öffnung ragt eine halbkreisförmige Platte herein", basically meaning: "a horseshoe-shaped chitinisation, in the anterior opening with a semi-circular plate". Probably due to the absence of figures of the epigyne, the species was never recognized or cited again.

Examining now the epigyne of the holotype of *L. ochraceum* and comparing it with my recently collected material of *Anagraphis pallida* (Hadjissarantos, 1940), identified with the excellent redescription of Chatzaki et al. (2002), shows that *L. ochraceum* has to be transferred to *Anagraphis*. The epigynes are identical, so there is no doubt they are the same species and *Anagraphis pallida* (Hadjissarantos, 1940) thus becomes a junior synonym of *Anagraphis ochracea* (L. Koch, 1867) **comb. nov.**

When examining the holotype of *Liocranum ochraceum*, I further came across the resemblances to the description of a species from Macedonia, *Macedoniella karamani* Drensky, 1935. *Macedoniella* is a monotypic genus and is only known from the female. According to Deltshev (2003), the type material was lost during the Second World War. Wunderlich (2011) states that the family relationships of the genus are unsure, but indicates: "Gnaphosidae?". In the World Spider Catalogue (2014) it is listed as a nomen dubium.

The description of Drensky is rather superfluous and the figures sketchy (Fig. 1). When comparing the material of *Anagraphis ochracea* with Drensky's description of *Macedoniella karamani*, size, colour, eye disposition and position of the spinnerets are identical. A special character of *Macedoniella* is, according to Drensky (1935), the presence of a subterminal tooth on Mt II (plate I, a). This is not observed in the present material. In these specimens, there are 2 dorsal and 2 prolateral spines on all femora, Ti I-III have 3 pairs of ventral spines, Mt I-III 2 pairs of ventral spines and Ti IV and Mt IV have more additional spines. I presume that the specimen of Drensky lost the ventral spines on the Ti and Mt, except the subterminal retrolateral spine of Ti II. The figure of the epigyne (plate 1, b) shows a horseshoe-shaped chitinisation with an anterior darkened region, almost exactly like what L. Koch wrote in the original description of *Liocranum ochraceum*.

The type locality of *Macedoniella karamani* is somewhat to the north of the newly established distribution area of *Anagraphis ochracea* (Fig. 1), but is within a reasonable distance. The conclusion that *Macedoniella karamani* Drensky, 1935 is a junior synonym of *Anagraphis ochracea* (L. Koch, 1867) thus seems evident.

Further material of *Anagraphis ochracea* (L. Koch, 1867) comb. nov. examined (all in CRB)

GREECE. **Evvoia-Voroies Sporades.** Alonissos: Steni Vala, N39°11'32" E23°55'24", 10 m, 1♀, stones in maquis, 14.VII.2005. Evvoia: Lake Distos, N38°20'19" E19°24'08", 100 m, 1♂, grassland along the lake, 16.V.2001; Psachna E., N38°35'00" E23°40'52", 100 m, 1♂, stones around ruins in open maquis, 10.V.2001. Skopelos: road Elios-Platanakia, N38°39'6" E23°24'2", 80 m, 1♂ 1♀, stones in *Pinus* forest, 18.VII.2005. **Ionian Islands.** Kefalonia: Aghia Varvara, N38°10'47" E20°30'5", 80 m, 1♂, stones in *Pinus* forest, 25.X.1999. Lefkada: road Komilio-Dragano, N38°41'32" E20°34'24", 420 m, 1♀, stones in grassland, 16.IV.2000. **Peloponnisos.** Achaia: Chaikali (N38°6'12" E21°40'6", 500 m), 1♀, 14.V.1998, G. Delmastro leg. Argolida: Arachnaio S., N37°37'47" E22°58'55", 650 m, 1♂ 1♀, stones in grassland, 24.V.1998. Arkadia: Megalopoli (N37°24'4" E22°8'32", 420 m), 2♀, 29.V.1998, G. Delmastro leg. Korinthia: Sofiko, N37°48'33" E23°1'28", 520 m, 1♀, stones in dense *Pinus* forest, 23.V.1998. Messinia: road Artemisia-Langada, N37°4'40" E22°16'13", 1100 m, 1♀, 27.V.1998.

Description

I refer to the excellent redescription of Chatzaki et al. (2002).

Distribution

Anagraphis pallida appears to be a species with a relatively small distribution area (Fig. 2), but according to the number of recent localities, it is not rare. L. Koch described the female in 1867 as *Liocranum ochraceum* from the Greek island of Corfu. Drensky (1935) described the female again as a new species, namely *Macedoniella karamani* from the Republic of Macedonia. The species was then described for a third time as *Talanites pallidus* by Hadjissarantos (1940) from Attiki in Greece, this time from both a male and female. Chatzaki et al. (2002) redescribed it, transferred it to the genus *Anagraphis* and added the island Antikithyra as a new locality. The species

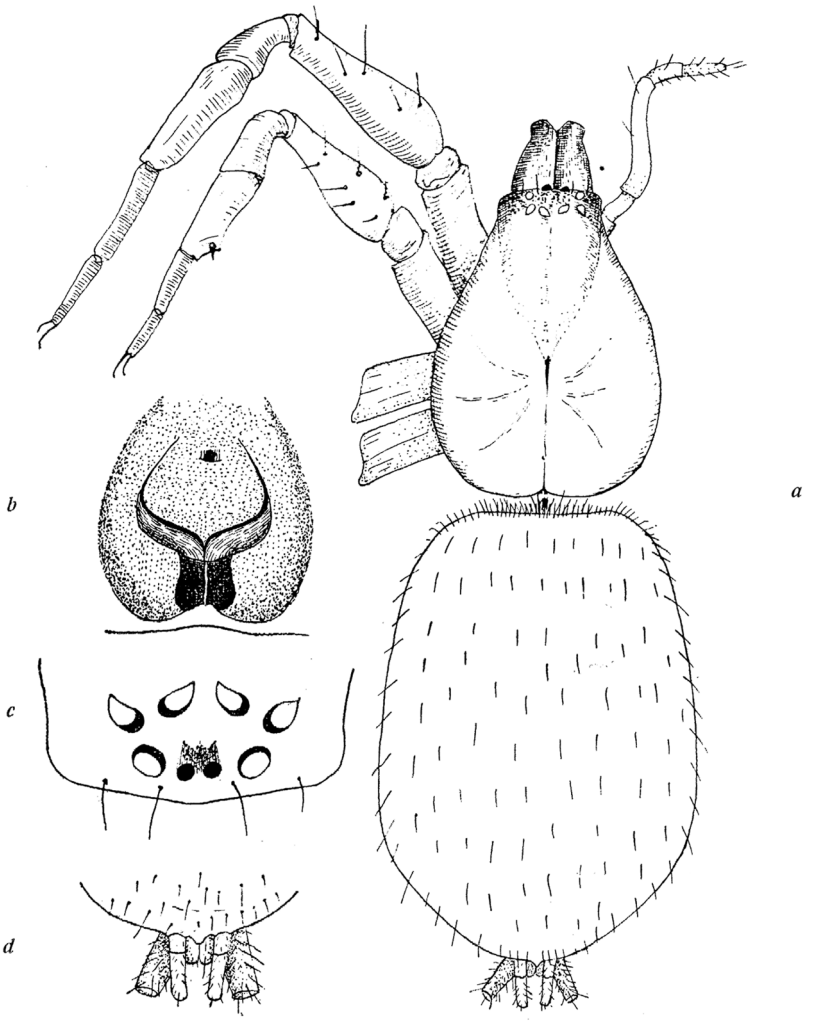

Fig. 6. — *Macedoniella Karamani* nov. gen. et nov. spec., aus Wodno bei Skoplje in Mazedonien; *a* — algemeiner Habitus des Weibchens; *b* — Epigyne; *c* — Augenstellung; *d* — Spinwarzen.

Fig. 1: Copy of figure 6 of *Macedoniella karamani,* in Drensky (1935)

was also cited from Albania by Deltshev et al. (2011). Here, new records from all over the Peloponnisos and from the islands Alonissos, Evvoia, Skopelos, Kefalonia and Lefkada are added and they provide confirmation of its wide distribution in Greece. The locality in the Republic of Macedonia (FYROM) is the northernmost site of its distribution.

Acknowledgments

Jan Beccaloni is thanked for the loan of the type material of *Liocranum ochraceum* and Pierre Oger for his help with the distribution map. Two anonymous revisers are thanked for their useful comments.

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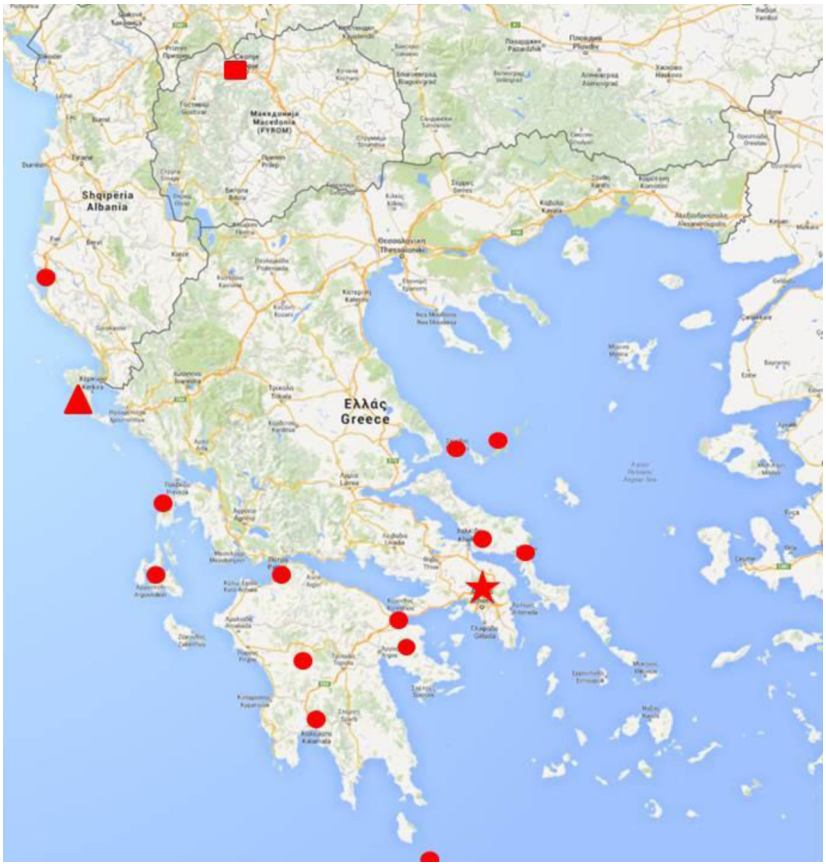

Fig 2: Distribution of *Anagraphis ochracea* (L. Koch, 1867) **comb. nov.** Triangle: Type locality of *Liocranum ochraceum* L. Koch, 1867. Rectangle: Type locality of *Macedoniella karamani* Drensky, 1935. Star: Type locality of *Anagraphis pallida* Hadjissarantos, 1940. Circles: Recent records of *Anagraphis ochracea* (L. Koch, 1867).

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Buchbesprechung

Christoph Muster & Marc Meyer 2014 Verbreitungsatlas der Weberknechte des Großherzogtums Luxemburg.

Ferrantia 70: 1-112. Musée national d'histoire naturelle, Luxembourg. Soft cover. 15 €. http://ps.mnhn.lu/ferrantia

For faunistic research on a certain animal group, knowledge of the situation in surrounding countries is a necessity. The presence of certain species in neighbouring regions, together with notes on their distribution and trends, offers valuable information for the interpretation of the status of these species in one's own study area. Changes in the national fauna – e.g. the discovery of a new species – can often better be explained when integrating information on the status of species in nearby countries. Distribution atlases are therefore not only valuable publications for the country of concern, but also for other countries in the same region.

In the north-western part of Europe, data on the occurrence of harvestmen is thankfully not as scarce as for the other groups within Arachnida; with the exception of certain spider families. The main reason for this is the limited number of species that occur in this region. For Belgium a distribution atlas has been published (Vanhercke 2010). In the United Kingdom a fairly old atlas is available (Sankey 1988) and (recent) records have been published on the website of the 'Spider and Harvestman Recording Scheme' (British Arachnological Society 2014). For Germany the website 'Nachweiskarten der Spinnentiere Deutschlands' (Staudt 2014) provides maps with up-to-date records of harvestmen, while of course the work by Professor Martens (1978) is still an important reference for Germany and Central-Europe. For other countries in this region, the fauna has also been described, although not in atlases: e.g. France (Delfosse 2014), the Netherlands (Wijnhoven 2009), Denmark (Stol 2003, 2007, Enghoff et al. 2014) and the Fennoscandian countries (Stol 2003, 2007). In Luxembourg, Müller (1962) and Schneider (1986) listed the species present, and reached a species count of (only) eighteen. Since then, harvestmen were identified during faunistic researches by the Musée national d'histoire naturelle Luxembourg, leading to the discovery of a number of new species. Now Christoph Muster (a freelance arachnologist from Germany) and Marc Meyer (Musée national d'histoire naturelle Luxembourg) have compiled all the present knowledge of the 31 currently known species of harvestmen into a distribution atlas!

The authors present a publication with many details and with an impressive amount of information. Data is offered for 226 localities and comprises 3091 records, deriving from only fifteen defined projects. The sampling locations are well spread over the country, although locations in the valleys of streams and rivers are somewhat overrepresented. Details of locations, including the number of sampled individuals per species, are given in two appendices.

For each species, information is presented on the total distribution area, localities in Luxembourg, habitat, distribution over the different sampling techniques, the sex ratio of the specimens and phenology. The description ends with remarks on status and trend. A photo of a live individual (not all species), a map with localities, a phenology diagram (representing the catches of adult individuals) and a bar graph giving the distribution over sixteen habitats types are

Fig 1. *Nelima sempronii* is a species that has recently reached the northwestern part of Europe; it was found in 2004 in the Netherlands and in 2009 in Luxemburg (photo: Jinze Noordijk)

given for all 31 species. Occasionally, a habitat photo is added. All this information is presented in two or three pages per species. The short discussion section that follows after the species descriptions elaborates on the fauna in comparison to Belgium and the Netherlands, zoogeography in European perspective, and the trends that can be observed in the harvestmen community.

For this atlas, most material (57 %) was gathered using pitfall traps. The presented data for each species on the origin of the material in relation to the separate sampling techniques, is therefore not very informative; it would have been better to present the relative contribution of each sampling technique to the obtained data. Sampling 'by hand' (searching or beating vegetation) is very much underrepresented (10%), resulting in quite meagrely filled maps for species that mainly dwell in the vegetation, such as *Paroligolophus agrestis*, *Dicranopalpus ramosus* and *Leiobunum blackwalli*. On the other hand, species of the family Trogulidae are extremely difficult to find and are only adequately sampled with pitfall traps. Records are therefore often quite scarce. Hence, the maps with localities for the four representatives of this family in Luxembourg are noteworthy.

The harvestmen fauna of Luxembourg 'has it all'. Among the 31 species, there are very common species (e.g., *Oligolophus tridens*, *Phalangium opilio*), outspoken generalists (e.g. *Paroligolophus agrestis*, *Rilaena triangularis*), stenotopic species (e.g. *Trogulus nepaeformis*, *Amilenus aurantiacus*), very rare species (e.g. *Lacinius horridus*, *Nelima silvatica*), a declining species (*Opilio parietinus*), an exotic species (*Leiobunum* sp. A), and 'new', range expanding species (*Nemastoma dentigerum*, *Nelima sempronii*, Fig. 1). This, and the manageable number of species, makes Opiliones a perfect subject for faunistic studies. Christoph Muster and Marc Meyer have produced a good publication that properly describes these patterns and processes. This atlas is a valuable piece of work, not only for Luxembourg, but also for the surrounding countries.

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Jörg Wunderlich wird 75 Jahre alt

Jörg Wunderlich wurde am 19. Dezember 1939 in Berlin geboren. Nach dem zweiten Weltkrieg befand sich seine Familie im Osten des Landes, es gelang ihr aber 1951 nach West-Berlin zu ziehen. Aufgrund der mangelnden schulischen Ausbildung in der Nachkriegszeit und der unterschiedlichen Schulprogramme im Osten (Russisch) und Westen (Latein und Englisch) schloss Jörg die Schule im Alter von 20 Jahren ab.

Danach begann er an der Freien Universität Berlin zunächst Mathematik zu studieren, wechselte aber bald zu Biologie, Geographie, Politikwissenschaften und Philosophie. Insgesamt verbrachte er acht Jahre an der Universität. Währenddessen übernahm er Jobs um sich seinen Lebensunterhalt zu finanzieren. Seine Staatsexamensarbeit an der Freien Universität war eine ökologische Studie über die Zwergspinnenfauna der Pfaueninsel in Berlin, einem Naturschutzgebiet, in dem er über 300 Webspinnenarten in verschiedenen Habitaten nachwies, zwei davon neu für die Wissenschaft (*Glyphesis taoplesius, Moebelia berolinensis*).

1969 zog Jörg nach Baden-Württemberg, wo er eine pädagogische Ausbildung als Gymnasiallehrer vollendete. Er lehrte 25 Jahre am Gymnasium (die letzten 15 Jahre in Teilzeitanstellung) und wurde Oberstudienrat. Während des Studiums an der Freien Universität Berlin begann Jörg sich auch politisch zu engagieren und wurde Mitglied der Grünen. In Straubenhardt war er dann auch 10 Jahre Mitglied des Gemeinderats.

Schon seit der Kindheit war Jörg von der Natur fasziniert, besonders von Arthropoden und später von Spinnen – das Verhalten von Springspinnen und der Netzbau von Radnetzspinnen standen zuerst im Vordergrund. Die Entdeckung von zwei bisher unbekannten Spinnenarten in Berlin verdeutlichte ihm den mangelnden Kenntnisstand in der Arachnologie – sogar in Deutschland.

Jörg arbeitete sich autodidaktisch in die Arachnologie ein. Er hatte keinen Lehrer oder Kollegen, der mit Spinnen vertraut war. Otto Kraus war der erste, der ihm wichtige Informationen und Hinweise zu Literatur gab und zu Experten vermittelte. Jörg war unter anderem in persönlichem Kontakt beziehungsweise korrespondierte mit Hermann Wiehle, Wolfgang Crome, Rudolf Braun, Jaques Denis, Herbert W. Levi, Gershom Levy und Konrad Thaler. Bestimmungshilfe bekam Jörg auch von František Miller und Raymond R. Forster.

Zu Beginn seiner Karriere war Jörg beim Publizieren seiner Revisionen über *Micaria* und *Walckenaeria* und weiterer taxonomischer Studien mit Schwierigkeiten konfrontiert – sowohl mit Herausgebern als auch mit Gutachtern (die zum Teil nicht mit der Paläoarachnologie vertraut sind und/oder Vertreter der Kladistik sind, ohne paläontologisches Hintergrundwissen). Daher gründete er einen eigenen Verlag. Als erstes Buch im Eigenverlag erschien die Monographie über die Spinnen der Kanarischen Inseln. Einer der Gründe für Jörgs hohe Produktivität war dieser Eigenverlag. Obwohl der Eigenverlag Vorteile bietet, gibt es auch gewisse Schwächen hinsichtlich professionellen Editierens (Gliederung, Formatierung, u. a.) und die Arbeiten erschienen dementsprechend unbegutachtet.

Jörg unternahm Sammelreisen in die verschiedensten Länder (Australien, China, Dominikanische Republik, Ecuador, Gambia, Indonesien, Jordanien, Malaysia, Myanmar, Peru, Singapur, USA und nahezu ganz Europa). Die Artenvielfalt der Makaronesischen Spinnen faszinierte ihn aber besonders. Seine ersten taxonomischen Arbeiten waren auf mitteleuropäische Spinnen konzentriert, mit der Zeit

Jörg im Jahr 1971

Hirotsugo Ono, Jörg Wunderlich, Michael Saaristo in Gent, 2004

erweiterten sich seine Interessen, insbesondere auf Bernsteinspinnen.

Wissenschaftliche Interessen

Jörg ist Autor von etwa 180 Publikationen (Bücher und Artikel). Seine Arbeiten lassen sich in vier Kategorien einteilen:

1) Faunistische Studien zur Spinnenfauna Deutschlands (18 Arbeiten), großteils mit taxonomischen Informationen. Diese ersten Studien von Jörg waren faunistisch und ökologisch ausgerichtet, doch mit der wachsenden Artenkenntnis wandte er sich zunehmend taxonomischen Arbeiten zu.
2) Taxonomische Publikationen über rezente Spinnenarten (106 Publikationen), darunter umfangreiche Revisionen der Gattungen *Micaria* und *Walckenaeria* sowie Beschreibungen neuer, hauptsächlich europäischer Arten.
3) Arbeiten zur Taxonomie, Faunistik und Biogeografie der Makaronesischen Spinnen (Kanarische Inseln, Azoren und Madeira) (8 Publikationen, darunter zwei umfangreiche Bücher mit über 1500 Abbildungen und Beschreibungen zahlreicher neuer Arten).
4) Arbeiten zu fossilen Spinnen und Spinnentieren in Bernstein (42 Publikationen). In den letzten drei Jahrzehnten widmete sich Jörg vermehrt paläontologischen Studien. Sein Interesse an fossilen Spinnen begann mit dem Kauf eines Stücks Bernsteins, das einen Spinneneinschluss enthielt, den er zunächst keiner Familie zuordnen konnte. Sie erwies sich als der Gattung *Acrometa* der Synotaxidae zugehörig, einer Familie, die derzeitig nur aus Süd- und Zentralamerika, Neuseeland und Australien bekannt ist. Zu Beginn seiner paläontologischen Arbeiten hatte Jörg den Schwerpunkt auf den Araneoidea, doch arbeitet er gegenwärtig an allen Webspinnen und sogar an anderen Ordnungen der Spinnentiere. Neben dieser taxonomischen Grundlagenarbeit ist Jörg auch an Paläofaunistik, Verhalten, Parasitismus, Mimikry und Ökologie von fossilen Spinnen interessiert.

Wissenschaftliche Leistungen

Jörg Wunderlich hat 1279 Spinnenarten beschrieben (Tab. 1, Tab. 2), 575 rezente und 704 fossile aus 86 Familien.

Tab. 1: Von J. Wunderlich beschriebenen rezenten und fossilen Spinnenarten
Tab. 1: Extant and fossil spider species described by J. Wunderlich

Familie	rezent	fossil	total	Familie	rezent	fossil	total
Agelenidae	3	2	5	Oxyopidae		1	1
Amaurobiidae	1		1	Oonopidae	8	29	37
Anapidae	3	20	23	Palpimanidae	2		2
Anyphaenidae		3	3	Philodromidae	4		4
Araneidae	2	21	23	Pholcidae	49	13	62
Archaeidae		10	10	Pholcochyroceridae		3	3
Atypidae		3	3	Phrurolithidae	8		8
Baltsuccinidae		2	2	Pimoidae		9	9
Barychelidae		1	1	Pisauridae	1		1
Burmascutidae		1	1	Plectreuridae		1	1
Caponiidae		1	1	Plumorsolidae		1	1
Clubionidae	5	6	11	Praeterleptonetidae		2	2
Comaromidae		6	6	Praetheridiidae		1	1
Corinnidae s.l.		26	26	Prodidomidae	4	1	5
Ctenidae		1	1	Protheridiidae		6	6
Ctenizidae		2	2	Salticidae	11	34	45
Cyatholipidae	1	13	14	Salticoididae		1	1
Cyrtaucheniidae		1	1	Scytodidae	3	6	9
Dictynidae	11	46	57	Segestriidae	10	12	22
Dysderidae	34	4	38	Selenopidae		2	2
Ephalmatoridae		10	10	Sicariidae		3	3
Eresidae	1		1	Sinopimoidae	1		1
Eutichuridae	4		4	Sparassidae	1		1
Filistatidae	4		4	Spatiatoridae		2	2
Gnaphosidae	22	7	29	Symphytognathidae	1		1
Hahniidae	3	4	7	Succinomidae		6	6
Hersiliidae		9	9	Synaphridae	4	1	5
Insecutoridae		2	2	Synotaxidae	3	26	29
Idiopidae	1		1	Telemidae	1	1	2
Lagonomegopidae		4	4	Tetrablemmidae	1	5	6
Leptonetidae		9	9	Tetragnathidae	4	19	23
Linyphiidae	202	43	245	Theraphosidae		1	1
Liocranidae	9	3	12	Theridiidae	42	125	167
Lycosidae	15		15	Theridiosomatidae	5	13	18
Micropalpimanidae		1	1	Thomisidae	17	5	22
Microstigmatidae		1	1	Titanoecidae	3	1	4
Miturgidae		1	1	Trachelidae	2	1	3
Mimetidae		10	10	Trochanteriidae		19	19
Mysmenidae	3	10	13	Uloboridae	3	20	23
Nemesiidae	1		1	Zoropsidae		12	12
Nephilidae		15	15	Zoridae		1	1
Nesticidae	4	8	12	Zodariidae	9	3	12
Ochyroceratidae		7	7	Familien	46	72	86
Oecobiidae	49	5	54	**Total**	**575**	**704**	**1279**

Tab. 2: Arachnologen die mehr als 1000 Arten beschrieben haben (after Platnick & Raven 2013, mit Ausnahme von Wunderlich, für den die fossilen Arten mit berücksichtigt wurden)
Tab. 2: Arachnologists who described more that 1000 species (after Platnick & Raven 2013, with exception of Wunderlich, of him the fossil species are included)

Rang	Autor	total	valid	Synonyme	% valid
1	Simon	4650	3789	861	81.5
2	Platnick	1831	1828	3	99.8
3	Levi	1317	1268	49	96.3
4	Thorell	1498	1168	330	78.0
5	Strand	1543	1097	446	71.1
6	Mello-Leitão	1473	1056	417	71.2
7	Gertsch	1174	998	176	85.0
8	Chamberlin	1475	984	491	66.7
9	O. Pickard-Cambridge	1402	932	470	66.5
10	Wunderlich	1279	1219	59	95.3
11	Keyserling	1109	827	282	74.6

Neben den vielen neuen Arten beschrieb Jörg 81 rezente und 212 fossile Gattungen, 18 neue Familien (5 rezente (fett) und 13 fossile) sowie 53 Triben bzw. Unterfamilien (Tab. 3, Tab. 4). Darunter weist nur die Familie Sinopimoidae keine fossilen Vertreter auf.

Tab. 3: Von J. Wunderlich neu beschriebene Familien (rezente fett)
Tab. 3: Newly decribed families by J. Wunderlich (extant families in bold)

1. Baltsuccinidae Wunderlich, 2004
2. **Borboropactidae** Wunderlich, 2004 (inzwischen von ihm selbst als Tribus in der Unterfamilien Stephanopinae der Thomisidae aufgefasst)
3. Burmascutidae Wunderlich, 2008
4. **Comaromidae** Wunderlich, 2004
5. Eopsilodercidae Wunderlich, 2008 (= Psilodercidae Deeleman-Reinhold, 1995; World Spider Catalog 2014: sub Ochyroceratidae)
6. Lagonomegopidae Eskov & Wunderlich, 1995
7. Micropalpimanidae Wunderlich, 2008
8. Pholcochyroceridae Wunderlich, 2008
9. **Pimoidae** Wunderlich, 1986
10. Plumorsolidae Wunderlich, 2008
11. Praeterleptonetidae Wunderlich 2008
12. Praetheridiidae Wunderlich, 2004
13. Protheridiidae Wunderlich, 2004
14. Pumiliopimoidae Wunderlich, 2008
15. Salticoididae Wunderlich, 2008
16. **Sinopimoidae** Li & Wunderlich, 2008
17. Succinomidae Wunderlich, 2008
18. **Synaphridae** Wunderlich, 1986

Tab. 4: Von J. Wunderlich beschriebene Triben und Unterfamilien
Tab. 4: Tribes and subfamilies described by J. Wunderlich

1. Achaearanini Wunderlich, 2008
2. Actometini Wunderlich, 1979
3. Agroecini Wunderlich, 2008
4. Ataliini Wunderlich, 2011
5. Anametini Wunderlich, 2008
6. Anelosiminae Wunderlich,
7. Antisteini Wunderlich, 2004
8. Apostenini Wunderlich, 2008
9. Ariadninae Wunderlich, 2004
10. Balticatypini Wunderlich, 2011
11. Balticorominae Wunderlich, 2004
12. Baltleucaugini Wunderlich, 2008
13. Borneoridiini Deeleman & Wunderlich 2012
14. Cameronidiini Wunderlich, 2011
15. Chelicerini Wunderlich, 2008
16. Chrysometinae Wunderlich, 2004
17. Chthonopini Wunderlich, 2011
18. Copaldictyninae Wunderlich, 2004
19. Echinotheridiini Wunderlich, 2008
20. Eodotinae Wunderlich, 2011
21. Eomactatatorinae Wunderlich, 2008
22. Eomatachiini Wunderlich, 2004
23. Eoprychiini Wunderlich, 2004
24. Eotrechaleinae Wunderlich, 2004
25. Flagelldictynini Wunderlich 2012,
26. Furcembolusini Wunderlich, 2008
27. Gaucelmini Wunderlich, 1986
28. Lacunaucheniinae Wunderlich, 2008
29. Lebanoecobiinae Wunderlich, 2004
30. Lebansegestriinae Wunderlich, 2008
31. Luangnaminae Wunderlich, 2011
32. Magnopholcommatini Wunderlich, 2008
33. Metabini Wunderlich, 2008
34. Microsegestriinae Wunderlich, 2004
35. Microclubionini Wunderlich 2011
36. Microsynotaxini Wunderlich, 2008
37. Miraraneinae Wunderlich, 2004
38. Mizagallinae Wunderlich, 2004
39. Nanoini Wunderlich, 2008
40. Palaeohygropodini Wunderlich,
41. Parvomygalinae Wunderlich, 2004
42. Pholcochyrocerini Wunderlich, 2008
43. Praeterleptonetini Wunderlich, 2008
44. Prochorini Wunderlich, 2011
45. Protomimetinae Wunderlich, 2011
46. Pseudoteutanini Wunderlich, 2008
47. Pumiliopimoidae Wunderlich, 2008
48. Sosybiini Wunderlich, 2004
49. Spinitharini Wunderlich, 2008
50. Stemoniphantinae Wunderlich, 1986
51. Succiniraptorinae Wunderlich, 2004
52. Succinomini Wunderlich, 2008
53. Zarqaraneini Wunderlich, 2008

Von den 1279 von Jörg beschriebenen Spinnenarten sind derzeit nur 59 rezente als jüngere Synonyme erkannt. Die Gesamtzahl an validen Arten ist sehr hoch und stellt 2,6 % aller bekannten Spinnenarten (ca. 45000 rezent und 1169 fossil, World Spider Catalog 2014). Jörg hat als einziger deutscher Arachnologe mehr als 1000 Arten beschrieben und rangiert hinsichtlich der Zahl der Artbeschreibungen weltweit auf Position 10 (Tab. 2). Nach der Zahl valider Arten ist er sogar als Nummer 4 der Arachnologen weltweit zu reihen und als Nummer 3 unter den zeitgenössischen Kollegen. In der Paläontologie steht er an erster Stelle, er hat mehr fossile Arten, Gattungen und Familien beschrieben als alle anderen Arachnologen (704 der 1169 validen Arten).

Es war nicht das Ziel von Jörg, so viele Arten wie möglich zu beschreiben. Vielmehr möchte er so weit wie möglich die Evolution der Spinnen verstehen und dafür ist die taxonomische Arbeit an fossilen Spinnen eine wichtige Grundlage.

Im Gegensatz zu den meisten anderen produktiven Arachnologen hatte Jörg nie eine akademische Position inne. Er arbeitete als Privatperson, ohne finanzielle Förderung für Reisen, Ausrüstung und zum Akquirieren von Bernstein. In den letzten 30 Jahren hat Jörg eine sechsstellige Summe zum Ankauf von Bernsteinstücken aufgewendet.

Aufgrund seiner arachnologischen Aktivitäten wurde Jörg Wunderlich mit 18 nach ihm benannten Spinnenarten und zwei Vertretern anderer Arachnidenordnungen geehrt:

Spinnen

1. *Bianor wunderlichi* Logunov, 2001
2. *Carbinea wunderlichi* Davies, 1999
3. *Clubiona wunderlichi* Mikhailov, 1992
4. *Nasoona wunderlichi* (Brignoli, 1983)
5. *Philodromus wunderlichi* Muster & Thaler, 2007
6. *Prodidomus wunderlichi* Deeleman-Reinhold, 2001
7. *Scotognapha wunderlichi* Platnick, Ovtsharenko & Murphy, 2001
8. *Scutpelecopsis wunderlichi* Marusik & Gnelitsa, 2009
9. *Setaphis wunderlichi* Platnick & Murphy, 1996
10. *Synaphris wunderlichi* Marusik & Zonstein, 2011
11. *Telema wunderlichi* Song & Zhu, 1994
12. *Tenuiphantes wunderlichi* (Saaristo & Tanasevitch, 1996)
13. *Theridion wunderlichi* Penney, 2001 (fossil)
14. *Tibiaster wunderlichi* Eskov, 1995
15. *Walckenaeria wunderlichi* Tanasevitch, 1983
16. *Wugigarra wunderlichi* (Deeleman-Reinhold, 1995)
17. *Xysticus wunderlichi* Logunov, Marusik & Trilikauskas, 2001
18. *Zarqagonomegops wunderlichi* Kaddumi, 2007

Andere Arachniden

19. *Cratosolpuga wunderlichi* Selden, 1996 (fossil; Solifugae, Ceromidae)
20. *Palaeoananteris wunderlichi* Lourenço, 2004 (fossil; Scorpiones, Buthidae)

Jörg Wunderlich ist immer noch sehr aktiv. Derzeit beendet er ein Buch über Spinnensystematik, Phylogenie und Mesozoische Spinnen. Er wird darin neue Spinnenfamilien und auch eine neue Unterordnung der Ricinulei beschreiben.

Zum Abschluss möchte ich Jörg Wunderlich ganz persönlich für seine vielen interessanten Beiträge zur Arachnologie danken und ihm den Respekt für die langjährige produktive Arbeit aussprechen. Zudem wünsche ich ihm, sicher auch im Namen der gesamten arachnologischen Gemeinschaft, viele weitere Jahre voller Aktivität und Begeisterung.

Danksagung: Mein herzlicher Dank geht an Barbara Thaler-Knoflach für die Übersetzung des Textes ins Deutsche.

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Neue Arbeitsgruppe der Arachnologischen Gesellschaft (AraGes) mit Erweiterung der Webpräsenz: Arachniden-Wiki und -Forum

Die Arbeitsgruppe „Wiki und Forum" stellt ein Onlineforum und ein Arachniden-Wiki bereit. Dahinter steht die Eingliederung der bereits bekannten Seiten „Forum europäischer Spinnentiere" und „Spinnen Forum Wiki" der Website http://spinnen-forum.de in die AraGes.

Im Jahr 2004 stellte Martin Lemke das Forum erstmals ins Netz. Hintergrund war, interessierten Personen Hilfe beim Bestimmen von Arten zu leisten. Das Forum ist in erster Linie Anlaufpunkt für Menschen, die Spinnen fotografiert haben und wissen möchten, um welche Art es sich handelt. Mit den Jahren hat sich hier eine sehr rege „community" entwickelt. Schwerpunkte sind nach wie vor Bestimmungsfragen, aber auch Fragen nach der Ökologie und Lebensweise von Spinnen, Weberknechten und – in etwas geringerem Umfang – Pseudoskorpionen und sonstigen Spinnentieren. Mitglieder, die länger andauerndes Interesse zeigen, werden angeregt, sich selbst in die Bestimmung einzuarbeiten und erhalten dazu auch Tipps und Tricks bis hin zur Bestimmung anhand von Genitalstrukturen. Das aktuelle Spektrum der Teilnehmer reicht von Schülern bis zu Universitätsprofessoren. Im Forum besteht Klarnamenspflicht, was die Ernsthaftigkeit der Teilnahme fördert.

Im Jahr 2008 wurde das Forum um ein Wiki zum Thema Spinnentiere ergänzt. Ziel war es, im Forum wiederkehrende Erklärungen und Bildmaterial dauerhaft verfügbar zu machen. Im Gegensatz zu Wikipedia werden die Inhalte dieses Wikis ausschließlich von einem registrierten Bearbeiterstamm gepflegt, es kann also niemand unangemeldet Inhalte ändern. Diese Restriktion ist notwendig, um die Qualität und Richtigkeit der Inhalte zu gewährleisten. Das Arachniden-Wiki hat sich über den ursprünglichen Anspruch hinaus zu einer umfangreichen allgemeinverständlichen Datenbasis zum Thema Spinnentiere (Webspinnen, Weberknechte, Pseudoskorpione, Milben u.s.w.) entwickelt. Es besteht derzeit aus 23000 Dokumenten mit rund 13000 Dateien (vorwiegend Bilder).

Eine Vielzahl von Bildautoren lieferte und liefert weiterhin Fotos sehr guter Qualität, auch von Epigynen, Vulven und Pedipalpen, die der Illustration der Wiki-Artikel zu Gute kommen und damit für permanente Erweiterungen im Wiki sorgen. Viele Arten und Verhaltensweisen werden hier erstmalig oder in einmaliger Qualität gezeigt, z.B. der Lebenszyklus der Großen Zitterspinne (siehe Link unten). Alle Abbildungen sind durch Experten verifiziert, einzelne Exemplare werden zur Nachbestimmung an den jeweiligen Experten verschickt. Hinzu kommen qualitativ hochwertige Genitalabbildungen und textliche Hinweise auf bestimmungsrelevante Merkmale sowie einfache Bestimmungsschlüssel.

Wie das Forum war auch das Wiki thematisch ursprünglich auf Mitteleuropa begrenzt. Wegen der vielen internationalen Teilnehmer im Forum wurden beide auf ganz Europa erweitert. Forumssprachen sind Deutsch und Englisch.

Wiki und Forum sind, wie alle Webseiten der AraGes, absolut werbefrei.

Innerhalb der Arachnologischen Gesellschaft fungieren fortan Wiki und Forum als Arbeitsgruppe, die durch eine fünfköpfige Kerngruppe geleitet wird, welche Entscheidungen ggf. in Abstimmung und nach Rücksprache mit weiteren Experten trifft. Die Seiten sind zusammen mit den Seiten der AraGes auf einen gemeinsamen Server umgezogen.

Für die AraGes eröffnet sich durch diesen Zusammenschluss eine gut funktionierende Schnittstelle zwischen Wissenschaft und interessierten Laien. Während sich die AraGes mit ihrer Webseite, mit Ausnahme der Seite „Spinnen für Einsteiger", vorwiegend an wissenschaftlich orientierte Personen richtet, stellen Wiki und Forum vor allem für interessierte Laien einen einfachen Zugang zur wunderbaren Welt der Spinnen dar. So können auch Bestimmungsanfragen von Laien einfach an das Forum übertragen werden. Umgekehrt ist zu hoffen, dass Forum und Wiki noch stärker vom Input der Mitglieder der AraGes profitieren können und damit die inhaltliche Qualität weiterhin hohen Ansprüchen genügen kann.

Ein (wissenschaftlich interessanter) Nebeneffekt des Forums ist, dass so manche Nachweise seltener Arten oder Erstnachweise durch das Forum erst publik werden und so den Weg in die Nachweiskarten

der AraGes und in Publikationen in den Arachnologischen Mitteilungen finden. Das Forum erweist sich auch immer wieder aufs Neue als Quelle für gute Fotos im Wiki.

Kerngruppe der AG „Forum und Wiki“ innerhalb der AraGes:
Eveline Merches, Martin Lemke, Tobias Bauer, Katja Duske und Sylvia Voss.

Links
Forum: http://forum.spinnen-forum.de
Wiki: http://wiki.spinnen-forum.de
Lebenszyklus der Großen Zitterspinne: http://wiki.spinnen-forum.de/index.php?title=Pholcus_phalangioides/Beobachtungen/Pageler_J
AraGes: http://arages.de

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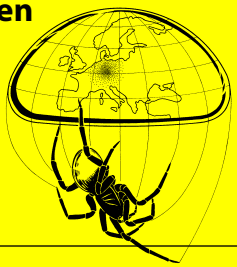
Arachnologische
Mitteilungen



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Inhalt/Contents

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