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Authors: Mezőfi, László, and Markó, Viktor

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Some rare and remarkable spider species from Hungary (Arachnida: Araneae)

László Mezőfi & Viktor Markó

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Abstract. This study reports the first records of two spider species for Hungary: *Cyclosa sierrae* Simon, 1870 (Araneidae) and *Porrhomma oblitum* (O. P.-Cambridge, 1871) (Linyphiidae). *Cyclosa sierrae* also represents the first record of this species from Central Europe. Furthermore, we provide evidence about the occurence of *Dysdera lata* Reuss, 1834 and *Philodromus marmoratus* Kulczyński, 1891 in Hungary and for six further species we report new data: *Brigittea vicina* (Simon, 1873) (Dictynidae), *Iberina microphthalma* (Snazell & Duffey, 1980) (Hahniidae), *Mermessus trilobatus* (Emerton, 1882) (Linyphiidae), *Pulchellodromus ruficapillus* (Simon, 1885) (Philodromidae), *Lasaeola prona* (Menge, 1868) (Theridiidae) and *Diaea livens* Simon, 1876 (Thomisidae). Comments on the distribution, biology and taxonomy of the ten mentioned spider species are provided.

Keywords: *Cyclosa sierrae*, distribution, *Dysdera lata*, first record, *Philodromus marmoratus*, *Porrhomma oblitum*

Zusammenfassung. Einige seltene und bemerkenswerte Spinnenarten aus Ungarn (Arachnida: Araneae). Diese Untersuchung enthält die Neunachweise von zwei Spinnenarten für Ungarn: *Cyclosa sierrae* Simon, 1870 (Araneidae) und *Porrhomma oblitum* (O. P.-Cambridge, 1871) (Linyphiidae). *Cyclosa sierrae* wird damit auch erstmals für Mitteleuropa gemeldet. Weiterhin werden *Dysdera lata* Reuss, 1834 und *Philodromus marmoratus* Kulczyński, 1891 für Ungarn belegt und von sechs Arten werden neue Daten präsentiert: *Brigittea vicina* (Simon, 1873) (Dictynidae), *Iberina microphthalma* (Snazell & Duffey, 1980) (Hahniidae), *Mermessus trilobatus* (Emerton, 1882) (Linyphiidae), *Pulchellodromus ruficapillus* (Simon, 1885) (Philodromidae), *Lasaeola prona* (Menge, 1868) (Theridiidae) und *Diaea livens* Simon, 1876 (Thomisidae). Verbreitung, Biologie und Taxonomie der zehn Arten werden diskutiert.

In the early twentieth century Chyzer & Kulczyński (1918) published the first comprehensive checklist of the spiders from Hungary, and already listed 742 species. More than 80 years later Samu & Szinetár (1999) updated the list according to the present borders of Hungary, thus their list contains 725 species. Since then many new additions have been reported for the fauna (e.g. Szűts et al. 2003, Pfliegler et al. 2012, Szinetár & Kovács 2013, Pfliegler 2014, Szinetár et al. 2014, 2015, Korányi et al. 2017) and several new species from the country were described (Szinetár & Samu 2003, Szinetár & Kancsal 2007, Szinetár et al. 2009, Kovács et al. 2015a). Presently, the Spiders of Europe database lists 800 spider taxa for Hungary (Nentwig et al. 2017), although the list is still far from complete. In this paper we report two further spider species which are new to the fauna of Hungary. We also provide a new data on the occurence and biology of some rare and interesting spider species.

Material and methods

The spiders were collected sporadically in various parts of Hungary, mainly in apple orchards (Bács-Kiskun, Pest, Szabolcs-Szatmár-Bereg and Tolna counties) and city parks (Budapest, Gödöllő) from 2013 to 2016. Exact locations are indicated with some comments in the Results. A variety of collecting methods were used, including hand collecting, beating, cardboard bands and litter sampling. For collecting overwintering spiders from apple trees, we used corrugated cardboard stripes (height 20 cm), which were placed around the tree trunks, at about 20 cm above ground usually in September. The bands and litter samples were collected during winter months, and for processing the litter samples we used Winkler extractors (Sakchoowong et al. 2007). Juvenile specimens of *Philodromus marmoratus* Kulczyński, 1891 and *Pulchellodromus ruficapillus* (Simon, 1885) were kept alive and fed with *Drosophila hydei* Sturtevant, 1921, until its final moult. The collected and reared specimens were stored in 70 % ethanol. Individuals were examined in the laboratory of the Department of Entomology, Szent István University. Identification was made under a binocular stereo microscope (Leica MZ6). In case of female specimens the genitalia were dissected from the specimens, and the epigynes/vulvas were cleared with 20 % KOH. The specimens were identified using various keys (see in the Results section), and were deposited in the first author's private collection. *Philodromus marmoratus* and *P. ruficapillus* habitus pictures were taken with a Nikon D3300 camera equipped with a Sigma 50mm 1:2.8 DG Macro lens. *Iberina microphthalma* (Snazell & Duffey, 1980), *Porrhomma oblitum* (O. P.-Cambridge, 1871) and *P. ruficapillus* epigynes/vulvas were photographed with a Zeiss Imager A2 light microscope equipped with AxioCam MRc5, and in other cases the photographs were taken with a Sony XCD-SX90CR digital interface connected to a Zeiss Stemi 2000 stereomicroscope. The specimens' parameters were measured with an ocular micrometer calibrated with a stage micrometer, and for post-processing work on the photographs, and for the preparation of the scale bars we used Adobe Photoshop CS3 software. Taxonomic names follow the nomenclature of the WSC (2017).

Results and discussion

As a result of our study the following ten new or rare spider species were recorded from Hungary:

Araneidae Clerck, 1757

***Cyclosa sierrae* Simon, 1870** (Fig. 1)

Determination. Levy 1997, Nentwig et al. 2017

Material examined. 1♂, Sükösd: 17.05.2016 – (46°17'59"N, 19°00'21"E, 100 m a.s.l., organic apple orchard). The specimen (leg. & det. L. Mezőfi) was collected by beating from the canopy of an apple tree.

Distribution. Europe to Georgia (WSC 2017). In Europe it occurs in Albania, Bulgaria, Cyprus, France (exclusively Corsica), Greece (including North Aegean Islands and Crete),

László MEZŐFI, Viktor MARKÓ: Department of Entomology, Faculty of Horticultural Science, Szent István University, Ménesi út 44, H-1118 Budapest, Hungary;
E-mails: mezofilaszlo@gmail.com, marko.viktor@kertk.szie.hu

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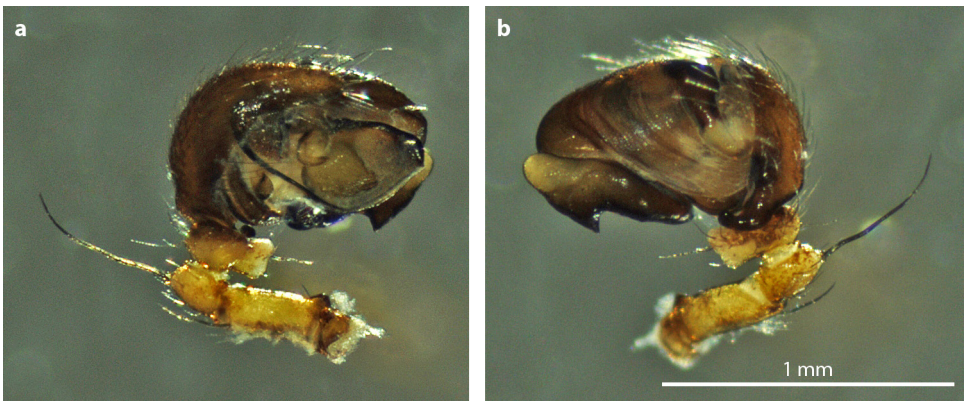

Fig. 1: Left palp of *Cyclosa sierrae* male from Hungary; **a.** prolateral view; **b.** retrolateral view

Italy (including Sardinia), Macedonia, Portugal, Russia (southern European part), Spain, Turkey (European part) and Ukraine (van Helsdingen 2017). It is also present in, e.g., Azerbaijan, Georgia, Iran, Israel, Lebanon, Syria and Turkey (Asian part) (Levy 1997, Kashefi et al. 2013, Komnenov 2013, Uyar et al. 2014).

Remarks. Until now, two representatives of the genus *Cyclosa* were known from Hungary: *C. conica* (Pallas, 1772) and *C. oculata* (Walckenaer, 1802) (Samu & Szinetár 1999). Here we report *C. sierrae* as the third member of this genus in Hungary.

This Mediterranean species usually occurs in steppe-like or shrub vegetations, but also occurs in *Pinus* forests (Komnenov 2013, Polchaninova & Prokopenko 2013, Ijland & van Helsdingen 2014, Uyar et al. 2014). *Cyclosa* spiders are easy to recognise by their habit of placing their prey remains and egg sacs in a vertical line crossing the center of their orb webs (Levy 1997). Furthermore, *Cyclosa* species can usually be easily distinguished from their relatives by, among other features, the posterior-dorsal extended opisthosoma which bears various humps (Levy 1997), but the identification of some species within the genus is difficult. In physical characteristics *C. sierrae* strongly resembles *C. conica*, but according to Mcheidze (2014) these two species can be distinguished on the basis of the sternum colouration: in case of *C. sierrae* the sternum is black (or dark brown) with yellow marks on the edge (one anterior transversal, one apical and two lateral marks), while in *C. conica* the sternum is entirely black, without yellow marks. Presumably the small-sized male specimen of this typically southern species reached the sampling site by ballooning. Spreading of this species in a northern direction has not been detected before in Europe.

Distribution. Mediterranean to Central Asia (WSC 2017). In Europe it is present in Bulgaria, Croatia, Czech Republic, France (including Corsica), Greece (including Crete), Hungary, Italy, Macedonia, Moldova, Romania, probably in Russia (north-western European part), Slovakia, Ukraine and former Yugoslavia (van Helsdingen 2017).

Remarks. A very rare mesophilic species (Havranek & Molnár 1965, Bryja et al. 2005b), which is critically endangered in, for example, the Czech Republic (Řezáč et al. 2015). However, *B. vicina* is not considered to be very rare in Hungary and it can be characterised as a species with a rather sporadic occurrence (Szinetár pers. comm.). It occurs in the herb layer of downy oak forests (Bryja et al. 2005b) or at forest edges (Havranek & Molnár 1965), although *B. vicina* was reported from urban areas (from *Picea abies* trees) as well (Szinetár 1992). In spite of the limited data on this species our results indicate that urban green ecosystems can provide appropriate habitats for *B. vicina*.

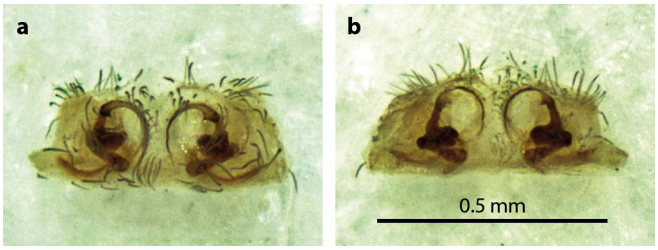

Fig. 2: Cleared, dissected epigyne/vulva of *Brigittea vicina* female from Hungary; **a.** epigyne, ventral view; **b.** epigyne/vulva, dorsal view

Dictynidae O. P.-Cambridge, 1871

***Brigittea vicina* (Simon, 1873)** (syn. *Dictyna vicina*) (Fig. 2)

Determination. Loksa 1969

Material examined. 8♀♀, Budapest: 1♀ 26.05.2016, 3♀♀ 23.06.2016 – Haller park (47°28'29"N, 19°04'48"E, 107 m a.s.l., urban green area); 1♀ 23.06.2016 – Róbert Károly körút (47°32'09"N, 19°03'48"E, 106 m a.s.l., urban green area); 1♀ 19.07.2016, 1 ♀ 13.09.2016 – Margit Island (47°31'19"N, 19°02'43"E, 103 m a.s.l., urban green area with floodplain-like forest vegetation); 1 ♀ 19.07.2016 – Vérmező (47°29'60"N, 19°01'43"E, 127 m a.s.l., urban green area). All the specimens (leg. D. Korányi, det. L. Mezőfi) were collected by beating mainly in urban environments, from canopies of *Acer campestre* trees.

Dysderidae C. L. Koch, 1837

***Dysdera lata* Reuss, 1834** (Fig. 3)

Determination. Kovblyuk et al. 2008, Le Peru 2011, Bosmans et al. 2017

Material examined. 1♂, Budapest: 27.07.2016 – Budai Arborétum (47°28'49"N, 19°02'24"E, 120 m a.s.l., urban green area). The specimen (leg. & det. L. Mezőfi) was collected by hand on a pavement near a rockery in the Botanical Garden of the Szent István University.

Distribution. Mediterranean to Georgia (WSC 2017). In Europe this species occurs in Bulgaria, Cyprus, France (exclusively on Corsica), Greece (including North Aegean Islands, Cyclades and Crete), Moldova, Portugal, Romania, Russia (southern European part), Slovakia, Spain (exclusively on the Balearic Islands) and Ukraine (Otto 2015, Bosmans et al. 2017, van Helsdingen 2017, Lissner 2017).

Fig. 3: Right palp of *Dysdera lata* male from Hungary; **a.** prolateral view; **b.** retrolateral view

Remarks. Deeleman-Reinhold & Deeleman (1988) and Řezáč et al. (2008) suggested that Chyzer & Kulczyński (1897: p. 267, plate 10, fig. 39) and Loksa (1969: pp. 75, 76 and 79, fig. 52 A–B) misidentified *Dysdera westringi* O. P.-Cambridge, 1872 and the species which they actually had was *Dysdera taurica* Charitonov, 1956. Řezáč et al. (2008) also examined some *D. taurica* specimens from Hungary to prove its presence in this country. Nevertheless, in the next year *D. taurica* was established as a junior synonym of *D. lata* by Kovblyuk et al. (2008). The main difference between males of *D. westringi* and *D. lata* is that the former one has no teeth while the latter one has 3–7 teeth on the apical lobe of the bulbus (Kovblyuk et al. 2008). In this paper we confirm the occurence of *D. lata* in Hungary. *Dysdera westringi* is rare in Hungary (Szinetár et al. 2012), and in the light of the above mentioned problems in identification, all records need to be re-checked because they probably all belong to *D. lata*.

Hahniidae Bertkau, 1878

***Iberina microphthalma* (Snazell & Duffey, 1980)**

(syn. *Hahnia microphthalma*) (Fig. 4)

Determination. Snazell & Duffey 1980, Szita et al. 1998

Material examined. 2♀♀, Madocsa: 27.09.2016 – (46°40'50"N, 18°58'32"E, 92 m a.s.l., commercial apple orchard treated with pesticides). The specimens (leg. L. Mezőfi, det. É. Szita) were collected by beating from canopies of apple trees.

Distribution. Only known from Czech Republic, Germany, Great Britain, Hungary and Switzerland (WSC 2017).

Remarks. Little is known about the biology of this rare species. Only a few records are available (Růžička & Dolanský 2016) and the male is still unknown. According to Snazell & Duffey (1980) the posterior median eyes are reduced, but various stages of eye reduction are possible and there may be differences in the form of the translucent copulatory ducts as well (Szita et al. 1998, Hänggi & Stäubli 2012). Růžička & Dolanský (2016) summarised earlier records and found that all previous specimens were collected on the ground surface or in the grass layer by various methods (e.g. by pitfall traps, sweeping), except some specimens that were collected using pipe traps which were designed to catch subterranean invertebrates. Snazell & Duffey (1980) propose that some of the characteristics of the spider suggest subterranean habitat use and Růžička & Dolanský (2016) consider *I. microphthalma* as a 'soil spider'. Nonetheless, its occurrence in the canopy of apple trees (at a height of approximately 1.5 m above the ground) suggets that besides the soil layer or the ground level *I. microphthalma* can sometimes also occur on plants.

Linyphiidae Blackwall, 1859

***Mermessus trilobatus* (Emerton, 1882)**

Determination. Nentwig et al. 2017, Šestáková et al. 2017

Material examined. 2♂♂, 3♀♀: 2♀♀ 15.12.2015 – Monorierdő (47°19'13"N, 19°31'12"E, 158 m a.s.l., organic apple orchard); 1♂ 05.02.2016 – Újfehértó (47°49'13"N, 21°39'58"E, 121 m a.s.l., organic apple orchard); 1♂, 1♀ 09.12.2016 – Sükösd (46°17'59"N, 19°00'21"E, 100 m a.s.l., organic apple orchard). The specimens (leg. & det. L. Mezőfi) were collected by litter sampling.

Distribution. North America. Introduced to Azores, Europe (WSC 2017). In Europe it is present in Austria, Belgium, Croatia, Czech Republic, France, Germany, Great Britain, Hungary, Italy, Netherlands, Poland, Portugal (exlusively on Azores), Slovakia, Slovenia, Switzerland and Ukraine (Dolanský et al. 2009, Katušić 2009, Kovács et al. 2015b, Szinetár et al. 2015, van Helsdingen 2017, Hirna 2017).

Remarks. This North American linyphiid spider was first found in Germany in the early 1980s and *M. trilobatus* is probably now the most frequently occuring alien spider in Europe (Nentwig & Kobelt 2010). This invasive ground-living species is probably spreading primarily by ballooning (Košulič et al. 2013, Blandenier et al. 2014) and its high colonization ability may relate to this, although the exact reasons for the success of *M. trilobatus* are still unclear (Eichenberger et al. 2009). In Hungary the first specimen was collected in 2012 (Kovács et al. 2015b), and since then it was found in several locations, especially in the western part of the country (e.g.

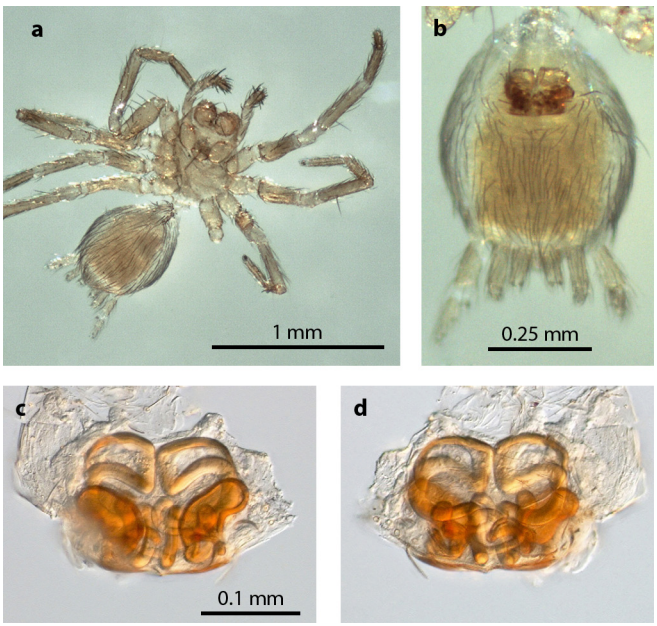

Fig. 4: *Iberina microphthalma* female from Hungary; **a.** general appearance, dorsal view; **b.** opisthosoma with epigyne, ventral view; **c.** epigyne/vulva, dorsal view; **d.** epigyne, ventral view

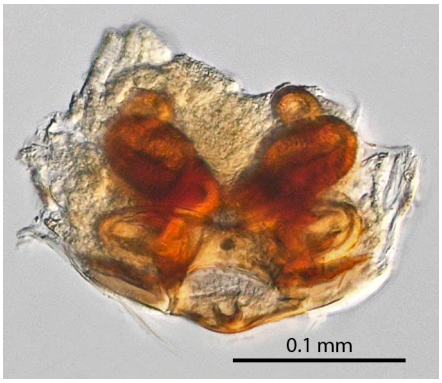

Fig. 5: Cleared, dissected epigyne/vulva of *Porrhomma oblitum* female from Hungary; dorsal view

Kovács & Szinetár 2015, Kovács et al. 2015b, Szinetár et al. 2015). Our results indicate that in recent years this species colonized almost the entire country, the central (Monorierdő), the southern (Sükösd) and the eastern (Újfehértó) parts equally. The species can also be expected to reach Serbia and Romania in the near future.

***Porrhomma oblitum* (O. P.-Cambridge, 1871)** (Fig. 5)
Determination. Merrett 1994, Russell-Smith 2009
Material examined. 1♀, Nagykálló: 05.02.2016 – (47°53'17"N, 21°48'57"E, 116 m a.s.l., organic apple orchard). The specimen (leg. & det. L. Mezőfi) was collected from a cardboard band.
Distribution. Europe (WSC 2017): Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, Iceland, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Romania, Russia (Eastern European part), Slovakia and Switzerland (van Helsdingen 2017).
Remarks. Samu & Szinetár (1999) listed seven *Porrhomma* species from Hungary: *P. convexum* (Westring, 1851), *P. errans* (Blackwall, 1841), *P. microphthalmum* (O. P.-Cambridge, 1871), *P. montanum* Jackson, 1913, *P. profundum* Dahl, 1939, *P. pygmaeum* (Blackwall, 1834) and *P. rosenhaueri* (L. Koch, 1872), however the presence of *P. errans* and *P. rosenhaueri*, are uncertain (Samu & Szinetár 1999). Szinetár & Horváth (2006) cited the unpublished M.Sc. thesis of Kovács (2002) for *P. oblitum*, suggesting that the species also occurs in Hungary, but in this thesis *P. oblitum* was not mentioned. Consequently, to the best of our knowledge we report *P. oblitum* for the first time in Hungary, making it the eighth member of its genus in the country.

This species is a facultative bark-dweller and it may occur in arable lands or various open and forest habitats, especially in semi-humid and humid ones (Blick et al. 2000, Szinetár & Horváth 2006). Identification of *Porrhomma* species is quite difficult. Both *P. oblitum* and *P. montanum* belong to the *Porrhomma* group, where the metatarsi are spineless, femur I has only one prolateral spine and the dorsal spines are lacking, and tibia I has a prolateral spine. *Porrhomma oblitum* and *P. montanum* can be distinguished from each other only by small details of the dissected and cleared genitalia (Russell-Smith 2009, Šestáková 2011).

Philodromidae Thorell, 1870
***Philodromus marmoratus* Kulczyński, 1891**
(syn. *P. buddenbrocki* Braun, 1965) (Fig. 6)
Determination. Kubcová 2004, Muster & Thaler 2004
Material examined. 2♂♂, 2♀♀ Budapest: 1♀ (leg. V. Hoffmann, det. L. Mezőfi) 20.04.2016, 1♀, 1♂ (leg. D. Gyóni, det. L. Mezőfi) 29.07.2016 – Margit Island (47°31'19"N, 19°02'43"E, 103 m a.s.l., urban green area with floodplain-like forest vegetation) (The male is a reared specimen, reached maturity after the ninth moult on 29.05.2017.). All specimens were collected by beating from shrubs. 1♂ (det. L. Mezőfi) an additional individual, an offspring of the female collected on 29.07.2016 was also examined. This reared specimen emerged from the egg on 10.08.2016 and reached maturity after the ninth moult on 19.05.2017.
Distribution. Only in Austria, Bulgaria, Czech Republic, Hungary, Slovakia, Ukraine and former Yugoslavia (with newer data from Serbia) (Grbić & Savić 2010, van Helsdingen 2017).
Remarks. A very rare species (Bryja et al. 2005a, 2005b), which is endangered in, e.g., the Czech Republic (Řezáč et al. 2015) and occurs near wetlands or floodplain forests (Jäger 1995, Bryja et al. 2005b). This species belongs to the *Philodromus aureolus* group (Segers 1992) and was originally described as *P. aureolus* ssp. *marmoratus* (in Chyzer & Kulczyński 1891). Segers (1992) firstly mentioned that *P. buddenbrocki* is possibly a synonym of *P. aureolus marmoratus* and later Kubcová (2004) clarified the situation and established *P. buddenbrocki* as a junior synonym of *P. marmoratus*. Although Chyzer & Kulczyński (1918), in their spider checklist reported several *P. aureolus marmoratus* records from the present territory of Hungary, surprisingly *P. marmoratus* was not included in the Hungarian checklist of spiders (Samu & Szinetár 1999), probably because of its uncertain taxonomic status. Our data provide further evidence for the occurence of *P. marmoratus* in Hungary. Furthermore, one individual (♂) was successfully reared from the egg. After the spider had emerged, it moulted nine times until maturity was reached. The other reared specimen (♂) which had been collected as a small nymph also moulted nine times until it reached adult stage. These observations indicate that *P. marmoratus* may have nine or more instars before maturity.

***Pulchellodromus ruficapillus* (Simon, 1885)**
(syn. *Philodromus ruficapillus*) (Fig. 7)
Determination. Muster et al. 2007, Kastrygina & Kovblyuk 2014
Material examined. 2♀♀, Nagykálló: 09.05.2016 – (47°53'17"N, 21°48'57"E, 116 m a.s.l., organic apple orchard) (reared specimens, final moulting reached on 25.07.2016). The specimens (leg. & det. L. Mezőfi) were collected by beating method from canopy of apple trees.
Distribution. Mediterranean to Kazakhstan (WSC 2017). In Europe it was found in Albania, Austria, France, Greece (including North Aegean Islands and Crete), Hungary, Italy, Portugal, Romania, Spain and Ukraine (van Helsdingen 2017).
Remarks. In 2012 the genus *Pulchellodromus* was separated from the genus *Philodromus* by Wunderlich (2012), and the genus now contains 13 cryptic species (WSC 2017), mostly from the Mediterranean region (Muster et al. 2007, Wunderlich 2012). Two of them have data from Hungary: *P. pulchellus* (Lucas, 1846) (Déri et al. 2007, Kancsal et al. 2010) and *P. ruficapillus*, the latter of which seems to have the largest distribution area among the other species of the genus (Duma

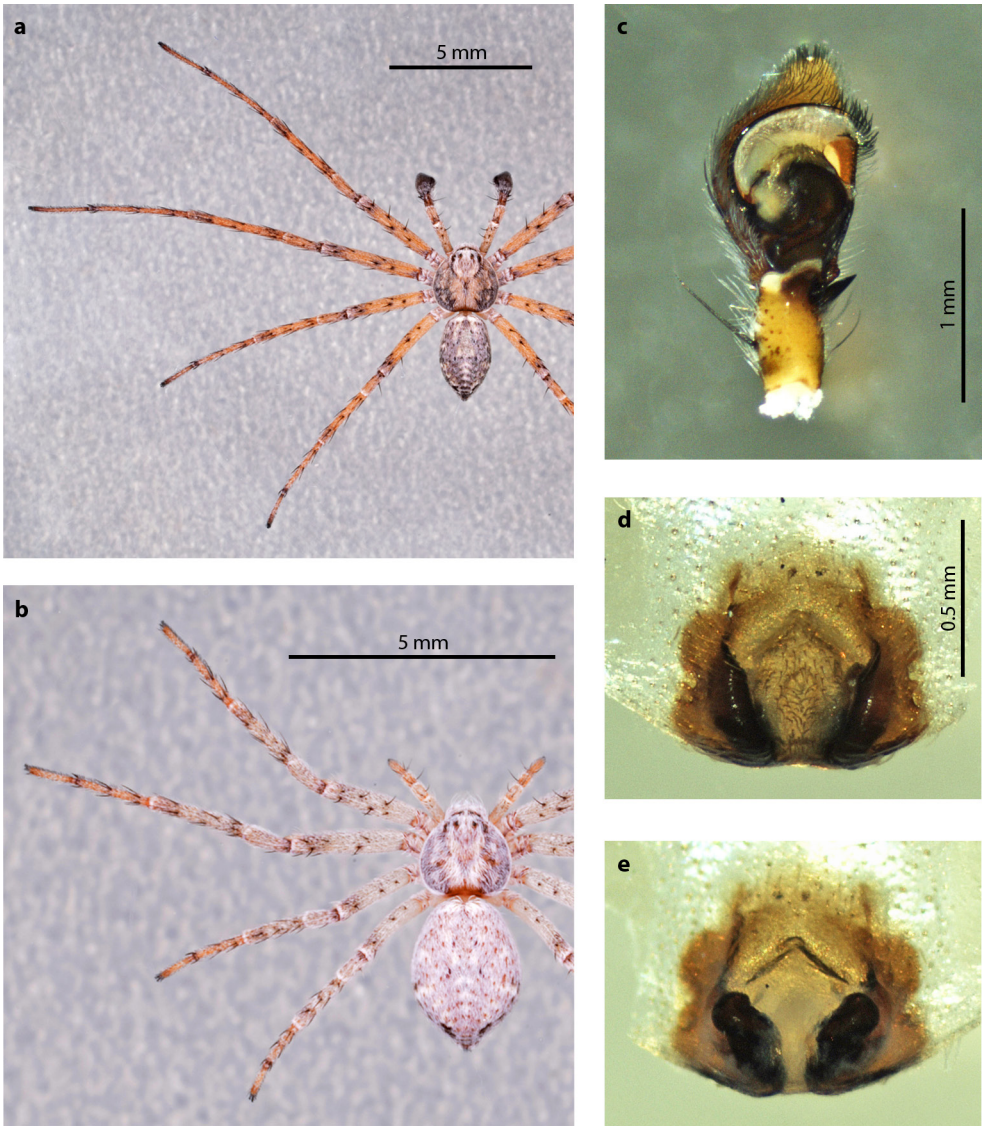

Fig. 6: *Philodromus marmoratus* specimens from Hungary; **a.** male, general appearance, dorsal view; **b.** female, general appearance, dorsal view; **c.** male's left palp, ventral view; **d.** epigyne, ventral view; **e.** epigyne/vulva, dorsal view

2008). Until now, in Hungary *P. ruficapillus* has been found in Fertő-Hanság (Northwestern Hungary) (Muster et al. 2007) and in the Balaton Upland (Szinetár et al. 2016), but our data (Nagykálló, Northeastern Hungary) suggest that it is widespred throughout Hungary. Furthermore, all the records of *P. pulchellus* from Hungary need to be re-checked, because they probably all belong to *P. ruficapillus* (Szinetár et al. 2016). *Pulchellodromus ruficapillus* occurs usually in wetlands or along riverbanks and also on seashores (Muster et al. 2007, Duma 2008, Szinetár et al. 2016).

Theridiidae Sundevall, 1833

***Lasaeola prona* (Menge, 1868)** (syn. *Dipoena prona*)

Determination. Roberts 1985, Le Peru 2011

Material examined. 1♂, 2♀♀, 3 sub ♂♂, 4 sub ♀♀, 1 nymph: 2♀♀ (leg. C. Nagy, det. L. Mezőfi) 28.04.2014 (The specimens were collected from their webs, at the base of apple trees.), 1♂ (leg. & det. L. Mezőfi) 09.07.2014 (This specimen was consumed by a *Carrhotus xanthogramma* (Latreille, 1819) nymph (det. L. Mezőfi) on an apple tree.) – Újfehértó (47°49'13"N, 21°39'58"E, 121 m a.s.l., organic apple orchard). The spi-

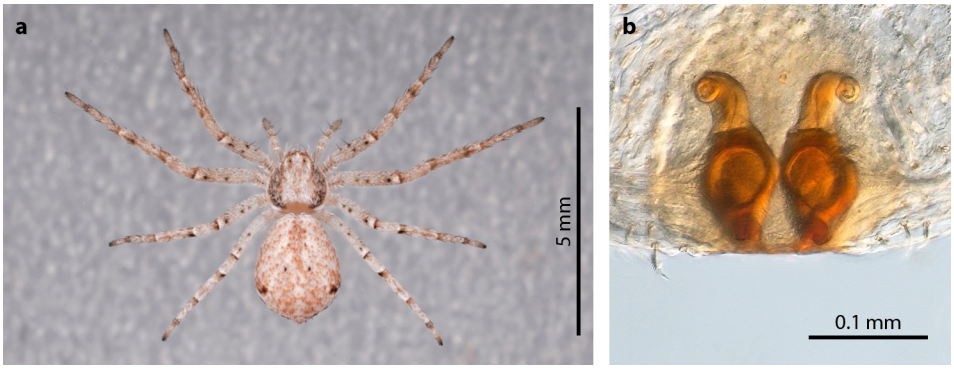

Fig. 7: *Pulchellodromus ruficapillus* female from Hungary; **a.** general appearance, dorsal view; **b.** epigyne/vulva, dorsal view

ders were collected by hand. 1 sub ♂ 01.12.2013 – Zsurk (48°24'54"N, 22°12'45"E, 103 m a.s.l., commercial apple orchard); 1 sub ♀ 01.12.2013 – Zsurk (48°23'30"N, 22°12'52"E, 105 m a.s.l., commercial apple orchard). These specimens (leg. M. Paróczai, det. L. Mezőfi) were collected by the cardboard band method. 1 nymph 22.09.2015 – Nyírcsaholy (47°55'17"N, 22°18'43"E, 126 m a.s.l., organic apple orchard); 1 sub ♂ 05.02.2016 – Újfehértó (47°49'13"N, 21°39'58"E, 121 m a.s.l., organic apple orchard). These specimens (leg. & det. L. Mezőfi) were collected by the cardboard band method. 1 sub ♂, 3 sub ♀♀ 05.02.2016 – Újfehértó (47°49'13"N, 21°39'58"E, 121 m a.s.l., organic apple orchard). The specimens (leg. & det. L. Mezőfi) were collected by litter sampling.

Distribution. North America, Europe, Caucasus, Japan (WSC 2017). In Europe it is widely distributed: Albania, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Russia (eastern European, northern European and Kaliningrad Region), Slovakia, Slovenia, Spain, Sweden, Switzerland and Ukraine (van Helsdingen 2017).

Remarks. Although widely distributed in Europe, this is quite a rare species and its biology is partly unknown (Nentwig et al. 2017). *Lasaeola prona* was classified as near threatened in the Carpathian Red List (Gajdoš et al. 2014), while in the Czech Republic it is critically endangered (Řezáč et al. 2015). Although much of its biology was previously unknown, more is known about it today. This thermophilous species usually occurs in open xerothermic habitats (Bryja et al. 2005b, Franc & Korenko 2008) and is often found at ground level, e.g. under stones (Roberts 1985). Adult individuals appear mostly from early June to the end of August (Szinetár 1995, Franc & Korenko 2008, Kovblyuk et al. 2012, Kostanjšek & Gorjan 2013, Aakra et al. 2016), and our data indicates that the mentioned species overwinters mainly in the subadult stage under bark or in the litter. Therefore, it seems that *L. prona* is a stenochronous species with a summer reproductive and dispersing period. Furthermore, we have observed the two collected female individuals (see above) preying on ants [*Lasius niger* (Linnaeus, 1758), det. C. Nagy]. In *Dipoena* sensu lato myrmecophagy is a known phenomenon (Roberts 1985, Le Peru 2011), therefore *L. prona* is probably also a myrmecophagous species.

Thomisidae Sundevall, 1833

***Diaea livens* Simon, 1876** [syn. *D. pictilis* (Banks, 1896)]

Determination. Buchar & Thaler 1984, Nentwig et al. 2017

Material examined. 2♂♂, 1 ♀, 2 sub ♂♂, 1 sub ♀, 3 nymphs: 1♀ 30.05.2015 – Gödöllő (47°35'35"N, 19°21'38"E, 222 m a.s.l., urban green area). The spider (leg. V. Hoffmann, det. L. Mezőfi) was collected by hand from a shrub. 1♂ 27.04.2016, 1 sub ♂ 14.10.2016 – Budapest, Normafa (47°30'24"N, 18°57'43"E, 463 m a.s.l., urban green area with deciduous forest vegetation); 1♂ 26.05.2016, 1 nymph 14.09.2016, 1 sub ♂ 14.10.2016 – Budapest, Széchenyi-hegy (47°29'43"N, 18°58'31"E, 462 m a.s.l. urban green area); 1 sub ♀ 14.09.2016, 1 nymph 14.10.2016 – Budapest, Hűvösvölgy (47°32'31"N, 18°57'46"E, 228 m a.s.l. urban green area with deciduous forest vegetation); 1 nymph 14.09.2016 – Budapest, Zugligeti út (47°31'04"N, 18°59'08"E, 180 m a.s.l., urban green area). These specimens (leg. D. Korányi, det. L. Mezőfi) were collected by beating mainly in urban forest areas from canopies of *Acer campestre* trees.

Distribution. Southern and Central Europe, Turkey, Caucasus. Introduced to USA (WSC 2017). In Europe it is present in Albania, Austria, Bulgaria, Czech Republic, France, Germany, Greece, Hungary, Italy, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey (European part) and Ukraine (Tomić & Grbić 2008, van Helsdingen 2017).

Remarks. Throughout Europe this is a very rare species (Nentwig et al. 2017) which was classified as vulnerable in the Carpathian Red List (Gajdoš et al. 2014) while in the Czech Republic it is endangered (Řezáč et al. 2015). In Hungary it was firstly detected by Szinetár (1995) and since then the spider was found at several locations within the country (Bogya et al. 1999, Horváth & Szinetár 2002, Szita et al. 2002, Horváth et al. 2009, Kovács et al. 2009, Szinetár et al. 2011, Keresztes 2013, Szita et al. 2014), although *D. livens* is still a quite rare species here. This species is a facultative bark-dweller (Szinetár & Horváth 2006) and occurs almost exclusively in oak forests on shrubs and lower branches of trees (Szinetár 1995, Szinetár et al. 2011, Nentwig et al. 2017). Although it has several records from other habitats/plants: e.g. from apple (Keresztes 2013) and pear (Bogya et al. 1999) orchards, from *Pinus nigra*, *Platanus hybrida* (Szinetár & Horváth 2006), *Tilia* spp. and from *Acer* spp. trees (Stenchly et al. 2007, Keresztes 2013). We collected several specimens from *A. campestre* trees as well, which suggets that *D. livens* might be less tightly bounded to the oak forests. The specimen collected in Gödöllő was consuming a *Smaragdina aurita* (Linnaeus, 1767) (Chrysomelidae) (det. L. Mezőfi) adult on a shrub.

Conclusions

Given their presence in neighbouring countries and distribution in Europe, the occurence of the new records (*C. sierrae* and *P. oblitum*) for Hungary is not surprising. Probably the two above mentioned species were naturally spread to Hungary, because human-mediated dispersal is less typical for Araneidae and Linyphiidae species (Nentwig 2015). At the moment, the Spiders of Europe database lists 800 spider taxa for Hungary (Nentwig et al. 2017), but the spiders reported here, and the many other recently described and first recorded species, indicate that the list is still far from complete. Therefore, in Hungary the number of spider species can be estimated to be much higher than 800. According to Nentwig (2015) international trade and climate change are the major factors that facilitate the spread and establishment of alien spider species. Currently one alien spider species per year is introduced to Europe, but this rate will surely increase in future. Therefore, it is important to continue the arachnological exploration of Hungary because, as in the case of Europe in general, many new species are expected to emerge in this country and also not all species that supposedly occur in Hungary have been found and listed yet.

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