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SPIDER FAUNA IN A GRASS DUNE REMNANT AT THE BLACK SEA COAST (ROMANIA), PRESENTING SEVEN NEW SPECIES FOR THE ROMANIAN FAUNA INCLUDING THE FIRST DESCRIPTION OF THE FEMALE *HARPACTEA ALEXANDRAE* LAZAROV, 2006 (DYSDERIDAE)

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Abstract. Some new data of spiders (Araneae) are presented from a small but valuable reserve in Romania. Spiders were captured in a habitat relic consisting of coastal grass-dunes at the Black Sea coast using pitfall traps. Seven new species were found for the Romanian fauna. Amongst these the female of *Harpactea alexandrae* Lazarov, 2006 was present. Only the male of this species has been described. This work highlights once again the importance of small relic habitats for the maintenance of species diversity in highly cultivated areas.

Key words: spiders, Araneae, *Harpactea alexandrae*, Romania, Black Sea coast.

Rezumat. Fauna de păianjeni dintr-un habitat relict de dune marine de la litoralul Mării Neagre (România), cu prezentarea a șapte specii noi pentru fauna României, inclusiv prima descriere a femelei de *Harpactea alexandrae* Lazarov, 2006 (Dysderidae). Fauna de păianjeni dintr-un habitat relict de dune marine din imediata vecinătate a litoralului Mării Neagre a fost investigată. 7 specii de păianjeni sunt citate pentru prima dată din fauna României, iar la specia *Harpactea alexandrae* Lazarov, 2006 (Dysderidae) a fost realizată prima descriere, această specie fiind cunoscută până în present doar după mascul. Abundența noutăților subliniză importanța acestui mic habitat în conservarea biodiversității, într-o zonă în care influiența antropică este foarte mare, toate zonele învecinate fiind destinate agriculturii.

Cuvinte cheie: păianjeni, Araneae, *Harpactea alexandrae*, România, litoralul Mării Negre.

Introduction

The Romanian Black Sea coast is an interesting location for biodiversity. Because of the hot summers the fauna and flora have some Mediterranean and Balkan characteristics while the cold winter and the low precipitation give this region also some characteristics of the eastern European steppe (Pop & Sălăgeanu, 1965). Apart from the Danube Delta, the entire Romanian Black Sea coast suffers the influence of intensive agriculture and tourism infrastructure (Făgăraș *et al.*, 2006). Only a few remnants of the former coastal dune landscape still exist. One of these remnants can be found near the marine research station (Stațiunea Biologică Marină “Prof. Ioan Borcea”) in Agigea (Constanța). A former military site dating from the First World War was donated to the university of Iași as a station for marine research. This site, measuring no more than 5 hectares, safeguards a typical dune grassland with characteristics of steppe grassland (Doniță *et al.*, 2005). Both floristic and faunistic data suggest the marine research station of Agigea to be a habitat relic (Doniță *et al.*, 2005; Mititelu *et al.*, 1992). Although habitat relics may be small, these often bear a range of species that went extinct in the nearby habitats.

In a survey for the araneofauna of the marine research station of Agigea, seven new species were recorded for the fauna of Romania.

Material and methods

Twenty pitfall traps containing 4% formaldehyde and a small droplet of detergent were set out, throughout the reserve, starting in mid April until mid June 2004. The traps were collected every third week and the spiders were transfered in 70% ethanol until further investigation. The specimens were examined with a Wild M3 (Wild-Heerbrugg) stereomicroscope. Species determination was done on the basis of the morphological characteristics of the adult female genitalia and male pedipalps according to Heimer and Nentwig (1991), Fuhn and Niculescu-Burlacu (1971), Metzner (1999) and additional individual papers. Drawings were made with an Olympus CH2 microscope (Olympus, Aartselaar, Belgium) with drawing attachment. In order to visualise the vulva of *Harpactea alexandrae* Lazarov, 2006, immersing the vulva in clove oil cleared the cuticle. All measurements were taken from the dorsal side.

For the SEM micrographs, specimens were dehydrated in increasing alcohol series followed by increasing ethanol-acetone series up to 100% acetone. Subsequently, the samples were dried to the critical point with a Balzers CPD 030 critical point drier (Sercolab bvba, Merksem, Belgium), mounted on metal bases and sputtered with platinum, using the JEOL JFC 1300 Auto Fine Coater (Jeol ltd., Zaventem, Belgium). Micrographs were taken with a JEOL JSM 5600 LV scanning electron microscope (Jeol ltd., Zaventem, Belgium).

Results

Collected material

In total, 60 species were collected in the reserve of Agigea (Table 1). Among these, *Zelotes balcanicus* Deltshev (2006) was present. This species was recently described, partially based on this material (Deltshev *et al.*, 2006). In addition, seven species were found to be new to the fauna of Romania in comparison with the checklist of Romanian spiders (Weiss & Petrișor, 1999).

Family Harpacteae

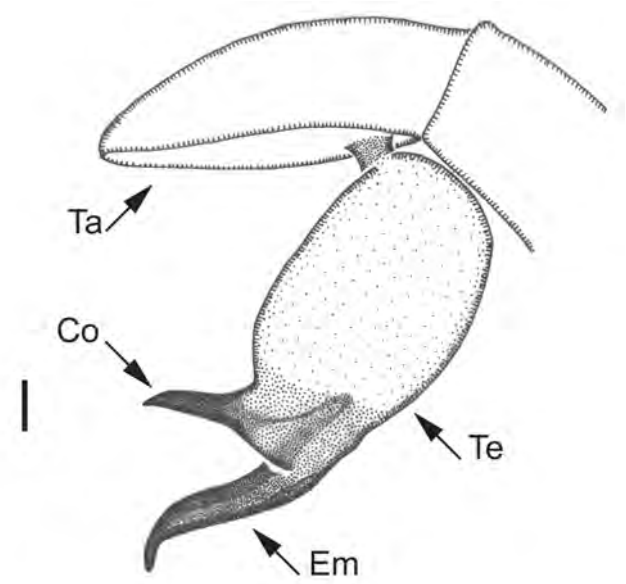
***Harpactea alexandrae* Lazarov** (Figs. 1-3; Tables 2, 3)

Material examined: Romania: Constanța: Agigea 9 male and 3 female specimens in pitfalls in dune grassland, 15 May and 16 June 2004, W. De Spiegelaere leg.

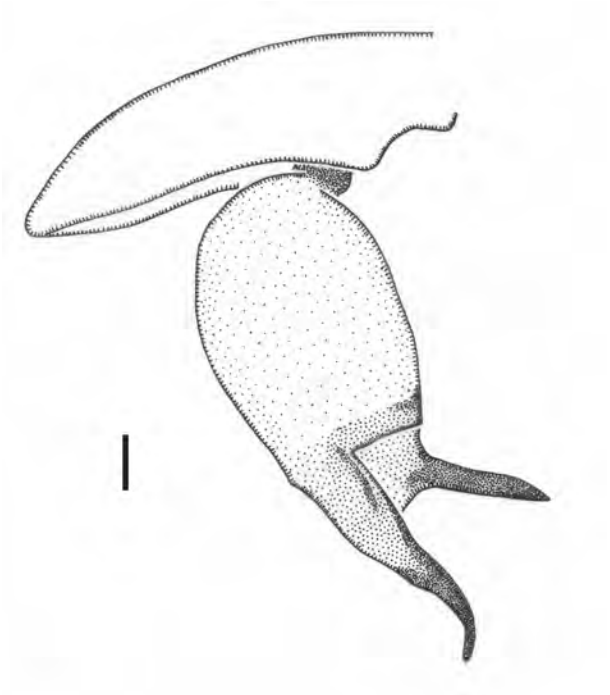
Measurements: *H. agigeensis*: male: total length: 5.08-6.35 mm; carapace length: 2.11-3.17 mm; carapace width: 1.89-2.38 mm; length of the chelicerae: 0.89-1.42 mm. Female: total length: 6.51-8.41 mm; carapace length: 2.44-3.36 mm; carapace width: 1.95-2.68 mm; length of chelicerae: 1.03-1.44 mm. Legs and pedipalp: see table 2 and 3.

Male palp (Figs. 1, 3): Tibia and tarsus are equal in size; tarsus with hairs of variable lengths (Fig. 3A), with featherlike protrusions, absent in the hairs of other palpal segments (Fig. 3C); these hairs are considered mechanoreceptors for air movement (Barth, 2000); tegulum large, olive shaped, with a long and massive embolus growing from its base, closely associated with a well-developed conductor which is about two-thirds the length of the embolus; the embolus and conductor are divergent.

Vulva (Fig. 2): The structure of the vulva is typical for the genus *Harpactea*. The epigastric furrow opens into a small atrium, delimited by two valves, i.e. the anterior arc which lies in the longitudinal plane, and a well-developed transversal bar which lies perpendicular to the former. These sclerotized bars function as muscle attachments and form the opening of the uterine valve (Chatzaki & Arnedo, 2006; Burger & Kropf, 2007). A wide, membranous posterior diverticulum is located posterior to the epigastric furrow.



A



B

Figure 1. Male palp of *Harpactea alexandrae* Lazarov, 2006, retrolateral view (A) and prolateral view (B); Ta: tarsus, Te: tegulum, Em: embolus, Co: conductor, scale bar: 0.1mm.

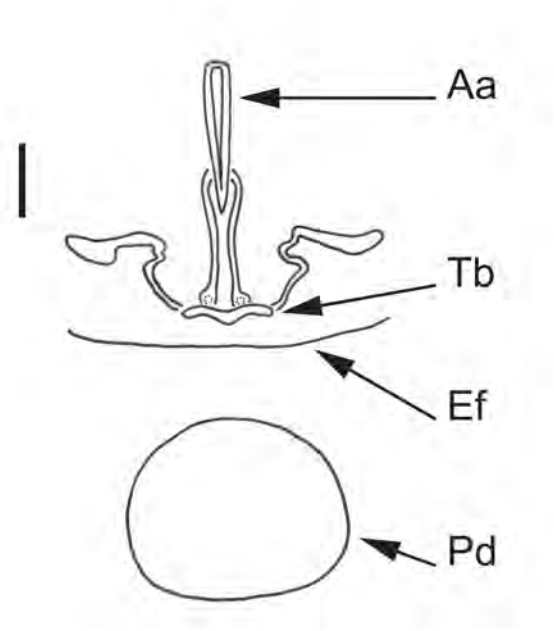


Figure 2. Vulva of *Harpactea alexandrae* Lazarov, 2006, Ef: epigastric furrow, Aa: anterior arc, Tb: transversal bar, Pd: posterior diverticulum, scale bar: 0.1mm.

Distribution: *H. agigeensis* is known to be present in the north east of Bulgaria (Lazarov, 2006).

Family Lyniphiidae

***Mecopisthes peusi* Wunderlich**

Material examined: Romania: Constanța: Agigea, 3 male specimens in pitfalls in dune grassland, 13 April 2004, W. De Spiegelaere leg.

Comments: *Mecopisthes peusi* (Fig. 1-A) is present in most parts of western and central Europe (Heimer & Nentwig, 1991; Platnick, 2008). The observation of this species in Agigea is the first record for the genus *Mecopisthes* in Romania. According to the general distribution of *Mecopisthes peusi*, the presence of this species in Romania was to be expected.

***Sintula retroversus* (Cambridge)**

Material examined: Romania: Constanța: Agigea, 3 male and 1 female specimens in pitfalls in dune grassland, 13 April and 16 June 2004, W. De Spiegelaere leg.

Comments: *Sintula retroversus* (Fig. 4) has been recorded in the south of Europe (Denis, 1967; Brignoli, 1985) and in the Caucasus (Tanasevitch, 1987). Our finding suggests the convergence of these two distinct distribution areas into one big area, from the western Mediterranean region up to the Caucasus.

A.

B.

C.

Figure 3. SEM micrographs of the male palp of *Harpactea alexandrae* Lazarov, 2006, showing the prolateral view (A) and the retrolateral view (B) of the bulb. The hairs on the tarsus bear featherlike protrusions (C). A patch of smaller hairs is located dorsally on the tarsus (A).

Family Zodariidae

***Zodarion thoni* Nosek**

Material examined: Romania: Constanța: Agigea, 5 male specimens in pitfalls in dune grassland, 13 April and 16 June, W. De Spiegelaere leg.

Comments: *Zodarion thoni* (Fig. 5) is known from Turkey (Nosek, 1905), Bulgaria (Deltshev, 1987), Greece (Bosmans, *in press*), Ukraine (Kovblyuk, 2005), the Caucasus (Otto, 2008), Israel and Lebanon (Levy, 1992). This record in Romania extends the distribution area of this species to the northwest.

Family Gnaphosidae

***Trachyzelotes malkini* Platnick & Murphy**

Material examined: Romania: Constanța: Agigea, 1 male, 5 females in pitfalls in dune grassland, 16 June 2004, W. De Spiegelaere leg.

Comments: *Trachyzelotes malkini* (Fig. 5) is known to be the most common *Trachyzelotes* species in Crete (Chatzaki *et al.*, 2003). It was also recorded in Turkey and some regions in Ukraine including the Crimean peninsula (Kovblyuk, 2005) and the Caucasian mountains (Platnick & Murphy, 1984).

Family Salticidae

***Neaetha membrosa* (Simon)**

Material examined: Romania: Constanța: Agigea, 2 males in pitfalls in dune grassland, 15 May and 16 June 2004, W. De Spiegelaere leg.

Comments: *Neaetha membrosa* (Fig. 6) has been recorded in the whole Mediterranean region (Heimer & Nentwig, 1991). The presence in Romania was to be expected.

***Talavera krocha* Logunov & Kronestedt**

Material examined: Romania: Constanța: Agigea, 2 males and 2 females in pitfalls in dune grassland, 15 May and 16 June 2004, W. De Spiegelaere leg.

Table 1. Species found in Romania, Agigea in the period from mid April to mid June 2004.

Family	Genus	Species	Males	Females
Corinnidae	*Phrurolithes*	*festivus*	5	0
Dictynidae	*Argenna*	*patula*	1	0
	Lathys	*stigmatisata*	8	1
Dysderidae	*Dysdera*	*crocota*	6	1
	Harpactea	*rubicunda*	36	9
	Harpactea	*alexandrae*	22	5
Eresidae	*Eresus*	*niger*	1	0
Gnaphosidae	*Berlandina*	*cinerea*	7	1
	Drassodes	*lapidosus*	4	2
	Drassodes	*pubescens*	4	3
	Drassyllus	*praeficus*	20	1
	Haplodrassus	*signifer*	17	3
	Micaria	*dives*	1	0
	Trachyzelotes	*pedestris*	1	5
	Trachyzelotes	*malkini*	11	1
	Zelotes	*balcanicus*	11	4
	Zelotes	*electus*	17	12
	Zelotes	gracilis	1	0
	Zelotes	*hermanni*	1	12
Linyphiidae	*Acartauchenius*	*scurrilis*	1	0
	centromerus	*prudens*	0	2
	Diplostyla	*concolor*	0	1

Family	Genus	Species	Males	Females
	Syedra	*gracilis*	6	0
	Canariphantes	*nanus*	6	4
	Mecophistes	*peusi*	3	0
	paludiphantes	*pillichi*	2	5
	Sintula	*retroversa*	4	1
	Stemonyphantes	*lineatus*	0	1
	Tapinocyboides	*pygmaeus*	8	1
	Tenuiphantes	*tenuis*	5	11
Liocranidae	*Agroeca*	*cuprea*	1	1
Lycosidae	*Alopecosa*	*cuneata*	1	0
	Alopecosa	*pulverulenta*	56	15
	Alopecosa	*albofasciata*	190	24
	Alopecosa	*cursor*	2	0
	Alopecosa	*taeniopus*	9	4
	Aulonia	*albimana*	1	0
	Pardosa	*blanda*	1	0
	Pardosa	*prativaga*	1	0
	Pardosa	*proxima*	0	1
	Pardosa	*agrestis*	0	0
	Trochosa	*terricola*	12	2
Miturgidae	*Cheiracanthium*	*virescens*	1	0
Pholcidae	*Pholcus*	*opilionoides*	0	1
Pisauridae	*Pisaura*	*mirabilis*	5	1
Salticidae	*Euophrys*	*rufibarbis*	0	1
	Euophrys	*frontalis*	0	1
	Heliophanus	*cupreus*	1	0
	Neaetha	*membrosa*	1	0
	Neon	*laevis*	1	0
	Sitticus	*distinguendus*	1	0
	Talavera	*aequipes*	1	0
	Talavera	*krocha*	2	2
Theridiidae	*Enoplognatha*	*thoracica*	1	0
	Robertus	*neglectus*	0	1
Thomisidae	*Ozyptila*	*praticola*	3	0
	Xysticus	*acerbus*	7	4
	Xysticus	*kempeleni*	2	0
	Xysticus	*kochi*	9	1
Zodaridae	*Zodarion*	*thoni*	16	8

Table 2. Measurements (in mm) of the legs of the male of *Harpactea alexandrae* Lazarov, 2006.

	I	II	III	IV	pedipalp
femur	2.07-2.93	1.89-2.62	1.59-2.07	2.26-2.99	0.98-1.28
patella	1.28-1.77	1.22-1.65	0.79-1.10	1.10-1.40	0.55-0.73
tibia	1.83-2.38	1.65-2.32	1.34-1.71	1.95-2.68	0.49-0.73
metatarsus	1.53-2.32	1.53-2.14	1.59-2.14	2.26-3.05	-
tarsus	0.49-0.61	0.49-0.61	0.49-0.55	0.61-0.67	0.73-0.73
total	7.20-10.01	6.78-9.34	5.80-7.75	8.18-10.79	2.75-3.47

Table 3. Measurements (in mm) of the legs of the female of *Harpactea alexandrae* Lazarov, 2006.

	I	II	III	IV	pedipalp
femur	2.26-2.99	2.20-2.68	1.65-2.26	2.26-2.93	1.04-1.34
patella	1.34-1.83	1.22-1.65	0.79-1.10	0.85-1.34	0.55-0.73
tibia	2.01-2.75	1.83-2.62	0.98-1.77	2.07-2.68	0.61-0.79
metatarsus	1.95-2.68	1.83-2.38	1.65-2.14	2.38-3.11	-
tarsus	0.55-0.67	0.49-0.67	0.55-0.61	0.61-0.79	0.61-0.79
total	8.11-10.92	7.75-10.00	5.62-7.88	8.17-10.85	2.81-3.65

Comments: *Talavera krocha* was recorded very recently in Ukraine, Azerbaijan and also in disjunctive localities in France and Kyrgyzstan (Logunov & Kronestedt, 2003). The new record from Romania partly fills the gap between the eastern and western localities (Fig. 6). It is very probable that this species has been overlooked and has a much wider distribution area, *Talavera krocha* being very small and easily confused with *Talavera monticola* (Kulczyn'ski) and *Talavera thorelli* (Kulczyn'ski).

Discussion

Although the Romanian araneofauna has been well documented in the past, many new records are still to be found in small habitat fragments. In Agigea seven new species for Romania are reported. Thus far, the genus *Harpactea* in Romania was only represented by four species. The *lepida* group is represented by *Harpactea lepida* (C.L. Koch), the *hombergi* group by *Harpactea hombergi* (Scopoli) and the *rubicunda* group is represented by, *Harpactea rubicunda* (C.L. Koch), *Harpactea saeva* Herman, 1879 and now also by *Harpactea alexandrae* Lazarov, 2006. Although the genus *Harpactea* is an ill-defined genus with extreme heterogeneity (Chatzaki & Arnedo, 2006), *Harpactea alexandrae* shows all the typical characteristics for the *rubicunda* group as defined by Deeleman-Reinhold (1993).

Figure 4. Map of Europe with the distribution of *Sintula retroversus* (triangles), the site of collection: Agigea (star).

Figure 5. Map of Europe with the distribution of *Zodarion thoni* (triangles) and *Trachyzelotes malkini* (circles), the site of collection: Agigea (star).

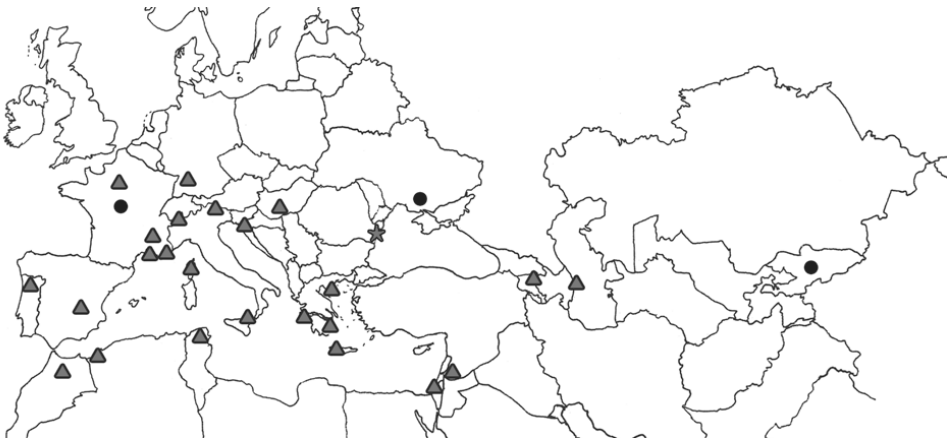


Figure 6. Map of Europe with the distribution of *Neaetha membrosa* (triangles) and *Talavera krocha* (circles), the site of collection: Agigea (star).

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