

Jumping Spiders (Araneae: Salticidae) of Northwest Anatolia (Turkey)

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Abstract: This research was carried out in Northwest Anatolia in 2006-2010 in order to inventory Salticidae fauna, which is shown to include 13 species in 10 genera. New records for the spider fauna of Turkey have been done for the following species: *Afraflacilla epiblemoides* (CHYZER, 1891); *Heliophanus lineiventris* SIMON, 1868; *Plexippus paykull* (AUDOUIN, 1826) and *Pseudeuophrys obsolete* (SIMON, 1868).

Key words: Araneae, Salticidae, Northwest Anatolia, Turkey

Introduction

To date, family Salticidae of Turkey is known to contain 85 species in 33 genera: *Aelurillus* – 2, *Afraflacilla* – 1, *Ballus* – 1, *Carrhotus* – 1, *Chalcoscirtus* – 2, *Cyrba* – 1, *Euophrys* – 3, *Evarcha* – 5, *Habrocestum* – 3, *Hasarius* – 1, *Heliophanillus* – 1, *Heliophanus* – 16, *Icius* – 1, *Leptorchestes* – 2, *Marpissa* – 3, *Menemerus* – 1, *Mogrus* – 1, *Myrmarachne* – 2, *Pellenes* – 4, *Phintella* – 1, *Philaeus* – 1, *Phlegra* – 4, *Plexippoides* – 1, *Plexippus* – 1, *Pseudeuophrys* – 3, *Pseudicius* – 3, *Saitis* – 1, *Salticus* – 6, *Sitticus* – 5, *Synageles* – 4, *Talavera* – 1, *Thyene* – 1, *Yllenus* – 2. *Euophrys fucata* (Simon, 1868), *Habrocestum nigristernum* dalmas, 1920, *Heliophanus feltoni* Logunov, 2009, *Heliophanus konradthaleri* Logunov, 2009 and *Yllenus zaraensis* Logunov, 2009 seem to be endemic species (LOGUNOV 2009, METZNER 2011, PLATNICK 2011, PRÓSZYŃSKI 2011). This figure is likely to be incomplete and further investigations will definitely increase it. Here, for comparative purposes, we have provided data on the diversity of Salticidae in neighbouring countries, such as: Bulgaria – 91 species (DELTSHEV, BLAGOEV 2001, BLAGOEV *et al.* 2008), Serbia – 49 (DELTSHEV *et al.* 2003), Greece – 139 (BOSMANS, CHATZAKI 2005), Crete – 54 of which 10 records are considered doubt-

ful or mistaken (LOGUNOV 2001, LOGUNOV, CHATZAKI 2003), FYRMacedonia – 81 (KOMNENOV 2006), Iran – 74 (LOGUNOV 2001, LOGUNOV *et al.* 2002, SAHRA 2006, LOGUNOV 2007, 2009), Turkmenistan – 72 (MIKHAILOV, FET 1994, WESOŁOWSKA 1996).

The aim of the present study is to document Salticidae spider fauna of northwest Anatolia (Turkey). Besides, new faunistic records of Salticidae from this region have been reported.

Material and Method

Spiders were collected by the authors in Northwest Anatolia during the spring and summer months of 2006-2010 from 24 localities. The research was carried out in order to inventory Salticidae spider fauna. Spiders were collected under stones, ground and plants by handpicking, sweeping and beating off bushes and trees. A total of 71 adult specimens (32♀, 39♂) were collected from Balıkesir, Bursa and Manisa (Fig. 1), and 13 salticid species belonging to 10 genera have been found. A list of localities with altitudes and coordinates is given in Table 1. Yet, the new localities in Turkey for *A. epiblemoides*, *H. lineiventris*, *P. paykulli* and *P. obsolete* are shown in Fig. 1. Identifications



Fig. 1. The survey areas in Northwest Anatolia regions: Balıkesir, Bursa, Manisa and new localities for *Afraflacilla epiblemoides* (1), *Heliophanus lineiventris* (2), *Plexippus paykulli* (3) and *Pseudeuophrys obsoleta* (4) in Turkey.

were made with the aid of the keys by NENTWIG *et al.* (2011), PRÓSZYŃSKI (2003, 2008, 2011), ROBERTS (1995), WESOŁOWSKA (1996) and WUNDERLICH (2008). The geography of species is given by: BAYRAM *et al.* 2002, 2010; DANILOV, LOGUNOV 1993, FUHN, GHERASIM 1995, LOGUNOV, ZAMANPOORE 2005, LOGUNOV 1992, 1998, LOGUNOV *et al.* 2006, METZNER 2011, PLATNICK 2011, PRÓSZYŃSKI 2011, RAKOV, LOGUNOV 1997, TROTTA A. 2005. The studied specimens are deposited in the Department of Biology Zoology Museum, Uludağ University, Bursa, Turkey.

Results

Afraflacilla epiblemoides (Chyzer, 1891)

Material: Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir province, 1♂, 30.06.2010; Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir province 1♂, 03.07.2010. Collected from *Pinus nigra*.

General Distribution: Asia: Turkey, Europe: Croatia, Czech Republic, Former Yugoslavia, Greece, Hungary, Romania, Serbia, Slovakia.

Cyrba algerina (Lucas, 1846)

Material: Sadağı Canyon, Orhaneli, Bursa province 3♀♀, 2♂♂; 02. 06. 2008; Kozluören village, Inegöl, Bursa prov. 1♀, 20. 06. 2010; Beşevler, Bursa prov. 1♀, 23 06. 2010. Collected under stones.

General Distribution: Canary Island to Central Asia.

Evarcha jucunda (Lucas, 1846)

Material: Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir province, 2010: 30.06 – 4♂♂, 01.07 – 1♂, 03.07 – 1♂; Beşevler, Bursa prov.: 1♂, 20.07.2010. Collected under stones.
General Distribution: Mediterranean, introduced in Belgium.

Heliophanus equester L. Koch, 1867

Material: Kadiyayla, Uludağ mountain, Bursa province, 1♂, 15.07.2007; around Doğanca dam, Nilüfer, Bursa prov., 1♀, 16.05.2010; Dağakça village, Osmangazi, Bursa prov., 1♂, 11.07.2010. Collected under stones or on vegetation.

General Distribution: Africa: Libya; Asia: Armenia, Azerbaijan, Iran, Israel, Turkey, Europe: Bosnia and Herzegovina, Croatia, Dalmatia, France, Greece, Corfu, Egean Islands, Hertzegovina, Italy, Sizily, Spain, Switzerland, Russia.

Heliophanus lineiventris Simon, 1868

Material: Yiğitalı village, Osmangazi, Bursa province, 1♂, 23.04.2006. Collected on the ground.

General Distribution: Asia: Armenia, China, Kazakhstan, Korea, Mongolia, Russia, Turkey; Europe.

Heliophanus melinus L. Koch, 1867

Material: Söğüt area, Aşağıdanışment village, Savaştepe, Balıkesir province, 1♂, 15.05.2010; Dağakça village, Osmangazi, Bursa

Table 1. The list of localities where the spiders have been collected in the study area.

No	Localities	Coordinates	Altitudes
1	Aşağıdanışment village, Savaştepe, Balıkesir province	39° 22' 34N, 27° 42' 51E	530 m
2	Around the Baraklı Pond, Keles, Bursa province	39° 58' 35N, 29° 17' 20E	1271 m
3	Beşevler, Bursa province	40° 12' 30N, 28° 57' 44E	138 m
4	Bursa province	40° 12' 03N, 29° 02' 55E	126 m
5	Dağakça village, Osmangazi, Bursa province	40° 04' 20N, 28° 59' 53E	412 m
6	Dingiller village, Akhisar, Manisa province	39° 00' 06N, 27° 52' 22E	141 m
7	Around the Doğanca dam, Nilüfer, Bursa province	40° 05' 20N, 28° 56' 06E	384 m
8	Erenler village, Orhaneli, Bursa province	40° 02' 47N, 28° 54' 06E	599 m
9	Around the Göynükbelen village, Orhaneli, Bursa province	39° 59' 09N, 29° 02' 35E	900 m
10	Gümüštepe village, Nilüfer, Bursa province	40° 10' 53N, 28° 58' 31E	153 m
11	Innik area, Aşağıdanışment village, Savaştepe, Balıkesir province	39° 22' 01N, 27° 41' 32E	458 m
12	Kadıryayla, Uludağ mountain, Bursa province	40° 09' 01N, 29° 05' 19E	1233 m
13	Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir province	39° 22' 17N, 27° 42' 01E	475 m
14	Kozluören village, Inegöl, Bursa province	40° 07' 43N, 29° 21' 17E	480 m
15	Kirazlıyayla, Uludağ Mountein, Bursa province	40° 06' 50N, 29° 05' 25E	1522 m
16	About 3 km to National Park, Uludağ Mountein, Bursa province		850 m
17	Osmangazi, Bursa province	40° 17' 20N, 29° 02' 57E	113 m
18	Sadağı Canyon, Orhaneli, Bursa province	39° 52' 96N, 28° 55' 49E	443 m
19	Söğüt area, Aşağıdanışment village, Savaştepe, Balıkesir province	39° 21' 12N, 27° 41' 40E	429 m
20	Sultaniye village, Osmangazi, Bursa province	40° 04' 51N, 29° 01' 17E	834 m
21	Şeytan Sofrası road, Ayvalık, Balıkesir province	39° 17' 09N, 26° 38' 31E	89 m
22	Uludağ Mountein, Bursa province	Unknown locality	
23	Uludağ university campus, Görükle; Bursa province	40° 13' 21N, 28° 51' 56E	107 m
24	Yiğitali village, Osmangazi, Bursa province	40° 10' 10N, 29° 01' 17E	660 m

prov., 1♂, 16.05.2010. Collected under stones.

General Distrubution: Palearctic

***Heliophanus tribulosus* Simon, 1868**

Material: Aşağıdanışment village, Savaştepe, Balıkesir province, 1♂, 02.07.2010. Collected on garden plants.

General Distrubution: Asia: Afghanistan, Azerbaijan, China, Georgia, Syria, Turkey; Europe.

***Menemerus semilimbatus* (Hahn, 1829)**

Material: Uludağ Mountein, Bursa province: 1♀, 2006; Beşevler, Bursa prov., 1♂, 10.05.2010; 1♂, 06.07.2010; ; Uludağ university campus, Bursa prov., 1♂ 18.06.2010;

Dingiller village, Akhisar, Manisa prov., 1♀, 18.04.2010; Uludağ university campus, Görükle; Bursa prov., 1♀, 18.06.2010 Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir prov., 1♂, 30.06.2010; Aşağıdanışment village, Savaştepe,

Balıkesir prov., 1♂, 02.07.2010; Dingiller village, Akhisar, Manisa prov., 1♂, 08.07.2010 ; Dingiller village, Akhisar, Manisa prov., 1♂, 25.07.2010. Collected under stones.

General Distrubution: West Palearctic, Afrotropic, Argentina, USA.

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

Material: Sultaniye village, Osmangazi, Bursa province, 1♀, 03.06.2006; Uludağ Mountein, Bursa prov. 1♂, 2006; Dağakça village, Osmangazi, Bursa prov., 4♀♀, 4♂♂, 16.05.2010; Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir prov., 2010: 1♀, 29.06; 1♂, 01.07; 1♀, 03.07; 1♂, 05.07; Şeytan Sofrası road, Ayvalık, Balıkesir prov., 1♀, 20.05.2010; Şeytan Sofrası road, Ayvalık, Balıkesir prov., 1♀, 22.05.2010. Collected under stones or on the ground.

General Distrubution: Palearctic.

***Phlegra fasciata* (Hahn, 1826)**

Material: Around the Göynükbelen village, Orhaneli, Bursa province, 1♀, 1♂, 07.05. 2010; Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir prov., 1♀, 03.07.2010. Collected under stones.

General Distribution: Asia: Afganistan, Azerbaijan, China, Georgia, Iran, Kazakhstan, Kyrgyzstan, Mongolia, South Korea, Turkey, Turkmenistan; Europe.

***Plexippus paykulli* (Audouin, 1826)**

Material: Bursa province, 1♀, 25.07.2010. Collected on the ground.

General Distribution: Cosmopolitan.

***Pseudeuphrys obsoleta* (Simon, 1868)**

Material: About 3 km to National Park, Uludağ Mountain, Bursa province, 2♂♂, 23.04.2006; Kirazlıyayla, Uludağ Mountain, Bursa prov., 1♂, 23.04.2006; Erenler village, Orhaneli, Bursa prov., 1♀, 13.07.2006; Around Baraklı Pond, Keles, Bursa prov., 1♂, 07.05.2007; Gümüštepe village, Nilüfer, Bursa prov., 1♀, 10.05.2007. Collected under stones or on the ground.

General Distribution: Asia: Azerbaijan, China, Kazakhstan, Turkestan, Turkey; Europe.

***Saitis taurica* Prószyński, 1905**

Material: Osmangazi, Bursa province, 1♂, 07.05.2007; Sadağı Canyon, Orhaneli, Bursa prov., 2♀♀, 1♂, 02.06.2008; Kaymak area, Aşağıdanışment village, Savaştepe, Balıkesir prov., 5♀♀, 30.06.2010; 1♀, 03.07.2010; İnnik area, Aşağıdanışment village, Savaştepe, Balıkesir prov., 1♂, 01.07.2010. Collected under stones or on the ground.

General Distribution: Asia: Turkey; Europe: Bulgaria, Greece, Egean Islans, FYRMacedonia Republic, Russia, Ukraine.

Comments

In this study, the family Salticidae is represented from Northwest Anatolia (Turkey) by 13 species of 10 genera. Besides, new faunistic records of Salticidae have been given for the species found in Marmara Region. The most common and abundant spiders was *P. chrysops*. *H. lineiventris*, *H. tribulosus*, *P. paykulli* were rare spiders among the collected salticids.

So far, the species of *A. epiblemoides* has been recorded from Mediterranean region in Turkey

(TOPÇU *et al.* 2005). In this study, we add new locality to the distribution range of species in Balıkesir province of Marmara Region but it is likely to be more widespread. All specimens were taken from *Pinus nigra*. In addition, *A. epiblemoides* is as yet known only from Turkey from Asia countries (METZNER 2011, PRÓSZYŃSKI, 2011). *C. algerina* is widespread in Mediterranean region, E Africa, the Near East, Central and SE Asia (WESOŁOWSKA 1996). *C. algerina* was reported from Turkey by first Turkish author KAYA, UĞURTAŞ (2007) in Terzioğlu Island from Marmara region. Our specimens were found in Bursa province from Marmara region. It is likely to be more widespread in Turkey. The distribution area of *H. lineiventris* covers Central Anatolia, East Anatolia and Mediterranean Regions (BAYRAM 2002, TOPÇU *et al.* 2005). In this study, new locality from Bursa province was added to the currently known distribution range of *H. lineiventris*. Only one male specimen of *H. lineiventris* was collected. *H. lineiventris* is widespread to Middle and South Europe, it was earlier found from some Asian countries but the species is likely to be more widespread in Turkey and Asia (BAYRAM 2002, LOGUNOV 1992; METZNER 2011, RAKOV, LOGUNOV 1996, PRÓSZYŃSKI 2011, TOPÇU *et al.* 2005).

The species of *P. paykulli* has been recorded from Aegean Region, Mediterranean Region (BAYRAM 2002, TOPÇU *et al.* 2005). New locality from Bursa province was added to the currently known distribution range of *P. paykulli* but only one female specimen from this species was found on the ground this area. *P. paykulli* is a widespread pantropical species (PRÓSZYŃSKI 2003).

H. equester and *P. obsoleta* were collected not only from high altitudes but also from low altitudes. The species of *P. obsoleta* has been recorded from Mediterranean Region (TOPÇU *et al.* 2005). We add new locality to the distribution range of species in Bursa Province of Marmara Region in Turkey. In addition, the species has been known Azerbaijan; China; Kazakhstan; Turkestan; Turkey but it is likely to be more widespread in Turkey and Asian countries. *H. equester* was earlier found from Aegean, Marmara and Central Anatolia Region in Turkey. In addition, the species has been known in Armenia, Azarbaijan, Iran, Isreal and Turkey from Asia (BAYRAM 2002, LOGUNOV *et al.* 2002, for 2001, PRÓSZYŃSKI 2011, TOPÇU *et al.* 2005).

In Asian countries, *E. jucunda* has been only known from Turkey and Syria. However the species is likely to be

more widespread Asia. *S. taurica* has been known from Europe only. However we reported it Turkey's Asian part (Balıkesir, Bursa province) so the species is likely be more widespread in Turkey and Asian countries.

The most species rich salticid genera in Turkey were *Heliophanus* and *Philaeus* is represented by a single widespread species *P. chrysops*.

Acknowledgments: We wish to thank Dr Christo Deltshv (Sofia, Bulgaria), Dr Dmitri Logunov (Manchester, UK) Dr Jerzy Prószyński (Warszawa, Poland) for identification suggestions. Dr Galina Azarkina (Novosibirsk, Russia), Dr Ioan Duma (Timișoara, Romania), Dr Maria Chatzaki (Irakleio, Greece), Marjan Komnenov (Skopje, FYRMacedonia), Dr Tarık Danişman (Kırıkkale, Turkey), Dr Victor Fet (West Virginia, USA) were of the great help in the providing literature. Dr Dmitri Logunov is also thanked for his comments and help with English.

References

- BAYRAM A. 2002. Türkiye Örümcekleri Tür Listesi ve Yayılışı. 'Genel ve Türkiye Zoocoğrafyası, Hayvan Coğrafyası. Edit. Demirsoy, A' Meteksan yayınları, Ankara, 1005.
- BAYRAM A., S. ÖZDAĞ, R. KAYA 2002. New spider [Araneae] records for Turkey: *Hyptiotes paradoxus* (Koch C. L., 1834) [Uloboridae], *Diaea pictilis* (Banks, 1896) [Thomisidae], *Alopecosa fabrilis* (Clerck, 1757) [Lycosidae] and *Evarcha arcuata* (Clerck, 1757) [Salticidae]. – *Israel Journal of Zoology*, **48**: 250-251.
- BAYRAM A., K.B. KUNT, T. DANIŞMAN 2010. The Checklist of the Spiders of Turkey (Araneae; Arachnida, version 10.10. <http://www.spidersofturkey.com/home.php>
- BLAGOEV, G., C DELCHEV, S. LAZAROV 2008. The Spiders (Araneae) of Bulgaria. Online at <http://www.cl.bas.bg/bulgarianspiders/toc.htm>.
- BOSMANS R., M. CHATZAKI 2005. A catalogue of the spiders of Greece. A critical review of all spider species cited from Greece with their localities. – *Arachnological Contributions. Newsletter of the Belgian Arachnological Society*, **20** (2, supplement): 1-124.
- DANILOV S. N., D.V. LOGUNOV 1993. Faunistic review of the jumping spiders of Transbaikalia (Aranei Salticidae). – *Arthropoda Selecta*, **2** (4): 25-39.
- DELTSHEV C., G. BLAGOEV 2001. A critical checklist of Bulgarian spiders (Araneae). – *Bulletin of the British Arachnological Society*, **12** (3): 110-138.
- DELTSHEV C., B. P. M. ČURČIĆ, G. BLAGOEV 2003. The Spiders of Serbia. Belgrade – Sofia, Institute of Zoology Monographs, **7**, 833 p.
- FUHN, I. E., V. F. GHERASIM 1995. *Familia Salticidae*. Fauna Romaniei, Arachnida **5** (5): 1-301 (Bucuresti, Ed. Acad. Roman.).
- KAYA R. S., İ. H. UĞURTAŞ 2007. A faunistic study on spiders (Araneae) of Terzioğlu, Island (Uluabat Lake, Bursa). – *Journal of Biological and Environmental Sciences*, **1**: 31-36.
- KOMNENOV M. 2006. New data on jumping spiders in the Republic of Macedonia with a complete checklist (Araneae: Salticidae). – *Acta zoologica bulgarica*, Suppl. **1**: 301-314.
- LOGUNOV D. V. 1992. The spider family Salticidae (Araneae) from Tuva. II. An annotated list of species. – *Arthropoda Selecta*, Moscow **1**(2): 47-71.
- LOGUNOV D. V. 1998. *Pseudoeuphrys* is valid genus of the jumping spiders (Araneae, Salticidae). – *Revue Arachnologique*, **12** (11): 109-128.
- LOGUNOV D. V. 2001. New and poorly nown species of the jumping spiders (Aranei: Salticidae) from Afghanistan, Iran and. – *Arthropoda Selecta*, **10** (1): 59-66.
- LOGUNOV D. V. 2007. A new species of the genus *Pseudicius* SIMON, 1885 (Araneae: Salticidae) from SW Iran. – *Acta Arachnologica*, **56** (1): 21-23.
- LOGUNOV D.V. 2009. New and poorly known species of Salticidae (Araneae) from Turkey and Iran. *Contrib. nat. Hist.* **12**: 899-919.
- LOGUNOV D. V., YU. M. MARUSIK, F. MOZAFFARIAN (2002; for 2001): Faunistic review of the jumping spiders of Iran (Aranei: Salticidae). – *Arthropoda Selecta*, **10** (2): 155-167.
- LOGUNOV D. V., M. CHATZAKI 2003. An annotated check-list of the Salticidae (Araneae) of Crete, Greece. – *Revista Iberica de Arachnologia*, **7**: 95-100.
- LOGUNOV D. V., M. ZAMANPOORE 2005. Salticidae (Araneae) of Afghanistan: an annotated check-list, with descriptions of four new species and three new synonymies. – *Bull. Br. arachnol. Soc.*, **13**: 217-232.
- LOGUNOV D. V., B. VAZIRIANZADEH, S. A. MORAVVEJ, S. NAVIDPOUR 2006. New faunistic records of the jumping and crab spiders (Aranei: Salticidae, Thomisidae and Philodromidae) from Iran. – *Arthropoda Selecta*, **15** (3): 225-228.
- METZNER H. 2011 Worldwide database of jumping spiders (Arachnida, Araneae, Salticidae). Online at <http://www.jumping-spiders.com/index.php>
- MIKHAILOV K. G., V. FET 1994. Fauna and Zoogeography of spiders (Aranei) of Turkmenistan. Biogeography and Ecology of Turkmenistan. Kluwer academic Publishers, 499-524.
- NENTWIG W., T. BLICK, D. GLOOR, A. HANGGI, C. KROPF 2011. Araneae Spinnen Europas. An internet identification key. <http://www.araneae.unibe.ch/> Version 6.2011
- PLATNICK N.I. 2011. The world spider catalog, version 11.5 American Museum of Natural History, online at <http://research.amnh.org/iz/spiders/catalog/>.
- PRÓSZYŃSKI J. 2003. Salticidae (Araneae) of the Levant. – *Annales zoologici*, Polska Akademia Nauk, **53** (1): 1-180.
- PRÓSZYŃSKI J. 2008. Salticidae (Araneae) of selected countries ckecklists, keys to genera and diagnostic drawings. Online at <http://www.miiz.waw.pl/research/spiders/checklist/0-0-salticidae-selected-countries-main.htm>.
- PRÓSZYŃSKI J. 2011. Global Species Database of Salticidae (Araneae) Version January 10th, 2011 Online at. <http://www.gsd-salt.miiz.waw.pl/salticidae.php>.
- RAKOV S. YU., D. V. LOGUNOV 1996. A critical review of the genus *Heliophanus* C. L. Koch, 1833, of Middle Asia and Caucasus (Aranei Salticidae). – *Arthropoda Selecta*, **5** (3/4): 67-104.
- RAKOV S. YU., D. V. LOGUNOV 1997. Taxonomic notes on the genus *Menemerus* SIMON, 1868 in the fauna of Middle

- Asia (Araneae, Salticidae). – *Proc. 16th Europ. Coll. Arachnol.*, 271-279.
- ROBERTS M. J. 1995. Spiders of Britain and Northern Europe. Harper Collins Publishers, London, 383 p.
- SAHRA G. 2006. Renewed Checklist of spiders (Aranei) of Iran. – *Pakistan Journal of Biological Sciences*, **9** (10): 1839-1851.
- TROTTA A. 2005. Introduzione al ragni italiani (Arachnida Araneae). – *Memorie Soc. entomol. ital.*, **83**: 3-178.
- TOPÇU A., H. DEMİR, O. SEYYAR 2005. A Checklist of the spiders of Turkey. – *Serket* **9** (4): 109-140.
- WESOŁOWSKA W. 1996. New data on the jumping spiders of Turkmenistan (Aranei Salticidae). – *Arthropoda Selecta*, **5** (1/2): 17-53.
- WUNDERLICH J. 2008. Identification key to the European genera of the jumping spiders (Araneae: Salticidae). – *Beithr Araneol.*, **5**: 698-719.

Received: 14.12.2011

Accepted: 18.04.2012