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LATRODECTUS TREDECIMGUTTATUS (ROSSI, 1790) (ARANEAE: THERIDIIDAE) IN ROMANIA. DISTRIBUTION AND ECOLOGY

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Abstract. Specimens belonging to *Latrodectus tredecimguttatus* (Rossi, 1790), the black widow spider, were first time collected in Romania, in 1961, from the Danube Delta (C. A. Rosetti) (Vintilă et al., 1963). Since then, this species was recorded only twice, at Popina Island (South of the Danube Delta) (Fuhn, 1966) in 1965, and at Periprava, in 1968 (Fuhn & Oltean, 1970). I record this species after almost 40 years since its last mention. This is also the first record of *L. tredecimguttatus* from the Black Sea coast, South of Constanța.

Résumé. En 1961, on a collecté, pour la première fois en Roumanie, des exemplaires de l'espèce, *Latrodectus tredecimguttatus* (Rossi, 1790), la veuve noire, dans la localité C. A. Rosetti (au Delta du Danube) (Vintilă et al., 1963). Des lors, on a collecté des exemplaires de la même espèce seulement deux fois: en 1965 sur l'île Popina (au sud du Delta du Danube) (Fuhn, 1966) et en 1968 dans la localité Periprava (au nord-est du Delta du Danube) (Fuhn & Oltean, 1970). Dans cette étude, nous signalons de nouveau, après 40 ans, la présence de cette espèce dans la faune de la Roumanie, pour la première fois au sud de Constanța.

Key words: *Latrodectus tredecimguttatus*, ecology, distribution, Romania.

INTRODUCTION

The black widow spider was mentioned for the first time in the Romanian literature by Vintilă et al. (1963), near C. A. Rosetti locality, in the Danube Delta. Later, in 1966, the species was mentioned on the island of Popina (Fuhn, 1966). The last individual was captured in 1968, in the Danube Delta, near Periprava settlement (Fuhn & Oltean, 1970).

During the summer of 2004 (1st of July – 17th of September), I studied the spider fauna from South Romania. The total number of collected spiders was of 735 from which 384 were from Dobrogea. Among them, three individuals were identified as *Latrodectus tredecimguttatus* (Rossi, 1790): two were adults (male and female caught in the same nest) and one was a juvenile male. The species represented 0.78 % from the total of 384 specimens caught in Dobrogea.

I studied the feeding behavior in the specimens I collected. My observations are according to Hódar & Sánchez-Piñero (2002). *In situ*, the specimens of *L. tredecimguttatus* build a trap web always close to the ground in low vegetation. They capture mainly ground dwelling invertebrates and in rare occasions small vertebrates (small lizards), as it is shown by Hódar & Sánchez-Piñero (op. cit.). The predation is not active (the species is not pursuing the prey), but passive. *L. tredecimguttatus* is a generalist and feeds on almost everything that can catch in the net. Hódar & Sánchez-Piñero (op. cit.) mentioned a passive selection for this species based on prey size. On one side, the smaller invertebrates avoid the sticky threads of the web. On the other side, larger animals may destroy the web. Therefore, the majority of the prey is of medium size (between 12.5 to 22.5 mm long) (Hódar & Sánchez-Piñero, op. cit.).

The knowledge of ecology and geographical distribution of black widow spider has a practical importance because the bite of this spider is very dangerous or even lethal to humans. Based on several ecological parameters at the collection sites, I present the hypothesis that this species may spread in other locations from the southern part of Romania.

MATERIAL AND METHOD

The period of material gathering in Dobrogea lasted from 6 until 17th of July 2004. The black widow spider specimens were recorded during collecting campaign, including the following localities on the Black Sea shore: Histria, Agigea, Eforie Nord, Eforie Sud, Techirghiol, North of 2 Mai resort, and Hagieni forest. The methods used for catching the spiders were: with Barber traps filled with 60% alcohol, by hand and with the entomological net. All *L. tredecimguttatus* specimens were captured by hand during the careful search of the grassy vegetation. *L. tredecimguttatus* specimens were deposited at the “Grigore Antipa” National Museum of Natural History from Bucharest. The specimens were measured with a technical micrometer under the stereomicroscope. The adult individuals of *L. tredecimguttatus* were kept alive in a terrarium 40/30/25 cm (H/L/l) from the 12 July to 27 August 2004 for observations on feeding behavior. The spiders were fed with locusts, beetles and ants.

The specimens were kept in 60% alcohol for further identification. In some cases I mapped the route and the location of collecting places with a Magellan 310 GPS unit.

RESULTS AND DISCUSSIONS

Table 1 presents the list of spider families, and the number of species and specimens by family that were recorded during the Black Sea shore collecting campaign.

The *Latrodectus tredecimguttatus* specimens were collected in the following localities:

- Eforie Sud: on the narrow strip of sand that separates the Black Sea from the Techirghiol Lake at the northern end of Eforie Sud resort; one juvenile male – 9th of July 2004;

- Agigea: under the rocky abrupt shore, at about 0.8 km from the “I. Borcea” Marine Research Center; adult female and male in the same nest, lat. 44°04'58''N / long. 28°38'28''E – 12th of July 2004.

Table 1

The gathered spiders along the Dobrogea seashore.

Family	Number of species	Number of specimens	Family	Number of species	Number of specimens
1. Dysderidae	1	16	8. Clubionidae	7	28
2. Zodariidae	1	7	9. Thomisidae	20	41
3. Theridiidae	9	21	10. Salticidae	15	32
4. Linyphiidae	12	38	11. Gnaphosidae	4	34
5. Tetragnathidae	1	9	12. Araneidae	16	64
6. Agelenidae	1	12	13. Eresidae	1	2
7. Lycosidae	9	79	14. Pholcidae	1	1
Total species: 98		Total of collected individuals: 384			

Description of the male (Fig. 1 A)

Dimension: the male is much smaller than the female. Its total length is 4.48 mm from which the *carapace* is 1.84 mm long and 1.69 mm wide.

Carapace: dark-brown almost black, on the dorsal and ventral side and it is covered with small dark hairs. *Clypeus*: grayish-brown. *Chelicerae*: small and of brown color.

Table 2

The measurements of the segments of legs from the male *Latrodectus tredecimguttatus*.

Leg	Coxa	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total length
I	0.66	0.32	5.31	0.87	3.67	4.68	1.61	17.12
II	0.57	0.20	2.60	0.66	1.92	2.95	1.04	9.94
III	0.41	0.18	2.21	0.37	1.44	1.86	0.87	7.34
IV	0.66	0.22	4.99	0.63	2.96	3.82	1.40	14.68

Abdomen: 2.64 mm long and 1.22 mm wide; dark brown with 13 more or less circular white-bordered red spots on the dorsal side. The spots are arranged in three rows: one median with five spots and two on each side with only four spots. There is a white semi lunar stripe at the anterior part of the abdomen. The ventral part of the abdomen is completely black.

Legs: reddish-brown, darker at the joints between the segments. For the measurements of legs see table 2.

Pedipalpus. The *patella*, *tibia* and *cymbium* are reddish-brown furnished with rare small dark hairs. *Cymbium* is relatively small compared with the genital bulb. The *embolus* is easily distinguished. It is coiled like a spring, having four loops. The fourth loop of the *embolus* is placed between the second and the third loop.

Description of the female (Fig. 1 B)

Dimension: total length 10.41 mm.

Carapace: 4.84 mm long and 4.51 mm wide; covered with small black hairs uniformly distributed. The sternum is dark-brown with rare black hairs.

Abdomen: 5.57 mm long and 4.71 mm wide; dorsal side is black with five irregular white spots. On the ventral side the abdomen is completely black, only the respiratory openings are yellow. The white spots on the abdomen are perhaps rests of the initial coloration, which in the early stages of life of *L. tredecimguttatus* may be very similar to males. Adult females are completely black. Between the juvenile stage and the adult stage the females may have various color patterns that change with every molting stage.

Legs: completely black and much longer than in male. The measurements of segments from the female's legs are presented in the table 3.

Table 3

The measurements of the legs segments from the female of *Latrodectus tredecimguttatus*.

Leg	Coxa	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total length
I	1.35	0.38	5.53	1.40	3.91	5.49	2.02	20.08
II	1.16	0.43	3.29	1.44	2.31	3.76	1.34	13.73
III	0.89	0.54	2.92	1.07	1.55	2.96	1.08	11.01
IV	1.40	1.02	5.25	1.40	3.74	5.52	1.75	20.08

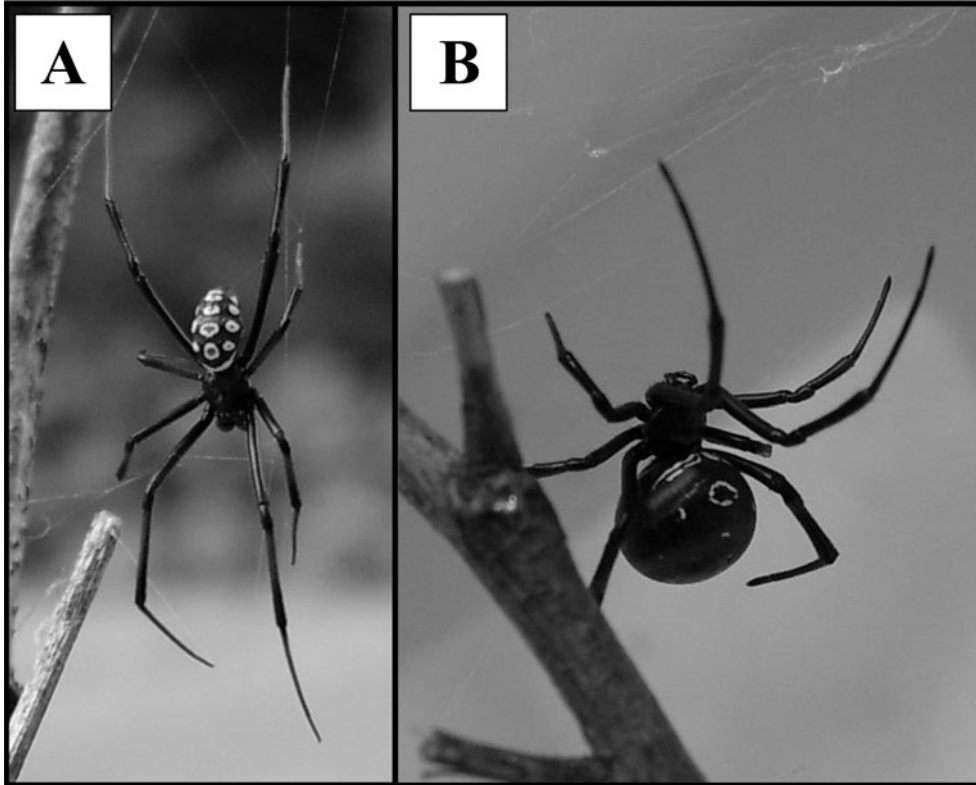


Fig. 1 – *Latrodectus tredecimguttatus* (Rossi, 1790): A, male; B, female. (photo by Ioan Duma)

Discussion on ecology and distribution of Latrodectus tredecimguttatus.

L. tredecimguttatus is usually found in open field with rare grassy vegetation. The density of individuals decreases in places with forests or bushy terrain. From my observations, I confirm the results of Hódar & Sánchez-Piñero (op. cit.) that *L. tredecimguttatus* is a generalist species. Specimens I studied captured mainly beetles of medium size: between 10 and 18 mm long.

L. tredecimguttatus is a species with a wide distribution: it is found from the Mediterranean area to the western borders of China in Asia (Platnik, 2006). Among the collecting sites I may cite Zaragoza in Spain (Garb et al., 2004; Melic, 2000), the Black Sea coast of Bulgaria (Deltshev, 1992), Sayeret Shaaed in Israel (Garb et al., op. cit.), Mangistau in southwest Kazakhstan (<http://news.co.uk/2/hi/asia-pacific/3857927stmdate>), Dhelal-Abad from Kyrgystan (Siberian Zoological Museum online at: <http://szmn.sbras.ru/index.html>).

Among the listed localities those from Spain and Israel have a warm Mediterranean climate. In Bulgaria the climate has pronounced Mediterranean influences and somewhat close to the climate in the southern parts of Romania. The warm regions of Kazakhstan and Kyrgyzstan, situated at approximate same latitude as Constanța and Bucharest (lat 44°N), are of great interest because they are found in the most northern part of the species distribution. In addition, they have the same climate as in Romania: temperate continental with warm influences from the

southern regions. More precisely, they have a medium annual temperature of about 11°C, a medium temperature in January of about -2 to -4°C and an average rainfall less than 400 mm per year (http://www.wild-natures.com/gallery_maps.html).

All the cited regions, although different regarding the medium annual temperatures, have a low amount of precipitations and a high rate of evaporation. In other words, they all are arid or semiarid areas. This shows that the *L. tredecimguttatus* may be a xerophile species and that the precipitations and the evaporation rate are very important abiotic factors that may limit the species distribution.

Trabajev (1990) found that the species can survive in areas with quite cold winters. However, the medium monthly temperatures in winter lower than -4°C and the long lasting colds combined with late frosts may negatively affect the species. Until now the black widow was documented for Romania only in Dobrogea along the Black Sea shore. This region of Romania has a warmer climate (medium temperatures in January of 0 to -2°C) and it's more arid (annual medium rainfall less than 400 mm) comparatively to the rest of the country. However the specimens mentioned for Kazakhstan are from a region with a lower monthly average temperature in January (Trabajev, op. cit.). This indicates that we should expect black widow to occur in other parts of Romania as well (at least other locations in the southern part of Romania). Medium temperatures in January of -2 to -4°C can be found in many regions of Romania: Southern Moldova, Muntenia, Oltenia, all western part of Romania. Although all the regions cited above have the medium annual temperature between 10 and 11°C (***) (1966) and medium temperatures in January (the coldest month of the year) within the limits supportable by the species accordingly to Trabajev, there are considerable differences regarding the medium rainfall per year.

From the above-cited localities for *L. tredecimguttatus* in Romania, I infer that this species can be found in arid areas that get between 500 and 400 mm rainfall per year or less. The maps of medium rainfall for Romania (***) (1966) shows that eastern part of Dobrogea and eastern parts of Muntenia (Bărăgan, near Great Island of Brăila and Balta Ialomitei Island) are the most arid areas from Romania with less than 400 mm rainfall annually. The rest of Dobrogea, southern part of Moldova, Muntenia (Bărăgan), and some southern parts of Oltenia get between 400 and 500 mm rainfall per year. The Banat region (south-western Romania) although has a warm climate with mild winters gets between 600-700 mm rainfall annually.

The specimens found by me have all the typical characteristics of the species.

The number of individuals documented for Romania is very low for inferring the distribution of this species in our country. In addition, all specimens were collected from a very restricted area of Romania: the Danube Delta and the Black Sea Shore. This indicates the rarity of this species in Romania and/or deficiencies in the collecting effort.

Considering the environmental factors discussed here, I conclude that the region near Razelm-Sinoe lagoon presents most appropriate conditions for the black widow spider. It follows the Danube Delta and the Black Sea shore. Other regions that have the same climatic parameters as in the places where black widow spider was collected are the eastern part of Muntenia (Bărăgan, Great Island of Brăila and Balta Ialomitei Island). With approximately same conditions but with more rain and colder winters there are: southern Moldova, southern and south-eastern Muntenia, and southern Oltenia.

L. tredecimguttatus may change its area given proper environmental parameters. Throughout the 20th century in Romania three major periods of drought were recorded. It was observed that these periods of drought are becoming much wider as extension in time. Also the year 2000 was the driest in the last century. The rain deficit was with 33.4% less than the normal rainfall (<http://www.inmh.ro/index.php?id=29>). The drought was amplified in the southern part of Romania. Looking at the most hottest and driest years recorded and at the years when the *L. tredecimguttatus* was caught it can be seen that there is a direct correlation. It can be also possible that this species may spread in adjacent regions given temporary favorable environmental parameters. The *L. tredecimguttatus* population responds directly to the environment conditions through a feed-back mechanism. Favorable conditions lead to an increase of population and so the probability of catching an individual is greater. On the other hand, during unfavorable years the density of individuals decreases. In addition, if the climatic conditions are not favorable for successive years, the species does not disappear because there are areas in Romania that are warm and dry enough to offer the right conditions for species survival.

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LATRODECTUS TREDECIMGUTTATUS (ROSSI, 1790) (ARANEAE: THERIDIIDAE) ÎN ROMÂNIA. RĂSPÂNDIRE ȘI ECOLOGIE

REZUMAT

Exemplare aparținând speciei *Latrodectus tredecimguttatus* (Rossi, 1790), văduva neagră, au fost colectate pentru prima dată în România în anul 1961, în localitatea C. A. Rosetti din Delta Dunării (Vintilă et al., 1963). De atunci au mai fost colectate exemplare aparținând acestei specii doar de două ori: în 1965 în Insula Popina (sudul Deltei Dunării) (Fuhn, 1966) și în 1968 în localitatea Periprava (nord-estul Deltei Dunării) (Fuhn & Oltean, 1970). În această lucrare, după o perioadă de aproape 40 de ani, semnalăm din nou prezența acestei specii în fauna României, însă localitățile de colectare sunt situate de data aceasta la sud față de orașul Constanța.

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