E.Ü. Su Ürünleri Dergisi 2006
E.U. Journal of Fisheries & Aquatic Sciences 2006
Cilt/Volume 23, Sayı/Issue (1-2): 181–183

ISSN 1300 - 1590
http://jfas.ege.edu.tr/

Araştırma Notu / Research Note

A New Locality for *Rana ridibunda caralitana* Arıkan, 1988 (Anura: Ranidae) in the Central Anatolia

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Özet: *Orta Anadolu'da* **Rana ridibunda caralitana** *Arıkan, 1988 için yeni bir lokalite.* Bu çalışmada, Bor (Niğde)'dan toplanan 18 (10 ♂♂, 8 ♀♀) ergin ova kurbağası örneği, başta renk-desen olmak üzere yapılan morfolojik analiz sonucunda incelenmiştir. İncelenen örneklerin *caralitana* formuna ait olduğu anlaşılmıştır. Böylece *caralitana*'nın dağılış areali genişletilmiştir.

Anahtar Kelimeler: *Rana ridibunda caralitana*, taxonomi, morfoloji, dağılış.

Abstract: In this study, a total of 18 (10 ♂♂, 8 ♀♀) adult marsh frog specimens collected from Bor (Niğde) have been examined through the morphological analysis, primarily on their coloration and pattern characteristics. It is concluded that the examined specimens fall into *caralitana* category. Thus, the distrubution area of *caralitana* has been extended.

Key Words: *Rana ridibunda caralitana*, taxonomy, morphology, distribution range.

Introduction

Rana ridibunda, considered a monotypical species until recent years, was first decribed by Pallas from Atyrau (Western Kazakhistan) (Terratypica-restricta). The species circulates in central and South Europe, North Africa and West Asia.

Lake frogs in Greece, formerly classified as *R. ridibunda*, have recently been reclassified as three species *R. ridibunda*, *R. epeirotica* and *R. balcanica* (Schneider et al. 1984; Schneider et al. 1993).

R. ridibunda is also widespread in Turkey. According to Bodenheimer (1944), Başoğlu and Özeti (1973), it is a homogenous species in Turkey. Although Bodenheimer (1944) has recorded specimens with orange coloured venters from Beyşehir Lake they are accepted without a detailed investigation as traits belonging to the nominate subspecies. Based on some morphological and coloration properties, Arıkan (1988) described the Beyşehir population as *R. r. caralitana*. Later, the same subspecies was reported from Lake Eğirdir and Lake Suğla, tributaries of the Çarşamba, and also from Gölcük (Isparta), Çivril (Denizli) in the west, outskirts of the Taurus Mountains in the south, the vicinity of İvriz-Ereğli (Konya), Kırkgöz (Antalya), Taşkesiği (Korkuteli/Antalya), Girdev Plataeu (Elmalı/Antalya), Lake Gencek (Derebucak/Konya), Derebucak (Konya) and Tınaztepe (Seydişehir/Konya) in the east, vicinity of Yağmapınar (Karapınar/Konya) in the north-east (Atatür et al. 1990; Arıkan et al. 1994, 1998; Budak et al. 2000, Kaya et al. 2002, Düşen et al. 2004; Tosunoğlu et al. 2005).

Water frogs in Southwest Asia, including Turkey, were described as *Rana levantina* by Schneider et al. (1992) using certain voice analysis methods. Beerli (1994) and Dubois and Ohler (1994), on the other hand, quoted the species as *R. bedriagae* taking the priority principle into consideration. Moreover, Sinsch and Schneider (1999) and Schneider and Sinsch (1999) carried out a series of studies in which they stated that the presence of this species in the moderate climate of the southern regions of Turkey was controversial and that *R. ridibunda* could inhabit these regions as well. Some other researchers (Beerli 1994; Jdeidi et al. 1998, 2001), on the other hand, reported that *R. bedriagae* is the only species that lived in Anatolia. Jdeidi et al. (2001) extended the distribution of *caralitana* subspecies so as to encompass the Çardak-Denizli area and described it as a subspecies of *R. bedriagae*. They also reported that *caralitana* could be accepted as a separate subspecies on account of the fact that *caralitana* and its nominate subspecies coexisted in Akşehir and Çardak. Most recently, Plötner et al. (2001) stated that Anatolian marsh frogs do not represent *R. bedriagae* on the basis of mitocondrial DNA techniques.

In this study, specimens collected from Bor (Niğde) were evaluated taxonomically according to their morphological properties.

Materials and Methods

Our study was conducted on September 7 July 2005. We studied 18 adult (10 ♂♂, 8 ♀♀) specimens of *Rana ridibunda* which were collected from Bor (37° 54' N, 34° 30' E, 1100 m a.s.l.) (Figure 1). The material is now deposited in the Zoology Department, Ege University (ZDEU). The pattern and coloration characteristics were recorded from live specimens,

later the alcohol-formaldehyde fixed specimens (3 parts 40% formaldehyde + 7 parts 70% alcohol) were kept in 70% ethanol. The morphometrical measurements were taken with a digital caliper of 0.01 mm sensitivity.

Material: ZDEU 262/2005, 1-18; Bor, Niğde province, 07-07-2005, Leg.: D. Ayaz, M. Afsar, K. Çiçek

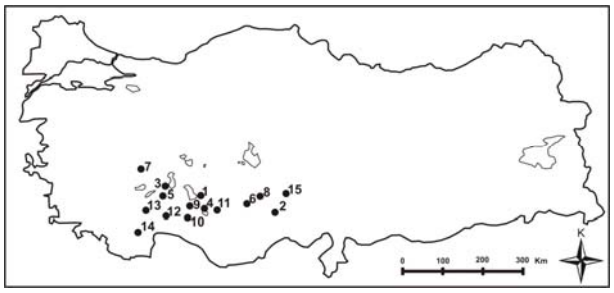


Figure 1. Current distribution area of *Rana ridibunda caralitana*: 1. Lake Beyşehir (its terra typica), 2. İvriz (Ereğli/Konya), 3. Lake Eğirdir, 4. Lake Suğla, 5. Lake Gölcük (İsparta), 6. Lake Hotamış, 7. Lake Işıklı and Çardak (Denizli), 8. Yağmapınar (Karapınar/Konya), 9. Lake Gencek (Derebucak/Konya), 10. Derebucak (Konya), 11. Tınaztepe (Seydişehir/Konya), 12. Kırkgöz (Antalya), 13. Taşkesiği (Korkuteli/Antalya) and 14. Girdev Plateau (Elmalı/Antalya), 15. Bor (Niğde)

Results and Discussions

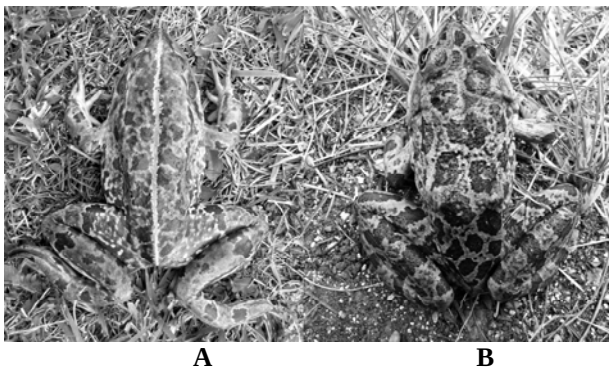
The samples used in this study were sexually mature. No difference between the sexes was observed in the investigated characteristics, so the data from both sexes were pooled. Morphometric measurements and some ratios derived from these measurements are given in Table 1.

In all the specimens examined, the ground coloration of the dorsum was in various hues of green and brown. The shape and size of the maculations in the dorsum varied. The ground coloration of the whole venter including the extremities and the head was off-white almost covered with orange maculations. The pattern types of the specimens of *R. ridibunda* from Bor (Niğde) are given in Table 2, Figure 2 (Dorsal A, B) and Figure 3 (Ventral A, B).

Subsequent studies (Atatür et al. 1990; Arıkan et al. 1994, 1998; Budak et al. 2000, Kaya et al. 2002, Düşen et al. 2004; Tosunoğlu et al. 2005) have extended the distribution area of *R. r. caralitana.* According to the morphological features, especially from the viewpoint of the pattern and coloration characteristics of their ventral, our specimens from Bor (Niğde) are almost identical with *R. r. caralitana* (Atatür et al. 1990; Arıkan et al. 1994, 1998; Budak et al. 2000, Kaya et al. 2002, Düşen et al. 2004; Tosunoğlu et al. 2005).

Table 1. Morphometric measurements (in millimeters) and ratios of the *R. ridibunda* material from Bor (Niğde) together with statistical data. N: number of specimens, M: mean; SD: standard deviations and SE: standard errors of the means, SVL: Snout-Vent Length, TL: Tibia Length, HL: Head Length, HW: Head Width, FTL: First Toe Length, MTL: Metatarsal Tubercle Length.

Characters	♂♂					♀♀					♂♂+♀♀				
	N	M	Range	SD	SE	N	M	Range	SD	SE	N	M	Range	SD	SE
SVL	10	76.70	70.62-85.63	4.975	1.573	8	82.06	73.61-95.48	7.201	2.546	18	79.08	70.62-95.48	6.478	1.527
TL	10	38.10	34.12-42.58	3.244	1.025	8	40.73	37.81-47.34	3.130	1.106	18	39.27	34.12-47.34	3.379	0.796
HL	10	25.87	23.88-28.77	1.492	0.471	8	27.14	25.07-31.25	2.014	0.712	18	26.43	23.88-31.25	1.809	0.426
HW	10	28.93	25.25-31.78	2.045	0.646	8	31.14	29.29-35.73	2.120	0.749	18	29.91	25.25-35.73	2.311	0.544
FTL	10	15.89	12.40-18.70	1.669	0.528	8	16.71	14.78-19.23	1.357	0.480	18	16.25	12.40-19.20	1.552	0.366
MTL	10	4.65	3.67-5.76	0.539	0.170	8	4.72	4.34-5.44	0.408	0.144	18	4.68	3.67-5.76	0.473	0.111
SVL/TL	10	2.01	1.91-2.26	0.101	0.032	8	2.01	1.89-2.09	0.059	0.021	18	2.01	1.89-2.26	0.083	0.020
SVL/HW	10	2.65	2.53-2.85	0.098	0.031	8	2.63	2.51-2.77	0.097	0.034	18	2.64	2.51-2.85	0.096	0.023
SVL/FTL	10	4.85	4.42-5.68	0.340	0.107	8	4.91	4.53-5.19	0.202	0.071	18	4.87	4.42-5.68	0.281	0.066
SVL/MTL	10	16.57	14.86-19.64	1.223	0.386	8	17.38	16.03-18.59	0.850	0.300	18	16.93	14.86-19.64	1.123	0.265
HL/HW	10	0.89	0.84-0.99	0.042	0.013	8	0.87	0.83-0.91	0.025	0.009	18	0.88	0.83-0.99	0.037	0.090
TL/MTL	10	8.21	7.38-9.29	0.571	0.180	8	8.63	8.01-8.92	0.286	0.101	18	8.40	7.38-9.39	0.501	0.118
FTL/MTL	10	3.42	2.82-4.08	0.318	0.100	8	3.54	3.24-3.94	0.214	0.076	18	3.47	2.82-4.08	0.276	0.065



A **B**

Figure 2: Dorsal (A, B) pattern types of the specimens of *Rana ridibunda* from Bor (Niğde) [(Horizontal bar 20 millimeters)]

A **B**

Figure 3: Ventral (A, B) pattern types of the specimens of *Rana ridibunda* from Bor (Niğde) [(Horizontal bar 20 millimeters)]

Table 2. Dorsal (A, B) and ventral (A, B) pattern types of *Rana ridibunda* specimens from Bor (Niğde), n: Number of specimens

Dorsal without a vertebral stripe (A) n: 6 (33.33%)	Dorsal with a vertebral stripe (B) n: 12 (66.67%)
Ventral maculation with small in spots (A) n: 4 (22.22%)	Ventral maculation in the shape vermiculate (B) n: 14 (77.78%)

Despite the studies (Beerli 1994; Jdeidi et al. 1998, 2001, Kaya et al. 2002, Düşen et al. 2004) that consider Anatolian marsh frogs as *R. bedriagae*, we are confident, as mentioned by Plötner et al. (2001) that more detailed studies should be done to explain the phylogenetic relations of Anatolian marsh frogs.

The present known distribution range of this subspecies has been extended to the easthern regions: Bor (Niğde) in addition to the known range of Lake Beyşehir (its terra typica), İvriz (Ereğli/Konya), Lake Eğirdir, Lake Suğla, Lake Gölcük (İsparta), Lake Hotamış, Lake Işıklı and Çardak (Denizli), Yağmapınar (Karapınar/Konya), Lake Gencek (Derebucak/Konya), Derebucak (Konya), Tınaztepe (Seydişehir/Konya), Kırkgöz (Antalya), Taşkesiği (Korkuteli/Antalya) and Girdev Plateau (Elmalı/Antalya) (Figure 1).

Acknowledgements

This study was supported by TÜBİTAK (The Scientific and Technical Research Council of Turkey) Project No: TBAG-2402 (103T189). We are indebted to TÜBİTAK for its financial support.

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