



ARASTIRMA MAKALESİ/RESEARCH ARTICLE

ON SPECIMENS of *RANA RIDIBUNDA* PALLAS, 1771 (Anura: Ranidae) COLLECTED FROM YAĞMAPINAR (Karapınar-Konya)

Murat TOSUNOĞLU, Dinçer AYZAZ¹, Bayram GÖÇMEN

ABSTRACT

In this study, 22 adult (10 ♂♂, 12 ♀♀) *Rana ridibunda* specimens were investigated morphologically. The morphological characteristics of the Yağmapınar specimens are in accordance with those given for *R. r. caralitana*. Furthermore, the distribution range of *R. r. caralitana* has now been extended.

Key Words: *Rana ridibunda caralitana*, Morphology, Distribution.

YAĞMAPINAR (Karapınar-Konya)'dan TOPLANAN *RANA RIDIBUNDA* PALLAS, 1771 (Anura: Ranidae) ÖRNEKLERİ HAKKINDA

ÖZ

Bu çalışmada, 22 ergin (10 ♂♂, 12 ♀♀) *Rana ridibunda* morfolojik olarak incelenmiştir. Yağmapınar örneklerinin morfolojik karakterleri *Rana ridibunda caralitana* için verilen karakterlerle uyum içindedir. Ayrıca, *R. r. caralitana*'nın dağılışı genişletilmiştir.

Anahtar Kelimeler: *Rana ridibunda caralitana*, Morfoloji, Dağılışı.

1. INTRODUCTION

Rana ridibunda was described for the first time from Guryev in Kazakhstan [Terra typica restricta- (Mertens and Wermuth, 1960)] by PALLAS in 1771. The species of *Rana ridibunda* is spread over central and southern Europe and western Asia. *Rana*

ridibunda has been represented as two subspecies (*R. r. ridibunda*, *R. r. perezii*) until 1974. After the acceptance of the subspecies *perezii* as a separate species (*Rana perezii*) (Hotz, 1974), it became a monotypical species.

¹ Ege University, Faculty of Science Biology Department 35100-Bornova-İzmir;

E-mail: ayaz@sci.ege.edu.tr; Phone: +90(232) 388 18 91

Recently, lake frogs in Greece, formerly classified as *R. ridibunda*, have 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) and Başoğlu and Özeti (1973), it is a homogenous species in Turkey. However, although Bodenheimer (1944) has recorded specimens which had orange coloured venters from Beyşehir Lake, these were accepted as belonging to the nominate subspecies without a detailed investigation. Later, Arıkan (1988) found significant differences especially in the pattern and coloration of the venters of the Beyşehir Lake specimens and described the population as a new subspecies (*R. r. caralitana*). Later, the same race was reported from Eğirdir and Suğla lakes, from the tributaries of the Çarşamba creek, from Gölcük (Isparta) and Çivril (Denizli) in the west, foot of the taurus Mts in the South and İvriz (Ereğli/Konya) in the east (Atatür et al., 1990; Arıkan et al., 1994; Arıkan et al., 1998; Budak et al., 2000).

In 1992, Schneider et al., named the marsh frogs from the southwestern parts of Asia, including the western Turkey, as *Rana levantina*, utilizing voice analysis methods. The same was later changed to *R. bedriagae* Camerano, 1882 considering the priority rule (Beerli, 1994; Dubois and Ohler, 1994). Sinsch and Schneider (1999) and Schneider and Sinsch (1999) asserted that the temperate western and southern parts of Anatolia is inhabited by *R. bedriagae*, while the presence of the same in the mountainous regions of northern Anatolia is debatable, so the presence of *R. ridibunda* at these regions is a possibility. But according to Beerli (1994), Jdeidi et al. (1998) and Jdeidi et al. (2001); Anatolia is inhabited solely by *R. bedriagae*. Jdeidi et al. (2001), extended the range of the *caralitana* form to include Çardak-Denizli region and inserted this form under *R. bedriagae*, but also stressed the point that since the *caralitana* form and *R. bedriagae* were found sympatrically at Akşehir and Çardak, it is possible to regard *caralitana* as a distinct species.

On the other hand, Plötner et al. (2001) stated that Anatolian marsh frogs do not represented *Rana bedriagae* according to mitochondrial DNA techniques. However, *caralitana*, the subspecies of *Rana ridibunda* was accepted as *Rana bedriagae* by Kaya et al. (2002).

In the present work, the specimens collected from Yağmapınar (Karapınar-Konya) were evaluated biometrically and from the viewpoint of their pattern and coloration characteristics.

2. MATERIAL and METHOD

2.1. Material List

ZDEU 32/2001. 1-22, (10 ♂♂, 12 ♀♀), Yağmapınar (Karapınar-Konya), 23.06.2001, Leg. M. Tosun-

oğlu, D. Ayaz & B. Göçmen.

The specimens examined in this study were made up of a total of 22 specimens (10 ♂♂, 12 ♀♀) and are deposited in ZDEU (Zoology Department, Ege University). Pattern and coloration features of the specimens were recorded while the animals were alive, and then killed by ether within a sealed container. Next a fixation fluid containing 3 cc 40% formaldehyde, and 97 cc 70% ethanol was injected into the abdominal cavity of the animal. They were then put into 70% ethanol for permanent preservation. The morphometrical measurements were taken with a digital caliper of 0.01 mm sensitivity.

3. RESULTS and DISCUSSION

The specimens used in this study were sexually mature individuals. No differences between the sexes, so the data from both sexes were pooled.

The morphometric measurements and some ratios derived from these measurements are given in Table 1.

In all the specimens examined, the ground coloration of the dorsal was various hues of green and brown. The ground coloration of the whole ventral, including the extremities and the head, was dirty white, and it was more or less covered with orange maculations.

The pattern types of the specimens of *Rana ridibunda* from Yağmapınar (Karapınar-Konya) are given in Table 2, Figure 1 (Dorsal A, B) and Figure 2 (Ventral A, B).

Subsequent studies (Atatür et al., 1990; Arıkan et al., 1994; Arıkan et al., 1998) have extended the distribution are 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 Yağmapınar (Karapınar-Konya) are almost identical with *R. r. caralitana* (Arıkan et al., 1988; Atatür et al., 1990; Arıkan et al., 1994; Arıkan et al., 1998).

Although the presence of the studies (Beerli, 1994; Jdeidi et al., 1998; Jdeidi et al., 2001; Kaya et al., 2002) which accept Anatolian marsh frogs as *Rana bedriagae*, we have confidence, as mentioned by Plötner et al. (2001), more detailed studies should be done to explain the phylogenetic relations of Anatolian marsh frogs.

Consequently, the present known distribution range of this subspecies has been extended north-east to include Yağmapınar (Karapınar-Konya) in addition to the known range of lake Beyşehir (its terra typica), İvriz-Ereğli (Konya), Lakes Eğirdir, Suğla, Gölcük (Isparta), Işıklı (Çivril), and Hotamış.

Table 1. Morphometric measurements and ratios of the *Rana ridibunda* material from Yağmapınar (Karaman-Konya) together with their statistical data (N: Number of specimens; M: mean; Ext.: extreme values; SD: Standard deviation; SE: standart error of the mean; SVL: Snouth-Vent Length, HL: Head Length, HW: Head Width, FL: Femur Length, TL: Tibia Length, HLL: Hind Leg Length, MTL: Metatarsal Tubercle Length, FTL: First Toe Length, FLL: Fore Leg Length).

Characters	♂♂					♀♀					♂♂ + ♀♀				
	N	M	Ext.	SD	SE	N	M	Ext.	SD	SE	N	M	Ext.	SD	SE
SVL	10	66.18	55.16-75.15	6.51	2.06	12	77.42	70.44-89.27	6.14	1.77	22	72.31	55.16-89.27	8.41	1.79
HL	10	21.77	17.16-24.33	2.13	0.67	12	24.48	21.19-27.63	1.73	0.50	22	23.35	17.16-27.63	2.33	0.50
HW	10	22.89	19.95-25.97	1.89	0.60	12	26.55	23.64-30.69	1.99	0.58	22	24.89	19.95-30.69	2.66	0.57
FL	10	32.17	28.00-37.07	2.85	0.90	12	35.97	32.68-40.44	2.23	0.64	22	34.24	28.00-40.44	3.13	0.67
TL	10	32.65	28.24-36.42	2.80	0.89	12	36.93	33.85-41.03	2.21	0.64	22	34.99	28.24-41.03	3.27	0.70
HLL	10	37.21	34.14-40.55	2.23	0.71	12	40.93	37.82-44.89	2.19	0.63	22	39.25	34.14-44.89	2.90	0.62
MTL	10	4.22	3.46-4.88	0.52	0.17	12	4.61	4.06-5.89	0.49	0.14	22	4.41	3.46-5.89	0.53	0.11
FTL	10	10.76	8.95-13.04	1.28	0.41	12	11.68	10.32-14.18	1.13	0.33	22	11.26	8.95-14.18	1.27	0.27
FLL	10	18.41	15.53-20.08	1.33	0.42	12	20.63	18.31-23.26	1.56	0.45	22	19.62	15.53-23.26	1.82	0.39
SVL/TL	10	2.03	1.95-2.12	0.06	0.02	12	2.10	1.96-2.20	0.07	0.02	22	2.06	1.95-2.20	0.07	0.02
SVL/HW	10	2.89	2.77-3.03	0.09	0.03	12	2.92	2.68-3.09	0.12	0.04	22	2.90	2.68-3.09	0.11	0.02
SVL/FTL	10	6.19	5.28-6.93	0.58	0.18	12	6.64	6.20-7.17	0.29	0.08	22	6.44	5.28-7.17	0.49	0.10
SVL/HL	10	3.04	2.86-3.21	0.12	0.04	12	3.16	2.99-3.33	0.12	0.03	22	3.11	2.86-3.33	0.13	0.03
SVL/FL	10	2.06	1.94-2.22	0.08	0.03	12	2.15	2.06-2.27	0.08	0.02	22	2.11	1.94-2.27	0.09	0.02
FTL/MTL	10	2.56	2.26-2.89	0.21	0.07	12	2.55	2.09-3.20	0.28	0.08	22	2.57	2.09-3.20	0.26	0.06
HL/HW	10	0.95	0.86-1.00	0.04	0.01	12	0.92	0.87-0.99	0.04	0.01	22	0.94	0.86-1.00	0.04	0.01
TL/MTL	10	7.79	6.87-8.47	0.52	0.16	12	8.07	6.44-9.52	0.70	0.20	22	7.99	6.44-9.52	0.70	0.15
FL/TL	10	0.99	0.94-1.02	0.02	0.01	12	0.97	0.93-1.02	0.03	0.01	22	0.98	0.93-1.02	0.03	0.01

Table 2. Dorsal (A, B) and ventral (A, B) pattern types of *Rana ridibunda* specimens from Yağmapınar (Karapınar-Konya), n: Number of specimens

Dorsal without a vertebral stripe	Dorsal with a vertebral stripe
(A) n: 8 (36.36%)	(B) n: 14 (63.64%)
Ventral maculation with small in spots	Ventral maculation in the shape vermiculate
(A) n: 1 (4.54%)	(B) n: 21 (95.46%)

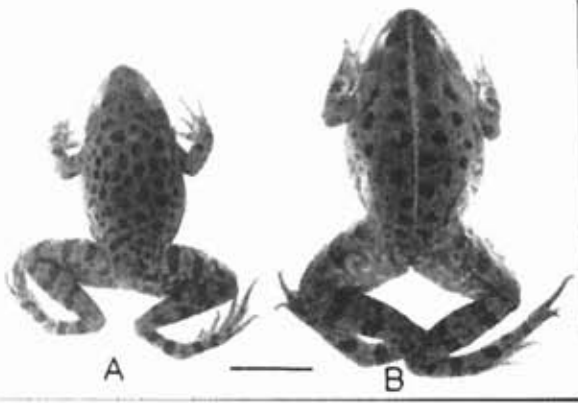


Figure 1. Dorsal (A, B) pattern types of the specimens of *Rana ridibunda* from Yağmapınar (Karapınar-Konya) [(Horizontal bar 20 milimeters)-♀ ♀]

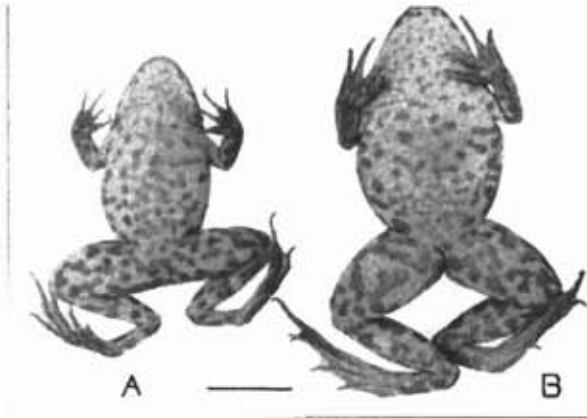


Figure 2. Ventral (A, B) pattern types of the specimens of *Rana ridibunda* from Yağmapınar (Karapınar-Konya) [(Horizontal bar 20 milimeters)-♀ ♀]

4. REFERENCES

- Arıkan, H. (1988). On a new form *Rana ridibunda* (Anura: Ranidae) from Turkey. *Istanbul Univ. Fen Fak. Mec.* 53, 81-87.
- Arıkan, H., Olgun, K., Çevik, İ. E. and Tok, C. V. (1998). A Taxonomical Study on the *Rana ridibunda* Pallas, 1771 (Anura: Ranidae) Population from İvriz-Ereğli (Konya). *Tr. J. of Zoology* 22, 181-184.
- Arıkan, H., Özeti, N., Çevik, İ. E. ve Tosunoğlu, M. (1994). *Rana ridibunda caralitana* (Anura: Ranidae)'nın Göller Bölgesi'nde Dağılışı. *Tr. J. of Zoology* 18, 141-145.
- Atatür, M. K., Arıkan, H. and Mermer, A. (1990). A taxonomical investigation on *Rana ridibunda* Pallas (Anura: Ranidae) populations from the Lakes District-Anatolia. *Istanbul Univ. Fen Fak. Biyoloji Dergisi* 54, 79-83.
- Başoğlu, M. ve Özeti, N. (1973). *Türkiye Amfibileri*. Ege Üniv. Fen Fak. Kitaplar Serisi, İzmir, No: 50, 1-155.
- Beerli, P. (1994). Genetic isolation and calibration of an average protein clock in western Palearctic water frogs of the Aegean region. Inaugural-Diss., Zürich.
- Bodenheimer, F. S. (1944). Introduction to the knowledge of the Amphibia and Reptilia of Turkey. *Rev. Fac. Sci. Univ. İstanbul*, 9 B, 1-83.
- Budak, A., C. V. Tok and Ayaz, D. (2000). On specimens of *Rana ridibunda* Pallas, 1771 (Anura: Ranidae) Collected from Işıklı Lake (Çivril-Denizli). *Tr. J. of Zoology* 24, 135-137.
- Dubois, A. and Ohler, A. (1994). Frogs of the subgenus *Pelophylax* (Amphibia, Anura, Genus *Rana*): a catalogue with comments on name-bearing types, complete synonymies, proposed common names, and maps showing all type localities. *Zool. Poloniae* 39, 139-204.
- Hotz, H. (1974). Ein Problem aus vielen Frageneuropäische Grünfrösche (*Rana esculenta*-Komplex) und ihre Verbreitung. *Natur u Museum*. 104: (9), 262-272.
- Jdeidi, T., Bilgin, C. and Kence, M. (2001). New Localities Extend the Range of *Rana bedriagae caralitana* Arıkan, 1988 (Anura: Ranidae) Further West and Suggest Specific Status. *Tr. J. of Zoology* 25: 153-158.
- Jdeidi, T., Kence, M. and Bilgin, C. (1998). Genetic variation in water frog, *Rana ridibunda* complex in Turkey. XVIII. International Congress of Genetics, Abstracts, Beijing, China.
- Kaya, U., Çevik, İ. E. and Erişmiş, U. C. (2002). New Distributional Records for *Rana bedriagae caralitana* in Anatolia. *Tr. J. of Zoology* 26, 381-383.
- Mertens, R. and Wermuth, H. (1960). Die Amphibien und Reptilien Europas. Verlag Waldemar Kramer, Frankfurt am Main, 1-264.
- Plötner, J., Ohst, T., Böhme, W. and Schreiber, R. (2001). Divergence in mitochondrial DNA of Near Eastern water frogs with special reference to the systematic status of Cypriote and Anatolian populations (Anura, Ranidae). *Amphibia-Reptilia* 22, 397-412.
- Schneider, H. and Sinsch, U. (1999). Taxonomic reassessment of Middle Eastern water frogs:

Bioacoustic variation among populations considered as *Rana ridibunda*, *R. bedriagae* or *R. levantina*. *Jour. For Zool. Syst. and Evol. Res.* 37, 57-65.

Schneider, H., Sinsch, U. and Sofianidou, T. S. (1993). The water frogs of Greece. Bioacoustic evidence for a new species. *Zeitschrift für Zoologische Systematik und Evolutions Forschung* 31, 47-63.

Schneider, H., Sinsch, U. and Nevo, E. (1992). The lake frogs in Israel represent a new species. *Zool. Anz.* 228, 97-106.

Schneider, H., Sofianidou, T. S. and Kyriakopoulou-Sklavounou, P. (1984). Bioacoustic and morphometric studies of water frogs (genus *Rana*) of Lake Ioannina in Greece, and description of a new species (Anura, Amphibia). *Z. Zool. Syst. Evolut.-forsch.* 22,349-366.

Sinsch, U. and Schneider, H. (1999). Taxonomic reassessment of Middle Eastern water frogs: Morphological variation among populations considered as *Rana ridibunda*, *R. bedriagae* or *R. levantina*. *Jour. For Zool. Syst. and Evol. Res.* 37, 67-73.



Dinçer Ayaz, 20.06.1972'de Milas (Muğla)'da doğdu. İlk ve orta öğrenimini Milas'ta, lise öğrenimini İzmir Atatürk Lisesi'nde 1990 yılında tamamladı. 1994 yılında Ege Üniversitesi Fen Fakültesi Biyoloji Bölümü Zooloji Anabilim Dalı'ndan mezun olduktan sonra, aynı bölümde 1998 yılında yüksek lisans, 2003 yılında da doktorasını tamamlamıştır. 1997 yılından bu yana aynı bölümde öğretim elemanı olarak çalışmakta olup evlidir.



Bayram Göçmen, 1965 Çanakkale (Kandı)-Limsol/Kıbrıs doğumludur. İlk, orta ve lise öğrenimini KKTC' de tamamlamıştır. 1989 yılında Ege Üniversitesi Fen Fakültesi Biyoloji Bölümü Zooloji Anabilim Dalı'ndan mezun olduktan sonra, aynı bölümde 1991 yılında yüksek lisans, 1996 yılında ise doktora eğitimini tamamlamıştır. 1997'de Yardımcı Doçent, 2003'te Doçent unvanını almıştır. *Herpetoloji* ve *Protozooloji* sahalarında yayınlanmış çok sayıda ulusal ve uluslararası makalesinin yanında, alanındaki toplam 7 kitapta tek yahut müşterek yazardır.



Murat Tosunoğlu, 1966 Karşıyaka-İzmir doğumludur. İlk, orta ve lise öğrenimini İzmir'de tamamlamıştır. Lisans öğrenimini 1988 yılında Ege Üniversitesi Fen Fakültesi Biyoloji Bölümü Zooloji Anabilim Dalı'nda tamamlamış. aynı anabilim dalında

1992 yılında yüksek lisans, 1997 yılında da doktorasını tamamlamıştır. 18 Şubat 2003 tarihinde Çanakkale Onsekiz Mart Üniversitesi Fen-Edebiyat Fakültesi Biyoloji Bölümü'nde Yardımcı Doçent Kadrosuna atanmıştır. Evli ve iki çocuk babasıdır.