

Research on the Herpetofauna of Murat Mountain (Kütahya-Uşak)

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Abstract: In this study, the amphibians and reptilians of Murat Mountain, where only mountain frogs have been investigated so far, are introduced. A total of 99 specimens from 15 different species were collected. Four of the species belong to anurans, one belongs to tortoises, six belong to lizards and four belong to the snakes group.

Key Words: Murat Mountain, Herpetofauna, Taxonomy

Murat Dağı (Kütahya-Uşak) Herpetofaunasının Araştırılması

Özet: Bu araştırmada şimdiye kadar yalnız dağ kurbağaları yönünden incelenmiş olan Murat Dağı'nın amfibi ve sürüngenleri tanıtılmıştır. Araştırma bölgesinden 15 ayrı türe ait 99 örnek temin edilmiştir. İncelenen örneklerin 4'ü kurbağa, 1'i kaplumbağa, 6'sı kertenkele, 4'ü yılan gruplarına aittir.

Anahtar Sözcükler: Murat Dağı, Herpetofauna, Taksonomi.

Introduction

A side from a few mountains, the herpetology of most of the high mountains in western Anatolia like Murat Mountain (2502 m), which is located between the borders of the cities Kütahya and Uşak, have not been investigated. Baran (1) investigated the mountain frogs of central and western Anatolia. In his study, he collected *Rana macrocnemis* from the northern part of Murat Mountain and compared this species with other mountain frogs that he had collected from other mountains.

Since there is not a full study about the herpetofauna of Murat Mountain, we hope the results of this study will make a valuable contribution to knowledge about Turkey's herpetofauna and wildlife.

Materials and Methods

A total of 99 amphibian and reptile specimens belonging to 15 species were collected during our excursions in 1997 and 1998. The specimens were fixed using traditional processes. Specimens were marked with ZDEU collection codes and are kept at the Buca Education Faculty, Department of Biology. In recording the specimens, the sequence of the collection number related

to ZDEU, gender, the exact collection place and date of collection were noted. The localities where the specimens were obtained are presented in the Figure with related altitudes. Of these, numbers 1-20 were placed within the borders of Kütahya province and 21-24 in Uşak province.

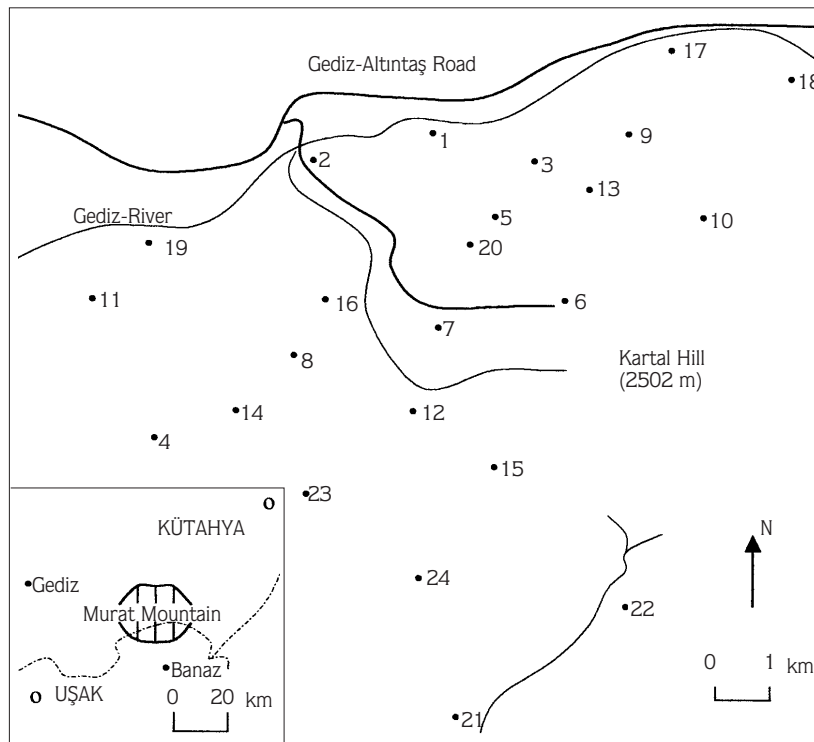
This study mainly aims to introduce the species and explain their taxonomic status. In the examination of the materials, the pholidosis features of tortoises, snakes and lizards were studied. In addition, the body lengths of the frog types were measured and their colour and pattern features were identified. The body and tail lengths of the specimens were measured with a dial caliper having an accuracy range of 0.02 mm. The colour and pattern features were recorded before the specimens were fixed.

Results

Bufo bufo (LINNAEUS, 1758)

Sample: N: 1♀; ZDEU 57/1998, ♀, 16, 14.06.1998.

The body measurements of the specimen are as follows: The total body length was 100.7 mm, the length of the head was 27.48 mm, the width of the head was 39.56 mm, the length of the parotoid was 28.48 mm, the length between the parotoids was 18.76 mm, and the



Figure

The stations in which specimens were collected: 1. Gediz Road (800m); 2. Hamam Road (900m); 3. Uğurluca Village (1000m); 4. Ayrancı Valley (850m); 5. Hamam Valley (1300m); 6. Hamam (1450m); 7. Baybiyen Valley (1400m); 8. İkizce Hill (1450m); 9. Çaylak Valley (1300m); 10. Söbealan (1450m); 11. Karaağaç Village (1300m); 12. Fikirsiz Hill (1600m); 13. Gürlü Stream (1250m); 14. Between Karaağaç and Karacahisar Village (1600m); 15. Between Karacahisar and Hamam (1650m); 16. Geyik Farm (1350m); 17. Between Çukurören and Hamam Road (1000m); 18. Azmak (1200m); 19. Sumaklı (1000m); 20. Kocaelma Hill (1300m); 21. Gürlek (1050m); 22. Gürlek Stream (1250m); 23. Küçükler (1450m); 24. Çeçe (1150m).

length of the metatarsal tubercle was 6.26 mm. The ground colour of the dorsum was dark-brownish and the venter was yellowish-white.

We believe that our specimen should be included in the subspecies of *B. bufo spinosus* as Murat Mountain is located within the region where subspecies of *B. b. spinosus* are distributed in western Anatolia (2).

Bufo viridis LAURENTI, 1768

Sample: N: 3 (1♂, 2♀♀); ZDEU 58/1998, 1♂, 2-3♀♀, 3, 28.06.1998.

The body length of the specimens ranged from 73.76 mm to 80.66 mm, with a mean of 78.08 mm, the length of the head varied from 21.48 mm to 23.32 mm (mean: 22.21) and the width of the head was between 29.04 mm and 30.98 mm (mean: 30.08). The ratio of the length of the first toe to the metatarsal tubercle length is between 1.17 and 1.39, with a mean of 1.27. The ground colour of the dorsum was greyish-green and maculated in dark-green. The venter was dirty white.

The material obtained from Murat Mountain resembles *B. viridis viridis*, which was reported to be present western Anatolia (2).

Rana ridibunda PALLAS, 1771

Sample: N: 19 (15♂♂, 4♀♀); ZDEU 214/1997, 1-4♂♂, 5♀♀, 3, 17.05.1997. ZDEU 215/1997, 1-2♂♂, 17, 18.05.1997. ZDEU 59/1998, 1-6♂♂, 7-9♀♀, 3, 14.06.1998. ZDEU 60/1998, 1-3♂♂, 23, 28.06.1998.

The ground coloration of the dorsum varied from greenish-grey to brown. On the ground, dark maculations, quite different in pattern and in size from the ground colour occur. Some statistical values of *R. ridibunda* are presented in Table 1.

In conclusion, as previously stated by a number of researchers, *R. ridibunda ridibunda* subspecies live in the western Anatolia (2,3). There are no obvious differences between the specimens examined in the Murat Mountain and the afore-mentioned subspecies.

Rana macrocnemis BOULENGER, 1885

Sample: N: 21 (10♂♂, 11♀♀); ZDEU 216/1997, 1♂, 2-3♀♀, 8, 17.05.1997. ZDEU 217/1997, ♀, 3, 18.05.1997. ZDEU 218/1997, 1-2♀♀, 10, 19.05.1997. ZDEU 219/1997, 1-2♂♂, 7, 22.05.1997. ZDEU 61/1998, 1-7♂♂, 8-13♀♀, 22, 27.06.1998.

Characters	N	Ext	M	SD	SE
Snout-Vent Length/Tibia Length	19	1.82-1.97	1.91	0.09	0.01
Snout-Vent Length/Head Width	19	2.55-2.86	2.74	0.19	0.03
Snout-Vent Length/First Toe Length	19	5.27-7.35	6.28	0.84	0.16
Femur Length/Tibia Length	19	0.80-0.96	0.92	0.06	0.01
First Toe Length/Metatarsal Tubercle Length	19	2.51-3.14	2.82	0.34	0.06

Table 1. Some body measurement ratios of *Rana ridibunda*. (N: Number of specimens, Ext: Extreme values, M: Mean, SD: Standard deviation, SE: Standard error of the mean).

There were no considerable differences between the specimens collected from the northern and southern parts of Murat Mountain in terms of their body measurement ratios.

The specimens collected from the northern site were different from those of the southern in terms of coloration and the occurrence of granules. Accordingly, the ground coloration of the dorsum of the northern specimens was dark and the maculations of the dorsum were more in number and darker in colour, and there was no granule in the chin, throat, or in the place where the back feet join the body. However, we think that the afore-mentioned difference is not enough to consider the two populations to be two separate taxa.

Since the ratio of the body measurements (Table 2) of our samples show considerable similarities to *R. macrocnemis* figures given by Baran (1), the materials examined in this study should be included with the afore-mentioned species. Murat Mountain specimens are considerably different from Akdağ (Denizli) specimens, which form the closest mountain population in western Anatolia (4). Furthermore, the distribution of *R. macrocnemis* extends to the southern part of Murat Mountain.

Testudo graeca LINNAEUS, 1758

Sample: N: 7 (3♂♂, 2♀♀, 2 s. ad.); 1♂, 2 s. ad., 12, 17.05.1997., 1♂, 14, 13.06.1998. 1♀, 4, 13.06.1998. 1♂, 2 s. ad., 5, 14.06.1998. 1♀, 24, 27.06.1998.

Single nuchal and supracaudal plates, 5 vertebrae, 4 pairs of costals and 11 pairs of marginals occur in all the

specimens. The ratio of the carapace length to the carapace width ranged from 1.09 to 1.21 (mean: 1.15), the ratio of the carapace length to the carapace height was between 2.1 and 2.62 (mean: 2.36) and the ratio of the plastron length to the plastron width was between 1.15 and 1.40 (mean: 1.27). The ground coloration of the carapace was yellowish or brownish-yellow. The colour of the plastron was pale.

The features and figures of the samples collected from Murat Mountain are similar to those that previous researchers (2,3,5) reported for *T. graeca iberica*. It should be appropriate to consider the specimens as a subspecies of *T. graeca iberica*.

Lacerta danfordi (GUNTHER, 1876)

Sample: N: 7 (5♂♂, 2♀♀); ZDEU 220/1997, 1♂, 2♀, 9, 17.05.1997. ZDEU 221/1997, 1-3♂♂, 20, 18.05.1997. ZDEU 62/1998, ♂, 15, 13.06.1998. ZDEU 63/1998, ♀, 18, 14.06.1998.

The ground coloration of the dorsum was greyish-brown. The upper part of the head was a bit lighter in colour and contained dispersed brown spots. There were whitish flecks on the temporal stripe and black spots on the chin, on the neck, on the two sides of the body and on the horizontal line of the first and second ventralia rows.

The taxonomic analysis of *L. danfordi* in the Aegean Region was made by Budak (6). There are no clear differences between our samples and *L. d. anatolica* subspecies in terms of given statistical values (Table 3) and explained features.

Characters	N	Ext	M	SD	SE
Snout-Vent Length/Tibia Length	21	1.50-1.91	1.69	0.11	0.03
Snout-Vent Length/Tarsus Length	21	3.23-4.31	3.68	0.30	0.05
Head Length/Head width	21	0.87-1.02	0.97	0.04	0.01
Tibia Length/Femur Length	21	1.02-1.24	1.09	0.06	0.02
Metatarsal Tubercle Length/First Toe Length	21	0.45-0.75	0.55	0.06	0.01

Table 2. Some body measurement ratios of *Rana macrocnemis*.

Characters	N	Ext	M	SD	SE
Supraciliar Granules	7	12-14	13	0.81	0.30
Dorsal Scale	7	54-63	58.57	3.20	1.21
Median Gularia	7	24-28	26.57	1.61	0.61
Femoral Pores	7	16-20	18.28	1.25	0.47
Pileus Index	7	40.62-51.45	44.30	3.41	1.29
Head Index	7	51.92-58.37	54.48	2.20	0.83

Table 3. Some pholidosis features and body measurement indexes of *Lacerta danfordi*.

***Lacerta trilineata* BEDRIAGA, 1886**

Sample: N: 13 (6♂♂, 2♀♀, 5juv.); ZDEU 222/1997, 1-3♂♂, 13, 17.05.1997. ZDEU 223/1997, 1-2juv., 3, 18.05.1997. ZDEU 224/1997, 1-3♂♂, 4-6juv., 10, 19.05.1997. ZDEU 64/1998, ♀, 19, 14.06.1998. ZDEU 65/1998, ♀, 21, 27.06.1998.

The longitudinal rows of ventralia were 8 in number. No small scales occur between the parietals and supratemporals. The ratio of the body length in adult specimens to the head + body length ranged from 2.73 to 3.14 (mean: 2.96) and the ratio of the pileus length to the pileus width varied between 1.90 and 2.12 (mean: 2.02). In adult specimens the dorsum had become green and the longitudinal bands appeared indistinct. The colour of the dorsum was almost yellowish-green and there were black spots on it. The venter was yellowish-green in older specimens.

The pholidosis characteristics (Table 4), the ratios of body measurements, and the colour and pattern characteristics of our samples were similar to those of *L. t. galatiensis* determined by other researchers (3,7-9).

Characters	N	Ext	M	SD	SE
Supraciliar Granules	13	3-12	7.3	3.09	0.85
Temporalia	13	21-36	25.30	4.34	1.20
Dorsal Scale	13	41-50	45.07	2.13	0.59
Femoral Pores	13	13-16	14.69	1.03	0.28
Subdigital Lamellae	13	23-28	26.07	1.55	0.43

Table 4. Some pholidosis features of *Lacerta trilineata*.

Characters	N	Ext	M	SD	SE
Supraciliar Granules	11	7-13	10.45	1.96	0.59
Temporalia	11	28-33	29.73	1.55	0.46
Median Gularia	11	13-19	16.09	1.81	0.54
Dorsal Scale+Plate	11	33-35	34	1.00	0.30
Femoral Pores	11	9-11	10.27	0.64	0.19
Subdigital Lamellae	11	19-24	21.73	1.61	0.48

Table 5. The statistical values of some pholidosis features of *Ophisops elegans*.

***Ophisops elegans* MENETRIES, 1832**

Sample: N: 11 (7♂♂, 4♀♀); ZDEU 228/1997, 1-4 ♂♂, 5-7 ♀♀, 9, 17.05.1997. ZDEU 229/1997, 1-2♂♂, 16, 18.05.1997. ZDEU 74/1998, ♀, 15, 14.06.1998. ZDEU 75/1998, ♂, 22, 27.06.1998.

There were supratemporal and subocular lines in all the specimens, whose ground coloration on the dorsum was brown with shades of green. There were blackish maculations on the vertebral stripe, on both sides of the body and on the venter, and these were found more in males. The venter was darkish-white. The pholidosis features of Murat Mountain specimens are given in Table 5.

The *O. elegans* populations collected from İzmir and Afyon were compared and both populations were stated to be *O. e. macrodactylus* by İret (10). Since there are some similarities between the specimens collected from Murat Mountain and the populations collected from İzmir and Afyon, it would be appropriate to include the aforementioned material into that subspecies.

***Ablepharus kitaibellii* (BIBRON-BORY, 1833)**

Sample: N: 1♂; ZDEU 66/1998. ♂, 11, 13.06.1998.

Frontonasale and rostrale were in touch and the numbers of praefrontale, supraciliaria, frenale and supralabiale were 2, 2, 1 and 3 respectively in the specimen. The number of the sub-digital lamellas of the fourth toe was 10, while the number of scales in a ring in the middle of the body was 20. The body length was 69.8 mm. The tail length was 27.36 mm. The length of the head was 5.42 mm and the width of the head was 3.68 mm. The ground coloration of the dorsum of our sample was metallic light brown and there were broken lines on it in four rows. The venter was light bluish-grey and the ventral part of the tail was darker than the venter.

The specimen we examined is similar to *A. k. kitaibellii*, which is considered in various articles (5,11,12) to be a widespread subspecies in western Anatolia.

***Mabuya aurata* (LINNAEUS, 1758)**

Sample: N: 1♀; ZDEU 67/1998. ♀, 2, 28.06.1998.

In our sample, there were 4 supralabialias on both sides of the head and 5 supraciliarias on the left and on the right. The frenale and the first supralabialia touch each other. The number of scales around the body was 36 and the number of subdigital lamella on the fourth toe was 20. Body length was 153.88 mm, the width of the head was 10.92 mm and the head length was 14.6 mm. The dorsum of the specimen was light brown. The venter was completely dirty white.

Many researchers state (5,8,11) that this specimen is no different from *M. a. aurata*, which is known to be widespread in western Anatolia.

***Blanus strauchi* (BEDRIAGA, 1884)**

Sample: N: 2 (1♂,1♀); ZDEU 68/1998. 1♂, 2♀, 2, 14.06.1998.

The nostrils of the specimens were on the first supralabialia. The number of sublabialia was 3; the number of scales around the body in both samples was 35; the number of rings on the body was 109 in one of the specimens and 111 in the other. Body lengths were 187.66 and 197.52 mm. Head + body lengths were 179.6 and 178.84 mm and the tail length was 17.92 mm in one of the specimens and 8.82 mm in the other. The colour of the dorsum of the specimens caught in a field at 900 m altitude was brownish and the venter was lighter in colour.

The taxonomic speciality of the specimen is not different from the *B. s. strauchi* subspecies consider by

many researchers (2,5,13-15) to be widespread in southwest Anatolia. Furthermore, the distribution of this species is extended further north and it was known to be present in the southern part of Murat Mountain (14).

***Typhlops vermicularis* MERREM, 1820**

Sample: N: 5; ZDEU 69/1998. 1-5, 2, 14.06.1998.

The specimens were caught from under stones in the damp parts of the field. The number of scales around the body was 22 to 24, while it was between 19 and 21 around the tail. The body length of the specimens in which gender distinction could not be identified was between 154.12 and 232.26 mm (mean: 200.1 mm). The colour of the dorsum was light or dark brown while the venter was yellowish-white.

The only representative of this family that shows a distribution in Turkey is *T. vermicularis*. It has been reported that the species was widespread in Turkey and it has not only been recorded in eastern Anatolian (16,17). It was also determined that the specimens collected from Murat Mountain have the same features with the reported species.

***Eirenis modestus* (MARTIN, 1838)**

Sample: N: 5 (1♂, 2♀♀, 2juv.); ZDEU 70/1997, ♂, 5, 17.05.1997. ZDEU 71/1997, 1-2juv., 6, 19.05.1997. ZDEU 225/1998, ♀, 18, 14.06.1998. ZDEU 226/1998, ♀, 22, 27.06.1998.

In all the specimens, the postocularia, frenale, temporalia, supralabialia and the number of scales on the dorsum on the mid-body were 2, 1, 1+2, 7 and 17 respectively. There were 7 sublabialia in 3 specimens while 8 and 9 were recorded in the others. The numbers of ventralia ranged from 167 to 184, with a mean of 177.4. The numbers of subcaudalia were 66 (min: 58, max: 70). The ground colour of the specimens was yellowish-brown. The black blotches on the head and nape distinguished in juveniles from adults.

Our samples do not show remarkable differences from *E. m. modestus* that was introduced by a number of researchers (2,6). Thus, it would be appropriate to include our specimens into that afore-mentioned subspecies.

***Natrix natrix* (LINNAEUS, 1758)**

Sample: N: 2 (1♀, 1juv.); ZDEU 72/1998, ♀, 2, 18.05.1998. ZDEU 73/1998, juv., 22, 27.06.1998.

In both specimens the anale was in two parts, the praeocularia and frenale were single, postocularia 3, temporalia 1+2, supralabialia 7, sublabialia 10, and the number of scales on the dorsum at mid-body was 19. Total body length was 415 mm in the female and 208 mm in the juvenile. There were two light coloured longitudinal lines over the yellowish-grey dorsum. The taxonomic features of the specimens do not show remarkable differences from the characteristics given by previous researchers (2,16) for the subspecies of *N. n. persa*.

***Natrix tessellata* (LAURENTI, 1768)**

Sample: N: 1♂; ZDEU 227/1997, ♂, 1, 17.05.1997.

Anale has two parts. The numbers of praeocularia, postocularia in both sides of head, frenalia and temporalia were 2, 3, 1 and 1+2 respectively. The numbers of ventralia, dorsal scales and subcaudalia were counted as 168, 19 and 67 respectively. The total body length was 724 mm. The dorsum was greyish-brown and venter was dirty white with black dots.

Our specimen's characteristics were compared with other characteristics given in the related literature (2,16) and it was found that our specimen was not different from *N. t. tessellata* subspecies.

Discussion and Conclusion

Four amphibia species were found in this study area. Among them, *B. bufo*, *B. viridis* and *R. ridibunda* show very wide distribution throughout Turkey. The other species, *R. macrocnemis*, is a mountain frog that lives at 1000 m altitude. As mentioned before, Baran (1) found that *R. macrocnemis* is distributed on the northern part of Murat Mountain. However, as a result of this study it was determined that this species is also distributed on the southern part of the mountain. The specimens collected from northern and southern parts of the mountain show very few differences in their appearances; therefore, specimens from both sides of the mountain were included

in the same species, namely *R. macrocnemis*. The subspecies *R. macrocnemis macrocnemis*, distributed in Uludağ (Bursa) and Bozdağ (Ödemiş), show similar characteristics with our specimens collected from Murat Mountain. On the other hand, the specimens of *R. macrocnemis* collected from this study area show very clear differences from the specimens collected by Baran and Atatür from the closest southern neighbouring mountain, Akdağ (Denizli). The specimens of Akdağ were classified into another subspecies in 1986 by Baran and Atatür (4) because of the differences.

In this study, a tortoise species was also found, *Testudo graeca*, which is distributed throughout Anatolia except in the eastern Black Sea region.

Six lizard species distributed on Murat Mountain were also identified. Among them, *Lacerta danfordi*, *Lacerta trilineata*, *Ophisops elegans*, *Ablepharus kitaibellii* and *Mabuya aurata* are very widespread in Turkey. On the other hand, the other species, *Blanus strauchi*, is normally distributed in the north distribution border of this species. Although a German, Trutnau, told İbrahim Baran that he found a specimen of this species from Çanakkale in 1972 but he had lost the specimen during the trip, to date a new species from the mentioned area has not been found.

Finally, four non-poisonous snakes were identified on Murat Mountain. These are *Typhlops vermicularis*, *Eirenis modestus*, *Natrix natrix* and *Natrix tessellata*. These species are widespread in suitable biotopes in most parts of Turkey. Murat Mountain is among their distribution areas.

Although, in general meaning, the herpetofauna of our country have been identified, studies cover very large areas were needed to do this. In other words, studies carried out in limited specific areas are very few. In this study, the herpetofauna of a specific limited area, Murat Mountain, was investigated. Therefore, the aim was to fill in the gaps about the information on Turkey's Herpetofauna.

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