

AMPHIBIANS AND REPTILES IN MONTENEGRO, YUGOSLAVIA

R. MEEK

8 Mountfield Road, Waterloo, Huddersfield, England

INTRODUCTION

In 1978 and 1983 field trips were made to Montenegro in southern Yugoslavia to record field data on Hermanns tortoise, *Testudo hermanni* (Meek and Inskeep, 1981, in press). During the study periods 16 additional species of amphibians and reptiles were observed. There are several reports in the literature concerning the Yugoslavian herpetofauna. For example, Peaker and Peaker (1968) located four amphibians and five reptile species in the Rovinj region and Mattison (1982) seventeen reptiles and two amphibian species from several areas on the Adriatic coast. With R. Inskeep, the author reported on ten reptiles and two amphibian species located during the 1978 study period (Meek and Inskeep, 1979). This paper presents new observations on several of these species, in addition to six species not previously recorded. A checklist of the Yugoslavian herpetofauna can be found in Breljeh and Dzukic (1974).

GEOGRAPHY

The coastline of Yugoslavia consists of large numbers of small islands, peninsulas, straits and gulfs. These were formed at the end of the last Ice Age when a rise in the sea levels resulted in a partial submergence of a former mountain range with the effect that the river valleys were flooded and the ancient mountain ridges transformed into islands and peninsulas. The present coastal region now consists of a narrow plain limited on the western side by the Adriatic sea and to the east by the limestone based Dinaric Alps which rise abruptly from the edge of the plain. The limestone base of these mountains has an important effect on the geography of the region since being porous it drains much of the regions rainfall. The effects are that although the region receives a good deal of rain it is one of the most waterless areas in Europe with few ponds or larger standing bodies of water. Summer air temperatures here often exceeded 30°C with the January isotherm 9°C.

PRINCIPAL SITES

Altogether five areas were investigated, their locations are shown in Figure 1.

Area 1 Extensive marshes drained by a series of ditches. Part of this area is shown in Plate 1.

Area 2 A series of fields and ditches bordering the town of Budva.

Area 3 Low terraced mountains bordering the road east from Budva.

Area 4 Mixed scrubland intersected with small ditches. This was the most intensively searched area. Plate 2 shows a section with dense vegetation, a view of more open habitat here can be found in Meek and Inskeep (1981).

Area 5 Low terraced mountains bordering the road north of the town of Petrovac.

SPECIES LIST

Amphibia

Urodela

Salamandridae

Triturus vulgaris (Linné, 1758)

One adult observed in a ditch on the perimeter of the area shown in plate 2 (area 4). A juvenile was found under refuse at area 1.

Anura

Bufonidae

Bufo viridis (Laurenti, 1768)

One juvenile located at area 2 after heavy rainfall only 100m or so from the sea shore.

Bufo bufo (Linné, 1758)

One adult female moving through dense water reeds in a ditch in late afternoon after rain at area 1.

Ranidae

Rana ridibunda (Pallas, 1771)

Large numbers observed in ditches at areas 1 and 2. Several were caught after leaping from basking sites on the banks. In broader sections of water they remained in shallow sections after being chased but in narrow stretches dived beneath aquatic vegetation. First located when heard calling loudly.

Reptilia

Chelonia

Testudinidae

Testudo hermanni (Gmelin, 1789)

Found in scrubland in area 4. Several juveniles were found dead on the road north of Budva.

Emididae

Emys orbicularis (Linné, 1758)

Adults and juveniles found at areas 1 and 4. Found in association with *Mauremys caspica rivulata* at area 1 where both species shared basking sites. Very alert and dived when approached. Frequently seen floating at the surface with just the head above water.

Mauremys caspica rivulata (Valenciennes, 1833)

Adults and subadults found in areas 1, 2 and 4. Most animals were initially observed basking (Plate 4) but others were seen moving along stream beds. A subadult retreated beneath a rock on a riverbed when chased. The systematics of the three Mediterranean races of *M. caspica* have been studied and revised by Busack and Ernst (1980). They favour the retention of *M.c. rivulata* as a subspecies.

Squamata

Sauria

Gekkonidae

Hemidactylus turcicus (Linné, 1758)

Several individuals observed and one caught on rockfaces by the roadsides in areas 3 and 5.

Lacertidae

Lacerta oxycephala (Dumeril and Bibron, 1839)

One animal observed at close quarters on a rockface in area 3. Found here in association with *H. turcicus*.

Lacerta viridis (Laurenti, 1768)

Very common in areas 2, 3, 4 and 5. Usually occupied habitats with dense thorny bush but was frequently seen running across large clearings in area 4. Numerous juveniles were observed in dense bush in area 4. These had the four narrow white stripes typical of the young of this species (Arnold *et al* 1978).

Lacerta trilineata (Bedriaga, 1886)

Located in area 3 living on mountain slopes by the roadside. Juveniles were seen in dense bush by the roadside. A very large male was found dead on the road here.

Podarcis melisellensis (Braun, 1877)

Very common in area 1 on the banks of ditches among sparse plant growth. Often observed basking.

Anguidae

Anguis fragilis (Linné, 1758)

Located in areas 1 and 4 usually under logs, stones or refuse. A large number of both adults and juveniles were found under a board in area 1.

Ophisaurus apodus (Pallas, 1775)

A common reptile in areas 4 and 5 in fields (4) and on roadsides (5). Appears to favour areas with good open basking sites and dense bush for cover. Several were observed climbing in low bush (area 4). All individuals caught were adults except for a dead juvenile found on a pathway in area 4. Several animals found in 1983 had extensive scale damage (Plate 4), probably a result of attacks by feral cats. One partly eaten animal was also found. Collected animals did not attempt to bite, but responded by twisting their bodies along the longitudinal axis; none shed any part of their tail. A captured animal in northern Yugoslavia has been observed to regurgitate a mouse and a large snail (J. Armitage, personal communication).

Serpentes

Colubridae

Elaphe longissima (Laurenti, 1768)

One adult observed and a juvenile captured in area 4. The adult was seen in mid-afternoon moving through bushes, the juvenile in early evening moving along the grass covered perimeter of a densely bushed area.

Coluber gemonensis (Laurenti, 1768)

Common in areas 2, 3 and 4. Usually observed moving across clearings or basking on piles of rocks. A juvenile was caught while swimming in a ditch in area 2. In area 3 they were found in low bush by the roadside where two adults were also found dead on the road.

Natrix natrix (Linné, 1758)

Abundant in the grass covered marshy plain in area 1. Observed basking on tufts of grass after heavy rain. A subadult was located under refuse in association with a juvenile *T. vulgaris* and several *A. fragilis*. Apparently these snakes were of the *persa* (Pallas, 1814) subspecies although the status of this and several other races of *N. natrix* are now in question (e.g. see Thorpe, 1979; 1980).

TABLE 1

Summary of amphibian and reptile species observed in Montenegro and their site locations.

SPECIES	SITES				
	1	2	3	4	5
<i>Triturus vulgaris</i>	x			x	
<i>Bufo viridis</i>		x			
<i>Bufo bufo</i>	x				
<i>Rana ridibunda</i>	x	x			
<i>Testudo hermanni</i>				x	
<i>Emys orbicularis</i>	x			x	
<i>Mauremys caspica rivulata</i>	x	x		x	
<i>Hemidactylus turcicus</i>			x		x
<i>Lacerta oxycephala</i>			x		
<i>Lacerta viridis</i>		x	x	x	x
<i>Lacerta trilineata</i>			x		
<i>Podarcis melisellensis</i>	x				
<i>Anguis fragilis</i>	x			x	
<i>Ophisaurus apodus</i>				x	x
<i>Elaphe longissima</i>				x	
<i>Coluber gemonensis</i>		x	x	x	
<i>Natrix natrix</i>	x				

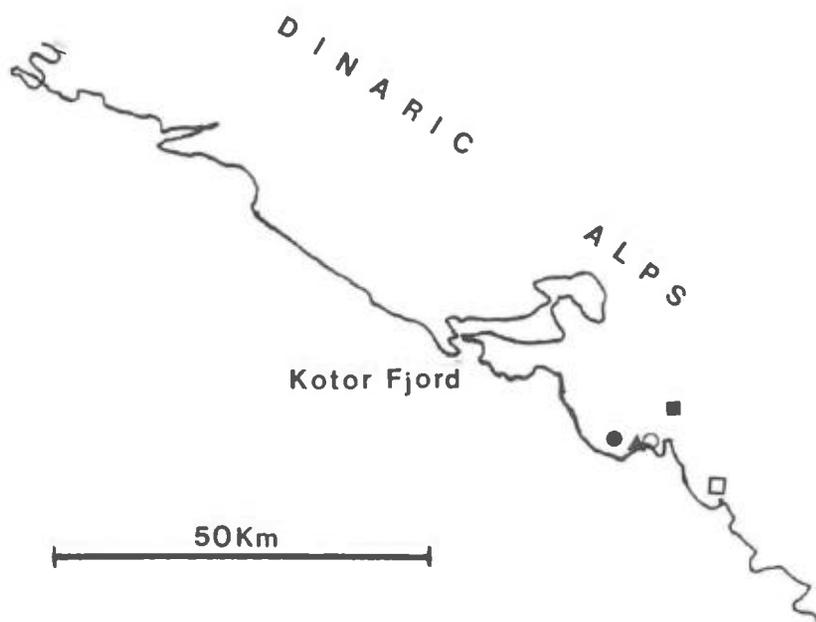


Fig. 1. A map of the coastline of Montenegro Yugoslavia showing site locations of area 1 (●), 2 (▲), 3 (■), 4 (○), and 5 (□).



Plate 1. View of part of area 1. In this section *Emys orbicularis*, *Mauremys caspica* and *Rana ridibunda* inhabited the ditches; *Podarcis melisellensis* on the banks among vegetation. Other amphibians and reptiles were found on the marshy plain around the ditches (see text).



Plate 2. A view of part of area 4, showing a section with dense vegetation. *Testudo hermanni* and *Ophisaurus apodus* were the most frequently observed species in this type of habitat.



Plate 3. Adult *Mauremys caspica* observed basking beside a ditch in area 2.



Plate 4. Adult female *Ophisaurus apodus* found in area 4 showing extensive scale damage.

DISCUSSION

A total of thirteen species of reptile and four species of amphibian were observed in Montenegro. However, not all the species recorded from the areas surveyed were located. For example Mattison (1982) apparently found *Natrix tessellata* at a ditch in area 1 where he further observed two juvenile *Lacerta trilineata*. On site on the eastern side of the road in area 1 he also found *Ophisaurus apodus*. Mattison (1982) believed that *Rana esculenta* was present in area 1, but it would seem that the calls he heard were in fact from *Rana ridibunda*. Large numbers of anuran larvae were observed in areas 1, 2 and 4. The great majority of these had the characteristic dark appearance of bufonid larvae but a small number at area 1 appeared to be ranid.

REFERENCES

- Arnold, E.N., Burton, J.A. and Ovenden, D.W. (1978). *A Field Guide to the Reptiles and Amphibians of Britain and Europe*. Glasgow and London; Collins.
- Busack, S.D. and Ernst, C.H. (1980). Variation in Mediterranean populations of *Mauremys*, Gray 1869 (Reptilia, Testudines, Emydidae). *Annals of Carnegie Museum* 49 (17): 252-264.
- Breljih, S. and Dzukic, G. (1974). *Catalogue Faunae Jugoslaviae Ljubljana*.
- Mattison, C. (1982). Notes on some reptiles collected and observed in Yugoslavia. *Herptile* 7 (2): 21-25.
- Meek, R. (in press). Thermoregularity behaviour in a population of Hermanns tortoise (*Testudo hermanni*) in southern Yugoslavia. *British Journal of Herpetology*.
- Meek, R. and Inskoop, R. (1979). Observations on the herpetofauna of a coastal region of southern Yugoslavia. *Herptile* 4 (1): 18-28.
- Meek, R. and Inskoop, R. (1981). Aspects of the field biology of a population of Hermanns tortoise (*Testudo hermanni*) in southern Yugoslavia. *British Journal of Herpetology* 6 159-164.
- Peaker, M. and Peaker, S. (1968). Spring herpetofauna of the Rovinj area (Istria, Yugoslavia) *British Journal of Herpetology* 4: 36-37.
- Thorpe, R.S. (1979). Multivariate analysis of the population systematics of the ringed snake *Natrix natrix* (L). *Proceedings of the Royal Society of Edinburgh* 78B 1-62.
- Thorpe, R.S. (1980). Racial affinities and geographical variation; a comparison of the use of multivariate morphometrics and conventional subspecies in relation to European reptiles. In J Coborn (Ed) *Proceedings of the European Herpetological Symposium C.W.L.P. Oxford 1980*.