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„GLASNIKA ZEMALJSKOG MUZEJA U BOSNI I HERCEGOVINI“

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Contributions to the Herpetology of Northeastern
Bosnia.

(With 3 Plates.)

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The northeastern corner of Bosnia, the so-called "Posavina" is herpetologically very little known. This territory is limited toward the North by the Save river and toward the East by the Drina. The landscape — especially toward the two rivers mentioned — is a pronounced lowland and in fact it is nothing else, than the southern continuation of the great Slavonian lowland over the Save river.

It was a long cherished desire of mine to visit this lowland of our otherwise too mountainous Bosnia, to make a closer acquaintance with its Amphibians and Reptiles,

I left Sarajevo on July 4th 1928 in the company of my taxidermist and collector Mr. Ljubomir Čorić. We have departed at first for Donja Tuzla and from there we have crossed the Majevisa-Mountains (843m) for the village Čelić. I have began with my field-work in that place. From Čelić we have set out by Korani to Zabrgje and from there by Bukovice and Brezovopolje along the Save river to Brčko. From that place we have returned on July 17th by Vinkovci and Sl. Brod to Sarajevo.

The herpetological material, collected during the journey, was not very rich in consequence of the sometimes insupportable heat (36° C in shadow); it is sufficient however to establish the zoogeographical position of "Posavina".

In the following I will publish the list of species collected during the trip, with all the necessary field-notes and the description of a new sub-species of *Bombina variegata variegata* L.

Class. AMPHIBIA.

Order. *Urodela*.

1. *Salamandra salamandra salamandra* L. 3 full-grown larvae from Zabrgje (229m), 9. VII. 1928.

The larvae were found in a so-called "bara" (a sort of puddle). They bear already the characteristic yellow spots on the upper arms and on the upper part of the thighs. The largest specimen measures 60mm from tip of snout to tip of tail.

The Spotted Salamander seems to be rather rare in this part of Bosnia.

2. *Triton carnifex carnifex* Laur.? 1 ad. ♀ and several larvae from Zabrgje (229m), 9. VII. 1928.

The largest larva measures 70mm. We have some specimens of this sub-species in our collections from Brčko, 24km distant from this new locality.

3. *Triton alpestris alpestris* Laur. A unique larva from Zabrgje, 9. VII. 1928.

4. *Triton vulgaris meridionalis* Blgr. We have collected 2 younger larvae, which may belong to this sub-species. I say "may belong", because there are in our collections 6 adult specimens from Brčko. It is hardly imaginable that on a place so very near to Brčko (24km in bee-line) and laying proportionally so low (229m) above the sea-level, the typical *Triton vulgaris vulgaris* L. could be occur.

Order. *Anura*.Family. *Discoglossidae*.

5. *Bombina variegata gracilis* n. subsp. 9 ♂♂, 5 ♀♀ and some younger larvae. Zabrgje (Northeastern Bosnia), 229m, 9. VII. 1928.

Diagnosis. — A slender form with very weakly developed warts (Plate I. a), which are separated by smooth skin from one another; horny spines on top of warts very small in males, quite blunt in females. General colouration clay-yellow above, bluish-black beneath, with orange-yellow marbling, which colour predominates in all specimens. Plantar and metatarsal spots are almost always separated.

Total length. — ♂ (Type spec.) 40mm; ♀ (Type spec.) 42.5mm.

Type locality. — Zabrgje (Northeastern Bosnia). Four specimens (3 ♂♂, 1 ♀) preserved in our collections from Brčko (1895) at the Save river, belong also to this sub-species. The largest ♂ measures 40.5mm.

By some recent papers of Karaman (II. III. IV.), Fejérváry (I.) and especially by that of Mertens (VI.) my attention was drawn upon the *Bombina*-question and therefore I should like to communicate here some remarks on the *Bombina variegata* living in the western portion of the Balkan Peninsula.

I have examined the whole *B. variegata*-material of our Museum, consisting out of 34 specimens from the following localities: Zagreb (1 ♀),

Gostović-valley (near Zavidovići, Central Bosnia) (1 ♂, 5 ♀♀), Han Pijesak (W. Bosnia) (2♂♂, 1 ♀), Zenica (C. Bosnia) (1 ♀), Sarajevo (1 yg. ♀), Gola Jahorina-Mtns. (S. Bosnia) (2 ♂♂, 1 ♀), Maklen-saddle (S. Bosnia) (1 ♀), Mokra Gora (Serbia) (1 semiad. sex?), Gacko-Avtovac (E. Hercegovina) (1 ♂), Glavatićevo (Northern Hercegovina) 1 yg. ♂ & 1 ♀, Lelija-Mtns. (Bosnia) (1 ♂), Jablanica (Central Hercegovina) (1 ♂ & 1 semiad. ♀), Gabela (Hercegovina) (1 ♂, 1 ♀), Split (Spalato in Dalmatia) (1 ♂, 1 ♀), Veliki Vermač-Mt. (South Dalmatia) (1 yg. ♂), Babino Polje (Montenegrin-Albanian frontier) (1 ♀), Čakor-Mtns. (Montenegrin-Albanian frontier) (3 ♂♂, 1 ♀) and Kryoneri (Greece) (1 ♂).

The examination of this fine series from many localities has led me to the following conclusion: Along the whole western part of the Balkan Peninsula there exist only one sub-species of *Bombina variegata*, namely the subsp. *Kolombatovići* Bedr.¹⁾ The geographical area of this sub-species may be limited toward the East provisionally by a line drawn from Zagreb through Mokra Gora-Skoplje and up to Kryoneri (Akarania) in Greece. The Western — natural — boundary is made up by the Adriatic and the Ionian sea.

Karaman has already shown in two papers (III. & IV.) that all our Yellow-bellied Toads belong to the sub-species *Kolombatovići*. In spite of this statement Baron Fejérváry has founded a new variety on the basis of some Albanian specimens under the name of var. *Csikii* (l. p. 24.). Mertens and Müller in one of their quite recent work (V. p. 16.) have accepted this form and have given it the rank of a sub-species, expressing at the same time the opinion that it substitutes the subsp. *Kolombatovići* in the south-western part of the Balkan Peninsula from Montenegro to Greece.

My Montenegrin-Albanian material and that of Karaman from South Serbia clearly show that there is no difference between the northern (Croatia, Bosnia, Hercegovina, Dalmatia, Serbia) and southern (Montenegro, Albania, Macedonia and Greece) specimens. They all belong to the unique sub-species *B. variegata Kolombatovići* Bedr.

This sub-species may be characterized quite short as follows: Large form, the largest male (Gola Jahorina-Mtns.) measures 48 and the largest female from the same locality 51 mm from snout to vent. It is very rough (warty) above, with strongly developed spines (♂♂) (Plate I. b) on the top of the warts, or somewhat smoother, with weakly developed spines (♀♀); the yellow, or orange-yellow colour on the underparts is always predominant; the metatarsal and plantar spots are mostly confluent.

There are, of course, local exceptions, which does not influence the value of the above diagnosis at all. I must here specially emphasize that the specimens from higher localities (about 1000 m and upward) very clearly show the pure character of *Kolombatovići*; specimens from

¹⁾ In a most recent paper of mine "Die zoogeographische Bedeutung des Neretva- (Narenta-) Tales" (Glasnik zem. muzeja u Bosn. i Herc. XL. 1928. p. 35-44) I have placed the *B. variegata* living in the valley of the Neretva rivers provisionally to the nominate form (*B. varieg. varieg.*). After the study of our whole *Bombina*-material, I came to the above conclusion, therefore one must read in my paper quoted above instead of *B. varieg. variegata* L., *B. varieg. Kolombatovići* Bedr.

lower situated places with much warmer climate, are more similar to the typ. *B. varieg. variegata* from Central Europe.

The sex plays also an important role in the whole question. The males are always more "warty" and "spiny" than the females. Last but not least the season is also responsible for the epidermal structure of this toads. Pairing animals are undoubtedly more "warty" and "spiny", i. e. "rough" on their back, than the animals out of the pairing-season.

Mertens in his newest paper on the European species of *Bombina* (VI. p. 616.) alludes to the interesting question of the origin of our *Bombinae*. He assumes (VI. p. 618.) that the original Prepleistocene form was nearer related to *B. bombina* (to one early form from the East European lowland with orange-yellow, or yellow belly), than to an other type. He presumes further (VI. p. 622. Zusammenfassung) that the ancient form, out of which the two present species of *Bombina* have evolved, originates from South-eastern Asia. He brings *Bombina bombina* with *Bombina orientalis* and *Bombina variegata* with *Bombina maxima* in close connexion. I have procured for a few years a very good preserved ♂ of the latter species from Yunnan Fu (W. China) and this specimen thoroughly corroborates the supposition of Mertens, as one may see also from the structure of the skin (Plate I.c).

I should like to sketch the whole development of the two European *Bombina*-species as follows: The common ancestor of all the living *Bombinae* is to be sought for in fossil state in the northern regions of Eurasia. That form should have been the nearest ally of *Bombina maxima* and at the same time a lowland animal. The nearing first Glacial Period has driven this primeval form (at that time generally distributed in Eurasia) to Western, Central and Southern Europe and to Southeastern Asia on protected places, where they have endured the severe climate of that period (periods?). After the definite disappearance of the Glacial Periods this *variegata*-like ancestor, already accommodated to a relatively rough climate, has wandered successively on higher places, i. e. on the higher mountains and on the chain of lower mountains. Then followed another new invasion from the North-East in the form of *Bombina bombina*. It is very probable that this ancient form was nearly related to *Bombina orientalis*, as Mertens quite correctly remarks. *Bombina orientalis* has remained in Northeastern Asia as a relic, thoroughly cut-off from the western *Bombina bombina* population by the Central Asiatic deserts and chains of high mountains.

Family. *Bufo*idae.

6. *Bufo viridis viridis* Laur. 1 ad. ♀, Čelić, 6. VII. 1928. I have found this specimen in the evening on the road.

Family. *Hyla*idae.

7. *Hyla arborea arborea* L. During the walking tour from Čelić to Brčko, I have heard the voice of this species on several places.

Family. *Ranidae*.

8. *Rana ridibunda ridibunda* Pall. 1 yg. ♀ from Zabrgje, 10. VII. 1928; 1 semiad. specimen from Brezovopolje, 13. VII. 1928.

9. *Rana dalmatina* Bonap. 1 semiad. ♀ and 1 yg. specimen from Gornji Bukovice, 11. VII. 1928, captured in an oak grove on very dry ground.

Class. REPTILIA.

Order. *Chelonia*.

1. *Emys orbicularis* L. 1 yg. ♀, Zabrgje, 9. VII. 1928.

Order. *Squamata*.Suborder. *Lacertilia*.

2. *Lacerta viridis viridis* Laur. 1 yg. ♀, Zabrgje, 11. VII. 1928.

Suborder. *Ophidia*.

3. *Natrix natrix persa* Pall. The head of an old, slayed specimen of 130 cm length found on the banks of the "Gnjica"-creek, some kilometres north-east of Čelić. 6. VII. 1928.

4. *Elaphe longissima longissima* Laur. I have seen one large specimen in the vicinity of Zabrgje on July 10th. A slayed specimen was thrown in the main drain of the road between Bukovice donji and Brezovopolje. 12. VII. 1928.

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From the above short list we may see that the Amphibians and Reptiles collected in that region, belong mostly to a lowland biocoenosis. None of the species represent true mountain forms, save — perhaps — *Triton alpestris alpestris* Laur. and *Bombina variegata gracilis*. This latter with its slender shape, with the weakly developed warts and spines and — last but not least — with its orange-yellow coloured belly, constitute rather a transitory form between *Bombina bombina* L. and *B. variegata Kolombatovići* Bedr.

As I have stated already in the preface, this part of Bosnia is the immediate continuation of the great Slavonian lowland, separated from it only by the Save river, which is already inhabited by the typical *Bombina bombina* L.

The whole territory belongs to the Central European lowland fauna and the pure character of this biocoenosis is disturbed only by *Triton vulgaris meridionalis* Blgr., which has successively advanced along the Save river from its original mediterranean home up to that part (Brčko, Zabrgje) of Bosnia.

Sarajevo, February 28th 1929.

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EXPLANATION OF PLATE I.

Structure of skin on back.

- Fig. a = *Bombina variegata gracilis* n. subsp. ad. ♂ (Type) from Zabrgje (Northeastern Bosnia), 229 m, 9. VII. 1928.
- Fig. b = *Bombina variegata Kolombatovići* Bedr. ad. ♂ from the Gola Jahorina Mtns. (Southern Bosnia), 1850 m, 16. VII. 1921.
- Fig. c = *Bombina maxima* Blgr. ad. ♂, Yunnan Fu (W. China). Purch. from Rosenberg in London. Del. Dr. Bolkey.
- All the figures are magnified four-times.

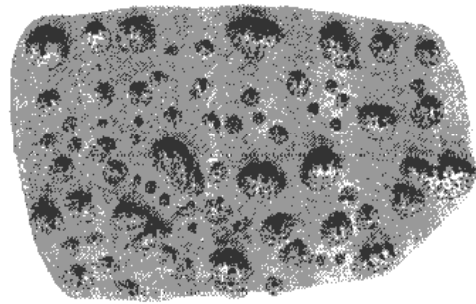
EXPLANATION OF PLATE II.

- Fig. 1. *Bombina variegata gracilis* n. subsp. ad. ♂. Type specimen from Zabrgje (Northeastern Bosnia), 229 m, 9. VII. 1928. Viewed from above. Nat. size.
- Fig. 2. The same specimen from below. Nat. size.
- Fig. 3. *Bombina variegata Kolombatovići* Bedr. ad. ♂, from the Gola Jahorina Mtns. (Southern Bosnia), 1850 m, 16. VII. 1921. Viewed from above. Nat. size.
- Fig. 4. The same specimen from below. Nat. size. Del. E. Germ.

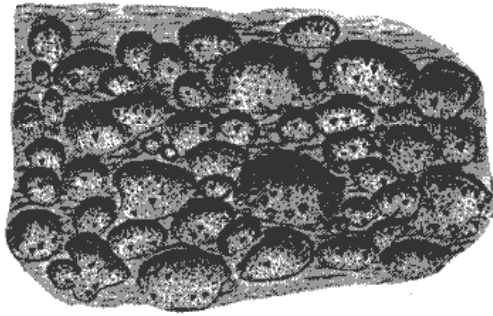
EXPLANATION OF PLATE III.

- Fig. 1. *Bombina maxima* Blgr. ad. ♂ from Yunnan Fu (W. China). From above. Nat. size.
- Fig. 2. The same specimen from below. Nat. size. Del. E. Germ.

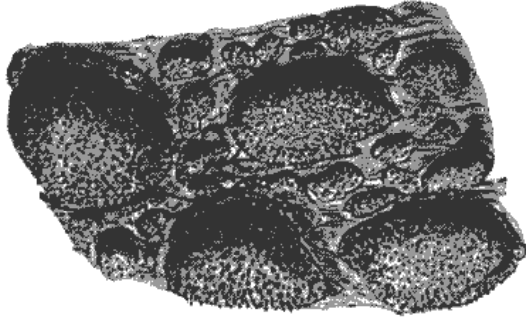
Plate I.



a



b

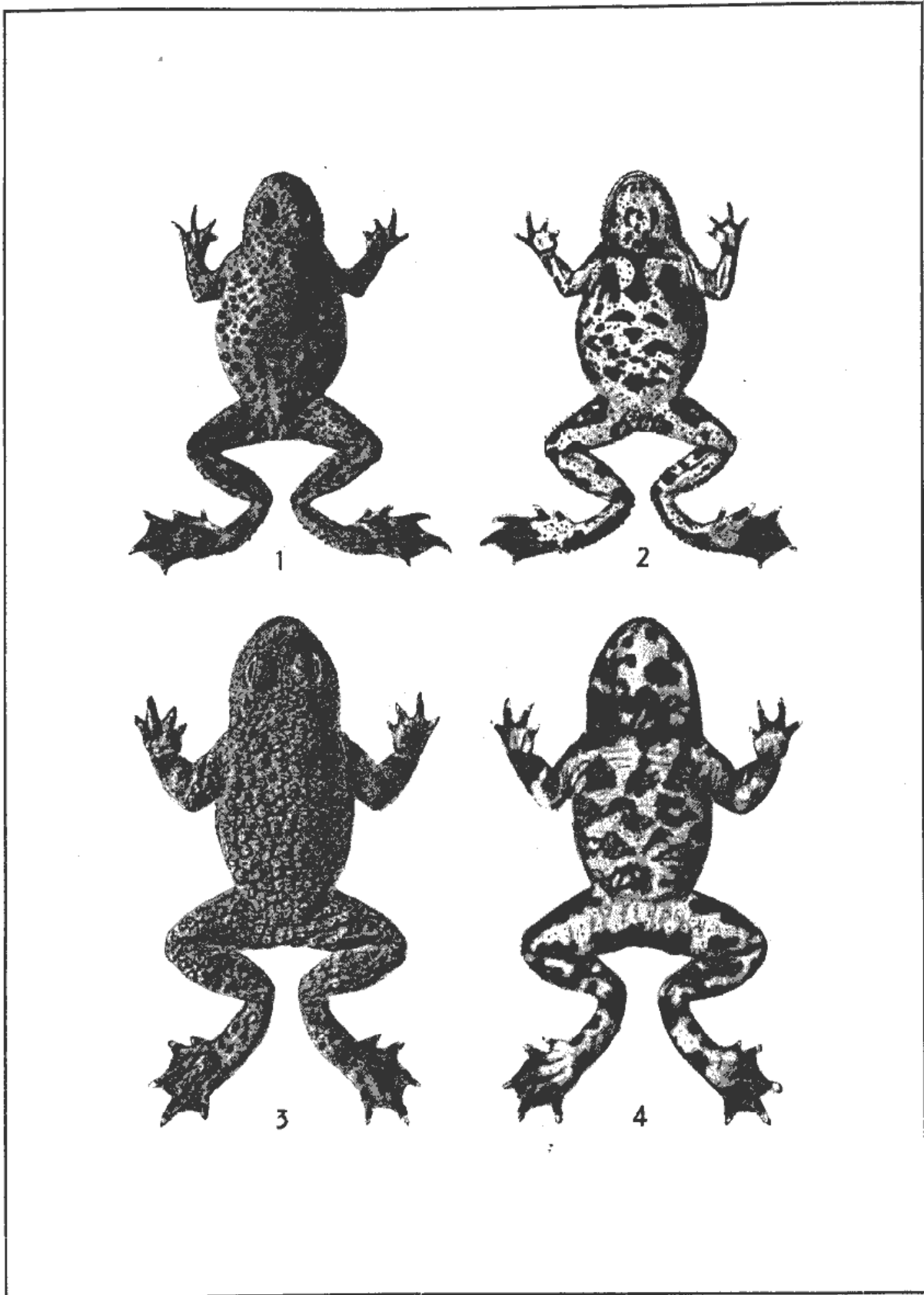


c

Del. Dr. Bolkey.

Structure of skin on back of various *Bombina*-species.

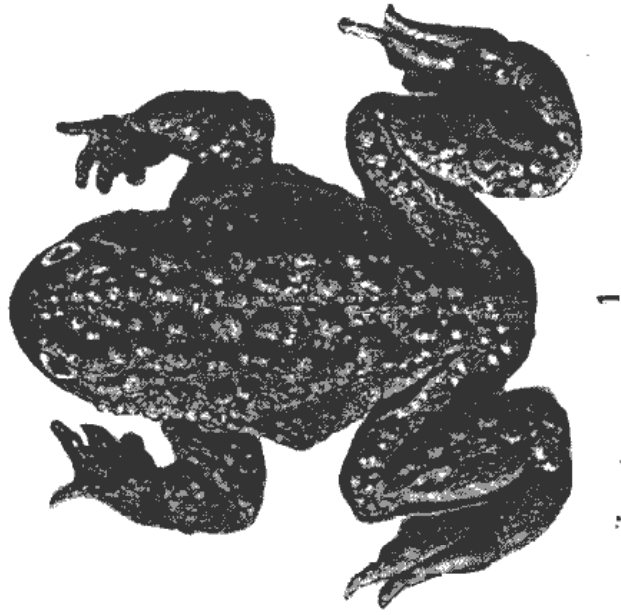
Plate II.



Del. E. Germ.

Bombina variegata gracilis n. subsp. & *Bombina variegata Kolombatovići* Bedr.

Plate III.



Del. E. Germ.

Bombina maxima Blgr.