

# FOOD ANALYSIS OF SOME *RANA* SPECIES IN THE HABITAT OF CARSKA BARA (YU)

E. Popovic, S. Simic and B. Tallósi

*Popovic, E., Simic, S. and Tallósi, B. (1992): Food analysis of some Rana species in the habitat of Carska Bara (YU). - TISCLIA 26,1-3.*

**Abstract.** The analysis of stomach content was done for following species: *Rana kl. esculenta* L., *R. lessonae* Camerano and *R. ridibunda* Pallas. It was found that these species feed on different groups of invertebrates (*Crustacea*, *Arachnida*, *Insecta*, *Myriapoda*, *Gastropoda* and *Bivalvia*). Quantitative and qualitative composition of food shows that insects are predominant.

**Keywords:** *Carska bara (YU)*, feeding, *Rana species*

E. Popovic, S. Simic, Institute of Biology, University of Novi Sad, 21000 Novi Sad, Yugoslavia, B. Tallósi, Institute for Plant Protection, Faculty of Agriculture, Novi Sad, Yugoslavia

## Introduction

Frogs are significant members of food webs in aquatic habitats. *Rana ridibunda* inhabits the whole territory of the former Yugoslavian countries, while species *R. kl. esculenta* and *R. lessonae* are characteristic only for northern parts of the Balkan peninsula (Radovanovic, 1951; Engelmann et al. 1985). They live in all types of aquatic habitats (ponds, lakes, fish ponds, backwaters, rivers), or in their vicinity. They are representatives of lowland species except of *R. ridibunda* which is quite often found on hills and mountains up to 2500m altitude. They rise from hibernation at the beginning of March and April, and their reproduction season is during the first half of April and May (Radovanovic, 1951; Engelmann et al, 1985). They are voracious species, active both during daylight and night. Edible and marsh frogs hibernate in the mud of aquatic habitats; while the pool frog hibernates in land (Arnold and Burton, 1978; Engelmann et al, 1985).

Concerning the feeding of *Rana* species, the formerly Yugoslavian literature contains only preliminary reports (Popovic and Mikes, 1989) related to Koviljski meadow. Having in mind the importance of this problem and the insufficient studies, we have tried to contribute for its better understanding.

## Methods

The quantitative analysis of frogs feeding was carried out in a sample of 32 individuals (*R. kl. esculenta*: 23 specimens; *R. lessonae*: 7 specimens and *R. ridibunda*: 2 specimens). Although the sample was small, obtained results were relevant because they represented the first data of this kind not only for Carska bara, but for whole area of formerly Yugoslavia. Beside that, all kinds of green frogs are protected as rare species with limiting catch permission. Accidental sample points to natural relations in representation of certain types, showing both fauna conditions of given habitat and its other ecological characteristics. They were collected in the region of Carska bara (near the Tisza) during July, 1990 at the forest edge dominated by flotant vegetation. Frogs were caught by nets and fish hooks during the period of their greater activity, from 9 a.m. to 4 p.m. Collected specimens were determined to the level of species (Engelmann et al. 1985). Sex and age were also defined. Biometrics data were also taken. After dissection, stomach contents were put into test tubes containing 70% alcohol. Stomach content determination was made according to the classification of Schmidt (1970) and Kerovec (1986).

## Certain characteristics of investigated area

Carska bara presents an inundated area of the river Tisza around the mouth of the river Begej. On the right side of Carska bara, there is a fish pond surrounded by agrobiocenoses. It is situated behind the protection embankment. Around it, there is a marshy forest association *Saliceto-Populetum nigrae*; a swampy association of *Scirpo-Phragmitetum* is spreading in front of it. Floating association of *Nymphaeetum albo-luteae* and submerged *Myriophyllo-Potametum* are predominant along the shore of the pond. This kind of area offers suitable conditions for survival and development of heterogeneous fauna.

## Results and discussion

*Rana* species are abundant and widely spread group of amphibians in Vojvodina. That is the reason generally they have an important role in the nature and especially in the population regulation of other animals they feed on. Performed under the international project "Exploration of the River Tisza", a new study about the feeding of these species has been initiated.

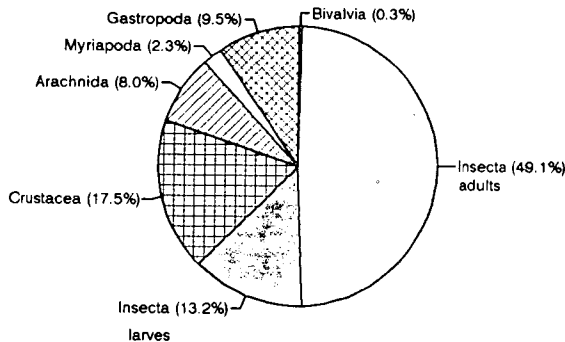


Fig. 1. Food contents of analyzed frog species.

Quantitative and qualitative composition of food shows that insects are predominant in the food of *Rana* species. The insects were represented with 171 (49.1%) adult forms (Fig. 1.). Beside adults, insect larvae with 46 specimens (13.2%) were also found, making a total of 62.3% food quantity. The species of the family *Formicidae* (*Hymenoptera*) were the most represented among insects. This is partly conditioned by a selective preference for the prey in question. At the same time it points out also the specificity of biocenotic components of the analyzed biotop. Other classes of invertebrates had a following share in food contents: *Crustacea*

17.5%; *Arachnida* 8%; *Myriapoda* 2.3%; *Gastropoda* 9.5% and *Bivalvia* 0.3%. From analyzed area, data of *Gastropoda* participation in food is in accordance with those from Kminiak (1978), and Popovic and Mikes (1989), (9.2% and 10.6%, respectively). But opposite Kminiak (1978), we did not record *Oligochaeta* presence in stomach contents.

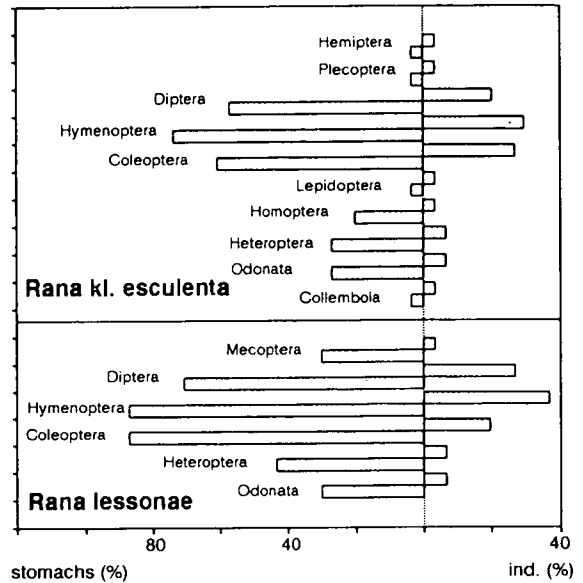


Fig. 2. Quantitative and qualitative presence of some insect orders in the stomachs of analyzed frog species.

Although the sample was not standardized in regard to the number of analyzed specimens, it was possible to recognize certain relations in feeding, on the basis of obtained results. With species *R. kl. esculenta*, beside insects and their larvae, the class of *Crustacea* (22.6%) was quite noticeable. This was not the case with pool frog (3.5%; Fig. 2.). One specimen of the edible frog had 42 individuals in its stomach content, and therefore there is such a high percentage of *Crustacea* in food. Then, there were the representatives of the class *Arachnida*, *Gastropoda* and *Myriapoda*. Only one individual of class *Bivalvia* was found in a stomach content. *Hymenoptera* (74% - 35 sp.) predominated among insects (Fig. 3.) because of the large individual number of *Formicidae* species. *Coleoptera* (60.9% - 31 sp.) and *Diptera* (56.5% - 24 sp.) had also an important role in feeding of edible frog, while it is not the case with other insect groups. According to Kminiak (1978) and Popovic and Mikes (1989), *Coleoptera* takes part with 44.5% and 54.1%, and *Diptera* with 7.6% and 13% in edible frog food.

Such differences of food contents were the result of differences in habitat conditions.

With species *R. lessonae*, the percentage of food composition was almost the same. It was the case both in other groups of invertebrates, as well as for some species of insects (Fig. 2. and 3.). The only obvious difference was in relation to the presence of *Crustacea* species.

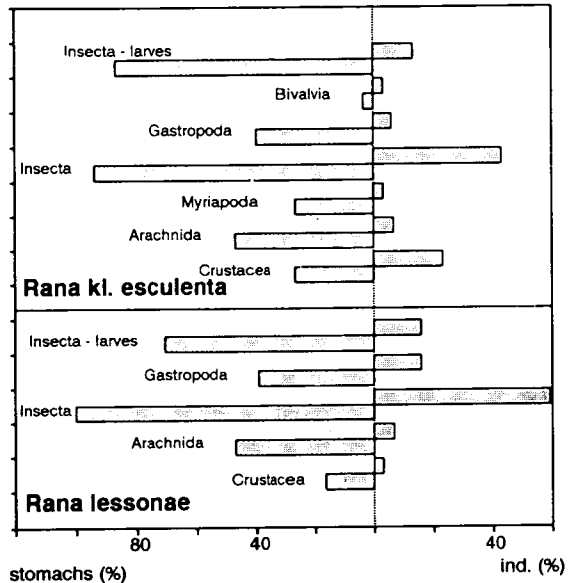


Fig. 3. Quantitative and qualitative presence of some invertebrate classes and their larvae in stomachs of analyzed frog species.

The analysis of stomach contents of only two marsh frog specimens provided us with insufficient result for comparison with data obtained for other two species. The insects were represented with

only 4 specimens in the stomach contents (*Hymenoptera* - 2, *Coleoptera* - 1 and *Orthoptera* - 1) and the class *Gastropoda* with one specimen.

We have especially to underline the data relating to the insufficient role of aquatic insects in feeding of genus *Rana*.

## References

- Arnold, E. and Burton, J.A. (1978): A Field Guide to the Reptiles and Amphibians. Collins, London
- Engelmann, W.E., Fritzsche, J., Gunter, R. and Obst, J.F. (1985): Lurche und Kriechtiere Europas. Neumann Verlag, Leipzig
- Kerovec, M. (1986): Prirucnik za upoznavanje beskrakjesnjaka nasih potoka i rijeka (The handbook of invertebrates in Yugoslavian streams and rivers), SNL, Zagreb
- Kminiak, M. (1978): Food composition of certain Amphibians at the beginning of their seasonal activity. Acta Fac. verum natur. Univ. comen. Zool. 23,105-114.
- Peterson, A. (1953): Larvae of Insects, Part II., Columbus, Ohio, USA.
- Popovic, E. and Mikes, M. (1989): Ishrana nekih vrsta roda *Rana* (*Amphibia: Anura*) u Vojvodini (The feeding of some frog species from genus *Rana* (*Amphibia: Anura*) in Vojvodina), Naucni skup: "Josif Panic i prirodne nauke", 23. 24. X, Beograd.
- Radovanovic, M. (1951): Vodozemci i gmizavci nase zemlje (Amphibians and Reptiles of Yugoslavia), Naucna knjiga, Beograd.
- Schmidt, L. (1970): Tabelice za determinaciju insekta. Prirucnik za agronome, sumare i biologe (Determination tables for Insects. The handbook for students of agronomy, forestry and biology), Sveuciliste u Zagrebu, Zagreb
- Slavinic, Z. (1952): Nizijske sume Vojvodine (Die Niederrungswälder der Vojvodina), Zbornik za prirodne nauke Matice Srpske, 2,17-39, Novi Sad.
- Slavinic, Z. (1956): Vodena i braska vegetacija Vojvodine (Die Wasser- und Sumpfvvegetation der Vojvodina), Zbornik za prirodne nauke Matice Srpske, 10,5-73, Novi Sad.