

## TROPICAL SPECTRUM OF A *RANA RIDIBUNDA RIDIBUNDA* PALLAS 1771 POPULATION FROM CEFA (JUD. BIHOR, ROMÂNIA)

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*Key words:* Cefa, *Rana ridibunda*, tropical spectrum

### INTRODUCTION

The species *Rana ridibunda* is a zoophagous poliphag (Ghira 1997), which has an important position in the tropical network situated in the ecoton area, at the border from aquatically and terrestrial ecosystems (Burton, Likes 1975).

In the studied area *Rana ridibunda* is the only species belonging to the green ranid series, being well represented, through very large populations, contrary some old opinions who considerate this species rare in the western part of Romania (Fuhn, 1960, 1967).

Our study endorse the knowledge of the role of the green frog in the tropical network of the aquatically ecosystem from Cefa jud. Bihor, by identifying the consumed preys. Although that until now there exist many studies referring at the tropical spectrum of *Rana ridibunda* (Ratajsky and Vojtkova, 1971; Medvedev, 1974; Sin et al., 1975; Sczerbak and Sczerban, 1980; Gutowski and Krzystofiak, 1988; Török and Csorgo, 1992; Simic et al., 1995; Ghira et al., 1997), those studies show disparate dates, the samples being collected in the majority of the situations in a specific period of the year. So, they have only a limited relevance among the evolution of the tropical spectrum of the green frog on a year period. Our study endorses exactly to follow the changes determined by the season in the tropical spectrum of this species and to compare the feeding resources in each period.

### MATERIAL AND METHOD

For our study we chose the ponds from the area of Cefa village, for the reason that this wet area represents an optimal environment from *Rana ridibunda*. The specimens studied by us from the perspective of their tropical spectrum belong with certainty to the species *Rana ridibunda* Palas, without presenting any character of the species *Rana lessonae* (Vancea et al 1989).

Cefa village is situated in the Crișurilor lower plain, at approximately 100-metre altitude, near to the Romanian-Hungarian state border. The swamp from here occupied an area by approximately 160 square km, being mainly arranged and dammed for pisciculture purposes, presented under the form of a succession of some greets basins linked trough the agency of a drain network, detached from the Crișurilor Channel. Near

that it begin the Rădvani forest, with little surface, but very damp, practically until the second part of mai being in large part swamped. The ponds from Cefa continues on the territory of Hungary with the similarly systems from Biharrugra.

During our activity (March – October 2000), we have studied the stomach contents of 230 *Rana ridibunda* exemplary, 20 contents being take in March and then 30 monthly in the period April – October inclusiv. The studied specimens were captured on the channels starting near the Rădvani forest and then going to Cefa village. The animals were captured with a net and to avoid harming the animals the harvest of the stomach contents were took with the stomach washing method (Cogălniceanu 1997). Once were tacked the probes, the animals were released in the provenience environment. The specimens were adults, the stomach contents once taken were stoked in tight test tubes and conserved with a 4% formalin solution. The study of the material was made under a binocular magnifying glass, determination of the pray being realised on the basis of the speciality literature of the domain (Radu și Radu 1967, Crișan și Mureșanu 1999, Crișan și Cupșa 1999, Ionescu et al 1971).

### RESULTS AND DISCUSSIONS

From the 230 stomach studied, 212 (92,81 %) have stomach contents and 18 (7,82 %) were empty, unequal distributed during the analysed period table. 1

Table. 1 Number and weight of empty stomach at the *Rana ridibunda* studied population in relation with the seasons

Month	March	April	Mai	Jun	Julie	August	Septem	Octom
No. of studied stomach	20	30	30	30	30	30	30	30
No. of empty stomach	7	4	0	0	0	4	1	2
% of empty stomach	35%	13,3%	0%	0%	0%	13,3%	3,33%	6,66%

In the stomach with contents we were identified in totally three groups of pray: animal preys, vegetal rests and mineral fragments.

### 1 Animal preys

#### Quantitative analysis

In the trophical spectrum of the studied *Rana ridibunda* population we are identified a total of 21 pray taxa, number variable in relation with the period of the year, the bigger number of pray taxa, 15, was found in June and September (Table 2).

Table 2 Pray taxa identified in the trophical spectrum of the studied *Rana ridibunda* population

Months	III	IV	V	VI	VII	VIII	IX	X
Insects								
Colebole	-	-	*	*	-	-	*	*
Odonate	-	*	*	*	*	*	-	-
Ortoptere	-	-	*	-	*	-	-	*
Heteroptere	*	*	*	*	*	*	*	*
Homoptere	-	-	-	*	*	*	*	*
Trichoptere larve	*	*	-	-	-	-	-	-
Coleoptere	*	*	*	*	*	*	*	*
Panorpate	-	*	*	*	-	-	-	-
Megaloptere larve	-	-	-	-	-	*	*	-
Lepidoptere larve	*	-	*	*	*	*	*	*
Diptere	*	*	*	*	*	*	*	*
Hymenoptere	*	*	*	*	*	*	*	*
Other invertebrates								
Anelida	-	*	*	*	*	-	-	*
Gastropode	-	*	*	*	*	*	*	*
Araneide	*	*	*	*	*	*	*	*
Opilionide	-	-	-	-	-	-	*	-
Pseudoscorpionide	-	-	-	-	*	-	-	-
Acarieni	-	-	-	-	-	-	*	-
Crustacee	*	*	*	*	*	-	*	*
Vertebrates								
Pisces	*	*	-	*	-	-	*	*
Amfibia	-	*	-	*	*	*	*	*
Total no. pray taxons	9	13	13	15	14	11	15	14

From the 21 taxa identified by us, 5 appeared on the whole period of study: *Araneide*, *Heteroptere*, *Coleoptere*, *Diptere* and *Hymenoptere*, founded constant in the trophical spectrum of the population of *Rana ridibunda* from Cefa in the entire period March – October 2000. Those taxa were also identified by other authors who studied the trophical spectrum of *Rana ridibunda* (Gutowski & Krzystofiak, (1988), Medvedev (1974), Sczerbak & Sczerban (1980), Torok & Csorgo (1992), Simic et al. (1995), Ratajsky & Vojtkova (1971) Sin et al. (1975) 9 - Ghira et al. (1997)). Also, another 3 taxa: *Gastropode*, *Crustacee* and larva of *Lepidoptere* appeared constantly in 7 from the 8 month of study, their absence in one of the month being probably accidental. There are two maximum of the number of prays taxa, in

June and September (15 taxa) and two minimum one in March (9 taxa) and one in August (11 taxa). The minim from March may be understandable trough the low temperature from the period, fact which negatively influenced the potentials pray. The August minim was determined by the drought that was registered in the period, drought that affected the trophical resource disposable from *Rana ridibunda*, especially as a result of drying the swamps from the Rădvani forest, so the green frogs can't any more feed at the level of the forest.

Previous studies referring to the trophical spectrum of *Rana ridibunda* show that the green frog consumed between 9 and 17 pray taxa (table 3). The big number of pray taxa obtained buy us may be understandable because of the long period of the study (III – X).

1 - Gutowski & Krzystofiak, (1988) - *R. esculenta*; 2 - Medvedev (1974); - *R. esculenta* & *R. ridibunda*; 3 - Sczerbak & Sczerban (1980); - *R. ridibunda*; 4 - Torok & Csorgo (1992); - *R. esculenta* & *R. ridibunda* 5 - Szabo (in Torok & Csorgo. 1992); 6 - Simic et al. (1995); 7 - Ratajsky & Vojtkova (1971); 8 - Sin et al. (1975); *R. ridibunda*; 9 - Ghira et al. (1997); - *R. ridibunda*; 10 - this paper

Comparing our results with those from the literature it's ascertain that we identified five new taxa in the trophical spectrum of the studied species: *Opilionida*, *Pseudoscorpionide*, *Trioptere*, *Panorpate*, and *Mecoptere*. Also *Araneidele* have the highest percentage 11,55 %, with 2,85 high than in Gutowski & Krzystofiak data's in Poland. In rest of our results are closed by those from the literature, only two taxa found by other authors (*Miriapode* și *Dermaptere*), hasn't been found also by us.

From the 21 pray taxa found by us, the majority, 12 appartained to the Insect.

In the situations in which the condition of the stomach contents permitted, it effectuated the determination of the family from which was appartained the prays. For example, the Coleoptere are represented trough 9 families, identified for a certainty (table 4). From the Coleopterc families, constantly appeared Coccinelidae (in 7 from the 8 month of study), followed by the *Curculionidae* and then *Crizomelidae*. Accidentally appeared the family of *Cerambycidae* and *Cantaridae* each in only one month from the whole period of study.

In the Hymenoptere order we can identified for a certainty specimens from the families of *Formicidae* (including genus *Camponotus*), *Vespidelcor* and from *Apidae* family.

*Rana ridibunda* is an zoophagous poliphag species. Like the other amphibians species, the green frog utilised the food resources related by the trophical basis offered by the environment and by the period when it is active (Schoener, 1974).

#### Cantitative analysis of the stomach contents

From a quantitative perspective along the period of our study, we identified a total of 1030 preys, unequal distributed on the period of the year (table 5). The month with the most prey taxa identified was Junc (206 preys).

Table 3. Comparison between our dates and those from the literature about the tropical spectrum of *Rana ridibunda*

Authors	1	2	3	4	5	6	7	8	9	10
Country	Polonia	Rusia	Ucraina	Ungaria	Ungaria	Serbia	Slovacia	România	România	România
Frogs number	10	54	35	47	55	45	42	514	60	230
Total nr. of prays	114	394	217	238	387	523	227	3156	376	1030
Nr. of pray taxa	10	11	13	14	14	11	9	17	13	20
Insects										
Hymenoptere	16.6	13,7	45,1	23,5	11,1	6,3	11	11,6	11,4	23,49
Coleoptere	24.5	52,8	29,9	16,3	26,6	37,8	28,4	10,5	24,5	20
Diptere	16.6	11,1	7,8	8,8	12,4	23,5	27,8	23,7	11,4	9,12
Lepidoptere	16.6	0,2	2,3	2,1	1,8	1,5	-	2,1	1,1	7,57
Heteroptere	8.7	3,3	1,4	1,2	3,1	6,5	2,2	1,7	5	5,53
Homoptere	2.6	-	0,5	15,5	0,5	-	0,9	29,1	1,1	3,39
Odonate	-	-	0,5	-	0,8	3,6	-	0,5	5,6	1,84
Indeterminate insects	-	-	-	-	-	-	-	-	-	0,97
Colembole	-	-	-	0,4	24,8	-	-	1,9	-	0,77
Panorpate	-	-	-	-	-	-	-	-	-	0,69
Ortoptere	-	2	-	1,2	1,8	1,9	-	1,6	2,4	0,58
Megaloptere larve	-	-	-	-	-	-	-	-	-	0,48
Trichoptere larve	-	-	-	-	-	-	-	-	-	0,38
Dermaptera	-	-	1,8	-	-	-	-	0,1	0,5	-
Total insecte	85.6	83,1	89,3	69	82,9	82,3	82,4	81,8	63,5	73,49
Other inverte.										
Araneide	8,7	9,6	3,2	4,2	5,1	2,7	3,8	3,5	6,1	11,55
Gastropode	13,1	4,3	2,7	6,7	7,2	11,5	9,7	1	4,2	6,01
Crustacee	1,7	-	-	4,6	2,1	2,9	-	4,1	25,2	2,91
Anelida	0,8	0,5	0,9	0,4	-	-	2,6	0,5	-	1,35
Opilioni	-	-	-	-	-	-	-	-	-	0,19
Pseudoscorpionide	-	-	-	-	-	-	-	-	-	0,09
Acanieni	-	-	-	5	2,1	-	-	0,2	0,3	0,09
Minapode	-	0,5	1,4	2,1	0,2	0,8	3,1	0,2	-	-
Vertebrates	-	0,2	1,4	-	-	-	-	8,9	-	3

In the same time it may be seen a periodical fluctuation of the frequency which *Rana ridibunda* consumed a certain prey taxa. That fluctuation interest as well the period in which it is consumed a certain prey taxa and also the percentage in which it is consumed the prey taxa.

The seasonal fluctuation interests the most prey taxa, in each case that fluctuations having an explication related by an internal parameter of each prey taxa. For example, *Diptere* represented on average under 15 %, represented 55.73 % from the total of the prays captured in March, and 13.11 % in October. Because of the low temperature registered in those months, the other kinds of preys were less accessible. In September when the frogs consumed more *Lepidoptere* larva and *Hymenoptere*, the *Diptere* registered only 0.72 % from the total amount of the month. An opposite situation has the *Hymenoptere* who have the minimum in March (1.63 %), but in June they reach at 37.37 % as a result of the swarms. The *Araneide* represent in average approximately 10 %

from the green frog preys, but in the month of April and May they registered height percentage (14.46 % and 27.47 %) as a result of the fact that *Rana ridibunda* extends the

Table 4. Numerical variation of Coleoptere familis in the tropical spectrum at the population of *Rana ridibunda* from Cefa

Month	III	IV	V	VI	VII	VIII	IX	X
<i>Stafilinide</i>	Da	Da	Da	-	-	-	-	-
<i>Carabide</i>	-	Da	-	-	Da	-	Da	-
<i>Elateride</i>	-	Da	Da	Da	-	-	-	-
<i>Curculionide</i>	-	Da	Da	Da	Da	-	Da	Da
<i>Coccinelide</i>	-	Da	Da	Da	Da	Da	Da	Da
<i>Crizomelide</i>	-	Da	Da	Da	-	Da	Da	-
<i>Cerambycide</i>	-	-	Da	-	-	-	-	-
<i>Ditiscide</i>	-	-	-	Da	-	-	-	Da
<i>Cantaride</i>	-	-	-	Da	-	-	-	-
Familis nr.	1	6	6	6	3	2	4	2

Table 5. Seasonal variation of number and weight of different prey taxa in the tropical spectrum of the population of *Rana ridibunda* from Cefa

Month	III		IV		V		VI		VII		VIII		IX		X		
	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%	Nr	%	
TOTAL NUMBER OF PRAYS	61	100	159	100	189	100	206	100	118	100	98	100	138	100	61	100	
Frogs number	20		30		30		30		30		30		30		30		
Pray numbers / frog	3.05		5.3		6.3		6.86		3.93		3.26		4.6		2.03		
Insects																	
Hymenoptere	1	1.63	41	25.78	18	9.52	77	37.37	34	28.81	26	26.53	35	25.36	10	16.39	
Coleoptere	5	8.19	25	15.72	66	34.92	47	22.81	24	20.33	7	7.14	22	15.94	10	16.39	
Diptere	34	55.73	13	8.17	8	4.23	13	6.31	8	6.77	9	9.18	1	0.72	8	13.11	
Lepidoptere larve	4	6.55	-	-	7	3.70	1	0.48	6	5.08	18	18.36	32	23.18	10	16.39	
Heteroptere	4	6.55	6	3.77	11	5.82	14	6.79	11	9.32	9	9.18	1	0.72	1	1.63	
Homoptere	-	-	-	-	-	-	5	2.42	6	5.08	11	11.22	12	8.69	1	1.63	
Odonate	-	-	1	0.62	4	2.11	8	3.88	5	4.32	1	1.02	-	-	-	-	
Insecte nedeterminabil	-	-	-	-	9	4.76	1	0.48	-	-	-	-	-	-	-	-	
Colembole	-	-	-	-	1	0.52	1	0.48	-	-	-	-	-	4	2.89	2	3.27
Panorpate	-	-	1	0.62	4	2.11	2	0.97	-	-	-	-	-	-	-	-	
Ortoptere	-	-	-	-	3	1.58	-	-	2	1.69	-	-	-	-	1	1.63	
Megaloptere larve	-	-	-	-	-	-	-	-	-	-	2	2.04	3	2.17	-	-	
Trichoptere larve	1	1.63	3	1.88	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL	45	80.28	90	56.56	131	69.27	169	81.99	96	81.4	83	84.67	110	79.67	43	70.44	
Other Intervertebrates																	
Araneide	6	9.83	23	14.46	33	27.46	18	8.73	11	9.32	10	10.20	9	6.52	9	14.75	
Gastropode	-	-	27	16.98	15	7.93	6	2.91	3	2.54	4	4.08	3	2.17	4	6.55	
Crustacee	5	8.19	15	9.43	2	1.05	3	1.45	3	2.54	-	-	1	0.72	1	1.63	
Anelida	-	-	1	0.62	8	4.23	3	1.45	1	0.84	-	-	-	-	1	1.63	
Opilioniide	-	-	-	-	-	-	-	-	-	-	-	-	2	1.44	-	-	
Pseudoscorpioniide	-	-	-	-	-	-	-	-	1	0.84	-	-	-	-	-	-	
Acarieni	-	-	-	-	-	-	-	-	-	-	-	-	1	0.72	-	-	
TOTAL	11	18.02	66	41.49	58	40.67	30	14.54	19	16.08	14	14.28	16	11.57	15	24.56	
Vertebrates																	
Pisces	1	1.63	2	1.25	-	-	3	1.45	-	-	-	-	11	7.97	2	3.27	
Amfibia	-	-	1	0.62	-	-	4	1.94	4	3.38	1	1.02	1	0.72	1	1.63	
TOTAL	1	1.63	3	1.87			7	3.39	4	3.38	1	1.02	12	8.69	3	4.9	

hunting are in the neighbouring forest, who is swamped in the spring month. The *Coleoptere* represent in average 16.39 % from the preys of the lake frog, but they are most intense captured in May (34.92 %), probably because they are the most accessible prey in that period.

Also it is understandable the increasing of the Lepidoptere larva in the autumn months (August 18.36 %, September 23.18 and October 16.39 %) in this conditions before that period those taxa registered values lower than 7 %. The explanation resided in the fact that in the autumn it appeared a largest number of Lepidoptere larvae that consume the vegetation from the drain borders. That larvae are living covered by two leaves. It is an interesting fact that the green frogs are identified even in that situation, being obligated for capturing them to cut out that piece of the leaf that contains the larva. So, in the stomach of *Rana ridibunda*

it will be two leaf pieces that contain between them a Lepidoptere larva.

A major importance for the *Rana ridibunda* population from Cefa has the Rădvanu forest, which is damp in the most period of the year, so it is accessible for the green frogs, representing an additional food source. This collateral trophic resource is accessible until the second half of the spring fact proved by the massive presence in that period of *Rana ridibunda* in the damp area deep in the forest, at great distance from their usual environment. In the same time that fact is proved by the stomach contents, in which the preys obtained with a certainty from the forest became important.

In conclusion, the tropical spectrum of *Rana ridibunda* from Cefa area, alternated enough much, being dependent by the biological cycle of the different Intervertebrates species living on the soil and on the vegetation from the green frogs hunt area. *Rana*

*ridibunda* has no taxonomic preferences, it consumed always the more accessible prey species, usual those which are in big number.

Althought in small number, the Vertebrate are relatively frequently consumed. From the Fish, we identified with certainty the species: *Alburnus alburnus* and *Pseudorasbora parva*. The amphibians found in the stomach contents of *Rana ridibunda* were as well larvas and adults, only one specimen being identified as *Rana ridibunda*. Probably, the other specimens belong to the same species. Before September, the Fish representing at last that 2 % from the total of the preys, in that month they reached at 7,97 % this fact has two explanations: a situation characteristic to the Cefa fish - ponds and an ethological adaptation of the frogs to that situation. At Cefa's fish - ponds, the pisciculture is achieved trough traditional methods, so, the alimentation of the ponds with water is achieved trough the agency of some drains situated little at a higher level than the ponds. In the same time, the evacuation of the water its achieved trough the agency of some pipe in a drain network situated at a lowest level. The fish are harvest emptying completely the ponds and than collecting the fish from the bottom of them. In the time when the ponds are emptying some fish are involve trough the running - tunnel, stunned, hit by the walls and then evacuated in the drain network where they are raise at the water surface. Here the green frogs that are coming in very large number in the area, in special big specimens capture the fish that have the right dimension and which are still moving.

The pray taxa with the height percentage in the tropical spectrum of the *Rana ridibunda* population studied by us are the *Hymenoptere* (23,48 %) and the *Coleoptere* (20 %) and *Araneide* representig 11,55 % from the total of the preys. The others taxa have percentages less than 10 %. the lowest percentage have the *Acarieni*, *Pseudoscorpionide* (0, 09 %) and *Opilionide* (0,19 %), who appeared accidentally. From the total of the preys the heightest percentage is obtained by de Insects who represented 73,49 %.

In table 6 it is render the number and the weight of the preys of each taxa from the whole period of study. As a result at the fact as the same specimen of *Rana ridibunda* may consume in the same time more taxa and more specimen from that taxa, the frequency of a certain taxa appeared in the tropical spectrum of the green frogs is different from the weigh of that taxa from the total of the preys. The frequency render by the rapport from the number of stomach contenting a certain taxa and the total number of the stomach containing that taxa is illustrate in the same table 6.

In the case of the weigh with different prey taxa appeared in the tropical spectrum of *Rana ridibunda*, the heightest weight is obtained by the *Hymenoptere* followed by the *Coleoptere*, the preys more frequently captured by the green frogs being also the Insects.

An important aspect is the environment from where come the preys, their appartenance at aquatic or terrestrial environment. On the whole period of our

study, it's ascertain that 174 from the total preys consumed by *Rana ridibunda*, representing 16,89 % came from aquatic environment, and the rest (865 preys representing 83,10 %) was terrestrial preys. Those percentages registered an important seasonal variation (table 7).

The heightest percentage of aquatic preys is registered in the spring and the autumn months, the lowest being notice in summer. As an exception appeared April which with 34,59 % aquatic preys is detaching from the average of the other month. This heightest percentage may been explained trough the *Gastropode* and *Crustacee*, taxa represented especially trough aquatic forms.

Table 6. Number, weigh and frecvency of the preys taxa in the tropical spectrum of the *Rana ridibunda* population from Ccfa from the whole year 2000

Pray Taxon	Total number of preys	% of pray in the total no of preys	No of frogs that consumed the pray taxon	No of preys/ frog	% of the frogs that consumed the pray taxon
Insects					
Hymenoptera	242	23,49%	93	2,60	40,4
Coleoptera	206	20%	90	2,29	39,1
Diptera	94	9,12%	45	2,00	19,5
Lepidoptera larvae	78	7,57%	39	2,00	15,6
Heteroptera	57	5,53%	37	1,54	16
Homoptera	35	3,39%	19	1,84	8,2
Odonata	19	1,84%	15	1,27	6,5
Indetermined insects	10	0,97%	4	2,50	1,7
Colembola	8	0,77%	5	1,60	2,1
Panorpata	7	0,69%	6	1,17	2,6
Ortoptera	6	0,58%	6	1,00	2,6
Megaloptera larvae	5	0,48%	4	1,25	1,7
Trichoptera larvae	4	0,38%	3	1,33	1,3
Total insects	757	73,49%	187	4,05	81,3
Other invertebrates					
Araneida	119	11,55%	79	1,51	34,3
Gastropoda	62	6,01%	38	1,63	16,5
Crustacea	30	2,91%	19	1,58	8,2
Anelida	14	1,35%	9	1,56	3,9
Opilionida	2	0,19%	2	1,00	0,8
Pseudoscorpionida	1	0,09%	1	1,00	0,4
Acarians	1	0,09%	1	1,00	0,4
Vertebrates					
Pisces	19	1,84%	9	2,11	3,9
Amfibia	12	1,16%	11	1,09	4,7
Total	1030	100%	230		

## 2 Plant fragments

Represents the second category of stomach contents identified at the *Rana ridibunda* population from Cefa. Together with the animal preys (the only one which the green frogs can digest) were identified a lot of plant fragments, represented by different aquatic plants,

alga or cormofite (*Lemna trisulca*), rests of terrestrial plants (leaf and little wood fragments) and different fruits. Quantitative weights of these plant fragments have an important seasonal variation (table 8).

Table 7. percentage of aquatic and terrestrial preys obtained by the studied *Rana ridibunda* population

Months		III	IV	V	VI	VII	VIII	IX	X	total
Aquatic preys	Nr	11	55	26	29	10	9	24	10	174
	%	18,03	34,59	13,75	14,07	8,47	9,18	17,39	16,39	16,89
Terrestrial preys	Nr	50	104	163	177	108	89	114	51	856
	%	81,96	65,40	86,24	85,92	91,52	90,81	82,60	83,60	83,10

Table 8. Number and weight variation of different plants fragments in stomach contents of the studied *Rana ridibunda* population

Month	III	IV	V	VI	VII	VIII	IX	X
Nr. of stomach with plants fragments	7	13	20	23	20	18	18	14
% of stomach with plants fragments	35	43,33	66,66	76,66	66,66	60	60	46,66
Nr of stomach wich contain exclusiv plants fragments	2	0	0	1	3	2	2	2
% of stomach wich contain exclusiv plants fragments	10	0	0	3,33	10	6,66	6,66	6,66

The explanation of that high presence of plant fragments in the stomach of a carnivore's species is multiple: the presence of aquatic plants and fragments of terrestrial plants may be caused by the accidentally swallowed together with the hunted prey. That situation is indicated by the fact that the month with the more prey number is also the month in which the largest number of stomach contents plant fragments. Different fruits and vegetal capsules carried by water and wind are catch by *Rana ridibunda* as an result of the confusion made by the green frogs between the plants and an potential prey. Data from the literature referring at the presence of plant fragments in the stomach contents of *Rana ridibunda* are contradictory, some author (Fuhn și Niculescu, 1963; Sin et al. 1975; Ghira et al. 1997), don't mentioned that kind of contents, other authors (Vancea, et al., 1960), describing them like abundant.

3 mineral elements was described by other authors (Hodar et al. 1990), we identified them only at three from the *Rana ridibunda*'s specimens studied, probably being accidentally swallowed with the prey.

## CONCLUSIONS

1. As a result of our study we identified totally three types of stomach contents: animal preys, plant fragments and mineral elements.
2. Animal preys are represented by 21 taxa, 12 belonging to the Insects, the highest percentage obtained by *Hymenoptere* (23,49 %), *Coleoptere* (20 %) and *Araneide* (11,55 %).
3. Comparing with the data from literature, we identified 5 new prey taxa for *Rana ridibunda*:

*Opilionide*, *Pseudoscorpionide*, *Trichoptere*, *Panorpate* and *Megaloptere*.

4. 16,89 % from the total of the preys were captured from the aquatic environment, the rest of 83,10 % come from the terrestrial environment.
5. We observed an important seasonal variation of all parameters related with the *Rana ridibunda*'s trophical spectrum: the weight of the stomach with out contents, prey taxa consumed and they percentage, the relation between aquatic and terrestrial preys.
6. *Rana ridibunda* is a zoophagous poliphagus, it consumed the most accessible prey in each period.
7. We consider important some changes in the feeding behaviour of the green frogs related by some particularly conditions of Cefa's fishpond. That so, in springs, *Rana ridibunda* hunts in the damp forest of Rădvani, situated near the ponds which offered on rich trofic basis for the frog. Also, the lake frogs gather up in the are a were the water get out from the fishponds, were are taken the little fish and eat them. Finally *Rana ridibunda* consumed the larva's of the *Lepidoptere* who make their refuge on the leaf from the water border, being capable to cut the piece of leaf who contend the larva.

## REZUMAT

Studiul nostru a vizat cunoaștere spectrului trofic al populației de *Rana ridibunda* de la Cefa (jud. Bihor). Pentru aceasta am investigat 230 de indivizi, 20 în luna martie, 30 pe lună din aprilie până în octombrie, metoda de lucru fiind a spălăturilor stomacale. În urma studiilor am identificat trei categorii de conținuturi stomacale.

prăzi de origine animală, resturi vegetale și fragmente minerale. Am determinat 21 de taxoni pradă, majoritatea (12) aparținând Insectelor, cinci dintre acestea fiind constant prezenți pe întreaga perioadă de studiu: (Araneide, Heteroptere, Coleoptere, Diptere și Hymenoptere). Sub aspect calitativ au fost identificate 1030 de prăzi, cea mai mare pondere în spectrul trofic la *Rana ridibunda* deținând-o Hymenopterele 23,49 %, Coleopterele 20 % și Araneidele 11,55 %. Cea mai mare parte din prăzi 83,10 % *Rana ridibunda* le obține din mediul terestru și doar 16,89 din cel acvatic. Există o importantă variație calendaristică a tuturor parametrilor de hrănire, atât a ponderii stomacurilor goale cât și a ponderii diferiților taxoni, ai importanței lor în fiecare moment sau a biotopului de proveniență al prăzilor. Considerăm importante anumite modificări ale comportamentului de hrănire ale speciei în raport cu anumite condiții particulare. Astfel primăvara *Rana ridibunda* vânează în pădurtea umedă din vecinătate care oferă bază trofică mai bogată; *Rana ridibunda* se aglomerează în zoncle de ieșire a apei din bazinele pescăriei unde sunt antrenati și amețiiți pești mici pe care îi culcă de la suprafața apei; broaca de lac consumă larvele de Lepidoptere ce își țes adăpost în frunzele de pe marginea apei, fiind capabilă să decupeze respectivelor bucăți de frunză cu larve cu tot.

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