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Population density and food analysis of *Bombina variegata* and *Rana graeca* in mountainous riverine ecosystems of northern Pindos (Greece)

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Abundance and diet of *Bombina variegata* and *Rana graeca* were investigated from August 2004 to August 2005 in two permanent mountain water bodies (Zesto River and Prioni Nazeti Stream) situated in the National Park of Northern Pindos (Greece). At Zesto, we recorded high population densities for both anuran species, while at Nazeti population density was high only for *R. graeca*. In the diet of *B. variegata* and of *R. graeca*, a large variety of prey taxa was identified in the stomach contents, suggesting that they are opportunistic predators. However, at both sites, the study species principally consumed five prey groups, i.e. ants, spiders, flies, terrestrial beetles and aquatic insect larvae. A comparison of prey size consumed by adults revealed that *B. variegata* feeds on smaller prey than *R. graeca*. Furthermore, intraspecific differences based on prey size were obtained for adults and sub-adults of *R. graeca*. In this study we found that prey size is a possible factor of niche partitioning for anuran species.

Key words: Anura, riverine habitats, density, diet, northern Pindos.

INTRODUCTION

The mainland area of northwestern Greece hosts a high biodiversity, including threatened, rare and endemic plants and animals. A large part of this area is protected as a national park (Northern Pindos National Park, Natura Network, site codes GR1310003 and GR2130001), originally designated as such for the protection of the brown bear –one of the most endangered mammalian species in Europe (Dafis *et al*., 1996). Regarding amphibians, 14 species are known to occur in northwestern Greece (Schneider *et al*., 1984; Malakou *et al*., 1986; Denoël & Schabetsberger, 2003; Denoël, 2004; Sotiropoulos, 2004; Bisa, 2006), but there are many gaps in our knowledge on their ecology and population status.

Nowadays, it is fairly known that among vertebrates, amphibians are subjected to a higher extinction risk and 32.9% of extant species are considered threatened worldwide (IUCN, 2004; Stuart *et al*., 2004). As records on the decline of amphibian populations all over the world are increasing (Kiesecker *et al*., 2001; Lips *et al*., 2004; Pounds *et al*., 2006), it is urged that conservation measures need to be taken for their protection. However, the lack of data on abundance, life history and ecology of amphibian populations is the main obstacle for successful conservation.

The aim of this study was to determine the population density of *Bombina variegata* and *Rana graeca* from permanent riverine habitats and to explore their feeding ecology. In order to achieve this goal, we conducted a study in water bobies with low human impact located in the Northern Pindos National Park, where the two species coexist. We focused on the feeding habits of these species and we investigated the spatial differences in the trophic resources, in an attempt to investigate the food partitioning patterns and the niche segregation mechanisms. Moreover, in

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the case of *R. graeca* for which data were available, we examined differences in the trophic spectrum of subadults and adults.

Bombina variegata (Linnaeus, 1758) has a wide distribution in the central and eastern Europe, while *R. graeca* Boulenger, 1891 occurs mostly in the riverine mountain areas of the Balkan Peninsula (Arnold & Ovenden, 2004). The snout-vent length of mature specimens of *B. variegata* ranges from 30 to 52 mm. Its biology, geographical distribution and life history are well known (Barandun, 1990; Rafinska, 1991; Barandun *et al*., 1997; Szymura, 1998; Buschmann, 2002; Nürnberger *et al*., 2003) and studies concerning its diet have revealed similarities to many other anurans in terms of being opportunistic predators (Kuzmin, 1990). The body length of adults of *R. graeca* ranges from 37 to 70 mm (Asimakopoulos, 1992). Studies concerning the biology and ecology of *R. graeca* are scarce, most likely due to the limited geographical distribution and its preference for highland habitats.

MATERIALS AND METHODS

Study area

We conducted our research in two water bodies of the Northern Pindos National Park: Zesto river and Prioni Nazeti stream (Fig. 1). The climate of the study area is Mediterranean-continental Mediterranean with average winter temperatures of 0.5°C (February) and summer temperatures of 25.9°C (July). Total annual precipitation is on average 1404 mm (meteorological station: Metsovo 1159 m a.s.l., period 1981-1999).

Zesto river (39°53′ - 39°54′ E, 21°07′ - 21°08′ N) is a permanent mountain river with a total length of about 2.5 km. It flows through an area whose elevation ranges from 1600 to 1350 m a.s.l. The river is situated in one of the two cores of the park, named Valia Kalda. A few streams feed into this river before its flowing into Arkoudorema, a tributary of the Aoos river. The dominant trees along the river banks are the black pine (*Pinus nigra*) and the common beech (*Fagus sylvatica*), whereas other characteristic plants are the box-tree (*Buxus sempervirens*) and the bracken fern (*Pteridium aquilinum*). Except for the two studied taxa, other amphibians recorded during this study at this water body were 13 adults and larvae of *Triturus alpestris*, a single individual of *Rana balcanica* and larvae of *Salamandra salamandra* and *Bufo bufo*.

Prioni Nazeti stream (39°56′ E, 21°01′ - 21°02′ N) is located at the buffer zone of the National Park and is a tributary of Aoos river. Prioni Nazeti stream flows from 1300 to 1040 m a.s.l. and is surrounded by slopes covered by a mixed coniferous forest. Apart from the black pine, other trees of the bank vegetation are the common beech, the willow (*Salix* sp.), the juniper (*Juniperus* sp.) and the European hornbeam (*Carpinus betulus*). Regarding amphibians at this water body, we also recorded five adults of *B. bufo*, larvae of *S. salamandra* and one individual of *R. balcanica*. For simplicity, we will hereafter refer to the study sites as “Zesto” and “Nazeti”, respectively.

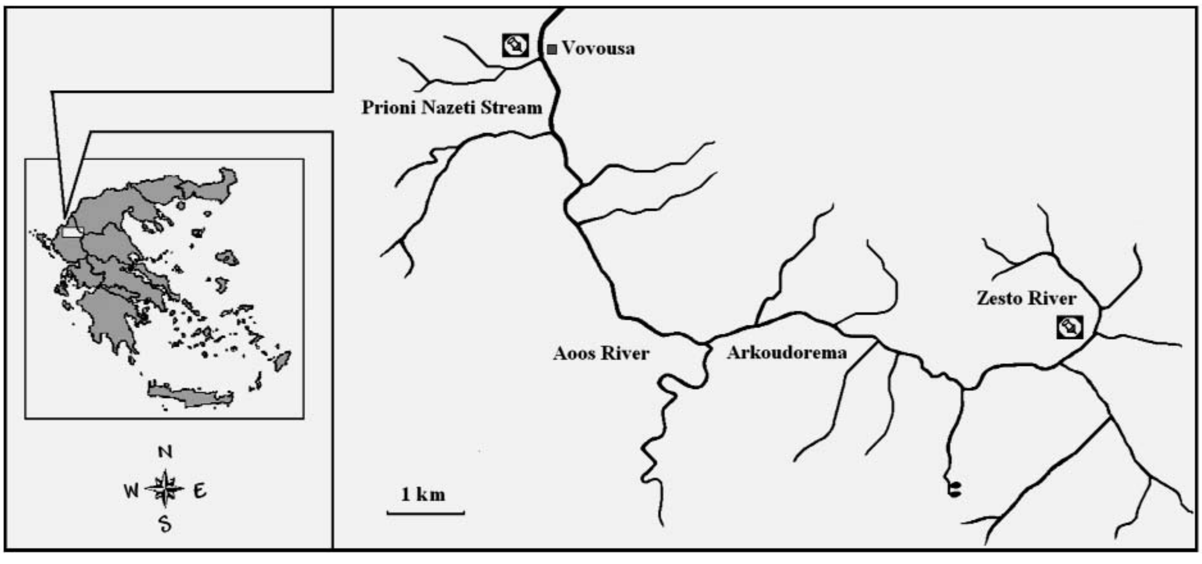

FIG. 1. Geographical location of the two study sites and the nearest human settlement (Vovousa) at the study area.

Estimation of population density

Data were collected monthly from August 2004 to August 2005, except for the hibernation period of amphibians, which in the area in question lasts from late October to early April. We visited both sites in late October but we did not record any activity of the study animals. Due to prolonged winter and severe snowfall we could not approach the study sites before May and we could not sample from Zesto in May 2005, due to a landslide that rendered any access to the area impossible. Fieldwork was conducted between 11:00 and 16:00, during sunny days, since amphibians are more active in such weather conditions (Heyes *et al*., 1994). At each site, 15 randomly selected plots (5×2 m) were monitored in a fixed area of 200 m in length. Two observers were engaged in the sampling effort in order to minimize escaping of the animals. The plots were 3 to 5 m apart, in order to avoid pre-sampling disturbances of animals and physical obstacles. We located the animals after overturning stones and logs and checking crevices, exposed roots of trees and among riparian vegetation. All captured animals were identified and released after the investigation, which lasted approximately 10 to 13 min per plot. In order to detect differences in population sizes between the sites, we applied independent t-tests and we conducted Kruskal-Wallis tests to assess differences in the mean density among the months sampled.

Diet analysis

Individuals of *B. variegata* and *R. graeca* were collected by hand or dip netting. They were measured for snout-vent length (SVL) with a ruler to the nearest 1 mm. The specimens of each species were kept in different baskets so that toxic secretions of *B. variegata* could not affect *R. graeca* individuals. Analysis of the stomach content of each specimen was performed within half an hour after capture, by applying stomach flushing without anaesthesia (Legler & Sullivan, 1979). For this purpose, we used a syringe of 20 ml and the watered down stomach contents were individually stored in vials containing 70% ethanol as preservative. None of the specimens died during this application. After this procedure, individuals were released at the proximity of their capture point.

In the laboratory, all prey items were usually identified to the order level. We measured length and width of each prey item to the nearest 0.1 mm under a stereomicroscope with an ocular micrometer. The presence of pebbles, plant remains and ingested skin of amphibians was also recorded. The diet composition was calculated as both relative abundance and frequency of occurrence.

Chi-square contingency tables were used to test the null hypothesis of equal proportions of prey groups consumed throughout surveys by the two species. Wilcoxon signed-rank tests were applied to search for differences in the size of the prey consumed. All tests were performed using the SPSS software (version 13.0). In all tests alpha was set to 0.05.

RESULTS

Population density estimation

At Zesto, monthly density values of *B. variegata* ranged from 0.13 adults/10 m^2 (September 2004) to 2.47 adults/10 m^2 (August 2005) (Table 1). The density of *B. variegata* was higher in late summer and decreased thereafter until September. For *R. graeca*, monthly density values ranged from 0.33 adults/10 m^2 (Octo-

TABLE 1. Numbers of individuals (N) encountered in the 15 plots used, mean and standard error (S.E.) of density (per 10 m^2) for adults of *B. variegata* and of *R. graeca*, number (N_{plots}) and percentage of plots (in parenthesis) in which species were syntopic at the two study sites at each month sampled (Au: August, Se: September, Oc: October, Ma: May, Jn: June, Jl: July)

Month	Zesto					Nazeti				
	B. variegata		*R. graeca*		Syntopic	*B. variegata*		*R. graeca*		Syntopic
	N	Mean ± S.E.	N	Mean ± S.E.	N_{plots}	N	Mean ± S.E.	N	Mean ± S.E.	N_{plots}
Au 04	24	1.60 ± 0.32	20	1.33 ± 0.32	9 (0.60)	4	0.18 ± 0.12	27	1.80 ± 0.33	3 (0.20)
Se 04	2	0.13 ± 0.09	10	0.67 ± 0.23	1 (0.07)	0	0.00	5	0.33 ± 0.16	0
Oc 04	0	0.00	5	0.33 ± 0.21	0	0	0.00	3	0.20 ± 0.14	0
Ma 05						1	0.07 ± 0.07	7	0.47 ± 0.17	1 (0.07)
Jn 05	13	0.87 ± 0.41	7	0.47 ± 0.22	1 (0.07)	1	0.07 ± 0.07	8	0.53 ± 0.19	1 (0.07)
Jl 05	25	1.67 ± 0.45	16	1.07 ± 0.27	6 (0.40)	8	0.53 ± 0.22	9	0.60 ± 0.19	4 (0.27)
Au 05	37	2.47 ± 0.50	33	2.20 ± 0.37	11 (0.70)	6	0.40 ± 0.16	28	1.87 ± 0.32	5 (0.33)

ber 2004) to 2.20 adults/10 m^2 (August 2005). The mean density values among the months were significantly different for *B. variegata* (Kruskal-Wallis test: $\chi^2 = 34.2$, df = 5, $p < 0.001$) and *R. graeca* (Kruskal-Wallis test: $\chi^2 = 28.3$, df = 5, $p < 0.001$). For both species, densities obtained in August 2005 were much higher than those observed in August 2004. In late summer, individuals of *B. variegata* and *R. graeca* frequently coexisted at the same plot as other ephemeral water bodies dried up (Table 1).

At Nazeti, *R. graeca* was the prevailing amphibian dweller and was recorded in all months sampled. Monthly densities ranged from 0.20 adults/10 m^2 (October 2004) to 1.87 adults/10 m^2 (August 2005) (Table 1). *Bombina variegata* was found mainly during the breeding period and its density ranged from total absence (September 2004) to 0.53 adults/10 m^2 (July 2005). Throughout the months sampled, the mean density values significantly differed for both species (Kruskal-Wallis tests, *B. variegata*: $\chi^2 = 19.3$, df = 6, $p < 0.005$; *R. graeca*: $\chi^2 = 45.6$, df = 6, $p < 0.001$).

The comparison of the population density of each species between the two sites revealed that the abundances of adult specimens of *R. graeca* did not differ (independent t-test: $t_{193} = 1.117$, $p = 0.27$), but the abundance of *B. variegata* at Zesto was significantly higher than that at Nazeti (independent t-test: $t_{193} = 5.700$, $p < 0.001$).

Diet analysis

At Zesto, we identified 479 prey items in the stomachs of 37 adult individuals of *B. variegata*, 227 prey items in 20 adults and 127 prey items in 16 sub-adults of *R. graeca* (Table 2). The mean number of prey items/stomach was higher for *B. variegata* (13.3) than for *R. graeca* (adults: 11.35 and sub-adults: 7.88). The highest number of prey items/stomach was found in an adult specimen of *B. variegata* (snout-vent length 35 mm) which had consumed 109 ants and one spider.

The diet of adults of both species mainly consisted of five major prey groups, namely spiders, terrestrial beetles (Carabidae, Clambidae, Cleridae, Chrysomelidae, Curculionidae, Elateridae, Lymexylidae, Staphylinidae), ants, flies and aquatic insect larvae (Diptera, Ephemeroptera nymphs, Odonata, Plecoptera nymphs, Trichoptera). Throughout surveys conducted at Zesto, the adults of *B. variegata* and *R. graeca* did not differ significantly in the consumption of the five main prey groups ($\chi^2 = 7.19$, df = 4, $p = 0.13$). *Bombina variegata* consumed often ants and aquatic insect larvae and *R. graeca* consumed mostly ants and spiders (Fig. 2).

The diet of sub-adults of *R. graeca* mainly consisted of the same five main groups mentioned for adults. Throughout surveys, sub-adults of *R. graeca* did not differ significantly in the consumption of the main prey groups from adults ($\chi^2 = 3.60$, df = 4, $p = 0.42$). They preyed mostly on ants, spiders and flies (Fig. 2).

At Nazeti, we identified 158 prey items in the stomach contents of 29 adults of *B. variegata*, 110 prey items in 21 adults and 61 prey items in 15 sub-adults of *R. graeca*. The mean number of prey items/stomach was similar for both species (Table 2). Throughout the sampling period, *B. variegata* and *R. graeca* mostly preyed on five prey groups: spiders, terrestrial beetles (Bostrichidae, Byrrhidae, Carabidae, Cleridae, Chrysomelidae, Curculionidae, Elateridae, Histeridae, Scolytidae) flies, ants and aquatic insect larvae (Diptera, Ephemeroptera nymphs, Odonata, Plecoptera nymphs, Trichoptera). Over all surveys, we recorded a significant variation in the consumption of the main prey groups in the adults of *B. variegata* and *R. graeca* ($\chi^2 = 22.03$, df = 4, $p < 0.001$). *Bombina variegata* consumed principally flies, ants and aquatic insect larvae, whereas *R. graeca* mostly preyed on spiders.

TABLE 2. Total number of stomach-flushed specimens (N_{Total}), number and percentage (in parenthesis) of full stomachs (N_{full}), total number of prey items (n), mean number and standard error (S.E.) of prey items/stomach of adults (ad) of *B. variegata* and adults and sub-adults (subad) of *R. graeca* at the two study sites

	Zesto			Nazeti		
	B. variegata (ad)	*R. graeca* (ad)	*R. graeca* (subad)	*B. variegata* (ad)	*R. graeca* (ad)	*R. graeca* (subad)
N_{Total}	37	20	17	29	21	16
N_{full}	36 (97.3%)	19 (97.3%)	17 (100%)	29 (100%)	20 (97.3%)	16 (100%)
n	479	227	129	158	110	61
Mean ± S.E.	13.3 ± 3.6	11.35 ± 2.91	7.88 ± 1.62	5.40 ± 0.6	5.24 ± 0.82	4.07 ± 0.75

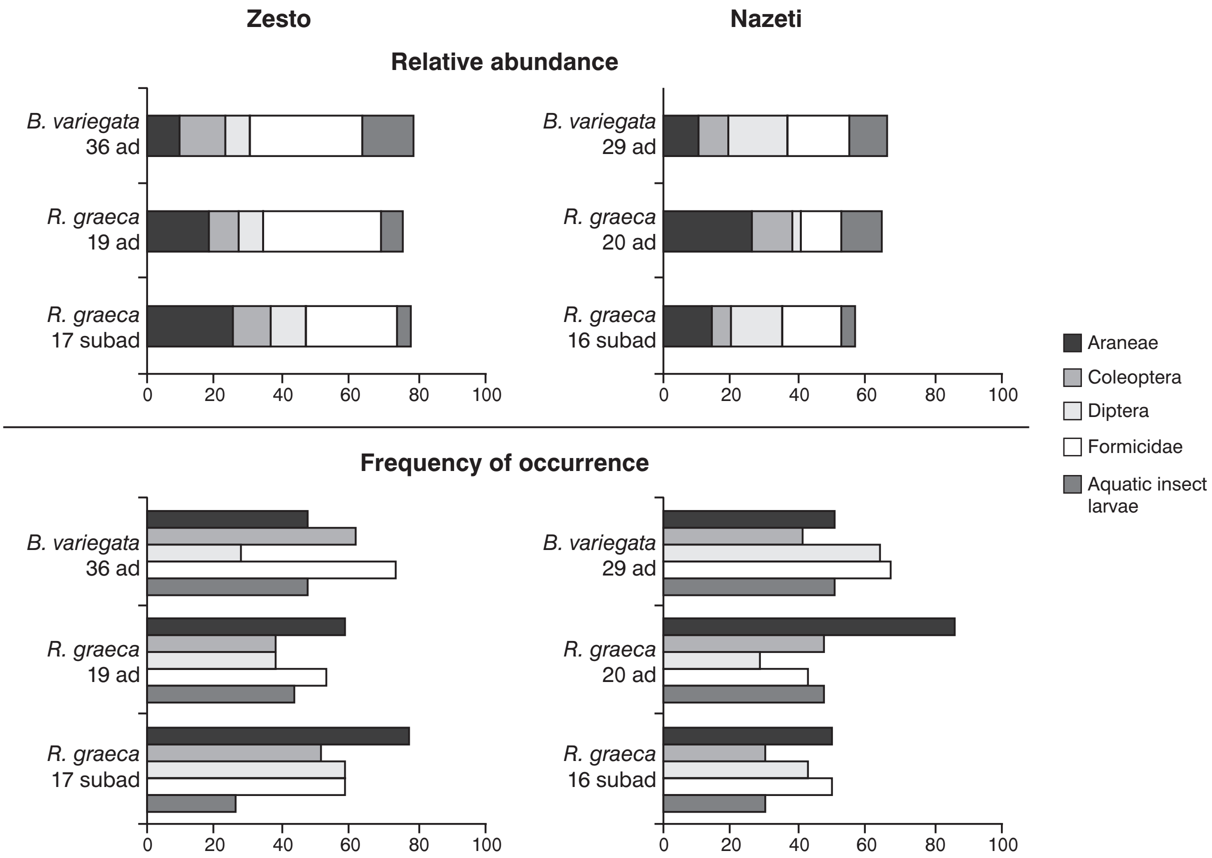

FIG. 2. Relative abundance and frequency of occurrence of the five main prey groups identified in the stomach contents of adults (ad) of *B. variegata* and of adults and sub-adults (subad) of *R. graeca* at Zesto and Nazeti.

From the comparison of different age classes of *R. graeca*, we observed that throughout the sampling period, the diet of sub-adults was significantly different from that of adults ($\chi^2 = 23.55$, df = 4, $p < 0.001$). Specifically, sub-adults of *R. graeca* mostly preyed on flies and ants (Fig. 2). Between sites, we obtained interpopulation differences in the diet of adults of *B. variegata* ($\chi^2 = 14.96$, df = 4, $p < 0.05$) and of adults of *R. graeca* ($\chi^2 = 17.07$, df = 4, $p < 0.005$). Sub-adults of *R. graeca* did not differ ($\chi^2 = 3.89$, df = 4, $p = 0.42$).

Other prey taxa identified in the stomach contents of both species were flying insects, bugs and invertebrates associated with soil, litter or vegetation (Table 3). Opiliones were identified in the stomach contents of *R. graeca*, whereas in the stomach samples of *B. variegata* opiliones were never found. Pebbles and plant material were present in most stomach samples of both species, but their quantity was insignificant, and most probably had been accidentally swallowed while capturing invertebrate prey. Parasitic nematodes were found in two adults of *B. variegata* and in one adult of *R. graeca*, and trematodes in one adult of *R. graeca*.

Prey size

At both sites, throughout surveys, the mean length (L) and width (W) of the prey consumed from the adults of *B. variegata* were lower than those from the adults of *R. graeca* (Table 4).

At Zesto, the mean values of the maximum length and maximum width of the prey consumed were significantly different between the adult specimens of the two species (Wilcoxon signed-rank test, maxL: $Z = -2.398$, maxW: $Z = -2.173$, $p < 0.05$ in both cases). Also, at Nazeti, the adults of *B. variegata* and *R. graeca* significantly differed in mean length, mean maximum length, mean width and mean maximum width of the prey consumed (L: $Z = -2.529$, W: $Z = -2.876$ maxL: $Z = -2.743$, maxW: $Z = -2.473$, $p < 0.05$ in all cases).

A similar comparison between different age classes of *R. graeca* revealed differences in the prey size con-

TABLE 3. Relative abundance (A%) and frequency of occurrence (F%) of other prey taxa encountered in stomach contents of adults (ad) of *B. variegata* and adults and sub-adults (subad) of *R. graeca* at the two study sites

	Zesto						Nazeti					
	B. variegata 36 (ad)		*R. graeca* 20 (ad)		*R. graeca* 16 (subad)		*B. variegata* 29 (ad)		*R. graeca* 21 (ad)		*R. graeca* 15 (subad)	
Prey taxa	A%	F%	A%	F%	A%	F%	A%	F%	A%	F%	A%	F%
Acari	0.3	5.6	0.4	5.0	1.7	12.2	1.5	6.9	0.3	4.7	1.7	6.6
Collembola	2.0	7.3	–	–	5.1	18.7	–	–	–	–	1.7	6.6
Chilopoda	0.6	2.8	0.5	5.0	1.0	6.2	2.2	6.9	–	–	0.6	6.6
Dermaptera	0.2	2.8	2.3	10.0	–	–	–	–	–	–	1.7	6.6
Dictyoptera	–	–	0.4	5.0	–	–	3.6	13.8	2.8	14.3	1.3	6.6
Diplopoda	–	–	0.6	5.0	–	–	1.2	3.4	2.8	9.5	1.3	6.6
Gastropoda	1.6	5.6	1.5	5.0	1.0	6.2	–	–	0.3	4.7	–	–
Hemiptera	5.7	25.0	1.3	15.0	1.9	12.5	8.8	27.6	4.0	23.8	10.6	26.6
Hydrophilidae	2.9	11.1	0.4	5.0	–	–	2.6	13.8	–	–	–	–
Hymenoptera	2.7	22.2	1.5	10.0	3.7	18.7	6.3	24.1	4.4	14.3	3.8	20.0
Isopoda	–	–	–	–	–	–	–	–	1.9	14.3	8.9	13.3
Lepidoptera	1.4	2.8	–	–	–	–	–	–	–	–	2.2	6.6
Orthoptera	0.6	5.6	1.3	15.0	1.2	6.2	1.2	6.9	2.1	9.5	1.7	6.6
Plecoptera	0.8	5.6	–	–	–	–	0.4	3.4	–	–	–	–
Pseudoscorpiones	–	–	–	–	–	–	–	–	–	–	1.1	6.6
Trichoptera	–	–	0.6	5.0	–	–	–	–	–	–	–	
Coleoptera larvae	3.7	16.6	0.4	5.0	2.3	12.5	2.9	10.3	2.4	9.5	3.6	13.3
Hymenoptera larvae	–	–	0.4	5.0	1.2	6.2	–	–	2.1	9.5	0.6	6.6
Lepidoptera larvae	–	–	4.2	15.0	3.1	12.5	0.4	3.4	2.6	14.3	–	–
Neuroptera larvae	0.7	2.8	–	–	–	–	0.5	3.4	–	–	–	–
Opiliones	–	–	5.3	20.0	3.0	18.7	–	–	5.6	23.8	3.3	13.3
Undetermined	3.9	13.8	3.5	10.0	–	–	1.6	6.9	5.1	19.0	0.6	6.6

TABLE 4. Values (mean, standard error and range) of the variables of prey size for adults (ad) of *B. variegata* and adults and sub-adults (subad) of *R. graeca* at the two sites. SVL: snout-vent length of anurans studied, L: length, maxL: maximum length, W: width, maxW: maximum width, S.E.: standard error (all values are expressed in mm)

	Zesto					
	B. variegata (N = 36) (ad)		*R. graeca* (N = 20) (ad)		*R. graeca* (N = 16) (subad)	
Variables	Range	Mean ± S.E.	Range	Mean ± S.E.	Range	Mean ± S.E.
SVL	32.0-49.0	42.09±0.81	35.0-62.0	48.07±1.99	16.0-32.5	24.85±1.42
L	2.3-12.2	4.88±0.37	3.2-14.6	6.75±0.71	1.6-7.8	4.48±0.41
maxL	2.4-16.8	7.34±0.57	2.2-26.1	12.15±1.32	2.0-22.9	8.51±1.18
W	0.5-2.1	1.23±0.07	0.9-4.2	1.74±0.19	0.6-2.1	1.16±0.09
maxW	0.5-3.8	1.95±0.13	1.1-6.0	2.58±0.24	0.8-2.9	1.90±0.13

	Nazeti					
	B. variegata (N = 29) (ad)		*R. graeca* (N = 21) (ad)		*R. graeca* (N = 15) (subad)	
Variables	Range	Mean ± S.E.	Range	Mean ± S.E.	Range	Mean ± S.E.
SVL	30.0-53.0	41.65±1.27	36.0-78.0	47.14±2.26	15.0-30.0	23.57±1.32
L	2.9-13.4	5.20±0.41	3.5-15.7	7.38±0.57	2.6-9.2	4.91±0.54
maxL	3.1-22.3	7.89±0.67	0.6-4.0	2.02±0.16	2.6-11.6	7.39±0.74
W	0.5-2.9	1.45±0.11	3.9-24.1	10.87±0.97	0.8-3.5	1.46±0.19
maxW	0.7-4.7	2.21±0.18	0.6-5.5	2.87±0.23	1.2-3.5	1.99±0.18

sumption of the sub-adults and adults. At Zesto, sub-adults and adults differed in the mean width of the prey (W: $Z = -1.992$, $p < 0.05$), whereas at Nazeti different age classes of *R. graeca* differed in the mean length and width of the prey ingested (L: $Z = -2.188$, W: $Z = -2.160$, $p < 0.05$).

DISCUSSION

During our study it was revealed that the population densities of *B. variegata* and *R. graeca* follow similar seasonal patterns. However, *R. graeca* remains active for a longer period of time. The monthly variation in the observed densities of the adults of both species may be attributed to two possible factors: 1) fluctuation of the density due to breeding activity, 2) expansion or shrinkage of the area used, due to changes in weather conditions. As adults of *B. variegata* assemble and breed from June to August (personal observations), it is likely that during summer, the population density increased due to mating activity. This does not seem to be the case for *R. graeca*, which in altitudes similar to those of the study sites, breeds in mid-spring (Asimakopoulos, 1992). Besides, with regard to the second factor, during May and June 2005, rainfalls were frequent and intense at the study sites. Therefore, the densities recorded during this period of the year were low and it is very likely that individuals of both species spread in the surrounding area. In late summer, water resources decreased and ephemeral water bodies dried up. As the life style of both species is closely related to water, the area with favorable conditions correspondingly shrunk. This is probably the reason why during that period, the highest population densities were obtained and the highest proportion of coexistence in number of individuals of both species at each sampling plot was recorded.

At Zesto, population densities for both species were by more than one third higher in August 2005 compared with those obtained in August 2004. The section of the river sampled in August 2004 (narrow riverbed, with deep points and large stones and rocks) differed morphologically from the section of the river surveyed the following August (wide riverbed with small stones) enabling a better estimation of the population sizes. In any case, it is possible that the population densities recorded for both species may constitute an underestimation of the true values due to difficulties in tracing all possible anuran shelters.

Our data on diet composition of *B. variegata* and *R. graeca* clearly underpin their status as carnivorous generalists. The stomach contents of both species consisted only of invertebrate prey. At Zesto, the diet composition was similar for both species with ants and spiders being generally consumed in higher proportions. As mentioned above, high population densities for both species were also recorded at this site. Nevertheless, opportunistic predation benefits the two syntopic species and the local anuran community can coexist in high densities, sharing the same space and food resources. However, at Nazeti interspecific differences in the consumption of the five main prey groups were observed between the adults of *B. variegata* and of *R. graeca*. At this site, *B. variegata* mainly preyed on flies and ants, whereas *R. graeca* mostly consumed spiders, ants and aquatic insect larvae. Most likely, based on the availability of food resources in their habitats, the studied species adjust their diets accordingly.

Other studies on the diet of *B. variegata* performed in forest ecosystems of Romania (Ghiurcă & Zaharia, 2005; Sas *et al*., 2005) report the prevalence of terrestrial prey categories in the diet of this species. In particular, Ghiurcă & Zaharia (2005) found that bugs, flies, spiders and ants were the most important prey categories in the diet of *B. variegata*. These prey categories are important in the diet of *B. variegata* with the difference that ants were eaten in higher proportions. Sas *et al*. (2005) reported that apart from bugs, ants, and flies, snails constitute a significant trophic resource. Although we identified snails in the stomach contents of *B. variegata*, this prey was rarely consumed.

At both sites, the comparison of prey size consumed by adults of *B. variegata* and *R. graeca* showed that the former preyed on thinner and smaller prey than the latter. Most likely, morphological differences between the species, such as mouth opening and predator size, contribute principally to the trophic resource partitioning. Kuzmin (1990) and Cogălniceanu *et al*. (2001) also report the significance of the prey size in relation to the predator size in the trophic resource partitioning of syntopic species.

Regarding the diet of the sub-adults of *R. graeca*, it was found that their trophic spectrum consisted principally of the same main groups specified for adults. At Zesto, both age classes of *R. graeca* preyed upon the same groups, and ants and spiders were mostly consumed. At Nazeti, sub-adults and adults differed in the consumption of the main groups and immature specimens preyed mostly on ants and flies, whereas mature specimens mainly consumed spiders.

The analysis of prey size revealed intraspecific differences between different age classes of *R. graeca*, with sub-adults ingesting smaller prey than adults. In the present study, as expected, we evinced that prey size is an important factor in the partitioning of food resources between sub-adults and adults, but further studies focusing on the diet of different age classes of *R. graeca* will provide more detailed results.

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