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Notes on distribution and current status of herpetofauna in the northern area of Braşov County (Romania)

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Abstract. In the northern area of Braşov County, the herpetofauna appears to be characteristic for a hilly and low-mountain zone and includes the following species: *Salamandra salamandra*, *Triturus cristatus*, *Lissotriton vulgaris*, *Bombina variegata*, *Pelobates fuscus*, *Bufo bufo*, *Pseudepidalea viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *Pelophylax* kl. *esculentus*, *Rana dalmatina*, *Rana temporaria*, *Rana arvalis*, *Emys orbicularis*, *Lacerta agilis*, *Lacerta viridis*, *Podarcis muralis*, *Anguis fragilis colchicus*, *Coronella austriaca* and *Natrix natrix*. The presence of other three species (*Zootoca vivipara*, *Zamenis longissimus* and *Vipera berus*) in this area is also listed in the scientific literature. The status of amphibians and reptiles in the vicinity of human localities is vulnerable and uncertain, being threatened by intensive agricultural and mining activity, overgrazing, deforestation, waste deposition and aggressive human behavior. The further existence of several small populations of *R. arvalis*, *P. muralis* and *L. viridis* is unstable.

Undisturbed habitats still exist near the Olt River and in central part of the Northern Perşani Mountains. The next steps concerning active protection of herpetofauna would be delimitation and protection of habitats, excavation of new breeding sites for amphibian populations and starting herpetological education in this area.

Keywords: herpetofauna, northern area of Braşov County, distribution, current status

Introduction

The first notes on herpetofauna in the study area are from Bielz (1888), who mentions the occurrence of *Emys orbicularis* near Rupea. Other early data come from Méhely (1892) proving the presence of *Rana dalmatina* at Comăna de Sus. Fuhn (1960) listed the herpetofauna just in 2 localities in the study area and noted the presence of 5 amphibian species. Fuhn & Vancea (1961) only reuse the data of Bielz (1888) concerning the European pond terrapin. More detailed data about herpetofauna is presented in recently published herpetofaunistical works, which refer to the herpetofauna of the Olt River Valley (Mara et al. 1999) and to the Transylvanian herpetofauna (Ghira et al. 2002). These data are still far from giving a comprehensive image about the distribution of the herpetofauna in the region. Not only the northern area, but all Braşov County lacks data

on accurate herpetofauna distribution. In Ghira et al. (2002) the county is listed just about 9 localities.

The aim of this current study was to present the distribution of the herpetofauna in the northern part of Braşov County, based on data collected from 1994 till 2006. In case of several species, these data can be used to prove the continuity of species presence over the years. With the aid of these data it is possible to elaborate convenient measures for protection, assess the effects of the drastic habitat changes caused by human activity and list the existing threatening factors for the local herpetofauna.

Materials and Methods

The study area comprises the territory between the drainage basin of the Olt River (S-E part of the area and the Târnava Mare) River (N-W direction from the study site; Fig. 1.). In general the area is characterized by the presence of 550-650 m high hills, which represent sources of small water courses, such as the Fişer, Kozd or Homorodul Mic streams. The area in the eastern part of the map belongs to the North Perşani Mountains with moderately high peaks between 800-850 m. The southern part is dominated by the Olt River, which supplies the adjacent inland marshes and meadows. The main habitat types are listed in Fig. 1. The climate has moderate continental character with an annual medium temperature of 9.5ºC in the center of the area (Rupea). Here the annual temperature varies between - 30ºC and + 30ºC (*** 1993).

The collection of herpetological data in this region was started by the author even before 1994, but these data lacks accuracy. Hence, only data from 1994 till 2006 is considered in the present study. The time allocated for research and the time-effort was unevenly distribuited between different parts of the area. Some zones were intensively investigated, while other places just on one occasion during the study period. I used mainly the visual encounter and transect method, completed with other methods (e.g. sound monitoring, aquatic trapping, road transect described by Puky et al. 2005). The determination of species was made mainly on the basis of the morphological and chromatic characteristics, without capturing them, if the method did not require this.

The distribution maps of the herpetofauna are based on the presence of the species in 2 x 2 km squares according to the Universal Mercator System (Lehrer & Lehrer 1990, Mara et al. 1999). The data on species presence in one unit of 2 x 2 km UTM square is not related to the observed occurrence in one habitat. One square can cover 2 or more identical habitats due the effect of habitat fragmentation and different squares can also represent the same habitat.

The data from recent herpetological literature is used to trace the 2x2 km UTM squares and to complete the distribution map of the species, when data is available (e.g. Mara et al. 1999). On the map a circle or triangle of 3 km diameter is used to signal the presence of the species, when the occurrence is connected to a locality name (e.g. Ghira et al. 2002, see distribution maps below). The used literature data is summarized in Table 1.

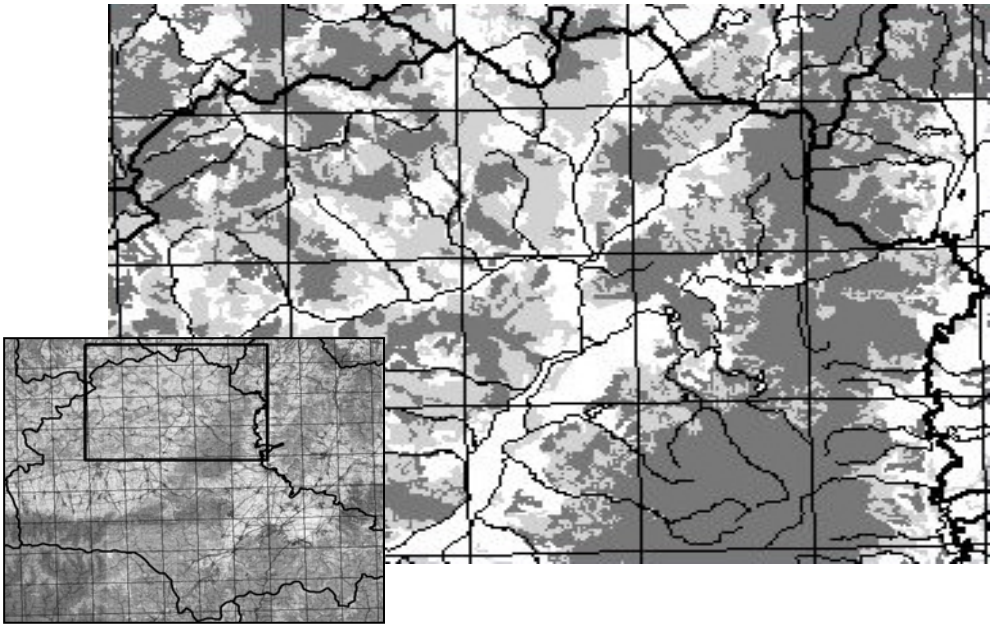

Figure 1. The study area in the northern part of Braşov County (Romania; small map) and the main habitat types in the study area (light gray: pastures, natural grasslands; dark gray: mainly broad-leaved forest with small areas with mixed or coniferous forest and transitional woodland; white - non-irrigated arable land and complex cultivation pattern; large map).

Results and Discussions

Data from 79 2x2 km UTM squares were recorded. These data denote the existence of 13 amphibian species (1 salamander, 2 newts and 10 frogs) and 7 reptilian (1 terrapin, 4 lizards and 2 snakes) within the studied region. The literature data confirms the presence of other 3 reptile (1 lizard and 2 snakes) species in the area (Mara et al. 1999, Ghira et al. 2002). Data on the presence of several species is presented in Figure 2.

The *Salamandra salamandra* (Linnaeus 1758; Fig. 3) is a typical inhabitant of deciduous (mainly beech) forests in mountainous or hilly landscapes (Veith 1997). Its presence in the forested area of North Perşani Mountains depends mainly on the occurrence of small clean streams, suitable for its reproduction. The population from Racoş is threatened by the deforestation and by micro-

habitat destruction caused by mechanized deforestation. Even in that small area this species is just locally abundant. I failed in reconfirmation of the species in the central part of the area (e.g. Homorod; Fuhn 1960).

Table no. 1.a The distribution dates of the herpetofauna in the study area
Abbreviations means: Ss - *S. salamandra*, Tc - *T. cristatus*, Lv - *L. vulgaris*, Bv - *B. variegata*, Pf - *P. fuscus*, Bb - *B. bufo*, Pv' - *P. viridis*, Ha - *H. arborea*, Pc - *R. esculentus* complex, Pr - *P. ridibundus*, Rd - *R. dalmatina*, V.: valley, P.: Forest.

Locality	***Ss***	***Tc***	***Lv***	***Bv***	***Pf***	***Bb***	***Pv'***	***Ha***	***Pc***	***Pr***	***Pe***	***Rd***
Apaţa	-	-	-	21	-	1	21	-	-	-	-	21
Arini	-	-	-	-	-	-	-	-	1	-	-	-
Augustin	1	1	-	1	1	1	1	-	1	-	-	1
Băile Homorod	-	-	-	+*	-	-	-	-	-	-	-	-
Buneşti	-	3	-	+04	-	-	3	-	-	+04	-	3 +04
Bogata V.	1	-	-	-	-	-	-	-	-	-	-	1
Caţa	-	-	-	-	-	-	-	-	+*	-	-	+01
Comăna (Jos)	-	-	-	-	-	-	-	-	-	-	-	-
Comăna (Sus)	-	+03	+03	+03	-	-	-	-	+03	-	-	4 7
Dăişoara	-	-	-	+05	-	-	-	-	-	-	-	-
Dumbrăviţa	-	-	-	-	-	-	-	-	-	-	-	-
Fişer	-	-	-	+*	-	-	-	-	+*	-	-	-
Gara Rupea						+*	+*		+*	-	-	-
Hoghiz	-	2 +*	3 +*	123 +*	23 +99	2 +*	2 +*	2 +*	12 +*	-	-	2 +*
Homorod	4	4	4	-	-	-	+*	-	+*	4	-	2 +99
Ioneşti	-	+94	+94	+94	-	-	-	+94	-	-	-	+94
Jimbor	-	-	-	+96	-	-	-	-	-	-	-	+96
Mercheaşa	-	-	-	-	-	-	-	-	+*	-	-	-
Mateiaş	-	-	-	+04	-	-	-	+04	-	+04	+04	-
Măieruş	2	-	-	2 3	-	-	-	-	2	-	-	-
Măieruş V.	1	-	-	1	-	-	-	-	-	-	-	-
Ormeniş	2	2	-	2	2	2	2	2	2	-	-	2
P. Bogăţii	-	-	-	+*	-	-	-	-	+*	-	-	+*
Racoş	+*	+*	-	12 +*	12	12 +*	12	-	1	+*	+*	12 +*
Rupea	-	2+*	2+*	2+*	2 +98	2+*	2+*	2+*	2	+*	+*	2+*
Ticuşu Vechi	-	-	-	-	-	-	-	-	-	-	-	-
Ungra	-	-	-	-	-	-	-	-	-	-	-	-

Table no. 1.b. The distribution dates of the herpetofauna in the study area
Abbreviations means: Rt - *R. temporaria*, Ra - *R. arvalis*, Eo - *E. orbicularis*, La - *L. agilis*, Lv - *L. viridis*, Pm - *P. muralis*, Zv - *Z. vivipara*, Afc - *A. f. colchicus*, Zl - *Z. longissimus*, Ca - *C. austriaca*, Nn - *N. natrix*, Vb - *V. berus*, V.: valley, P.: Forest.

Locality	***Rt***	***Ra***	***Eo***	***La***	***Lv***	***Pm***	***Zv***	***Afc***	***Zl***	***Ca***	***Nn***	***Vb***
Apaţa	12	-	-	-	-	-	-	-	-	-	-	-
Arini	-	-	-	-	-	-	-	-	-	-	1	-
Augustin	-	-	-	2	-	1	1	1	1		1	1
Băile Homorod	-	-	-	+*	-	-	-	-	-	-	+04	-
Buneşti	+04	-	-	+04	-	-	-	-	-	+04	+04	-
Bogata V.	-	-	-	-	-	-	-	-	-	-	-	-
Caţa	-	-	-	+*	-	-	-	-	-	+*	+01	-
Comăna (Jos)	-	1	-	-	-	-	-	-	-	-	-	-
Comăna (Sus)	3	+03	-	+03	-	+03	-	-	-	-	+03	-
Dăişoara	-	-	-	-	-	-	-	-	-	-	-	-
Dumbrăviţa	-	-	-	-	-	-	-	8	-	-	+98	-
Fişer	-	-	-	+*	-	-	-	-	-	-	-	-
Gara Rupea	-	-	-	+*	-	-	-	-	-	-	+*	-
Hoghiz	2 +*	-	-	12 +*	2	2	1	12	2	-	2 +*	12
Homorod	-	-	-	2 +*	-	-	-	-	-	2 +99	+99	-
Ioneşti	-	-	-	+94	-	-	-	+94	-	+94	-	-
Jimbor	-	-	-	+96	-	-	-	-	-	-	-	-
Mercheaşa	-	-	+94	-	-	-	-	-	-	-	+98	-
Mateiaş	-	-	-	-	-	-	-	-	-	-	-	-
Măieruş	2	-	-	-	-	-	-	-	-	-	2	-
Măieruş V.	-	-	-	-	-	-	-	-	-	-	-	-
Ormeniş	-	-	-	+02	2	2	-	-	2	-	2	2
P. Bogăţii	+*	-	-	+*	-	+*	-	+*	-	-	-	-
Racoş	12 +*	-	-	1+*	2+*	-	-	1 +04	12	+01	12 +01	-
Rupea	2+*	-	25+ ‘95	+*	-	-	-	+*	-	2 +*	2 +*	-
Ticuşu Vechi	-	-	-	-	-	-	-	-	-	-	9	-
Ungra	-	-	-	+99	-	-	-	-	-	-	-	-

Legend: +: present study with the year of recording, +*: for some species the time period of the records appear in Fig. 13, 1: Mara et al. 1999, 2: Ghira et al. 2002, 3: Cogălniceanu 1991, 4: Fuhn 1960, 5: Fuhn & Vancea 1961, 6: Bielz 18885, 7: Méhely 1892, 8: Zeitz, Târgu Mureş, pers. comm. 2005, 9: Babeţ, Rupea, pers. comm. 2005.

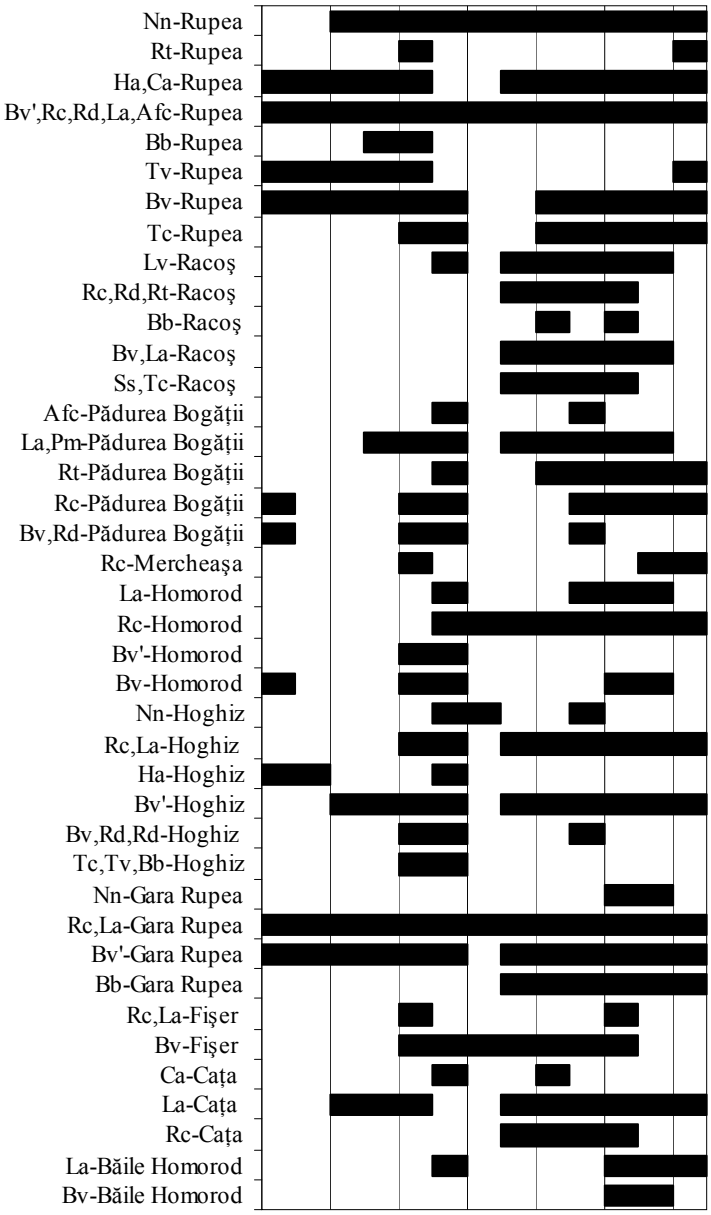

Figure 2. The continuity in data on presence of herpetofauna elements in several investigated locality collected between 1994-2006 (abbreviations see in Tab. 1.). The grids represent 2 year distances.

The typical habitats for *Triturus cristatus* (Laurenti 1768; Fig. 3) are larger and deeper stagnant water bodies. I found *T. cristatus* in the 4 artificial fish ponds near Rupea. Here, in the last part of the '80s and in the first part of the '90s the existence of the newt has been endangered by the fishing activity. Hundreds of newts were captured accidentally with fishing lines, but killed intentionally by local fishermen and children because it's putative venomous reputation. In the first part of the 90's, a large part of these 4 fishponds has been drained, therefore the newt population was later forced to use mainly the drainage ditches for breeding, till these have disappeared too. The lack of breeding places forced the newts to use temporal pools and ditches, even in the middle of intensively used agricultural landscapes (e.g. in Rupea) or even in the basalt mine (Racoş). A similar record was spotted from Pădurea Craiului Mountains (Bihor County), where *Triturus cristatus* is breeding in the ponds of currently unexploited bauxite mines (Covaciu-Marcov et al 2003).

Lissotriton vulgaris (Linnaeus 1758; Fig. 3) breeds in sun-exposed small pools and in ditches. This species in the area is threatened by the lack of breeding sites and the considerable distances between the breeding sites and undisturbed habitats. The chemical pollution and waste deposition in the breeding ponds and ditches are greatly responsible for the scarce distribution of local populations. The existence of *L. v. ampelensis* (Fuhn, 1951), the Transylvanian endemic subspecies, is mentioned to be present at Buneşti (Cogălniceanu, pers. comm. 1998). The distribution map of the two subspecies, *Lissotriton* reveals the contact zones in the N-W part of the studied region (Rafiński et al. 2001).

Bombina variegata (Linnaeus 1758; Fig. 4) is widespread in the area. The estimation of population size of this species is mostly erroneous. Because it is strongly associated with the small temporary water bodies, when time allocated for the pond identification is too long, double-counting or uncounting some ponds is highly probable. The *B. variegata* appears in a great variety of habitats, including those of human origin, but not in great abundance, mainly due to the small dimension of existing water bodies. In summer, *B. variegata* leaves the desiccated pools to find other pools, even if this means the change of an open habitat to a closed one, such as forest (Sos unpublished data) or it burrows in the soil to wait for the next rainy period.

Pelobates fuscus (Laurenti 1768; Fig 5) prefers soft soils near rivers and

streams. In the study area the adjacent territories to the Olt River and the other little streams are under intensive agricultural use. Its occurrence is recorded from a potato field in Rupea and from a beet field in Hoghiz. The species is connected to its remaining breeding places, maintained after the annual spring inundations. I connect the rare findings of the *P. fuscus* with the lack of breeding sites, caused by the construction of dikes to border the water courses and to the yearly drainage of flooded areas and of small ponds. A large part of *P. fuscus* population is expected to be still maintained in the undisturbed areas near the Olt River. In Hoghiz, in the remaining pools, the common *P. fuscus* are preferred prey of the herpetofagous birds (mainly Corvids) because of their large size. A great number of larvae dies after the desiccation of pools. The larvae compensate for the habitat reduction with cannibalism or predation of other amphibian larvae (e.g. *B. bufo*, *R. dalmatina*).

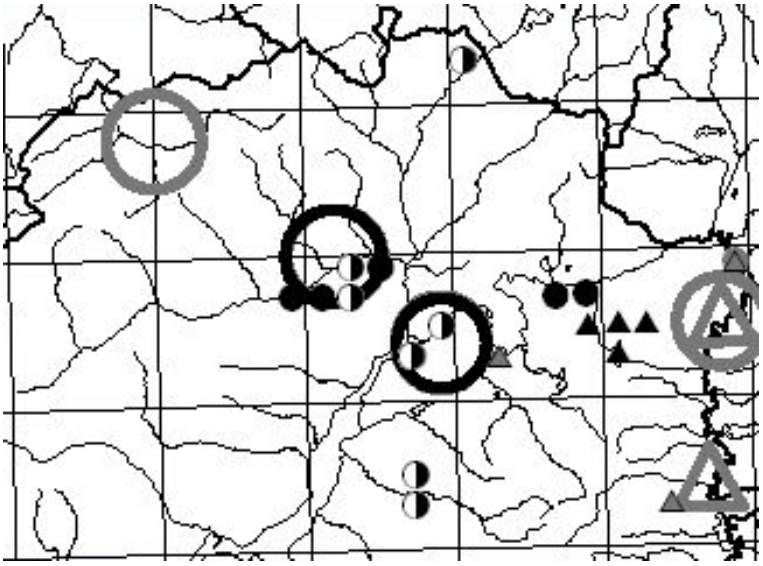

Figure 3. Distribution map of the *S. salamandra*, *T. cristatus* and *L. vulgaris* in the studied region. Data from this study: black triangle - *S. salamandra*, black point - *T. cristatus*, half point - both *Triturus* and *Lissotriton* species. Data from literature (1991-2002): small and big grey triangle - *S. salamandra*, grey point and circle - *T. cristatus*, black circle - both *Triturus* and *Lissotriton* species

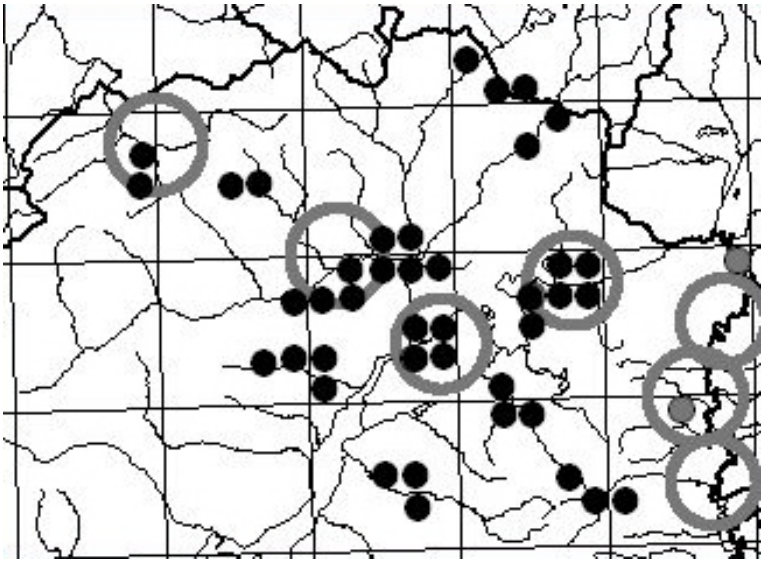

Figure 4. Distribution map of the *B. variegata* in the studied region.
Data from this study (black point) and from literature (grey point and circle; 1991-2002).

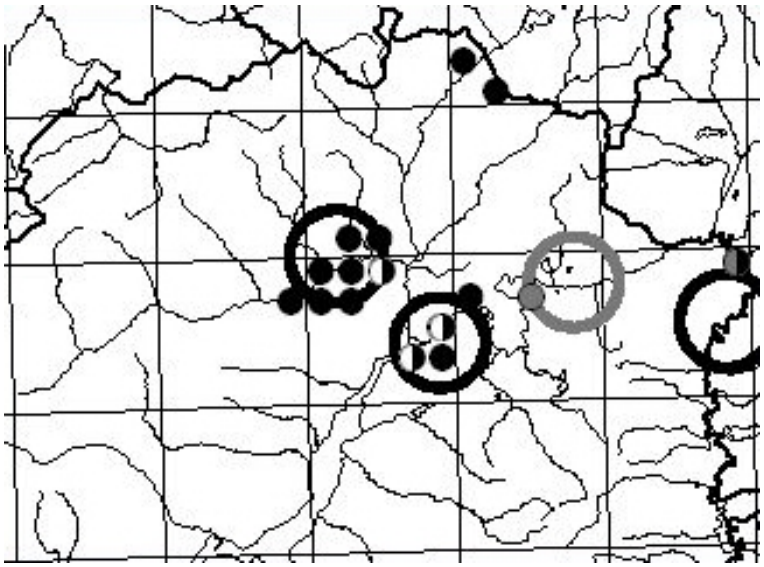

Figure 5. Distribution map of the *H. arborea* and *P. fuscus* in the studied region. Data from this study: black point - *H. arborea*, half point - both species. Data from literature (1991-2002): greu point and circle - *P. fuscus*, black circle - both species

In the area the *Bufo bufo* (Linnaeus, 1758; Fig. 6) reproduces in pools or in human made water basins. Rarely is it found in hilly sites too. I never found any migration route crossed by roads, although in the migration period (to and from the breeding places) the *B. bufo* is generally the most affected species by traffic (Covaciu-Marcov et al 2005). In Braşov County, the species is mainly connected to the mountainous areas (Amphibian and Reptile WorkGroup, Milvus, unpublished data). The small number of *B. bufo* can be explained by the lack of larger breeding sites in the area.

Pseudepidalea viridis (Laurenti 1768; Fig. 6) can be found in great number in the studied localities. It finds ideal conditions for reproduction in temporary pools, mostly in anthropogenous habitats. In Rupea, a considerable number of green toads are crashed by cars every year.

Reproduction of the *Hyla arborea* (Linnaeus 1758; Fig. 5) takes place in small temporary pools or drainage ditches, but after the mating period, the species can be found far away from the breeding place, even in old forests or agricultural landscapes (e.g. cornfields). The sound of the male *H. arborea* is a giveaway for its sporadic presence. The species is threatened here by the lack, loss or disturbed breeding sites. The human made ditches filled with water are almost permanently used by the species.

The predominantly aquatic *Pelophylax ridibundus* (Pallas, 1771; Fig. 7) was identified in one locality alone, and otherwise together with the hybrid *P.* kl. *esculentus* (Linnaeus, 1758; Fig. 9) in 11 2x2 km UTM squares near 3 localities. The *Pelophylax esculentus* complex, with unidentified species composition, was found in 17 2x2 km UTM squares near 7 localities. The complex can be found in fishponds, rivers and small ponds. In the area, the species of the complex show a pioneering character.

Rana dalmatina (Bonaparte, 1840; Fig. 8) is a typical inhabitant of deciduous forests, but with specific requirements on the terrestrial sites. These can be forest edges and clearings or meadows closed to the forest or to wooded paths. In the area, it is constrained to reproduce in small pools, ditches or in little pools, which appear in tracks on forest roads. After the mating period it widespreads in the area, and can be found in populated areas, in places such as gardens, courtyards and cemeteries. Locally, the reduced number of populations is caused by the lack of the breeding sites.

There is a strong decreasing pattern in the numbers of *Rana temporaria* (Linnaeus, 1758; Fig. 9) from the

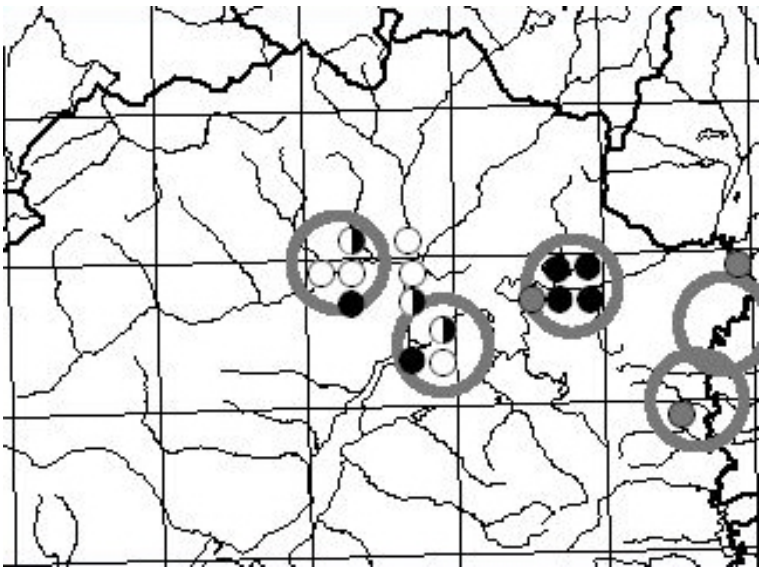

Figure 6. Distribution map of the *B. bufo* and *P. viridis* in the studied region. Data from this study: black point - *B. bufo*, white point - *P. viridis*, half point - both species. Data from literature (1999-2002): grey point and circle - both species.

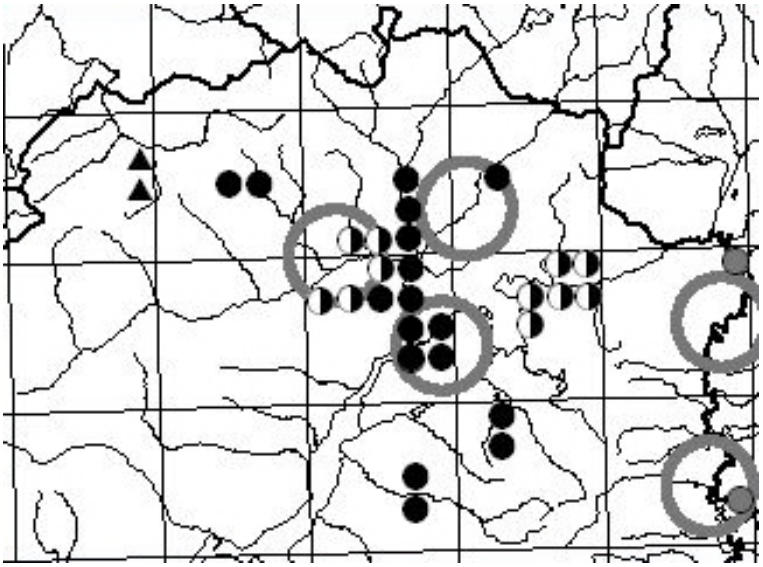

Figure 7. Distribution map of the *Pelophylax esculenta* complex in the studied region. Data from this study: black triangle - *P. ridibunda*, half point - *P. ridibunda* + *P. esculenta*, black point - *P. esculenta* complex. Data from literature (1999-2002): grey point and circle - *P. esculenta* complex.

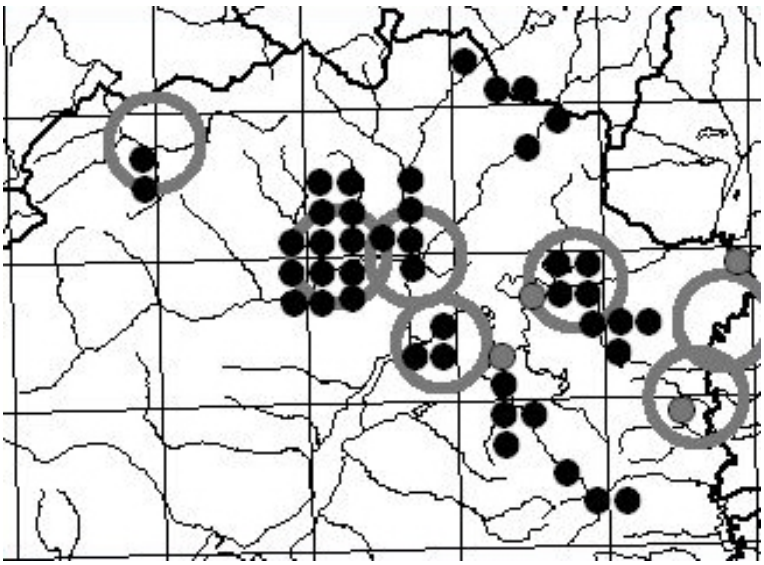

Figure 8. Distribution map of the *R. dalmatina* in the studied region. Data from this study (black point) and from literature (grey point and circle**;** 1991-2002).

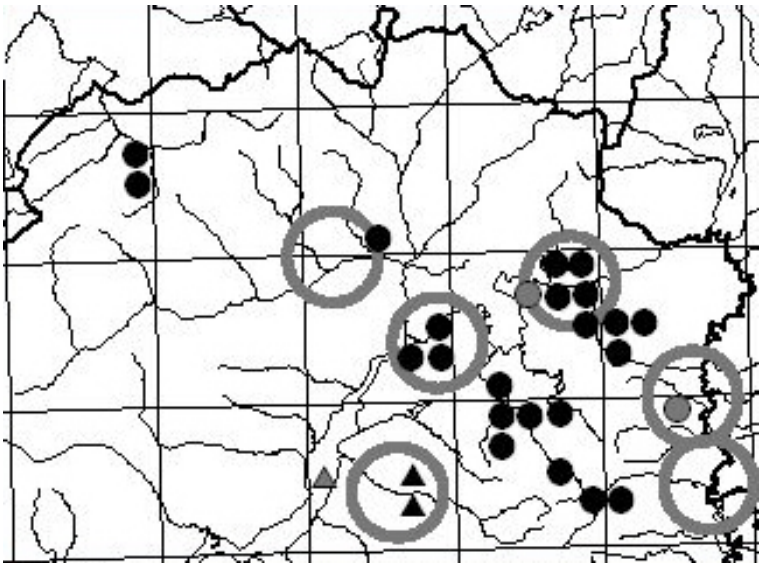

Figure 9. Distribution map of the *R. temporaria* and *R. arvalis* in the studied region. Data from this sudy: black point - *R. temporaria*, black triangle - *R. arvalis*. Data from literature (1991-2002): grey point and circle - *R. temporaria*, grey triangle - *R. arvalis*.

Northern Perşani Mountains to the west part of the studied region. Probably the warmer hilly zone and the fragmented forest habitats are not preferred by the *R. temporaria*, and for that reason the frog species appears close to the mountainous area, although in other areas of distribution the species reaches altitudes up to 170 m (e.g. in Arad County; Covaciu-Marcov et al 2006).

The presence of *Rana arvalis* (Nilson 1842; Fig. 9) was discovered only in Comăna de Sus. The data from literature (Cogălniceanu 1991, Mara et al. 1999, Amphibian and Reptile WorkGroup, Milvus, unpublished data 2006) predict a local population of the species spreading from this location along the Olt River Valleys to Sibiu County. The species is rare in Romania, the populations are generally isolated and are characterized by low density of individuals (Sas et al 2006).

The presence of *Emys orbicularis* (Linnaeus, 1758) near Rupea has early proof (Bielz 1888, Fuhn & Vancea 1961). Bielz (1888) used the old name of the locality Rupea, Cohalm, which was valid before 1920. Fuhn & Vancea (1961) are using this name for another occurrence of the species but without a localization of the place on the map of distribution of the *E. orbicularis* (no. 22, p. 175). I found two specimens in, at that time still existing, 4 fishponds near Rupea. The first specimen (female), captured in the last part of the '80-s, had an artificial 5 mm diameter hole on the downer part of her carapace. I think this individual was a captive one, and the hole was used to block the terrapin escape movements with a twist. The other one was captured accidentally with fishing line using boiled corn in 1995. In 1997 another captive individual was found free on the street of Rupea. The presence of introduced individuals is not a particular feature, e.g. in Germany Fritz et al. (2004) found that the German *E. orbicularis* has only few native populations, the rest are generated by introduced pond turtles or escaped pets. During and after the second half of the '80-s, and especially after the destruction of the fishponds, I never found the proof of existence of a reproductive population in the area. In the Mercheaşa locality I found 1994 an artificial pond with captive specimens, non-native for the area, but in the recent years the pond was partly destroyed, and the remaining part has no sign of presence of *E. orbicularis*. Even in the large fishponds near Rodbav the local rangers have no idea about the occurrence of the species in the area (Anonymous, pers. comm. 2006). A zone with real possibility to hold a population of *E. orbicularis* is the undisturbed area of

Olt Valley, in the southern part of the investigated area.

Lacerta agilis (Linnaeus, 1758; Fig. 10) inhabits various dry and warm habitats: forest edges, meadows, river banks, gardens, cemeteries, etc. being used to the immediate vicinity of humans. It is a widespread species but just locally abundant. It avoids the parts of the area under intensive agricultural use, with intensive reaping or overgrazing. In some parts of the area, only narrow transitional woodland compensates the effect of habitat fragmentation. The *L. a.* var. *rubra* form appears sometimes with full reddish specimens (e.g. Pădurea Bogății, Rupea).

I recorded one location of *Lacerta viridis* (Laurenti 1768, Fig. 11), confirming the one cited by Ghira et al. (2002). The population from Racoş has an isolated part in the still-in-use basalt mine from the northern part of the locality. It is partly protected thanks to the Basalt Piles of Racoş , but the considerable part of its habitat, which has artificial origin, is heavily disturbed by the mine exploitation. The species appears in small number at the base of the Tepő peak in a natural rocky grassland.

The occurrence of *Podarcis muralis* (Laurenti 1768; Fig 11) in the area is connected to the warm habitats with limestone walls or piles. The small areas of these habitats makes the species vulnerable even threatened by human disturbance. Its population from Pădurea Bogății is under the pressure of rock mining activity. The same pressure of mining activity is noted from the lower part of Lotrioara Valley (Sibiu County), were the local population is decimated by the blasting and many specimens are killed by the lorries that bear the rock (Krecsák et al. 2004), and from Roşia Montana (Alba County) too, were the *P. muralis* is present in very small number due to disturbance of the open-pit mining activity (Sos & Szatmári 2005). Sometimes the translocation, if the lizards are not injured, helps the species colonizing other habitats, but, in the case of *P. muralis* from the Pădurea Bogății site, the lack of suitable habitats in the area makes this kind of passive migration impossible.

Zootoca vivipara (Jacquin 1787) does not appear only in the mountainous part of the investigated area (Tab. 1). The existence of the *Z. vivipara* (Mara et al. 1999), *L. viridis* and *P. muralis* near Hoghiz (Ghira et al. 2002) was not confirmed, despite the thorough-going investigation made in 1998-99. The zone lacks the habitat types characteristically inhabited by these species.

Anguis fragilis colchicus (Nord-mann, 1840. Fig. 12) prefers open wood margins, clearings, places along the roads, gardens, cemeteries, etc.,

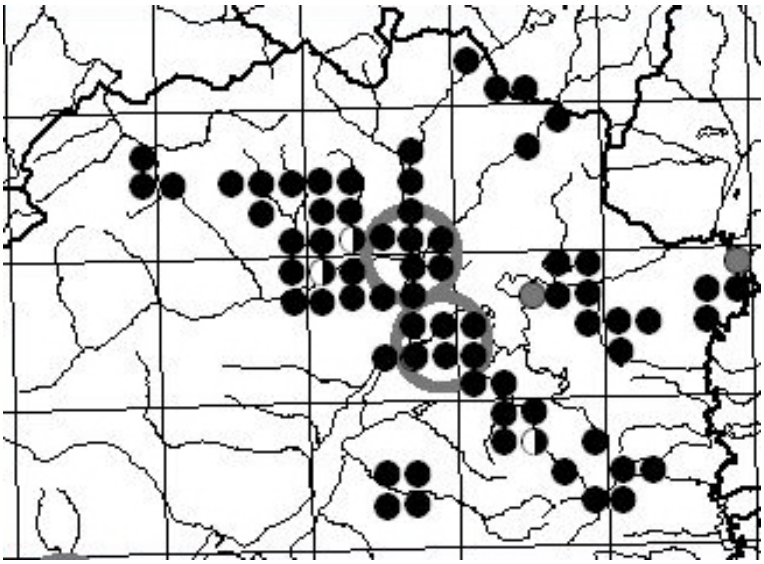

Figure 10. Distribution map of the *L. agilis* in the studied region. Data from this study: black point - *L. agilis*, half point - *L. agilis* var. *rubra*. Data from literature (grey point and circle; 1999-2002).

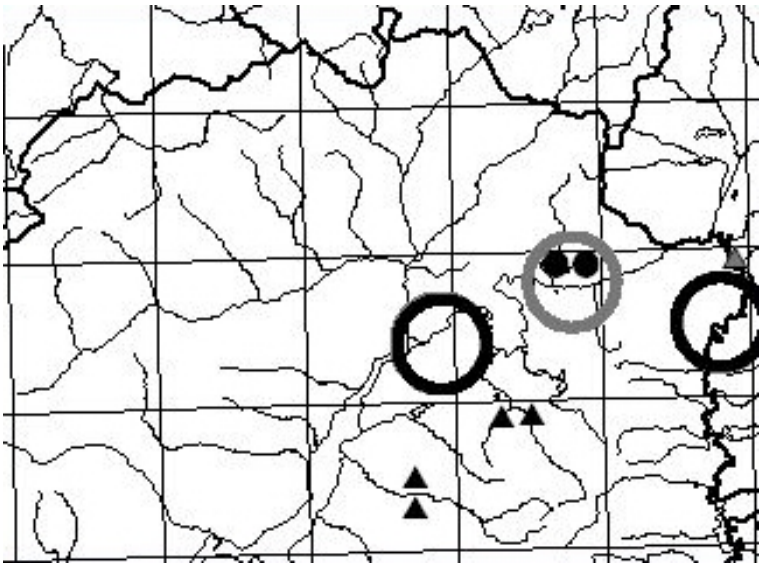

Figure 11. Distribution map of the *L. viridis* and *P. muralis* in the studied region. Data from this study: black point - *L. viridis*, black triangle - *P. muralis*. Data from literature (1999-2002): grey triangle - *P. muralis*, grey circle - *L. viridis*, black circle - both species.

always characterized by good sun-exposition, high level of humidity and dense grass cover or natural shelters (rocks, logs, etc.). In suitable environment it is abundant even in artificial habitats (e.g. 204 specimens were identified in four years in the 0.8 ha orthodox cemetery of Rupea; Sos unpublished data). Sometimes they are killed by humans for its putative venomous reputation and snake-like form.

Coronella austriaca (Laurenti, 1768; Fig. 12) prefers sun-exposed forest margins, bushy slopes, meadows with heterogeneous vegetation, offering enough hiding places and available food. It is absent from compact forests and agricultural landscapes. It is a hiding, solitary snake. Its population is in general characterized by low density and specimens are situated far from each other. The individuals from the Rupea population frequently capture small mammals. The snake is frequently killed for its viper-like back drawing.

Zamenis longissimus (*Elaphe longissima* Laurenti, 1768) is listed from the low mountainous part of the study area (Tab. 1.). I consider that the

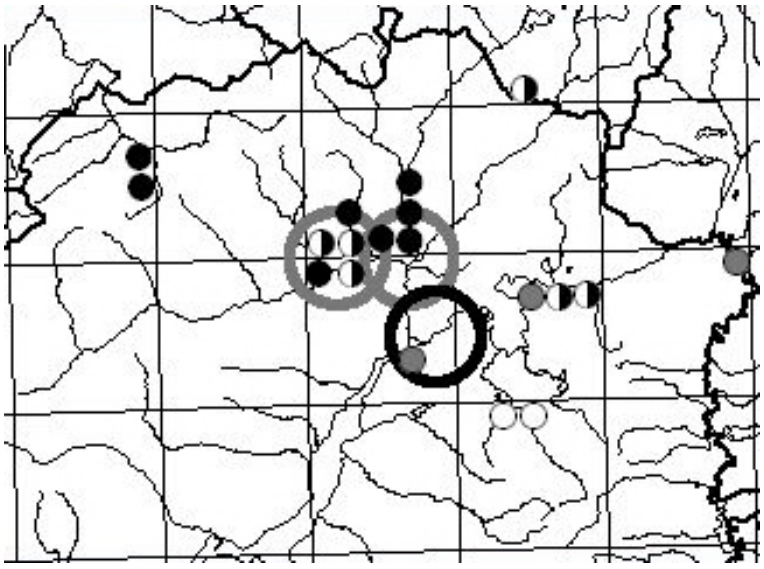

Figure 12. Distribution map of the *A. f. colchicus* and *C. austriaca* in the studied region. Data from this study: white point - *A. f. colchicus*, black point - *C. austriaca*, half point - both species. Data from literature (1999-2002): grey point and black circle - *A. fragilis*, grey circle - *C. austriaca.*

lack of the species from the central and west part of area is mainly caused by the lack of suitable habitats. The fragmented small forested areas with no transitional woodland are avoided by the species.

Natrix natrix (Linnaeus, 1758; Fig. 13) is the most common snake species in the area. It is associated with the water bodies, even small pools but occasionally it can be found far from the water, in search for its prey, mainly brown *Rana*. Exceptionally one specimen was observed in Gara Rupea, with a captured *Pseudopiladea viridis*. Population size mostly depends on the existence and state of the wet habitats, the food availability and undisturbed nesting places. In wet habitats the species is abundant. When roads occur near these habitats, individuals are frequently crashed by cars, phenomena that is frequent in other distribution areas too (e.g. Krecsák et al. 2004, Puky et al. 2005).

The existence of *Vipera berus* (Linnaeus, 1758) is confirmed from the Perşani mountainous area (Tab. 1). The reconfirmation of the species' occurrence in the central part of the investigated area (e.g. Hoghiz) has failed.

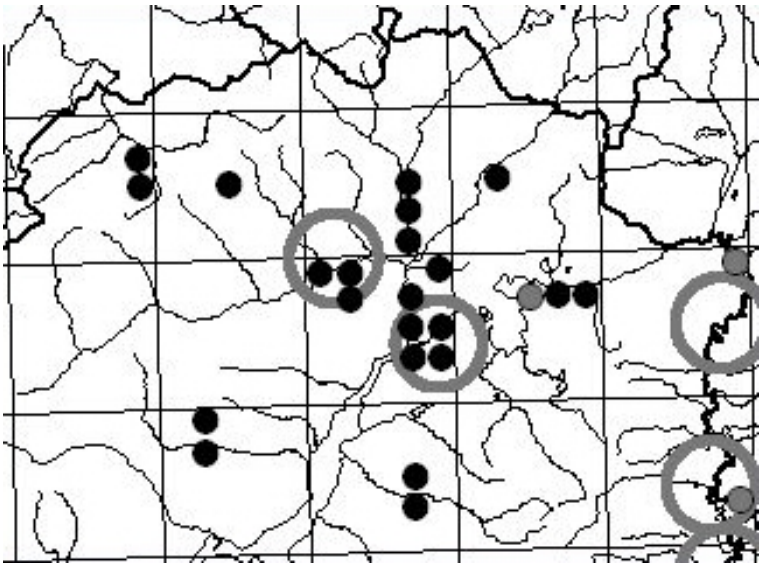

Figure 13. Distribution map of the *N. natrix* in the studied region. Data from this study (black point) and data from literature (grey point and circle; 1999-2002).

Conclusions

The herpetofauna of the northern region of Braşov County is characteristic for the hilly and low mountain zone. In this area the herpetofauna can be found in narrow habitats fragmented by human settlements and are under heavy pressure from the human activity. The intensive agricultural use of landscapes, the overgrazing of pastures, the deforestation resulted in habitat fragmentation, the uncontrolled waste deposition, the industrial activity and the aggressive human behavior make are causes of the current status of amphibians and reptiles as vulnerable or even threatened species. The future survival of several small populations of species, such as those of *R. arvalis*, *P. muralis* and *L. viridis* in this state is beyond possibility.

The amphibian species are forced to use different disturbed seminatural or artificial breeding sites. The reptiles are forced to inhabit the narrow transitional areas between forests and grasslands, pastures or agricultural lands. Habitats lacking direct human pressure still exist near the Olt River and in the central part of North Perşani Mountains area. The delimitation and protection of habitats could be a factor of greatest impact towards the stabilization of the herpetofauna in the area. Creating new breeding sites and their management is also of considerable importance in the active protection of amphibian populations. Starting herpetological education activiteas can be another way to reduce the human pressure on local herpetofauna.

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