Contribution to the knowledge of the herpetofauna of the Cândești piedmont (Dâmbovița and Argeș counties, Romania)

Contribuție la cunoașterea herpetofaunei piemontului Cândești (jud. Dâmbovița și Argeș, România)

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Abstract

The Cândești piedmont comprises a sub-Carpathian area characterized by forest habitats, of a more pronounced montane character as one moves to the north of the area (and to higher altitudes). This habitat is interspersed with anthropogenic pasture, cultivation and rural mosaic habitats and is influenced by hydrocarbon extraction activities. The area is quite scarcely known in terms of the distribution of amphibian and reptile species. Numerous populations of ten amphibian and six reptile species were found; Rana dalmatina and Pelophylax ridibundus are common amphibian species, while Emys orbicularis is a frequently found reptile in waterbodies in the area. The impact of both extractive activities and drought upon herpetofauna is also discussed.

Keywords: *Cândești Piedmont, new records, amphibians, reptiles*

Introduction

The Cândești piedmont is an alluvial, fan-shaped sub-Carpathian hill area delineated by the Dâmbovița River on the east, the Târgului River on the west and the Argeș River on the south. Its main natural habitat is deciduous forest (dominated by hornbeam *Carpinus betulus*, sessile oak *Quercus petraea*, pedunculated oak *Quercus robur*, beech *Fagus silvatica*), of a more pronounced montane character to the north of the area. Due to human habitation and land use, the forest cover became fragmented, interspersed with anthropogenic pasture (with common bent *Agrostis capillaris*, red fescue *Festuca rubra*, etc.), cultivation and rural mosaic habitats (MÂCIU *et alii*, 1982). The anthropogenic impact continues to increase; throughout the area we could observe hydrocarbon extraction activities and the expansion of alien species (the common ragweed *Ambrosia artemisiifolia*, an invasive species, is locally abundant).

The extant herpetofaunal data on this area is quite scarce. Four amphibian species are known: *Salamandra salamandra*, *Ichthyosaura alpestris* and *Bombina variegata*, as "old" records, and *Pelophylax ridibundus*/ *P*. kl. *esculentus* (undifferentiated) as a relatively "new" record (COGĂLNICEANU *et alii*, 2013a). No reptiles were recorded (COGĂLNICEANU *et alii*, 2013b) until

Vipera berus (subsp. *nikolskii*) was recently mentioned in online literature (CIOFLEC, 2017).

Materials and methods

We have performed investigative fieldwork in 2019, 2020, 2021 and 2022 using the active and auditive transect method (SCOTT *et alii*, 1994); we have also employed older personal data (2003). Photographs were taken, and the location of the records was determined by aid of Garmin GPS devices.

Results and discussion

Records were acquired for ten species of amphibians: *Triturus cristatus* (Photo 1), *Lissotriton vulgaris* (including specimens showing morphological traits of a probable past *L. vulgaris – L. montandoni* hybridization: paravertebral canthi, black tail-tip filament, massive head – Photo 2), *Bombina variegata*, *Bufo bufo*, *Bufotes viridis*, *Hyla orientalis* (Photo 3), *Rana dalmatina*, *Rana temporaria*, *Pelophylax ridibundus*, *Pelophylax lessonae* (and the hybrid *Pelophylax* kl. *esculentus* – Photo 4) and six species of reptiles: *Emys orbicularis* (Photo 5), *Lacerta viridis*, *Lacerta agilis*, *Podarcis muralis*, *Natrix natrix, Coronella austriaca* (see Table 1).

Table 1. Geographical coordinates (GPS) of observation sites and the identified species

Tabel 1. Coordonatele geografice (GPS) ale stațiilor de observare și speciile identificate

GPS coordinates	Altit.	Species
N44 46.999; E25 20.038	213 m	*Pelophylax ridibundus*, *Natrix natrix*
N44 49.202; E25 20.493	234 m	*Rana dalmatina*, *Pelophylax ridibundus*
N44 49.206; E25 20.493	236 m	*Rana dalmatina*, *Pelophylax ridibundus*, *Lacerta viridis*, *Natrix natrix*
N44 49.514; E25 20.418	235 m	*Rana dalmatina*, *Emys orbicularis*
N44 51.435; E25 21.685	285 m	*Bombina variegata*, *Rana dalmatina*, *Emys orbicularis*, *Lacerta viridis*, *Natrix natrix*
N44 51.939; E25 22.404	288 m	*Triturus cristatus*, *Bombina variegata*, *Rana dalmatina*, *Lacerta viridis*, *Natrix natrix*, *Coronella austriaca*
N44 53.609; E25 19.042	298 m	*Rana dalmatina*, *Pelophylax ridibundus*, *Lacerta viridis*, *Natrix natrix*
N44 52.332; E25 18.423	280 m	*Rana dalmatina*
N44 50.054; E25 15.393	241 m	*Rana dalmatina*, *Pelophylax ridibundus*; *Emys orbicularis*
N44 55.928; E25 15.927	390 m	*Bombina variegata*, *Lacerta viridis*, *Natrix natrix*
N44 56.139; E25 15.917	394 m	*Triturus cristatus*, *Lissotriton vulgaris*, *Pelophylax ridibundus*, *Emys orbicularis*

GPS coordinates	Altit.	Species
N44 55.984; E25 17.672	357 m	*Lissotriton vulgaris*, *Pelophylax ridibundus*, *Lacerta agilis*
N44 58.912; E25 11.842	364 m	*Pelophylax ridibundus*
N44 56.011; E25 11.772	306 m	*Bufotes viridis, Pelophylax ridibundus*
N44 51.124; E25 12.471	264 m	*Hyla orientalis, Rana dalmatina, Emys orbicularis, Lacerta viridis, Natrix natrix*
N44 50.832; E25 12.388	254 m	*Rana dalmatina, Pelophylax ridibundus*, *Emys orbicularis*
N44 51.644; E25 09.000	350 m	*Triturus cristatus, Lissotriton vulgaris, Bombina variegata*, *Pelophylax ridibundus, Lacerta viridis, Natrix natrix*
N44 51.928; E25 08.906	354 m	*Triturus cristatus, Lissotriton vulgaris, Rana dalmatina, P. ridibundus, Pelophylax lessonae*
N44 52.050; E25 07.288	368 m	*Triturus cristatus, Lissotriton vulgaris, Rana dalmatina, Lacerta viridis, Natrix natrix*
N44 51.368; E25 05.585	264 m	*Rana dalmatina, Pelophylax ridibundus*, *Pelophylax* kl. *esculentus*
N44 55.511; E25 05.847	307 m	*Rana dalmatina, Pelophylax ridibundus*
N44 56.540; E25 07.000	333 m	*Rana dalmatina, Pelophylax ridibundus*
N45 02.365; E25 09.473	460 m	*Bombina variegata, Rana temporaria, Lacerta agilis, Natrix natrix*
N45 10.515; E25 10.561	557 m	*Lissotriton vulgaris-Lissotriton montandoni* hybrid; *Rana dalmatina*, *Lacerta viridis*
N45 12.841; E25 12.422	689 m	*Podarcis muralis*
N44 51.810; E25 22.174	305 m	*Rana dalmatina*, *Bufo bufo*
N44 47.604; E25 12.436	240 m	*Pelophylax ridibundus*
N44 48.701; E25 12.686	271 m	*Rana dalmatina*
N44 55.391; E25 18.965	283 m	*Rana dalmatina*
N44 46.314; E 25 18.550	164 m	*Hyla orientalis, Lacerta agilis, Lacerta viridis*
N44 51.000; E25 18.312	311 m	*Pelophylax ridibundus, Emys orbicularis*, *Natrix natrix*
N44 48.387; E25 11.617	323 m	*Bufo bufo, Lacerta viridis*
N44 49.596; E25 11.180	334 m	*Lacerta viridis*
N44 48.549; E25 6.910	272 m	*Rana dalmatina, Pelophylax ridibundus*
N44 49.023; E25 6.651	343 m	*Hyla orientalis*
N44 49.201; E25 5.883	336 m	*Rana dalmatina*
N44 48.081; E25 9.246	235 m	*Rana dalmatina*
N44 47.289; E25 9.914	247 m	*Lacerta agilis, Lacerta viridis*
N44 54.088; E25 19.721	327 m	*Rana dalmatina*

We confirmed the presence of *Bombina variegata* and *Pelophylax ridibundus* (and *P*. kl. *esculentus*) but did not find *Salamandra salamandra*, *Ichthyosaura alpestris* or *Vipera berus*. We also added new records of species, as of *Triturus cristatus*, *Lissotriton vulgaris* (and probable *L. vulgaris* –

L. montandoni hybrids), *Bufo bufo*, *Bufotes viridis*, *Hyla orientalis*, *Rana dalmatina*, *Rana temporaria*, *Pelophylax lessonae*, *Emys orbicularis*, *Lacerta viridis*, *Lacerta agilis*, *Podarcis muralis*, *Natrix natrix* and *Coronella austriaca*, raising the total number of species known in the area to 19 (and two hybrid forms) of which 15 (and the two hybrids) were observed by us in 2019-2022 and one, *Podarcis muralis*, is an older observation, dating from 2003.

The most common species are *Rana dalmatina*, *Pelophylax ridibundus* and *Lacerta viridis*; the Natura 2000 species *Triturus cristatus*, *Bombina variegata* and *Emys orbicularis* are found in a significant number of points, suggesting numerous populations and/ or intense metapopulational dynamics.

Montane elements are localized (e. g. *Rana temporaria* or the *Lissotriton vulgaris* - *L. montandoni* hybrids) and found in the upper/northern areas of the piedmont. Most of the area is occupied by a typical nemoral, hill-area herpetofauna.

The condition of the habitats is, however, not always optimal. The drought prevalent across most of Romania from 2019 onwards has significantly reduced habitats available for amphibian reproduction, many ponds drying progressively from 2019 to 2020, 2021 and 2022. Our latest observations (April 2022) show that amphibians (i. e. especially *Rana dalmatina*) were forced to resort to suboptimal breeding sites, e. g. fishponds (the N44 48.549, E25 6.910 site), very shallow puddles fed by recent rains (the N44 49.201, E25 5.883 site) or residual pools along a former stream, highly polluted with household and other waste (the N44 48.081, E25 9.246 site). The breeding success should accordingly be limited, and we could already see signs of this in the shape of many already degraded egg masses. The long-term impact upon amphibian populations remains to be evaluated. Also, hydrocarbon extraction pollutes some of the waterbodies to the extent of causing a specific film upon water; this lowers oxygen content in the water, which in turn promotes the growth of iron-oxidizing bacteria (see e. g. YU *et alii*, 2009). This is apparently happening here, the characteristic reddish slimy deposit being obvious upon the substrate, plants and even upon the shell of *Emys orbicularis* specimens (Photo 6). Besides this, unregulated garbage discarding is rampant throughout the area, choking waterbodies with various kinds of refuse, biodegradable or not (which is apparent in Photo 3). The occurrence of hybrid newts might also have been contributed to by a reduction in one or both parental populations, due to perturbing influences such as the drought in the previous years (2006–2007, 2011–2012 and 2014–2015 were the driest years in Romania since the beginning of the century, ANGEARU *et alii*, 2020) pollution and/or other factors (see also IFTIME, 2004).

Conclusions

This area has a rich herpetofauna of a typical nemoral/submontane character, including Natura 2000 species such as *Triturus cristatus*, *Bombina variegata* and *Emys orbicularis*, which have a significant presence. However, the area suffers from the effect of a multi-year drought, which exacerbates the already substantial anthropogenic impact. The amphibians and reptiles deserve protective actions such as better, more conservation-oriented management of water resources, and restoration of habitats degraded by improper refuse discharge.

References

ANGEARU, C.-V., ONTEL I., BOLDEANU G., MIHAILESCU D., NERTAN A., CRACIUNESCU V., CATANA S., IRIMESCU A., 2020. Multi-Temporal Analysis and Trends of the Drought Based on MODIS Data in Agricultural Areas, Romania. Remote Sensing, 12:23: 3940.

CIOFLEC, V., 2017. O nouă premieră. https://fieldherpingromania.wordpress.com/2017/05/01/o-noua-premiera/.

COGĂLNICEANU, D., SZÉKELY, P., SAMOILĂ, C., IOSIF, R., TUDOR, M., PLĂIAŞU, R., STĂNESCU, F., ROZYLOWICZ, L., 2013a. Diversity and distribution of amphibians in Romania. ZooKeys, 296: 35-57.

COGĂLNICEANU, D., ROZYLOWICZ, L. SZÉKELY, P., SAMOILĂ, C., STĂNESCU, F., TUDOR, M., SZÉKELY, D., IOSIF, R., 2013b. Diversity and distribution of reptiles in Romania. ZooKeys, 341: 49-76.

IFTIME A., 2004. *Triturus vulgaris* x *T. montandoni* hybrids in disturbed habitats in the Piatra Craiului Massif (Romania). Herpetozoa, 17(1/2): 91-94.

MÂCIU, M., CHIOREANU, A., VĂCARU, V. (ed.),1982. Enciclopedia geografică a României. Ed. Ştiinţifică şi Enciclopedică, Bucureşti.

YU, R., GAN, P., MACKAY, A. A., ZHANG, S., SMETS, B. F., 2009. Presence, distribution, and diversity of iron-oxidizing bacteria at a landfill leachate-impacted groundwater surface water interface. FEMS Microbiology Ecology, 71(2): 260-271.

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Photo. 1. *Triturus cristatus* – adult male (Photo Al. Iftime)
Foto 1. Triturus cristatus – mascul adult

Photo 2. *Lissotriton vulgaris* – adult male showing features suggestive of hybridization with *L. montandoni*: paravertebral canthi, black tail-tip filament, massive head (Photo Al. Iftime)
Foto 2. Lissotriton vulgaris – mascul adult cu caracteristici sugerând hibridizarea cu L. montandoni: muchii paravertebrale, filament negru în vârful cozii, capul masiv

Photo 3. *Hyla orientalis* – adults on PET bottle (Photo Al. Iftime)
Foto 3. Hyla orientalis – adult pe sticlă de plastic

Photo 4. *Pelophylax* kl. *Esculentus* – subadult.
Notice yellowish coxal marbling and metatarsal tubercle shape (Photo Al. Iftime).
Foto 4. Pelophylax kl. *Esculentus* – subadult.
Se observă marmorația coxală galbenă și forma tuberculului metatarsal.

Photo 5. *Emys orbicularis* – juvenile (Photo Al. Iftime)
Foto 5. Emys orbicularis juvenil

Photo 6. *Emys orbicularis* – adult in polluted water.
Notice slime on various objects and on shell (Photo O. Iftime)
Foto 6. Emys orbicularis – adult în apă poluată.
Se observă mâzga pe diverse obiecte și pe carapace.