

A New Biotope of *Chilostoma banaticum* (Rossmässler, 1838) in Hungary and its Nature Conservational Aspects

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Abstract: In this paper a recently found biotope of *Chilostoma banaticum* and its ecological characteristics are discussed, considering the faune-historical and palaeontological aspects of the species, as well as the possible way of the colonization of the population. Statistical analysis of shell parameters and some characteristics of the biotope important from a nature conservational point of view are also mentioned.

István Fintha from the Hortobágy National Park Authority during his field studies in September, 1992 has found adult individuals of *Chilostoma banaticum* near Tiszabecs (NE-Hungary). In the course of the subsequent joint visit of the authors to the area it has been turned out that a new, until now unknown biotope of *Chilostoma banaticum* was found, where juvenile and adult individuals of the species could be collected. The characteristics of the new biotope are as follows:

The biotope

Szabó-füzes, Tiszabecs, along the Hungarian-Ukrainian border part of River Tisza, 50-500 m far from the river on the left, Hungarian side of it, with a 1.5-2 km length.

Vegetation

Remarkably disturbed with semi-cultural features. The original vegetation might be a soft wood gallery forest, remained patches of which consist of *Salix triandra*, *S. alba* and *Populus nigra*. In the plantation replacing the gallery forest *Robinia pseudoacacia* is the dominant tree species with *Acer negundo*, *Sambucus nigra* and *S. ebulus*, but individuals of *Chilostoma banaticum* were found in the actively cultivated walnut (*Juglans regia*) plantations as well. The most characteristic plant species of the undergrowth of all forest types are *Urtica dioica* and *Stellaria media*. On the other hand one can find there two interesting species (Fintha I. 1992, manuscript), namely *Telekia speciosa*, which has its only occurrence on the Hungarian Great Plain here and *Heracleum mantegazziani*, with its sometimes more than 3 m tall individuals, and also other species (*Impatiens gaudulifera*, *Chrysosplenium alternifolium*, etc.) demonstrating that the original vegetation of the area could be very valuable with a lot of species which were carried into the biotope by the river and populations of which successfully established here. Today only relic patches of this original valuable vegetation are found on the area.

Seat-rock

Fluviatile, clayey silt, mixed with gravel, with carbonate free, water-affected flood plain soil on it, rich in SiO₂ (pH: 5.5-6.0).

Climatic conditions

The area can be characterized by a cool humid microclimate in a lowland situation. The dense vegetation on the edge of the forests, dominant species of which are *Heliantus decapetalus* and *Reynoutria japonica* effectively help to maintain this high humidity. The July mean temperature is about 20 °C and the precipitation of the vegetation period exceeds 400 ml. River Tisza itself and also the backwaters on the area increase its humidity, which is remarkable even in the dry summer months, thus the surface of the soil is wet throughout the entire vegetation period.

In the new biotope of *Chilostoma banaticum* the following malacofauna has been found till now:

- Carychium minimum* (Müller, 1774)
- Cochlicopa lubrica* (Müller, 1774)
- Vallonia pulchella* (Müller, 1774)
- Arion subfuscus* (Draparnaud, 1805)
- Zonitoides nitidus* (Müller, 1774)
- Bradybaena fruticum* (Müller, 1774)
- Euomphalia strigella* (Draparnaud, 1801)
- Cepaea vindobonensis* (Férussac, 1821)
- Helix pomatia* Linnaeus, 1758
- Helix lutescens* Rossmässler, 1837

The newly found biotope of *Chilostoma banaticum* (Rossmässler, 1838) at Tiszabecs is the second occurrence of this rare species, having today a dacic distribution, (the other one is the Bagi-szeg Forest near Vásárosnamény [Bába, K. 1967]) in NE-Hungary, and the third known biotope on the Hungarian Great Plain together with that of the Mályvád Forest (Sitke Forest) near Gyulavár (Domokos, T. 1992). It should be emphasized that all the three biotopes are directly affected by river-water. The two sites near River Tisza are on the flood-plain (between the dike and the river), and although the third one, the Mályvád Forest is situated outside the dike, but used as an emergency waterstorage area, thus the connection with the upper parts of River Fekete-Körös is provided.

All the fossil, subfossil and recent occurrences of the species are located on the banks of rivers taking their sources in Transylvania and flowing through the Hungarian Great Plain (Tisza, Maros, Fekete-Körös). Thus the newly found biotope near River Tisza confirms the idea, that *Chilostoma banaticum* was carried from the mountains of Transylvania to establish populations on the plain by the means of the rivers and their floods (Czöglér, K. 1935, Bába, K. 1979, Domokos, T. 1987). The population near Tiszabecs might be originated from the N-NE part of the species range, ancestors of which could be transported to the lowland through the „green corridor” on the banks of River Tisza from the high mountains (Máramaros, Gutin, Kőhát, Radnai) of the Eastern Carpathians. In our opinion established populations of this species would be found in the Sub-Carpathian region of Ukraine by which we could follow its migration way and map its range in the Upper Tisza region.

Considering the ecological aspects of the species, the new biotope of *Chilostoma banaticum* is also exceedingly important because human activities (forest clearing, change in the tree species composition, relatively open walnut plantations, weedy vegetation) are extremely powerful in comparison with that of the other two occurrences. In spite of these disturbances the population of *Chilostoma banaticum* seems to be very strong (2–25 individuals/m²). We think the species to be highly sensitive to the humidity of its micro-sur-

roundings and if this can compensate the effects of human activities, the population survives, but if the activities disturb directly the wet microclimate of the soil surface (e. g. by clear cutting, burning, cutting out the shrub stratum) the population will disappear from the biotope.

The species is also of a great importance from a faunahistorical point of view. Its fossils are known from Tertiary (Sarmata) formations in the Carpathian Basin as well (Sümegehy, J. 1923). It had a larger range in the Pleistocene than today (Kormos, T. 1909, Soós, L. 1943, Ehrmann, P. 1956, Ložek, V. 1964), on the basis of these data it was distributed in Central and Eastern Europe. Large numbers of individuals were found in the sediments of the Riss-Würm interglacial period (Ložek, V. 1964, Krolopp, E. 1964). Ložek, V. (1964) uses the term „banatica-fauna” while Krolopp E. (1973, 1983) determines this stratum as *Phenicolimax annularis-Helicigona banatica* biozone (Oppel zone) in Hungary. In Pleistocene sediments the species was found only in the Northern Mountains of Hungary (Krolopp, E. 1964, 1988, Hir, J. 1988).

There is no data on the occurrence of the species on the Hungarian Great Plain from the Pleistocene, but it was found in Holocene sediments near the banks of the former bed of River Fekete-Körös (Domokos T. 1986). Its occurrence from the Lower Holocene at Bélmegyer is extremely important, where Mollusc and Vertebrate species were found in remarkable numbers together with *Chilostoma banaticum* (Domokos, T. et al. 1989). On the basis of biostratigraphic and paleontological studies the species established populations there at the beginning of the atlantic phase in gallery and marshy forests (Domokos, T. et al. 1989) and became extinct because of the very powerful extinct because of the very powerful human activities (the area is a ploughed field).

Hence former publications (Domokos, T. 1987, Bába, K.–Domokos, T. 1992) give statistical measurements, these were carried out in the case of the recently found population as well, using the method of Domokos, T. (1987) on 50 adult individuals.

	Height	Width	Height/Width
Mean	1.580	2.531	0.625
Standard Error	0.013	0.016	0.004
Median	1.580	2.530	0.621
Mode	1.600	2.450	0.620
Stand. Deviation	0.090	0.115	0.030
Variance	0.008	0.013	0.001
Kurtozis	-0.408	-0.317	-0.533
Skewness	0.375	0.160	0.416
Range	0.360	0.550	0.128
Minimum	1.410	2.250	0.574
Maximum	1.770	2.800	0.702
Sum	79.000	126.550	31.230
Confidence Level (95%)	0.025	0.032	0.008

On the basis of these measurements, statistical data of this population seem to be highly similar to that of near Vásárosnamény (Domokos, T. 1986, Bába, K.–Domokos, T. 1992), thus it can be concluded, that these two populations near the Upper Tisza originated from the same Transylvanian population, having colonized in two quite similar bi-

otopes. But in our opinion shell parameters of *Chilostoma banaticum* do not depend on the annual precipitation and on the changes of the mean annual temperature (Bába, K.–Domokos, T. 1992), but they are related to local humidity and microclimatic conditions, thus the assumed connection between shell characteristics and macroclimatic factors can be considered only as a draft approach, and not as the solution.

Chemical characteristics of the seat-rock of the biotope (similarly to the one near Vásárosnamény) are not suitable for the fossilization of the shells, thus it is impossible to make clear the time of colonization of the species. We can only assume – on the basis of quarter-malacological and pollenanalytical studies carried out in the region – that it could happen in the last 7000 years, supposedly before the XVIII. century.

Summary

A new biotope of *Chilostoma banaticum* (*Helicigona banatica*) was found in the Szabó-füzes, Tiszabecs (NE-Hungary). Recently this endemic species of the Carpathian Basin can be found on the Hungarian Great Plain only in the soft and hardwood gallery forests, near the rivers coming from Transylvania. The newly found population near Tiszabecs has confirmed the ideas of Hungarian malacologists on the species, its migration and decline caused by human activities. At the same time despite the strong human disturbances the population near Tiszabecs has survived, thus one can hope that with suitable forest management (single logging, giving up with grubbing) or by the purchase of the areas by nature conservation in order to prevent the undesirable consequences of compensation and (re)privatization processes going on at a quick pace, the species will survive in the threatened biotopes. The new checklist of protected Hungarian Mollusc species, in which *Chilostoma banaticum* is included with a 10.000 HUF jurisdictional value (Magyar Közlöny 1993/36.), can help to protect this very important bioindicator species also of an outstanding fauna-historical significance.

Összefoglalás

A *Chilostoma banaticum* (*Helicigona banatica*) Mollusca faj új élőhelyet a tiszabecsi Szabó-füzesben találtak meg a szerzők. Ez a Kárpát-medencei endemikus faunaelem, napjainkban a Magyar Nagyalföldön csak az Erdélyből a síksági területre kilépő folyók mentén található meg, elsősorban kemény- és puhafás ligeterdőkben. A tiszabecsi populáció kimutatása – túl az új adat jellegén – megerősítette azokat a tudományos eredményeket, amelyeket a magyar malakológusok a hatvanas évek végétől erről a fajról, migrációjáról, emberi hatásra történő visszaszorulásáról leírtak. Ugyanakkor a tiszabecsi bolygatott élőhelyen, az erős kultúrhatások ellenére is fennmaradt a *C. banaticum*, így remény van arra, hogy megfelelő erdőgazdálkodással, erdőkezeléssel (egyeléses fakitermelés, tuskózás megszüntetése), vagy az élőhelyek természetvédelem általi megvásárlásával a gyors ütemben folyó kártalanítása és (re)privatizációs jelenségeket megelőzendően, ez a faj még veszélytetett élőhelyeken is fennmaradhat. Ezt segíti elő a magyarországi puhatestűek új és már elfogadott védettségi koncepciója, amely biztosítja e rendkívül fontos bioindikátor és kimagasló faunatorténeti jelentőségű szárazföldi csigafaj védelmét (védett faj, 10 000 Ft-os eszmei értékkel: Magyar Közlöny, 1993/36).

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