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## **An isolated occurrence of *Alopi* *bielzii tenuis* (E.A. Bielz) (Mollusca, Gastropoda, Clausiliidae) in the Bihor-Vlădeasa Mountains (Romania)**

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**Abstract.** A population of *Alopi* *bielzii tenuis* (E. A. Bielz, 1861) is reported from the western side of the Bihor-Vlădeasa Mts., near Pietroasa (jud. Bihor). The zoogeographical significance of this isolated occurrence is discussed.

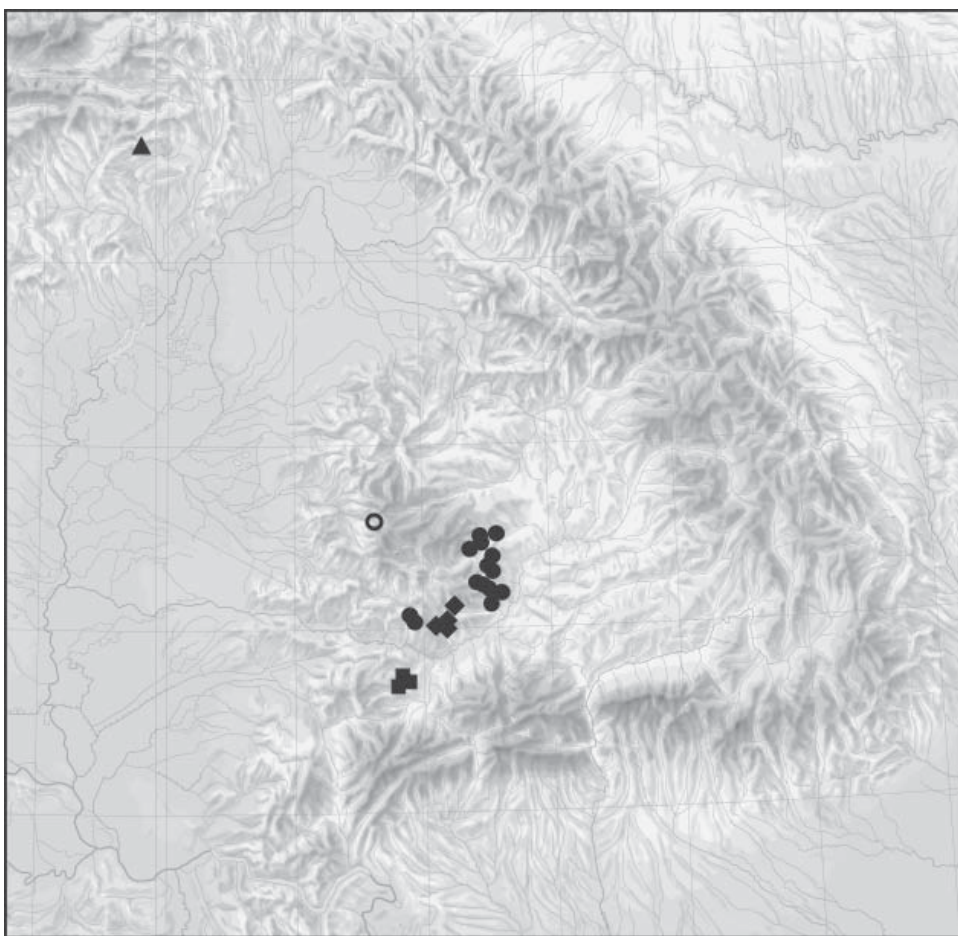
**Keywords.** Clausiliidae, *Alopi* *bielzii*, zoogeography, Bihor-Vlădeasa Mountains.

### **Introduction**

The genus *Alopi* H. & A. Adams 1855 is endemic to the Carpathians. Except one isolated occurrence in south-eastern Slovakia, all other *Alopi* forms inhabit Romania's Southern and Eastern Carpathians, as well as the interlocked Apuseni Mountains. These strongly calcophilic clausiliids are quite ubiquitous in the limestone ranges toward the south-eastern part of their area, but become sporadic toward the western, north-western and northern limits of their distribution.

The widest distributed species of the genus is the *A. bielzii* (L. Pfeiffer, 1849). The nominate subspecies of this dextral *Alopi* (*A. b. bielzii*) occurs in the

Poiana Ruscă Mts., near Hunedoara. Two further subspecies, *A. b. madensis* (Fuss, 1855) and *A. b. tenuis* (E. A. Bielz, 1861) are native to the Apuseni Mts., whereas *A. b. clathrata* (E. A. Bielz, 1856) is found in the Zádiel Valley of the Slovak Karst (Figure 1). In contrast to most other species of the genus, the subspecies of *A. bielzii* forms are quite thermophilic, showing strong preference for sunlit limestone cliffs at low altitudes (below 1000 m).



**Figure 1.** Distribution map of *A. b. bielzii* (square), *A. b. madensis* (diamond), *A. b. tenuis* (circle), and *A. b. clathrata* (triangle). The new locality of *A. b. tenuis* is highlighted by empty circle.

The subspecies *A. b. tenuis* is widely distributed along the eastern and southern boundaries of the Apuseni mountain complex, in the Gilău-Muntele Mare, Trascău and Metaliferi Mts. It was not known, however, from other limestone regions of the Apuseni Mts., where only sporadic populations of *A. livida julii* A. J. Wagner, 1913 were found. Here we report finding an isolated occurrence of *A. b. tenuis* at the foothills of the Bihor-Vlădeasa Mts. This zoogeographically very interesting locality has not yet been published, though there are two samples of *A. b. tenuis* that originate from here. One of these at the Naturhistorisches Museum (Vienna) was collected in 1926 by Franz Käufel with the record "Padis bei der V. Bulsa" (NHMW 10021), whereas the other at the Mátra Múzeum (Gyöngyös) was collected by the amateur naturalist Tibor Wirth (Miskolc) in 1977 with the indication of Pieroasa, at the upper flow of Crișu Pietros (MMG 31208; see: Varga, 1983). The locality data are not precise, but it seems likely that these two forgotten samples were collected at, or very near, the site which was now re-discovered.

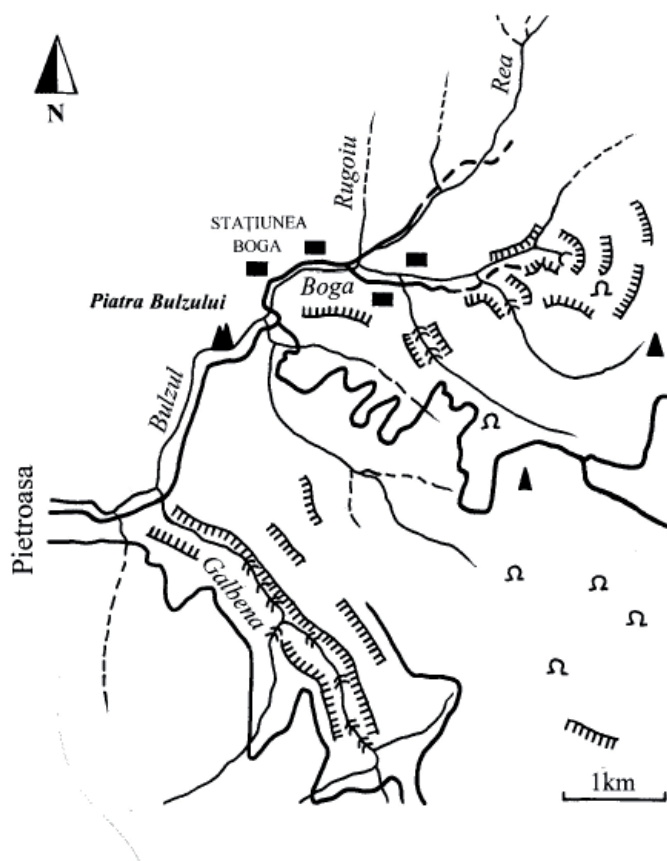
## Results

On December 1, 2010, the authors of this paper conducted a brief malacological survey in the Boga Valley. During this field trip 56 fallen shells of *A. b. tenuis* were collected from a leaf litter-covered scree at the SSW cliffs of Piatra Bulzului (46°36'4" N 22°38'29" E), situated on the right side of the Bulzu Stream along the highway, at an elevation of 560 m (Figs 2 and 3).

Over the steep, shaded slope beneath the cliffs the following accompanying snail taxa were collected:

*Acanthinula aculeata* (O. F. Müller, 1774)  
*Bulgarica vetusta* (Rossmässler, 1836)  
*Carychium tridentatum* (Risso, 1826)  
*Chondrina arcadica clienta* (Westerlund, 1883)  
*Drobacia banatica* (Rossmässler, 1842)  
*Faustina faustina* (Rossmässler, 1835)  
*Granaria frumentum* (Draparnaud, 1801)  
*Helix pomatia* Linné, 1758  
*Kovacsia kovacsi* (Varga & Pintér, 1972)  
*Morlina glabra striaria* (Westerlund, 1881)  
*Oxychilus montivagus* (Kimakowicz, 1890)  
*Platyla banatica* (Rossmässler, 1842)  
*Platyla microspira* (Pini, 1885)  
*Platyla polita* (Hartmann, 1840)

*Punctum pygmaeum* (Draparnaud, 1801)  
*Pupilla muscorum* (f. *bigranata*) (Linné, 1758)  
*Pyramidula pusilla* (Vallot, 1801)  
*Ruthenica filograna* (Rossmässler, 1836)  
*Truncatellina cylindrica* (Férussac, 1807)  
*Vallonia costata* (O. F. Müller, 1774)  
*Vitrea subrimata* (f. *maritae*) (Reinhardt, 1871)  
*Vitrea* sp.  
*Vitrina pellucida* (O. F. Müller, 1774)



**Figure 2.** Map of the Bihor-Vlădeasa Mountains at the northern headwaters of the Crișu Pietros. Piatra Bulzului is situated on the right side of the Bulzu stream.

Among the shells found, there was a clear dominance of *Bulgarica vetusta*, with nearly 25% of the specimens. Farther upstream in the valley, toward Amfiteatrul Boghii, the following further species were recorded:

*Aegopinella* cf. *epipedostoma* (Fagot, 1879)

*Aegopinella pura* (Alder, 1830)

*Balea stabilis* (L. Pfeiffer, 1847)

*Cochlodina laminata* (Montagu, 1803)

*Isognomostoma isognomostoma* (Schröter, 1784)

*Trichia bielzii* (A. Schmidt, 1860)

*Vertigo alpestris* Alder, 1838

*Vertigo pusilla* O. F. Müller, 1774



**Figure 3.** Piatra Bulzului, the locality of *Alopi* bielzii tenuis (E. A. Bielz).

## Discussion

Verification of the locality of *A. b. tenuis* near Pietroasa confirms the presence of this subspecies on the western side of the Bihor-Vlădeasa Mts., which could be expected on the basis of two earlier, unpublished collection data from the same valley. In major overviews of the genus these remained unmentioned (Grossu, 1981; Nordsieck, 2008), perhaps also due to reservations prompted by isolation of the Piatra Bulzului population from the other occurrences of this subspecies. The closest locality data of *A. b. tenuis* are from the Gilău-Muntele Mare and Metaliferi Mts. (near Poșaga de Sus and Crăciunești, respectively), both at a distance of 65-70 km.

Another, even more isolated occurrence of *A. bielzii* is that of the subspecies *A. b. clathrata* in the Zádiel Valley in south-eastern Slovakia. The large distance between this site and the known Romanian range of the species lead to considering possible human introduction at the Slovakian locality (Soós 1928). Later, however, thorough analyses of shell morphology (Soós, 1943), and especially the presence of *A. b. clathrata* in Holocene deposits of the Zádiel Valley (Ložek, 1964), provided strong support for the natural origin of the Slovakian population.

Current locality records and ecological preferences of *A. bielzii* seem to indicate fragmentation and contraction of a once larger distribution area, which could have been established at a warm period toward the end of the Pleistocene. The locally confined occurrence of *A. b. tenuis* in the Bihor-Vlădeasa Mts., an otherwise favourable and well studied environment, attests to the relict character of this subspecies. But this record is particularly important, because it considerably decreases the distance separating the Romanian and Slovakian localities of *A. bielzii* (Figure 1). It is worth noting that similar disjunct ranges, comprised of distribution areas in the Apuseni Mts. and foothills of the Northern Carpathians, are also known in the cases of other gastropods, such as *Vestia elata* (Rossmässler, 1836), *Lozekia transsilvanica* (Westerlund, 1876), *Kovacsia kovacsi* (Pintér & Varga, 1972), and species of the genus *Aspasita* Westerlund, 1889. These are indicative of expansion routes which once lead to the colonization of the Northern Carpathians by Transylvanian species via the Apuseni mountain complex.

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