Pleistocene Vertigo species from Hungary

Endre Krolopp & Pál Sümegi


Key words: Quaternary, Pleistocene, malacology, palaeoecology, Vertigo.

This paper contains a short palaeoecological and biostratigraphical evaluation of twelve Vertigo species known from Pleistocene sediments in Hungary. Of these species seven are extant in the Recent Hungarian fauna, three species live in neighbouring areas, and two species became extinct in Europe at the end of the Pleistocene.

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Introduction

The genus Vertigo (Gastropoda, Stylommatophora, Vertiginidae) developed already at the beginning of the Tertiary. Its numerous species are found in various Tertiary and Quaternary formations and several species are still present in the Recent European fauna.

In Quaternary malacology the Vertigo species merit special interest, as they are highly responsive to environmental changes and therefore excellent ecological indicators. Presence or absence of certain species, or the percentage of their occurrence in a fauna help to make a more precise palaeoecological reconstruction. Furthermore, some Vertigo species are of biostratigraphical importance in the Hungarian Pleistocene (Krolopp, 1973, 1983). The stratigraphical ranges of the various species are represented in Fig. 1.

The Recent distribution of the Vertigo species was established by using the data of Soós (1943), Pintér et al. (1979) and Kerney et al. (1983) on the ecological demands of the different species. For the palaeoecological ranging we used data from Ložek (1964).

Characterisation of species

Twelve Vertigo species are known so far from the Pleistocene formations in Hungary of which seven form still part of the Recent Hungarian malacofauna (V. pusilla, V. antivertigo, V. substria, V. pygmaea, V. mouinsiana, V. alpestris, and V. angustior). Three species (V. geyeri, V. genesii and V. modesta) had withdrawn from the examined region at the beginning of the Holocene, and two species (V. parcedentata, V. pseudo-

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Fig. 1. Chronostratigraphical range of Vertigo species in the Pleistocene of Hungary.

*Vertigo substrata* became extinct all over Europe at the end of the Pleistocene.

**Vertigo pusilla** (Müller, 1774)

This species is widespread all over Europe. In Hungary it is recorded first of all from the midmountains and it is sporadically present on the Great Hungarian Plain (Sümegi, 1988). It is found in forests and forest fringes, living on trunks and moss-grown rocks. Kormos (1926) was the first to report this species from Hungarian Pleistocene formations. Additionally to its occurrence in the Riss-Würm interglacial fauna it is also known to be present during the Early and Middle Pleistocene (Krolopp, 1958, 1977, 1982). In the Pleistocene accompanying association a significant ratio of forest elements is observed, e.g. *Acanthinula aculeata* (O.F. Müller, 1774), *Ruthenica filograna* (Rossmässler, 1836), and *Discus rotundatus* (O.F. Müller, 1774). In palaeoecological reconstructions therefore *Vertigo pusilla* is one of the important index species for a forest environment.

**Vertigo antivertigo** (Draparnaud, 1801)

*V. antivertigo* is a faunal element with a palaearctic distribution pattern. In Hungary it is widespread in forests in Transdanubia and in the northern midmountains. On the Great Hungarian plain it has only a scattered occurrence on the shores of calcareous swamps and marshes.

It is a highly characteristic species of mollusc faunas of Early and Middle Pleistocene ages. In malacofaunas recovered from fossil soils of the Riss-Würm interglacial...
and of the Early Würm it is one of the dominant elements (Krolopp, 1964, 1965, 1982). After the Early Würm its occurrence decreases and it is only rarely found in Middle and Late Würm sediments. In the Late Glacial period (11000-12000 BP according to radiocarbon data) the species re-appears (Sümegi, in press). It is a highly hygrophilous species, indicative of a mild and moist climate, and a forest and shrubby environment. Also in the associated faunas hygrophilous species characteristic for forest environment are dominant, e.g. Carychium minimum O.F. Müller, 1774, C. tridentatum (Risso, 1876), Vertigo angustior, Clausilia pumila Pfeiffer, 1828, and Euomphalia strigella (Draparnaud, 1801).

Vertigo substriata (Jeffreys, 1833)

This species has a boreo-alpine distribution pattern and is only rarely encountered in Hungary (Eröss, 1981). It is found living in moist, humid, cool valleys, at moss-grown places. In the Hungarian Pleistocene the presence of this species is especially characteristic for sediments formed during the Würm period. A more large-scale appearance is characteristic for the Late Würm and Late Glacial infusion loesses (flood-plain loessy silt), and of sediments accumulated on flood-plains and at shore lines. On the basis of radiocarbon dating its conspicuous dominance in the Great Hungarian Plain lies between 25000 and 22000 BP, and again from 16,000 to 13,000 BP (Sümegi, in press). V. substriata is an indicator element of cold to cool, and moist climate phases. In its accompanying fauna other cold-prefering, cold-resistant and hygrophilous species are present, e.g. Columella edentula (Draparnaud, 1805), C. columella (Martens, 1830), and Trichia hispida (Liné, 1758).

Vertigo moulinsiana (Dupuy, 1849)

This is a species with an Atlanto-Mediterranean distribution. In the Recent fauna it has a sporadic occurrence in Transdanubia (Hungary), while in the Great Hungarian Plain it is found living on the shores of calciferous swamps and lakes in the zone of matgrass (Typha-zone) and sledge (Carex-zone). The species is rare in Pleistocene formations and mainly known from the Early Pleistocene. V. moulinsiana is a highly hygrophilous species, with preference for a mild climate. In its accompanying fauna forest elements and highly hygrophilous waterside species are found, e.g. Carychium minimum, Acanthinula aculeata, Cochlodina laminata (Montagu, 1803), and Perforatella bidentata (Gmelin, 1791). In palaeoecological reconstructions the presence of this species suggests moist, mild breading seasons.

Vertigo pygmaea (Draparnaud, 1801)

The distribution of this species is holarctic. In Hungary it is found widespread, both in the mid-mountains and in the lowland area. Its habitat comprises grass and mosses in meadows and forest fringes.

V. pygmaea is known from various formations of Pleistocene age. Although it is occasionally found in loesses, its presence is first of all connected with humic zones, i.e. steppe-like soils, indicating interstadial periods between loess-formations. In its
accompanying fauna high-resistance, as well as xerophilous steppe and forest-steppe species are dominating (e.g. *Pupilla muscorum* (Linné, 1758), *P. triplicata* (Studer, 1820), *Chondrula tridens* (O.F. Müller, 1774), and *Vallonia costata* (O.F. Müller, 1774). In palaeoecological interpretations the present species is recorded as a mesophilous steppe-dwelling species of high resistance.

**Vertigo alpestris** Alder, 1838

Although a species with a holarctic distribution pattern *V. alpestris* is considered a boreo-alpine faunal element, on the basis of its European area. In the Recent Hungarian fauna this species is found at a few cool, moist-vaporous habitats in Transdanubia and in the northern mid-mountains. It prefers a calcareous environment, like limestone rocks in forests, living in between mosses and other plants.

Its presence during the Pleistocene was recorded by Krolopp (1961). *V. alpestris* is present from the Early Pleistocene onwards, but it became more frequent only during the Late Würm.

The ecological range of the Recent populations and the ranges and distribution of their accompanying faunas, including e.g. *Discus ruderatus* (de Férussac, 1821), *Semitrilimax kotulai* (Westerlund, 1883), *Punctum pygmaeum* (Draparnaud, 1801) and *Vestia turgida* (Rossmässler, 1836), indicate that in palaeoecological reconstructions *V. alpestris* can be applied as a good marker species for forest and shrubby environments, and of a cool, moist climate.

**Vertigo angustior** Jeffreys, 1830

This species is a palaeartctic fauna element. In Hungary it is known from the Late Miocene onwards as *Vertigo angustior oecsensis* (Halaváts, 1911)

The Recent distribution of this species, as well as its occurrence during the Pleistocene are highly similar to those of *V. antivertigo*. Both during the Early and the Middle Pleistocene it frequently was a fauna-forming species. It is one of the most common elements of faunas present in fossil soil levels of Early Würm age (Krolopp, 1965). Among the accompanying faunas the percentage of hygrophilous species is significant: *Carychium minimum*, *C. tridentatum*, *Vertigo antivertigo*, and *Clausilia pumila*. In the middle and upper parts of the Late Pleistocene sequence the importance of this species decreases, but it appears again near the end of the Late Glacial (11000-12000 BP) in the Carpathian Basin, together with the species *V. antivertigo*. Like the latter species *V. angustior* indicates a mild, moist climate.

**Vertigo geyeri** (Lindholm, 1925)

In Hungary this species with a boreo-alpine distribution pattern became extinct near the end of the Pleistocene. In Middle and Late Würm sediments and in Late Glacial formations it is especially frequent in sediments (infusion loesses, flood-plain loessy silt) accumulated in flood-plains and wet meadows with a high carbonate content. On the basis of its ecological demands, its distribution pattern and its accompanying fauna (*Succinea oblonga* Draparnaud, 1801, *Columella* spp., *Trichia hispida*, *Vertigo parcedentata*).
V. geyeri is considered to be a hygrophilous, cold-resistant faunal element.

*Vertigo parcedentata* (Braun, 1847)

Near the end of the Pleistocene this species became extinct all over Europe. In Hungary it is so far only recorded from Würm sediments (Krolopp, 1973, 1983), being a typical element of Late Würm and Late Glacial loesses and infusion loesses. An acme in its occurrence is found between 16,000 and 13,000 BP.

The accompanying fauna of *V. parcedentata* comprises hygrophilous, cold-resistant and cold-preferring elements in high percentages, such as *Succinea oblonga*, *Columella* spp., *Vertigo geyeri*, and *Trichia hispida*. We consider this species to be a cold-resistant, hygrophilous species.

*Vertigo pseudosubstriata* Ložek, 1954

This species likewise became extinct in Europe at the end of the Pleistocene. Its presence in Hungarian Pleistocene deposits was demonstrated by Krolopp (1958). It is a rare species, exclusively known from Würm formations at two Hungarian localities (Krolopp, 1958; Sümegi, in press). The accompanying fauna yields dominant elements of cold-preferring, cold-resistant, hygrophilous species, such as *Columella* spp. and *Vertigo parcedentata*.

As indicated by Ložek (1954, 1956, 1964) and our own studies we consider this species to be a cold-preferring, hygrophilous faunal element.

*Vertigo genesii* (Gredler, 1856)

A boreo-alpine species, living mostly in marshy areas (Coles & Colville, 1980). In Hungary the species became extinct near the end of the Pleistocene. It is known from Würm sediments, but only from a few localities. On the basis of Hungarian material its morphological distinction from *V. parcedentata* seems to be problematical. As indicated by its mode of life and its accompanying fauna *V. genesii* is a cold-resistant, hygrophilous faunal element.

*Vertigo modesta* (Say, 1824)

In Europe *V. modesta* has an arctic-alpine distribution. Its nearest place of actual occurrence are the Tatra Mountains, where it lives at an altitude of 1900-2150 m (Ložek, 1964). From the Hungarian Pleistocene the present species is known at only one locality, in loess of Late Würm age (new record, unpublished), in the southern part of the Great Hungarian Plain. No doubt the palaeogeography and -ecology of this Pleistocene species need further research.

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References


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