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Helicodiscus (*Helicodiscus*) *depressus* (EICHWALD, 1830) or *Helicodiscus* (*Helicodiscus*) *parallelus* (SAY, 1821) in the Neogene of Europe? (*Gastropoda Pulmonata*: *Endodontidae*)

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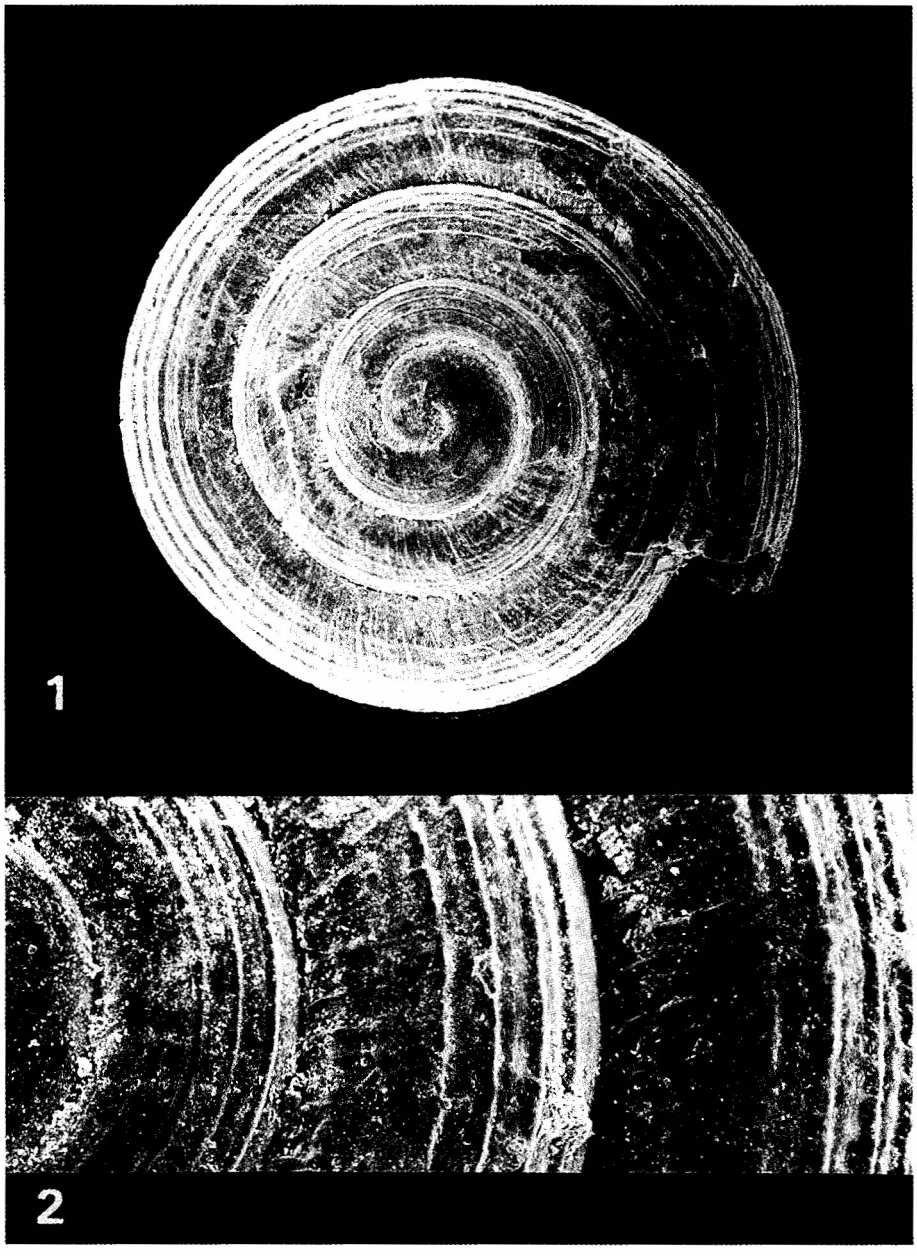
ABSTRACT. Members of the subgenus *Helicodiscus* s. str. are rare and poorly known in the Neogene of Europe. Recognition of a Miocene species *Helicodiscus* (*Helicodiscus*) *roemeri* (ANDREAE, 1902), known from Poland and Austria, as a synonym of *H.* (*H.*) *depressus* (EICHWALD, 1830) from Ukraine extends the geographical range of the species towards the east. *H.* (*H.*) *eichwaldi* PRISYAZHNYUK, 1972 from Zamiehov (Ukraine) - reported also from other Ukrainian localities - is also placed among synonyms of *H. depressus*. The close similarity of *H.* (*H.*) *depressus* and the living American *H.* (*H.*) *parallelus* might suggest an originally wider distribution range of the latter species in the Neogene.

Key words: malacology, fossil snails, *Endodontinae*, *Helicodiscus*, Neogene, Europe.

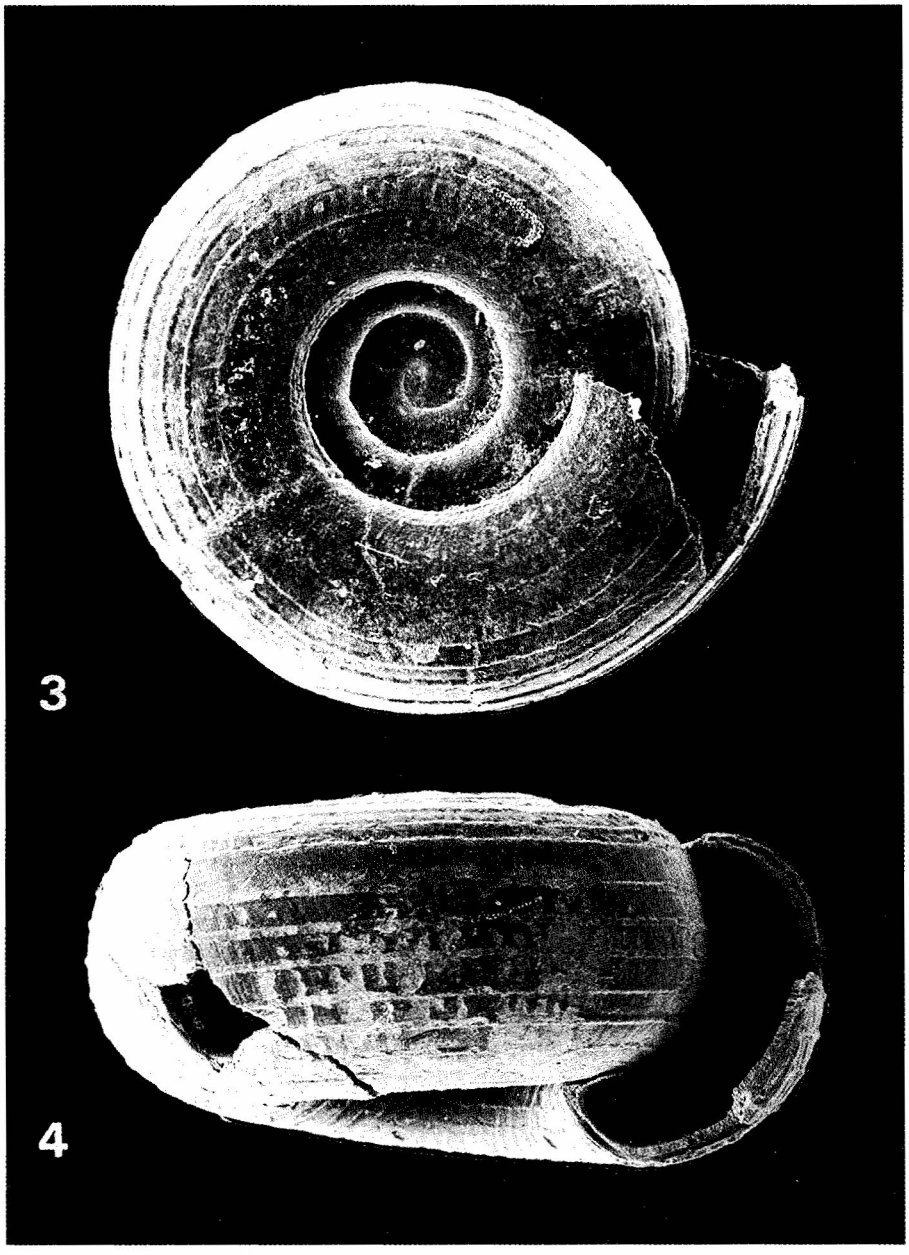
INTRODUCTION

Fossil members of the subgenus *Helicodiscus* s. str., which are rather rare in the Neogene deposits of Europe, were for a long time questionably referred to zonitids, namely to the subgenus *Gyralina* ANDREAE, 1902 of the genus *Oxychilus* FITZINGER, 1833 or *Retinella* P. FISCHER, 1877. This point of view was also shared by WENZ (1923) and ZILCH (1959-1960).

However, as early as 1972 PRISYAZHNYUK recognized generic appurtenance of EICHWALD's (1830, 1853) *Helix depressa* and ANDREAE's (1902) *Gyralina roemeri* to



1-2. *H.* (*Helicodiscus*) *depressus* (EICHWALD, 1930) from Zamiehov; 1. top view, width of the specimen = 2.95 mm; 2. detail of surface sculpture, x 94



3-4. *H.* (*Helicodiscus*) *depressus* from Bełchatów B; 3. umbilical view, width of the specimen = 2.74 mm; 4. front view, height of the specimen = 1.25 mm

Helicodiscus, based on specimens from several Ukrainian localities described by him as a new species - *Helicodiscus* (*Helicodiscus*) *eichwaldi*. Unfortunately, at that time he had no possibility to examine ANDREAE's material. Furthermore, EICHWALD's type specimens were lost, and his description of *H. depressa* was insufficient. EICHWALD made no mention of the small conical teeth, which are commonly present in pairs at irregular intervals on the palatal and basal walls of the shell of *Helicodiscus* s. str.; one pair is usually visible in the aperture, the others are located farther inside. Moreover, the specimens of *H.* (*H.*) *eichwaldi* were found in older strata (localities at Zamiehov, Slyedy and others) than those of EICHWALD (type locality at Holovchintzy), while the exploration in the region of Holovchintzy at that time gave no result.

At present we have at our disposal sufficient material from over a dozen Polish and Ukrainian localities (including that from the vicinity of the type locality) of different age; some localities in Austria (LUEGER 1981) and Moldavia (ROSHKA 1986) were also reported.

SYSTEMATIC PALEONTOLOGY

The comparison of all the available specimens from the horizons ranging in age from the Badenian (MN 5-6) to Pontian (MN 11-13) reveals that all of them represent the same species (Figs 1-4) which is morphologically very close to the living American *H.* (*H.*) *parallelus*. All the fossil specimens are quite similar in outline, although the degree of spire depression varies. Only the specimens from the Middle Sarmatian of Podolia are slightly lower (body whorl by ca. 0.1 mm lower) than those from the older horizons. A similar phenomenon was recorded by LUEGER (1981) in specimens found in three localities in Austria. These specimens are somewhat lower than the type series, but they are very similar in all other characters (including number of ridges on the body whorl - 10-15), and they were considered by this author as a separate race.

The fossil specimens vary slightly in size and degree of development of teeth (when visible) as well as in the spacing of spiral ridges on the surface (11-20 on the fourth whorl). Unfortunately, the fossil specimens are not translucent and their aperture is often filled with sediment, making it impossible to establish the presence of teeth. In spite of this, some of them bear more or less visible teeth.

It seems very likely, that the Neogene snails of the subgenus *Helicodiscus* s. str. had strictly determined ecological preferences and during the Badenian (Poland), Middle Sarmatian (Ukraine) and Pontian (Austria) did not develop forms which would deserve a status of distinct species or even subspecies.

On the basis of five available specimens (coll. Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw) of the extant *H.* (*H.*) *parallelus* from an American locality in Illinois we have found a higher number of ridges on the body whorl (18-23), and, in general, a slightly wider umbilicus and aperture. The observed differences may be due to damage of the terminal part of the body whorl in almost all the fossil specimens, which, moreover, are mostly subadult (only few specimens reach 4 or, exceptionally, 4 1/8 whorls, while the recent adult specimens have

approximately 4 1/2 whorls). The terminal part of the body whorl of adult *H.* (*H.*) *parallelus* distinctly descends and somewhat expands, hence the aperture shape may be different. It is noteworthy, that the five mentioned recent specimens show a distinct variation in ridging and in the width of umbilicus, and one of them (subadult) is so similar to H. depressus from Bełchatów-B that their separation is most difficult.

Measurements of similar-sized specimens of *H.* (*H.*) *depressus* from some Neogene localities and *H.* (*H.*) *parallelus* (adult and subadult specimens) are as follows (in mm; body whorl of the specimen from Opole was damaged and fixed with glue, hence umbilicus width is uncertain):

	Shell		Umbilicus	Number of	
	width	height	width	whorls	ridges
Recent adult	3.30	1.37	1.42	4 1/2	21
Recent subadult	2.59	1.12	1.09	3 7/8	18
Bełchatów B	2.74	1.09	1.14	4	17
Zamiehov	2.95	1.24	1.16	4 1/8	15
Opole	2.90	1.23	ca 1.15	4 1/8	15

A question arises, whether or not *H.* (*H.*) *depressus* and *H.* (*H.*) *parallelus* are conspecific. This seems likely, though unequivocal decision would require a more extensive material, both fossil and recent. The answer to this question may throw some light on the origin of the genus *Helicodiscus* in Europe and may confirm one of SCHLICKUM's (1979) presumptions concerning the occurrence of living *Helicodiscus* (*Hebetodiscus*) *singleyanus* inermis BAKER, 1929 in Europe. However, in contrast to the latter species, *H.* (*H.*) *parallelus* has not been hitherto found in Europe in habitats which could seem natural to it. All findings come from botanical gardens in Ireland, England, Germany and The Netherlands (KERNEY et al. 1983; RIEDEL & WIKTOR 1974). In the fossil record, this species has not been reported from the Pleistocene of Europe either.

The Neogene material shows that the oldest localities of *H.* (*H.*) *depressus* from the Badenian - Middle Sarmatian are located on the northern side of the Carpathian arch while the younger ones (Pannonian and Pontian) are situated south of the range (Vienna Basin) (Fig. 5).

The findings from Ukraine indicate that the species is much more frequent in the horizons which correspond to the most humid periods of the Sarmatian. On the contrary, in the sediments referred to the dry periods, this snail is found very rarely.

In Kansas (North America) *H.* (*H.*) *parallelus* occurs in the early Pleistocene deposits of the latest Nebraskan glacial age (TAYLOR 1960). Although the species is regarded as a form usually associated with damp humus around dead wood, recent

data from eastern Kansas show that in more humid parts of the state it may also occur in grasslands, on sparsely wooded slopes, and on rock ledges (LEONARD & GOBLE 1952). In the more arid areas, however, it is limited to woodlands. Thus it seems less probable that members of *Helicodiscus* s. str. in Europe could survive progressive aridization over the Pliocene rather than the glacial cooling.

Considering the above remarks, the following synonymy of the species has been accepted:

Family *Endodontidae*
Genus *Helicodiscus* MORSE, 1864
Subgenus *Helicodiscus* s.str.

***Helicodiscus* (*Helicodiscus*) *depressus* (EICHWALD, 1830)**

Helix depressa EICHWALD 1830: 215
Helix depressa: EICHWALD 1853: 300-301, pl. XI Fig. 10a-d.
Hyalinia (*Gyralina*) *roemeri* ANDREAE 1902: 8-9, Fig. 3. **New synonym.**
Gyralina roemeri: WENZ and EDLAUER 1942: 93, pl. 4 Fig. 12.
Helicodiscus eichwaldi PRISYAZHNYUK 1972: 132, Fig. A. **New synonym.**

5. Distribution of *H.* (*Helicodiscus*) *depressus* in the Neogene of Europe

Helicodiscus eichwaldi: GOZHIK and PRISYAZHNYUK 1978: 85, pl. II, Figs 6-8.
Helicodiscus (Helicodiscus) roemeri: SCHLICKUM 1978: 69, Fig. 3.
Helicodiscus depressa: ROSHKA 1986: 40, pl. I, Fig. 10-11.

Type locality: Holovchintzy (Ukraine)
Type horizon: the Middle Sarmatian
Occurrence (* material examined by the authors):

1. UKRAINE and MOLDAVIA: late Badenian - *Minkovtzy (1 specimen); lower Sarmatian - Bursuk (2 specimens), *Zamiehov (12 specimens), *Sledy (6 specimens), *Brykov (2 specimens); middle Sarmatian - *Verbka (1 specimen), *Gritzev (1 specimen), *Ivankovtzy-Pilyava (1 specimen), *Tchapla (near the type locality) (26 specimens) and *Popovtzy.
2. POLAND: Badenian - *Opole (11 specimens), *Bełchatów-B (4 specimens), *Śladków Mały (1 specimen); lower Pannonian - *Bełchatów-A (6 specimens).
3. AUSTRIA: Pannonian C - *Leobersdorf (1 specimen); Pannonian E - *Vösendorf (1 specimen); Pontian H -*Eichkogel (14 specimens), Richardshof (1 specimen).

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