

***Insectivora (Mammalia)* from the Miocene of Bełchatów in Poland. I. *Metacodontidae* : *Plesiosorex* POMEL, 1854**

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Abstract. Isolated teeth of *Plesiosorex germanicus* (SEEMANN, 1938) have been found for the first time in Poland, in the Miocene locality of Bełchatów (central part of the country). They were localized in horizon B, dated to the Middle Miocene (MN5/6). The systematic position of above-mentioned taxon, its measurements and illustrations are given.

Key-words: fossil mammals, *Insectivora*, *Metacodontidae*, Miocene, Poland.

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I. INTRODUCTION

The present paper is the first part of a series of studies concerning the remains of the insectivores from the Miocene locality of Bełchatów. This locality is situated in the area of a brown coal mine in Central Poland. It consists of several layers of carbonate limnic sediments intercalated between coal seams and contains numerous shells of molluscs and remains of small mammals (STWORZEWICZ, SZYNKIEWICZ 1989, STUCHLIK et al. 1990, KOWALSKI 1993 a and b). Three main horizons bearing animal remains have been distinguished at this locality: lower Bełchatów C dated to the Early Miocene (MN4), middle Bełchatów B dated to the Middle Miocene (MN5/6) and upper Bełchatów A dated to the late Middle Miocene (MN9).

The primary studies of the Bełchatów *Insectivora* indicate the presence of the *Metacodontidae*, *Heterosoricidae*, *Dimylidae*, *Soricidae*, *Erinaceidae* and *Talpidae*.

Measurements were taken according to the pattern presented in SCHÖTZ (1989). The highest number of identical elements (e. g., right first lower molar, M₁) has been assumed to be the minimum number of individuals. The specimens described are housed in the collection of the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences in Cracow.

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II. SYSTEMATIC PART

Family *Metacodontidae* BUTLER, 1948

Genus *Plesiosorex* POMEL, 1854

Plesiosorex germanicus (SEEMANN, 1938)

Bełchatów B, MN5/6 (no. MF/2141)

Material and measurements (in mm).

M³ dext. L 1.45, W 2.48

M₁ dext. L 3.95, W 2.28 (L of trigonid 2.27, L of talonid 1.68)

M₁ sin. (part of talonid only) W 2.20

M₂ dext. L 2.95, W 2.23 (L of trigonid 1.65, L of talonid 1.30)

M₃ dext. L 2.75, W 1.76 (L of trigonid 1.52, L of talonid 1.23)

Description of material. The third upper molar M³ (Fig. 2E) is slightly worn and its enamel is damaged. The anterior part of the tooth is better developed than the posterior one: the base of the pointed parastyle is large ("eared") and the metastyle is totally lacking. The highest cusp (cusp-crest, according to SCHÖTZ 1989), is the metacone, the protocone is a little lower but massive. The metaloph is present, making the trigon basin closed. The hypocone is well developed as a small but distinct conical cusp. The protocone and hypocone are separated by a valley. The cingulum is absent.

The first lower molar M₁ (Fig. 1 A-C) is relatively big and slender. Its cusps are sharp and the highest cusp is the protoconid. The trigonid and talonid are, more or less, the same size. The cingula are lacking. The paralophid is divided by a very distinct fissure. It is clearly visible in the buccal wall of the paralophid, between the paraconid and protoconid and it reaches to about half the height of that wall. The mesostylid cuspule between the metaconid and entoconid is present. The hypoconulid, vestigial in one and distinct in the second (broken, Fig. 1 D) tooth may also be seen.

M₂ (Fig. 2A-B) is shorter than but its width is the same as in M₁, so the tooth seems to be much larger. It is extremely worn and some of its characters, such as the height of cusps, or the presence of the paralophide fissure, are not visible. Other structures, like the mesostylid cuspule or hypoconulid are present but only as oval traces. The distinct, large cingulum is present in the anterior side of the tooth. It tapers towards the buccal side, where it is visible only between the protoconid and hypoconid, in the buccal re-entrant valley. This valley is deep and it opens just above the cingulum.

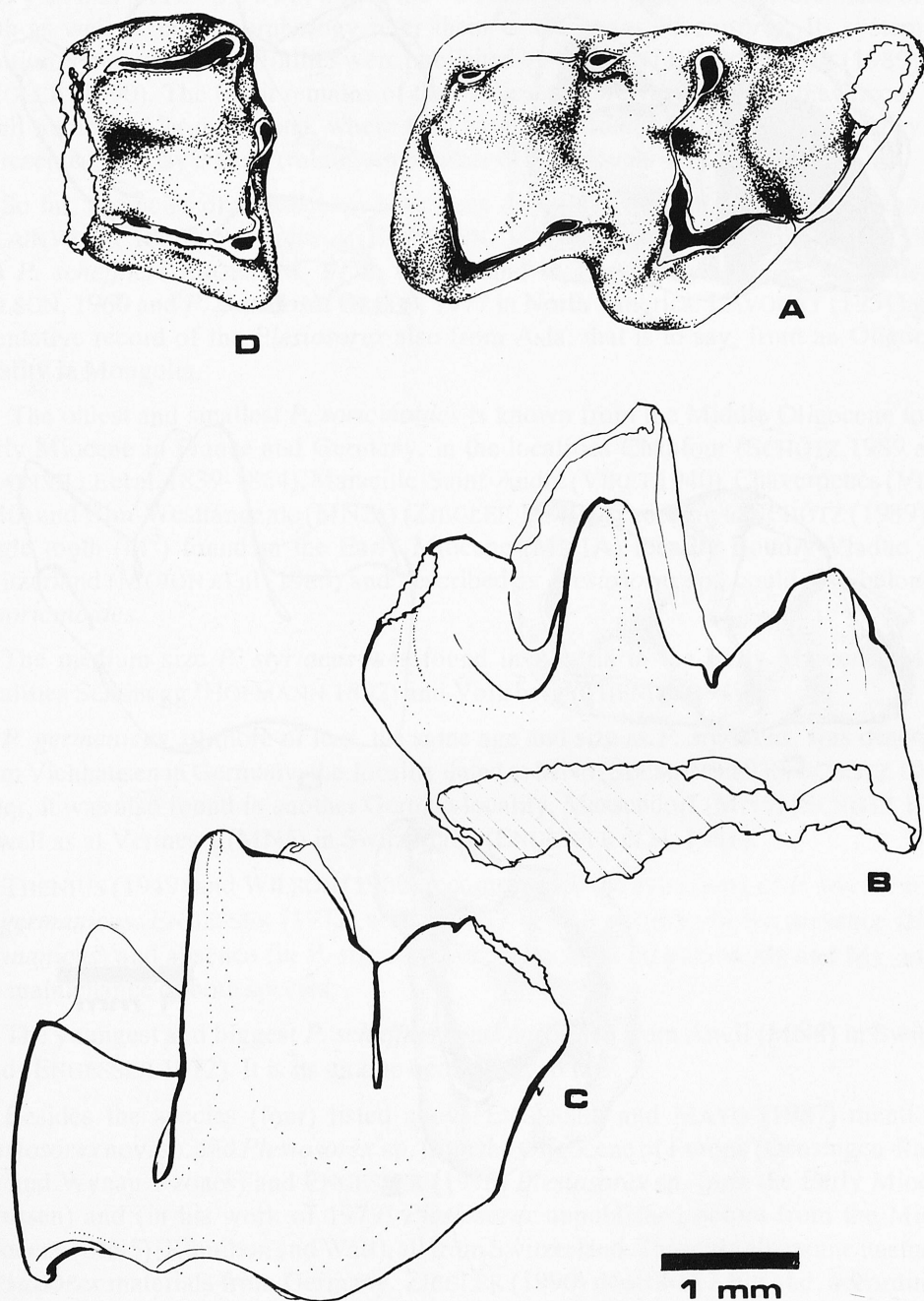


Fig. 1. *Plesiosorex germanicus* from Bełchatów. A – right M₁ in occlusal view, spec. no. MF/2141/1, B – in lingual view, C – in buccal view, D – fragment of left M₁ in buccal view, spec. no. MF/2141/2.

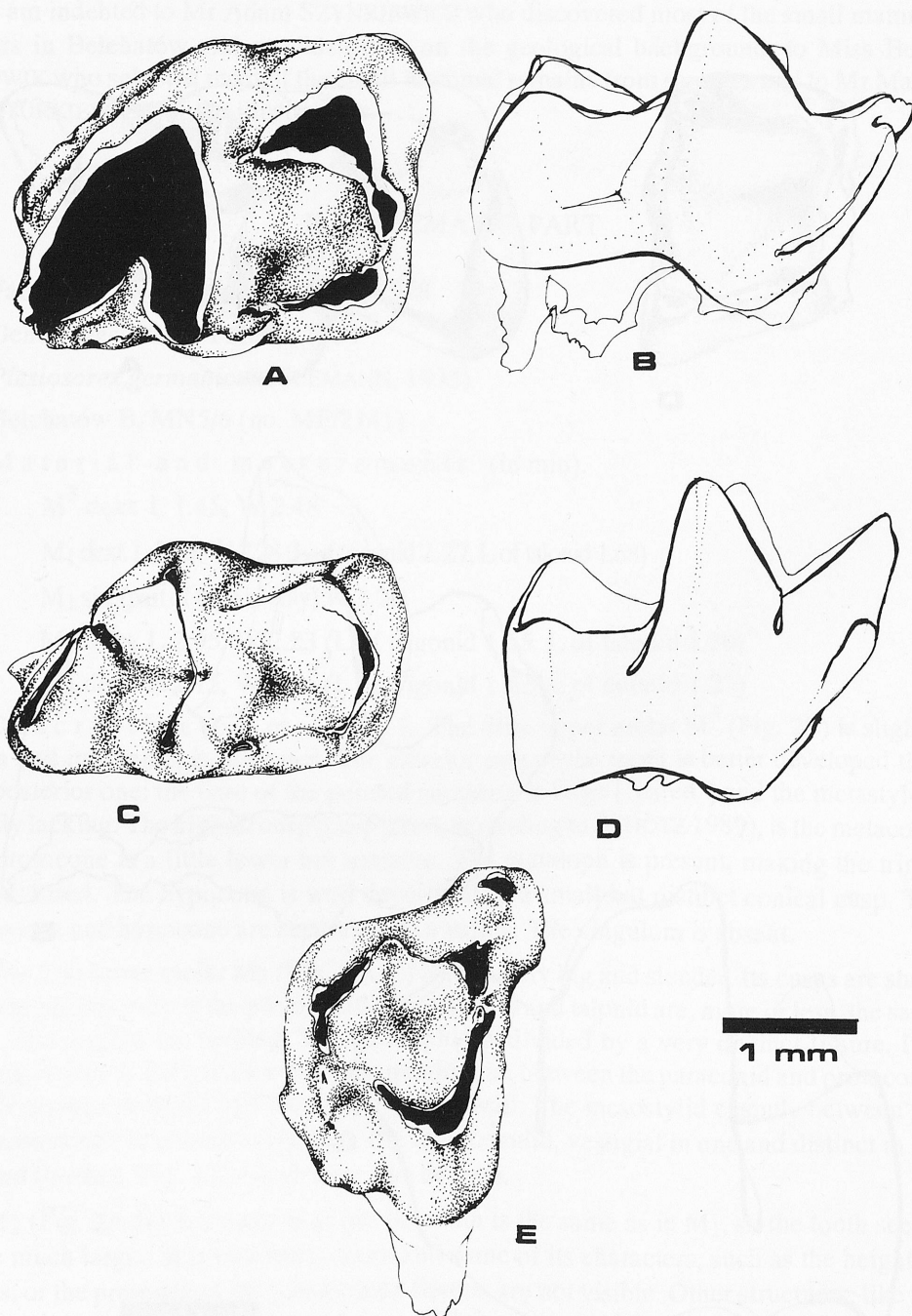


Fig. 2. *Plesiosorex germanicus* from Bełchatów. A – right M₂ in occlusal view, spec. no. MF/2141/3, B – in buccal view, C – right M₃ in occlusal view, spec. no. MF/2141/4, D – in buccal view, E – right M₃ in occlusal view, spec. no. MF/2141/5.

The third lower molar M₃ (Fig. 2C-D) is the smallest, but as long as M₂. Its paralophid fissure is shorter than in M₁, the mesostylid cuspule practically absent and hypoconulid vestigial. On the other hand the anterior cingulum is very distinct, although short.

Systematic position and distribution. The measurements of the teeth as well as their morphology refer them to the genus *Plesiosorex*. Its systematic position, synonymy and affinities were published by WILSON (1960), SCHÖTZ (1989) and ZIEGLER (1990). The fossil remains of the *Plesiosorex* are very rare and they occur in a small number. Also in Poland, where they have been found for the first time, they are represented only by 5 teeth (minimum number of individuals = 1).

So far, 6 species of *Plesiosorex* have been described. Four of them, *P. soricinoides* (BLAINVILLE, 1838), *P. styriacus* (HOFMANN, 1892), *P. germanicus* (SEEMANN, 1938) and *P. scheffneri* ENGESSER, 1972, were found in Europe and two, *P. coloradensis* WILSON, 1960 and *P. donroosai* GREEN, 1977 in North America. LAVOCAT (1951) gave a tentative record of the *Plesiosorex* also from Asia, that is to say, from an Oligocene locality in Mongolia.

The oldest and smallest *P. soricinoides* is known from the Middle Oligocene to the Early Miocene in France and Germany, in the localities Chaufour (SCHÖTZ 1989 after BLAINVILLE et al. 1839-1864), Marseille-Saint-André (VIRET 1940), Chaveroches (VIRET 1940) and Ulm-Westtangente (MN2a) (ZIEGLER 1990). According to SCHÖTZ (1989) the single tooth (M³) found in the Early Miocene (MN1A) locality Boudry-Viaduc 1 in Switzerland (MOJON et al. 1985) and described as *Plesiosorex* sp., could also belong to *P. soricinoides*.

The medium size *P. styriacus* was found in Austria in the Early Miocene (MN4) localities Schöneegg (HOFMANN 1892) and Voitsberg (THENIUS 1949).

P. germanicus, of more or less the same age and size as *P. styriacus*, was described from Viehhausen in Germany, the locality dated to MN6 (SEEMANN 1938, SCHÖTZ 1989). Later, it was also found in another German locality, Massendorf (MN5) (SCHÖTZ 1989) as well as at Vermes 1 (MN5) in Switzerland (ENGESSER et al. 1981).

THENIUS (1949) and WILSON (1960) recommended the synonymy of *P. styriacus* and *P. germanicus*. ENGESSER (1972) and SCHÖTZ (1989) pointing to the presence (in *P. germanicus*) and absence (in *P. styriacus*) of the anterior cingula in M₂ and M₃, advise the maintenance of both species.

The youngest and biggest *P. schaffneri* was described from Anvil (MN8) in Switzerland (ENGESSER 1972). It is its unique occurrence, so far.

Besides the species (four) listed above ENGESSER and MAYO (1987) mentioned *Plesiosorex* nov. sp. and *Plesiosorex* sp. from the Oligocene of Europe (Oensingen-Ravel-ten and Wynau 1 zones) and ENGESSER (1976) *Plesiosorex* sp. from the Early Miocene (Messen) and (in his work of 1979) *Plesiosorex* unpublished before from the Middle Miocene (MN5) (Rümikon and Watt), all from Switzerland. There are also some unstudied *Plesiosorex* materials from Germany. ZIEGLER (1990) described a big and, according to him, morphologically different ?*Plesiosorex* n. sp. from the Early Miocene (MN4a) locality Petersbuch 2, HEIZMANN et al. (1980) noted *Plesiosorex* sp. in the Early Miocene locality Langenau 1, SCHÖTZ (1989) after SCHLOSSER (1887/1888) wrote about *Plesiosorex*

from the Middle(?) Miocene locality Günzburg and finally about an undetermined *Plesiosorex* from other Middle Miocene (MN8/9) localities, Aumeister and Grosslappen.

The above cited data indicate that *Plesiosorex* lived in Europe from the Middle Oligocene to the Middle Miocene but in North America the representatives of the family (genus *Meterix*) persisted to the Lower Pliocene (HALL 1929, ENGESSER 1979).

A comparison of the tooth dimensions of the Bełchatów *Plesiosorex* with those of other *Plesiosorex* species shows that with the exception of M₃ (which is longer) they lie within the range of variation of *P. germanicus* and the dimensions of M₁ within the range of variation of the material from the type locality Viehhausen (Fig. 3). Also the morphology of teeth from Bełchatów, especially of the lower molars (the absence of the anterior cingulum in M₁ and its presence in M₂ and M₃) refer them to *P. germanicus*. This

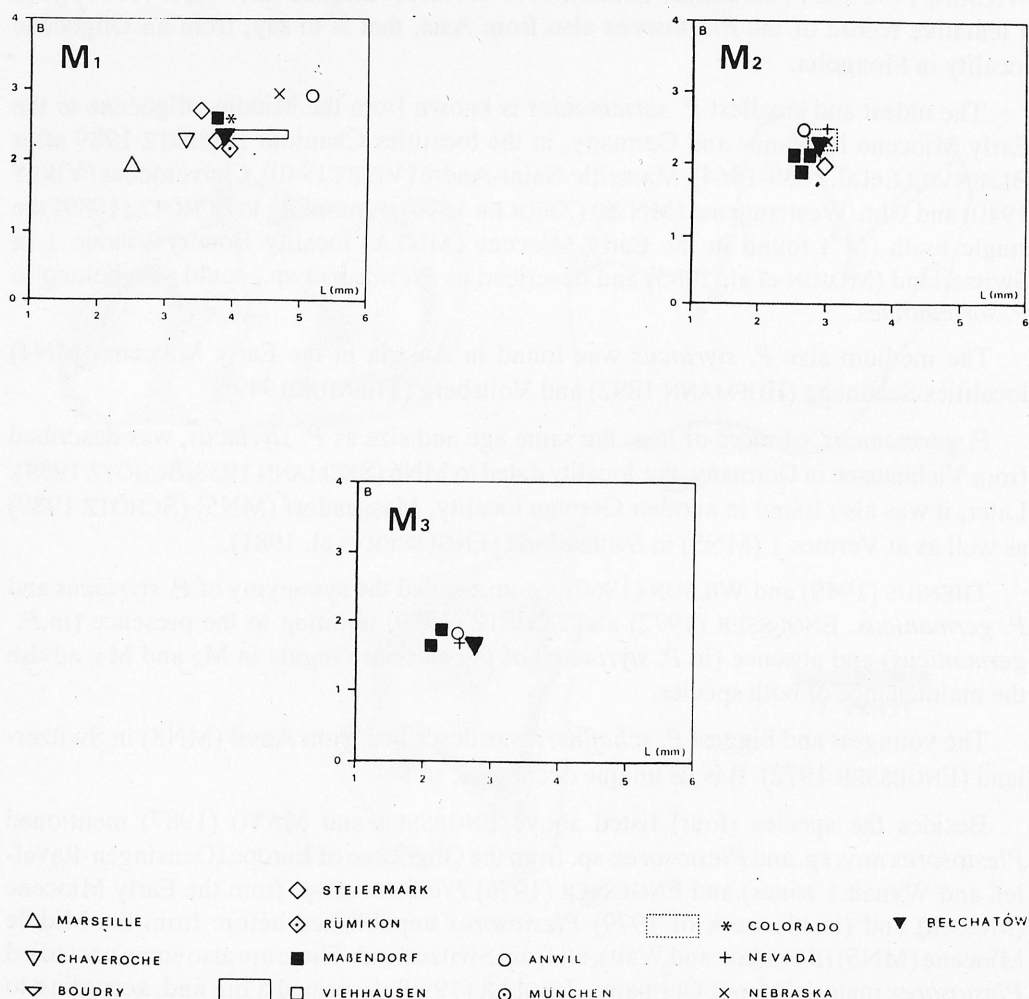


Fig. 3. Scatter-diagram showing the length (L) and width (B) (in mm) of M₁, M₂ and M₃ in *Plesiosorex* and *Meterix* (after SCHÖTZ 1989, completed with Bełchatów, specimens no. MF/2141/1, MF/2141/3 and MF/2141/4).

determination is in accordance with the geological age (MN5/6) of the localities in which those teeth were found. The differences in relation to the so far described material (greater length of M_3 and the better developed parastyle and hypocone of M^3) may be accounted for by the insufficient knowledge of teeth variability (only 5 M^3 and 5 M_3 are known so far) in this species.

The Bełchatów teeth differ from the corresponding teeth of *P. soricinoides* in bigger size and in the lack of the anterior cingulum in M_1 , and from *P. styriacus* in the presence of a very distinct anterior cingulum in M_2 and M_3 .

In comparison with *P. schaffneri* from Anwil the Bełchatów M_1 and M_2 are smaller and M_1 shorter and narrower. Especially short is the trigonid of M_1 , which in the Bełchatów tooth is more or less as long as the talonid while in Anwil tooth more than twice as long as the talonid. Both species differ also in the M_1/M_2 proportion. In Bełchatów M_2 measures about 3/4 of the length of M_1 while in Anwil about half of it. There are also difference in the length of M_3 in both species.

The presence of *Plesiosorex* in the Early and Middle Miocene localities (Martin Canyon, Quarry A, Colorado – WILSON 1960 and Springer local fauna, South Dakota – GREEN 1977) in North America implies a faunal exchange between Eurasia and America. According to WILSON (1960), that event took place probably during the "Lower Miocene".

On the other hand, ENGESSER (1979) suggests that *Plesiosorex* could reach North America before the time of its earliest known occurrence and developed in parallel to its European relatives. This is suggested by the morphological differences between young (Miocene) forms in both continents. Further studies are needed to explain the relationship of the American and European *Metacodontidae*.

The presence of *P. germanicus* in Poland extends the range of *Metacodontidae* towards the East.

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