

Tragulidae (Artiodactyla, Mammalia) from the Middle Miocene of Przeworno (Lower Silesia, Poland)

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Abstract. Remains of *Dorcatherium crassum* (LARTET, 1851) (*Tragulidae, Artiodactyla, Mammalia*) from the Middle Miocene (Zone MN 7) of Przeworno in Lower Silesia, Poland, are described. The teeth found show a fold in the shape of the letter Σ on the lower low-crowned molars, characteristic of *Dorcatherium*. The authors propose to acknowledge the species *Dorcatherium guntanium* v. MEYER, 1847, *Dorcatherium vindobonense* v. MEYER, 1846 and *Dorcatherium penecke* HOFMANN, 1892 as subspecies of *Dorcatherium crassum* (LARTET, 1851).

Key words: fossil mammals, *Artiodactyla, Tragulidae*, Middle Miocene, Poland.

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I. INTRODUCTION

The remains of *Dorcatherium crassum* (LARTET, 1851) (*Tragulidae, Artiodactyla, Mammalia*) described in this paper come from the Middle Miocene locality (Zone MN 7) KOWALSKI 1990; HEIZMANN & KUBIAK 1992) at Przeworno in Lower Silesia.

This locality is situated in a quarry of Proterozoic marbles NW of Przeworno (OBERC 1966; GŁAZEK et al. 1971, 1972, 1977; KUBIAK 1981 a,b, 1987, and others). In 1970 excavation was started by GŁAZEK, DYJOR and SULIMSKI (GŁAZEK et al. 1971, 1972), who detected the occurrence of three assemblages of a fossil fauna, all dated to the Miocene though varying in age, in three rock fissures (Przeworno 1 and 2 – remains of vertebrates and Przeworno 3 – insects). Systematic work at this locality was next continued by a team directed by Prof. H. KUBIAK of the present Institute of Systematics and Evolution of Animals, PAScs, in Kraków. As a result an abundant assemblage of Middle Miocene remains of vertebrates were excavated at two coeval localities, Przeworno 1 (also called "lower") and Przeworno 2 (called "upper") (KUBIAK 1975; KOWALSKI 1990; KOWALSKI & ZAPFE 1974). The results of studies of the faunal assemblage from Przeworno and the

considerations concerning the stratigraphy and palaeoecology of this locality were published by BOCHEŃSKI (1987), CZYŻEWSKA (1989), (GŁAZEK and SZYNKIEWICZ (1987), GŁAZEK et al. (1971, 1972, 1977), HEIZMANN & KUBIAK (1992), KOWALSKI (1990), KOWALSKI & ZAPFE (1974), KUBIAK (1975, 1981a,b, 1982, 1987, 1989), KUBIAK & WOLSAN (1986), MŁYNARSKI (1978, 1984) and SZYNDLAR (1984).

The whole of the material described in this paper have been obtained from the lower locality (Przeworno 1) and constitutes a part of the assemblage of *Artiodactyla* handed over to the authors for study. It is in the possession of the Institute of Systematics and Evolution of Animals, PAScs, in Kraków and is designated with the symbol (MF/ ?). In the present work the authors used also the material of *Dorcatherium* cf. *crassum* excavated during earlier investigations at the same locality (GŁAZEK et al. 1971, 1972) and studied by SULIMSKI (GŁAZEK et al. 1971). It comes from the collection of the Institute of Geology, Warsaw University (IGUWr Nos 13-16) and is housed in the Laboratory of Palaeobiology, PAScs, in Warsaw.

All the bones are very brittle, decalcified and white in colour. The colour of the teeth is navy-blue or yellowish-brown.

The nomenclature used for individual parts of teeth has been adopted after HEINTZ (1970).

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II. SYSTEMATIC PART

Family: *Tragulidae* MILNE-EDWARDS, 1864

Genus: *Dorcatherium* KAUP, 1833

Dorcatherium crassum (LARTET, 1851)

(Figs 1-2, Tables I-II)

Material. Fragmentary left mandible width M₁ (MF/2165/50A), damaged left mandible width M₂ (MF/2165/50B), left M¹ or M² (MF/2165/50C), left P₂ (MF/2165/50D), fragmentary left mandible (MF/2165/49A), damaged right mandible (MF/2165/49B), DP₄ (MF/2165/49C), right C (MF/2165/65D), 2 damaged upper ends of tibiae (MF/2165/56A,B), 3 left astragali (MF/2165/62, 63A,B), 2 damaged right calcanei (MF/2165/54A,B), cubonavicular (MF/2165/64), upper end of metatarsus (MF/2165/61), right scaphocuboid (MF/2165/64), proximal end of metacarpus (MF/2165/61). Left maxilla with M² and M³ (IGUWr 13), right M¹ (IGUWr 15), left P₃ (IGUWr 16), 2 left M₃ (IGUWr 14A,B).

Measurements. The measurements of teeth and skeletal bones (in mm) are given in Tables I and II.

Table I

Dimensions of teeth of *Dorcatherium crassum* from Przeworno

<div> <div>Tooth</div> <div>Dimension</div> </div>	DP ₄	P ₃	M ₁	M ₁ or M ₂	M ¹ or M ²
Length	12.5	10	12.6	12.8	12.8
Width	7.1	3.7	8.15	7.5	13.5

Description. Mandible (MF/2165/50A), belonging to a young individual, with the crown of M₁ preserved, on which only the anterior wing of the hypoconid is worn. The cusps are high, the anterior and posterior bands of the cingulum distinct, the ectostylid reaches to one-third of the crown height. Folds characteristic of *Dorcatherium*, occurring on the protoconid and metaconid, are in the shape of the letter Σ and not worn (Fig. 1a,b).

Mandible (MF/2165/50B) (Fig. 1e) in the process of replacement of its dentition, with an erupting crown of M₁ or M₂.

M¹ or M² (MF/2165/50C) is unworn, with well-developed cusps and styles on the labial side and no folds of the protocone and entostyle. Cingulum on the protocone and hypocone thick, reaching up to a third of the crown height. The lingual walls of the crown are strongly inclined (Fig. 1c).

P₂ (MF/2165/50D) with unworn crown, two well-developed cusps on labial side: larger protoconid and smaller hypoconid. Metaconid not large, entoconid missing, parastylid and entostylid small.

Fragmentary left mandible (MF/2165/49A) heavily damaged, with its tooth-crowns destroyed.

Right mandible (MF/2165/49B), showing the crown of erupting M₂ and a fragment of the destroyed crown of M₁.

Table II

Dimensions of the skeletal bones of *Dorcatherium crassum* (LARTET, 1851) from Przeworno

<div> <div>Dimension</div> <div>Bone</div> </div>	N	Antero-posterior dimension	Transverse dimension	Height	W prox.	W dist.
Astragalus	3			24.6-28.5	14-16.2	15.1-16.1
Calcaneus	2		14.30-14.9	20.4		
Cubonaviculare	1		22.4			
Tibia	2	22-23.1	23.25-24.2			

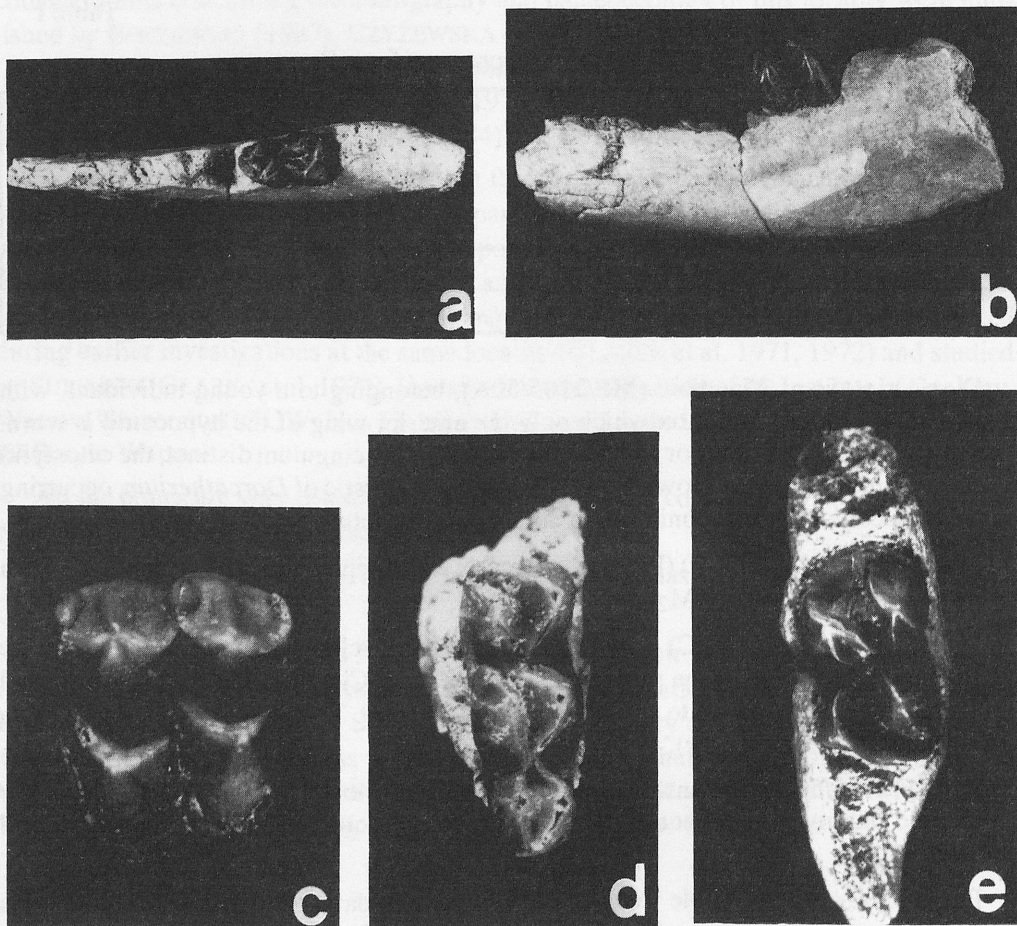


Fig. 1. *Dorcatherium crassum* (LARTET, 1851) from Przeworno 1. a – left mandible (MF/2165/50A), seen from above, $\times 1$; b – left mandible (MF/2165/50A), labial view, $\times 1$; c – M^1 or M^2 (MF/2165/50C), occlusal view, $\times 2.8$; d – left DP₄ (MF/2165/49C), seen from above, $\times 2.6$; e – left M_2 (MF/2165/50B), occlusal view, $\times 2.5$.

DP₄ (MF/2165/49C) with lightly worn crown and poorly developed stylids of the paraconid and entoconid. Metastylid larger than endostylid. Palaeomeryx fold present on protoconid (Fig. 1d).

Preserved crown of upper canine (MF/2165/65D). (Fig. 2d). The section of this tooth has the shape of an irregular drop, similar to that of the canine of *Dorcatherium crassum* from Göriach (HOFMANN 1896).

The descriptions and measurements of the astragalus (MF/2165/62, 63A,B) and cubonavicular (MF/2165/64) correspond with those given by RINNERT (1956) for *Dorcatherium crassum*. The astragalus is slender and has a characteristic, protruding proximal articular surface in the lateral part (Fig. 2a,b). Both calcanei (MF/2165/56A,B) are heavily

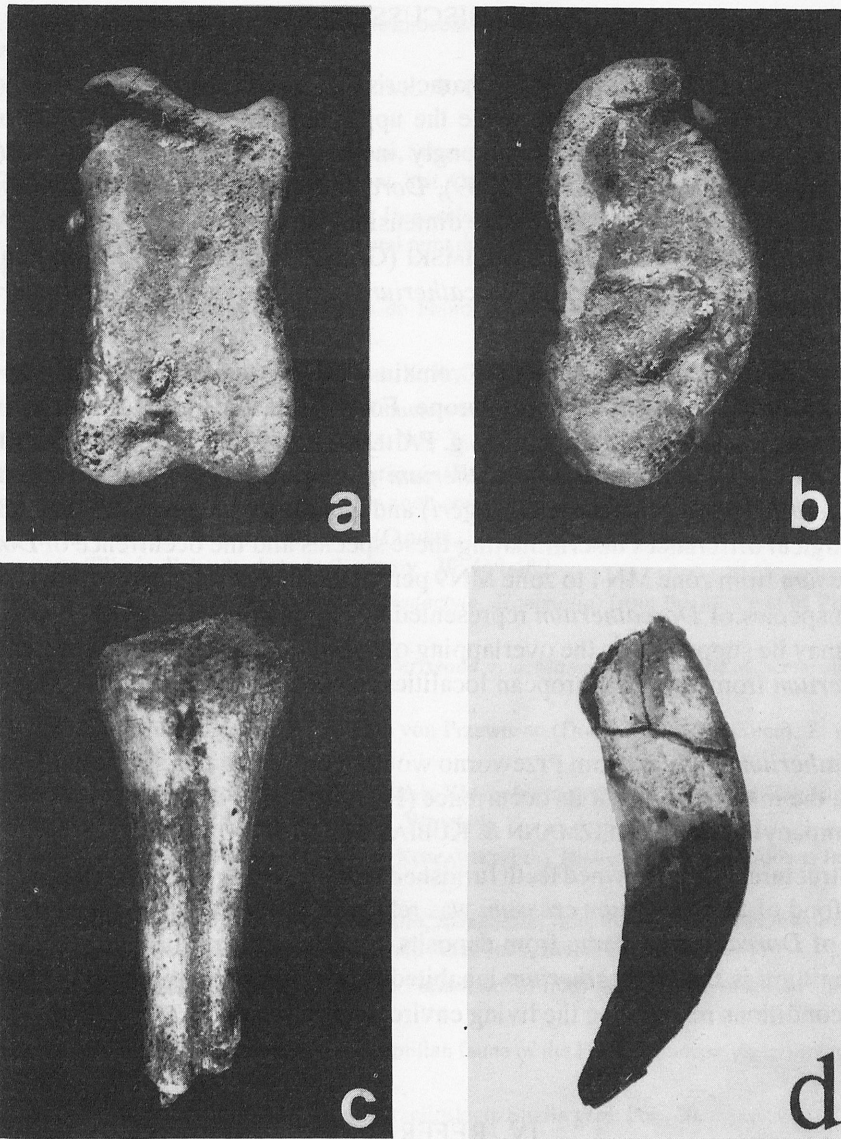


Fig. 2. *Dorcatherium crassum* (LARTET, 1851) from Przeworno 1. a – astragalus (MF/2165/62), posterior view, $\times 2$; b – astragalus (MF/2165/62), lateral view, $\times 2$; c – metatarsus (MF/2165/61), anterior view, $\times 1.5$; upper canine (MF/2165/65D), lateral view, $\times 1.3$.

damaged and their measurements correspond to the sizes of the astragalus and cubonavicular. Only the proximal ends of the tibiae (MF/2165/56A,B) are preserved and very heavily damaged at that. A small fragment of the proximal part of the left metatarsus (MF/2165/61) (Fig. 2c) preserved, is distinguished by a narrow shaft and relatively broad articular surface.

A description and dimensions of the material studied earlier are given by SULIMSKI (GŁĄZEK et al. 1971).

III. DISCUSSION

The structure of the lower molars is characteristic of *Dorcatherium*. Folds in the shape of the letter *c* occur on these teeth, while the upper molars are furnished with massive cingula and their lingual walls are strongly inclined. According to KUBIAK (1982), KOWALSKI (1990) and CZYŻEWSKA (1989), *Dorcatherium crassum* occurred at Przeworno. This species is also suggested by the dimensions of the teeth (cf. FAHLBUSCH 1985; HOFMANN 1893; RINNERT (1956). SULIMSKI (GŁAZEK et al. 1971), basing himself on RINNERT's (1956) data, designates *Dorcatherium* from Przeworno as *Dorcatherium* cf. *crassum*.

Comparatively few and fragmentary remains of *Dorcatherium* are found at the localities known from the Miocene of Europe. For this reason, it is difficult to separate particular species. Most of the authors (e.g. FAHLBUSCH 1985; GINSBURG 1990; RINNERT 1956) distinguish four species: *Dorcatherium guntanium*, *Dorcatherium crassum* (= *nauï*), *Dorcatherium vindobonense* (= *rogeri*) and *Dorcatherium peneckeï*. The unknown morphological differences discriminating these species and the occurrence of *Dorcatherium crassum* from zone MN4 to zone MN9 permit the supposition that we are concerned with one species of *Dorcatherium* represented by its subspecies varying in size, which opinion may be supported by the overlapping of variation graphs for tooth dimensions in *Dorcatherium* from various European localities, presented by FAHLBUSCH (1985, p.87, Abb.1)

Dorcatherium crassum from Przeworno would represent this species in zone MN7, that is, in the middle period of its occurrence (FAHLBUSCH 1985), which is evidenced by the accompanying fauna (HEIZMANN & KUBIAK 1992).

The structure of low-crowned teeth furnished with sharp ridges justifies the supposition that the food of *Dorcatherium crassum* was relatively soft (leaves, young shoots). Most remains of *Dorcatherium* come from deposits of carboniferous formations. The widely known opinion is that *Dorcatherium* inhabited mixed forests growing in wet areas and lived in conditions resembling the living environment of modern *Tragulidae*.

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