

HENRYK DYBKA

**MACHAIRODUS SP. FROM THE LOWER PLIOCENE BONE BRECCIA
OF WĘŻE (POLAND)**

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First record of *Machairodus* from Poland (locality Węże I) is presented. The material, containing three isolated teeth, presumably comes from the oldest sedimentary cycle of the Węże I breccia (5.5—6.0 My). It is the northernmost known locality of *Machairodus* in Europe.

Key words: *Machairodus*, Mammalia, Pliocene, karst, Poland.

Henryk Dybka, Zakład Paleozoologii, Uniwersytet Wrocławski, ul. Stenkiwiczka 21, 50-335 Wrocław.

INTRODUCTION

The bone breccia site Węże I, situated in the Zelce Hill, the northernmost part of Kraków-Wieluń Jurassic Highlands, represents the karst infilling of a large cave. The deposits consist of bone breccia including numerous remains of land vertebrates. The geological setting of the locality has been recently given by Głazek *et al.* (1973). The remains of Carnivora from Węże I have been described by Stach (1951, 1953, 1954, 1957, 1959, 1961) and Czyżewska (1969, 1978, 1981a, 1981b). They represent the Mustelidae, Canidae, Ursidae and Felidae.

According to Głazek *et al.* (1973) Węże breccia has been deposited during three sedimentary cycles: the Lower Pliocene Brunssumian A — Ruscinian (5.5—6.0 My); the Upper Pliocene Reuverian A — Lower Villafranchian (3.3—4.0 My), and Cromerian (0.8—1.0 My).

The exact position of the present remains within the stratigraphical profile of Węże I is unknown. The teeth of *Machairodus* most probably come from the oldest part of the deposits in this site, from which a fauna of small mammals including *Desmana pontica* Schreuder, *Hystrix primegenia* (Wagner) and *Parapodemus schaubi* Papp has been described (Sulimski 1964) and considered indicative for the Lower Pliocene sedimentary cycle (Brunssumian A — Ruscinian, Głazek *et al.* 1973). The

above supposition about the age of the remains is based on the known stratigraphic range of the genus *Machairodus* (Vallesian—Ruscinian according to Beaumont 1975, Schmidt-Kittel 1976), and its concurrence with the above index species in other Pliocene localities (Pikermi, Polgardi etc.).

Weże I is the first *Machairodus* locality from Poland and the northernmost record of this genus in Europe. *Machairodus* sp. suggests relationship either with *M. giganteus* or *M. alberdiae*.

The terminology and methods of measurements of P⁴ (fig. 1) follow Schmidt-Kittler (1976). The material described is stored at the Museum of the Earth, Polish Academy of Sciences, Warsaw for which the abbreviation MZ is used.

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Family Felidae Gray, 1881
Subfamily Machairodontinae Gill, 1872
Genus *Machairodus* Kaup, 1832
Machairodus sp.
(figs. 2—4; tab. 1; pls. 19—20)

Material. — MZ VIII-V-361. Fragment of a right upper C lacking root. Basal part of the crown damaged. Height 71.5 mm.

MZ VIII-V-362. Left P⁴. Fragments of roots are preserved under three cusps: the protocone, the metastyle and the parastyle. Length 40 mm, width 14.45 mm.

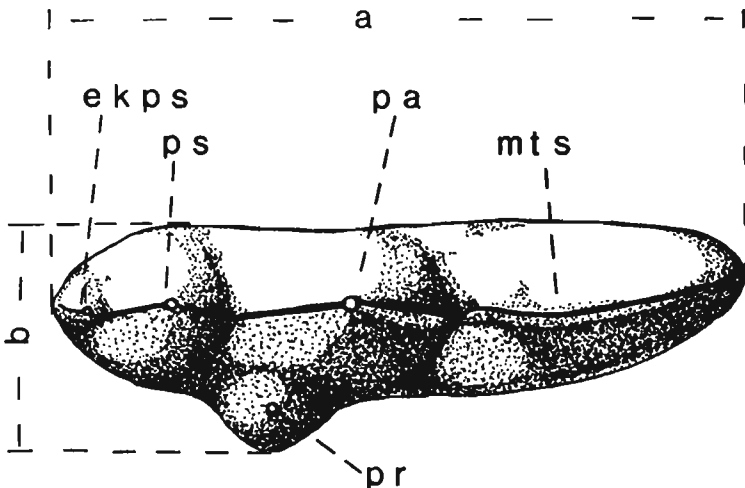


Fig. 1. Terminology and methods of measurements of P⁴ (according to Schmidt-Kittler 1976). *ekps* — ectoparastyle; *ps* — parastyle; *pa* — paracone; *mts* — metastyle; *pr* — protocone; *a* — length; *b* — width.

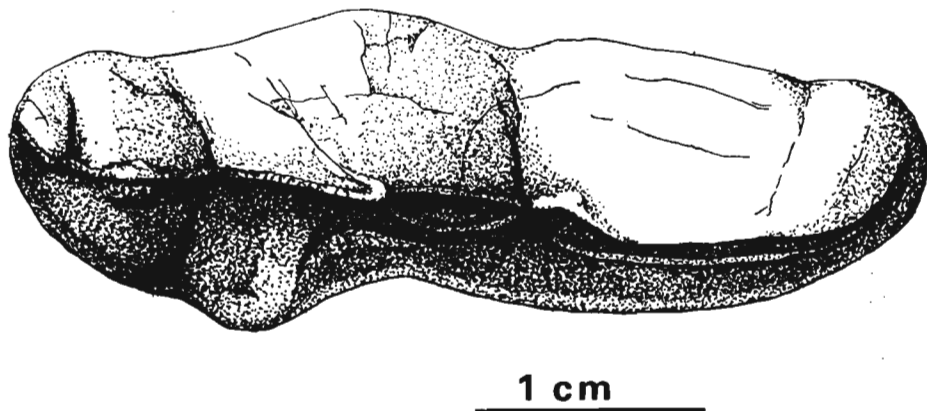


Fig. 2. P⁴ of *Machairodus* sp. from Weże I. MZ VIII-V-362. Occlusal view.

MZ VIII-V-363. Left lower C. The crown is intact, the root fragmentary. Length 16.6 mm, width 10.4 mm.

Description. — Upper C. The crown of the specimen MZ VIII-V-361 is lanceolate and laterally compressed. Both anterior and posterior edges are sharp and finely serrated, but the serration is much coarser and more widely spaced on the anterior edge (in average 27 denticles, 0.5 mm in height, for 2 cm of edge length), than posteriorly (40 denticles, about 0.3 mm in height, for 2 cm of edge length).

Table 1

Characters of P⁴ in diverse species of *Machairodus*.

The data on *M. aphanistus* are from Beaumont (1975), Ginsburg *et al.* (1981) and Schmidt-Kittler (1976); the data on *M. giganteus* are from Zdansky (1924), Chang (1957) and Schmidt-Kittler (1976); the data on *M. catocopsis* are from Burt (1931).

Size of ectoparastyle	<i>M. aphanistus</i>	<i>M. giganteus</i>	<i>M. catocopsis</i>	<i>Machairodus</i> sp.
	low	high	high	high
size of protocone	strong with apex preserved	rudimentary	rudimentary	rudimentary
location of protocone	in front of parastyle apex	behind parastyle apex, sometimes reaches paracone apex	in front of anterior edge of paracone	in front of anterior edge of paracone

P⁴. The crown of MZ VIII-V-362 is high and narrow. Situated in front of the anterior margin of the paracone a convexity represents a rudiment of the protocone. The ectoparastyle is high and barely delimited from the remaining crown. The edge of the ectoparastyle and anterior edges of both the parastyle and paracone are finely serrated. The posterior edge of the parastyle is smooth and that of the

paracone is worn off. The paracone is the highest and the metastyle the longest of all the cusps. The former has two sharp edges, the latter has both edges strongly worn.

Lower C. Two sharp, finely serrated edges separate the flat, lingual surface of the crown of MZ VIII-V-363 from its convex labial surface. The anterior edge turn into a fine thickening on the lingual side. The cingulum is feeble. The root is ellipsoidal in transverse section and higher than the crown.

Remarks.—The data on the following species of *Machairodus* have been available from the literature for comparison with the present material: *M. giganteus* (Zdansky 1924, Chang 1957, Schmidt-Kittler 1976, Morales et Soria 1979) from Eurasia; *M. alberdiae* (Ginsburg et al. 1981) from Europe; *M. aphanistus* (Beaumont 1975, Schmidt-Kittler 1976, Ginsburg et al. 1981) from Europe and Asia Minor; *M. caticopis* (Burt 1931) from America and *M. tingli* (Zdansky 1924, Chang 1957) from Asia. The latter species is considered conspecific with *M. giganteus* (Beaumont 1975), which is supported by the dimensions of the P⁴ of this species that fall into a variability range of *M. giganteus* (see fig. 3).

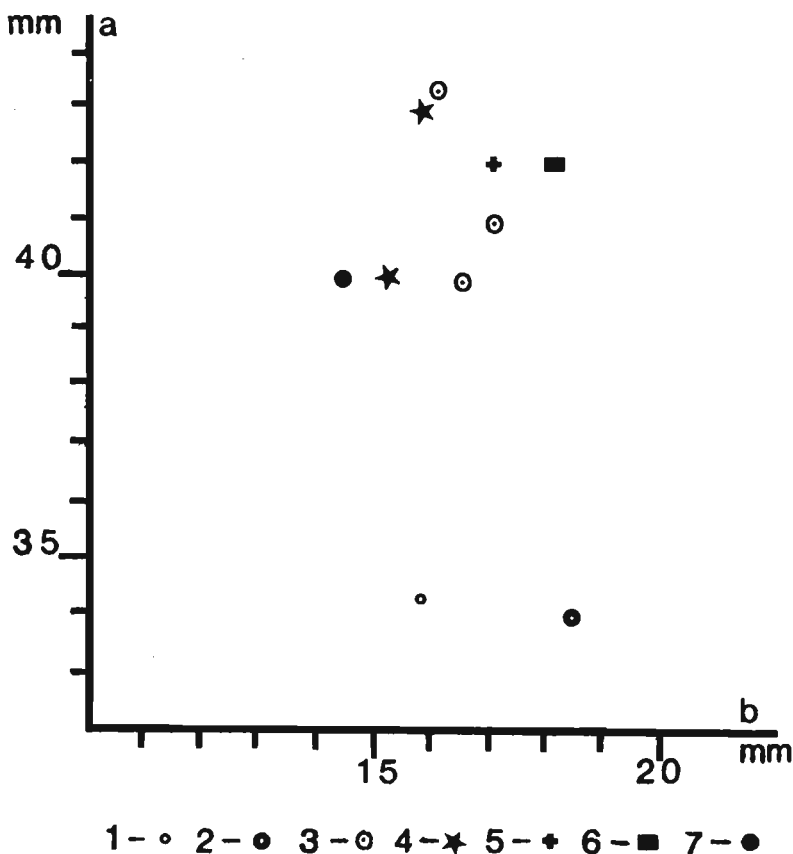


Fig. 3. Length (a) to width (b) ratio in P⁴: 1—*M. aphanistus* Kaup from Eppelsheim, BRD (According to Beaumont 1975); 2—*M. aphanistus* Kaup from Ackakoy in Turkey (according to Schmidt-Kittler 1976); 3—*M. giganteus* (Wagner) from China (according to Zdansky 1924); 4—*M. giganteus* (Wagner) from Mahmutgazi in Turkey (according to Schmidt-Kittler 1976); 5—*M. giganteus* (Wagner) from Shansi, China (according to Chang Hsi-Chin 1957); 6—*M. tingii* Zdansky, Shansi, China (Chang Hsi-Chin, 1957); 7—*Machairodus* sp. from Weže I.

The fragment of the upper canine from Weże I differs from the same tooth of *M. alberdiae* by its greater height and its stronger lateral compression. The differences in state of serration of the anterior edge of the canine between the present specimen (serrated) and *M. tingii* (even) are provisionally considered as a phenomenon of intraspecific variability, given the fact that *M. tingii* is regarded as conspecific with *M. giganteus* (serrated edge) (see above). On the other hand, the preserved part of the upper canine MZ-VIII-V-361 does not differ from those of *M. aphanistus* and *M. giganteus*, which suggests that the differences in remaining parts were not important if present at all.

The structures and dimensions of P⁴ MZ VIII-V-362 fully agree with the carnassials of *M. giganteus* and *M. catocopsis*, while differing from that of *M. aphanistus* (table 1; figs. 2—3). *Machairodus catocopsis* is so far exclusively known from America, which speaks in favour of the assignment of the specimen from Weże I rather to the Eurasian species *M. giganteus*.

Characteristics of the genus *Machairodus*, the here described incisive-like lower C with sharp serrated edges has the ratio width/length $\times 100$ equal to the values given for *M. aphanistus* (56,2%—61,0%) and *M. alberdiae* (64,3%—69,0%) (see fig. 4), both from Europe. In contrast, the values are higher (68,2—80,5, see fig. 4) for *M. giganteus* (with *M. tingii* included).

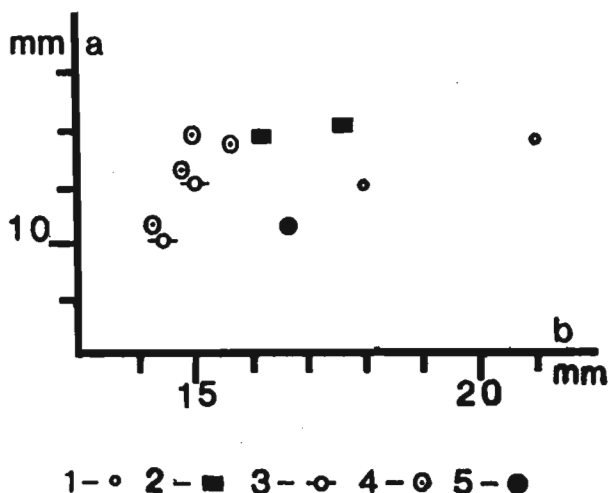


Fig. 4. Width (a) to length (b) ratio in C: 1—*M. aphanistus* Kaup from Los Valles in Spain (according to Ginsburg et al. 1981); 2—*M. tingii* Zdansky from China (according to Zdansky 1924); 3—*M. alberdiae* Ginsburg, Morales et Soria from Los Valles in Spain (according to Ginsburg et al. 1981); 4—*M. giganteus* (Wagner) locality near Teruel in Spain (according to Morales et Soria 1979); 5—*Machairodus* sp. from Weże I.

The scarcity of the *Machairodus* remains in the locality Weże I is suggestive of the conspecificity of the three specimens described herein, but it is not decisive. The differences of the specimen of P⁴ from Weże I with respect to *M. aphanistus* tend, thus, to support the assignment of the upper canine to *M. giganteus* rather than to *M. aphanistus*. Instead, the lower canine displays primitive features characteristic of *M. alberdiae* and *M. aphanistus*, but absent in *M. giganteus*.

The above comparisons are, thus, inconclusive with respect to the exact specific assignment. They only suggest the relationships of the present form with one of two European *Machairodus* species, *M. giganteus* and *M. alberdiae*. The material is, thus, determined as *Machairodus* sp. *Machairodus* belongs to the most

archaic carnivorous fauna known from Weże I. The material probably comes from the same portion of the bone breccia of Weże I as do *Desmana pontica* Schreuder, *Hystrix primigenia* (Wagner), and *Parapodemus schaubi* Papp (Sulimski 1964), judging from the composition of fauna in localities Pikermi, Polgardi etc. (Beaumont 1975) including the same genera and species. According to Głazek *et al.* (1973) this fauna is suggestive for the oldest sedimentary cycle in Weże breccia (Brunsumian A—Ruscinian: 5.5—6.0. My).

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HENRYK DYBKA

MACHAIRODUS SP. Z DOLNOPLIOCEŃSKIEJ BREKCJI KOSTNEJ Z WĘŻÓW I
(POLSKA)

Streszczenie

W pracy zamieszczono pierwszy z obszaru Polski opis zębów *Machairodus* sp. Pochodzą one z, przypuszczalnie, najstarszego cyklu osadzania brekcji kostnej (5,5—6,0 mln lat) w stanowisku Węże I. Jest to najdalej na północ wysunięte w Europie stanowisko ze szczątkami *Machairodus*. Opisane zęby (uszkodzone kły, prawy górny i lewy dolny, oraz lewy przedtrzonowy P⁴: figs. 2—4, pls. 19—20) wykazują podobieństwa do *M. giganteus* i *M. alberdiae*.

EXPLANATIONS OF PLATES 19—20

Plate 19

Machairodus sp., Lower Pliocene, Węże I

1. Right upper C, MZ VIII-V-361: a lingual and b labial sides, \times ca. 1.7.
2. Left lower C, MZ VIII-V-363: a labial and b lingual sides, \times ca. 2.1.

Plate 20

Machairodus sp., Lower Pliocene, Węże I

Left P⁴, MZ VII-V-362, a labial and b lingual sides, \times ca. 1.8.



