



The first Polish find of Lower Paleocene crocodile *Thoracosaurus* Leidy, 1852: geological and palaeontological description — discussion

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In a recently published paper M. Żarski, G. Jakubowski and E. Gawor-Biedowa (1998) describe the first find of a crocodile in Paleocene (Danian) deposits of Central Poland. This interesting paper contains several serious mistakes which need to be rectified:

1. The title “The first Polish find of Lower Paleocene crocodile *Thoracosaurus* Leidy, 1852: geological and palaeontological description” is misleading. *Thoracosaurus* is not “Lower Paleocene crocodile” — its remains are known from Cenomanian–Turonian, Maastrichtian, Paleocene, and Eocene strata (R. Steel, 1973; E. W. A. Mulder, 1997).

2. On p. 141 the Authors state: “In 1845 C. Meyer described a fragment of ... Jurassic crocodile *Machimosaurus hugii* Meyer, 1845, coming from Czarnogłowy near Kamień Pomorski (J. Dzik, 1997)”. This is not true. The species was erected by H. von [non C.] Meyer in 1837 [not in 1845], for isolated teeth from the Upper Jurassic of Western Europe (B. Krebs, 1967; R. Steel, 1973), not from Czarnogłowy! J. Dzik (1997) illustrated a fragment of the skull representing the *Machimosaurus* material from Czarnogłowy, housed in the University of Greifswald. The presence of *Machimosaurus* in Pomerania was noted not by H. von Meyer, but by Dames in 1888 and Schmidt in 1905 (the papers quoted in B. Krebs, 1967).

3. P. 143. The quotation that “...the Cretaceous/Tertiary boundary [near Kazimierz Dolny] runs at the top of the hard limestone (M. Machalski, M. Żarski *fide* [sic] M. Żarski *et al.*, 1997).” is not correct either. In the quoted unpublished report I wrote that “...the Maastrichtian–Paleocene boundary should be placed at the top of Kazimierz Opoka...”. This is an

important difference, given the fact, that the topmost part of the Kazimierz Opoka consists of heavily burrowed soft opoka; moreover, many clearly *in situ* soft opoka pieces, left by burrowing organisms, are present above the hard limestone. In my opinion M. Żarski *et al.* (1998) wrongly assign a Danian age to these soft opoka clumps (Fig. 3). Even if we interpret these clumps as redeposited opoka pieces, the quotation is wrong.

4. P. 144. “...belonging to the *Belemnella kazimiroviensis* biostratigraphic zone ... defined by A. Błaszkiwicz (1980) as *Hoploscaphites constictus crassus*.”. The Authors probably wished to express that the first zone is equivalent to the latter, but this is not true as the *H. constrictus crassus* Zone of A. Błaszkiwicz encompasses also the upper part of the *Belemnitella junior* Zone of the standard European belemnite biostratigraphic scheme (A. Błaszkiwicz, 1980).

5. P. 144. “According to M. Machalski (*fide* [sic] M. Żarski *et al.*, 1997), the hard limestone is not the real hardground, because in this sediment the cementation processes took place in the Danian...”. This is not true. In the quoted unpublished report I wrote that “Lithification of the sediment leading to the formation of the hard limestone layer must have occurred some time after the sandy-glaucanitic sedimentation”.

6. P. 144. “In the topmost part of the [Maastrichtian] opoka a few specimens of typically Paleocene foraminifers were recorded..., which were redeposited here after having been removed out of overlying Paleocene formations”. And further below: “Both in the top and in the bottom part of the [Maastrichtian] hardground a few redeposited Paleocene species of

foraminifers were recorded". These are odd statements as younger fossils cannot be redeposited in older sediments! They may be secondarily introduced to the older sediments, e.g. by burrowers or by percolating water.

7. P. 144. "...numerous borings made by the ichnogenera *Thalassinoides*, *Ophiomorpha* and *Chondrites*...". These are burrows, not borings; moreover "borings" cannot be "made by ichnogenera" but by their producers!

8. P. 144. *Lyropecten acuteplicatus* is not a Paleocene bivalve as stated by the Authors; it is restricted to Maastrichtian deposits (G. I. Abdel-Gawad, 1986).

9. P. 150. The Figure 4 is misleading. It is based on P. A. Ziegler (1990) and shows an "averaged" Senonian and Danian palaeogeography and not "late Maastrichtian and early Danian" as stated in the caption. There are no late Maastrichtian and Danian deposits west of the Mid-Polish Anticlinorium and that area was probably emerged then (W. Pożaryski, 1962), contrary to what is shown on the map presented by the Authors.

10. P. 150. The Authors write that the American material of the thoracosaurine crocodiles is of Danian age. This is only partially true as *Thoracosaurus* is known from the Maastrichtian to "Dano-Montian" deposits of the Inner Coastal Plain in New Jersey and Delmarva (W. B. Gallagher, 1993).

11. P. 152. The French *Thoracosaurus*-bearing deposits of the Marne Department, the Aimé-Vertus Formation in modern terminology, were not "deposited slightly before the Danian" (what does that mean anyway? During Maastrichtian time?) but during the early Danian time (G. Bignot, 1993).

12. P. 153. "It is the first Polish crocodylian find in Danian sediments and the fourth one in Europe". Only the first part of the sentence is true; the number of finds in Europe surely exceeds the figure given by the authors (e.g. R. Steel, 1973). The authors probably meant to say that Danian thoracosaurine crocodiles are so far known from four regions in Europe. It should be noted in this context, however, that most, if not all, finds from the Maastricht area, The Netherlands, are of late Maastrichtian age (E. W. A. Mulder, 1997). It is also worth to note that single teeth attributable to *Thoracosaurus* sp. are known from Danian deposits of Faxø and the remains of a crocodile were recently discovered in the latest Maastrichtian chalk of Stevns Klint, both localities in Denmark (Mr. S. Jakobsen, Geological Museum Copenhagen, pers. com.).

13. Polish abstract. The phrase "bivalves and oysters" goes without comment.

It is really pity that the description of such an important find is marred by so many factual errors (let alone editorial mistakes, e.g. *fide* instead of *vide*).

REFERENCES

- ABDEL-GAWAD G. I. (1986) — Maastrichtian non-cephalopod molluscs (Scaphopoda, Gastropoda and Bivalvia) of the Middle Vistula Valley, Central Poland. *Acta Geol. Pol.*, **36**, p. 69–224, no. 1–3.
- BIGNOT G. (1993) — The position of the Montian stage and related facies within the stratigraphic-paleogeographic framework of NW Europe during the Danian. *Contr. Tert. Quatern. Geol.*, **29**, p. 47–59, no. 3/4.
- BŁASZKIEWICZ A. (1980) — Campanian and Maastrichtian ammonites of the Middle Vistula River Valley, Poland; a stratigraphic-paleontological study. *Pr. Inst. Geol.*, **42**.
- DZIK J. (1997) — *Dzieje życia na Ziemi*. PWN. Warszawa.
- GALLAGHER W. B. (1993) — The Cretaceous/Tertiary Mass extinction event in Northern Atlantic Coastal Plain. *The Mosasaur*, **5**, p. 75–154.
- KREBS B. (1967) — Der Jura-Krokodilier *Machimosaurus* H. v. MEYER. *Paläont. Z.*, **41**, p. 46–59, no. 1/2.
- MULDER E. W. A. (1997) — Thoracosaurine vertebrae (Crocodylia; Crocodylidae) from Maastrichtian type area. *Proc. Kon. Ned. Akad. v. Wetensch.*, **100**, p. 161–170, no. 1/2.
- POŻARYSKI W. (1962) — Atlas geologiczny Polski. Zagadnienia stratygraficzno-facjalne. Zesz. 10 — Kreda. Inst. Geol. Warszawa.
- STEEL R. (1973) — Crocodylia. In: *Encyclopedia of Paleoherpertology* (ed. O. Kuhn), part. 16. Stuttgart.
- ZIEGLER P. A. ed. (1990) — Geological atlas of Western and Central Europe. Shell Internationale Petroleum Maatschappij B.N.
- ŻARSKI M., JAKUBOWSKI G., GAWOR-BIEDOWA E. (1998) — The first Polish find of Lower Paleocene crocodile *Thoracosaurus* Leidy, 1852: geological and palaeontological description. *Geol. Quart.*, **42**, p. 141–160, no. 2.