

**AN EOCENE TURTLE HUMERUS
(DERMOCHELYIDAE, *PSEPHOPHORUS*)
FROM NEW ZEALAND**

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RESUMEN.- El fragmento de un húmero de *Psephophorus* sp., del Luteciense superior o Bartoniense inferior, amplía el conocimiento geográfico de dicho género en el Pacífico Sur. Las comparaciones con otros húmeros de Dermochelyidos muestran que tiene algunas similitudes con *Psephophorus eocaenus* Andrews, 1901 (descrito y figurado en 1901 y 1906 por dicho autor). Sin embargo, el ejemplar neozelandés presenta diferencias, por lo que no se le incluye dentro de la especie *eocaenus*.

ABSTRACT.- The find of a late Lutetian to early Bartonian humerus extends the geographic range of *Psephophorus* into the Southern Pacific. Comparisons to other Dermochelyid humeri show some similarities with *Psephophorus eocaenus* Andrews, 1901 (as described and figured by him in 1901 and 1906). But the New Zealand find is too different to be included in the species *eocaenus*.

Palabras clave: Chelonia (Dermochelyidae, *Psephophorus*), húmero, Eoceno, Pacífico Sur, Nueva Zelanda.

Key words: Chelonia (Dermochelyidae, *Psephophorus*), humerus, Eocene, South Pacific, New Zealand.

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INTRODUCTION

The humerus OU 22021 (Institutional abbreviation OU = Geology Museum, University of Otago, Dunedin, New Zealand. Fossil record number I44/f183 in the New Zealand fossil record file (Geological Society of New Zealand)) was found in mid 1988 by S.G.McMillan and Dr.R.E.Fordyce. It was discovered in situ in the Burnside Formation at Boulder Hill near the city Dunedin (New Zealand Mapping Series) 260 metric sheet, I44 (1987): 054873; near latitude 45° 47,5' S, longitude 107° 21,8' E). Despite ongoing prospecting in this area, no further remains were discovered. The Burnside Formation is a brackish marine, goethitic, burrow-mottled, muddy sandstone which was subsequently interpreted as a subtidal estuarine sediment by McMILLAN (1993: 1/2). Due to the lack of sufficient foraminifera material, the age of the fossil was determined (McMILLAN 1993: 1/89, A 7/5) using a rich dinoflagellate assemblage, with the key specimen of *Wetzelia hampdenensis* indicating a mid Bortonian age.

According to HARLAND *et al.* (1990: 62) the New Zealand Bortonian stage correlates with the European stages of late Lutetian to early Bartonian, near 43 Ma.

The humerus was prepared by Greg Ferguson at the Geology Department, Otago University, using small pneumatic chisels, dentist drills and hand scrapers.

SYSTEMATIC PALEONTOLOGY

Order **Testudines** Linnaeus, 1758
Family **Dermochelyidae** Gray, 1825
Genus ***Psephophorus*** v.Meyer, 1847
Species indet.

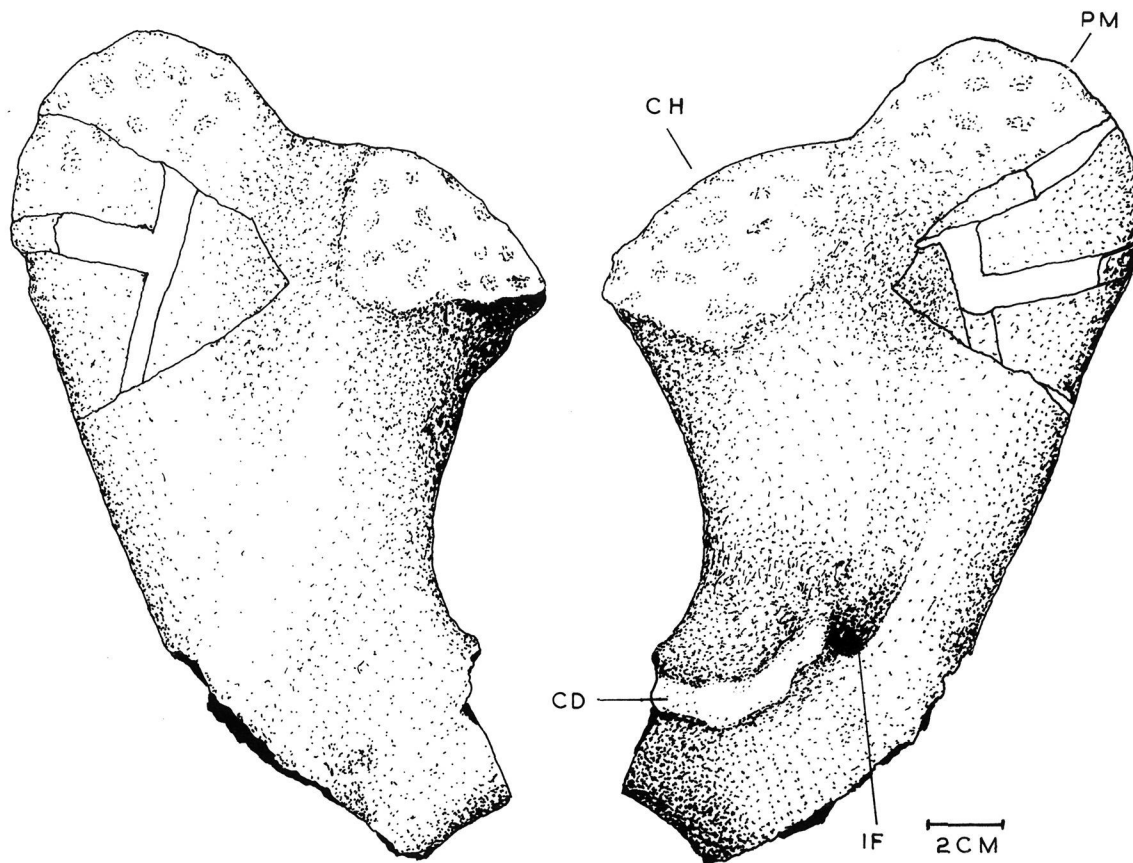


Figura 1: *Psephophorus* sp. Humerus. OU 22021, Mid Bartonian (late Lutetian to early Bartonian). Dunedin, New Zealand. CD: crista deltopectoralis. CH: caput humeri. IF: intertubercular fossa. PM: processus medialis.

DESCRIPTION OF HUMERUS

This partial right turtle humerus (total length 247 mm) (Fig.1) shows a fair preservation and no signs of a diagenetic distortions, its shaft is damaged beneath the caput humeri due to breakage and the cutting for thin sections. The dorso-ventrally compressed humerus is broken just distal to the crista deltopectoralis. The proximal width, measured from the radial side of the caput humeri to the ulnar side of the processus medialis is 150 mm.

The roughly pitted, large and strongly convex, somewhat triangular caput humeri (dorsoventral diameter 103 mm; ulnar-radial diameter 78 mm) shows a distinct edge towards the shaft.

The processus medialis, which is also roughly pitted, is only slightly wider than the shaft; there is no obvious ulnar crest on the processus medialis. From its massive proximal end the shaft constricts and flattens towards the crista deltopectoralis to an ulnar-radial width of 79 mm and a dorsoventral thickness of 49 mm.

Ventrally at the proximal end between the bases of the caput humeri and the processus medialis is a shallow concavity, which is separated from the intertubercular fossa by a slight saddle.

The intertubercular fossa reaches down to level the proximal end of the crista deltopectoralis, where it appears very deep, which is partially due to the grinding off of bone material during the preparation process.

The processus lateralis is partially missing, but its original voluminous size can be recognised from its ovoid base, which shows a maximum diameter of 50 mm along an oblique ventral-distally inclined axis.

Distal to the damaged processus lateralis the ulnar border of the shaft is only preserved in a small area.

A 10 to 12 mm thick semicircular ridge, the base of the crista deltopectoralis, which is not separated into distinct fields, appears to have reached out onto the radial side of the incomplete processus lateralis; its ulnar part is directed proximal, so that if the line of its direction were continued it would run along the interior border of the caput humeri.

The dorsal side of the humerus shows on its proximal end a very shallow depression medially between the caput humeri and the processus medialis. On the dorsal surface at the broken distal end, is a small concavity visible, despite damage to this area.

DISCUSSION

The features of OU 22021 place it in the parathalassic turtle group *sensu* WIELAND (1900: 421) and HAY (1905: 153-154).

In trying to locate OU 22021 within this group I compared it with described parathalassic humeri of living species *Dermochelys coriacea* (Linnaeus, 1766), and fossils *Psephophorus scaldii* Van Beneden, 1871, *Eosphargis breineri* Nielsen, 1959, *Psephophorus rupeliensis* Van Beneden, 1883, and *Psephophorus eocaenus* Andrews, 1901.

Comparisons with *D. coriacea* humeri show that OU 22021 is distinct in being more slender and not that strongly compressed. Also the ulnar part of the crista deltopectoralis is orientated in a distal direction in *D. coriacea*.

P. scaldii Van Beneden, 1871, of which a Miocene humerus from near Antwerp, Belgium is known (DOLLO, 1888: 75, pl.4, fig.1), has a more stout appearance between its proximal end and the crista deltopectoralis which is in itself subdivided into distinct knobs, unlike OU 22021.

E. breineri Nielsen, 1959, from the lower Eocene of Jutland, Denmark, as described by NIELSEN (1963: 296-297, fig.10) is also more stout in appearance and has a transverse-distally orientated crista deltopectoralis. Also the intertubercular fossa is much less accentuated in *E. breineri*.

The known four humeri of *P. rupeliensis* Van Beneden, 1883 are figured in DOLLO's paper on the Oligocene and Neogene turtles from Belgium (DOLLO 1888: 64-66, pl.4, figs. 7-9). His excellent figure of a humerus fragment shows that the

crista deltopectoralis in *P. rupeliensis* is separated into distinct knobs similar to *P. scaldii*. It can also be seen that *P. rupeliensis* has not the same slender appearance as OU 22021.

The type specimen for *P. eocaenus* Andrews, 1901 is an incomplete left humerus from the Quasr-el-Sagha beds, North of Birkel-el Qurum, Egypt, which are according to ANDREWS (1906: 275) mid Eocene in age. GINGERICH (1992: 51) however gives a Priabonian age for those sediments. The figure given by ANDREWS (1901: 441) is very poor and does not show many details but his descriptions (ANDREWS 1901: 440-441 and 1906: 276) are detailed enough to show that there are many similarities to OU 22021.

P. eocaenus has a similar slender appearance of the part proximal to the crista deltopectoralis and it also shows a crista deltopectoralis which is not separated into distinct knobs as is the case in all other *Psephophorus* specimens. In later publications however, the partial humerus *P. eocaenus* is «reconstructed» (DACQUE, 1912, MÜLLER 1968, KARL, 1994) showing a crista deltopectoralis which stands in sharp contrast to the descriptions given by ANDREWS. Nevertheless the original description by ANDREWS must be seen as more reliable than attempted reconstructions made by others.

The differences to OU 22021 are the lack of a distinct ulnar crest and the lack of an obvious deep pit on the dorsal side of the humerus opposite the base of the radial process in OU 22021.

A further difference is the small size of *P. eocaenus* with a width of the shaft above the radial process of only 44 mm compared to 79 in OU 22021. The difference in age of OU 22021 (Lutetian - Bartonian) and *P. eocaenus* (Priabonian) also shows that OU 22021 and *P. eocaenus* are not the same species.

CONCLUSIONS

The comparison with known parathalassic humeri shows that OU 22021 is not a member of any described species of *Psephophorus*, but clearly a member of the genus *Psephophorus*. OU 22021 could be interpreted as being the predecessor of *P. eocaenus*, but the incomplete material allows no firm conclusions. This is also the reason, that a new species name was not proposed here.

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