NEW MATERIAL OF THE MOSASAUR CARINODENS BELGICUS FROM THE UPPER CRETACEOUS OF THE NETHERLANDS

ANNE S. SCHULP1,2, JOHN W. M. JAGT1, and FRANS FONKEN3, 1Natuurhistorisch Museum Maastricht, De Bosquetplein 6, NL-6211KJ Maastricht, The Netherlands, mail@nhmmaastricht.nl; 2Faculteit Aard- en Levenswetenschappen, Vrije Universiteit Amsterdam; 3Marktstraat 16, NL-6464AC Brunssum, The Netherlands

Current knowledge of the durophagous mosasaur genus Carinodens Thurmond, 1969 (Squamata, Mosasauridae) is scant. In addition to the holotype, an incomplete right dentary, only isolated teeth (mostly crowns) are known. In the holotype, only the posteriormost teeth are preserved, so that until recently no data concerning the remainder of the dentition of this species were available. We here record a fragment of a left dentary assignable to Carinodens from the Maastrichtian type area (Late Cretaceous, Fig. 1) of The Netherlands, which furthers our understanding of the morphology of the species and its dietary habits.

Institutional Abbreviations—FHSM, Fort Hays State University’s Sternberg Museum of Natural History, Hays, Kansas, USA; IRScNB, Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium; NHMM, Natuurhistorisch Museum Maastricht, Maastricht, The Netherlands; PR, Field Museum of Natural History, Chicago, Illinois, USA; USNM, United States National Museum, Washington D.C., USA.

SYSTEMATIC PALEONTOLOGY

Order SQUAMATA Oppel, 1811
Superfamily MOSASAUROIDEA Gervais, 1853 (nom. transl. Camp, 1923)
Family MOSASAURIDAE Gervais, 1853
Subfamily MOSASAURINAE Gervais, 1853 (nom. transl. Williston, 1897)
Tribe GLOBIDENSIINI Russell, 1967
CARINODENS Thurmond, 1969
CARINODENS BELGICUS (Woodward, 1891)

Referred Specimen—NHMM2003-141, fragmentary left dentary, preserving three teeth (Fig. 2).

Taxonomic Note—So far, two ‘species’ have been assigned to the genus Carinodens. The type of Globidens fraasi (IRScNB R43) was described and illustrated by Dollo (1913), who subsequently (Dollo, 1924) erected a separate genus, Compressiden, for this species, on account of the more compressed nature of the teeth in comparison to those of Globidens Gilmore, 1912. The name Compressiden turned out to be preoccupied by a scaphopod, and Thurmond (1969) proposed the subspecies name Carinodens Bottosaurus basalis Woodward, 1891, originally interpreted as a crocodilian tooth, is assignable to Carinodens as well. Kuypers et al. (1998) considered C. belgicus and C. fraasi to be synonyms, with the former name having priority. For illustration and discussion of additional remains and more information on taxonomic history, reference is made to Meijer (1982), Lingham-Soliar and Nolf (1990), Kuypers et al. (1998) and Lingham-Soliar (1999).

Locality and Horizon—The specimen described here was discovered by one of us (F.F.) at the ENCI-Maastricht bv limestone quarry, 3 km south of Maastricht, The Netherlands (50°49’N latitude, 5°41’E longitude; Fig. 1). The specimen was collected from just above the Lava Horizon, within the Emael Member (Maastrichtian Formation, early Late Maastrichtian, Belemnitella junior Cephalopod Zone). A detailed account of local stratigraphy was presented by Schioler et al. (1997). Preliminary strontium-isotope curve fitting (Vonhof and Smit, 1996) suggests an age of ±65.7 Ma.

Description—The specimen is 50 mm long, and is considerably abraded. Most of the bone on the lingual side is missing, leaving the alveoli and the replacement tooth pits exposed. The labial side is worn as well, but less so. A vestigial rim of the Meckelian canal can be discerned. Three of the four alveoli preserved still hold teeth. The posteriormost preserved tooth has a low, laterally compressed crown, with a thick, inflated base, and a blunt, well-worn central cusp. The anteriormost preserved teeth have a distinctly different crown morphology, in being much smaller, but still laterally compressed, tapering towards a much thinner, anteroposteriorly elongate cusp. The three preserved teeth all have the accompanying replacement tooth alveolus partially preserved.

Dentition—In the holotype of C. belgicus, an almost complete right dentary with three teeth preserved (IRScNB R43), the lateral expansion of the labial side of the dentary decreases between tooth positions #9 and #8; the size of the alveolus decreases markedly between positions #8 and #7. A similar decrease in size along the dentary is observed in NHMM2003-141. This suggests that the preserved teeth in NHMM2003-141 represent #6, #7, and #9. The distance between the anterior rim of alveolus #6 to the posterior rim of alveolus #9 is 44.2 mm in NHMM2003-141; in IRScNB R43 this equals 53.4 mm, making the specimen described here about 17% smaller.

Carinodens developed, for mosasaur standards, an unusually high degree of heterodonty, both in size as well as in morphology. Not only do the alveoli show a marked size decrease between positions #8 and #7, measurements on NHMM2003-141 also confirm that tooth size and morphology dramatically change between positions #8 and #7. Similar features, albeit considerably less pronounced, are seen in maxillary teeth of Globidens dakotensis (PR486; Russell, 1975) between positions #5 and #6 (add two premaxillary teeth to correspond with positions #7 and #8 in the dentary), and in G. alabamaensis (USNM6527; Gilmore, 1912) alike. Descriptions of dentary material of Globidens may be found in an abstract, lacking illustrations (Everhart and Everhart, 1996), but Michael J. Everhart has kindly provided us with a photograph of specimen FHSM