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The first record of albuneid crabs (Crustacea, Decapoda) from the Cretaceous

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Abstract

A recently collected new member of the Albuneidae from the type Maastrichtian of the Netherlands extends the range of the family from the Eocene down to the Cretaceous. *Praealbunea rickorum* new genus and species is yet another example of the major crustacean radiation in the Maastrichtian. It appears to represent the rootstock for the basal albuneid clade comprising *Albunea cuisiana*, *A. hahnae*, and *A. speciosa*.

Key words: Crustacea, Decapoda, Albuneidae, new genus, Maastrichtian, the Netherlands

Introduction

To date the Albuneidae is represented in the fossil record by five species only. Four of these are of Eocene age, two from the U. S. A. (Blow and Manning, 1996; Schweitzer and Boyko, 2000) and two from Italy (Beschin and De Angeli, 1984; De Angeli, 1998). A single species has been described from the Miocene of Hungary (Müller, 1979). This first Cretaceous record of sand crabs from the Maastrichtian type area throws new light on their evolution.

Although members of this group of specialized burrowing crabs are not rare in extant sandy habitats in shallow, tropical waters (e.g. Boyko, 1999; 2000), until Boyko and Harvey's study (1999) little was known of their biology. The diagnostic morphological carapace features used in albuneid taxonomy by Boyko and Harvey (1999) are scored in the present study.

Intensive bed-by-bed collecting from several key sections in the Maastrichtian stratotype area during the past 15 years has resulted in a large and stratigraphically well-documented decapod crustacean collection of over 1,200 specimens. The collections are housed in the Oertijdmuseum De Groene Poort (Boxtel) and the Natuurhistorisch Museum Maastricht. Thirty-one species of decapod crustaceans and five successive decapod crustacean assemblages were presented and their paleoecological and evolutionary trends through time discussed by Fraaye (1996). Jagt et al. (2000) listed no fewer than 12 anomurans and 27 brachyurans from the Maastrichtian type area, as well as several species of astacid and palinuroid lobsters. Currently, decapod crustacean diversity in the Maastrichtian type area surpasses that of other Mesozoic localities worldwide.

Not only are anomurans, brachyurans and lobsters characterized by high diversities in the type Maastrichtian, but other crustacean groups such as cirripeds and ostracodes occur commonly as well and even stomatopods (Hof & Fraaije in prep.) and cycloids (Fraaije et al. in prep.) have been discovered recently.

Systematic palaeontology

Order Decapoda Latreille, 1802
Superfamily Hippoidea Latreille, 1825
Family Albuneidae Stimpson, 1858
Genus *Praealbunea* new genus

Diagnosis: As for the type species.

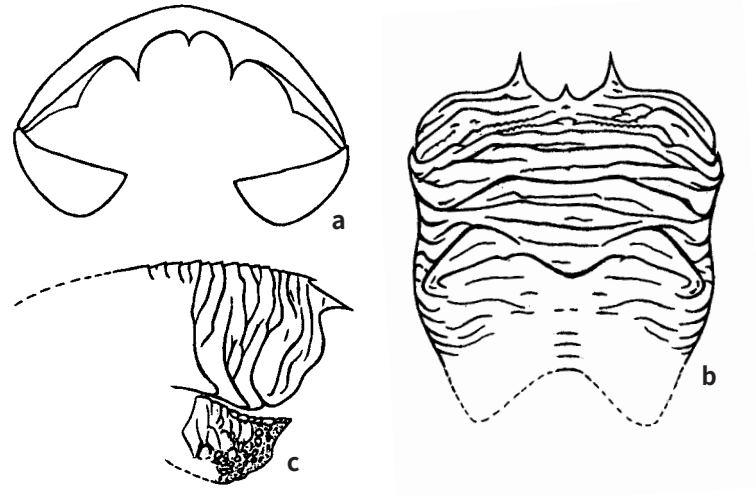
Type species: *Praealbunea rickorum* new species, the sole species known to date.

Etymology: In allusion to its ancestral position.

Praealbunea rickorum new species



Fig. 1. *Praealbunea rickorum* new species.



Figs. 2a-c. Frontal, dorsal and lateral views of *Praealbunea rickorum* new species. a, frontal; b, dorsal; c, lateral view.

(Figs. 1, 2a-c)

Diagnosis: Carapace slightly longer than wide, uniformly covered with numerous deeply incised transverse grooves; small triangular rostrum; long, sharp orbital spines; frontal region otherwise smooth; very small setal field with only central CG1 region crenulate; completely extending transverse CG2, 3 and 4 forwardly curving posterolaterally.

Description: Carapace slightly longer (c. 22 mm) than wide (19mm), strongly arched transversely and moderately arched longitudinally. Rostrum a small acute tooth, about one third the size of orbital spines, extending just to the anterior margin. Relatively broad, subovate and unarmed ocular sinus. Anterior margin smooth and concave on either side of ocular sinus, becoming convex laterally. Orbital spines sharply pointed and gently curving downwards. Medial portion of CG 1 coarsely crenulate.

The major grooves (numbered 1-11) described and used by Boyko (1999) for recognizing extant species are also recognized in *Praealbunea rickorum* (fig. 2b). *P. rickorum* has by far the most, and well-developed, transverse grooves of all known fossil albuneids.

CG1, 2, 3 and 4 with their fused lateral elements extend, sinuously parallel to the frontal margin, to the lateral margins. CG5 parallel to CG4, nearly reaching the topmost margins of CG6. CG6 strongly concave medially and sloping out to anteriorly convex lateral thirds. CG7 connected to CG6 and parallel to lateral parts of CG1, 3, 4 and 8. CG6 and CG7 laterally curving inwards posteriorly. CG8 relatively small lateral elements parallel to CG7.

CG10 consists of a row of 5 lateral elements parallel to CG4, the most lateral and largest elements are sigmoidally shaped. Small elements of CG11 are present. Unfortunately the posterior margin is badly damaged. Right chela only partially preserved. Propodus strongly curved and

covered centrally with short transverse grooves; anteriorly the short grooves become irregularly shaped nodes.

Etymology: This species is named after Rick Bonte, who collected the specimen in 1998 (aged 11), and the State Secretary of Culture of The Netherlands, Dr Rick van der Ploeg, who opened the Oertijdmuseum De Groene Poort in 1999.

Material: A single specimen MAB k.1031, from the central part of the Nekum Member, Maastricht Formation (late Maastrichtian), quarry Ankerpoort-'t Rooth, Bemelen southern Limburg (The Netherlands).

Discussion: When found, only the central part of the carapace of *P. rickorum* was visible. At first sight it looked very similar to the groove system of a large chela of the raninid genus *Eumorphocorystes* van Binkhorst, 1857. After careful preparation most of the carapace was exposed and although general morphology resembles a raninid, a closer look at the frontal region and distinct groove pattern made clear it was the first Cretaceous albuneid. The convergent features (general carapace shape and chela) of raninids and albuneids that evolved from a (sand)burrowing habitat are striking. This has resulted in the identification of fossil albuneids as raninids and raninids as albuneids (Schweitzer & Boyko, 2000). In collections of extant decapods many raninids are mixed with albuneids (C. B. Boyko, pers. commun.).

Only three other species in the family have a fused central and lateral CG1: namely the Eocene *Albunea cuisiana* Beschin and De Angeli (1984) from Italy, *A. hahnae* Blow and Manning (1996) from the Eocene of South Carolina, USA, and the extant *A. speciosa* Dana (1852) from the Indo-West Pacific. Low sloping lateral edges of the front and a small and narrow setal field are also relatively primitive characters present in the new genus and the Eocene *A. cuisiana* and *A. hahnae*. Based on the characters described above *Albunea cuisiana*, *A. hahnae* and *A. speciosa* seem to be potential descendants of the new genus.

Praealbunea rickorum is easily differentiated from all other extant and fossil albuneid species by the combination of a smooth frontal margin, a broad orbital region and the numerous well-developed transverse grooves. *P. rickorum* differs from representatives of the genus *Lophomastix* Benedict, 1904, by having a shorter rostrum, having a wider carapace and a different and more uniform transverse carapace groove system lacking anterolateral spines.

The specimen was found in the central and most homogenic part of the biocalcarenites of the Nekum Member. This member yields numerous remains of the burrowing shrimp *Protocallianassa faujasi* (Sven et al., 2001). *Praealbunea rickorum* apparently occurred in between the *Protocallianassa faujasi* (Desmarest, 1822) community and the major habitats of *Eumorphocorystes sculptus* van Binkhorst, 1857 and *E. muelleri* (van Binkhorst, 1857) (see Fraaye, 1996). The estimated depositional depth of the Nekum Member is 10 to 20 meters (Fraaye, 1996). This figure corresponds well with the habitat of extant *Albunea* species. The closest living relative, *A. speciosa*, has been found at a depth of 3.7 to 13.7 meters in Hawaiian waters (Boyko, 1999).

To understand the evolution of ancient marine ecosystems, a thorough knowledge is required of the life habitats of all major invertebrate and vertebrate groups. Reconstruction of Mesozoic ecosystems are very often incomplete and misleading because of selective interest in certain groups such as reptiles, ammonites and foraminifera. The same holds true for paleobiological studies dealing with the K/T boundary interval. The enormous body of paleobiological literature dealing with mass extinctions at this interval that came out during the last decades is disproportionate to the number of surviving and radiating groups such as the decapod crustaceans. The new genus described in the present paper documents that.

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