Zoosymposia 7: 71–79 (2012)
www.mapress.com/zoosymposia/

ISSN 1178-9905 (print edition)
ZOOSYMPOSIA
ISSN 1178-9913 (online edition)

urn:lsid:zoobank.org:pub:5FD38322-DCB7-4BAD-8A8C-AF032CC571EC

Crinoid diversity in the Upper Cretaceous Yezo Supergroup, Hokkaido, northern Japan*

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**In*: Kroh, A. & Reich, M. (Eds.) Echinoderm Research 2010: Proceedings of the Seventh European Conference on Echinoderms, Göttingen, Germany, 2–9 October 2010. *Zoosymposia*, 7, xii+316 pp.

Abstract

New data, principally from 'local' encrinites in the Yezo Supergroup of Hokkaido, northern Japan, suggest that many relict 'Jurassic-type faunas' identified in Europe and central Japan might have persisted in the Late Cretaceous deep-water (>100 m) muddy sandstone facies found throughout the island of Hokkaido. For example, *Isocrinus* and *Balanocrinus* occur in the outer shelf sandy mudstone facies of the Turonian-Coniacian Saku Formation and the Coniacian- Campanian Haborogawa Formation, of the Mikasa area (central Hokkaido), respectively. *Isocrinus* is also found in the Turonian-Coniacian deep-water siltstones and sandy siltstones of the Nishi-chirashinai Formation of the Nakagawa area (northern Hokkaido). In contrast, *Isselicrinus*, which belongs to 'Late Cretaceous type-faunas', occurs in the uppermost Cretaceous (Campanian) outer shelf mudstone facies of the Upper Yezo Supergroup around Hobetsu (south-central Hokkaido). Although collections of crinoids from the chalks of northern Europe are themselves largely free from sampling biases, Cretaceous crinoid diversity data have been markedly influenced by fossils preserved in the relatively homogeneous chalk facies where the faunal differences between the deep-water Danish, English and north German chalks (>250 m) and the shallow-water facies found around Maastricht, the Netherlands (<50 m) are slight. The results of this preliminary report on the crinoid faunas of Hokkaido suggest that global crinoid diversity reported from the Upper Cretaceous might be influenced by sampling and facies biases.

Key words: Crinoidea, Upper Cretaceous, Yezo Supergroup, Hokkaido, Japan, Mesozoic Marine Revolution

Introduction

Studies into fossil crinoids have tried to understand why during the late Mesozoic to late Cenozoic stalked forms retreated into deep-water habitats (the shallowest modern population having been recorded at a depth of only 150–160 m), whilst leaving the comatulids to dominate the shallow shelves and reefs. The Marine Mesozoic Revolution is most often cited as the principal cause for this decline, and although the precise mechanism remains under investigation (Vermeij 1977), the lack of stalked forms in the early Cenozoic (post-Danian) is clear, with only relict populations found (Meyer & Oji 1993; Hess 1999, 2011). However, this cannot be said for the Jurassic and Cretaceous diversity; Baumiller *et al.* (2010) suggested that increased predation pressure by echinoids from the Middle-Late Triassic onwards might be an underlying cause of these diversity changes during the

Accepted by A. Kroh: 1 Jan. 2012; published 12 Dec. 2012