



urn:lsid:zoobank.org:pub:74808BF8-B07D-4A43-865C-0BCDC5A9C24D

## Observations on *Onychaster* Meek & Worthen, 1868 (Ophiuroidea: Onychasteridae) (Famennian–Visean age)\*

FREDERICK H.C. HOTCHKISS<sup>1,3</sup> & ALEXANDER GLASS<sup>2</sup>

<sup>1</sup> Marine and Paleobiological Research Institute, Vineyard Haven, MA, USA

<sup>2</sup> Earth and Ocean Sciences, Duke University, Durham, NC, USA

<sup>3</sup> Corresponding author, E-mail: hotchkiss@MPRIInstitute.org

\*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.

Contribution dedicated to the memory of Dr. John H. Dearborn (1933–2010)

### Abstract

*Onychaster* is prominent in discussions on the ancestry of crown group ophiuroids because about half of researchers have classified *Onychaster* as a Palaeozoic representative of the living Order Euryalida. With this classification there is a Mississippian to Cretaceous gap in the euryalid fossil record. Other researchers have classified *Onychaster* as non-euryalid, in which case there is no such gap. This undecided status is an important reason to review the classification of *Onychaster* using new observations. In *Onychaster* the lateral plates are strictly on the underside of the arm where they form a double row and nearly touch midventrally; there are no mid-ventral underarm plates. The undersurface-laterals bear a transverse row of spines that point proximally (in retro-direction). The disk in large specimens bulges interradially such that the arms insert subambitally. The morphology of *Onychaster* vertebrae is documented anew in SEM stereo-pair images. Distinctive features include: a median dorsal cleft or circular pit on the upper surface; an auluroid canal; paired epanapophyses; a zygosphene dorsal to the auluroid canal; exceptionally spacious fossae for the ventral longitudinal muscles; and an undersurface plastron that is dimensioned like a waist belt. These features are transformationally close to eospondylid/furcasterid vertebrae and progressively/increasingly distant from zygospondylous, transpondylous, and streptospondylous vertebrae. Classification of *Onychaster* as an euryalid is not supported. We reclassify the Onychasteridae next to the Furcasteridae.

**Key words:** Ophiuroidea, Furcasteridae, *Onychaster*, Palaeozoic, Classification, ophiuroid vertebrae

### Introduction

*Onychaster flexilis* Meek & Worthen, 1868, lived epizoic on the crowns of stalked crinoids. Whereas most bottom-dwelling ophiuroids bend their arms into sideways curves for movement or bend them upward to feed from the water column, *Onychaster* bent its arms ventrally into coils that grasped the calyx and arms of its crinoid host. *Onychaster* may have gathered food from the water column from this perch, or stolen the food of the crinoid, or fed upon the anal wastes or the flesh of the crinoid (Wachsmuth & Springer 1897; Clarke 1908, 1921; Dacqué 1921; Meyer & Ausich 1983). Because of its life habits, *Onychaster* has been compared with living euryalid ophiuroids that also curl their