

Paleozoic echinoderm hangovers: Waking up in the Triassic

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In arguing that the Triassic trichasteropsid *Migmaster* is a Paleozoic survivor rather than a member of the crown group Asteroidea, Thuy et al. (2017) do not address the fundamental argumentation of Blake and Hagdorn (2003) that the apomorphies of the crown group are to be found in the ambulacral column, and that these apomorphies are first recognized in a Carboniferous fossil, in which marginal ossicles occur in a single series, the latter criterion addressing the third challenge of Thuy et al. The first and second criteria of these authors rely on subjective descriptors, the first finding arrangement of ossicles on the ventral surface of *Migmaster* to be “unlike the development in any” member of the crown group, and also that adambulacral development of *Migmaster* is “reminiscent” of that of a Permian asteroid. Enlarged ossicles on the ventral surface are much more common in the crown group than among Paleozoic taxa, occurring widely in the extant Goniasteridae, for example, and arguing that these differ fundamentally calls for a more

rigorous analysis than personal opinion. Adambulacral ossicles “reminiscent” of those of the crown group are found among some of the earliest, Ordovician, asteroids, and many such similarities led earlier researchers to trace crown-group ordinal-level asteroid diversification from the Ordovician (Spencer and Wright, 1966); Ordovician *Urasterella*, for example, is highly “reminiscent” of extant *Henrica* in many aspects of overall form and body wall ossicular form and arrangement. Thuy et al. need rigorous analysis to argue that *Migmaster* is a Paleozoic survivor.

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