

The origin and early evolution of *Balanocrinus* (Crinoidea: Articulata)

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The genus *Balanocrinus* is a common Jurassic crinoid recognised primarily on the pattern of the columnal articulations. Superficially similar columnals are found as early as the Middle Triassic and have been taken as ancestral. However, strong similarities in morphology and columnal microstructure exist between Lower Jurassic *Chladocrinus* and true *Balanocrinus* but are absent in the supposed Triassic ancestor. *Chladocrinus* and *Balanocrinus* share an identical shape and arrangement of stereom lumina on columnal latera, identical arrangement of brachial articulations, and similar very long cirri. Four species, representing a monophyletic lineage, can be unequivocally assigned to *Balanocrinus* up to the close of the Domerian (fig.1); *B. quiaiosensis* Loriol, 1891 (Oxynotum-Taylori Subzone), *B. subteroides* (Quenstedt, 1858) (Taylori-Figulinum Subzone),

B. gracilis (Charlesworth, 1847) (Capricornus-Stokesi Subzone) and *B. sp. nov.* (Subnodosus-Apyrenum Subzone). '*Balanocrinus*' antiquus Loriol, 1887, from the Hettangian, is considered a remnant of a Triassic lineage. *Balanocrinus quiaiosensis* is a small species showing strong morphological similarities to juvenile *Chladocrinus*. Derivation of *Balanocrinus* from *Chladocrinus*, by paedomorphosis, during the mid-Sinemurian seems probable. Subsequent evolution fits the punctuated equilibria model, with prolonged periods of evolutionary stasis punctuated by brief speciation events which correlate with rapid and widespread facies changes. No significant changes have been detected within species but several inter-specific trends are apparent. These include a progressive increase in maximum size, nodal spacing and robustness of the cirri.

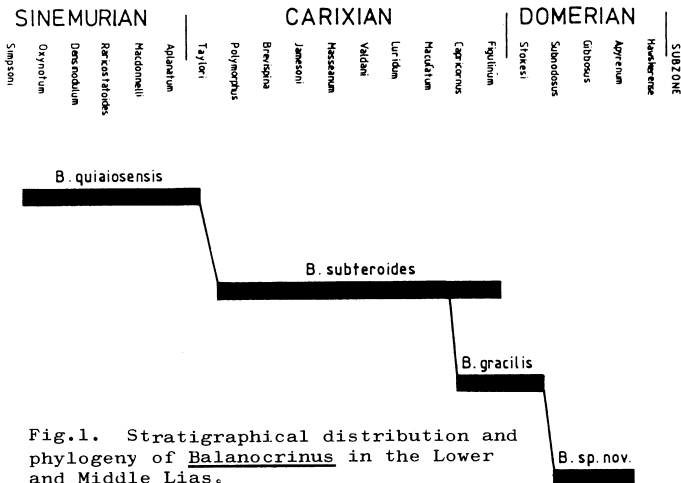


Fig.1. Stratigraphical distribution and phylogeny of *Balanocrinus* in the Lower and Middle Lias.