

## THE CTENOSTOMATA - THE HISTORICAL IMPORTANCE OF A FORGOTTEN MAJOR GROUP

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The ctenostomes are a major group (order) of primitive yet extant, unmineralized, marine bryozoans. Their existence has been consistently ignored in palaeoecological and phylogenetic studies despite their having a known range from the Early Ordovician. This is in large part due to the Palaeozoic taxa (and, until recently, the majority of Mesozoic taxa) being known solely from a limited diversity of borings. Nevertheless the borings are morphologically highly informative and are an untapped source of systematic information. When combined with a cladistic (PAUP) analysis of Recent ctenostome superfamilies they show that almost all of these may have originated by the Ordovician, implying vast ghost lineages. Fortunately such unmineralized encrusters may be systematically collected in large numbers, preserved by bioimmuration (organic overgrowth by a neighbouring skeletonized encruster).

Snapshots of Mesozoic marine hard substrate communities with their full complement of mineralized and unmineralized denizens, are routinely provided by bioimmuration. Many of these communities contained, and sometimes were dominated by, members of a single, highly diverse family of extant encrusting ctenostomes: the Arachnidiidae. Apart from revolutionising our knowledge of such communities, the apparent ubiquity of this clade in Mesozoic shelf seas forces a re-evaluation of the ecological importance of ctenostomes throughout much of the Phanerozoic. Preserved with submicron-scale fidelity, and sometimes with soft parts, many taxa are more completely known than their Recent counterparts. Stem-group members of this family, in particular, provide previously inaccessible information which necessitates a revision of current notions of bryozoan phylogeny and classification. Indeed, PAUP analysis reveals that the dominant and most speciose group of bryozoans today - the cheilostomes - nest amongst, and were derived from, probable stem-group arachnidiids.

Despite an often rich suite of characters, high-level cladistic analysis of post-Palaeozoic Bryozoa is still in its infancy. Study of bioimmurations has largely removed the taphonomic calcification barrier which had previously prevented a clear view of the inter-relationship of ctenostomes and cheilostomes, two of the three major extant groups of bryozoans.