Morphological Evolution within Holocystitid Diploporitans

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Biogeography is an important driver of evolutionary trends, such that the morphological consequences of migrations and faunal invasions are vital in understanding large-scale evolutionary patterns. The holocystitids are diploporitan echinoderms typified by having food grooves that lack floor plates, which end with a single, large brachiole facet. The holocystitids are a locally abundant and largely North American clade of diploporitans that became established, likely following a migration from Europe. Following the Late Ordovician Mass Extinction, few lower tiered echinoderms with broad feeding structures survived such that the Holocystites fauna, particularly Holocystites, experienced a competitive release following the invasion.

To explore the evolutionary patterns that occurred during this migration, we constructed a novel morphological character suite. We characterized 24 individuals, from holocystitids and closely related diploporitan taxa, from seven genera and combined the morphological patterns with a recently published phylogeny to construct a phylomorphospace. This methodology allows for the visualization of morphology within an evolutionary framework.