

Blastoidea - A Blast from the Past

GEOL 204 The Fossil Record

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Distinct Features and Varieties of Blastoidea

In regards to **Figure 1**, Blastoids were inactive animals that were connected to the seafloor by stemlike columns of circular plates. This causes these animals to be immobile. The body of the blastoid consists of 13 plates of calcium carbonate, a skeleton arranged in 3 circles about the body [5]. The theca and the arms of the blastoid were important parts of the body due to their ability to aid in feeding. Another feature blastoids have are hydrospires. Hydrospires are complex, folded respiratory organs that were mesh-like to allow for oxygen to be exchanged in the main body cavity [9]. One specific variety of the blastoid class is the *Pentremites*. They are an extinct genus of blastoid echinoderm. Their theca is in a nut shape, which gives them the name of hickory nut. They were present during the Carboniferous Period and are also easily preserved. Two species of the *Pentremites* are *Pentremites obesus* and *Pentremites symmetricus* which can be seen in **Figures 6 and 7** [6].

Ecology of the Blastoid

Blastoids are known to be epifaunal suspension feeders that remain on the ocean floor. They use their bristle arms to grab planktons in the open sea [3]. They are the longest living and most diverse group of blastozoa which are part of the crinoids [12]. They use their hydrospire slits and spiracles to sift water through their pores. Their mouth and anus are situated on the top of the head (calyx) as shown in **Figure 2**, indicating that blastoids have a single orifice for their food and bodily functions [3]. They tend to live alongside other echinoderm species and other marine animals in the reef [12]. However, it is not always this type of environment as we dive into the habitats of these Blastoids.

Geologic Range of the Blastoid

As shown in **Figure 4**, Blastoids originated in the Ordovician Period (541 million to 470 million years ago), with a variety of other echinoderm classes [2]. The greatest diversity of the Blastoid was reached within the Mississippian, or early Carboniferous [9]. They lasted until the end of the Permian period. The end Permian mass extinction was the cause of extinction for Blastoids. In total, Blastoids were on earth for a range of around 200 million years [2].

Habitat of the Blastoid

In total, there are one hundred fifteen genera of blastoids and each are divided into two orders based on the presence of exposed hydrospire slits or spiracles [12]. Historically blastoids were considered part of shallow water crinoid communities. Often they were, but blastoids can also appear in deeper water communities. They have an evolutionary history of local explosions of abundance and diversification with later rapid declines. Most notably, they were diverse during the Ordovician period [12]. Blastoids, generally, are associated with two major communities: the first being the shallow water communities with a reefal buildup and the second being the deep water communities alongside other Cambrian echinoderms [12]. Some modern day locations of these prehistoric communities can be found alongside the Mississippi River, in high latitudes around Bolivia and South Africa, and in some formations like the Bromide Formation in Oklahoma [12]. As shown in **Figure 3**, the depiction of what might the community looked like for these blastoids indicates the changes presented within a single area given million of years of evolution and transformation.

Geographic Range of the Blastoid

The paleobiogeographic history of blastoids can be viewed in three phases. Within the first phase, the geographic range along with the diversity of blastoids increased in the Devonian, due to the radiation from North America in the Ordovician. Within the second phase, there was Tournasian radiation in North America along with Europe. This led to a decrease in the diversity and range of blastoids in the Carboniferous period. Lastly, in the third phase, the biogeographic center of blastoids shifted to the East, due to re-radiation. Upper Carboniferous/Permian blastoids were mostly found in southeast Asia along with Australia [11].

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