

Age and Palaeoecology of the Earliest Cenozoic Caribbean Coral Reef Communities

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Abstract

Early Cenozoic coral reefs of the Caribbean are rare and poorly understood. This contrasts significantly from the abundant and diverse coral faunas of the latest Maastrichtian. In the Caribbean, Palaeocene and Early Eocene fossil corals are scarce and never show any distinctive growth fabric or 'reef' formation. The oldest Caribbean Cenozoic deposits in which extensive assemblages of corals are a dominant component are found in Jamaica (Middle Eocene Yellow Limestone Group). Fossil corals from the Yellow Limestone Group were first described in taxonomic works of the 19th and early 20th century, but there has been no modern research to their taxonomy, palaeoecology, or the position of these corals in a modern stratigraphic model. Therefore, recent work on a range of localities and a large scale collecting effort has begun to detail the age, richness and ecological structure of these earliest Cenozoic coral communities.

New collections of corals have been made from 22 previously described localities and newer exposures through the Eocene of central and western Jamaica. Large samples have been made either as surface collections or bulk samples. Over 2200 coral specimens have been identified from these localities, and information on lithofacies, coral density and growth fabric have been recorded for each site. Associated large benthic foraminifera have been used to approach a more detailed stratigraphy of the coral bearing deposits.

Results to date show that all older collections and the recently collected material come from the uppermost unit of the Chapelton Formation, Yellow Limestone Group. Based on the foraminiferal faunas, these appear to be Late Lutetian to Bartonian in age. Corals are the most common macrofossil group in the Chapelton Formation, with >26 different species identified. Faunas have been retrieved from a range of facies, including bioclastic limestones and calcareous mudrocks. Coral colonies are chiefly thinly-branched morphs, though more diverse samples include thicker-branched forms and some small mounding corals. There is little or no coral growth fabric; some localities show small (50-100cm scale) patches of corals in growth position but most show only toppled or transported clusters of branches. All samples included both typical reef forming zooxanthellate types and probable azooxanthellate species.

The age of the Yellow Limestone corals appears to be somewhat younger than earlier reported. The coral communities, while abundant and diverse, are generally smaller with a more limited range of colony form than younger coral faunas. The common mixture of likely azooxanthellate and zooxanthellate species suggests that the ecology of these older Caribbean coral communities was distinct from that seen in Late Oligocene-Recent reefs. Greater sampling from throughout the Caribbean may determine whether this is controlled by local environmental conditions of the Jamaican middle Eocene or if it represents a larger regional-scale pattern.