Exploratory paleontology of Paleogene marine molluscan faunas in the neotropics

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The Paleogene marine fossil record of the neotropics is widely regarded as being poorly preserved and under sampled, relative to contemporaneous, adjacent temperate regions, or the Neogene. Compared with the Gulf Coastal and Atlantic Coastal Plains of North America and classic Western European successions the Paleogene outcrops of Central America and northern South America are patchier in distribution, with lithified siliciclastic or carbonate facies, and are often more inaccessible or ephemeral in exposure. Recent research has focused on revisiting known Eocene fossil localities in Panama (Gatuncillo and Tonosí formations) to augment existing knowledge of the local faunas, and to make new collections that permit modern paleobiological analyses. These localities are being studied in a way will enable more meaningful comparison with the better-known faunas of contemporaneous temperate regions.

1) The Gatuncillo Formation, distributed within the Canal Basin of central Panama, was fairly well documented by Wendell Woodring during his authoritative studies of Panamanian Cenozoic molluscs. The formation ranges in age from the Middle through Late Eocene, as determined through large foraminiferal biostratigraphy and Sr isotopes. As many as 80 taxa are known from the formation, including 18 endemic species, although over 30 taxa have not been named to species-level because of their poor preservation. The formation preserves a diverse array of paleoenvironments, from marginal marine to mid-shelf depths, and includes both siliciclastic and carbonate facies.

2) The Tonosí Formation, on Panama's Azuero Peninsula, has been relatively ignored by paleontologists despite early reports of the presence of abundant fossils. The fauna is quite diverse, although to date no tabulations have been made of its apparent richness. Only three species appears to have been recorded in the literature from the formation, including a notable occurrence of abundant *Aturia* (Nautilida). The formation is Middle Eocene at its base but is thought to include rocks that range into the Miocene as dated through nanoplankton biostratigraphy. The Eocene portion of the formation comprises siliciclastic facies that accumulated in nearshore to mid-shelf depths while the overlying shallow marine carbonate succession probably accumulated during the Oligocene.

New collections from these units are being obtained from carefully measured stratigraphic sections, and are providing material suitable for taxonomic description as well as bulk samples appropriate for quantitative paleoecologic and diversity analysis. Stable isotope analysis will be carried out on suitably preserved material to understand local paleoceanographic conditions. Multiple dating techniques (Sr isotopes, molluscan, foraminiferal and nanoplankton biostratigraphy) are being utilized to produce an integrated chronostratigraphic framework for these formations and correlative stratigraphic units in Panama and Colombia.