ABSTRACT

The study of fossil istiophorids is limited by its fragmentary fossil record; the absence of osteological specimens for comparisons; the cryptic bibliography of several early works and the absence of more accurate comparative methods. Appling a data imputation model we took advantages of extant data for rostral and articular variables for istiophorid billfishes. We used this result to apply PCA analysis and we compared fossil and modern istiophorids together. With this analysis we present here two new istiophorid species: *Makaira*? sp. nov. 1 and *Makaira* sp. nov. 2. *Makaira*? sp. nov. 1 is the most complete fossil istiophorid ever discovered and represent that share characters in various genera. We hypothesize that characters in bones involved in alimentation process have phylogenetic importance as: rostrum shape, denticles, lower jaw, vomer, basioccipital and skull shape as well as orbital size. Our taxonomic reviews of fossil istiophorid reorganize its taxonomy and solve many conflicts about the classification of fossil species. The istiophorids are abundant macrovertebrate in the Chagres sediments and its presence suggests a water column with a minimum of 200m depths in an environment of short platform with oceanic influence. Given the high productivity inferred in this environment we suggest that istiophorid aggregation in the Late Miocene of Chagres Formation could be seasonal and that they could use the Central American Seaway as migration route before the modern oceanographic pattern were established.