

Oldest record of a seagrass ecosystem: evidence of herbivory in marine angiosperms from the mid-Cretaceous of México (N America)

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Seagrasses are marine angiosperms and are widely distributed in modern shallow marine environments forming some of the most productive ecosystems on Earth, rivaling tropical rain forests and coral reefs (Costanza et al. 1997, Fourqurean et al. 2012). Seagrasses have an extremely sparse fossil record. So far, the oldest indisputable fossils of this group are from the latest Cretaceous (Maastrichtian) of Europe. The fossils in our study derive from the El Chango site, which exposes a Konservat-Lagerstaten belonging to the Cintalapa Formation of the Sierra Madre Group. This unit is mid-Cretaceous in age (most likely Cenomanian); it represents an opportunity to study the dynamics of plant-invertebrate interactions in early marine angiosperms during the KTR (Cretaceous Terrestrial Revolution). Deposits at this site are interpreted to have been laid down in a paralic environment. They host a varied range of fossils, including plants, mollusks, fishes, arthropods, and echinoderms. Our study documents the oldest evidence of seagrass meadows worldwide, including vegetative and reproductive remains, these fossils come from low-latitude, mid-Cretaceous (Albian–early Cenomanian) deposits of North America, about 30–40 Myrs older than the previous records. Additionally, evidence of herbivory and other seagrass-animal interactions are recorded in this material, supporting the hypothesis that these angiosperms invaded marine ecosystems early in the radiation of flowering plants and played an important role in shallow marine food webs before the end of the Mesozoic. Our results indicate that during the Cretaceous Terrestrial Revolution, marine herbivores had managed to adapt their feeding behavior to this new botanical group.

References

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