

FIRST OCCURRENCES IN A HIGHLY DIVERSE LATE EOCENE FRESHWATER  
DIATOM FLORA FROM THE FLORISSANT FORMATION, CENTRAL  
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The 34 million-year-old lake sediments of the Late Eocene Florissant Formation in central Colorado contain the most diverse (genus-rich) early freshwater diatom flora on record. Six genera were identified by Frank Round and David Williams, as reported by Harding and Chant in 2000. A preliminary examination by Eugene Stoermer, cited by Meyer in 2003, indicated that taxa with affinities for 19 modern genera were observed. A reported, but undescribed, minimum of 30 species were recognized by Lohman, as stated by Lohman and Andrews in 1968; but neither location information nor a list of taxa was provided. The present investigation has resulted in the identification of a minimum of 20 genera, many with multiple species, from a single field site. Descriptions of these taxa, their geochronology, and an overview of the relationship of diatom assemblages with associated biota and with sedimentological parameters within the lake beds are on-going aspects of this study. It is anticipated that this Late Eocene record will provide to the greater diatom research community necessary paleontological data for interpreting the stratigraphic and phylogenetic history of several diatom lineages.

The Florissant diatom flora, composited from all sources above, is compared in composition and taxon richness with published accounts of pre-Neogene freshwater floras of Cretaceous and Middle Eocene age. Similar to the Middle Eocene lake beds of Canada and Wyoming, the Late Eocene Florissant lake deposit is in its own unique position to inform the evolutionary record of the earliest of freshwater diatoms. First, it is unique in its position relative to global climate change, as Florissant lake existed during the final phase of the warmer global climates of the Paleogene, just prior to major cooling trends that characterized the Neogene. As well as the superior taxon richness and the decidedly modern taxonomic affinity, the Florissant flora, as a consequence of its greater diversity, yields the first reported occurrence in the geologic record of 14 genera. These first-appearing genera represent centric, araphid, biraphid, and monoraphid morphologic groups. Although they must be treated as apparent first occurrences due to the innate incompleteness of the fossil record, such appearances confirm that many of the modern genera had evolved before the end of Paleogene time. The Florissant flora, thereby, provides concrete evidence of the sequence and timing of phylogenetic changes that accompanied the Late Paleogene to Neogene increase in freshwater diatom taxonomic diversity and adds the context of global climate.