

Fossil insect larvae provide clues for interpretation of the depositional environment of the Green River Formation

Glenn Mason

Indiana University Southeast, USA

The Green River Formation has produced one of the most remarkable fossil assemblages known, consisting of vertebrates, invertebrates, microorganisms, and plants, ranging from microscopic bacteria to 16 ft. long crocodiles. At least 300 species of insects alone have been described from this formation, with early identifications dating back to the 1800's. Exquisitely preserved fossilized insects and larvae can provide valuable clues to seasonal timing, depositional characteristics, and the climatic conditions present in Lake Gosiute at the time of deposition. Outcrop samples of insect larvae-bearing sediments were collected from a single locality in the Southeastern Green River Basin from the Laney Member of the Green River Formation, and formed the basis for this research. Examination of morphological characteristics of the larvae, while taking into account the depositional and environmental characteristics of the sediment, were used to tentatively identify the fossils as part of the Order Diptera: Family Stratiomyidae (common name: Soldier Fly), a family of insects still abundant today. Soldier Fly eggs are deposited in the spring to early summer, in ponds and lakes where stream and current flow is minimal. Fully-grown larvae pupate in mud at the edge of water with adult flies active in late summer. Given the known life cycle of the Soldier Fly, a relatively exact time line for deposition of these sediments can be determined. This interpretation results in the conclusion that these sediments were deposited in early to mid-summer, under warm climatic conditions, in a low energy environment, probably a bay or lagoon. Preservation of the larvae could have been achieved when a spring or summer rainstorm washed sediments into the normally quiet lake, entombing the larvae in a layer of silt and mud.