

ORIGINS AND ELEMENTS OF THE FRESHWATER DIATOM FLORA OF THE HAWAIIAN ISLANDS

J.P. Kociolek¹, R.L. Lowe², C. Graeff¹ and J.R. Johansen³

¹Museum of Natural History and Department of Ecology and Evolutionary Biology, University of Colorado, Boulder, CO 80309

²Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403

³Department of Biological Sciences, John Carroll University, University Heights, OH 44118

The Hawaiian Islands are an archipelago in the mid-Pacific Ocean, located over 4000 km from the closest mainland in North America. The Islands developed over a long period of time, with the oldest, Kauai being over 5 million years old, and the youngest, the big island of Hawaii, being ca. 1 million years old. Because they are oceanic islands, and are distant from sources of biodiversity, the flora and fauna of Hawaii have been hypothesized to travel by prevailing westerly winds from Asia and Oceania, from the New World by episodic storm events, and even the arctic dispersed by migratory birds. Some species are invasive and thought to have been introduced to the Islands by humans. The native flora and fauna have many species endemic to the Islands, and several (e.g. honeycreepers, etc.) are textbook examples of evolutionary pattern and process.

The freshwater diatom flora of Hawaii has been explored by relatively few investigators, most of whom concluded that most of the species present are cosmopolitan. A few endemic species were described by Hustedt (1942) and Fungladda et al. (1983). More recently a new genus and several new species were described by Main (2001), and Lowe and Sherwood (2009, 2010), but the compilation by Sherwood concluded that the vast majority of freshwater diatoms species in Hawaii are cosmopolitan.

We have made over 2000 unique collections from a wide variety of habitats on 6 of the islands (Molokai, Lanai, Hawaii, Maui, Oahu, Kauai) and have begun to document the species present. Overall, $\frac{3}{4}$ of the freshwater diatom genera found in North America occur in Hawaii. The number of species found in each genus is relatively small, compared to North America. It appears that certain groups of species have either directly migrated to Hawaii, or appear to have their closest allies from very distinct origins. Some species are clearly allied with congeners from South America, some from southeast Asia/Oceania and others from North America. Many taxa have crossed the salinity rubicon, invaded freshwater systems, and even radiated in terms of the number of species. In this talk we will discuss the patterns of biogeographic origin, taxon richness and levels of endemism in the Hawaiian freshwater diatom flora.

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