

Susan Gresens: Project Description REU Summer 2010

Research will focus on development of a model laboratory ecosystem that will be used to study the nutritional requirements of aquatic insect larvae: Chironomidae, or “non-biting midges, feeding on cultures of attached algae (primarily diatoms). This laboratory ecosystem is intended to represent organisms at the base of the food chain in streams. Chironomid midge larvae are of special interest because this family of small flies contains many species, which vary greatly in their tolerance to organic pollution and eutrophication. However much less is known about the tolerances of chironomid species to toxic compounds such as metals. Refinement of laboratory microcosms and algal culture media will ultimately allow us to conduct experiments to determine whether the distribution of midge species in local urban and rural streams is affected by toxic levels of trace metals, or other anthropogenic chemicals. Midge larvae in our current artificial culture conditions grow, but often do not complete development into adult flies. The REU project will address some possible reasons why. This will involve manipulation of the amounts of phosphorus and iron in algal growth media, as well as the degree of exposure of larvae to the trace metals which are normally included in algal culture media. The growth and survival of larvae under these different culture conditions will be compared to determine whether a nutritional limitation or a toxic effect has been causing incomplete development of larvae.

The REU experience may also include some field sampling of midge larvae from a local river impacted by a wastewater treatment plant and other types of urban development. Emergence of huge numbers of adult midge flies in this area has created a nuisance for local residents and a marina. A field study may be underway to determine the nature of the problem, and potential solutions.