Morphological Deformities in Larval Chironomidae (Diptera) from the Western Basin of Lake Erie: An Historical Comparison.

Megan S.E. Doherty[1](mdoherty75@hotmail.com), L.A. Hudson1, J.J.H. Ciborowski[1] and D.W. Schloesser[2]. [1]Dept. of Biological Sciences & Great Lakes Inst. for Environ. Res., University of Windsor, Windsor, ON N9B 3P4, and 2 Great Lakes Science Center, US Geological Survey, Ann Arbor, MI 48105

Chironomid larvae are an integral part of freshwater benthic communities and are often used to assess environmental quality. Contaminants can eradicate sensitive species or cause sublethal developmental or genotoxic effects. Mouthpart deformities are one indicator of sublethal effects. Historically, western Lake Erie has received contaminants and nutrients from many sources, leading to benthic community impairment. Water quality improved through the 1980's. We examined chironomid larvae collected in benthic surveys by the US EPA in 1982 and 1993 from 38 sites in Lake Erie's western basin. A total of 2,517 chironomids was individually mounted, identified, and examined for morphological deformities (extra or missing teeth in the ligula or mentum). Samples were dominated by Procladius and Coelotanypus. In 1993, both overall and site-specific generic richness were significantly greater than in 1982 (16 genera vs. 6 overall, $t=3.005$; $p<0.01$), and chironomid density decreased ($t=8.73$; $p<0.001$). In 1982, Procladius and Coelotanypus each displayed significantly elevated overall incidence of deformities (>6%) compared to the baseline level of 1.55% from reference areas of Lake Erie (G-statistic goodness of fit test = 67.20, $p<0.001$). Larvae collected from sites extending from the mouth of the Detroit River showed the greatest incidence of deformities. Between 1982 and 1993, overall incidence of deformities decreased significantly for both Procladius and Coelotanypus. However, incidences remained elevated (3-6%) at the mouths of the Detroit and Maumee rivers. Chironomid community and deformity data appear to reflect improving water/sediment quality in western Lake Erie.