

DIFFERENCES IN SURVIVAL FUNCTIONS OF MOSQUITOFISH (*GAMBUSIA AFFINIS*) AND SAND SHINER (*NOTROPIS LUDIBUNDUS*) GENOTYPES EXPOSED TO PESTICIDES

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Abstract—Differential genotypic tolerance of two species of fish native to the Great Plains of North America (the western mosquitofish [*Gambusia affinis*] and the sand shiner [*Notropis ludibundus*]) was examined in 96-h acute exposures to the pesticides lindane and parathion. Although a significant amount of data is available indicating that heavy metals cause selective genotypic mortality in aquatic organisms, very few studies have focused on the effects of pesticides on population genetic structure. Fish used in this experiment were captured from field populations in Kansas, USA, and acclimated to laboratory conditions for 1 month before the acute toxicity tests. Two hundred individuals of each species were exposed, in two separate experiments, to estimated LC70 concentrations of each pesticide for 96 h. Dead individuals were removed at 3-h intervals allowing for comparison of genotypic times-to-death. Individuals of each species were electrophoretically examined at two polymorphic loci. Phenotypes of mosquitofish were determined for phosphoglucose mutase (*PGM*) and malic enzyme (*ME*). Phenotypes of sand shiners were determined for *PGM* and aspartate aminotransferase (*AAT*). Three of eight statistical tests (two species two loci two pesticides) indicated significant differences among survival curves of genotypic classes. Genotypes of *ME* and *PGM* of mosquitofish exhibited significantly different survivorship functions in the parathion and lindane time-to-death tests, respectively. Genotypes of *AAT* of sand shiners exhibited significantly different survivorship curves when exposed to lindane. Given certain experimental limitations, these results support a continued examination of population genetic characteristics as biomarkers of environmental contamination.

Keywords—Pesticides Genetic variation Fishes Bioindicators