Effects of Fish Size and Stream Characteristic on Piscicide Effectiveness

Peter J. Brown and Alexander V. Zale, Montana Cooperative Fishery Research Unit, U.S. Geological Survey, Montana State University, PO Box 173460, Bozeman, MT 59717
pbrown@montana.edu

The piscicides rotenone and antimycin are important tools in fisheries conservation but their application can be both inefficient and ineffective. Current information on the toxicity of these piscicides is based on a narrow size class of fish and persistence of toxicity is not known for a wide range of environmental conditions. For example, the toxicity of piscicides has been assessed in separate studies using juvenile and adult rainbow trout but has not been compared across a wide range of fish sizes. We determined the toxicity of rotenone and antimycin to a wide range of sizes rainbow trout (*Oncorhynchus mykiss*) and determined the applicability of piscicide persistence models over a wide range of environmental conditions. We tested the toxicity of rotenone (12.5 ug/L) and antimycin (7.5 ug/L) to rainbow trout from 31-345 mm total length. Rotenone killed fish faster than antimycin but no significant relationship existed between size of fish and time to death. We also developed models that measured the detoxification of piscicides caused by the interactive effects of combined stream characteristics. These models were tested against measurements of piscicide persistence in stream applications. The predictive ability of the models was good using reclassification procedures but varied when models were applied to data from stream applications. Models to predict the persistence of piscicides in streams will enhance the efficiency and effectiveness of piscicide applications.