



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003CA38B

Title: Pyrethroid Insecticides in Nursery Runoff: Transport and Impact on Aquatic Invertebrates

Project Type: Research

Focus Categories: Water Quality, Wetlands, Irrigation

Keywords: pesticide runoff, sediment runoff, urban watersheds, pesticide pollution, pyrethroids, bifenthrin, aquatic toxicity, water quality

Start Date: 7- 1-2002

End Date: 6-30-2004

Federal Funds: \$19644.00

Matching Funds: \$ 33211.00

Congressional District: 44

Principal Investigators: Gan, Jay

Abstract: Commercial nurseries rely on heavy uses of pesticides and fertilizers. These uses, when coupled with intensive overhead sprinkler and drip irrigation, often result in substantial sediment runoff at nursery sites. Recent monitoring by CDPR and CDFG of nursery sites and creeks in Orange County showed that bifenthrin, a pyrethroid insecticide used for fire ant control in plant containers, consistently appears in nursery runoffs and adjacent creeks. This is alarming because pyrethroids are known to be immobile in the environment and are considered as potential alternatives to organophosphorous insecticides (e.g., diazinon and chlorpyrifos). Preliminary study showed that sediment movement apparently drove the transport of bifenthrin in runoff paths and small streams. Bifenthrin, like all pyrethroids, is extremely toxic to fish and aquatic invertebrates, and the LC50 for *Ceriodaphnia dubia* is only 0.07 ppb. At present, however, little is known about the potential damage of bifenthrin output from nurseries to the quality and health of receiving water bodies. This project is proposed to assess the impact of sediment-associated bifenthrin on aquatic invertebrates *C. dabia* and *Daphnia magna*, and to understand the long-term fate and partitioning of bifenthrin between sediment and water in water streams. The research will consist of field experiments at a 120-acre nursery site near Irvine, CA, and laboratory experiments using samples collected from the nursery and its adjacent aquatic environments.

This research will not only provide information to fill a gap in our knowledge about the impact of nursery operations on water quality of urban watersheds, but also is timely because it addresses an emerging issue. It is further anticipated that this project will lend us evidences about the course of the problem, and the options for improving current practices to alleviate this problem.

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