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The Effects of Nufarm Glyphosate Gold® on Freshwater Invertebrate Communities



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ABSTRACT

The effects of the glyphosate herbicide Nufarm Glyphosate Gold® on freshwater invertebrates was examined in field and laboratory experiments. Although this agrochemical is used extensively over water in New Zealand to control emergent aquatic pest plants, its impact on aquatic invertebrates within these ecosystems has not been comprehensively examined. In a field experiment, six discrete groundwater-fed ponds were used. Aquatic invertebrate diversity and abundance within these ponds was monitored with sweep nets over nine months, with the application of the glyphosate herbicide occurring in the middle of this period. This study found that the natural variation within each pond community far exceeded any caused by the addition of the glyphosate herbicide. In a laboratory study, dose response experiments were used to determine the tolerance of five common freshwater invertebrate species. At recommended application rates of 9 l.ha⁻¹, Nufarm Glyphosate Gold® caused no mortalities within the experimental parameters in the species studied. However when the concentration was increased above the recommended dosage, mortalities did occur. The backswimmer *Anisops wakefieldi* and the snail *Physa acuta* were the most sensitive species. The most resilient species studied was the damselfly *Xanthocnemis zelandica*, requiring a concentration 1877 times the recommended rate to cause mortalities. From both studies it can be concluded that at recommended application rates, the glyphosate formulation Nufarm Glyphosate Gold® does not cause mortalities when used at recommended rates. Furthermore no changes in community structure could be attributed to the addition of the glyphosate formulation within the ponds in the field experiments. The continued use of this agrochemical can therefore be advocated.

PREFACE

This thesis has been written in four chapters. The second and third chapters, which describe the methods and results of the field and laboratory experiments, have been written as individual entities for separate publication. Because of this there may be times where text is repeated.

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