

Fate of thiamethoxam from treated seeds in mesocosms and response of aquatic invertebrate communities

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ABSTRACT

Thiamethoxam is a neonicotinoid insecticide widely applied in the Canadian Prairies. It has been detected in surface waters of agro-ecosystems, including wetlands, but the potential effects on non-target invertebrate communities in these wetlands have not been well characterized. In an effort to understand better the fate of thiamethoxam in wetlands and the response of invertebrates (zooplankton and emergent insects), model systems were used to mimic wetland flooding into planted fields. Outdoor mesocosms were treated with a single application of thiamethoxam-treated canola seeds at three treatment levels based on a recommended seeding rate (i.e., 6 kg/ha; 1×, 10×, and 100× seeding rate) and monitored over ten weeks. The mean half-life of thiamethoxam in the water column was 6.2 d. There was no ecologically meaningful impact on zooplankton abundances or community structure among treatments. Statistically significant differences were observed in aquatic insect abundance between control mesocosms and the two greatest thiamethoxam treatments (10× and 100× seeding rate). The observed results indicate exposure to thiamethoxam at environmentally relevant concentrations likely does not represent a significant ecological risk to abundance and community structure of wetland zooplankton and emergent insects.

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