

Occurrence and Fate of Fungicides in Water and Sediment Collected From Agriculturally Dominated Watersheds in Idaho

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The presence of new fungal disease, the persistence of older diseases and increased fungicidal resistance has led to the development and registration of new fungicides as well as an expansion of their use globally. Fungicides are moderately hydrophobic (log Kow 3-5) and are considered to be relatively persistent in water and sediments. Because fungicides are not typically included in environmental monitoring studies, little is known about their fate, transport and occurrence in aquatic environments. To better understand the environmental occurrence of fungicides, methods were developed to analyze a suite of 34 compounds in water, sediments and biota using gas chromatography/mass spectrometry. In 2009, water, bed and suspended sediments were collected from three sites in areas of active potato production in western Idaho where prophylactic fungicide applications are made throughout the growing season to prevent Late Blight and other fungal diseases. Azoxystrobin, boscalid and pyraclostrobin were the most frequently detected fungicides in water and sediment. Mixtures of fungicides were common, with more than half of the samples containing three or more fungicides. There is limited environmental data available for many of these compounds and the aquatic toxicity of the newer fungicides, especially in sediment, is still unknown. Most samples (water and sediment) contained multiple fungicides, often including two or more from the same chemical class and with similar modes of action, thus additive toxic effects should be considered. Since many of these fungicides are applied 5-10 times during the growing season and as their use continues to expand, it is important to assess their toxicity to aquatic organisms.