

# **Development and Application of a Regression Model for Estimating the Occurrence of Atrazine in Shallow Ground Water beneath Agricultural Areas of the United States**

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## **Abstract**

Results from 52 ground-water studies throughout the United States were used to examine relations between the occurrence of atrazine in shallow ground water in agricultural settings and explanatory variables that describe the natural setting, agricultural-management practices, and the type and amount of development in each area. The explanatory variables that were found to be correlated with atrazine occurrence were soil infiltration rates, presence of artificial drainage (tile drains or trenches), available water-holding capacity of soils, soil permeability, amount of study area using ground for irrigation source (as percentage of total area), amount of agricultural land (as percentage of total area), and intensity of atrazine use. Ordinary least-squares regression equations that used one or more of these explanatory variables describe as much as 58 percent of the variation in atrazine-detection frequencies. Application of a multivariate equation to unmonitored agricultural areas across the conterminous United States illustrates that atrazine use alone is insufficient for estimating the occurrence of atrazine in shallow ground water; rather, areas in which soil characteristics and agricultural-management practices favor the movement of water from land surface to the water table and that also have intensive atrazine use are the most vulnerable to atrazine contamination.