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Soil amendments reduce P release from flooded soils: Incubation studies simulating snowmelt and summer flooding

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Flooding caused by snowmelt runoff in the spring and early summer and heavy rainfall in the summer could enhance P release into nearby surface water bodies causing eutrophication. Six soil amendments were tested for their effectiveness in reducing P release from flooded-soils. Soils were collected from the flood-prone fields in the Red River Valley region in Manitoba, Canada. The tested amendments were gypsum, magnesium sulphate, alum, ferric chloride, zeolite and manganese oxides. Intact soil columns were subjected to flooding for 8 weeks at 4°C simulating the snowmelt in the spring and the early summer and at 22°C simulating flooding occurrences in the summer. Release of soil P into soil solution and floodwater was higher at 22°C than that at 4°C. Gypsum, magnesium sulphate, alum and ferric chloride were effective in reducing the concentrations of P in the pore- and flood-water at various capacities. Ongoing research on zeolite and manganese oxide suggests that manganese oxide was more effective in reducing soluble P concentrations in soils at early days of flooding.