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Frithjof Lutscher* (flutsche@uottawa.ca), Department of Mathematics and Statistics, University of Ottawa, 585 King Edward Avenue, Ottawa, Ontario K1N6N5, Canada, and **Mark A. Lewis**, Canada. *Invasion and persistence in heterogeneous stream flow environments.*

Most mathematical models for invading organisms assume symmetric spread in a homogeneous environment. While the assumption on homogeneity is clearly not met in many cases, it is often difficult to quantify and control spatial heterogeneity in experiments. In flow-environments such as rivers and streams, the spread of organisms is also influenced by the flow and therefore not symmetric.

We present a mathematical model for the spread of benthic algae in a river with variable cross-section and heterogeneous supply of nutrients. We analyze the model with respect to persistence and invasion criteria as well as the speed of invasions and the effect of competition. We focus on different mechanisms related to spatial heterogeneity that facilitate or inhibit the spread of organisms. We also report on experiments in small laboratory streams where the degree of heterogeneity in nutrient supply is controlled and the spread of (competing) algal populations is studied. (Received August 22, 2005)