Beáta Oborny and Péter Englert

Position: B.O.: Associate Professor, P.E.: BSc student
Institution: Loránd Eötvös University, Department of Plant Taxonomy, Ecology, and Theoretical Biology
Contact: E.mail: beata@ludens.elte.hu
Web: http://beata.web.elte.hu

ADAPTATION BY „FALLING APART?" – GROWTH STRATEGIES IN MODULAR ORGANISMS

Modular organization of the body is widespread in many taxa of plants and animals. We modelled the growth process - the production of modules and branching - of a modular organism in space. Growth proceeded in a heterogeneous environment, in which an essential resource, required for growth, was distributed in patches. We varied the number, size, and permanence of patches, to simulate different habitats. The model was based on stochastic cellular automata, extended with some specific features of the organisms. Two basic strategies were compared. In the Integrator, the modules remained interconnected throughout their lives, and shared the resource. In the Splitter, the modules were independent ("selfish"). We let the strategies compete for the resource, and we recorded their developing spatial patterns over time. The results show that each strategy has a characteristic parameter range (habitat type) in which it is adaptive. Coexistence of the strategies is possible in a broad parameter range, where the Integrator fills the gaps left open by the Splitter. We review some results from percolation theory to explain exclusion vs. coexistence, and consider their implications for the diversity of species in ecological communities.