

Growth and Competition in a Light Gradient

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Abstract

This talk is based on the paper Growth and Competition in a Light Gradient by Weissing and Huisman (1994).

In this paper a general model for growth and competition in a light gradient is developed. The model is based on a few qualitative assumptions. By introducing the concept of "quantum return", it is shown that growth can be quantified directly in terms of the light gradient. In monoculture, growth leads to a globally stable equilibrium, at which the light intensity at the bottom of the light gradient is reduced to a "critical light intensity" I_{out}^* . When all species are similarly distributed over the light gradient, the outcome of competition can be inferred from this monoculture characteristic: the species with lowest I_{out}^* will competitively exclude all other species. In contrast, spatial differentiation of the competitors may lead to a completely different situation: several species may co-exist, and the species with lowest I_{out}^* may be competitively displaced by species with a better position in the light gradient.