On the Models of Metapopulations with Overcolonization

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We consider ODE-meanfield as well as cellular automaton models of some two-species metapopulations (species fight for territory). The competing species can colonize not only empty patches but also overcolonize those which are occupied by the other. After a short summary of some single-species models, we investigate ODE models with overcolonization, in which no hierarchy is assumed between the competitors. We present results on the dynamics of the models. We give conditions for colonization and extinction strategies that either guarantee or exclude stability of the coexistence. We show that there can even appear unstable coexisting equilibrium.

Then, we show experimental results (using Wolfram *Mathematica*) for stochastic cellular automata models of some aggressively spreading species, in particular some parasites, and compare our models with our field data concerning some Cuscuta species. Simulations give us a lot of information on special properties such as aggregation, diffusion, properties of the boundary of patches.

References

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