

Meanfield and cellular automata models of competitions in metapopulations with overcolonization

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In our talk, we deal with the spatio-temporal development 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. We present some theoretical result for their meanfield, and experimental results (using Wolfram *Mathematica*) for stochastic cellular automata models.

After a short summary of the development of some single-species models, we investigate systems with general overcolonization, where no hierarchy is assumed between the competitors. We describe the dynamics of the model, and among the others, we show that there can appear either g.a.s or even unstable coexisting equilibrium. We also investigate, what colonization and extinction strategies can guarantee stable coexistence. Finally, we consider occupation strategies 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; and in general, the role of neighbors in the development. In some cases, simulations can help to improve the meanfield models of the phenomena.