

## Coupling individual and community models

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### ABSTRACT

Ecological systems can be modelled at different levels. We present a short review of mathematical models that are commonly used to describe the dynamics at the individual, the population and the community levels. Realistic models must take into account processes which are going on in these different levels in order to study their interactions. Such mathematical models usually involve many variables and parameters and are difficult to handle. However, the time scales associated to processes going on at each level are usually different. At the individual level, the time scale is typically the day, at the population level, the year and at the community level, the evolutionary time scale. Aggregation methods take advantage of these time scales to build a reduced model governing a few global variables at a slow time scale. We present applications of aggregation methods to prey-predator models in which we incorporate individual behaviour for predators. We also apply aggregation methods to reduce the complexity of spatial model of a host-parasitoid community.

**Key Words:** Aggregation of variables, population dynamics, individual and community levels.