

Demographic and evolutionary consequences of sex determination mechanism in host-parasitoids systems

CJS INRA ELIGIBLE *

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Laboratory

Ecologie des populations et communautés INRA USC 2031
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Subjects / Tools-Methodologies

- 1 : Genetic Allee effect and extinction risk/populations dynamics models
- 2 : mating behavior/individual based models
- 3 : Evolution of life history trait/adaptive dynamics models

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This project may be selected to be founded by a 5-year grant from INRA (Early stage scientist contract)

Summary of lab's interests

The thesis will be developed in the frame of a collaboration between two teams: "Population and Community Ecology" (USC INRA 2031, Paris, France) and "Behavioural Ecology and Population Dynamics" (UMR CNRS 5558 "Biometry and Evolutionary Biology", Lyon, France). The USC 2031 is a small unit that also constitutes a team of a larger unit, the UMR 7625 "Ecology and Evolution". Its research concern essentially ecological interactions (essentially host-parasitoid and prey-predator interactions but not exclusively) within populations and community and their consequences in terms of stability, structure and evolution. The work of the group strongly calls on a large variety of modelling approaches. The main interests of "Behavioural Ecology and Population Dynamics" group are the individual and population level consequences of animal decisions. Its work is then at the interface between behavioral ecology and population dynamics.

Summary of project

The objective of this work is to better understand the impact of bottlenecks on the population dynamics and extinction risk of haplodiploid parasitoid populations and its evolutionary consequences. Many parasitoid populations experiment a sex determination mechanism called complementary sex determination (CSD), which results in a type of severe inbreeding depression. The effect of this « genetic Allee effect » on the extinction risk of small populations is still unclear, in particular in the context of fragmented host-parasitoid systems. Three types of model will be developed: (1) deterministic host-parasitoid models including an Allee effect for parasitoids; (2) stochastic individual-based models including more details on mate-choice, dispersal and sex allocation; (3) adaptive dynamics models, to challenge the evolutionary consequences of CSD.