How demographic parameters affect the dynamics of a coyote-fox-rodents food web with intraguild predation?

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Résumé

Living species interact with each other in complex food webs, mostly *via* predation, a phenomenon that yielded many modelling research studies. Previous work has been done with one predator and multi-preys systems. Among them, one has the originality of including a multi-species functional response component of the predator so that the plasticity of the predator's feeding behaviour in the face of several prey can be taken into account (see Baudrot *et al*, 2016, *Ecology*). The present talk focuses on the extension of this latter model incorporating several predators. As a study case, a concrete application focuses on a system on a system in North America composed of coyotes and foxes as generalist opportunistic predators and two rodent species, meadow vole and deer mouse, as preys. This system is particularly relevant to study because it includes a well-known multi-predator effects that is intraguild predation (a prey and a predator share a same prey). Here, coyotes eat foxes, while both also share rodent species as preys. The proposed model is described by ordinary differential equations and multi-prey functional responses of Beddington-DeAngelis shape. We expect different dynamics depending on the ecological context, especially in urban areas where food resources for predators alternative to rodents are more abundant compared to rural areas. We thus explore how some demographic parameters (such as carrying capacity) or some human control on predator or prey species could have a top-down or bottom-up impact on the dynamics of the system.

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