INTRAGUILD PREDATION AND CONSERVATION OF ENDANGERED SEABIRDS. MODELLING, THEORY AND NONSTANDARD APPROXIMATIONS.

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Seabirds breeding on islands are vulnerable to introduced predators, such as rats and cats, and the removal of such predators is generally viewed as a priority for seabird conservation and restoration. However, multiple invasive mammal species interacting may generate unexpected outcomes following the removal (eradication) of one species. Generally these indirect interactions are not well understood or demonstrated.

We propose and study a prey (seabird)-mesopredator (rat)-superpredator (cat) model, taking into account the juvenile stages in the prey population, in order to direct conservation management for seabird conservation [4,5]. We give a more biologically realistic differential system than those studied before [2,3], in particular for long-lived seabird species.

We present a theoretical study and show existence and uniqueness of a positive solution as well as a qualitative study of the equilibria that may appear [5]. Because standard numerical methods, usually implemented in scientific softwares, like Scilab or Matlab, can fail to give the right biological approximations [1,5], we propose a reliable algorithm that preserves most of the qualitative properties of the continuous system, using the theory of nonstandard finite difference methods. We illustrate our approach with Barau's Petrel, an endemic seabird from Réunion Island.

References
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