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Abstract:
Models of near-exclusive predator-prey systems such as that of the Canadian lynx and snowshoe hare have included factors such as a second prey species, a Holling Type II predator response and climatic or seasonal effects to reproduce sub-sets of six signature patterns in the empirical data.

We present an agent-based model which does not require the factors or constraints of previous models to reproduce all six patterns in persistent populations. Our parsimonious model represents a generalised predator and prey species with a small prey refuge. The lack of the constraints of previous models, considered to be important for those models, casts doubt on the current hypothesised mechanisms of exclusive predator-prey systems. The implication for management of the lynx, a protected species, is that maintenance of an heterogeneous environment offering natural refuge areas for the hare is the most important factor for the conservation of this species.

Keywords: individual-based model; lynx–hare system; Mustela-Clethrionomys system; pattern-oriented, predator-prey, refuge, modelling; Prey-switching; lynx; rabbit; hare