



On the dynamics of predation risk perception for a vigilant forager

Submitted by Olivier Pays-Volard on Thu, 04/06/2017 - 21:05

Titre On the dynamics of predation risk perception for a vigilant forager

Type de publication Article de revue

Auteur Sirot, Etienne [1], Pays, Olivier [2]

Editeur Elsevier

Type Article scientifique dans une revue à comité de lecture

Année 2011

Langue Anglais

Date 2011

Numéro 1

Pagination 1-7

Volume 276

Titre de la revue Journal of Theoretical Biology

ISSN 0022-5193

Mots-clés Anti-predatory behaviour [3], Information [4], Predation [5], Risk [6], vigilance [7]

Résumé en anglais

Foraging animals often raise their head to scan for predators. Scanning intervals have variable durations, and occur more or less frequently, depending on ecological conditions. Our study relies on the assumption that temporal patterns of vigilance depend on the speed with which information concerning the likelihood of a predator's presence in the neighbourhood is gathered when an animal is vigilant, and lost when it is not. Using an analytical model, we study how the perceived level of risk progressively decreases, when the individual is vigilant and detects no predator, then increases again, when it lowers its head to feed, thereby losing most of its detection abilities. The speed of these variations is affected by the likelihood of the presence of a predator in the whole environment, by the mobility of this predator, and by the detection capacities of the prey. We show how, combined with the range of risk level tolerated by this animal, this dynamics determines the frequency and the duration of its scanning intervals. The dynamics of risk perception can also explain particular behavioural patterns, such as the progressive decrease of vigilance that may occur after the arrival into a novel environment, and the central tendency in the distribution of interscan durations reported by many studies. Next, we use the model to compute optimal vigilance strategies, taking into account the trade-off between feeding and limiting exposure to predators. The model predicts that a forager will scan more often, and for longer periods, when the likelihood of a predator's presence in the surrounding environment is increased. A similar response is expected when the mobility of the predator is increased. By contrast, when the detection capacities of the prey are reduced, it will increase its vigilance by scanning for longer periods, but scanning intervals will be separated by longer interscans.

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DOI 10.1016/j.jtbi.2011.01.045 [9]

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Titre abrégé J. theor. biol.

Liens

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- [2] <http://okina.univ-angers.fr/olivier.pays/publications>
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