Spatial behavior of female red deer in response to hunting

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Abstract

Spatial behavior in response to predation is the result of a trade-off between the perception of the risk and the benefits to be gained from engaging in another activity. Hunting, including drive hunts, can be considered as a predation process. Although drive hunts are spatially well defined, the scale at which the hunting risk is perceived by preys remains poorly documented. It is unclear whether hunting disturbance occur beyond the hunted areas and how it may trigger anti-predator behaviors. The present study aims at (1) investigating the effects of drive hunt on the spatial behaviour of red deer and (2) understanding the main determinants affecting the intensity of the spatial response at the individual level. We hypothesize that (H1) the distance to hunters affects the intensity of spatial anti-predator responses and (H2) topographic obstacles and vegetation cover modify the risk perception by animals.
We used GPS and activity data from 91 female red deer collected in the National Hunting and Wildlife Reserve of La Petite Pierre (Bas-Rhin, France), between 2004 and 2017. Each year, drive hunts were conducted by about 40 hunters and 5 dogs, once a week from October to February.

Female red deer increased their activities and their speed, and enlarged their home-range size in response to hunting. The intensity of the spatial response appeared linked to the distance to hunters, while topographic obstacles and vegetation cover had no significant effect. Animals almost doubled their home-range size for short distances to hunters while no change in home-range size was found in low-risk situations (distance $>$ 500 m).
This study brings new insights into our understanding of non-lethal effects of human predation on animal spatial behaviour. It allows to rethink hunting practices at the right spatial scale, in the new 'hunting for fear' context for ungulates management.

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