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TOO HOT TO HANDLE?

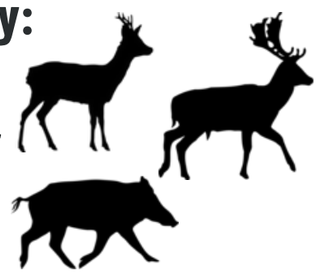
Spatiotemporal responses of ungulates to environmental stressors

INTRODUCTION

Increasing temperatures are expected to affect the ecology and behaviour of wild animals through direct and/or indirect effects. Further environmental stressors include anthropogenic disturbance and predator presence. However, studies aiming at disentangling the effects of temperatures, human and predator activities on prey behaviour are scarce.

Species in study:

- Roe deer
- Fallow deer
- Wild boar



Environmental stressors:

- Increasing temperatures
- Predator presence
- Human disturbance

Aims:

- Assess the direct effect of temperature on the species' temporal activity patterns
- Analyse possible changes in their activity patterns due to the relative effect of the environmental stressors
- Evaluate if one stressor has more impact than the others

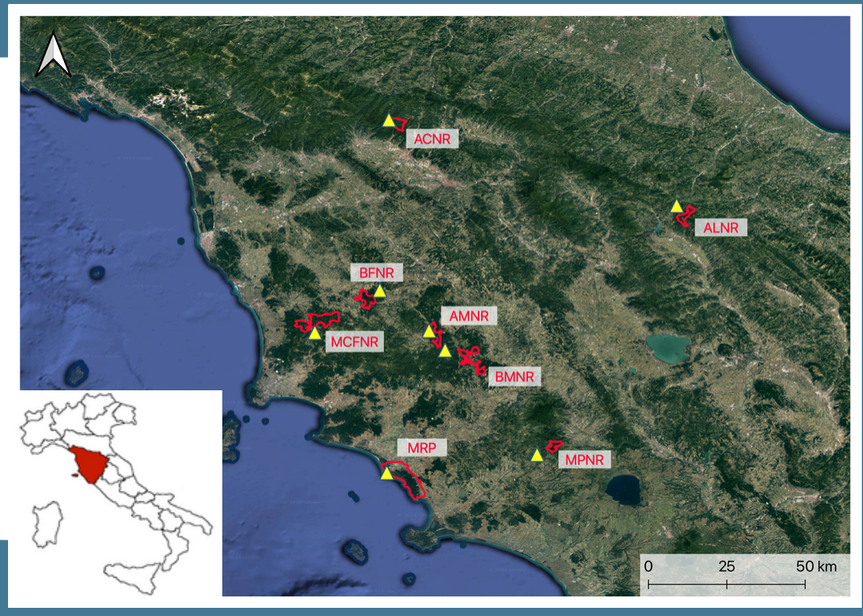
Find out more!

METHODS

When? June, July, and August of 2021, 2022, 2023

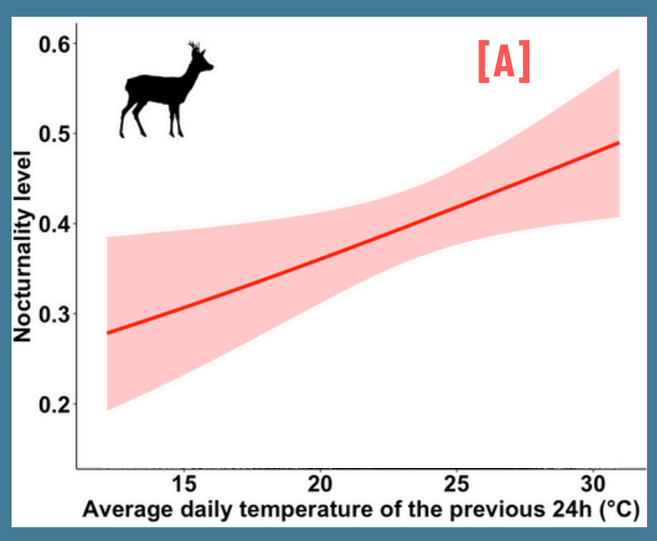
Where? Tuscany, Italy (8 protected areas)

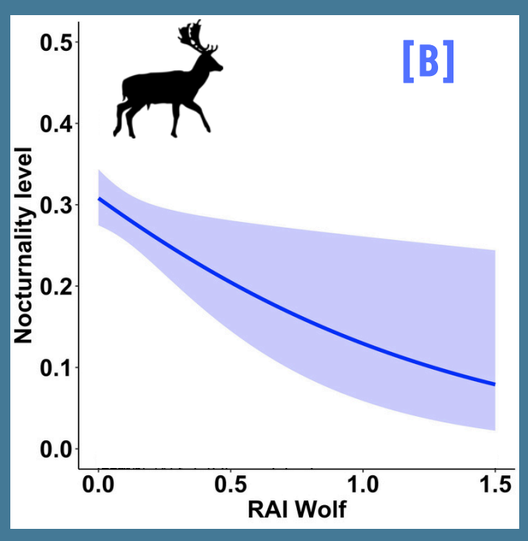
How? Using camera traps (181 locations), temperature data (8 weather stations), and Generalised Linear Mixed Models

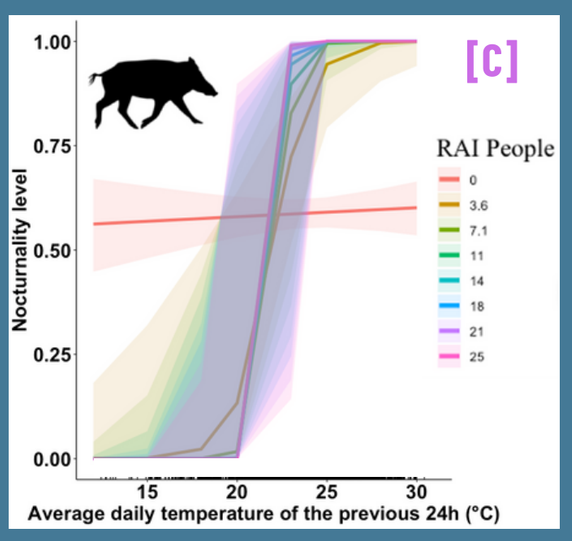


RESULTS

- **All species** reduced their diel activity with increasing temperatures
- **Roe deer** [A] and **wild boar** increased their nocturnality with warmer temperatures
- **Fallow deer** reduced nocturnality with the increase of wolves detected (RAI Wolf) [B]
- **Wild boar** had a stronger increment of nocturnality with the increase of humans detected (RAI People) [C]







DISCUSSION

- Cooler night temperatures may reduce costs of thermoregulation, favouring nocturnality
- Reduction of diel activity might be partially retrieved during night hours
- Support to diurnal activity as anti-predator response in fallow deer, as assessed in Esattore et al. (2023)
- Wild boar were more influenced by human activity than current hot temperatures
- Wild boar nocturnality increased with higher altitudes. This might be related to '*elevation-dependent warming*': at higher elevations the effects of temperature might be perceived stronger by wild boar
- Roe deer reduced nocturnality and fallow deer reduced diel activity with the increase of shrub cover. This might suggest that different habitats characteristics change the perception of safety and danger