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Are you avoiding me? Effects of wild ungulates on mesocarnivores' activity patterns [Student talk]

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Wild ungulates have been increasing in the past few decades, particularly in Europe. Land abandonment, among other factors, has fostered the natural expansion of roe deer, red deer and wild boar. They are considered ecosystem engineers since they can modify habitat features such as vegetation structure and soil composition, with potential consequences for the whole ecosystem. Such alterations may induce changes in the spatial and temporal patterns of other wildlife species occurrence.

While some studies have demonstrated the negative impacts of wild ungulates on small mammals, few have focused on their effects on mesocarnivores. To fill this gap, this study aims to 1) understand the effects of wild ungulates' presence on mesocarnivores activity patterns and 2) how environmental factors (anthropogenic disturbance, habitat diversity and composition) shape the temporal overlap between each species pairwise at a large scale.

This study was conducted in continental Portugal and we used the most common mesocarnivore species as models: red fox, stone marten, and European badger. We used a total of 578 cameras between 2020 and 2024, in 24 different study areas, across the whole country. We calculated the coefficient of overlap between each species pairwise per area and used a GLM approach to model the effect of each environmental factor on temporal overlap.

Our results show a mismatch in activity patterns between wild ungulates and mesocarnivores, especially when anthropogenic disturbance is high, while habitat diversity tends to increase the temporal overlap in species occurrence. Human disturbance causes both mesocarnivores and wild ungulates to change their activity patterns to avoid human contact, with different activity peaks. Areas with higher habitat diversity showed greater temporal co-occurrence, probably due to uneven distribution of resources. By promoting habitat heterogeneity, we can promote the coexistence of wild ungulates and mesocarnivores in the context of natural expansion and rewilding initiatives.