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# Influence of grazing intensity on dung beetle species assemblages in two distinct bioclimatic contexts

William Perrin\*<sup>1</sup>

<sup>1</sup>Université Paul-Valéry Montpellier 3 (UPVM3) – Centre d'Ecologie Fonctionnelle et Evolutive – route de Mende, 34090 Montpellier, France

## Abstract

In European grasslands, livestock is the main source of grazing and one of the largest land use sectors in rural economies. Livestock management and the intensity of grazing are likely to deeply modify the ecosystems. While intensive farming is increasing within some regions, more traditional practices are declining within others. Both may give rise to negative effects on biodiversity. A common approach to study the effects of grazing intensity is to compare pastures along gradients characterized by different stocking rates, such as intensive versus extensive grazing, or abandoned, lowly and moderately grazed pastures. But in a given rangeland, the behavior of domestic mammals and the spatio-temporal variability of their activities may result in a non-homogeneous distribution of defoliation, trampling and organic inputs. This heterogeneity of intra-pasture grazing is rarely considered and entirely depends on the type of livestock management. Our aim is to investigate the spatial heterogeneity of grazing on the structure of dung beetle species assemblages. Despite their dependency to herbivorous mammals, which provide suitable dung pats for feed and reproduce, there is little information about the effects of grazing on dung beetles. We sampled rangelands within two contrasted areas in terms of bioclimatic conditions, supporting distinct dung beetle species pools: the Crau steppe near the Mediterranean Sea, and the Vanoise mountains in northern French Alps. We hypothesized that grazing pressure may shape the structure of local species assemblages through several processes: dung quantity (abundance of resource), herbaceous cover and soil trampling (habitat). Grazing pressure may act as a filter would select dung beetles depending on their functional traits. First, we compared the observed patterns between the two study areas. We then disentangle the relative effects of grazing, the environmental conditions and the spatial structure, in order to highlight the relative importance of these processes structuring species assemblages.

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\*Speaker