

The impact of grazing by Przewalski horses on orthoptera populations of the Causse Méjean (Le Villaret, France)



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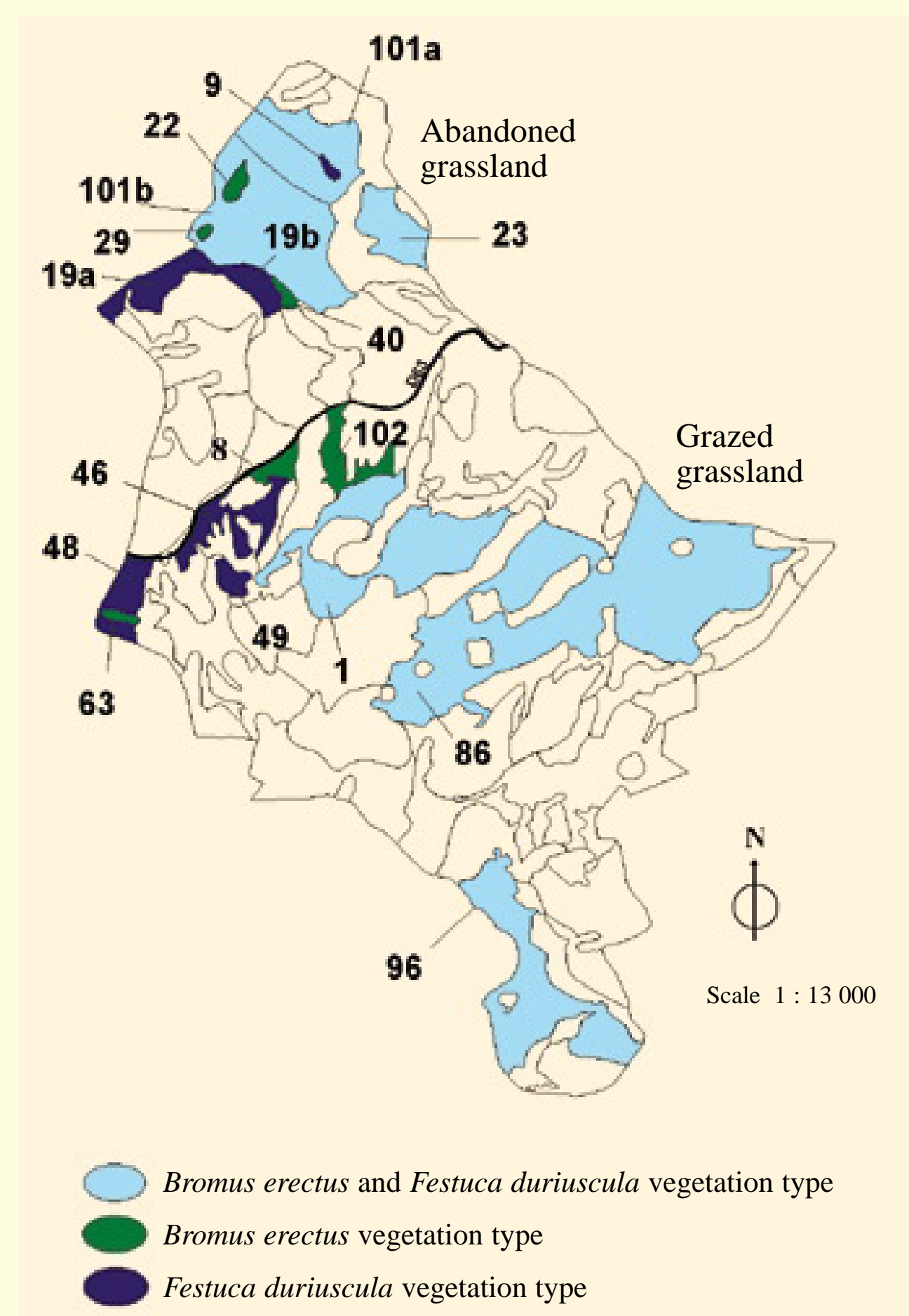
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INTRODUCTION

The aim of ecosystem management can be either to create new ecosystems or restore and rehabilitate degraded ecosystems (Aronson et al. 1993). By increasing habitat heterogeneity, species diversity should increase simultaneously (Cairns 1988). In many natural reserves, wild or domestic large herbivores are used to achieve these objectives through restructuration of the vegetation.

Here we investigate how grazing by Przewalski horses, through vegetation changes, affects the orthoptera community. We compared the vegetation structure and orthoptera community of an abandoned and of a grazed chalk grassland in Le Villaret (France).



RESULTS

- We captured 528 orthoptera and identified 21 species. Five species (endemic or specific of open habitats) were observed only in the grazed grassland and 2 (1 endemic) only in the abandoned one.
- Principal Component Analysis and Correspondence Analysis shows a gradient of vegetation cover openness for both matrices (vegetation plots and orthoptera species).
- Grazing explains 9.7% of the variance between vegetation quadrats and 22.1% of the variance between orthoptera cages (Between Class Analysis, both $p < 0.001$). As a result of long term grazing, the high vegetation layers and the orthoptera densities have decreased in the grazed grassland (Anova/t test ; $p < 0.05$ and $p = 0.002$; Fig. 4).
- The short term grazing pressure (summer 98) was negatively correlated to the 0-5 cm vegetation layer density ($r^2 = 0.518$, $p = 0.028$; Fig. 5). The orthoptera density is negatively correlated to the density of this layer ($r^2 = 0.452$, $p = 0.04$). No correlation was found between grazing pressure and orthoptera density.
- We didn't observe any significant long term or short term grazing effect on the richness and diversity of orthoptera.

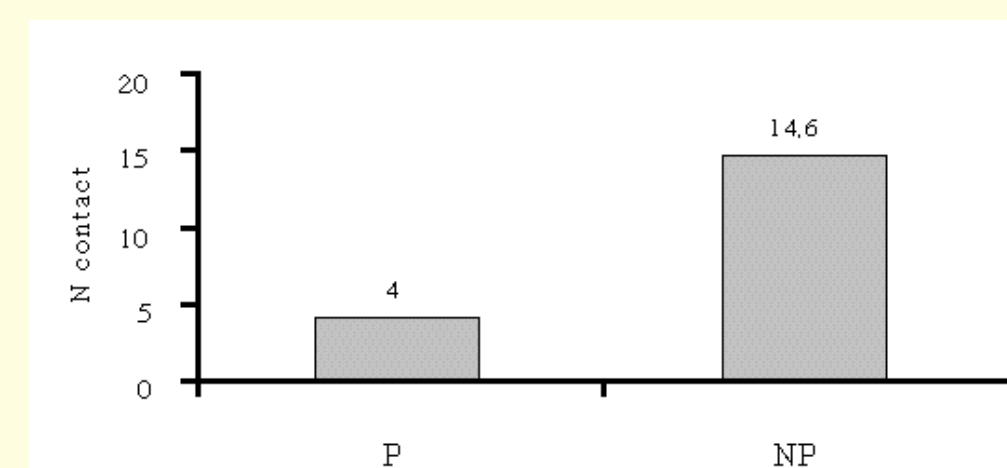


Fig. 4 : Long term grazing effect on the density of the 20-40 cm vegetation layer

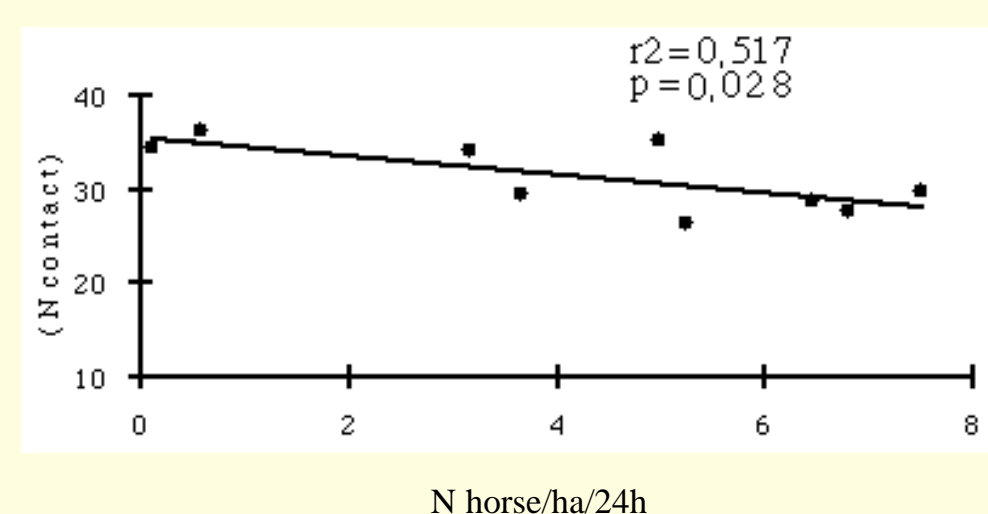


Fig. 5 : Correlation between grazing pressure and density of the 20-40 cm vegetation layer



MATERIALS AND METHODS

- Both grasslands are located on the Causse Méjean, at Le Villaret village (alt. 1007m). The grazed part of 200 ha contained 30 horses (18 adults, 7 foals and 5 yearlings) and the abandoned part of 87 ha had been grazed by sheep seven years prior to the data collection.
- For comparison, we choose the 3 vegetation types preferentially grazed by the horses (Fig. 1 ; Saïdi 1998). We picked out 3 plots in each vegetation type and sampled 10 m² in each plot (3 plots x 3 vegetation types x 2 grazing treatments = 18 sampled plots).
- A cage of 1 m² allowed us to capture the orthoptera (Fig. 2) and point quadrats were used to measure the vegetation structure on the same m² (Fig. 3). The soil surface proportion of luminosity was estimated using a P.A.R. (Photosynthetically Active radiation).



CONCLUSION

- Grazing by Przewalski horses creates a heterogeneous habitat in which some plots looked similar to the abandoned ones with regard to orthoptera and vegetation. This results from the horses grazing selectively. Pasture quality, topography and social structure are known to influence grazing patterns of horses (Duncan 1992).
- Extensive grazing and the maintenance of a mosaic of habitats creates optimal conditions for orthoptera diversity and density.

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