

# Are we talking about the same thing? Stakeholder perspectives on grassland management intensity

Tonn B.<sup>1,2</sup>, Ten Berge H.<sup>3</sup>, Bufer C.<sup>3</sup>, Buchmann N.<sup>4</sup>, Eggers S.<sup>5</sup>, Fernández Rebollo P.<sup>6</sup>, Klaus V.H.<sup>4</sup>, Lellei-Kovács E.<sup>7</sup>, Lombardi G.<sup>8</sup>, Ravetto Enri S.<sup>8</sup>, Stypinski P.<sup>9</sup> and Newell Price J.P.<sup>10</sup>

<sup>1</sup>University of Göttingen, Department of Crop Sciences, Germany; <sup>2</sup>FiBL Switzerland, Department of Livestock Sciences, Switzerland; <sup>3</sup>Wageningen Plant Research, Agrosystems Research, the Netherlands; <sup>4</sup>ETH Zürich, Department of Environmental Systems Science, Switzerland; <sup>5</sup>Swedish University of Agricultural Sciences, Department of Ecology, Sweden; <sup>6</sup>University of Córdoba, Department of Forestry, Spain; <sup>7</sup>Centre for Ecological Research, Institute of Ecology and Botany, Hungary; <sup>8</sup>University of Turin, Department of Agricultural Forest and Food Sciences, Italy; <sup>9</sup>Warsaw University of Life Science, Faculty of Agriculture and Biology, Poland; <sup>10</sup>ADAS Gleadthorpe, United Kingdom

## Abstract

Grassland management crucially influences the delivery of ecosystem services from permanent grasslands. Variability in management practices is often described along a gradient from ‘low intensity’ to ‘high intensity’. These terms are likely to carry different meanings across European regions that differ in environmental and socio-economic conditions as well as between different groups of stakeholders. We conducted an online survey among grassland stakeholders asking them to characterise what they consider as ‘low’, ‘intermediate’ and ‘high’-intensity management in terms of cutting frequency, grazing intensity, and nitrogen fertilization. The answers of the 125 respondents revealed high variability in the thresholds between management intensity levels. Professional background (‘agriculture’ vs ‘ecology/conservation’) explained only a small percentage of the variability. The biogeographical region on which the respondents’ expertise was based also influenced the evaluation of management practices. Our survey exposed the hidden problem of communicating about grassland management across regions and professional backgrounds, and identifies a need for a common terminology when making general recommendations for sustainable grassland management.

**Keywords:** biogeographical regions, management intensity, permanent grassland

## Introduction

European permanent grasslands differ greatly in their contribution to agricultural production, biodiversity conservation and other ecosystem services. This variability is strongly related to differences in management, often described as a gradient from ‘low intensity’ to ‘high intensity’. While these terms are widely used as a shorthand when communicating about permanent grasslands, they are likely to carry different meanings across biogeographical regions differing in environmental or socio-economic conditions as well as between different groups of stakeholders. To quantify the agreement or disagreement in interpreting management intensity levels, we surveyed stakeholders, asking them to characterize their understanding of ‘low’, ‘intermediate’ and ‘high’ management intensity of European permanent grasslands. We expected answers to show high variability and to be influenced by the professional and geographic background of the stakeholders.

## Materials and methods

We conducted an online survey from June – December 2019, recruiting respondents through the professional networks of partners within the European Union (EU) H2020 project ‘SUPER-G’. Respondents characterized what they considered typical of ‘low’, ‘intermediate’ and ‘high’ management intensity of permanent grasslands by providing lower and upper thresholds for three management practices: (1) cutting frequency in grassland that is exclusively mown, not grazed (numbers of cuts

per year); (2) grazing intensity in grassland that is exclusively grazed, not mown (livestock-unit (LU) grazing days per hectare and year, one LU corresponding to 500 kg live weight); and (3) rate of total nitrogen (N) fertilizer application, including mineral or organic fertilizers and animal excreta during grazing. As ranges were allowed to overlap, we calculated two threshold values for each respondent and management practice as the means of the given ranges: one between low and intermediate and one between intermediate and high management intensity.

Respondents were also asked to specify the country or countries on which their expertise in grassland management was based and whether their professional background was in ‘agriculture’, ‘ecology/conservation’ or in both. For each management practice and threshold, we used a linear regression model to test the effect of professional background, parameterised as a factor with three levels. Furthermore, we assigned respondents’ countries of expertise to one or more of six biogeographical regions and calculated means and standard deviations for the six management intensity thresholds separately for each region represented.

## Results and discussion

A total of 125 respondents from 26 countries answered the survey, with the numbers of answers differing among cutting frequency ( $n=123$ ), grazing intensity ( $n=84$ ) and nitrogen fertilization ( $n=82$ ). Of the respondents, 67 specified their background as ‘agriculture’, 36 as ‘ecology/conservation’ and 16 as both. The mean thresholds between ‘low’ and ‘intermediate’ management intensities were 1.9 annual cuts, 238 LU grazing days  $ha^{-1} y^{-1}$  and 63 kg N  $ha^{-1}$  total N fertilization. The corresponding mean thresholds between ‘intermediate’ and ‘high’ management intensities were 3.2 cuts, 467 LU grazing days  $ha^{-1} y^{-1}$  and 149 kg  $ha^{-1}$  total N fertilization. In all cases, individual answers varied widely around these means (Figure 1).

A professional background in ‘agriculture’ vs ‘ecology/conservation’ significantly influenced both thresholds for cutting frequency and the low/intermediate threshold for N fertilization, with a background in ‘ecology/conservation’ being associated with slightly lower thresholds than one in ‘agriculture’ (Figure 1). This background, however, explained no more than 13.4% of the variance observed. Geographical background also appeared to influence responses (Figure 2). Mean thresholds were generally lowest for respondents from the Mediterranean, Pannonian, and Boreal biogeographical regions, where summer drought or long winters restrict vegetation season length and productivity. Standardizing management intensity categories by growing conditions might address this source of variability but holds its own methodological challenges.

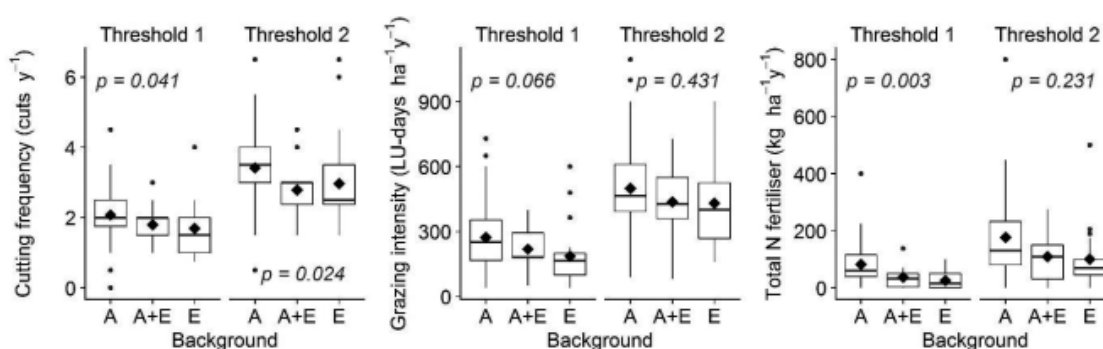


Figure 1. Thresholds between low and intermediate (threshold 1) and between intermediate and high (threshold 2) management intensity of permanent grassland, depending on respondents’ background (A: ‘agriculture’ and/or E: ‘ecology/conservation’).

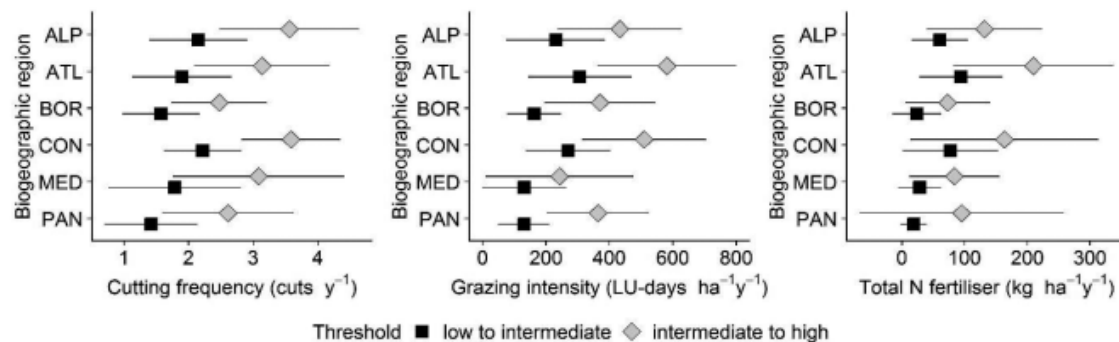


Figure 2. Thresholds between low and intermediate as well as between intermediate and high management intensity of permanent grassland, depending on the biogeographical regions of the respondents. Means  $\pm$  standard deviation. ALP: Alpine, ATL: Atlantic, BOR: Boreal, CON: Continental, MED: Mediterranean, PAN: Pannonian.

Few alternatives for characterizing agriculturally managed grasslands across Europe exist, besides attempts to calculate continuous gradients in land-use intensity (Blüthgen *et al.*, 2012). Terms such as ‘semi-natural’ or ‘unimproved’ versus ‘improved’ grasslands have sometimes been defined more stringently (e.g. Peeters *et al.*, 2014), but still suffer from similar ambiguities in meaning and thresholds. The EU EUNIS habitat classification (EEA, 2021), which is based on phytosociological classification, distinguishes only two subclasses (‘dry or moist’ and ‘wet’ within the class of ‘Agriculturally improved grasslands’ (Code V31), which represents most agriculturally managed permanent grasslands in Europe.

## Conclusions

Our survey revealed that the terms ‘low-intensity’ and ‘high-intensity’ grassland management carried widely differing meanings among European stakeholders, making them insufficient for communicating across regions and stakeholder groups. It is thus important to acknowledge this difficulty when communicating about European permanent grasslands. Concerted actions to refine existing terminologies could facilitate knowledge transfer about permanent grassland among European stakeholders.

## Acknowledgements

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