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Meeting the future demands for grassland production

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Theme 5.
Knowledge exchange

Invited

Submitted

Posters

Preferences for grassland-management innovations in dehesa farms from Andalusia (Spain)

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Abstract

Permanent grasslands (PG) are of key importance for the provision of ecosystem services (ES). Suitable management is essential to guarantee their persistence and functionality. Currently, there is a growing interest in innovations and new technologies aimed to facilitate and to improve the management of PG while increasing their provision of ES. It is important to know which innovations are preferred by PG managers and farmers so they can be prioritized by researchers and policymakers. In this study, we produced a list of the main innovations and technologies that can be applied to the management of PG of dehesa farms concerning in Andalusia. Through surveys, we gathered information on the importance that farmers give to these innovations according to their preferences and needs. The willingness to implement innovations on dehesa farms correlated positively with the education level and negatively with high age levels of the farmers.

Keywords: innovations, farmers, permanent grasslands, pastures, dehesa

Introduction

The dehesa is a savanna-like ecosystem composed of scattered oak trees and pastures. This ecosystem covers 3 million hectares in the Iberian Peninsula, and it is considered as one to be a highly biodiverse and multifunctional system (Bugalho *et al.*, 2011).

The development of new technologies and species over the last decades has made available different tools and innovations that could be applied to grassland management on dehesa farms. These innovations could be essential to guarantee the provision of ecosystem services while making their management more efficient and effective (Berckmans, 2017; Maroto-Molina *et al.*, 2019). Remote sensing and GPS-collars technology have been proposed as some of these innovations for grassland and grazing management (Gómez-Giráldez *et al.*, 2019; Moreno *et al.*, 2015). Other tools that focus on grass production and quality control are also been applied. However, little is known about the preferences and needs of grassland managers about these innovations. This is essential as it could help to focus research on the real needs of grassland managers in order to answer the real demand for innovations. A better understanding of these preferences might also explain which profile of managers are willing to apply certain innovations.

The objectives of this study were: (1) to compile a list of the main innovations and technologies that can be applied to the management of PG of dehesa farms, (2) to evaluate the preferred innovations by farmers and grassland managers, and (3) to investigate the correlation between some attributes of farmers and the preferred innovations.

Materials and methods

A list of innovations was gathered through a literature review. This list was evaluated and completed by a panel of four experts on grassland management and ecosystem services. An innovation was considered

to be any tool, change, improvement or technology that could be applied to permanent grasslands of dehesa farms.

Once the innovation list was completed, a survey was carried out in two focus groups with farmers. Each innovation was rated according the following range of relevance: 1 = very low, 2 = low, 3 = medium, 4 = high, 5 = very high. A total of 36 surveys were answered. The survey also gathered information about the farmers (e.g. education level; from 1 = primary education to 5 = university studies) and farms attributes (e.g. farm size, farming system). Correlations between innovations and farmers/farms attributes were explored by Chi-Square test and Pearson correlation coefficients.

Results and discussion

The average farm size was 247 ha with a large range of sizes from 2 ha to 1,400 ha. The age distribution of the farmers in classes of <25, 26-35, 36-45, 46-55, 56-65 was 14, 26, 14, 26 and 20% respectively. The main enterprise of the farms was sheep breeding for meat (55%) followed by mixed systems of sheep with pigs or dairy/beef cattle (24%), the rest (21%) were farms specialised in either dairy or beef cattle.

Those innovations aimed to increase pasture performance and drought tolerance were rated with high scores (I1, I2, I3, I4 and I12, Table 1). These results denote the importance that farmers give to grasslands as the main source of feed for livestock. Farmers might consider grassland improvement as crucial to maintain their livelihood in the future. That need aligns with the predictions that climate change threatens quality and ecosystems services of Mediterranean pastures (Bernués *et al.*, 2011). New technologies such as virtual fences or GPS collars that are useful for grazing management (I6 and I7) were poorly rated. This might be caused either by a lack of knowledge about these technologies or because the farmers do not find them useful. Other factors could be the cost and the need for technical assistance to use them. Research efforts should be directed to make these technologies useful and applicable to special systems such as extensive farming.

Correlation coefficients showed that innovations I2 (0.305), I3 (0.316), I4 (0.389), I5 (0.313), I7 (0.310) and I10 (0.322), had a positive significant correlation (P<0.05) with higher education level of farmers.

Table 1. List of innovations and scores assigned by the farmers (n=36).[1]

	Innovations	Average score	Standard Dev.
I1	Sowing with new mixes of seeds	4.36	0.83
I2	Searching for drought-tolerant grassland species	4.58	0.84
I3	Increasing the knowledge about the quality of grassland species in the Dehesa and their evolution during the year	4.25	0.91
I4	Grassland fertilisation: products and fertilisation guidelines	4.06	1.12
I5	Monitoring and guidance for soil health assessment	3.94	1.14
I6	GPS collars	3.18	1.51
I7	Virtual fences	3.06	1.54
I8	Remote sensing of grasslands as monitoring tool	3.37	1.24
I9	Analysis of manure and slurry	3.82	1.17
I10	Software for short-term estimation of grass growth based on current pasture status and weather conditions	3.66	1.14
I11	Software for GHG emissions estimations on the farm, with existing farm management, and recommendations on how to reduce them	3.15	1.35
I12	Extension and dissemination of research results on permanent pasture and its management through specialized websites, workshops and courses	4.34	0.87

[1] Range of relevance: 1 = very low, 2 = low, 3 = medium, 4 = high, 5 = very high.

A new generation of farmers could be willing to improve the management of grassland, demanding the implementation of some of the proposed innovations. Dissemination of research results and specialized courses could be essential to spread the use of some innovations, since higher education leads to a greater willingness to implement them. This aligns with I12 being highly rated, as it might indicate a demand for closer research-farmer trade-offs on permanent-grassland management.

Conclusions

The farmers rated positively the pasture performance-related innovations, highlighting the need for productive and drought-tolerant pastures. Low relevance was given to new technologies, and this might be related to the complexity of adapting these technologies to dehesa farms. Younger farmers and higher education level correlated with a positive willingness to implement innovations on dehesa farms.

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