Forage yield and protein content of five native species from Lanzarote (Canary Islands)

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Introduction

The aridity and drought periods in Lanzarote Island (Canary Islands, Spain) cause the development of an active desertification process affecting 31% of its surface. The use of native species for the revegetation of the soil minimizes this effect and offers a possible solution. In addition, these plants can be a source of cattle feed during periods of forage scarcity. The Canary Islands is the region of Spain with the lowest cattle feed production.

Objective: To study the production and protein levels of five native forage valuable species from Lanzarote’s Biosphere Reserve (Atriplex halimus, Bituminaria bituminosa var. albomarginata, Corinna villosa, Echium decussii and Lotus lanceolatus) in an experimental plot.

Materials and methods

Seeds from wild populations in Lanzarote Island (Figure 1) were collected in July 2008 and germinated in forest containers (February 2009). In July 2009, they were planted in an experimental plot which showed a traditional mulching system (Picture 1).

A random block design with four replications per species was established employing sub-plots of 1.5x1.5 m. Plants were irrigated with a dose of 1.35 mm (approx. 1 plant) during the first year and 0.68 mm (approx. 0.5 plant) in the second year. Three cuttings were made in total: January 2010 (Winter/2010), June 2010 (Spring/2010), and January 2011 (Winter/2011). The production of edible dry matter (EDM) was determined. Dried and crushed samples were analysed for crude protein (CP) using the Kjeldahl distillation method. Data were statistically analysed using analysis of variance (ANOVA) and least significant difference (LSD) test was used for means comparison (SPSS statistics 17).

Results and discussion

The highest edible dry matter production (EDM) was obtained in B. bituminosa (2.11±0.42 Mg ha⁻¹ and cutting) and the lowest in C. villosa (0.77±0.19 Mg ha⁻¹ and cutting) (Figure 2).

Concluding, seasonal cuttings, the highest EDM production was obtained in Spring/2010 followed by Winter/2010 and Winter/2011. Significant differences among all seasons can be observed (P<0.05). Atriplex halimus showed the highest CP levels (166±48.8 g kg⁻¹), with the lowest appearing in E. decussii (111±86.9 g kg⁻¹), showing this latter species significant differences with all the others. The three leguminous species (B. bituminosa, C. villosa and L. lanceolatus) presented intermediate levels and no significant differences among them (Figure 3).

The highest CP concentration was obtained in Winter/2010 followed by Winter/2011 and the lowest mean values in Spring/2010. Nitrogen content is higher when the growing conditions (temperature, light and water availability) are more favourable. This explains why in winter, with the highest vegetative regrowth rates in the island, the highest CP contents are reached.

Conclusions

The studied species showed high protein content and therefore could be of interest as forage crops in arid zones with low amounts of irrigation and without the need of fertilization.

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