

Seasonal variation of crude protein content of different herbaceous, shrub and tree species

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Introduction Silvopastoralism is a sustainable way of land management that reduces fire risk due to the reduction of fuel under trees when plants are used as animal food. This is particularly important in areas like Galicia that have 16% of the fired area of Europe. Silvopastoral systems can contribute to environment conservation and provide feed for autochthonous breeds more adapted to mountain conditions, enhancing biodiversity conservation. In formation on seasonal changes in crude protein content of spontaneous species will indicate better management of pasture resources in mountain areas.

Materials and methods The experiment was conducted in A Fonsagrada (Galicia, NW Spain) at an altitude of 800m above sea level. Mean temperature during winter and spring was below 7°C and mean annual precipitation was around 1700mm. The chosen species grew spontaneously in acid soils (water pH of 5.01) with low nutrient availability and high percentage of saturated aluminium. Samples from each area were taken monthly using hand scissors and cutting young buds (including leaves and twigs) with diameter less than 0.5mm, sampling shrubs and trees up to a height of 1m, because this is the height that can be reached by animals. The analysed species were herbaceous: (*Agrostis duriaei* Boiss et Reuter ex Willk, *Agrostis stolonifera* L., *Holcus lanatus* L., *Lolium multiflorum* Lam, *Mentha suaveolens* Ehrh, *Plantago lanceolata* L., *Pteridium aquilinum* (L) Kuhn , *Rumex acetosa* L., *Trifolium pratense* L., *Trifolium repens* L.), shrubs (*Cytisus striatus* (Hill) Rothm, *Chamaespartium tridentatum* (L) P. Gibbs., *Daboecia cantabrica* (Hudson) C. Koch, *Erica arborea* L., *Rubus ulmifolius* Schott, *Ulex europaeus* L., *Ulex minor* Roth.) and trees (*Alnus glutinosa* Gaertn , *Betula* sp L., *Corylus avellana* L., *Fagus sylvatica* L., *Fraxinus excelsior* L., *Quercus pyrenaica* Willd., *Quercus robur* L.) Samples were dried and milled and N was analysed after microkjeldahl digestion. Statistical analysis was by ANOVA.

Results Crude protein content ranged between 6.7-10%, 11-15%, 8-13% and 9-15% for herbaceous monocots, herbaceous dicots, shrubs and tree twigs, respectively. These values are normal for pasture species in the area and are sufficient to cover the requirements of cows and horses for maintenance (Mosquera *et al.*, 2000). Protein concentration was higher during the spring and lower during the winter for all the groups with herbaceous dicots having higher crude protein than herbaceous monocots in most of the periods. Tree species had higher protein content than shrubs, with the exception of autumn; most of the evaluated species were broadleaved and therefore lost leaves during the autumn. There were no significant differences between species groups during the winter as low temperature reduced plant development. Traditional management in the area consisted of tree branches being harvested for feeding animals during periods of pasture shortage like summer or winter.

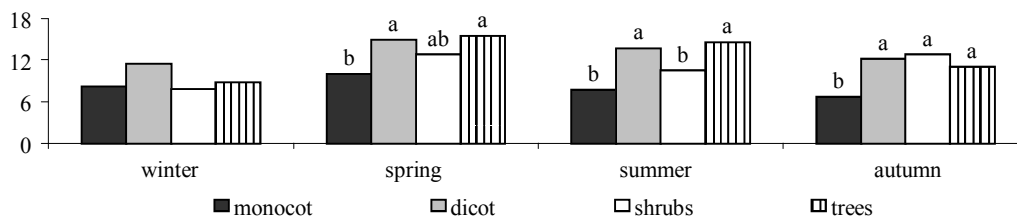


Figure 1 Seasonal concentration of crude protein for different classes of feed. Different letters indicate significant differences ($P < 0.05$) between means

Conclusions The measured protein contents indicate that tree and shrub species can be used as a resource for animal feeding during the autumn and summer in the Galician mountain area at a time when spontaneous monocots had very low protein concentration. This allows a sustainable use of fodder resources in fragile areas.

References

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