Grazing behaviour and body-weight gains of steers grazing at Cantabrian mountain pastures

Román-Trufero A., Martínez A., García Prieto V., Rosa García R., Osoro K., Celaya R.

in

Casasús I. (ed.), Lombardi G. (ed.).
Mountain pastures and livestock farming facing uncertainty: environmental, technical and socio-economic challenges

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 116

2016
pages 149-152

Grazing behaviour and body-weight gains of steers grazing at Cantabrian mountain pastures

A. Román-Trufero, A. Martínez, V. García Prieto, R. Rosa García, K. Osoro and R. Celaya

Área de Sistemas de Producción Animal, Servicio Regional de Investigación y Desarrollo Agroalimentario (SERIDA), 33300 Villaviciosa, Asturias (Spain)

Abstract. Steer meat is highly appreciated but its production in northern Spain is deficient to attend the meat consumers' demand. Yearling steers could be managed in summer pastures of Cantabrian Mountains to obtain a valued product utilizing natural resources. The objective of this work was to compare the grazing behaviour and productive performance of two local breeds of yearling steers, Asturiana de los Valles (AV) and Asturiana de la Montaña (AM), grazing in mountain pastures consisting in 70% grassland and 30% heathland with broom scrublands. Body weight (BW) changes from a total of 42 steers (half of each breed) were recorded during four grazing seasons (from June to October). In two years, plant community selection and grazing times were recorded in July and September by visual monitoring during daylight hours. Results indicated that grazing time increased from July to September (488 *vs*. 557 min/day; $P<0.001$) as sward height in the grassland decreased. AM steers grazed for more proportional time in heathlands and less in grasslands than AV steers (21.5 *vs*. 12.5%; $P<0.01$). No differences between breeds were observed in the utilization of other plant communities. Steers from both breeds rejected browsing on brooms. In general, AM steers showed greater mean BW gains than AV steers (332 *vs*. 199 g/day; $P<0.05$). AM steers seem to be better suited than AV steers to these mountain pastures, supporting previous evidence on the better performances achieved by smaller breeds under less favoured conditions.

Keywords. Grazing behaviour – Steers – Gains – Breeds.

Comportement de pâturage et gains de poids corporel de bouvillons pâturant dans les Montagnes Cantabriques

Résumé. *La viande de bouvillons est fortement appréciée mais sa production dans le nord de l'Espagne ne suffit pas à répondre à la demande des consommateurs. Des bouvillons d'un an ont été conduits en pâturages d'été dans les Montagnes Cantabriques pour obtenir un produit de valeur en utilisant les ressources naturelles. L'objectif de ce travail était de comparer le comportement de pâturage et les performances productives de bouvillons d'un an de deux races locales, Asturiana de los Valles (AV) et Asturiana de la Montaña (AM), pâturant des alpages consistant à 70% de prairie d'herbe et à 30% de broussailles de bruyères et genêts. Les changements de poids corporel (BW) d'un total de 42 bouvillons (la moitié de chaque race) ont été notés durant quatre saisons de pâturage (de juin à octobre). Sur deux ans, la sélection de communautés de plantes et les temps de pâturage ont été notés en juillet et septembre par suivi visuel pendant les heures de jour. Les résultats indiquent que le temps de pâturage a augmenté de juillet à septembre (488* vs. *557 min/jour;* $P<0,001$*) à mesure que diminuait la hauteur dans la prairie d'herbe. Les bouvillons AM ont pâturé pendant un temps plus proportionnel dans les bruyères et moins dans les prairies d'herbe que les bouvillons AV (21,5* vs. *12,5%;* $P<0,01$*). Aucune différence entre races n'a été observée concernant l'utilisation d'autres communautés de plantes. Les bouvillons des deux races ont refusé de brouter les genêts. En général, les bouvillons AM ont montré un GMQ plus élevé que les bouvillons AV (332* vs. *199 g/jour;* $P<0,05$*). Les bouvillons AM semblaient être mieux adaptés que les bouvillons AV à ces pâturages de montagnes, allant dans le sens des résultats précédents qui montraient de meilleures performances des races plus petites sous conditions moins favorables.*

Mots-clés. *Comportement de pâturage – Bouvillons – Gains – Races.*

I – Introduction

Steer meat is a quality product that is highly demanded by consumers, although its production in the North of Spain is deficient. Meat production is mostly focused on beef from young or yearling calves. Extensive steer meat production could be economically sustainable because of lower production costs and reduced reliance on food purchased outside the farm. Furthermore, this kind of system may promote a better use of pastures, which is important from an environmental point of view.

The typical beef cattle management system in Asturias (northern Spain) is the valley-mountain system. On this system, animals graze in common high mountain pastures during the summer, from May-June to September-October. In spring and autumn animals are grazing in lowland pastures and they are housed to pass the winter. This system promotes a more efficient use of grazing resources. In Asturias, the two local cattle breeds are Asturiana de los Valles (AV) and Asturiana de la Montaña (AM). Despite the confusing names of their origin (valleys and mountains, respectively), AV is the most abundant cattle breed throughout the region, whereas AM, with a smaller body size, is declared endangered and is mostly restricted to the mountain areas of eastern Asturias.

The objective of this work was to compare the productive performance (body weight changes) and grazing behaviour (plant community selection) of yearling steers from AV and AM breeds, grazing during summer in mountain pastures consisting in 70% grassland and 30% heathland with broom scrublands.

II – Materials and methods

1. Study site and experimental animals

The study was conducted during four years (2011 to 2014) in Puertos de Agüeria, Quirós, Asturias. The vegetation of the experimental field (33 ha, 1600-1750 m a.s.l.) consisted of 70% grasslands (mostly *Festuca rubra-Agrostis capillaris-Nardus stricta*) and 30% *Calluna vulgaris* heathland interspersed with broom (*Genista florida*) scrublands. Other minor plant communities were also present, such as *Carex* spp. fens, calcareous rocky pastures, furze (*Genista occidentalis*) shrublands, and barberry (*Berberis vulgaris*) formations.

A total of 42 yearling steers, half of AV breed and half of AM breed, born during winter-spring between 2010 and 2013 were utilized. As suckling calves, they stayed with their mothers at the experimental site in the preceding summer. Calves were weaned when returned to lowlands with 7-10 months of age, and when they were one year old, they were castrated by surgical removal of the testicles. Grazing season at the summer pasture extended from mid June to late September or early October.

2. Measurements

Animals were weighed at the beginning, middle (August) and at the end of the grazing season. Body weight (BW) changes were calculated for the different periods. In two years (2013 and 2014), grazing times at each plant community were recorded in July and September by visual observations every 15 minutes during daylight hours in two consecutive days. The availability of preferred pasture was assessed by monthly measuring the sward height in the grassland areas using a sward stick.

3. Statistical analysis

We used factorial ANOVA to analyse individual animal performance (BW changes), examining the fixed effects of breed, year and their interaction. Grazing behaviour data were analyzed by repeated measures ANOVA, examining the effects of breed, year, season (two repeated measures at July and September) and their interactions.

III – Results and discussion

Both breeds were grazing for a similar time, but we observed that time increased from July to September (from 488 to 557 min/day; $P<0.001$; Fig. 1) while grass availability decreased (from 6.85 to 3.09 cm in 2013; from 5.36 to 3.64 cm in 2014). In 2013 steers spent more time grazing than in 2014 (547 *vs*. 498 min/day; $P<0.05$).

AV steers grazed for more proportional time on herbaceous pastures (and less on shrublands) than AM steers (81.3 *vs*. 73.3%; $P<0.05$). *Festuca-Agrostis* grasslands were utilized at a higher rate by AV steers than by AM steers (75.4 *vs*. 66.8%; $P<0.05$). There were no differences between breeds in the times spent grazing on other herbaceous communities. Both fens and rocky pastures in general were more utilized in July than in September (9.2 *vs*. 3.6%; $P<0.01$; Fig. 1), although there were season × year interactions ($P<0.01$). Regarding shrubby communities, AM steers grazed for longer on heathlands than AV steers (21.5 *vs*. 12.5%; $P<0.01$). Higher grazing times on heathlands were observed in 2013 than in 2014 (21.5 *vs*. 12.5%; $P<0.01$). In general, both breeds increased the time grazing on heathlands as summer progressed, except in the case of AM steers in 2013, resulting in a triple interaction breed × year × season ($P<0.05$). There were no differences between breeds in the time grazing on broom scrublands, but it was superior in 2014 than in 2013 (6.3 *vs*. 3.4%; $P<0.05$). Remarkably, although steers grazed a mean percentage time of 4.9% on these scrublands, no observation was recorded on steers browsing the small-leaved shoots of brooms; instead they grazed below on the herbaceous or dwarf-shrub layer. It has been observed in previous studies that cattle usually reject browsing on these woody legumes, unlike sheep, which browse on them intensely (Osoro *et al*., 2000). Other shrubby communities were scarcely utilized, around 1% of the grazing time in September.

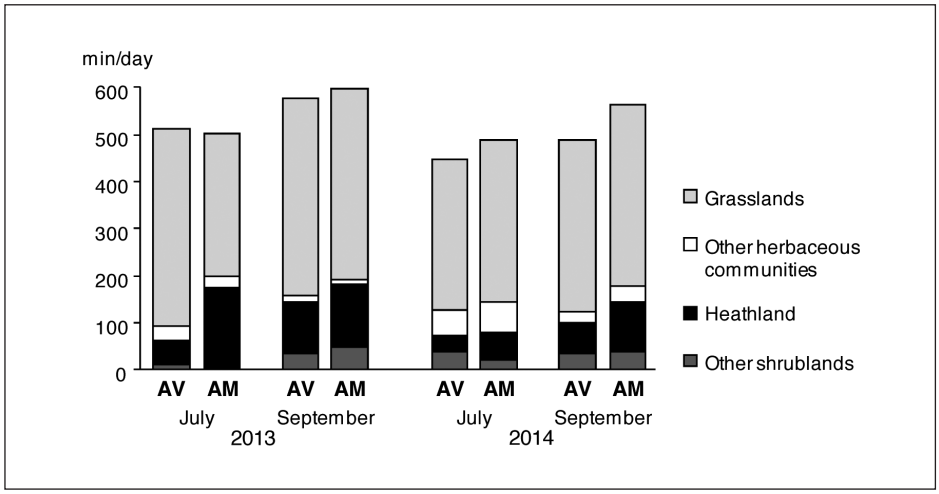

Fig. 1. Grazing times on each plant community by Asturiana de los Valles (AV) and Asturiana de la Montaña (AM) steers at Cantabrian mountain pastures.

Regarding animal performance, during the first half of the grazing season (from June to August) AM steers gained more BW than AV steers (487 *vs*. 360 g/day; $P<0.01$). From August to October, when grassland herbage availability and its nutritive quality was reduced, AV steers lost BW on average, whereas AM steers continued gaining BW, although less than in the former period (Table 1). During the whole grazing season, AM steers achieved higher BW gains than AV steers (332 *vs*. 199

g/day; $P<0.01$). In a previous study in similar conditions, no differences between these breeds were found in the BW changes of cows and calves (Osoro *et al*., 1999). There were also differences in BW gains between years, particularly during the second half of the grazing season ($P<0.001$). The maximum mean BW gain during the whole grazing season was observed in 2012 (408 g/day), while in 2013 steers only gained 109 g/day. It could be related to weather conditions and grass availability. The interaction breed × year was not significant in any period. When animals are grazing on high mountains usually present low BW gains due to several causes, such as the low nutritive quality of available pastures and adverse weather conditions, among others (Casasús *et al*., 2002). Animals have higher energy costs because they have to move through a more difficult terrain. It is important to underline that, despite the lower gains achieved in mountain pastures, these steers showed a compensatory growth relative to those managed in lowlands, once they grazed on quality pastures during autumn (Román-Trufero *et al*., 2015).

Table 1. Body weight (BW) changes of steers from Asturiana de los Valles (AV) and Asturiana de la Montaña (AM) breeds grazing at Cantabrian mountain pastures during summer (least squares means of four years)

	Breed			Significance		
	AV	AM	SEM	Breed (B)	Year (Y)	B × Y
Initial BW (kg)	371	300	9.3	***	NS	NS
BW change (g/day)						
From June to August	360	487	31.9	**	**	NS
From August to October	-12	120	45.5	*	***	NS
Overall	199	332	27.3	**	***	

NSSEM: standard error of the mean; NS: non-significant ($P>0.1$); * $P<0.05$; ** $P<0.01$; *** $P<0.001$.

IV – Conclusions

AM steers are better suited than AV steers to mountain conditions. Smaller breeds have a better performance under less favoured conditions. AM animals are more adapted to graze on heathlands and on pastures with a minor nutritive quality.

Acknowledgments

Research was funded by the Spanish National Institute for Agronomic Research (INIA, project RTA2011-00122-00-00) and co-funded by the European Regional Development Fund. Alicia Román-Trufero has a FPI-INIA fellowship. The authors wish to acknowledge the staff at Animal Production Systems Area of SERIDA for technical support.

References

Casasús I., Sanz A., Villalba D., Ferrer R. and Revilla R., 2002. Factors affecting animal performance during the grazing season in a mountain cattle production system. *Journal of Animal Science,* 80, 1638-1651.

Osoro K., Celaya R., Martínez A. and Zorita E., 2000. Pastoreo de las comunidades vegetales de montaña por rumiantes domésticos: producción animal y dinámica vegetal. *Pastos,* 30, 3-50.

Osoro K., Fernández Prieto E., Celaya R., Noval G., Alonso L. and Castro P., 1999. Respuesta productiva de dos razas de ganado vacuno manejadas en dos cubiertas vegetales de montaña. *ITEA,* 95A, 188-203.

Román-Trufero A., Celaya R., Martínez A., García-Prieto V. and Osoro K., 2015. Rendimientos productivos de terneros cebones de razas asturianas bajo dos estrategias de manejo. *XVI Jornadas sobre Producción Animal,* I, 33-35. AIDA, Zaragoza.