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## Cattle and Sheep Foraging Behaviour in a Heterogeneous Subtropical Grassland

ESTANISLAO DÍAZ FALÚ<sup>1</sup>, MIGUEL ÁNGEL BRIZUELA<sup>2</sup>, DITMAR BERNARDO KURTZ<sup>3</sup>, MARCUS  
GIESE<sup>1</sup>, FOLKARD ASCH<sup>1</sup>

<sup>1</sup>*University of Hohenheim, Inst. of Plant Production and Agroecology in the Tropics and Subtropics, Germany*

<sup>2</sup>*University of Mar del Plata, Dept. of Animal Production, Argentina*

<sup>3</sup>*National Institute of Agricultural Research, Corrientes Experimental Station, Argentina*

### Abstract

Analysis of foraging behaviour is central to understand grazing distribution and to optimise grassland management. Our objective was to analyse the effects of environmental variables upon foraging behaviour of cattle and sheep co-grazing heterogeneous grasslands of tall and short grasses. Three cows and ewes grazing in a 130 ha paddock of north-eastern Argentina (INTA Mercedes) were fitted with GPS collars during 6 consecutive days in fall, winter, spring and summer 2009. Stocking rate was 0.67 AU ha<sup>-1</sup> (cattle:sheep ratio = 3:1). Foraging behaviour was assessed by daily foraging time, speed, sinuosity and daily displacement. Climate and vegetation were also characterised. Behavioural variables were analysed by ANOVA, and its relationships with environmental covariates were explored. Daily foraging time was similar for cattle and sheep in all seasons (10.9 ± 1.5 hours). Cattle moved faster than sheep in spring and summer (7.8 ± 1.8 vs. 4.5 ± 1.8 m min<sup>-1</sup>), showing similar speeds in fall and winter (6.4 ± 1.2 and 5.7 ± 1.7 m min<sup>-1</sup>). Displacements were predominantly straight, irrespective of speed. Daily displacements were higher for cattle during spring and summer (5439 ± 1979 vs. 3114 ± 1090 m day<sup>-1</sup>), being similar between herbivores in fall and winter (4122 ± 770 and 3611 ± 896 m day<sup>-1</sup>). Since there were no variations in daily foraging time, the displacements were a consequence of the speed, which was confirmed by its positive correlation ( $r_{\text{cattle}} = 0.77$ ,  $r_{\text{sheep}} = 0.71$ ). Cattle walked faster when soil vegetation cover of the tall grasses was 90%, decreasing above and below this value. On the other hand, sheep walked faster when standing dead biomass of short grasses increased. This could suggest that both herbivores increased their speed tending to increase the encounter rate of the preferred forage as it becomes less abundant. For cattle, lower speeds when soil vegetation cover decreased below 90% could reflect a threshold where speed increments are not enough to efficiently graze preferred forage, probably causing changes in diet selection to sustain the daily intake. Our results may help to develop criteria based on seasonal herbivore's foraging behaviour to optimise grazing management.

**Keywords:** Argentina, GPS collars, grazing distribution, mixed grazing