

TRITICALE AS EARLY WINTER FORAGE FOR MEAT CALVES ON SANDY ACIDIC SOILS

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ABSTRACT

The use of triticale as a winter forage, improves animal performance. The objective of this study was to characterize a triticale crop during winter months, in relation to liveweight gain and animal production, under different grazing systems on sandy acidic soils. Three treatments were imposed to weaned calves of 110 kg liveweight average. Continuous grazing at a herbage allowance of 4% liveweight in dry matter (C4), rotational at an herbage allowance of 4% dry matter (R4) and rotational grazing at an herbage allowance of 2.5% liveweight (R2.5). Individual calf gain was 585 g/day for C4 and R4 and 280 g/day in R2.5 over the 70 days. Liveweight increase 200, 280 and 220 kg/ha for C4, R4 and R2.5 respectively.

KEYWORDS

Triticale, forage production, forage quality, calves, winter grazing, animal performance and meat production

INTRODUCTION

In Uruguay the quantity and quality of forage produced during winter is a serious constraint on animal livestock enterprises, especially on sandy soils (Perez Gomar and Bemhaja 1991). Cultivation of these soils modifies and deteriorates their biological, physical and chemical properties. After 15 years of continuous cropping, laboratory analyses showed poor conditions for plant development; low pH (near 5), 0.7% organic matter, 0.09 K meq/100g and Al toxicity.

Oats, rye and their mixtures, have been utilized as early green winter forage with important sanitary problems on sandy soils (Baier et al. 1994; McCartney and Vaage, 1994; Bemhaja *et al.* 1995). Triticale cv. INIA Caraceí has been studied as a double purpose winter crop under critical soil conditions (Wright et al. 1986; Bemhaja 1996). Its vegetative forage production, nutritive value, sanitary conditions, winter early production, grain yield, as well as the possibility of legume intercropping, make important advantages to be considered to avoid weight losses in cattle and promote beef cattle production (Sweeney et al. 1992; Miller *et al.* 1993).

The main purpose of this experiment was to determine animal performance on triticale crop grazed by calves under different winter grazing systems.

METHODS

A triticale crop was sown in early fall to be utilized by weaned calves from June to September, during a 70 day period. When herbage mass reached about 1600 kg DM/ha, three treatments were imposed to calves of ± 110 liveweight. Experimental design was a randomized block with two replications. Numbers of animal was 10 for treatment: (C4) continuous grazing at an herbage allowance of 4% dry matter in relation to liveweight adjusted each 28 days, (R4) rotational grazing with the same previous herbage for periods of 7 days, and (R2.5) rotational grazing at 2.5% herbage allowance. A spare paddock was maintained without grazing for herbage data collection.

Forage availability was estimated by cutting quadrats (50x50 cm) at 2 cm from soil level weekly and number of tillers was counted before and after grazing. Herbage growth rate was determined from enclosure cages each 14 days. Leaf:stem ratio was measured at different crop heights, 0-15, 15-30 and more than 30 cm. Organic

matter digestibility (OMD) crude protein (CP) and acid detergent fiber (ADF) were estimated from forage on offer.

Animals grazed triticale for 10 days of the adaptation period and received sanitary control prior to the start of the experiment. Liveweight gain was recorded for each animal at two week intervals.

RESULTS AND DISCUSSION

Herbage mass was about 3800 kg DM/ha, being 1600 at the beginning and 5100 at the end, for all treatments during the trial. Herbage growth rate was about 28 kg DM/day/ha at the beginning of the experiment and 52 kg DM/day/ha after 42 days of experiment. Leaf:stem index decreased from 2.8 to 0.9 in the upper crop horizon at 40 and 70 days respectively, and following the same trend for the lower horizon. Even though, no significant differences were observed in the number of tillers under grazing compared with non-grazing treatments. Forage OMD ranged significantly from 71 to 57 ($P < 0.05$) at the beginning to the end of the experiment period respectively. Values were greater in the continuous grazing treatment. Crude protein followed the same trend ranging from 15 to 11%, while ADF increased from 42 to 60, from the beginning to the end of the experiment.

The final liveweight of calves were 150, 150 and 130 kg in C4, R4 and R2.5 respectively after 70 days of experiment. Continuous and rotational grazing (4%) presented significant differences ($P < 0.05$) for liveweight gain in relation to R2.5. Daily gain average was 580 g for both C4 and R4 and 280 g for animals grazing at R2.5 treatment.

Stocking rates were 5, 7 and 11 calves/ha for C4, R4 and R2.5 respectively for the whole period. Instant stocking rates were 46 and 78 calves/ha on rotational grazing systems at 4% and 2.5% herbage allowance. The highest value was for R4 (280 kg/ha), following R2.5 treatment with 220 kg/ha and the lowest was C4 (200 kg/ha).

At the same herbage allowance (4%), rotational grazing resulted in greater utilization of forage than continuous, achieving higher stocking rates with the same daily gains. Calves grazing at 2.5% herbage allowance (very high stocking rate) reached spring in appropriate conditions to make good use of the compensatory growth (Leterme, P. and A. Thewis, 1991)

Triticale cv "INIA Carace" produced early winter quantity and quality forage. It was consumed by calves and they could obtain high daily gain under high stocking rates.

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Table 1

Daily gain (kg), meat production (kg/ha) and stocking rate as number of calves/ha during 70 days grazing winter triticale at different grazing systems. LSD (P<0. 05).

	Daily gain	Stocking rate		Liveweight
	(kg)	Number calves	Inst.	Increase
		/ha		kg/ha
Continuous 4%	0. 580a	5		200b
Rotational 4%	0. 580a	7	46	280a
Rotational 2. 5%	0. 280b	11	78	220b