Increasing Stocking Rate Affects Fecal Deposition and N Return on Signal Grass Pastures

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Introduction

✓Grazing management may affect nutrient return in pastures via litter deposition or animal excreta.

✓This experiment aimed to evaluate the effect of three stocking rates on fecal deposition, fecal N concentration, and N return via feces on rotationally stocked signal grass (*Brachiaria decumbens* Stapf.) pastures.

Material and Methods

✓Treatments: Three stocking rates [2, 4, and 6 Animal Units (AU)/ha; 1 AU = 450 kg live weight].

✓Grazing period: 3 days.

✓Resting period: 32 d and 72 d, on rainy and dry season, respectively.

✓Response variables measured included : fecal deposition, fecal N concentration, and N return via feces.

✓Methods: Fecal deposition and chemical composition were determined in eight evaluations. Two cross bred Holstein/zebu cows were used and daily fecal output per animal was estimated by giving a feed marker (purified and enriched lignin - LIPE®; 500 mg/d). Feces were collected (~200 g/an.) at the second and third day of grazing. Composite samples of the two cows from the same treatment were analyzed for modified lignin and N.

Figure 1 – (A) Overview of the experimental area, and (B) LIPE.

Results

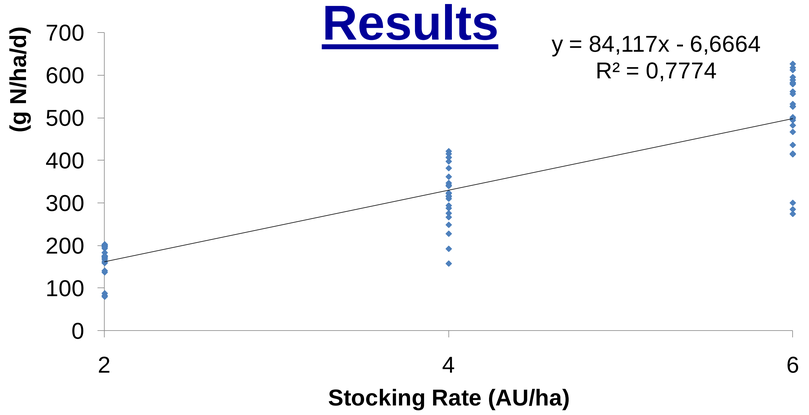

Figure 2 – Daily N return via feces on *Brachiaria decumbens* pastures managed under different stocking rates (2, 4, and 6 AU/ha).

Table 1 – N concentration in the feces of crossbred Holstein/Zebu cows on *Brachiaria decumbens* pastures managed under different stocking rates (2, 4, and 6 AU/ha).

Evaluation	Stocking rate		
	2 AU/ha	4 AU/ha	6 AU/ha
	------ g N/kg of feces (DM basis)------		
March/2008	20,3 A a§	18,7 C a	20,3 BCD a
April/2008	19,3 A a	20,0 BC a	18,7 D a
June/2008	21,7 A a	23,0 A a	23,0 A a
July/2008	21,0 A a	21,7 AB a	22,7 AB a
August/2008	21,3 A a	19,7 BC a	21,0 ABCD a
September/2008	20,3 A a	18,3 C b	20,3 CD a
October/2008	17,0 B a	15,3 D a	15,7 E a
January/2009	19,7 A b	21,3 AB ab	22,0 ABC a
SE		0,8	

§Means followed by the same letter, capital letters on the column and small letters on the row, do not differ (P>0.05) by the PDIFF Toeplitz test from SAS.

Table 2 – Fecal output per kg of liveweight on lactating dairy cows on *Brachiaria decumbens* pastures managed under different stocking rates.

Evaluation	Stocking rate		
	2 AU/ha	4 AU/ha	6 AU/ha
	------ g DM of feces/kg of animal live weight ------		
March/2008	10,0 A a§	9,0 A b	9,3 A ab
April/2008	9,0 B a	8,3 AB ab	8,0 BC b
June/2008	7,3 D ab	7,0 C b	8,0 BC a
July/2008	9,0 B a	8,3 AB a	8,7 AB a
August/2008	7,7 CD b	7,3 C b	9,0 A a
September/2008	7,3 D b	9,0 A a	7,3 C b
October/2008	8,7 BC a	8,7 AB a	9,3 A a
January/2009	7,0 D c	8,0 BC b	9,0 A a
SE		0,3	

§Means followed by the same letter, capital letters on the column and small letters on the row, do not differ (P>0.05) by the PDIFF Toeplitz test from SAS.

Table 3 – Fecal output (animal.d^{-1}) on *Brachiaria decumbens* pastures managed under different stocking rates.

Evaluation	Stocking rate		
	2 AU/ha	4 AU/ha	6 AU/ha
	------ kg DM of feces/animal.d^{-1} ------		
March/2008	4,69 A a§	4,54 A a	4,54 AB a
April/2008	4,26 BC a	4,15 AB a	4,18 BC a
June/2008	4,21 C b	4,17 AB b	4,83 A a
July/2008	4,19 C a	4,16 AB a	4,04 C a
August/2008	4,22 C a	4,02 B a	4,34 BC a
September/2008	4,32 ABC a	4,37 AB a	4,17 BC a
October/2008	4,21C a	4,36 AB a	4,45 BC a
January/2009	4,10 C a	4,34 AB a	4,22 BC a
SE		0,15	

§Means followed by the same letter, capital letters on the column and small letters on the row, do not differ (P>0.05) by the PDIFF Toeplitz test from SAS.

Conclusions

✓ A more pronounced effect of stocking rate and evaluation period was observed for fecal deposition and N return per area than per animal. Increasing stocking rate increased N return via feces.