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# Stage of regrowth of tropical forage have various effect on diet quality of grazing heifers.



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## Summary

The effect of two stages of re-growth (14 vs 28 days) of a native *Dichanthium* spp. was assessed on organic matter digestibility (OMD) and intake (OMI) by grazing Creole heifers. OMD, OMI, ingestive behavioural parameters (biting rate, bite size and grazing time) and some sward characteristics (herbage mass, morphological and chemical), were measured simultaneously per animal.

OMD was greater for the 14-day sward compared to the 28-day one (0.701 vs 0.672), whereas OMI was lower for the 14-day sward (58.6 vs 67.2 g.kg LW<sup>-0.75</sup>). Consequently, digestible OMI (dOMI) at 14 days was of lower value than the 28 days of re-growth (41 vs 45 g.kg LW<sup>-0.75</sup>). Similar rate of biting were measured for both the swards (64 vs 61 bites.mn<sup>-1</sup>) although the bite size was lower for the 14-day sward (163 vs 228 mg OM). The heifers spent more time to graze on the 14-day sward (437 mn.day<sup>-1</sup>) than on the 28-day sward (369 mn.day<sup>-1</sup>). However this did not allow to compensate the lower bite size, and dOMI remained lower on the 14-day sward.

**Key words** : intake, digestibility, bite size, tropical grass, stage of re-growth, Creole heifers,

## Introduction

To improve the diet quality of ruminants grazing in tropical areas, the main strategies developed were : introduced productive planted grass, fertiliser and water inputs. Moreover little has been done about the effect of younger stages of re-growth on diet quality, even though re-growth stage is a determining parameter for tropical grass (Minson, 1990). It was reported that maturation and lignification in tropical C4 grass occurred before 28 days, and that a 14-day old grass is of good nutritive value for housed ruminants (Archimède *et al.*, 2000). In grazing conditions, different factors may influence digestibility and intake of young grass. Therefore, using equal daily herbage allowances, we tested the effect of 14 and 28 days of re-growth of a native *Dichanthium* spp. based sward, on digestibility and intake of grazing Creole heifers.

## Materials and methods

Two 4-Creole heifer groups (305 kg LW) tethered individually, grazed for 24 h circular areas (60 and 25 m<sup>2</sup>) at 14 or 28 re-growth days, during 4 grazing periods comprising each a 4-day measurement period following a 11-day adaptation period, according a Latin Square design.



The heifers were moved and watered daily. Sward characteristics were measured at 10 sites per individual area : total herbage mass, by cutting the herbage (0.09 m<sup>2</sup>) to ground level with hand-held electric clippers and by drying a representative sample (80°C, 48h); leaf and stem fractions, by sorting manually fresh cut herbage samples, dried afterwards; the nitrogen content by the Kjeldahl

method. OMD was estimated from faecal N according to a local equation (Boval *et al.*, 1996). OMI was calculated from OMD and faecal output measured per heifer by collecting manually all faeces excreted over 4 days. Rate of biting, grazing and ruminating times were recorded with automatic recorders (Rutter *et al.*, 1997) twice per measurement period, for 2 heifers per group, during 24 h. Bite size was calculated from rate of biting, grazing time and OMI.



## Results and discussion

Irrespective of total herbage mass at 14 and 28 days of re-growth (236 vs 577 g DM.m<sup>-2</sup>), the total daily allowances for the heifers grazing either the 14 or 28-day sward were equal (Table 1), although leaf allowance was greater on the 14-day sward (Table 1).

OMD was greater for the 14 compared to the 28-day sward, by 3 digestibility units. The greater leaf allowance and the N content (Table 1) may explain the better digestibility of the herbage consumed on the 14-day sward. Conversely, OMI was lower on the 14-day sward, by 13 %. The rate of biting (64 vs 61 bites.mn<sup>-1</sup>, P>0.05) was the same for both the swards. However the heifers pulled out smaller bites on the 14-day than on the 28-day sward and increased the time spent to graze (Table 1). But the greater grazing time on the 14-day sward did not allow to balance the low bite size, to reach the amount of herbage consumed on the 28-day sward. Therefore each bite taken out of the 14-day sward, is of good digestibility but the amount bitten off is too small, inducing a lower dOMI than on the 28-day sward (41 vs 45 g.kg LW<sup>-0.75</sup>).

For equal allowances, the 14-day sward is more digestible, whereas the 28-day sward is better consumed. It is relevant to make allowances for quality and quantity of grass consumed, and our results showed that the higher dOMI, by 9% is permitted with the 28-day sward, even if the leaf fraction and N content were lower in this sward. These results speak to researchers about which criteria to take into account when assessing diet quality of ruminants at pasture.

Table 1. Effect of two stages of re-growth (14 vs 28 days) on *Dichanthium* spp. swards characteristics and on OMD, OMI and ingestive behaviour of grazing Creole heifers.

	14 days	28 days
Allowance (kg DM.day <sup>-1</sup> )	14.1 <sup>a</sup>	14.5 <sup>a</sup>
Leaf allowance(kg DM.day <sup>-1</sup> )	5.8 <sup>a</sup>	3.9 <sup>b</sup>
N (% DM)	1.9 <sup>a</sup>	1.5 <sup>b</sup>
OMI (g.kg LW <sup>-0.75</sup> )	58.6 <sup>b</sup>	66.3 <sup>a</sup>
OMD	0.701 <sup>a</sup>	0.672 <sup>b</sup>
dOMI (g.kg LW <sup>-0.75</sup> )	41.1 <sup>b</sup>	44.6 <sup>a</sup>
Bite size (mg OM)	163.2 <sup>b</sup>	228.2 <sup>a</sup>
Grazing times (mn.24h <sup>-1</sup> )	437 <sup>a</sup>	369 <sup>b</sup>