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Intake and milk production of suckling Creole goats reared at pasture in humid tropics according to the post-grazing residue management☆

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Abstract

Creole suckling goats, reared on rotationally grazed tropical pasture were used to study the effect of post-grazing residue control on forage intake and milk production. The pastures were irrigated and fertilized with 500 kg ha^{-1} year^{-1} of commercial fertilizer (30% N, 12% P_2O_5, 18% K_2O). A system in which residuals were mown (RM) was compared to the control (Residuals Remained, RR) at three parturition seasons (dry, intermediate and wet). For both pasture management systems, each plot of 4100 m^2 was equally divided into five paddocks. Animals grazed the forage within each paddock for 7 days. Thereafter, pastures were grazed after every 28-day regrowth period for a full year. Each group at each season was composed of 20 goats weighing 36.0 ± 2.5 kg LW (half of them were pregnant and half were lactating). Milk production (oxytocin method), live weight (LW), body condition score (BCS) and intake (fecal index method) were determined using six multiparous twin-bearing goats from each group for each season (35.2 ± 5.0 kg LW) during 1 year. Herbage biomass (3.12 t DM/ha versus 4.98 t DM/ha, $P < 0.001$) was lower in RM than RR treatments while it was the opposite for the crude protein content of vegetation (123 g/kg DM versus 110 g/kg DM, $P < 0.05$). The organic matter digestibility, DM intake and organic matter intake averaged 0.695, 88 and 69 g/W$^{-0.75}$, respectively. The daily milk production over the 12 weeks of lactation averaged 1.06 kg/day in both groups. The fat and protein contents reached on average 56 and 37 g/kg, respectively. Goats lost about 3.5 kg LW during lactation but did not lose BCS. No significant differences in intake, milk and body traits were observed among the two management systems (i.e. RM and RR). Seasonal effects ($P < 0.01$) were found and are discussed. Highest values were obtained during the intermediate season,

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20% more forage ($P < 0.05$) and 17% more milk ($P < 0.01$). The forage biomass and feeding value were not limiting factors and generated adequate levels of intake and production whatever the pasture management system. Removing post-grazing residues in intensive grazing systems with suckling goats reared in tropical conditions, would not change the intake level or milk production of the does compared to the control system. It is recommended to develop new grazing systems, which would allow the use of post-grazing residues.

Keywords: Creole goat; Intake; Milk production; Tropical pasture

1. Introduction

In the West Indies, suckling goats and their offspring are mainly raised under extensive systems of production. The most widespread feeding mode is grazing (Devendra and Mc Leroy, 1982; Alexandre et al., 1997a) mainly on natural pastures, and performance of animals raised under these conditions is low.

For the past 20 years in Guadeloupe, increased livestock productivity was associated with an improvement in reproductive traits and intensive management of the local breed, i.e. Creole goat (Alexandre et al., 1999). Does weighing about 33 kg live weight (LW) had high reproductive capacities and produced up to 20 kg LW of weaned offspring per doe per year (i.e. two-third of the doe LW). The main feeding system was based on rotationally-grazed pastures, exploited at 28 to 35 days. Tropical pastures (C_4 grasses) are productive but their rapid maturation leads to a high level of lignification (Minson, 1990; Humprheys, 1991). Tropical forage even when fertilised and irrigated is of moderate food value (0.55 DM digestibility and 95 g/kg DM of CP; Minson, 1990; Aumont et al., 1995), which is a major limiting factor in animal production. It was shown that the forage prior to the first month of regrowth had high intake and digestibility (Aumont et al., 1995; Archimède et al., 2000) and was adequate for housed animals. However, the response of free-grazing animals was different due to high levels of gastrointestinal-parasitism (Aumont et al., 1997). Supplementation improved animal performance substantially (Alexandre et al., 1997b). However, this is an expensive and non-adapted alternative to tropical conditions. It is therefore necessary to optimise the use of forages at pasture and to develop management approaches for grazing high-quality forage.

In tropical conditions, intensive grazing systems generate high amounts of post-grazing residues (Alexandre et al., 1997a). The large amounts of herbage are not totally exploited, this leads to reduced forage value, low leaf/stem ratio and consequently to weed invasion and to long-term bad management of the pastures. Such problems of residuals have been underlined in grazing experiments carried out on dairy cows in New Zealand (Hughes et al., 2001), meat cattle in Brazil (Corsi et al., 2001) and suckling sheep in Martinique (Mahieu et al., 1997).

Experiments aimed at the management of post-grazing residues were designed and carried out over 2 years. In a first phase, mowing to eliminate such residuals was tested against the control system. Assuming that the modifications of forage availability and sward structure can improve the intake level of grazing ruminants (Minson, 1990; Humphreys, 1991; Baumont et al., 2000), the objective of this experiment was to study the effect of post-grazing residue management on forage intake and milk production of suckling goats. These traits were assessed over the first year of the trial. Results on the reproductive cycle, growth rate of the offsprings and flock productivity over the 2-year experiment have been analysed in a previous paper (Ortega-Jimenez et al., 2003).

2. Materials and methods

2.1. Study area

This study was carried out in Guadeloupe, a humid tropical island in the Caribbean (16.1°N, 61.6°W). The experimental farm is located in the driest region where annual rainfall averages 1280 mm, with a dry season lasting from January to May with less than 70 mm per month. Maximum air temperature varies from 27 °C (January) to 32 °C (August) with the minimum from 21 to 25 °C, respectively. The relative humidity is