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GROWTH AND LAMBING PERFORMANCE OF HAIR SHEEP
GRAZING NATIVE PASTURES DURING THE DRY SEASON
ON ST. CROIX, VIRGIN ISLANDS

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ABSTRACT

The production potential of native pastures, grazed by V.I. White hair sheep, was examined during the dry season (Jan. to Aug. 1987; avg. monthly rainfall: 94mm). Animals were put on a rotational grazing system at a stocking rate of 5 ewes with lambs/ha, on pastures containing predominantly Guinea grass (*Panicum maximum*) and *Leucaena leucocephala*, as well as native legumes. Pastures were fertilized (21-0-0; 336kg/ha) in Dec. 1986. Crude protein was 8.1 ± 1.5 , 28.3 ± 1.0 , and $16.7 \pm 1.4\%$, and *in vitro* digestibility 53.2 ± 3.0 , 59.1 ± 1.7 and $51.4 \pm 2.8\%$ in *P. maximum*, *L. leucocephala* and the native legumes, respectively. Mature, pregnant ewes ($n=40$) increased in body weight from 35.6 ± 0.9 kg at conception to 47.2 ± 0.8 kg at parturition, producing 5.1 ± 0.3 kg of lamb, at a lambing rate of 1.60 lambs/ewe lambing. These ewes weaned 16.6 ± 0.9 kg of lamb at 9 weeks post partum, at a weaning rate of 1.43 lambs/ewe lambing. The data suggest that fertilized, native pastures, under a rotational grazing system with moderate stocking rates, are able to support high reproductive rates under dry season conditions.

INTRODUCTION

The livestock industry in the U.S. Virgin Islands depends largely on unimproved pasture with native forages as the principal source of feed. In this setting, the dry season presents problems of reduced yield and quality in the forages needed to meet the nutritional requirements of livestock. On St. Croix, this seasonal feed shortage is one of the foremost limiting factors in livestock production. The lack of nutritious feed, coupled with low-input management systems, cause reduced animal performance.

Only limited practices are in place to harvest forages for small ruminant production during times of abundant pasture growth. The use of hay or silage is generally restricted to beef and dairy production, though feeding of green chop is utilized at times. Often concentrate feeds (corn) are provided as supplements, but at considerable expense. Changes in pasture management and manipulation of stocking rates may provide tools to improve dry season productivity of small ruminants. This study

of the dry season production potential of native pastures, managed under a rotational grazing system, was conducted at the Sheep Research Facility of the University of the Virgin Islands Agricultural Experiment Station.

MATERIALS AND METHODS

Pastures at the Sheep Research Facility are predominantly composed of Guinea grass (*Panicum maximum*) and the local browse legume tan-tan (*Leucaena leucocephala*). Also present, but of less significance as a source of forage, are *Desmanthus* (*D. virgatus*) and *Teramnus* (*T. labialis*). Problems exist with the invasion of thorny shrubs (*Acacia* spp.), which is controlled by grubbing and treatment with diesel. In December 1986, nitrogen fertilizer (21-0-0) was broadcast with a Gandy fertilizer spreader at a rate of 336 kg/ha. On these pastures a rotational grazing system was established through the division into pie-shaped segments with a central watering area. The total amount of pasture (8 ha) was subdivided into 10 segments of 0.5 to 1.0 ha each.

The forage samples were collected after observing the grazing behavior of sheep and based on the species selection made by the animals. Samples were cut manually using stainless steel shears and limited to the non-woody (grazed) parts of the plant. They were then weighed and dried in a forced air oven at 60°C to determine dry matter percent, ground and analyzed for crude protein, *in vitro* digestibility (IVD), phosphorus and potassium content.

Data were collected from mature ewes (n=40), grazing at a stocking rate of 5 ewes with lambs/ha, starting in January 1987 and lasting until August 1987. During this period the pastures received an average monthly rainfall of 94 mm with a peak in May and June (217 and 279 mm, respectively). The animals were allowed to graze throughout the day and confined overnight to control predation and larceny. All ewes were wormed at 2 months intervals and vaccinated for tetanus. Ewe weights were recorded at weekly intervals, while lamb weights were taken within 24 hours of birth and at 9 weeks of age (weaning).

RESULTS AND DISCUSSION

The crude protein percentage of the pasture species examined was adequate (>7%) to maintain the animals on pasture (Table 1). Crude protein values of the Guinea grass were slightly lower than the 9.5 to 9.7% reported by Youssef and Braithwaite (1987) grown in fertilized plots, but higher than the 4.5% previously reported in pasture stands on St. Croix (Oakes, 1969). The reason for this difference may be the selective clipping utilized in this study, since the nitrogen fertilizer that was applied was expected to increase the dry matter yield of guinea grass, but not the protein percentage (Oakes, 1966).

Both crude protein and IVD in *L. leucocephala* were high (Table 1) and in agreement with its suggested role as a dry season protein bank in Caribbean pastures (Paterson et. al., 1986). Observation of the grazing behavior and the leucaena plants indicated that considerable amounts of the leafy material were removed and utilized by the animals. However, this information was not quantified. The protein content and IVD of *D. virgatus* and *T. labialis* were lower than *L. leucocephala* and the contribution of these species towards the dry matter intake of the sheep appeared smaller.

Table 1
Crude protein, *in vitro* organic matter digestibility (IVD) and macro minerals (mean±SEM) in the major forage species.

	Guinea grass (<i>P. maximum</i>)	tan-tan (<i>L. leucocephala</i>)	legume mix ¹
% crude protein	8.13±1.5	28.30±1.0	16.73±1.4
% IVD	53.20±3.0	59.10±1.7	51.40±2.8
% phosphorus	0.112±0.007	0.116±0.012	0.154±0.024
% potassium	1.64±0.24	1.63±0.06	1.66±0.148
% calcium	0.73±0.06	1.50±0.18	1.40±0.09
% sodium	0.25±0.03	0.46±0.10	0.39±0.10

¹ combination of *Teramnus labialis*, *Desmanthus virgatus*

The phosphorus content of all pasture species were lower than the 0.20-0.24% recommended for gestating ewes by the National Research Council (1985), though other minerals were adequate in the plants (Table 1). The impact of the phosphorus deficiency on animal performance was not clinically evident, but the effects on animal performance will have to be examined in subsequent studies.

The lambing performance of the ewes on these pastures are summarized in Table 2. The lambing and weaning rates fell well within the range of 1.44 to 1.84 and 1.26 to 1.68, respectively, that were previously reported for this type of sheep under Virgin Islands conditions (Hupp and Deller, 1983). The number of lambs born per ewe lambing were lower (1.72 vs. 1.60), but the number of lambs weaned at 9 weeks of age are similar (1.43 vs. 1.46 lambs/ewe lambing), to sheep data collected at the Sheep Research Facility on a year round basis (Wildevs, 1987). Seasonal depression in litter size was also observed for Blackbelly sheep during the dry season on Barbados (Braford et. al., 1983). However, on a year round basis the amount of lamb born/ewe lambing was similar (5.1 vs. 5.0 kg), while the amount of lamb weaned was lower during the dry season (16.6 vs. 19.5 kg, respectively), compared to year round productivity of sheep on these pastures (Wildevs, 1987). Similarly, the frequency of multiple birth was lower (55% vs. 62%) during the dry season compared to year round production, and the higher incidence of single lambs may be partly responsible for the lower amount of lamb weaned per ewe.

Table 2
Lambing performance and body weight changes of ewes
grazing native pasture without supplementation during
the dry season.

no. of lambs/ewe lambing	1.60
amount of lamb/ewe lambing (kg) ¹	5.1±0.3
no. of lambs weaned/ewe lambing ²	1.43
amount of lamb weaned/ewe lambing (kg) ¹	16.6±0.9
frequency of multiple birth (%)	
singles	45.0
twins	47.5
triplets	7.5
breeding weight (kg) ¹	35.6±0.96
ADG breeding to lambing (kg/day)	0.078
lambing weight (kg) ¹	47.2±0.86
ADG lambing to weaning (kg/day)	-0.186
weaning weight (kg) ¹	35.5±1.02

¹ mean±SEM

² lambs weaned at 9 weeks of age

Body weight at breeding was 35.6 kg and ewes gained weight at a rate of 80g/day throughout gestation (Table 1). As a result of parturition and weight loss during lactation, ewes returned to breeding weight by 9 weeks post partum. Despite the weight loss during lactation, the ewes failed to drop below the previous breeding weight at weaning, suggesting that pasture quality and quantity were adequate to support lactation without supplementation.

Lamb performance under dry season conditions is summarized in Table 3. Lambs, unadjusted for sex and type of birth, gained at a rate of 109g/day. These weights were lower than in lambs produced throughout the year (Wildeus, 1987), but the reduced birth weights and growth rates had no adverse effects on lamb survival.

Table 3
Pre-weaning growth of lambs nursing mature ewes on
native pasture without supplementation¹

birth weights (kg) ²	3.11±0.46
weaning weight (kg) ²	10.04±0.48
ADG birth to weaning (g/day)	108.9

¹ weights not adjusted for sex or type of birth

² mean±SEM

These data indicate that dry season conditions will somewhat reduce reproductive performance of Virgin Islands White ewes in respect to litter size at birth and weaning weight. However,

the rotational grazing system employed helped to preserve pasture quality and maintain body weight of the ewes. The grazing management system resulted in only a small to moderate reduction in reproductive performance and lamb growth, respectively, during the dry season without additional supplementation of concentrate feeds.

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