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O. Faftine

Instituto de Produção Animal, Mozambique

A. Alage

Instituto de Produção Animal, Mozambique

J. P. Muir

Texas A&M University

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**CHARACTERIZATION OF FORAGE SELECTED BY CATTLE ON COMMUNAL
RANGE IN MANHIÇA, MOZAMBIQUE**

O. Faftine¹, A. Alage¹ and J.P. Muir²

¹Instituto de Produção Animal, C.P. 1410, Maputo, Mozambique

²Texas A&M University, Route 2, Box 00, Stephenville, TX, USA, 76401-9698,

faftine@yahoo.com

Abstract

Forage selection by 10 cattle herds was observed monthly over 2 years on a communal rangeland. Plants grazed were hand-plucked as representative of both species and plant portions being cropped by cattle. Herds were led to green pasture year-round. Nutrient concentration of species and plant portions selected by cattle indicated adequate crude protein and calcium but phosphorus deficiency during the dry season. Well-drained escarpments and uplands were more important during the rains while upland depressions and the Nkomati valley were essential for adequate forage intake during the dry seasons.

Keywords: range quality, crude protein, phosphorus, calcium

Introduction

Range management in sub-Saharan Africa has unique characteristics that do not allow for facile transfer of extra-continental techniques. This uniqueness, according to Scoones (1994), is

due primarily to variable (over seasons, years and space) rainfall. The situation, however, is more complex than climate or vegetation; it involves uniquely African approaches to traditional land tenure, herding practices and knowledge of the local vegetation as affected by season, year, soils and topography. Dismissal of this knowledge base as “non-scientific” has led to what Oba et al (2000) describe as the wholesale failure of equilibrium range science in Africa.

An understanding of traditional range management may reverse the trend of range degradation in sub-Saharan Africa. This study recorded the species and the quality of forage selected by herded cattle on communal lands typical of southern Mozambique. The objective was to determine what effect mobility and access to widely divergent range types had on forage ingested by communal herds.

Material and Methods

Manhiça is located in Southern Mozambique at 25° S and 33° E. Rainfall averages 850 mm/year with a fair amount falling during the dry season due to its proximity to the Indian Ocean. Agricultural potential exists for both cattle and crops and includes privately owned Nkomati River alluvial plains with irrigated crops year-round, communal pastures on the transitional escarpment and communal pastures or annual cropping lands in the sandy uplands. Animal husbandry continues to be the most important activity for 70% of the approximately 54 000 people (Cooptecnital, 1990).

Cattle are herded on 76 000 ha of unfenced rangeland (Cooptecnital, 1990) outside the valley. Ten cattle herds, ranging in size from 8 to 50 animals, were observed bi-monthly for 2 years to identify grazing patterns. The four general land divisions were:

Nkomati river alluvial valley with poorly drained clay soils and subject to flooding. This area was covered by *Sporobolus* spp., *Echinochloa* spp., *Phragmites* spp., *Sesbania* spp. and *Paspalum* spp., with occasional *Ipomea* spp., *Rhynchosia* spp. and *Vigna* spp.

Sandy escarpment dominated by *Cynodon dactylon*, *Panicum* spp., isolated *Sclerocarya birrea* and *Dichrostachys cinerea*.

Sandy uplands dominated by short species such as *Urochloa mosambicensis*, *Cynodon* spp. and *Paspalum* spp., as well as isolated *Ipomea* spp., *Stylosanthes fruticosa* and *Typhrosia* spp. under an *Acacia* spp. and *Albizia* spp. overstory.

Depressions in the uplands dominated by tall *Cyperus* spp. and *Echinochloa* spp.

Each month the herbage being grazed was identified. Those portions of the range species being grazed were collected (hand-plucked) and analyzed for crude protein (CP) phosphorus (P) and calcium (Ca).

Results and Discussion

Herds were led to green pasture throughout the two years, keeping away from range that was overgrazed and returning when the forage had regenerated. The distribution of cattle over the area and the availability of grasses showed the importance of mobility and access to alluvial plains during the dry season.

The field observations of range species selected as well as the CP, P and Ca composition of the forage (Table 1) ingested indicated that cattle were able to select plants containing values above those considered minimum, namely 7%, 0.20 % and 0.20% respectively on a dry matter basis (Van Soest,1982; NRC, 1976). Some plants were deficient in May, August and September, 1995 as well as February, April and June, 1996. However, since the herbage selected consisted of

grass and legumes with CP contents ranging from 7.7%-25.0%, average CP in the forage was likely adequate. P content was low without exception in plants collected on the sandy upland sites in July-August 1996.

The CP content of grasses on the escarpment during the rainy seasons and in the upland depressions during the dry seasons was high relative to other areas (Table 2). The contribution of the legumes and other forbs, as indicated by higher mineral concentrations during all seasons, indicates the importance of managing communal rangelands for the survival of this herbage component.

When irrigated cropping returns to the valley year-round, herds will be excluded to the nutritional detriment of the cattle (DDA,IPA & FAEF, 1994).

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Table 1 - Crude protein, phosphorus and calcium contents in the pasture selected by cattle
(means followed by s.d.).

Season		<i>Mar</i>	<i>Apr-Jun</i>	<i>Aug-Sept</i>	<i>Oct-Dec</i>	<i>Apr-May</i>	<i>Jul-Aug</i>	<i>Oct-Nov</i>
<i>Area</i>		<i>Escarp.</i>	<i>Valley</i>	<i>Upland</i>	<i>Valley</i>	<i>Escarp</i>	<i>Upland</i>	<i>Upland</i>
<i>Year</i>		<i>1995</i>	<i>1995</i>	<i>1995</i>	<i>1995</i>	<i>1996</i>	<i>1996</i>	<i>1996</i>
Grass: CP		7.70±1.80	7.80±2.40	7.70±1.80	7.70±1.80	7.60±1.70	7.80±1.70	7.70±1.90
P		0.28±0.13	0.30±0.08	0.22±0.10	0.31±0.10	0.18±0.06	0.16±0.03	0.26±0.08
Ca		0.40±0.15	0.23±0.06	0.37±0.17	0.43±0.15	0.30±0.17	0.60±0.33	0.36±0.12
Legume:CP		25.00±0.10	--	21.90±0.10	20.10±5.40	--	13.60±3.80	18.00±0.10
P		--	--	0.54±0.50	0.25±0.07	0.14±0.08	--	--
Ca		1.20±0.10	0.08±0.00	0.78±0.31	0.77±0.33	0.24±0.00	1.14±0.00	0.38±0.00
Others: CP		--	--	12.10±4.20	13.60±0.00	11.70±2.60	12.60±8.90	--
P		--	--	0.23±0.07	--	0.16±0.04	0.35±0.04	--
Ca		--	--	0.88±0.56	0.78±0.46	0.98±0.45	1.01±0.00	--

Table 2 - Crude protein, phosphorus and calcium concentration in range plants consumed by cattle.

<i>Grasses</i>	<i>Season</i>	<i>Range</i>	<i>CP%</i>	<i>P%</i>	<i>Ca%</i>
Aristida pongicanda	Dry season	Uplands	7.40	0.10	0.51
Cynodon dactylon	Dry season	Depression	7.40	0.20	0.55
		Uplands	9.10	0.31	0.34
		Escarpment	5.75	0.10	0.45
	Rainy season	Depression	8.25	0.22	0.51
		Escarpment	8.45	0.13	0.32
Digitaria spp	Dry season	Valley	8.00	0.25	0.44
		Depression	10.69	0.16	0.39
	Rainy season	Uplands	4.38	0.14	0.50
		Escarpment	7.30	0.26	0.21
Echinochloa spp	Dry season	Valley	8.40	0.25	0.36
		Depression	4.50	0.14	0.26
	Rainy season	Depression	12.40	0.20	0.19
Eragrostis spp	Dry season	Valley	7.30	0.32	0.31
		Upland	7.40	0.12	0.49
	Rainy season	Escarpment	7.34	0.17	0.40
		Escarpment	4.10	0.07	0.53
Heteropogon contortus	Dry season	Valley	9.57	0.27	0.45
Hyparrhenia dissoluta	Dry season	Upland	2.87	0.32	0.49
Imperata cylindrica	Dry season	Upland	2.30	0.18	0.12
Leersia hexandra	Dry season	Upland	6.40	0.36	0.28
Panicum maximum	Rainy season	Valley	11.27	0.40	0.38
		Upland	11.4	0.34	0.62
	Dry season	Escarpment	5.8	0.10	0.17
Paspalum commersonii	Rainy season	Valley	9.28	0.34	0.44
		Valley	11.64	0.31	0.56
	Dry season	Valley	10.81	0.21	0.36
		Valley	6.7	0.19	0.44
Phragmites australis	Rainy season	Escarpment	12.40	0.18	0.36
		Valley	10.75	0.19	0.40
	Dry season	Valley	9.00	0.21	0.33
Sorghum halepense	Rainy season	Valley	10.85	0.39	0.25
	Dry season	Depression	6.20	0.25	0.50
Sporobolus spp	Rainy season	Escarpment	3.00	0.14	0.53
	Dry season	Valley	8.60	0.40	0.50
Urochloa mosambicensis	Rainy season	Valley	5.90	0.27	0.38
Legumes					
Crotalaria sphaerocarpa	Dry season	Escarpment	14.52	0.27	1.00
Sesbania spp	Rainy season	Valley	25.00	0.25	1.20
Tephrosia spp	Dry season	Escarpment	18.30	0.24	0.58
Vigna spp	Rainy season	Valley	17.50	0.18	1.00
Others					
Astripomea	Dry season	Escarpment	9.10	0.34	1.53
Cyperus spp	Dry season	Depression	7.80	0.13	0.53
		Valley	5.40	0.22	0.32
	Dry season	Valley	5.30	0.15	1.01
Dicerocarrium senecisides	Rainy season	Escarpment	13.39	0.30	0.59
	Valley	13.40	0.20	0.72	
Oxigonum delagoense	Dry season	Upland	19.81	0.21	0.53
Salacia kraussi	Dry season	Escarpment	13.18	0.30	0.59
Strychnos spinosa	Rainy season	Escarpment	14.40	0.21	1.59
Ipomea plebea	Dry season	Valley	14.83	0.14	0.76
		Escarpment	15.89	0.18	0.24
	Rainy season	Valley	13.24	0.25	1.00
		Escarpment	8.69	0.12	0.56
Waltheria indica	Rainy season	Valley	6.40	0.12	0.51