Seasonal variation of forage productivity and quality of communally managed grassland in the N'komati river basin

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Introduction Livestock production is increasing in Mozambique. This trend, however, is facing such challenges as land tenure, erratic and not well-distributed rainfall (resulting in floods or droughts), overgrazing, wildfires, and the unsustainable resource management practices of communities. The study objectives were to evaluate forage species occurrence and seasonal variation and to estimate grassland productivity, nutritive value and savanna carrying capacity.

Materials and methods Ten 8m x 8m exclosures were randomly established in low, transitory and high veld areas of the N'Komati river basin in southern Mozambique (semi-arid topical grassland). Each exclosure was divided into three sub-plots which were respectively cut every six weeks (6-W) throughout the year, cut once at the end of the rainy season (ERS) or cut once at the end of the dry season (DS) during 2002. Forage yield and crude protein (CP) were determined on samples from which inedible stalks were excluded and carrying capacity for the complete year (CC) was determined according to Handzel (1981).

Results The most frequently occurring species during the DS and ERS were *Panicum maximum*, *Digitaria ciliaris*, *Setaria sphacelata* and *Imperata cylindrica.* There were 50 % more species harvested and identified in the rainfall season compared to subsequent seasons**.** Native legumes did not occur frequently (except *Tephrosia* spp.), suggesting that wildfires, wildlife, and competing grass species may have suppressed them at the early growth stage**.** There were significant differences in yield between treatments (P=0.05, $LSD_{0.05}$=0.83. The total forage yield of 6W was 7.6 t/ha compared with only 4.0 t/ha and 2.0 t/ha for ERS and DS respectively. Lowveld (LV) produced on average twice the yield of the upland (HV) and transitory zones (TR). Significant differences (P=0.05; $LSD_{0.05}$ =2.0) between cutting treatments were also observed for CP content of the harvested herbage with a range from 4.3 % to 7.20 % and there were also significant differences between locations (Table 1). Forage CP declined as the harvested biomass advanced in phenological and physiological stages, especially at DS**.** Pasture carrying capacity (CC) increased with clipping frequency by 95 %, with the 6-W frequency and the lowveld pastures giving the most promising results (4.6 and 8.8 ha/LWU).

Table 1 Forage production, crude protein (CP) and carrying capacity for different clipping frequencies and locations

	6W	ERS	DS	LV	TR	HV
Forage production, t/ha	5.0^{ab}	4.0^{b}	2.0^{c}	2.9^{d}	3.0^{d}	4.0^{b}
CP, %	7.3^{a}	5.1^{ac}	4.3^{c}	5.0^{ac}	5.5^{ac}	6.2^{a}
Carying capacity, ha/LWU	4.6^{a}	10.9^{b}	13.3^{c}	8.8^{d}	9.9^{d}	18.3^{e}

Values followed by transcripts (letters) in the same row are significantly different

Conclusions There is much variation of species composition, grassland productivity, nutritive value, and CC through the year. Forage yield increased at 6-W cutting intervals, while at the ERS and DS it was low. Crude protein was also highest with 6-W harvesting. The highest CC was at 6-W cutting (4.6 ha/LWU), in line with the higher forage productivity for this treatment. Range management strategies for communal pastures should strongly encourage approaches such as pasture deferment, rotational grazing and forage legume overseeding. The lowveld should be used more intensively during the dry season, since this area retains more moisture and thus has the potential for year-round grazing.

References

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