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Effect of cutting interval on yield and quality of two *Panicum maximum* cultivars in Thailand

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Introduction

Tanzania guinea grass [*Panicum maximum* cv. Tanzania (cv. Purple in Thailand)] has been grown in Thailand for over 20 years and has proven to be a high quality forage (Phaikaew et al. 2007). Mombasa guinea grass (*Panicum maximum* cv. Mombasa) was introduced to Thailand in 2007 and commercial seed production commenced in 2008, because of a demand for seed in Central and South America (Hare et al. 2013). It is a larger and taller cultivar than Tanzania. A series of studies have been undertaken at Ubon Ratchathani University, Thailand, to study the agronomic differences between these cultivars. The effects of cutting were examined in the first of these studies.

Materials and Methods

This study was conducted for two 180-day periods on the Ubon Ratchathani University farm from July 9, 2010 to January 5, 2011, and from May 23, 2011 to November 18, 2011 on plots planted in May 2010. The trial was a randomized complete block design, with 2 cultivars (Mombasa and Tanzania), 4 cutting intervals (30, 45, 60 and 90 days) and 4 replications. At the beginning of each 180-day period, the plots were cut 5 cm above ground level and 200 kg/ha NPK (15:15:15) was applied. The same amount of fertilizer was applied thereafter every 45 days. Traits evaluated included dry matter (DM) yields and concentrations of crude protein (CP), acid detergent fiber (ADF) and neutral detergent fiber (NDF) of both leaves and stems.

Results

Increasing cutting interval significantly increased stem and total DM yields and significantly reduced the percentage of leaf, but had no effect on leaf DM production in both years (Table 1). Mombasa produced 17−21% more total DM and 18−24% more leaf DM than Tanzania, but similar amounts of stem DM and percentage of leaf.

Increasing cutting interval significantly reduced CP concentrations and increased ADF and NDF concentrations in stems and leaves (Table 2). Mombasa had lower stem and leaf CP levels than Tanzania at all cutting intervals and higher stem fiber levels than Tanzania but similar leaf fiber levels.

Discussion and Conclusion

The higher total (17−21%) and leaf (18−24%) DM production from Mombasa than from Tanzania supports earlier findings under grazing in Central and South America, where Mombasa produced 28−40% more DM than Tanzania (Cook et al. 2005). It is the greater production of green leaf that has increased the demand for Mombasa rather than for Tanzania. Even though the quality of Tanzania was superior to Mombasa in terms of CP and stem fiber levels, Mombasa's greater DM production appeals to farmers. An optimum cutting interval based on the data in this study, would involve a compromise between quantity and quality. Cutting at 30-day intervals will produce the highest quality forage in terms of CP concentrations, but DM production is lower than from longer cutting intervals. The appropriate cutting interval will depend on what combination of yield and quality is desired for the particular application.

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Table 1. Effects of cutting interval on stem and leaf dry matter production and percentage of leaf of Mombasa and Tanzania guinea grasses.

Cultivar	Cutting interval (days)							
	Year 1				Year 2			
	30	45	60	90	30	45	60	90
	Total dry matter (kg/ha)							
Mombasa	9848	10865	12435	12002	8176	9823	9596	10177
Tanzania	7558	8011	9570	12075	6876	8082	6519	10662
LSD (P<0.05)	2434				1719			
	Stem dry matter (kg/ha)							
Mombasa	2352	3354	4343	5199	1546	2421	2475	3783
Tanzania	1646	2410	3413	5673	1327	1866	1692	4081
LSD (P<0.05)	1216				739			
	Leaf dry matter (kg/ha)							
Mombasa	7496	7511	8092	6803	6630	7402	7121	6394
Tanzania	5912	5601	6157	6402	5549	6216	4827	6581
LSD (P<0.05)	1340				1046			
	Leaf (%)							
Mombasa	76.4	69.3	65.2	56.9	81.2	75.6	74.4	62.9
Tanzania	78.4	70.7	64.5	53.0	80.7	76.8	73.9	62.1
LSD (P<0.05)	4.9				2.9			

Table 2. Effects of cutting interval on mean crude protein (CP), acid detergent fiber (ADF) and neutral detergent fiber (NDF) concentrations in stem and leaf of Mombasa and Tanzania guinea grasses.

Cultivar	Cutting interval (days)							
	Year 1				Year 2			
	30	45	60	90	30	45	60	90
	Stem CP (%)							
Mombasa	5.1	3.5	4.4	2.9	5.6	2.3	2.4	2.2
Tanzania	5.9	5.1	4.9	4.2	5.8	3.0	3.2	2.3
LSD (P<0.05)	2.5				0.5			
	Leaf CP (%)							
Mombasa	9.3	7.1	7.8	5.6	10.4	5.9	5.3	4.3
Tanzania	10.9	9.9	8.9	7.2	10.6	6.6	6.4	5.1
LSD (P<0.05)	2.4				0.7			
	Stem ADF (%)							
Mombasa	42.1	45.1	47.6	48.4	40.3	41.5	45.0	50.8
Tanzania	41.7	42.2	45.3	48.5	41.4	42.3	44.7	53.6
LSD (P<0.05)	2.1				0.4			
	Leaf ADF (%)							
Mombasa	37.2	36.5	38.3	38.8	35.6	37.2	37.5	40.1
Tanzania	36.2	36.9	38.1	37.5	34.6	37.2	38.2	39.7
LSD (P<0.05)	1.9				0.4			
	Stem NDF (%)							
Mombasa	70.1	74.2	74.3	76.6	69.3	73.3	74.3	77.4
Tanzania	70.3	69.9	72.8	75.5	68.9	70.9	72.4	75.6
LSD (P<0.05)	2.6				0.2			
	Leaf NDF (%)							
Mombasa	64.7	65.3	65.8	66.2	62.3	64.3	66.4	68.0
Tanzania	64.3	65.8	65.6	65.6	62.3	65.5	66.3	66.6
LSD (P<0.05)	1.6				0.3			

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