

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 twenty years and has proven to be a high quality forage (Phaikaew *et al.* 2007). Mombasa guinea grass (*Panicum maximum* cv. Mombasa), however, was only 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). Mombasa 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 two cultivars. The effects of cutting is 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), four cutting intervals (30, 45, 60, 90 days) and four 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) applied. The same amount of fertiliser was applied thereafter every 45 days.

RESULTS

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

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

Cultivar	Cutting interval							
	Year 1				Year 2			
	30 days	45 days	60 days	90 days	30 days	45 days	60 days	90 days
	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		

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

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

Cultivar	Cutting interval							
	Year 1				Year 2			
	30 days	45 days	60 days	90 days	30 days	45 days	60 days	90 days
	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	

DISCUSSION

At all cutting intervals, Mombasa produced 17-21% more total and 18-24% more leaf DM than Tanzania. It is this greater production of green leaf that is increasing the demand of Mombasa compared to Tanzania. Under grazing systems in Central and South America, Mombasa has produced 28-40% more DM than Tanzania (Cook *et al.* 2005). Even though the quality of Tanzania was superior to Mombasa in terms of crude protein and stem fibre levels, Mombasa's greater DM production appeals to farmers. An optimum cutting interval based on the data in this study, suggest a compromise between quantity and quality. Even though the 30 day cutting interval produced crude protein levels 2-3 percentage points higher than levels from 45- and 60-day-old forage, dry matter production from 30-day-old forage was nearly 15-20% less than production from 45- and 60-day-old forage. A recommended cutting interval will depend on what combination of yield and quality is desired.

REFERENCES

- Cook BG, Pengelly BC, Brown SD, Donnelly JL, Eagles DA, Franco MA, Hanson J, Mullen BF, Partridge IJ, Peters M, Schultze-Kraft R (2005) *Tropical Forages: an interactive selection tool*. [CD-ROM], (CSIRO, DPI & F (Qld), CIAT and ILRI, Brisbane, Australia).
- Hare MD, Phengphet S, Sonsiri T, Sutin N, Vernon ESF, Stern E (2013) Impact of tropical forage seed development in villages in Thailand and Laos: research to village farmer production to seed export *Proceedings of the 22nd International Grassland Congress* xxxx.
- Phaikaew C, Nakamane G, Pholsen P (2007) Purple guinea: a high quality grass for forage and seed that improves smallholder income in Thailand. In: "Forages: A Pathway to Prosperity for Smallholder Farmers" (Eds MD Hare, K Wongpichet). *Proceedings of an International Forage Symposium*. pp. 61-76. (Faculty of Agriculture, Ubon Ratchathani University, Thailand).