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The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Effect of cutting frequency on silage making from napier grasses in Thailand

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Key words: napier grass, silage, cutting frequency

Introduction In central Thailand the genus *Pennisetum* is the most productive species of the tropical grasses. These species are recommended for cut-and-carry system with a cutting frequency of 30-40 days (Tudsri *et al.* 2002). However, such a cutting frequency may not be appropriate for silage making. Thus, the main objective of this study was to determine the optimum cutting time and the best variety of napier grass for conservation as silage.

Materials and methods The experiment was conducted on a sandy clay loam soil with pH 7.2 at the Suwanvajokasikit Research Station, Pakchong. A randomized split-plot design with three replications was used. The sub-plot size was 3 x 3 m. The main plots consisted of three cutting frequencies: 30, 45 and 90 days and sub-plot consisted of ten napier grass varieties: dwarf small (DS), dwarf medium (DM), dwarf early flowering (DE), dwarf late flowering (DL), Merkeron (MK), wruk wona (WW), Taiwan A25 (T25), Taiwan A148 (T148), common napier (CN) and King napier (KN). Grasses were sown at 50 x 50 cm spacings on December 10, 2002. Cutting started on June 4 2003 and finished on March 10 2004. After 30 days ensiling, samples were taken for quality analysis by (state procedure used).

Results and discussion The pH of the silage was below 4.2, the level suggested by Catchpoole and Henzell (1971) for effective preservation, only when the forage was cut every 90 days (except for DS and DM) (Table 1). Highest pH values were consistently obtained from silage cut every 30 days with intermediate values for those cut every 45 days. Lactic acid is a major component of fermentation and responsible for increase in acidity of ensiled forage (Catchpoole and Henzell, 1971). Thus, a higher lactic acid content in silage is a desirable characteristic for good quality. In the present study, the low lactic acid content in most silages came from forage cut at 30 and 45 days and the highest at the longest cutting interval (Table 1). Good silage should have 3-13% lactic acid. Silage made from 30 and 45 day cutting intervals had higher crude protein content than when cut at 90 days and were well above critical crude protein concentration (7%) suggested by Milford and Minson (1966). ADF increased with decreasing cutting interval. Most dwarf types had lower ADF than tall types.

Table 1 Effect of cutting frequency and variety on pH, Lactic acid, ADF (%) and CP (%).

Variety	pH			Lactic acid			CP			ADF		
	Cutting Frequency			Cutting Frequency			Cutting Frequency			Cutting Frequency		
	(days)			(days)			(days)			(days)		
	30	45	90	30	45	90	30	45	90	30	45	90
Dwarf, DS	4.9 ab ¹	4.9 a	5.1 a	0.7 a ¹	0.7 c	0.76 c	15.6	11.1	10.0	30.1	31.6	34.0
DM	5.2 a	4.9 a	5.0 a	0.4 a	0.6 c	0.91 c	12.1	9.4	7.2	32.6	32.6	34.8
DE	5.0 a	4.3 b	4.2 b	0.4 a	1.7 b	3.12 b	12.9	9.9	7.1	33.2	36.9	40.3
DL	5.1 a	4.4 ab	4.1 b	0.4 a	1.4 bc	3.10 b	13.8	10.4	8.6	34.7	36.4	37.5
Tall, MK	5.0 a	4.8 a	4.1 b	0.5 a	1.1 bc	3.39 b	11.6	7.8	5.4	36.5	41.4	44.5
WW	4.9 ab	4.0 c	3.9 b	0.3 a	3.1 a	4.35 a	10.8	7.2	4.8	35.8	37.4	42.6
T148	4.8 ab	4.3 b	4.1 b	0.3 a	1.5 b	4.05 a	11.6	8.4	4.6	36.5	38.5	46.3
T25	4.6 b	4.4 b	4.2 b	0.3 a	1.8 b	3.01 b	15.0	8.3	5.9	32.1	38.3	43.8
CN	5.1 a	4.6 ab	4.2 b	0.4 a	1.3 bc	3.08 b	12.5	9.2	5.9	34.3	40.7	46.2
KN	4.6 b	4.2 bc	4.1 b	0.5 a	3.0 a	4.50 a	13.5	8.9	4.8	34.3	39.5	46.1

¹ Values in the same column not followed by the same letter differ at $P > 0.05$.

Conclusions The optimum cutting frequency for silage making from napier grasses depends on variety when considering a combination of desirable forage characteristics at the time of harvest and ensiling. DS and DM are regarded less suitable for silage making, due to the high pH, for effective conservation when compared to DE and DL cut every 90 days. For all the remaining varieties including the tall types, cutting frequency should not be more than 90 days of regrowth, except for WW and KN when cutting could be carried out after 45 days of regrowth.

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