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Performance of hybrid Napier cultivars CO-5 (*Pennisetum glaucum* × *P. purpureum schumach*) and Sampoorna (*Pennisetum pedicillatum* × *P. americanum*) harvested at five intervals during Yala season of the year

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Low quality tropical forages are one of the main constraints for ruminant feeding in Sri Lanka leading to low animal productivity. As a solution to this, two hybrid Napier cultivars; CO-5 and Sampoorna were recently introduced and have been described as superior yielding to previous cultivars of CO-3 (*Pennisetum perpureum* × *P. typhodium*) and CO-4 (*Pennisetum glaucum* × *P. purpureum*). The objective of this study were to evaluate the yield and nutrient composition of the CO-5 and Sampoorna Napier cultivars grown under rain fed conditions during the Yala season (May to September).

A 2 × 5 factorial experiment, including two cultivars (CO-5 and Sampoorna) and five harvest intervals (HI; 4, 6, 8, 10 and 12 weeks after planting) was undertaken using a randomized complete block design, with plots 5 m × 2 m in size and each treatment replicated three times. Fertiliser was applied using a blend recommended by Premarathne and Premalal (2006). Planting was undertaken by inserting two stem cuttings (30 - 45 cm long) at 1 m × 1 m spacings. At each harvest interval, plants within a 1 m^2 section in each plot were cut (5 cm above ground level) for determination of fresh and dry weights. A representative sub sample (±500 g) was taken to measure dry matter (DM), crude protein (CP), ash, acid detergent fibre (ADF), neutral detergent fibre (NDF), *in-vitro* organic matter digestibility (IVOMD) and *in-vitro* metabolizable energy (IVME) content. Data were analysed using MINITAB (16th Version) as a generalized linear model with a 2 factor ANOVA to compare mean differences between cultivars harvested at five intervals.

The DM yield was similar ($P > 0.05$) for the two cultivars but there was a significant difference ($P < 0.05$) between harvesting intervals with DM yield, increasing almost linearly with increasing HI (Table 1). The CP% decreased exponentially with HI with CO-5 greater than Sampoorna ($P = 0.05$; average 9.3% vs 8.7%). Ash% was significantly greater for Sampoorna than CO-5 at 4 weeks, but it then declined more rapidly in Sampoorna, such that the two cultivars were not significantly different from week 8 onwards (C × HI = 0.00). NDF% was similar at each HI except at week 6 when CO-5 was significantly less than Sampoorna (C × HI = 0.00). ADF% was not significantly different ($P > 0.05$) between cultivars, increasing linearly with maturity. Both IVOMD% and IVOME content were not significantly different between cultivars ($P > 0.05$) and was highest between weeks 6 to 8 and 4 to 8, respectively.

Table 1. Yield and nutritional composition of Napier hybrid cultivars CO-5 and Sampoorna at five harvest intervals[A]

Parameter	Cultivar	Harvest interval (weeks)					SEM	Significance		
		4	6	8	10	12	C × HI	C	HI	C × HI
DM yield (t/ha)	CO-5/Sam[B]	1.88^{d}	4.20^{cd}	6.05^{bc}	8.42^{b}	12.54^{a}	0.08	0.16	0.00	0.61
CP (%)	CO-5/Sam[B]	17.9^{a}	11.9^{b}	6.8^{c}	4.6^{d}	3.9^{d}	0.41	0.05	0.00	0.18
Ash (%)	CO-5	13.1^{b}	10.4 ^{c}	8.4^{de}	7.3^{ef}	6.5^{ef}	0.41	0.22	0.00	0.00
	Sampoorna	15.2^{a}	10.1^{cd}	6.8^{ef}	5.5 ^{f}	6.6^{ef}				
	Mean	14.1^{a}	10.2^{b}	7.6^{c}	6.5^{cd}	6.4^{d}				
NDF (%)	CO-5	64.8^{d}	67.7^{cd}	73.5^{ab}	75.7^{ab}	77.6 ^{a}	1.34	0.97	0.00	0.00
	Sampoorna	62.7^{d}	73.9^{ab}	73.3^{ab}	75.9^{ab}	73.7^{ab}				
	Mean	63.7^{c}	70.8^{b}	73.4^{ab}	75.6^{a}	75.7^{a}				
ADF (%)	CO-5/Sam[B]	37.5^{c}	38.7^{c}	42.8^{b}	48.9^{a}	49.9^{a}	0.83	0.11	0.00	0.27
IVOMD (%)	CO-5/Sam[B]	54.0^{b}	58.6^{a}	59.8^{a}	50.4^{c}	46.2^{d}	1.16	0.19	0.00	0.23
IVME (MJ/kg DM)	CO-5/Sam[B]	7.83^{b}	8.63^{a}	8.92^{a}	7.51^{bc}	6.91^{c}	0.17	0.38	0.00	0.08

[A]Values are means. Means within a variable with similar superscripts are not significantly different based on a Duncan's multiple range test ($P = 0.05$). C, Cultivar; HI, Harvesting Interval; SEM, Standard Error of the Mean.
[B]Average of cultivar means (i.e. HI main effect means).

Compared with previous studies on CO-3 and CO-4 cultivars in Sri Lanka (Premarathne and Premalal 2006; Jothirathne *et al*. 2018), CO-5 and Sampoorna were superior in terms of DM yield, IVME and OMD content whilst lower in CP. For both newer cultivars, the highest DM yield was obtained at the 12th week of maturity, but from a nutritional perspective harvesting at the 6th week of maturity during Yala season of the year was optimum for farmers.

References

Jothirathne MWHH *et al*. (2018) *Wayamba University International Conference*. p. 377.
Premarathne S, Premalal GCC (2006) *Agricultural Sciences* **2**(1), 22–23.