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Optimum Time of Cutting for Maximum Yield of Extractable Protein in Some Fodder Grasses

By

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ABSTRACT

A study with three fodder grasses to find out the optimum time of cutting for maximum yield of extractable protein employing three frequencies of cutting *viz.*, 30, 45 and 60 days was conducted. All the grasses, in general, gave good yields upto three months. *Panicum* and *Bracharia* gave higher average per day yield than *Cenchrus*. 30 days frequency was found to be better for the former two while 60 days for the latter.

INTRODUCTION

An attempt was made to find out the optimum time of cutting to get maximum yield of extractable protein with three fodder grasses *viz.*, *Cenchrus glaucus*, *Bracharia mutica* and *Panicum maximum* under fertilization.

MATERIALS AND METHODS

A field trial was laid out in the black soil of Tamil Nadu Agricultural University farm at Coimbatore with three fodder grasses. The plot size was 10 × 10 metres. Nitrogen, phosphorus and potassium were applied in the form of ammonium sulphate, superphosphate and muriate of potash at the rate of 200, 60 and 60 kg/ha respectively. Cutting was done at a frequency of once in 30, 45 and 60 days for all the three grasses for a period of one year and the dry matter yield at successive harvests was recorded. The samples were processed for the extraction of leaf protein as described by Balasundaram and Samuel (1971) and the analysis and calculations of extractable protein yields were done according to the method of Byers and Sturrock (1965). From the information on the extractable protein yields, the amount of protein extracted in kg/ha/day was also calculated.

RESULTS AND DISCUSSION

The yield of dry matter and extractable protein at successive harvests are presented for the three grasses (Table 1). The total yield of extractable protein decreased in 45 days cutting frequency than in 30 days, while 60 days registered an increase over 30 days. Similar trend was observed in *Cenchrus* sp and *Bracharia* sp while in *Panicum* sp 30 days registered the maximum yield followed by 60 and 45 days.

In *Cenchrus* specis the yield/unit time was highest under the second cut in all the three frequency of

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TABLE 1. Yield of dry matter and extractable protein in *Cenchrus glaucus*, *Bracharia mutica* and *Panicum maximum* (kg/ha)

Frequency of cutting		Number of cuttings											
		1	2	3	4	5	6	7	8	9	10	11	12
Cenchrus glaucus													
30 days	I	2145	4946	4178	1850	1930	821	1278	985	1482	1236	375	186
	II	80.6	161.5	120.4	110.8	134.5	43.0	40.3	38.1	61.6	57.1	12.3	4.5
		(2.6)	(5.4)	(4.0)	(3.6)	(4.5)	(1.4)	(1.3)	(1.2)	(2.1)	(1.9)	(0.4)	(0.2)
45 days	I	2505	8538	1816	1872	1578	1877	1748	841	—	—	—	—
	II	94.5	298.5	129.0	75.7	63.8	57.1	51.5	21.3	—	—	—	—
		(2.1)	(6.6)	(2.8)	(1.7)	(1.4)	(1.2)	(1.1)	(0.5)	—	—	—	—
60 days	I	7490	10401	3604	3056	3646	968	—	—	—	—	—	—
	II	287.7	366.9	156.4	63.8	109.2	23.5	—	—	—	—	—	—
		(4.8)	(6.1)	(2.6)	(1.1)	(1.7)	(0.4)	—	—	—	—	—	—
Bracharia mutica													
30 days	I	2544	6215	4628	1732	1258	1017	738	833	1146	678	326	196
	II	49.6	24.2	333.5	117.8	74.3	49.5	21.2	54.8	61.6	43.6	8.9	4.4
		(1.6)	(8.1)	(11.1)	(3.9)	(2.3)	(1.6)	(0.7)	(1.8)	(2.1)	(1.4)	(0.2)	(0.1)
45 days	I	2759	3684	2159	2103	1820	2135	1587	488	—	—	—	—
	II	105.2	243.6	126.4	84.1	52.6	76.1	58.2	17.9	—	—	—	—
		(2.3)	(5.4)	(2.8)	(1.9)	(1.2)	(1.7)	(1.3)	(0.4)	—	—	—	—

TABLE 1. *(Contd.)*

Frequency of cutting		Number of cuttings											
		1	2	3	4	5	6	7	8	9	10	11	12
60 days	I	3967	9255	6498	2506	2959	8198	—	—	—	—	—	—
	II	164.9	474.8	273.7	43.6	112.0	20.2	—	—	—	—	—	—
		(2.7)	(7.9)	(4.6)	(0.7)	(1.8)	(0.3)	—	—	—	—	—	—
Panicum maximum L.													
30 days	I	2416	5309	8026	2172	. . /9	948	1388	1271	696	548	421	195
	II	150.0	224.6	474.2	145.6	48.1	49.9	35.8	66.1	35.8	35.8	11.2	5.6
		(5.0)	(7.5)	(15.8)	(4.8)	(1.6)	(1.7)	(1.2)	(2.2)	(1.2)	(1.2)	(0.4)	(0.2)
45 days	I	2491	5336	1220	782	1394	661	455	408	—	—	—	—
	II	81.9	177.0	66.3	32.0	95.2	28.0	22.4	12.3	—	—	—	—
		(1.8)	(3.9)	(1.4)	(0.7)	(2.1)	(0.6)	(0.5)	(0.3)	—	—	—	—
60 days	I	3718	8691	2744	1963	1281	704	—	—	—	—	—	—
	II	122.7	359.8	166.9	69.4	35.8	22.4	—	—	—	—	—	—
		(2.0)	(5.9)	(2.8)	(1.1)	(0.6)	(0.4)	—	—	—	—	—	—

Figures in parenthesis are the amount of protein (kg/ha/day) extracted.

I Dry matter.

II Extractable protein.

cuttings while in *Bracharia* sp and *Panicum* sp a similar trend was seen for the 45 and 60 days cutting frequency but in the 30 days frequency the third cut registered the maximum. This may be due to protein yield and extractability decreased just after flowering stage as reported in different crops (Arckoll, 1971).

Panicum maximum: Comparing the cuts, the second cut was found to yield more of extractable protein in two of the three cutting frequencies tried in the experiment. But on the whole, the yield was more up to three months of the crop and later on declined gradually. Keeping this in view, an average day yield for the first three months was recorded (Table 2) and it was found to vary from as low as 2.8 to 9.4 kg/ha/day. Thus, 30 days frequency was observed to be the best for *Panicum* sp giving 9.4 kg/ha/day followed by 60 days, while 45 days frequency, registered the least with 2.8 kg/ha/day.

Cenchrus glaucus: Second cut gave the highest yield/unit time in all the three frequencies of cut tried. A similar trend as observed in *Panicum* sp showing an increase in the extractable protein yield upto three months is apparent. The average per day extractable protein yield, for the first three months revealed that 60 days frequency as the best with 5.45 kg/ha/day followed by 45 days while the 30 days registered the least with 4.00 kg/ha/day.

Bracharia mutica: The average per day extractable protein yield for the first three months showed a similar trend akin to *Panicum* and 30 days frequency proved as the best with 6.93 kg/ha/day followed by 60 days, while 45 days registered the least with 3.85 kg/ha/day.

A comparative study of all the three grasses together with all the three frequencies tried showed that in general the second cut recorded the maximum yield/unit time. All the grasses gave good yields till three months and showed a gradual reduction subsequently. An average per day yield for the first three months for all the three frequencies put together revealed that *Panicum* and *Bracharia* sp were on a par with 5.36 kg/ha/day while a lower yield of 4.6 kg/ha/day was observed in *Cenchrus* sp. This may be due to the short stature of the plant as compared to *Panicum* and *Bracharia*, resulting in a lower dry matter and protein yields.

Among the three frequencies of cuts tried 30 days frequency was found to be superior for the grasses, *Bracharia* sp and *Panicum* sp while 60 days proved to be better for *Cenchrus* sp.

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