Effect of Cutting Intervals on Yield and Nutritive Value of *Stylosanthes seabrana*

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Introduction

In India natural pastures do not meet the nutritional needs of grazing ruminants, and supplementary feeding of crop residues and concentrates is necessary for profitable animal production (Phaikaew *et al*., 2004). Stylo has a long history of research and development in India and has been used in many production systems including as a fodder crop, in ley farming and intercropping in agroforestry and silvipasture and for wasteland development and soil conservation (Ramesh *et al*., 1997).

Recent developments in the commercial utilization of stylo as a fodder crop have mostly been in the peninsular Indian states of Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Kerala. Stylosanthes species have made a significant contribution to animal nutrition in the tropics and subtropics. As a component of animal rations stylo can contribute to alleviate the significant shortage of green and dry fodder in India and generate income for smallholder farmers.

Relatively recent introduction of new improved germplasm including *S. seabrana* has shown a great promise for diverse agro-climatic zones. Among its different species, *S. seabrana* possesses high seedling vigour, high nutritional value and better adaptation under rainfed situations in heavy cracking clay soil types. The excellent adaptation of highly productive S. seabrana to a wide range of environments in India without the need to apply specific Bradyrhizobium is expected to further enhance its use (Ramesh *et al*., 2004).

Several studies have demonstrated the usefulness of Verano and CIAT 184 as cut-and-carry fodders for animals. Studies on dry matter production under different environments and cutting regimes have been used to develop optimum cutting management techniques to maximize fodder yield of these cultivars. It has also been indicated that *S. seabrana* gives enhanced yield in second and consecutive years as compared to the first year (Phaikaew *et al.*, 2004). This study was carried out to find the cutting regime which would give the optimum fodder quantity and quality in *S. seabrana*.

Materials and Methods

The experiment was carried out on the research farm of the Nimbkar Agricultural Research Institute (NARI) at Phaltan in Maharashtra state of India. It was laid out in a randomized complete block design and was replicated four times. Sowing was carried out on 16 August 2014. There were seven different cutting intervals viz. 30, 45, 60, 75, 90, 105 and 120 days. The sampling area in each plot was 1.35 X 4 meters as shown in Fig. 1. Basal application of 31 Kg N ha^{-1} and 81 Kg P_2O_5 ha^{-1} as Diammonium phosphate was made 10 days after sowing. Gliricidia leaves at the rate of 20 Kg per plot were applied to the trial on 9 October 2014. The seeds of *Stylosanthes seabrana* were sown at the rate of 5 Kg ha^{-1}. The treatments were allocated completely at random in each of the four fodder blocks. Cutting was done with a sickle at a uniform height of 15 cm. The first general cut was carried out 145 days after planting.

The harvest intervals of 30, 45, 60, 75, 90, 105 and 120 days have so far given 4, 3, 2, 1, 1 and 1 samples respectively. The fresh weight of herbage was taken by weighing the fresh herbage harvested within the sampling area of 1.35 X 4 meters. A 250 g subsample of each sample was put in paper envelope and dried in a forced draft oven set at 70^{o}C and weighed after attaining constant dry weight. This was used to calculate the total dry weight. Plant height was recorded using the mean of five readings taken from the sample area in each plot. Fresh herbage was separated into leaf + petioles and stem and oven-dried before weighing to find out % leaf .

Soil samples were collected at random from five representative locations of the field to a depth of 0-20 cm. These were bulked together to form a composite sample from which a sub-sample was taken for soil analysis to determine the physical and chemical characteristics of the site. Meteorological data of rainfall, rain days, pan evaporation, wind velocity, ambient temperature and relative humidity were collected. Statistical analysis of the data was done by using Windostat software.

Fig. 1: Sampling area from the plot of 45-day cutting regime ready for harvest. 30-day cutting regime plot is on the left.

Results and Discussion

The first general cut at 145 days after sowing gave 13968 kg fresh weight, 6251 kg dry weight, 54% moisture content, 60 cm plant height, 15.1% protein content, 8.1% ash content and 1.2% fat content in the herbage.

Comparisons were made between the first cut of all the seven treatments for forage yield and quality. Significantly highest ($P<0.05$) fresh and dry weights as well as plant height were recorded for the treatments where first cut was carried out at either 105 or 120 days. Significantly highest ($P<0.05$) protein content was recorded for the fodder harvested at 30, 45 and 60 days. Percent leaf was significantly higher ($P<0.05$) f
or all the cutting intervals compared to the treatment where fodder was harvested at 120 days.

Table 1: Forage quantity and quality of *Stylosanthes seabrana* fodder cut at different times after the initial cut

Cutting interval (days)	Fresh weight (kg/ha)	Dry weight (kg/ha)	Plant height (cm)	Ash Content (%)	Protein Content (%)	Fat Content (%)	Moisture Content (%)	Leaf (%)
30	1241	399	24.30	10.02	15.92	0.97	66.52	-
45	3400	1291	41.00	7.96	15.42	1.36	69.14	-
60	7914	2289	46.05	9.53	15.26	1.23	70.12	54.42
75	8104	3475	54.60	8.90	10.45	1.16	54.16	54.13
90	9176	4836	55.50	8.48	9.62	1.13	46.72	50.62
105	11793	5980	65.75	8.89	10.28	1.13	48.90	47.56
120	13372	7156	72.55	-	-	-	44.75	39.31
C.D. (0.05)	3820.53	1286.44	11.27	0.72	0.93	NS	6.89	7.52
SEM ±	1285.86	432.96	3.79	0.24	0.30	0.12	2.31	2.44

Conclusion

Stylosanthes seabrana can be harvested at an interval of every 60 days as values of protein content in the fodder for this cutting regime are at par with those for fodder cut at 30 or 45 days. Also the fresh and dry weight yields of fodder are significantly higher ($P<0.05$) for 60 day cutting interval than the 30 and 45 day ones.

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