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Yield of Mott Grass as Affected by Varying Levels of Nitrogen and Farmyard Manure Application

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ABSTRACT

The main objective of present study was to determine the effect of different levels of nitrogen (N) and farmyard manure (FYM) on yield of Mott grass (*Pennisetum purpureum*) at different cuttings. Treatments were T_1= control; T_2= 24 t FYM ha^{-1}; T_3= 300 kg N ha^{-1}; T_4= 150 kg N+12 t FYM ha^{-1}; T_5= 200 kg N + 8 t FYM ha^{-1} and T_6= 225 kg N + 6 t FYM ha^{-1}. Production potential of Mott grass was determined on the basis of green fodder and dry matter yield. Application of N or FYM increased both green fodder and Dry Matter yield significantly over control in all the three cuttings. Crop fertilized @ 300 kg N ha^{-1} produced the maximum green fodder yield (62.10-66.27 t $ha^{-1)}$ and Dry Matter yield (14.94-15.32 t ha^{-1}) in all the three cuttings. The difference between T_3 and T_6 was non-significant. Similarly, T_4 and T_5 produced same yield.

Key Words: Mott grass; Nitrogen; Farm Yard Manure

INTRODUCTION

Forages are the major and cheap source of feed for livestock. In Pakistan, about 16% of the total cropped area is put under fodder crops annually, even then regular supply of adequate and quality fodder is not being made (Hanjra *et al.*, 1995). This results in lowered production due to underfed animals. There may be many alternatives to overcome the shortage of forage but one of them is the introduction of high yielding crop varieties. During recent years, a number of high yielding varieties have been introduced and Mott grass is one of the promising forage because of its rapid growth, multicut nature and high yield.

Mott dwarf elephantgrass is a vegetative perennial, highly productive, stay for years in the fields and maintains its quality over long re-growth intervals. In a field of one acre, a fresh matter yield of 192 tons per year can be produced with improved agronomic practices (Gill & Bhatti, 1996). Mott grass is also important because of its availability during feed shortage period (May and June). The scientific evidence on production potential of mottgrass is limited. Therefore, the present study was planned to determine the effect of different levels of organic and inorganic fertilizers on the yield of Mott grass at various cuttings.

MATERIALS AND METHODS

In this experiment, effect of farmyard manure (FYM) and nitrogen (N) along with their different combinations on productivity of Motgrass was studied. The experiment was laid out in RCBD with three replications. The experiment was conducted at fodder production area of the Department of Livestock Management, University of Agriculture, Faisalabad. Experiment comprised the following treatments: T_1= control; T_2= 24 t FYM ha^{-1}; T_3 = 300 kg N ha^{-1}; T_4 = 150 kg N + 12 t FYM ha^{-1}; T_5 = 200 kg N + 8 t FYM ha^{-1} and T_6 = 225 kg N + 6 t FYM ha^{-1}. FYM was incorporated in soil at the time of seedbed preparation. Double-budded stem cuttings were planted at 60 x 60 cm spacing. Plot size was 4.20 x 12.6 cm. Nitrogen was applied in two equal splits for each cutting. First dose was given after planting with first irrigation, while second dose at 45 days after planting in first cutting and at 30 days after harvest in subsequent cuttings. The other agronomic practices were kept normal and uniform for all the treatments. Five plants per plot were selected at random (one plant from each row except two aside rows) and tagged. These plants were used throughout the production trial. Three cuttings were taken, first after 90 days of planting and subsequent cuttings with an interval of 60 days each. The data recorded was green fodder and dry matter yield.

Green fodder and dry matter yield per hectare. At harvest, all the plants of a plot were cut at an appropriate height and weighed with the help of a spring balance. Then green fodder yield per plot was converted to green fodder yield per hectare. Green fodder samples from each plot were chopped and dried in hot air oven to a constant weight. The dry matter (DM) percentage was calculated as follows:

$$\text{DM \%} = \frac{\text{Weight of dried sample}}{\text{Weight of fresh sample}} \times 100$$

DM yield/ha was calculated on the basis of DM percentage. The data were subjected to statistical analysis using analysis of variance technique according to RCBD. Comparison of treatment means was made by Fisher's Least significance test (Steel & Torrie, 1982). The analysis was made by using the M-STATC software (Russell D. Freed, MSTAT Director, Crop and Soil Science Department, Michigan State University, USA).

RESULTS AND DISCUSSION

Green fodder yield. The data regarding the green fodder yield ha^{-1} are presented in Table I. Application of N/FYM increased green fodder yield significantly over control in all the three cuttings. On an average, crop fertilized @ 300 kg N ha^{-1} produced the maximum yield (64.62 t ha^{-1}) that did not differ significantly from 225 kg N+ 6 t FYM (59.29 t ha^{-1}). Similarly, application of 150 kg N + 12 t FYM and 200 kg N + 8 t FYM produced the same green fodder yield (53.00 t ha^{-1}). An increase in green fodder yield in response to N/FYM fertilizations ascribed to greater number of tillers per plant and heavier plants.

Table I. Effect of different levels of nitrogen and farmyard manure on green fodder yield (t ha^{-1}) of Mott grass at different cuttings

	Cutting			
Treatments	**I**	**II**	**III**	**Average**
T1	34.120	33.440	22.680	30.080
T2	58.600	52.480	33.000	48.020
T3	66.270	65.510	62.100	64.620
T4	62.830	49.090	47.100	53.000
T5	49.040	56.810	53.160	53.000
T6	59.770	57.330	60.780	59.290
LAD value	7.447	15.880	13.650	9.310

T_1= control; T_2=24 t FYM ha^{-1}; T_3= 300 kg N ha^{-1}; T_4= 150 kg N+12 t FYM ha^{-1} ; T_5= 200 kg N + 8 t FYM ha^{-1}; T_6= 225 kg N + 6 t FYM ha^{-1}

These results are in line with those of Costs and Chandler (1960) who reported that green fodder yield of Pangola and Napier grasses increased progressively with N application. Ashley *et al.* (1965) and Doss *et al.* (1966) found that green fodder yield of Bermuda grass increased with increasing N rates. Saeed *et al.* (1996) also reported an increase in the green fodder yield of Mott grass in response to N application. Results of the present study suggest that Mott grass is highly responsive to N fertilization and its green fodder yield may be further enhanced by using higher levels of nitrogen than those under study.

Dry matter yield. The data pertaining to DM yield of Mott grass are presented in Table II. Application of N/FYM increased DM yield significantly over control in all the three cuttings. On an average, application of 300 kg ha^{-1} resulted in the maximum DM yield (14.94 t) but did not differ significantly from 225 kg N + 6 t FYM, 200 kg N + 8 t FYM and 150 kg N + 12 t FYM with DM production of 13.90, 12.27 and 12.20 t ha^{-1}, respectively. These findings are in line with those of Nowachi and Weznikas (1975) who found that high rates of N application increased the DM yield of grasses. Desai and Deore (1980) reported that DM yield increased with increasing N application. Valentim *et al.* (1988) and Siddiqui (1994) also reported that application of N to Mott grass increased its DM yield significantly over control.

Table II. Effect of different levels of nitrogen and farmyard manure on dry matter yield (t ha^{-1}) of Mott grass at different cuttings

	Cuttings			
Treatment	**I**	**II**	**III**	**Average**
T1	8.240	8.080	5.480	7.260
T2	14.330	12.830	8.070	11.740
T3	15.320	15.150	14.360	14.940
T4	14.460	11.300	10.840	12.200
T5	11.350	13.150	12.310	12.270
T6	14.020	13.440	14.250	13.900
LSD value	1.638	3.494	3.003	2.048

T_1= control; T_2= 24 t FYM ha^{-1}; T_3= 300 kg N ha^{-1}; T_4= 150 kg N+12 t FYM ha^{-1}; T_5= 200 kg N + 8 t FYM ha^{-1}; T_6= 225 kg N + 6 t FYM ha^{-1}

CONCLUSION

It is concluded that application of N and FYM increased green fodder and dry matter yield significantly over control in all cuttings. Crop fertilized @ 300 kg n ha^{-1} produced the maximum yield.

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