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Effect of Varying Levels of Nitrogen and Farm Yard Manure Application on Tillering and Height of Mott Grass

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ABSTRACT

This research project was undertaken to determine the effect of different levels of nitrogen (N) and farm yard manure (FYM) on tillering and height of Mott grass (*Pennisetum purpureum*) plant at different vegetative growth stages. The experiment was conducted at the Livestock Research Farm, University of Agriculture, Faisalabad during the year 1997-1998. Treatments were T_1 = control; T_2 = 24 tonnes FYM ha^{-1}; T_3 = 3000 kg N; T_4 = 150 kg N +12 tonnes FYM ha^{-1}; T_5= 200 kg N + 8 tonnes FYM ha^{-1} and T_6= 225 kg N +6 tonnes FYM ha^{-1}. Production potential of Mott grass was determined on the basis of number of tillers and plant height. Number of tillers/plant increased significantly with N or FYM application over control. At harvest, tillering was maximum (46.37/plant) in 300 kg N ha^{-1} treatment, while minimum number of tillers (21.25) were observed in control. However, the difference between T4 and T6 was non-significant. Plant attained the maximum height (157.32 cm) in 300 kg N ha^{-1} and minimum (111.47 cm) in control. However, the difference between T_3 and T_5 was non significant. Results revealed that crop fertilized with "N" @ 300 kg ha^{-1} produced the tallest plant alongwith maximum tillering.

Key Words: Mott grass; Maturity; Fertilizer; Nitrogen; Farm yard manure

INTRODUCTION

There may be many alternatives to overcome the shortage of forage but one of them is the introduction of high yielding crop varieties. Mott dwarf elephant grass (*Pennisetum purpureum*) is a vegetative perennial, highly productive, stay for years in the fields and maintains its quality over long regrowth intervals. In a field of one acre, a fresh matter yield of 192 tonnes 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 growth performance, nutritional and biological evaluation of Mott grass is limited. Therefore, the present project was planned to determine the effect of different levels of organic and inorganic fertilizers on the tillering and height of Mott grass plant at different vegetative growth stages.

MATERIALS AND METHODS

In this experiment, effect of farm yard manure (FYM) and urea (N) alongwith their different combinations on productivity of Mott grass was studied. The experiment was laid out in RCBD with three replications. The experiment was conducted at the fodder production area of the Department of Livestock Management, University of Agriculture, Faisalabad. Experiment comprised the following treatments: T1 = Control; T2 = 24 t FYM ha^{-1}; T3 = 300 kg N ha^{-1}; T4 = 150 kg N + 12 t FYM ha^{-1}; T5 = 200 kg N + 8 t FYM ha^{-1}; T6 = 225 kg N + 6 t FYM ha^{-1}.

FYM was incorporated in soil at the time of seedbed preparation. Mott grass was planted on March 31,1997 on a well prepared seed bed. Double-bedded stem cuttings were planted at 60 x 60 cm spacing. Plot size was 4.20 x 12.6 m. Nitrogen was applied in two equal splits for 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 observations recorded were number of tillers per plant and plant height.

Observations

Tillers/plant. With an interval of 15 days from planting to harvesting, number of tillers of five randomly selected and tagged plants from each plot was counted and averaged.

Plant height. Five selected plants from each plot were measured with a meter rod from base of plant to its growing point after each 15 days. Thereafter, the plant height was averaged.

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 difference test (Steel & Torrie, 1982). The analysis was made by using the M-STAT C Software (Russell D. Freed, MSTAT Director, Crop & Soil Science Deptt., Michigan State University).

RESULTS AND DISCUSSION

Tillers per plant. Plant density per unit area at harvest is the main yield determining component of a fodder crop. The data pertaining to number of tillers per plant at different development stages and treatments is presented in Table I. Regardless of the fertilizer treatments, number of tillers per plant increased progressively up to harvest. However, such increase in tillers became more pronounced at 30 days after planting (DAP) where nitrogen alone was applied @ 300 kg N ha^{-1}.

Application of N/FYM increased number of tillers per plant at harvest significantly over control in all the three cuttings. On an average, crop fertilized @ 300 kg N ha^{-1}. Produced the maximum number of tillers per plant (46.37) followed by that fertilized @ 225 kg N + 6 t FYM (34.20) and 150 kg N + 12 t FYM (33.51) the latter two treatments did not differ significantly from each other.

Plant height. Plant height of a crop at harvest is a function of the well coordinated interplay of the inherent and the environmental factors. The data pertaining to plant height at different development stages and treatments are given in Table II. Plant height increased progressively up to harvest with the application of fertilizers. However, such increase became more prominent after 45 DAP in all the treatments.

Application of N/FYM increased plant height significantly over control at all the growth stages in all cuttings. On an average, crop fertilized @ 300 kg N ha^{-1} produced the tallest plants (157.32 cm) but that did not differ significantly from the crop fertilized @ 200 kg N + 8 t FYM (146.36 cm). Similarly the differences between 150 kg N +12 t FYM and 225 kg N + 6 t FYM ha^{-1} treatments were non-significant.

Thomas and Osenbrug (1959) found that the use of manure and nitrogen fertilizer markedly increased plant height. Aslam (1964) also found similar results who reported that application of N-fertilizer to napier grass hybrid increased plant height. Several previous studies (Desai & Deore, 1980; Mustafa & Abdelmagid, 1982; Muldoon, 1985) have also shown that application of N-fertilizer increased plant height in sorghum. Panda

Table I. Effect of different levels of nitrogen and farmyard manure on number of tillers per plant at various growth stages

Cutting	Treatment						LSD-Value
	T1	T2	T3	T4	T5	T6	
				15 Day			
I	1.00	1.00	1.20	1.00	1.00	1.26	0.549
II	20.33	27.00	34.93	24.53	30.06	29.93	7.606
III	32.20	41.67	50.80	53.67	53.80	54.63	7.228
				30 Day			
I	2.60	3.46	5.66	3.13	2.80	3.26	0.734
II	19.533	24.0	30.13	27.06	23.80	22.53	5.291
III	39.80	50.66	82.86	63.80	63.00	63.80	10.070
				45 Day			
I	3.46	4.33	6.06	4.33	3.53	4.66	0.609
II	20.0	25.93	30.46	27.13	24.26	23.73	5.042
III	38.40	51.20	93.53	65.66	61.80	77.46	6.712
				At Harvest			
I	10.10	12.21	16.64	13.61	10.84	12.83	2.478
II	14.0	19.93	22.80	20.73	19.33	18.20	5.399
III	39.66	47.34	99.73	66.20	56.40	71.60	3.944

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}

Previous studies (Aslam, 1964; Deesai & Deore, 1980) have also shown that application of N-fertilizer increased number of tillers per plant in Bajra-napier grass. Sollenberger *et al.* (1988), Woodward and Prine (1990) and Saeed *et al*. (1996) reported that in Mott dwarf elephant grass increasing N-fertilize rates resulted in a greater number of tillers per plant.

(1972) found that in guar fodder, plant height also increased with increasing N level. Saeed *et al*. (1996) reported that height of Mott grass plant significantly increased with the application of N over the check. The plant height was 99.86, 115.00 and 124.39 cm for control, 100 kg N and 200 kg N ha^{-1} treatments, respectively.

Table II. Effect of different levels of nitrogen and farmyard manure on plant height (cm) at various growth stages

Cutting	Treatment						LSD-Value
	T1	T2	T3	T4	T5	T6	
				15 Day			
I	2.26	3.40	3.0	3.53	2.40	4.46	0.407
II	31.40	37.33	39.20	35.53	31.73	38.53	6.839
III	26.60	28.13	30.53	28.80	30.46	26.46	5.4.4
				30 Day			
I	7.93	11.93	12.80	11.73	9.30	13.46	0.931
II	52.93	61.40	62.86	60.86	67.00	67.93	11.540
III	39.06	46.70	52.13	54.66	56.73	56.40	9.142
				45 Day			
I	10.26	18.66	15.90	16.33	16.80	16.86	1.735
II	114.66	125.46	134.66	118.46	138.13	116.46	19.02
III	68.23	52.46	116.80	86.00	91.60	88.96	7.414
				At Harvest			
I	96.60	109.74	117.92	114.67	112.98	116.64	4.130
II	139.33	161.66	161.06	152.00	155.40	155.33	10.260
III	98.60	103.00	193.00	144.60	170.84	146.62	28.94

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 increase number of tillers and plant height significantly over control at all the growth stages in all cuttings. Crop fertilized @ 300 kg N ha^{-1} produced the tallest plant alongwith maximum tillering.

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