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EFFECT OF FERTILIZER AND CUTTING MANAGEMENT ON DRY FORAGE YIELD OF *ISEILEMA LAXUM* GRASS IN BUNDELKHAND REGION (U.P.)

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SUMMARY

The beneficial effects of different management practices (Cutting management, N levels and methods of N application) on dry forage yield of *Iseilema laxum* grass were studied during 2008-10 in the dry sub-humid region of Bundelkhand region (U. P.) India. The results indicated that no cut treatment (control) produced significantly higher dry forage yield than two and three cuts. Application of 90 kg N/ ha recorded significantly higher dry forage yield than lower levels of nitrogen (0, 30 and 60 kg N/ha). It can be inferred from the present investigation that natural grass can be harvested once at the time of maturity and fertilized with 90 kg N/ha to obtain higher dry forage yield.

Key words : Cutting management, nitrogen, dry forage yield and *Iseilema laxum* grass

India has the largest cattle population i.e. 1/6th of the world strength. Livestock play a key role in the Indian agricultural economy and form an integral part of the farming system. In the diverse climate of India, a variety of forages, pasture grasses, legumes, shrubs and trees find their place in the natural vegetation.

Bundelkhand is extended over about 59.52 thousand sq km area. The climatic condition of this region is remarkably different from other areas as evident from the physiographic nature and development of soil and agriculture system. In view to keep pace at rising cattle population, there is an urgent need to increase and maximise our forage resources manifold through efficient and judicious use of fertilizer, cutting management, etc. in grassland communities.

Iseilema laxum as principal grass species represents the better development of grassland in this dry sub-tropical region comprising the western part of Uttar Pradesh. *I. laxum* has better palatability as compared to other important species in the region.

Fertilizer and cutting management of natural grassland significantly influence the growth and forage yield of grass. As there is lack of adequate information regarding the effect of fertilizer and cutting management on the productivity of *I. laxum*, the present experiment was conducted.

The experiment was conducted for three consecutive years during 2007-08 to 2009-10 at Aata Agriculture Farm, Orai (U.P.). It lies between 25^0 29' N latitude and 79^0 37' E longitude at an elevation of 141.6 m above mean sea level. The soil was pale brown in colour (10 YR; 6/3), loamy in texture, with pH of 7.2 i.e. slightly alkaline. Organic carbon and C/N ratio for different depths ranged from 0.03 to 0.05per cent and from 13.00 to 16.23, respectively.

The climate, in general, is typical monsoonic (dry sub-humid) with extremes of temperature and well demarked by three distinct seasons viz., rainy (hot and humid), July to October, winter (cold and dry) November to February and summer (hot and dry) March to June. The average annual temperature is uniformly high (25^0C) but the mean monthly values vary considerably (13.9^0C mean minimum to 34^0C mean maximum). The mean total annual precipitation is 1169 mm of which 84% falls between July to October. There are four wet months (July to October) and eight dry months.

The treatments consisted of three cutting management (C_1 - Control, cutting at the time of maturity; C_2-two cuts, 45 days and at the time of maturity; C_3 - three cuts, 45 days, 75 days and at the time of maturity), four nitrogen levels (0, 30, 60 and 90 kg N/ha) and two methods of application (all basal - M_1 and 50% basal

and 50% at 45 days after sowing - M_2). The experiment was laid out in strip plot design with three replications. The sowing of *I. laxum* grass was carried out on the onset of rainfall and harvested as per treatments. The N was applied as per treatment in the form of urea. The plant samples collected at each harvest separately from each plot were sun-dried for 20 days and dry forage weight was recorded for each treatment. Morphological observations on plant height and tiller number per plant were recorded at the time of harvest.

Effect of Cutting Management

The results showed that no cut treatment (control) produced higher dry forage yield of *I. laxum* grass than two and three cuts treatments during all the years as well as pooled (Table 1). No cut treatment produced 43.3 and 26.2per cent higher dry forage yield than two cuts and three cuts, respectively.

Nitrogen Levels

Application of 90 kg N/ha recorded significant high dry forage yield (DFY) than 0, 30 and 60 kg N/ha in 2008-09 and 2009-10 (Table 1) and the increase was 32.0, 21.1 and 11.4 per cent, respectively, on pooled basis. Maximum DFY at 90 kg N might be due higher plant height and more number of tillers per plant. Application of 90 kg N/ha showed significantly higher plant height in 2008-09, 2009-10 and on pooled basis also. Similarly, significantly maximum number of tillers per plant was recorded at 90 kg N/ha in 2008-09, 2009-10 and on pooled basis. The work at IGFRI, Jhansi also indicated that Marvel grass variety IGFRI-585 showed positive response to N (Anonymous, 1999). Research work in Gujarat Agricultural University, Anand also indicated that Gujarat Marvel Grass-1 variety gave positive response upto 90 kg N/ha (Patel *et al.*, 1998). The result of present investigation is also in conformity with the finding of research work done by Patel *et al*. (2007) on Marvel grass (GMG-1) at Anand Agricultural University, Anand.

Methods of Nitrogen Application

The data presented in Table 1 revealed that the method of nitrogen application had no significant influence on DFY of the grass in any year as well as on pooled basis.

Interaction Effect

The maximum DFY on natural grass was

TABLE 1
Effect of nitrogen levels and cutting management on dry forage yield (DFY) of *Isielema laxum* grass

Treatment	Dry forage yield (q/ha)			
	Year			
	2007-08	2008-09	2009-10	Pooled
Cutting management (C)				
C_1–Control	40.27	62.50	50.36	51.01
C_2–Two cuts	35.82	43.58	27.40	35.60
C_3–Three cuts	38.32	42.55	40.36	40.41
C. D. (P=0.05)	NS	7.8	1.2	9.9
Nitrogen levels (N)				
N_1–0 kg/ha	41.51	41.00	33.17	38.56
N_2–30 kg/ha	41.44	48.47	39.06	42.99
N_3–60 kg/ha	38.97	54.07	47.07	46.70
N_4–90 kg/ha	38.63	61.30	52.89	50.94
C. D. (P=0.05)	NS	2.2	1.2	NS
Method of nitrogen application (M)				
M_1–All basal	40.36	50.46	41.36	44.06
M_2–50% basal+50% DAS	39.91	51.96	44.72	45.53
C. D. (P=0.05)	NS	NS	0.8	NS

NS–Not Significant.

recorded when grass was harvested after applying 90 kg N/ha irrespective of cutting management in 2008-09 and 2009-10 barring C_2 N_{90} in 2009-10 (Table 2). The effect of cuts irrespective of year was significant for DFY.

TABLE 2
Interaction effect of year, cutting management on N levels on DFY of *Iseilema laxum* grass

Year x cutting management	Dry forage yield (q/ha)			
	Nitrogen levels (kg/ha)			
	N_0	N_{30}	N_{60}	N_{90}
2007-08 x C_1	56.53	46.70	44.28	43.37
2007-08 x C_2	35.17	41.33	39.53	36.05
2007-08 x C_3	44.43	42.88	39.70	43.07
2008-09 x C_1	61.53	66.03	69.20	78.03
2008-09 x C_2	33.20	40.07	49.37	55.87
2008-09 x C_3	34.87	45.28	49.23	56.60
2009-10 x C_1	49.87	57.20	66.20	71.87
2009-10 x C_2	25.03	28.03	31.87	34.53
2009-10 x C_3	31.20	38.53	49.70	58.87
C. D. (P=0.05)	5.10			

CONCLUSION

It can be concluded that *Iseilema laxum* grass may be fertilized with 90 kg N/ha and harvested once at the time of maturity to obtain higher dry forage yield.

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