

Effect of cutting management and nitrogen fertilization on dry-fodder production of *Iseilema laxum* under natural grassland condition

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ABSTRACT

An experiment was conducted during the rainy seasons of 1991 and 1992 at Paria, to study the effect of cutting management and nitrogen application on dry-fodder production of *Iseilema laxum* Hack. in natural grassland condition. The pooled results revealed that 2-cut management resulted in significantly higher dry grass as well as protein yield over 1 cut. However, methods of nitrogen application showed non-significant treatment difference among them. Nitrogen fertilization significantly increased the dry-grass yield up to 40 kg N/ha, while protein yield up to the higher level of 60 kg N/ha. Incremental cost : benefit ratio between the cutting managements was higher in 2 cuts and among the N levels with 20 kg N/ha.

Iseilema laxum Hack. (locally known as *fulva* grass) is the principal grass species of in the eastern tract of south Gujarat. It has a good demand as fodder both in Gujarat, where it gives an average yield of 2,000–2,500 kg/ha of dry matter compared with 5,000–6,000 kg/ha in deep and fertile soils.

This zone is characterized by high rainfall (1,600 mm in north to 2,500 mm in south), undulating fine-textured and shallow to medium deep soils. Hence poor nutrient availability rather than moisture availability seems to be the major limiting factor in natural grasslands. Another important reason for low yield is the practice of taking 1 cut only. Since information is lacking on these aspects, present investigation was carried out to find out effect of cutting and fertilizer management on *Iseilema laxum* under natural grassland condition.

MATERIALS AND METHODS

The investigation was carried out during the rainy seasons of 1991 and 1992 at Paria, Gujarat. Soil of the experimental field was clayey in texture containing 0.17% organic carbon, 187 kg/ha available N, 36 kg/ha available P_2O_5 , with 8.2 pH. The rainfall received during first and second years was 2,144 and 2,355 mm respectively, spread over 112 and 147 days. Sixteen treatment combinations involved 2 cutting management, viz. 1 cut at maturity (C_1), and 2 cuts, i.e. 1 cut at 45 days growth and second at maturity (C_2); and 2 nitrogen-management practices, i. e. full dose of N as basal (M_1) and 50% N as basal + 50% N at 45 days stage (M_2); 4 levels of N (0, 20, 40 and 60 kg/ha, N_0 , N_{20} , N_{40} and N_{60}). The treatments were replicated 3 times in split-plot design. The phosphorus @ 20 kg P_2O_5 /ha was applied common to all plots.

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RESULTS AND DISCUSSION

Effect of cutting management

The 2-cut management significantly increased the dry-grass yield as well as protein yield over 1 cut during both the years as well as in pooled data. The significant increase in dry-grass yield was 52.3 and 58.3% in the individual years and 55.5% in the pooled over 1 cut (Table 1). Higher yield under 2-cut management could be ascribed to conducive climatic conditions, particularly the duration and amount of rainfall under south Gujarat conditions.

Effect of method of N application

Between the methods of N application, there was no significant increase in dry-fodder yield during individual year as well

as in pooled (Table 1).

Effect of N level

Nitrogen fertilization significantly increased the dry-fodder yield in both the years (Table 1). The maximum yield was obtained with 60 kg N/ha, which was significantly superior to the control and 20 kg N/ha, but was at par with 40 kg N/ha. The differences between 20 and 40 kg N/ha were also non-significant.

The pooled data also indicated corresponding increase in dry-fodder yield with successive N level from 20 to 60 kg/ha; however, the significant response was observed only up to 40 kg N/ha. The mean increase in dry-fodder yield with 20, 40 and 60 kg N/ha on pooled data basis was 42.5, 60.8 and 76.7% respectively. These findings

Table 1. Effect of cutting and fertilizer management on dry-fodder and protein yields of *Iseilema laxum*

Treatment	Dry-fodder yield (q/ha)			Protein yield (kg/ha)		
	1991-92	1992-93	Pooled	191-92	1992-93	Pooled
<i>Cutting management</i>						
1 cut at maturity	62.1	59.7	60.9	291	352	321
2 cuts, i.e. 1 at 45 days stage + 1 at maturity	94.6	94.5	94.6	506	577	542
SEm $\pm$	2.4	2.9	1.9	28	33	22
CD (P = 0.05)	14.8	17.8	7.5	172	202	86
<i>Method of N application</i>						
All basal	79.6	77.5	78.5	386	468	427
50% N basal + 50% N at 45 days	77.5	76.5	77.0	411	461	436
SEm $\pm$	3.0	3.1	2.1	18	28	17
CD (P = 0.05)	NS	NS	NS	NS	NS	NS
<i>N (kg/ha)</i>						
0	53.8	53.3	53.6	213	283	248
20	77.8	75.1	76.4	363	429	396
40	86.3	86.0	86.2	468	518	493
60	95.5	94.0	94.7	550	628	589
SEm $\pm$	4.2	4.4	3.0	26	40	24
CD (P = 0.05)	12.1	12.7	8.6	75	117	68

Table 2. Effect of cutting management and N level on pooled gross realization, expenditure, net realization and net incremental : cost benefit ratio in *Iseilema laxum*

Treatment	Gross realization (Rs./ha)	Total expenditure (Rs/ha)	Net realization (Rs/ha)	Incremental benefit (Rs/ha)	Incremental cost (Rs/ha)	Increment cost : benefit ratio	
						Gross	Net
<i>Cutting management</i>							
1 cut at maturity	4,263	781	3,482				
2 cuts (1 at 45 days stage + 1 at maturity)	6,622	931	5,691	2,209	150	1 : 14.73	1 : 13.73
<i>N (kg/ha)</i>							
0	3,752	668	3,084				
20	5,348	793	4,555	1,471	125	1 : 11.77	1 : 10.77
40	6,034	919	5,115	2,031	251	1 : 8.09	1 : 7.09
60	6,629	1,044	5,585	2,501	376	1 : 6.65	1 : 5.65

Dry grass Re 0.70/kg; N Rs 6.27/kg; labour charge Rs 15/day

are in conformity with those obtained by Kumar and Singh (1992).

Application of 60 kg N/ha recorded higher protein yield during individual years as well as in pooled data. Protein yield increased significantly with successive level up to 60 kg N/ha during 1991–92 as well as in pooled data, while the significant response occurred only up to 40 kg N/ha during 1992–93.

None of the interactions was found significant in dry fodder as well as protein yields during both the years as well as in pooled data.

Economics

The highest net realization was obtained under 2-cut management, with the net incremental cost : benefit ratio (1 : 13.73),

followed by 1-cut management (Table 2). Thus, the farmers can have 1.5 times more production with an additional expenditure of Rs 150/ha only on labour, signifying the superiority of 2-cut management over the 1-cut.

Among the different levels of N, the highest net realization was recorded under 60 kg N/ha, followed by 40 kg N/ha and 20 kg N/ha. However, 20 kg N/ha showed the maximum net incremental cost : benefit ratio (1 : 10.77), followed by 40 kg N/ha (1 : 7.09) and 60 kg N/ha (1 : 5.65).

REFERENCE

- Kumar, A. and Singh, B. V. 1992. Effect of cutting management and fertilizer levels on fodder production of Gobhi Sarson (*Brassica napus* L.) *Forage Research* 18 (1) : 85–87.