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EFFECT OF DIFFERENT VARIETIES AND NITROGEN ON YIELD AND QUALITY OF OAT (*Avena sativa* L.)

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Abstract: A field experiment was conducted during the Rabi season of 1996-97 at the experimental field of Department of Agronomy, Forages and Grassland Management, CSKHPKV, Palampur (Himachal Pradesh) to evaluate the effect of nitrogen levels on the yield and quality of promising varieties of oat. On the basis of result, the highest green and dry fodder yield was associated with the application of 80 kg N/ha in the variety Palampur -1. Crude protein content was not influenced significantly by different varieties at all cuts. Application of 120 kg N/ha recorded the highest crude protein content at individual cut. Crude fibre content was not influenced significantly by different varieties at all cuts. Significant decrease in crude fibre content was observed with each increase in nitrogen level at individual cut.

Keywords: Nitrogen, oat, varieties, yield, fodder, crude protein and crude fibre.

INTRODUCTION

Oat (*Avena sativa* L.) is a crop which can suitably be introduced in areas with limited irrigation facilities. It is known to produce high yields of nutritive forage. The oat crop is known to have high yielding potential and multicut ability. There is possibility of utilizing the regrowth and its yield potential both for forage production and as seed production making it a dual purpose crop. Besides, regrowth being very leafy, produce profuse tillers and quick growth and it is nutrious too. With the various advantages offered by oat, it is regarded as useful yet the cheapest source of crude protein, carbohydrates and minerals in the livestock feeding. Oat, being cereal forage crop, responds well to nitrogen. Judious use of fertiliser, especially nitrogen, is essential for high yield of good quality fodder. In the last few years, new improved and high yielding varieties of oat have been released for cultivation in the country, but the scanning of literature indicates that very little work has been undertaken in the past on nitrogen application of multi-cut oat for fodder production; hence, present investigation was undertaken.

MATERIALS AND METHODS

A field experiment was conducted during the *Rabi* season of 1996-97 at Research Farm of Department of Agronomy, Forages and Grassland Management, CSK Himachal Pradesh

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Krishi Vishvavidyalaya, Palampur. The experiment was laid out in Factorial Randomised Block Design with three replications. There were twelve treatment combinations comprising of three varieties (Palampur-1, Kent, JHO-822). The soil of the experimental field was silty clay loam in texture, moderately acidic in reaction, high in organic carbon and phosphorus and medium in available nitrogen and potassium. The healthy seeds of variety Palampur-1, JHO 822 and Kent as per the treatment were sown at the rate of 100 kg/ha in rows 25 cm apart by Kera method. The sowing was done on October 10, 1996. Half of the nitrogen as per treatment, 60 kg P_2O_5 and 40 kg K_2O per hectare were applied at the time of sowing. The remaining half of the nitrogen was applied after respective cutting stages for forage production. Urea (46% N), Single super phosphate (16% P_2O_5) and muriate of potash (60% K_2O) were used as a source for nitrogen, phosphorus and potash, respectively. The data pertaining to the growth and development studies were recorded at respective cutting stage.

RESULTS AND DISCUSSION

Effect of Varieties

The selection of variety is an important step in forage production programme to obtain high yields. The performance of three oat varieties was evaluated with reference to plant height, number of tillers per meter row length, dry matter and green forage yield. Data in Table 1 reveal that significantly higher green and dry fodder yield was recorded in variety Palampur-1 followed by Kent and significantly lowest in variety JHO 882. This may be probably due to genetic superiority of cultivar Palampur-1. Nainwal and Singh (2000) also reported similar findings.

Crude protein and crude fibre contents did not differ significantly at all the cuts due to different varieties, indicating thereby that when the forage plants are cut periodically, the quality remains unaffected. Hassan et al. (1995) also observed that crude protein content in oat varieties did not show significant difference when cut at the same stage of growth.

Effect of nitrogen

Total green and dry fodder yield were significantly influenced levels of nitrogen (Table 1). Total green and dry fodder yield (Total of three cuts) increased significantly and consistently upto 80kg N/ha. Further increase in nitrogen level from 80 to 120 kg N/ha did not show the significant difference in green and dry fodder yield. This may be due to the fact that the harvesting was done three times from each plot. At all the three cuts, the plants were more or less in early growth stages. At early growth stages the rate of dry matter accumulation through photosynthetic activity is lesser than the rate of nitrogen absorption which ultimately

reflected in significant effect on green and dry fodder yield upto 80kg N/ha. Moreover, the yield per unit area is a resultant of plant height, number of tillers per metre row length, green and dry weight/m^2 which increased significantly with increasing levels of nitrogen upto 80kg N/ha and thus increased green and dry fodder yield significantly upto 80kg N/ha. The results are in conformity with the earlier finds of Sheoran et al. (2002) and Thakuria and Gagoi (2001).

Crude protein content increased significantly with each increment in nitrogen level at all cuts (Table 2). This might be due to the accumulation of protein bodies and their derivatives through increased efficiency of water utilization by forage crop and better translocation and assimilation of absorbed nitrogen, which in turn, have resulted in higher crude protein. Similar observations were also reported by Ganguly (19930). Increasing levels of nitrogen decreased the crude fibre content probably due to role of nitrogen in protein synthesis and consequent reduction in fibre contents. Similar results were also reported by Thakuria (1992).

Table 1: Effect of different treatments on fodder yield and yield contributing characters

Treatments	Plant height (cm)	No. of tillers/m row length	Green weight (g/m^2)	Dry weight (g/m^2)	Green fodder yield (q/ha)	Dry fodder yield (q/ha)
A. Varieties						
Palampur-1	55.08	140.33	1063	289	399.17	124.66
Kent	80.95	129.58	1562	385	353.21	107.23
JHO-822	84.84	124.91	1432	370	314.79	97.49
CD (P=0.05)	4.24	9.02	132	24	30.91	10.46
B. N levels (kg/ha)						
0	63.49	105.33	872	276	201.25	64.74
40	72.63	132.99	1319	340	352.67	96.88
80	78.89	143.77	1584	384	434.50	112.96
120	79.47	144.33	1633	392	434.47	109.79
CD (P=0.05)	4.90	10.41	152	27	35.70	12.08

Table 2: Effect of different treatments on crude protein (%) and crude fibre (%)

Treatments	Crude protein			Crude fibre		
	1^{st} cut	2^{nd} cut	3^{rd} cut	1^{st} cut	2^{nd} cut	3^{rd} cut
A. Varieties						
Palampur-1	8.85	7.80	7.28	28.16		
Kent	8.78	7.62	6.98	28.64		
JHO-822	8.63	7.58	7.10	28.73		
CD (P=0.05)	NS	NS	NS	NS	NS	NS

B. N levels (kg/ha)						
0	6.23	5.07	4.53	30.27	35.22	36.10
40	8.20	7.00	6.30	28.69	33.39	33.86
80	9.77	8.53	8.07	27.93	31.96	32.40
120	10.80	10.10	9.57	27.06	30.68	31.80
CD (P=0.05)	0.72	1.29	1.12	0.78	1.16	1.37

REFERENCES

[1] Hassan, B., Bali, A.S. and Singh, K.N.1995. Response of oat varieties to nitrogen fertilization. Indian J. Agric. Res. 18(2): 79-82.

[2] Nainwal K and Singh M. 2000. Varietal behaviour of oat (*Avena sativa* L.) to dates of sowing under Tarai region of Uttar Pradesh. *Indian Journal of Agronomy* 45(1): 107-113

[3] Sheoran RS, Rana DS Rana and Grewal R P S. 2002. Influence of Azotobacter inoculations in conjunction with graded doses of nitrogen on forage yield of oats (Avena sativa L.). Forage Res., 28: 8-12.

[4] Thakuria K. 1992. Effect of nitrogen and Azotobacter on fodder yield and quality of oat. Indian J. Agron. 37(3): 571-572.

[5] Thakuria K and Gagoi PK. 2001. Performance of oat (Avena sativa) in rice (Oryza sativa) fallows under different levels of nitrogen and sowing method. Indian J. Agron. 46(2): 361-363.