

## EFFECT OF CUTTING AND FERTILITY LEVELS ON QUALITY OF OAT

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### SUMMARY

A field experiment was conducted at main Forage Research Area, CCSHAU, Hisar with three cutting management (cut for fodder at 50, 60 and 70 DAS) and four fertility levels (Control, 40+20, 80+40 and 120+80 kg N+P<sub>2</sub>O<sub>5</sub>/ha). The crude protein and *in vitro* dry matter digestibility (IVDMD) content in fodder decreased significantly with each delayed cutting ranging from 50 to 70 DAS. Cutting management had no effect on crude protein content of grain and straw. Crude protein content in fodder increased with increasing fertility levels from control up to the highest level i. e. 120 kg N+60 kg P<sub>2</sub>O<sub>5</sub>/ha.

**Key words :** Oat, crude protein content, fertility levels, grain yield

Forages are the mainstay of animal wealth and their production is the backbone of livestock industry. The scarcity of green forages and grazing resources in the country has made the livestock to suffer continuously with malnutrition resulting in their production potentiality at sub-optimum level as compared to other countries.

Oat (*Avena sativa* L.), locally known as “*jai*”, is an important non-legume, winter cereal crop, grown under irrigated conditions of northern and north-western regions of India because of its excellent growth characters, quick regrowth and economic source of dietary energy like other multicut fodders. It provides succulent and highly palatable fodder in two to three cuttings extending from December to February. Oat fodder can also be converted into hay or silage for feeding the animals during lean period. The perusal of literature shows that little work has been carried out in the past on cutting management, nitrogen and phosphorus applications on quality of oat. Therefore, with this view the study was carried out.

The field experiment was conducted at main Forage Research Area, CCSHAU, Hisar during **rabi** 2012-13. The experiment was laid out in factorial randomized block design with three replications. Treatments comprised three cutting management times i. e. cut for fodder at 50 DAS and then left for grain production. Similarly, cut for fodder after 60 and 70 DAS and left for grain production. The fertility levels were control, 40 kg N+20 kg P<sub>2</sub>O<sub>5</sub>/ha, 80 kg N+40 kg P<sub>2</sub>O<sub>5</sub>/ha and

120 kg N+60 kg P<sub>2</sub>O<sub>5</sub>/ha. The variety used was HJ-8 with seed rate of 100 kg/ha and row spacing of 25 cm. The full dose of phosphorus and half dose of nitrogen was given at the time of sowing, remaining half dose of nitrogen was top-dressed in oat crop after cut for fodder. The crop was grown as per the recommended package of practices. Plant samples were collected at harvest and analyzed for quality parameters by standard procedures.

The data presented in Table 1 reveal that crude protein in fodder was found highest when cut for fodder at 50 DAS and it went on decreasing significantly up to 70 DAS. The crude protein production was significantly higher (4.20) at 70 DAS over 50 and 60 DAS. Among fertility levels, 120 N+60 kg P<sub>2</sub>O<sub>5</sub>/ha recorded the maximum crude protein production (5.81 q/ha) and it was significantly higher over rest of the treatments.

There were non-significant differences among crude protein (%) in grain under cutting management. As far as fertility levels were concerned, the highest crude protein (%) in grain was recorded under F<sub>3</sub> treatment and it was significantly higher than other levels. In case of crude protein production in grain (%), the highest crude protein yield was recorded at 60 DAS treatment and it was closely followed by 50 DAS. The lowest crude protein production was realized at 70 DAS. In case of crude protein in straw (%) was found to be significant at 50 DAS cutting over rest of the cutting management treatments. However, under fertility levels,

TABLE 1  
Effect of cutting management and fertility levels on quality of oat

Cutting management	Fodder		Grain		Straw		IVDMD (%)	DDM (q/ha)
	C. P. (%)	Production (q/ha)	C. P. (%)	Production (q/ha)	C. P. (%)	Production (q/ha)		
Cut for fodder at 50 DAS	13.51	3.85	9.13	2.33	2.28	1.49	68.48	19.44
Cut for fodder at 60 DAS	12.64	4.03	9.12	2.56	2.23	1.41	64.99	20.73
Cut for fodder at 70 DAS	11.77	4.20	9.06	2.17	2.27	1.26	62.98	22.48
C. D. (P=0.05)	0.32	0.14	NS	0.11	NS	0.05	1.22	1.20
<b>Fertility levels</b>								
Control	11.61	2.47	8.85	1.90	2.17	1.24	65.53	13.85
40 kg N+20 kg P <sub>2</sub> O <sub>5</sub> /ha	12.27	3.37	9.14	2.27	2.25	1.34	66.12	18.09
80 kg N+40 kg P <sub>2</sub> O <sub>5</sub> /ha	13.05	4.81	9.11	2.49	2.29	1.44	65.46	24.05
120 kg N+60 kg P <sub>2</sub> O <sub>5</sub> /ha	13.65	5.81	9.32	2.74	2.33	1.55	64.83	27.56
C. D. (P=0.05)	0.36	0.17	0.20	0.14	0.11	0.06	NS	1.39

NS–Not Significant.

the highest crude protein in straw (%) was obtained under 120 kg N+60 kg P<sub>2</sub>O<sub>5</sub>/ha treatment and it was significantly higher than control. However, it was at par with 40 kg N+20 kg P<sub>2</sub>O<sub>5</sub>/ha and 80 kg N+4 kg P<sub>2</sub>O<sub>5</sub>/ha treatments. The highest crude protein production in straw was obtained at 50 DAS cutting and it was closely followed by 60 DAS cutting. However, 70 DAS was significantly inferior to 50 and 60 DAS. The lowest crude protein production (q/ha) was recorded under control and it went on increasing significantly with each increase in fertility level up to the highest level (120 kg N+60 kg P<sub>2</sub>O<sub>5</sub>/ha). Similar results were found by Midha *et al.* (1999).

As far as IVDMD (%) is concerned, it was observed that cutting for fodder at 50 DAS recorded the maximum IVDMD (68.48%) and it was significantly higher over 60 and 70 DAS. The lowest IVDMD (62.98%) was found at 70 DAS. However, various fertility levels could not influence IVDMD content (%). The highest digestible dry matter (DDM) was obtained at 70 DAS and it was significantly higher over 60 and 50 DAS. With every increase in fertility level, the DDM production (q/ha) was observed in increasing order up to 120 kg N+60 kg P<sub>2</sub>O<sub>5</sub>/ha level. These findings are in confirmation of the study conducted by Rana *et al.* (2013).

Protein content with delay in cutting decreased because of higher fodder yield which led to dilution of photosynthates. IVDMD (%) decreased with increase in age of plant that led to increase in cell wall constituents which thereby reduced digestibility of the fodder. Similar results were reported by Bhilare and Joshi (2007).

Cutting management had no significant effect on crude protein content of grain and straw. Similar results were reported by Jehangir *et al.* (2013). Nitrogen being a major constituent of protein was found to affect protein content of plant. It was observed that crude protein content in fodder increased with increasing fertility levels. The increase in protein content was because of more availability of nitrogen to plants with increasing fertility levels. Prasad and Rokima (1991) advocated that the nitrogen content in soil solution was proportional to the quantity of fertilizer added and its built up in the soil gradually with the increase in fertility levels.

## REFERENCES

- Bhilare, R. L., and Y. P. Joshi. 2007 : Productivity and quality of oat (*Avena sativa*) in relation to cutting management and nitrogen levels. *Indian J. Agron.*, **52** : 247-250.
- Jehangir, I. A., H. U. Khan, M. H. Khan, F. U. Rasool, R. A. Bhat, T. Mubarak, M. A. Bhat, and S. Rasool. 2003 : Effect of sowing dates, fertility levels and cutting managements on growth, yield and quality of oats. *African J. Agric. Res.*, **8** : 648-651.
- Midha, L. K., K. S. Panwar, and S. K. Sharma. 1999 : *Forage Res.*, **25** : 99-102.
- Prasad, B., and J. Rokima. 1991 : Change in available nutrients status of calcareous soil as influenced by manures, fertilizers and biofertilizers. *J. Indian Soc. Soil Sci.*, **39** : 383-385.
- Rana, D. S., Bhagat Singh, K. Gupta, and A. K. Dhaka. 2013 : Performance of single cut forage sorghum genotypes to different fertility levels. *Forage Res.*, **39** : 96-99.