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Evaluation of Different Doses of Nitrogenous Fertilizer on Green Fodder Yield Potential of Multicut Oat (*Avena Sativa* L.) Varietis

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Abstract
Oat (*Avena Sativa* L.) is most important rabi fodder crop and is suitable for cultivation under wide range of agro-ecological climates. It serves as an excellent source of soft, palatable and nutritious fodder rich in protein, phosphorus, cellulose, hemi-cellulose, neutral detergent fiber, acid detergent fiber, vitamins and iron. It can be used as as straw, hay and silage. Its grains are particularly used as feed for horses, sheep and poultry. There are several factors which affect growth, productivity and quality of forage oat, all nitrogenous fertilizer is one of the major components. Muti cut oat cultivars are heavy feeder of nutrient and remove large amount of nutrients from the soil. The field experiment conducted to evaluate the effect of nitrogen level in different varieties on growth, yield and quality of fodder oat (*Avena sativa* L).A field experiment was conducted during Rabi season 2012-13 at forage Research Field, Dept. Of Genetics and Plant Breeding, Birsa Agriculture University Kanke Ranchi (Jharkhand) to evaluate the effect of nitrogen levels on multi cut oat varieties. Green forage yields increases with increasing nitrogenous fertilizer levels. JHO-12-3 exhibited higher green forage, dry matter and crude protein yields. Application of 80 kg N/ha resulted in significantly highest green forage yield (566.67q/ha). Dry matter yield (45.46 q/ha), and crude protein yield (4.37q/ha).Plant height and leaf: stem ratio increased significantly up to 80 kg N/ha.

Keywords: Multi cut oat, Fodder, Nitrogenous fertilizer

Introduction
Oat is one of the important rabi forage crop.Its fodder is highly palatable rich in energy, protein, vitamin B, phosphorous and iron (Tiwana *et al*, 2008) [8]. It is cultivated worldwide both grain and green forage. Its excellent growth habit quick regrowth after cutting and high nutritive value for both milch as well as livestock. It is cultivated in an area of 1021 million ha with as annual production of 233 tons in the world (Anonymous 2009), The total area covered under oat cultivation in India is about 1.0 million ha. With 350-500 qha^{-1}green fodder productivity (IGFRI 2011) [2]. In India it is grown in Punjab, Jammu-Kashmir, Haryana, Uttar Pradesh, Himachal Pradesh, Madhya Pradesh, Maharashtra, Rajasthan. It is grown as multipurpose crop for grain pasture forage or as a rotation crop. The Protein quality of oat is excellent oat is mostly feed as green but surplus is converted in to silage or hay to use during fodder deficit periods. Oat as a forage crop has the advantage of being winter hardy and serves as catch crop.

India is having the largest livestock population, 15% of the world 'livestock population (Neelar 2011) [6]. Livestock contributing 7% to national GDP and source of employment and ultimate livelihood for 70% population in rural areas. Deficiency in feed and fodder has been identified as one of the major components in achieving the desired level of livestock production. At present the country faces a net deficit of 63% green fodder,24% crop residues and 64%feeds (Kumar et.al,2012) [4]. The productivity of our livestock often remains low due to inadequate and nutritionally unbalanced supply of feed and fodder. Half of the total losses in livestock productivity are attributed to the inadequacy in supply of feed and fodder.

There are several factors which affect the productivity and quality of forage oat Nitrogen is a one of the major component to influence the forage growth, yield and quality. Nitrogen play a major role in early establishment of the crop. It also play the vital role in the growth of fodder through the impact on cell elongation and cell division. Nitrogen improves the fodder yield through enhancement of growth parameters like plant height number of tillers, number of leaves, leaf stem ratio and dry matter accumulation. Nitrogen availability to the plant directly influence the forage yield, it is the reason to provide the nitrogen with the split application. Split application of nitrogen improves the availability of the nutrient to the crop and improves the nitrogen use efficiency.

Material Method

A field experiment was conducted during rabi 2012-13 at Genetics and Plant Breeding, research farm of Birsa Agricultural university Kanke, Ranchi to evaluate the response of nitrogen levels (20,40,and 80 Kg/ha) on multicut oat varieties (PLP-14, HFO-488, OL-1769,OL-1766, JHO-2012-3,JHO-4-315). The experiment was laid out in factorial randomized block design with 3 replication. The soil of the experimental site was sandy loam. The crop was sown in rows of 25 cm apart on 18 November 2012 using 100kg seed/ha. Full dose of Phosphorus (40kg P_2O_5/ha) and half dose of N as per treatment were applied as basal and remaining half dose N was top dressed in two equal splits 30 days after sowing and after the fist cutting of forage. Two cutting of green forage were taken on (January 7 and 3 March 2012).The data on yield attributes, green forage and crude protein yields were recorded at the time of harvest.

Result and Discussion

There is no significant difference in Green forage yield due to different levels of nitrogen. Total green forage yield increase significantly with successive increment in nitrogen levels. There was significant differences in green forage yield among different varieties. The green fodder yield increases with increasing levels of nitrogenous fertilizer. However JHO-2012-3 was found superior over then varieties in respect of green forage yield, dry matter yield and leaf stem ratio.(Table 1) The variety JHO-2012-3 exhibited significantly highest green fodder yield 566.67q/ha and found to be best among rest of the varieties. (Table1) Nitrogen application had significant effect on growth and yield attributes like green forage,dry matter yield increased significantly with increasing levels of N up to 80 kg/ha. Nitrogen involved in increasing the protoplasmic constituents and accelerating the process of cell division and elongation which in term gives luxuriant vegetative growth for higher productivity (Verma and Singh 2007). Leaf: stem ratio increased significantly up to 80 kg N/ha. This increase in leaf: stem ratio with increasing level of N might be due to increase in number and size of leaves under the treatment. Crude protein yield increased significantly with increasing N levels from 20 to 80 kg/ha. This might be due to increase in protein content and dry matter yield with increasing levels of nitrogen (Singh and Singh 1995)

The interaction effect between nitrogen and different varieties on green forage yield was significant.(Table-2) The JHO-12-3 exhibited the significant effect on total green forage yield at 80 kg/ha of Nitrogen levels. This varieties was on at par with variety PLP-14 at same level i.e Highest level of nitrogen 80 kg/ha.

Table 1: Forage and crude Protein yields as influence by different treatments

Treatment variety	**Green forage yield (q/ha)**	**Dry matter yield (q/ha)**	**Crude Protein yield (q/ha)**	**Leaf : stem** ratio	**Plant height (cm)**
PLP-14	506	36.27	3.57	0.39	80.20
HFO-488	466	37.33	3.59	0.33	79.20
OL-1769	393.33	37.20	3.58	0.41	83.85
OL-1766	462.27	34.00	3.72	0.28	82.20
JHO-2012-3	566.67	45.46	4.37	0.31	79.45
JO-04-315	497.73	35.60	3.97	0.29	79.75
SEm±	1.51	21.33	0.1	0.01	0.02
CD at 5%	4.59	6.53	NS	NS	NS
N. level	**Green forage yield (q/ha)**	**Dry matter yield(q/ha)**	**Crude Protein yield(q/ha)**	**Plant ht (cm)**	**Leaf : stem** ratio
20	220.8	40.9	2.5	75.0	0.51
40	312.5	65.3	5.1	102.0	0.66
80	370.0	79.5	7.5	125.0	0.83
SEm±	5.1	1.0	0.1	1.3	0.02
CD at 5%	14.0	3.2	0.2	4.1	0.05
CV%	5.5	5.0	4.9	4.2	7.5

Table 2: Interaction effect of nitrogen levels and varieties on total green forage yield (q/ha)

	F1	**F2**	**F3**	**Aug. V**
PLP-14	364	422	507	431
HFO-488	360	458	460	426
OL-1769	259	299	393	317
OL-1766	335	413	462	403
JHO-2012-3	444	502	567	504
JO-04-315	329	382	489	400
Aug. F	349	413	480	

CD 0.5% V - 46.32
SEm± - 16.04
CD 0.5% FXV - 80.23
SEm± - 27.70
CV% - 11.64%

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