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EFFECT OF CUTTING AND NITROGEN MANAGEMENT ON PLANT MATURITY AND SEED SET IN OAT CV. JHO-*851*(*AVENA SATIVA* L.)

M. S. PUNEETH RAJ* AND B. S. VYAKARANAHAL
Department of Seed Science & Technology, UAS, Dharwad - 580 005, INDIA
e-mail: rajpuneeth@gmail.com

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***Corresponding author**

ABSTRACT
The field experiment was carried out at UAS, Dharwad, in the department of Seed Science and Technology during Rabi season of 2012 and 2013for 2 year with the following treatments N_1: 80 kg/ha, N_2: 100kg/ha, N_3: 120kg/ha, N_4: 140kg/ha. Cutting management**:** C_1: No cut, C_2: one cut, C_3: two cut and for all treatments 60:40 P_2O_5, K_2O per ha, nitrogen is varied.Resultsrevealed that application of 80:60:40, N, P_2O_5, K_2O kg/ha showed significant plant performance such as early plant maturity, early days to 50 % flowering for the application of 60:40, P_2O_5: K_2O Per ha + 80kgN/ha 131.02 days and with no cut93.06 days and forthe seed set %significantly higher seed set % forthe application of 60:40, P_2O_5: K_2O Per ha + 140kgN/ha81.99 (%)andwith no cut 83.89 (%) and in seeds per panicle showed significantly higher in no cut recorded 68.52 and for the application of 60:40, P_2O_5: K_2O Per ha + 140kgN/ha showed significantly higher 66.73 seeds per panicle.The data can be concluded with no cut and 140kgN/ha showed significantly higher seed quality parameters.

INTRODUCTION

Effect of cutting and nitrogen management on plant maturity and seed set in oat cv. JHO-*851*(*Avena sativa* L.). Livestock production is backbone of Indian Agriculture and source of employment in rural areas for centuries by the production of early and faster maturing cutting and nitrogen responsive oat cultivar for good early maturity, better seeds per panicle, good seed set (%). Our whole system of rural economy has revolved around livestock production. India is house to 15% world cattle population and 16% of human population to be sustained and progressed on 2% of total geographical areas (Anon., 2012). Thus there is little chance of having good quality arable land available for fodder and seed production.The world area under oat is around 12.5 million ha. In India, it covers an area about one lakh hectare with productivity of 30-45 t/ha (Anon., 2012).

Oats are also an ingredient in many cold cereals. Hence to increase its productivity, are a function of seeds per panicle, plant maturity and seed set per cent which are significantly influenced by nitrogen application (Vyas *et al.,* 2011).

Among the various factors affecting the forage growth, yield and seed quality of oat, nitrogen and cutting management play a vital role. Nitrogen is an absolutely necessary component of the protoplasm of the plants and plays an important role in chlorophyll synthesis and also helps in increasing cell division, cell enlargement and plant growth (Shekara*et al.,*2011). Hence to increase its yield by seeds per panicle, early maturity which are significantly influenced by nitrogen application and cutting management in oat crop.

Oats may also be consumed raw. Highly nutritive fodder to all categories of livestock make up a part of the daily diet of horses, about 20% of daily intake or smaller, and are regularly fed to cattle as well by early maturity is important, used in some brands for chicken feed, commonly marketed as cat grass to cat enthusiasts henceseeds per panicle, early plant maturity and seed set per centare important (Anon, 2012). Oat (*Avena sativa* L.) belongs to the family Poaceae, it is presently grown in many parts of the world including India, USA, Canada and Europe etc. as spring-sown cultivars. It ranks around sixth in the world cereal area production and productivity followed by wheat, maize, rice, barley and sorghum. It requires a long and cool season for its growth therefore; it is successfully grown in the plains and hilly areas of the country. Oats are generally considered as "healthful", or a health food, being used commercially as nutritious. The discovery of healthy cholesterol-lowering properties has led to wider appreciation of oats as human food.

Information on the variety of oat with respect to nitrogen fertilization and cutting management to improve plant maturity and seed setper cent is meager in south Indian conditions and to improve seed production. Hence need an attempt to evaluate promising varieties of oats varying in different treatments under south Indian condition and also to improve plant maturity and seed set per cent of oat seeds. Main objective of this research was to find out nitrogen fertilization and cutting management to improve plant maturity and seed set per cent in oat cultivar seeds brought from north India and grown in south Indian conditions.

MATERIALS AND METHODS

The field experiment was carried out at UAS, Dharwad, during

rabi season of pooled data of 2012 and 2013 to assess the effect of nitrogen and cutting managementtreatments on plantmaturity and seed set (%) of oat (*Avena sativa* L.). Oats seeds were obtained from the Jhansi fodder research institute, experiment was conducted at south Indian condition the seeds were used to record the initial quality parameters. After recording the initial observations, four treatments consist of viz. Nitrogen: N_1: 80, N_2: 100, N_3: 120, N_4: 140 kg/ha. And three cutting management viz, C_1: No cut, C_2: First cut, C_3: Two cut and for all treatments 60:40 P_2O_5, K_2O kg per ha. So the Treatment Combinations are: 12, the experiment was laid out in Randomized Complete Block Design Gomez and Gomez (1989) with three replication in Dharwad during Rabi season sowing 2012 and 2013. Sowing was done with a spacing of plant to plant is 30 cm x 10 cm. Seed rate 100 kg per hactar was JHO-851 variety, the observations on days to 50 per cent flowering, days to maturity,seeds per panicle and seed set%were included.

RESULTS AND DISCUSSION

Results revealed that days to 50 per cent flowering were significantly influenced by cutting management. Minimum number of days to 50 per cent flowering (93.06) was noticedin C_1 (no cut) and it was significantly superior over other treatments, while maximum number of days was noticed in C_3 (two cut) (163.88). Significantly Minimum number of days to 50 per cent flowering (131.02) was noticed in N_1 (80 kg N/ha), while maximum number of days was noticedin N_4 (140 kg N/ ha) (133.94).The interaction effect between cutting and nitrogen management are found to be significantly minimum number of days to 50 per cent flowering (92.02) was noticed in treatment combination of C_1N_1 (no cut with 80 kg N/ha) and significantly superior over other treatments, while maximum number of days was noticed in C_3N_4 (two cut with 140 kg N/ ha) (165.84). Significantly minimum number of days to maturity (162.73) were observed in C_1 (no cut) and it was significantly superior over other treatments followed by C_2 (one cut) (169.21), while maximum number of days observed in C_3 (two cut) (180.12). Similar trend of result was found in days to maturity as that of days to 50 % flowering for nitrogen and interaction effect.Numbers of seeds per panicle was the characters which was higher in no-cut system this may be due to good seed set per cent because of higher nutrient accumulation over a long period of crop growth. Similar results were reported by Hasan *et al*. (2000) in oat and Shah and Hasan (1999) in oat.

Lower days to maturity was significantly influenced by nitrogen levels (168.89) was recorded in N_1 (80 kg N/ha), while the lowest value was recorded in N_4 (140 kg N/ha) (172.41). Application of higher doses of fertilizers, more than recommended has increased the number of days to 50 per cent flowering and days to maturity because of higher nitrogen prolonged the life cycle, since cutting was done so additional days are required to complete life cycle which extends the plant growth and delayed the flowering. Similar results were reported by Singh *et al*. (2007) in oat crop. Significantly Higher seed set (83.89%) was observed in C_1 (no cut) and it was significantly superior over other treatments followed by C_2

Table 1: The effect of cutting and nitrogen management on days to 50 per cent flowering and days to maturity in oat cultivar JHO-851

Treatments	Days to 50 (%) flowering			Days to maturity		
Cutting (C)	2012	2013	Pooled	2012	2013	Pooled
C_1-No cut	93.00	93.11	93.06	162.30	163.15	162.73
C_2-One cut	140.39	140.70	140.55	169.38	169.04	169.21
C_3-Two cut	163.75	164.00	163.88	180.58	179.65	180.12
S.Em. ±	0.35	0.32	0.33	0.35	0.32	0.27
C.D. at 5%	1.02	0.95	0.95	1.04	0.94	0.80
Nitrogen (N)						
N_1-80 kg/ha	130.68	131.35	131.02	168.98	168.80	168.89
N_2-100 kg/ha	131.87	131.90	131.89	170.14	170.37	170.26
N_3-120 kg/ha	133.12	133.14	133.13	171.18	171.21	171.20
N_4-140 kg/ha	133.85	134.02	133.94	172.72	172.09	172.41
S.Em. ±	0.40	0.37	0.38	0.41	0.37	0.32
C.D. at 5%	1.18	1.09	1.10	1.20	1.08	0.92
Interaction (CxN)						
C_1N_1	92.00	92.03	92.02	158.85	159.80	159.33
C_1N_2	92.61	92.67	92.64	161.33	162.88	162.11
C_1N_3	93.52	93.72	93.62	163.91	164.80	164.36
C_1N_4	93.88	94.00	93.94	165.10	165.14	165.12
C_2N_1	138.35	139.68	139.02	168.67	168.48	168.58
C_2N_2	139.96	140.02	139.99	169.05	168.50	168.78
C_2N_3	141.24	141.04	141.14	169.11	169.01	169.06
C_2N_4	142.00	142.07	142.04	170.69	170.19	170.44
C_3N_1	161.70	162.33	162.02	179.42	178.12	178.77
C_3N_2	163.04	163.00	163.02	180.05	179.71	179.88
C_3N_3	164.60	164.67	164.64	180.51	179.83	180.17
C_3N_4	165.67	166.00	165.84	182.35	180.93	181.64
Mean	132.38	132.60	132.490	170.75	170.62	170.69
S.Em. ±	0.69	0.65	0.65	0.71	0.64	0.55
C.D. at 5%	1.91	1.891	1.91	2.076	1.878	1.60

Table 2: The effect of cutting and nitrogen management on seeds per panicle and seed set per cent in oat cultivar JHO-851

Treatments	Seeds per panicle			Seed set (%)		
Cutting (C)	2012	2013	Pooled	2012	2013	Pooled
C_1-No cut	68.24	68.79	68.52	83.92	83.86	83.89
C_2-One cut	66.23	66.22	66.23	81.37	81.40	81.39
C_3-Two cut	60.56	60.83	60.70	76.09	76.06	76.08
S.Em. ±	0.28	0.28	0.26	0.29	0.28	0.21
C.D. at 5%	0.82	0.83	0.78	0.84	0.81	0.62
Nitrogen (N)						
N_1-80 kg/ha	62.91	63.34	63.13	78.50	78.38	78.44
N_2-100 kg/ha	64.69	65.02	64.86	80.11	80.17	80.14
N_3-120 kg/ha	65.76	65.97	65.87	81.24	81.23	81.24
N_4-140 kg/ha	66.68	66.78	66.73	81.99	81.98	81.99
S.Em. ±	0.32	0.33	0.31	0.33	0.32	0.24
C.D. at 5%	0.95	0.95	0.90	0.97	0.93	0.71
Interaction (CxN)						
C_1N_1	66.43	67.39	66.91	82.55	82.20	82.38
C_1N_2	67.99	68.54	68.27	83.66	83.74	83.70
C_1N_3	68.70	69.21	68.96	84.37	84.35	84.36
C_1N_4	69.85	70.01	69.93	85.10	85.14	85.12
C_2N_1	65.22	65.21	65.22	80.29	80.32	80.31
C_2N_2	65.95	65.91	65.93	80.90	81.04	80.97
C_2N_3	66.32	66.32	66.32	81.69	81.67	81.68
C_2N_4	67.45	67.45	67.45	82.58	82.58	82.58
C_3N_1	57.10	57.43	57.27	72.64	72.63	72.64
C_3N_2	60.15	60.62	60.39	75.76	75.74	75.75
C_3N_3	62.27	62.38	62.33	77.67	77.67	77.67
C_3N_4	62.73	62.87	62.80	78.28	78.22	78.25
Mean	65.01	65.28	65.15	80.46	80.44	80.45
S.Em. ±	0.56	0.56	0.53	0.57	0.55	0.42
C.D. at 5%	1.65	1.65	1.55	1.68	1.62	1.24

(one cut) (81.39%), while lowest was observed in C_3 (two cut) (76.08%).Seeds per panicle and seed set per cent were significantly influenced by nitrogen. Higher seeds per panicle and seed set per cent (66.73, 81.99%) was recorded in N_4 (140 kg N/ha), while the lowest values recorded in N_1 (80 kg N/ha) (63.13, 78.44%). These results are in accordance with the findings of Sarkar *et al*. (2011) in oat.Higher seed set per cent (81.99%) was observed in N_4 (140 kg N/ha) which was on par with N_3 (120 kg N/ha) (81.24%) and significantly superior over other treatments, while lowest was observedin N_1 (80 kg N/ha) (78.44%). These results are in accordance with the findings of Sarkar *et al*. (2011) in oat,Pradeep(2013) in maize, Patel(2013) in corianderopined that the beneficial effects of nitrogen on cell division and elongation, formation of nucleotides and co-enzymes that have resulted in increased meristematic activity and photosynthetic area finally leads to higher production and accumulation of photosynthates which reflected in the higher seeds per panicle and seed set %.

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