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Research Article

EFFECT OF LOPPING AND LEVELS OF POTASSIUM ON GROWTH AND YIELD OF BASMATI RICE IN NORTH WEST HIMALAYA

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Abstract- An investigation entitled "Effect of lopping and levels of potassium on productivity of basmati rice" was conducted at Research Farm of Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu at Chatha during *kharif* seasons of two consecutive years. Among the different time of lopping treatments, lopping at 45 days after transplanting (DAT) in basmati rice was significantly reduced plant height and increased number of tillers resulted higher grain yield (30.55q/ha) over early lopping at 35 DAT and control. Potassium levels also influenced grain yield of basmati rice and it was found that 15 kg/ha increased 12% higher yield (30.83 q/ha.) over control (26.54 q/ha.) during both the year of study.

Key words- Basmati rice, lopping, potassium, growth and yield.

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Introduction

Basmati rice is the predominant crop in Jammu region of J&K state. The cultivation of basmati rice has been found highly remunerative because it fetches 2-3 times higher price than coarse varieties of rice [1]. Local basmati and basmati 370 are the most popular varieties grown in the Jammu region of the state and are known for their cooking quality and scented nature. The basmati varieties are tall, highly photoperiod sensitive, and have a very long maturity period. Basmati rice suffers heavily due to crop lodging during the maturity stage of the crop. In basmati rice 20-30 % losses of grain yield due to crop lodging at maturity stage of crop. Nitrogen helps plant in height development as well as stem, leaf to make cells prolonged quickly, but the cell wall is weak as cellulose not to be accumulated in time. When the farmers apply high nitrogen rate or they use nitrogen in unsuitable times, an excessive growing occurs in the plants and resulted lodged basmati tall varieties. In order to cope-up with this problem the height of rice can be reduce with lopping (cutting of foliage) and prevent lodging in basmati rice. Lopping decreases biological yield and plant height while it increases harvest index. Potash to help rice rootage develop and absorb nutrients better simultaneously to intensify resistance to pests, tolerance towards unfavourable weather and prevent from lodging in basmati rice. The lopping and potassium fertilizer application can play important role in reducing lodging in basmati rice. With the objective to find out the suitable time of lopping and dose of potassium application in basmati rice an experiment entitled "Effect of lopping and levels of potassium on growth, yield and yield attributes of basmati rice" was laid out at Research Farm of SKUAST-Jammu.

Materials and Methods

A two year field experiment was conducted during *Kharif* seasons of 2007 and 2008 at the Research Farm Chatha, Division of Agronomy, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu. The soil tested sandy loom in texture, neutral in reaction (pH 7.5), low in organic carbon (0.40%) and available nitrogen (214 kg/ha), medium available phosphorus (14.60 kg/ha) and potassium (152 kg/ha). Rice-wheat rotation was followed at the experimental site for the previous two seasons. The experiment was laid out in split-plot design with three replications. The treatments comprised four lopping treatments in main plots, *viz.* control (no lopping), lopping at 35 days after transplanting (DAT), 45 DAT and 55 DAT and four levels of potassium, *viz.* 0,10, 15 and 20 kg/ha in subplots. 25 days seedling of the variety basmati-370 of basmati rice was transplanted in second week of July and harvested in the second fortnight of November during both the years. The recommended dose of N: 30 kg, P: 20 kg and K: 0,10,15,20 kg/ha as per treatments were applied through urea, DAP and MOP respectively. The full dose of P and K and half dose of N were applied at basal and remaining 50 % N applied in two equal split doses at tillering and panicle initiation stage of rice during both the years. All other operations were performed as per package of practices during both years of experiment

Results and Discussion

Effect of lopping on growth, yield attributes and yield of rice

The two years data showed that all the lopping treatments brought out a significant effect on growth, yield and yield attributes of basmati rice as compared to control plots [Table-1& 2]. The plant height significantly reduced and increased numbers of tillers, panicle weight and grain yield when lopping was done at 45 days after transplanting (DAT) over 35 DAT and control (no lopping) but it remained at par with 55 DAT during both the years. It may fact that lopping at 45 DAS was found superior due to reduced plant height resulted reduced lodging in basmati rice and besides produced higher numbers of tillers in basmati rice and yielded higher grain yield. Early lopping at 35 days after transplanting did not

showed any significant effect on plant height, number of tillers and yield over others treatments during both years of study. It may fact that early lopping adversely affected crop establishment in early stage of basmati rice and also recover plant height resulted decrease yield of basmati rice. Similar results also reported [2,3].

Table-1 *Effect of lopping and levels of potassium on growth of basmati rice*

Treatment	Plant height (cm)		Number of tillers/m²	
	2007	2008	2007	2008
Lopping				
No lopping	112.83	115.35	260.34	268.30
Lopping at 35 DAT	111.19	114.91	250.36	258.76
Lopping at 45 DAT	104.56	108.21	269.60	272.60
Lopping at 55 DAT	101.16	105.41	266.60	271.06
CD (p=0.05)	5.85	4.25	11.03	4.31
Potassium levels (kg/ha)				
0 (control)	103.23	107.66	252.78	258.23
10	108.09	111.27	262.91	270.19
15	110.86	114.06	267.85	273.07
20	107.56	110.89	263.35	269.27
CD (p=0.05)	NS	NS	7.03	7.75

Table-2 *Effect of lopping and potassium on yield and yield attributes of basmati rice*

Treatment	Panicle weight (g)		Test weight (g)		Grain yield (q/ha)		Mean of 2 year
	2007	2008	2007	2008	2007	2008	
Lopping							
No lopping	2.11	2.20	22.62	23.26	28.10	29.54	28.82
Lopping at 35 DAT	1.95	2.10	22.46	23.01	25.20	27.95	26.57
Lopping at 45 DAT	2.25	2.36	22.90	23.27	30.10	31.00	30.55
Lopping at 55 DAT	2.20	2.30	22.80	23.33	29.70	29.80	29.75
CD (p=0.05)	0.15	0.092	NS	NS	2.09	1.18	1.67
Potassium levels (kg/ha)							
0 (control)	2.05	2.16	22.36	22.98	26.08	27.00	26.54
10	2.08	2.21	22.69	23.23	28.58	28.92	28.71
15	2.24	2.35	23.06	23.59	30.30	31.37	30.83
20	2.14	2.24	22.67	23.07	27.15	29.40	28.27
CD (p=0.05)	0.10	0.07	0.37	0.34	2.44	1.73	2.08

Effect of potassium on growth, yield and yield attributes of rice

The data of two year showed that all the levels of potassium significantly effect on growth, yield and yield attributes of basmati rice as compared to control plots [Table-1 & 2]. The increase levels of potassium up to 15 kg/ha significantly increased growth, yield and yield attributes of basmati rice over control. Among the different levels of potassium, 15 kg/ha produced tallest plant height and maximum number of tillers, panicle weight and grain yield of rice. Further, increase in level of potassium by 20kg/ha decreased grain yield during both year of study. This is attributed to the better growth of plants and yield attributes contributed higher rice yield under 15 kg/ha and further higher dose of potassium resulted decreased availability of nitrogen and other micro nutrient and adversely affected growth of basmati rice. Similar results were reported [4-6].

Conclusion

On the basis of two year study it may be concluded that higher grain yield was obtained where the crop was lopped at 45 days after transplanting (DAT) as compared to 35 and 55 DAT and no lopping. Among the potassium levels 15 kg/ha gave the highest grain yield of basmati rice.

Application of research: The research is useful for the basmati growers of Jammu region of J&K State for taking optimum production with the suitable time of lopping at 45 days after transplanting (DAT) and application of potassium at 15 kg/ha.

Research category: Nutrient management.

Abbreviations:

DAT: Days After Transplanting
DAP: Di Ammonium Phosphate
MOP: Muriate of Potash

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