Original Research Article

EFFECT OF SEED RATE ON YIELD OF WHEAT (*TRITICUM AESTIVUM*) UNDER FRONT LINE DEMONSTRATIONS IN POONCH

ABSTRACT

Among several crop management factors sowing method, seeding rate and selection of appropriate genotype have prime role in affecting wheat productivity. Most of the times, farmers are in practice of using excess seed rate to the tune of (8kg/kanal) 160kg/ha as compared to recommended seed rate of 120 kg/ha. This affects crop production due to increased competition among plants for available resources. Demonstrations on farmer's field are a proven way to demonstrate the technology and increase the adoption rate among farmers. KVK Poonch therefore conducted On-farm demonstrations to popularize the importance of optimum seed rate in wheat. Seed rate of 120 kg/ha produced more numbers of grains per ear (52) and 1000 grain weight (38.48 g) and grain yield (33.8 q/ha) whereas less numbers of grains per ear (44) and 1000 grain weight (38.04 g) and grain yield (27.2 q/ha) were obtained with seed rate of 160 kg/ha. Optimum seed rate @ 120 kg/ha also gave highest net returns per hectare (Rs. 41,592) and benefit cost ratio (3.02) whereas higher seed rate @160kg/ha recorded lower net returns (Rs. 28,448) and B:C ratio (2.32).

Key words: Seed rate, yield, economics, wheat

Introduction

Wheat is an important staple food and is one of the most important *rabi* crop in India occupying an area of 31.0 million hectares with annual production 108.75 million tonnes and productivity of 35.0 quintals per hectare during 2021 (Anonymous. 2021). Wheat crop also ranks first in terms of area during *rabi* season in Poonch district, occupying on an area of **15 thousand hectares** with annual production of 22.7 **thousand** quintals. Agricultural productivity

of wheat (**15.15 quintals** per ha) is quite low in the district (Anonymous 2017) due to non-availability of location specific varieties, poor soil conditions and lack of assured irrigation (Singh and Gupta, 2019). It has also been observed that wheat yield in farmers field is generally low as compared to in research trials. This might be due to the use of improper production technology including optimum seed rate by the farmers. According to findings of Isidro-Sánchez et al., 2017, seeding rate and selection of appropriate genotype have prime role in affecting wheat productivity. Most of the times, farmers are in practice of using excess seed rate which may affect yield (Kabir *et al*, 2009). Optimum seed rate is therefore vital to realize maximum crop yields. KVK Poonch conducted 80 front line demonstrations during *rabi* 2020-21 to demonstrate the effect of seed rate on wheat yield and economics on farmers field.

MATERIAL AND METHODS

The present investigation was carried out in the Poonch Block in 05 village panchayats. Poonch district of Jammu and Kashmir (India) is located on the southern slopes of Pir Panjal range and lies between 33^0 25' to $34^0$10' north latitude and 73^0 58' to 74^0 35' east longitude. 80 front line demonstrations on wheat variety WH 1080 were laid using 120 kg seed per hectare. This variety is suitable for cultivation under rainfed conditions. Wheat was sown following kera and sowing was completed from 14 to 20 November 2020 in 05 village panchayats and was compared with farmers practice of broadcasting higher seed rate @ 160 kg/ha. The nutrient management (60:30:20) was practiced as per package of practices of SKUAST-J for rainfed areas. A total rainfall of 596 mm was received during the crop season between November to May during 2021. Data on plant height, ear length, tillers/plant from 10 selected plants/locations was recorded while grains/ear from randomly selected 10 ears were counted and averaged. Data on 1000 grain weight was also recorded. Crop yield was determined by manually harvesting the produce at physiological maturity and expressed as quintals per hectare. Cost of production and monetary returns (gross and net returns) of demonstrated variety and check plots was calculated on the basis of market prices.

Table 1: Particulars showing the detail of Front Line Demonstrations on wheat

Crop	Wheat
Variety	WH1080
Condition	Rainfed
Blocks	Haveli Poonch
No. of FLDs	80
Area in hectares	13.0 ha
Date of sowing	14 to 20 November 2020
Seed rate	120 kg/ha (line sowing)
Check	(seed rate @160 kg/ha) broadcasting
Technique of Sowing	Line sowing (kera) 22.5 cm apart
Nutrient Management	60:30:20
Harvesting	Manually

RESULTS & DISCUSSION

Data on yield attributes, yield and economics is presented in table 2. Average plant height was 100.5 cm in plots with higher seed rate @ 160 kg/ha as compared to 99.4 cm in plots with optimum seed rate. Higher plant population in 160 kg/ha seed rate might have resulted in more competition for sunlight which led to higher plant height in this treatment. Higher seed rate affected the tillering in wheat considerably as it recorded less tillers /plant (6.6) compared to optimum seed rate (7.5). Optimum seed rate of 120 kg/ha produced more numbers of grains per ear (52) and 1000 grain weight (38.48 g) and grain yield (33.8 q/ha) as compared to 160 kg/ha which recorded less grains per ear (44), 1000 grain weight (38.04 g) and grain yield (27.2 q/ha). Kabir *et al*., 2009 also observed that yield parameters and seed yield in wheat was significantly influenced by seed rate. Optimum plant population under 120 kg seed rate resulted in less intra-crop competition thereby recording better yield parameters and yield. Increase in plant population due to increase in seed rate results in decrease in number of grains per spike and grain weight due to competition among plants for available resources (Isidro-Sánchez et al., 2017). Economics of cultivation and gross returns, net returns and benefit cost ratio was also recorded. Seed rate @ 120 kg/ha also gave highest net returns per hectare (Rs. 41,592) and benefit cost ratio (3.02) whereas higher seed rate @160kg/ha recorded lower net returns (Rs.

28,448) and B:C ratio (2.32). Higher net returns in this treatment was due to higher yield per hectare.

Table 2: Effect of seed rate on yield and economics of wheat under front Line demonstrations in Poonch

Seed rate kg/ha	**160**	**120**
Plant height (cm)	100.5	99.4
Ear length (cm)	12.9	13.2
Number of tillers/plant	6.6	7.5
Grains/ ear	44	52
1000 grain weight	38.04	38.48
Grain yield	27.2	33.8
Cost of cultivation	21600	20600
Gross returns	50048	62192
Net returns (Rs./ha)	28448	41592
BC ratio	2.32	3.02

Sale rate: Rs. 1840/q

CONCLUSION

Yield parameters viz. ear length, number to tillers/plant, grains per ear, 1000 grain weight and grain yield was found to perform better under optimum seed rate as compared to higher seed rate due to less completion for resources.

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