

IMPACT OF SEED RATES AND PLANTING METHODS ON ECONOMIC OF WHEAT (*TRITICUM AESTIVUM* L.) UNDER IRRIGATED CONDITION

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Abstract: A field experiment was conducted to find out the economics of wheat crop with various seed rates and planting methods under irrigated condition. This experiment were laid out in split plot design with total 12 treatment combinations and replicated thrice. The treatment comprises of five planting practices (Broadcasting – M1, 25 cm Spacing – M2, 22.5 cm Spacing – M3 and 20 cm Spacing– M4) and four seed rate (100 kg ha⁻¹ - S1, 125 kg ha⁻¹ - S2 and 150 kg ha⁻¹ -S3). The maximum gross income (Rs 71722 ha⁻¹) was obtained at 22.5 cm apart which was higher other practices, broadcasting (Rs 39728 ha⁻¹) and 25 cm (Rs 66949 ha⁻¹). The maximum net return (Rs 47799 ha⁻¹) was recorded under the seed rate 125 kg ha⁻¹ than other seed rate 100 kg ha⁻¹ and 150 kg ha⁻¹, whereas the highest benefit: cost ratio recorded with 125 kg ha⁻¹ seed rate which is significantly higher in comparison to 150 kg (3.30).

Keywords: Wheat, Seed rate, Planting methods, Economics

INTRODUCTION

Wheat (*Triticum aestivum* L.) is one of the most important food grain crops in the world. In our country it is placed just after rice in terms of production and consumption. It is consumed mostly in the form of bread as “chapati”. Wheat grain is a staple food used to make flour for leavened, flat and steamed breads, biscuits, cookies, cakes, breakfast cereal, pasta, noodles and for fermentation to make beer and other alcoholic beverage or bio fuel. Wheat contains more protein than other cereals and has a relatively high content of niacin and thiamine. It is basically concerned in providing the characteristics substance “glutin” which is very essential for bakers. For the production point of view India is the second wheat growing country after China in the world.

The Wheat (*Triticum aestivum* L.) is cultivated in almost every state except Kerala. Based on the agro-climatic conditions and varying agro ecological production conditions, the country is broadly divided into six wheat growing zones. The maximum wheat growing duration is in Northern Hill Zone and minimum in Peninsular Zone.

Wheat is a very adoptable crop and is grown under a wide range of soil and climatic condition. The crop is most successfully grown between latitudes of 30° N to 60° N and 27° S to 40° S in the world, with a high altitude of 5000 m. In India wheat is grown from 11° N to 30° N and from sea level up to an elevation of 3658 m in the Himalayas. In India it is grown mostly in the plains where as in the hills it is cultivated in mountainous regions of North India under a wide range of climatic conditions from Kashmir and other mountainous region to semi arid regions with mild to severe winter.

Based on the present rate of population growth of 1.5 percent and per capita consumption of

180 gm of wheat per day in the country, the demand for wheat is expected to be around 109 million tonnes by 2020. In the future scenario of climate change better agronomical practices would help in adaptation and resilience of crops. Seeding rate is one of the important production factors. Higher wheat grain yield with better quality requires appropriate seeding rate for various varieties (Radwan, 1997). Therefore, the optimum seeding rate is crucial for getting high yield of wheat in various regions (Lloveras, *et al.* 2004). Wheat is planted with different sowing methods depending upon the available resources such as soil water, time of planting, amount of preceding crop residues in the field and availability of planting machinery (Sikander *et al.*, 2003). Due to differences in crop stand establishment, wheat grain yield was significantly affected by different sowing methods including broadcast and line sowing (Jan *et al.*, 2001).

MATERIALS AND METHODS

A field experiment was conducted at Students Instructional Farm (SIF) of C.S. Azad University of Agriculture and Technology, Kanpur (U.P.), during winter season of 2010-2011. The experimental plot was sandy loam in texture, having a pH of 8.0, OC 0.45% and the available NPK were analyzed to be 177.0 kg/ha, 19.50 kg/ha and 160.0 kg/ha respectively. The treatments consisting of 4 planting methods and 3 seed rate practices, the recommended dose of fertilizer (150:60:40 kg ha⁻¹) were applied, half amount of Nitrogen together with full dose of Phosphorus, Potash and Zinc were applied as basal at the time of planting in the form of Urea, DAP, MOP and Zinc sulphate respectively. Remaining half dose

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of nitrogen was top dressed into two split doses at 32 and 56 days after planting. Each net plot size was 4.50 x 4.0 m (18 m²). The crop was sown in the first week of November, 2010 and crop was harvested on last week of April, 2011.

RESULTS AND DISCUSSION

Yield:

It is clear from the table 1.0 that the maximum grain yield (41.75 q/ha) recorded in the planting method of 22.5 cm apart was significantly higher than 20 cm (40.94 q/ha) and 25 cm apart (40.61 q/ha). The straw yield did not effected significantly by planting method however the higher straw yield produce planting method 20 cm (61.11 q/ha) followed by 22.5 cm apart (59.91 q/ha) and minimum by broad casting method of planting (55.64 q/ha).

In the case of seed rate, yield affected significantly. The maximum grain yield was produced 125 kg/ha (43.28 q/ha) which was higher than 100 kg/ha (40.14 q/ha) and 150 kg/ha (39.61 q/ha). Straw yield did not affected significantly, however maximum straw yield was produced 150 kg/ha seed rate (56.91 q/ha) respectively.

The interaction effect among the methods of planting and seed rate was significantly. The maximum grain yield 42.49 q/ha was produced under method of planting 22.5 cm with seed rate of 150 kg/ha. The minimum grain yield (35.75 q/ha) were observed under the planting method of 20. cm apart and seed rate 125 kg/ha. In case of straw yield maximum straw yield was recorded under the planting method of 22.5 cm apart and seed rate 100 kg/ha in minimum straw yield was recorded 25 cm apart seed rate of 125 kg/ha. The finding conforms to Goel and Verma (2005).

Gross income:

Gross income was calculated by multiplying market price at the time of harvesting to the grain yield and by product obtained from the different plots of the experiment and the data of gross income under the different method of planting and seed rate treatment have been given in table 1.0 and fig 1 & 2.

The estimate of grass income regarding different method of planting was affected significantly. The

maximum gross income (71722 Rs/ha) was obtained at 22.5 cm apart. Which was higher than other method of planting, broadcasting (69728 Rs/ha) and 25 cm (66949 Rs/ha) respectively.

Among seed rate gross income regarding different seed rate were affected significantly. The maximum gross income (69522 Rs/ha) was obtained with 125 kg/ha seed rate. Which was higher than seed rates of 150 kg/ha (68470 Rs/ha) and 100 kg/ha (66729 Rs/ha) respectively, however 125 kg/ha seed significant over 150 kg/ha seed rate.

In the case of interaction, it was also observed that the significantly maximum gross income (74446 Rs/ha) recorded under the method of planting 22.5 cm apart and seed rate of 125 kg/ha. The minimum gross income (65052 kg/ha) obtained under the planting method of 25 cm apart and seed rate of 100 kg/ha. Result conforms to Pandey and Mishra (1999).

Net profit:

Net income were obtained by subtracting the total cost of cultivation plot wise from the relative plot wise gross income and have been given in table 1.0 and fig 1. & 2.

The maximum net profit was recorded under the method of planting 22.5 cm apart as (51752 Rs/ha) which was significantly higher than other method of planting after 25 cm (46865 Rs/ha), (43254 Rs/ha) at 20 cm apart. However broadcasting did not show significant effect over 22.5 cm method of planting but it was numerically higher than other method of planting.

The maximum net profit was recorded under the different seed rate. Maximum net return was recorded under 125 k/ha seed rate as (47794 Rs/ha) then other seed rate 100 kg/ha (47753 Rs/ha) and 150 kg/ha (46466 Rs/ha) respectively. However 150 kg/ha seed did not show significant effect over 100 kg seed rate.

In interaction, It was also observed that the significantly maximum net return (51525 Rs/ha) recorded under the method of planting 22.5 cm apart and seed rate of 125 kg/ha. The minimum net return (35216 kg/ha) were observed under the planting method of 22.5 cm apart and seed rate 100 kg/ha. It confirms the finding of Pandey and Mishra (1999).

Table 1. Impact of seed rates and planting methods on grain yield, straw yield, gross return, net return (Rs/ha) and B: C ratio

Treatments	Grain yield (q/ha)	Straw yield (q/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B:C ratio
Method of planting					
M ₁	36.66	58.64	68728	51752	3.46
M ₂	40.94	61.11	63228	43254	3.15
M ₃	41.75	59.91	71722	49755	3.49
M ₄	40.61	48.21	66949	46865	3.34
SE (d)	1.05	1.09	638.8	835.20	0.14
CD at 5%	2.94	3.03	1595.70	2088.54	0.35
Seed rate					

S ₁	40.14	56.04	66729	46499	3.42
S ₂	42.28	56.94	68822	48466	3.46
S ₃	39.61	57.97	68470	45755	3.30
SE (d)	0.82	1.88	759.60	965.20	0.09
CD at 5%	1.73	N.S.	1749.50	1913.53	0.15

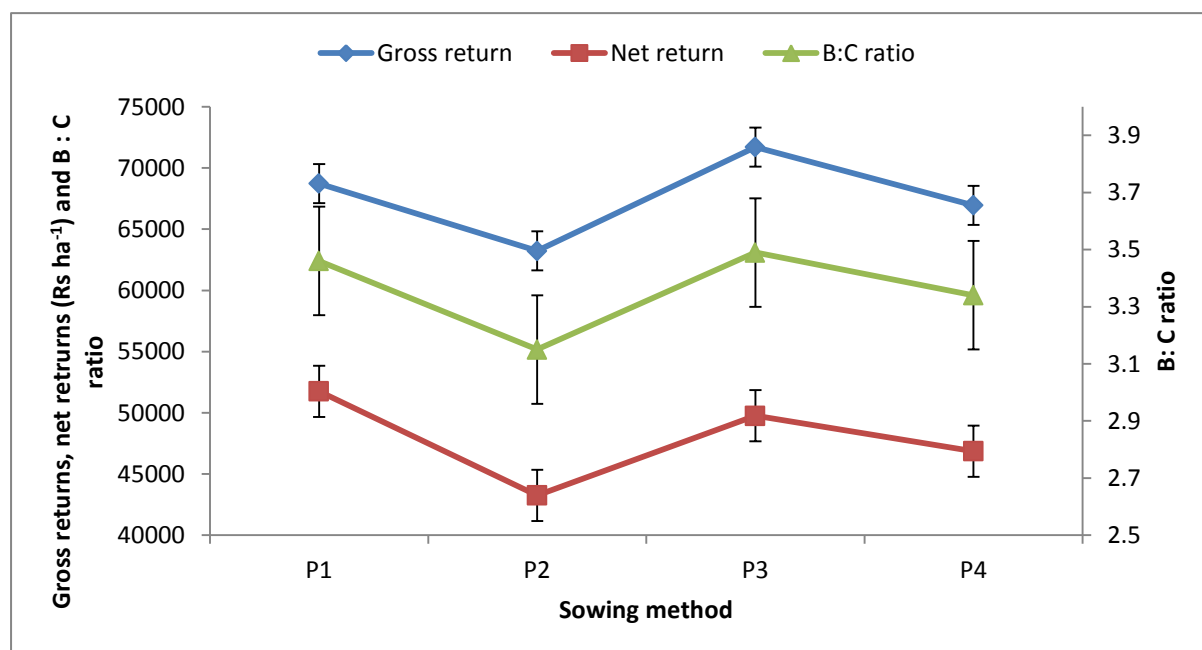


Fig-1

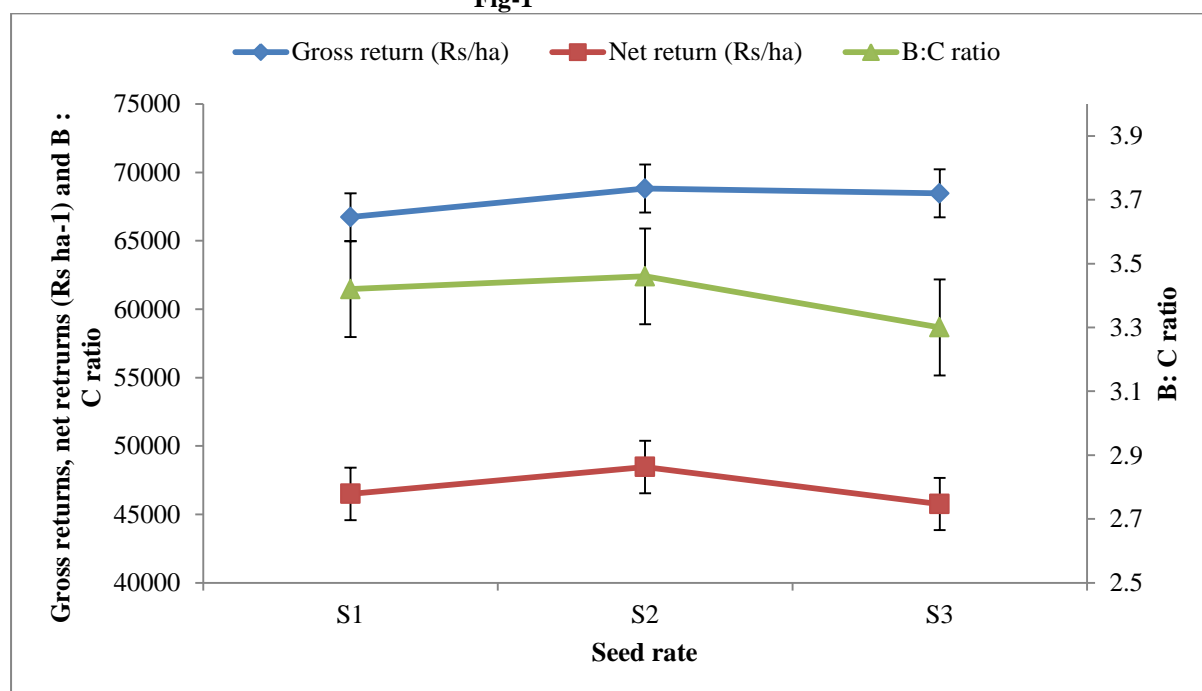


Fig-2

Benefit: Cost ratio:

From the data presented in table 1.0 and fig 1.0 and 2.0 clear that the benefit cost ratio were affected significantly various method of planting. The highest benefit cost ratio was obtained under the methods of planting 22.5 cm which was significant higher (3.49) in comparison to 25 cm (3.34). The benefit cost ratio was affected significantly under the various seed

rate. The highest benefit cost ratio was obtained with 125 kg/ha seed rate which was significantly higher (3.46) in comparison to 150 kg/ha (3.30).

In the case of interaction the data showed that the high benefit: cost ratio obtain from 22.5 cm planting of crop and seed rate of 125 kg /ha (3.58) whereas minimum recorded from the planting of crop by the method of broadcasting and seed rate 125kg /ha

(3.30). Such type of finding reported Meenakshi *et al.* (2006).

CONCLUSION

Thus results of the present investigation clearly demonstrate that 22.5 cm with 125 kg seed rate can be practiced to achieve higher profit compare other methods of wheat cultivation.

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