



Science

**EFFECT OF SOWING METHODS AND SEED RATE ON YIELD OF
BREAD WHEAT (*TRITICUM AESTIVUM L.*) AT SOUTH ARI DISTRICT,
SOUTH OMO ZONE, SNNPR, ETHIOPIA**

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Abstract

Wheat is one of the most important cereal crops of the world and is a staple food for about one third of the world's population. Despite the significant area of wheat production in the country, the mean national yield 1.3 t ha^{-1} is 24% below than mean yield for Africa and 48% below than global mean yield. A field experiment was carried out at Senegal and Selmamer during 2014 cropping season to determine the effects of sowing methods and seed rate on yield of bread wheat (*Triticum aestivum L.*). Treatments were two sowing methods namely row planting and broadcasting with six Seed rate (kg/ha): 125, 150, 175, 200, 225 and 250 kg/ha. The experimental was laid in randomized complete block design (RCBD) with three replications. The study result depicted that sowing method and seed rate had brought significant effect on the yield of bread wheat. The maximum grain yield of 3.9 t ha^{-1} and the minimum 2.7 t ha^{-1} were obtained from seed rate of 125 kg ha^{-1} and 200 kg ha^{-1} respectively. And the maximum grain yield of 3.5 t ha^{-1} was obtained from row planting and the least 3.13 t ha^{-1} was recorded from broadcast method; from these output we can conclude that, using of seed rate of 125 kg ha^{-1} and row planting is advisable for bread wheat production in the Senegal and Senmamer kebeles and their vicinities to increased wheat production and productivity.

Keywords: Bread Wheat; Row Sowing; Broad Casting; Seed Rate and Yield.

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1. Introduction

Wheat is one of the most important cereal crops of the world and is a staple food for about one third of the world's population [11]. It is primarily used as a staple food providing more protein than any other cereal crop [12]. In sub-Saharan Africa, Ethiopia ranks second to South Africa in terms of total wheat area and production. In Ethiopia, wheat ranks fourth in total cultivated area and production [2]. According to [5] Ethiopia is the largest wheat producer in Sub-Saharan Africa with the cultivated land of 1.1 million hectares. Area coverage of wheat increased from 600,000 to 760,000 ha between 1979/80 and 1994/95 [3, 4]. Despite the significant area of wheat production in the country, the mean national yield 1.3 t ha^{-1} is 24% below the mean yield for Africa and 48% below the global mean yield [2]. Also, [7] reported that the national average yield of wheat less than 1.5 t ha^{-1} .

There are different factors for low production of wheat. Amongst many factors crop production the patter of planting greater significance, as it is not only determined the proper crop stand establishment but also the production of individual plant through balancing the plant to plant competition and facilitating the conversion of light energy to harvest yield of crop. There is no uniformly recommendation by the agronomists regarding the seed rate for unit area, Salazar et al, reported that wheat seed rate as low as 5 kg ha^{-1} can give high yield, while [14] recommended $100 \text{ kg seed rate ha}^{-1}$ for obtain high grain yield. Therefore the present study was conducted to determine appropriate planting method and seed rate for optimum yield of bread wheat in study area.

2. Materials and Methods

The experiment was conducted at south Ari woreda of Senegal kebele of South Omo zone which is 10 km away from Jinka town. The sites are situated at 653432N and 231980E with an altitude of 2100 m.a.s.l. This area receives a mean annual rainfall of 1000 mm with maximum and minimum temperatures of 35°C and 15°C , respectively. The treatments included two seedling methods consists of row sowing and broad casting and six Seed rate (kg/ha): 125, 150, 175, 200, 225 and 250 kg/ha . Bread wheat (variety "Kekeba") was used for planting. The experimental design was laid out randomized complete block design (RCBD) with three replications. The plot size was $2.6 \times 3 \text{ m}^2$ with spacing of 20cm between rows for row sowing and Spacing between plots and replications was 1 and 1.5m respectively.

All other agronomic practice kept constant except treatment. Agronomic data were recorded and being subject to analysis. Analysis of variance was performed using the GLM procedure of sas statistical software version 9.1. Effect were considered significant in all statistical calculations if the P- value were <0.05 . Means were separated using least significant difference (LSD) test.

3. Results and Discussion

The analysis of variance result for mean squares showed that grain yield was significantly ($P \leq 0.01$) affected by sowing method and seed rate at Senegal kebele (Table 1) and Selmamer kebele (Table 3). Analysis of mean values showed that the maximum grain yield of 3.9 t ha^{-1} and the minimum 2.7 t ha^{-1} were obtained from seed rate of 125 kg ha^{-1} and 200 kg ha^{-1} , respectively

(Table 2) at Senegal kebele which is different from the previous findings of [10] which is highest grain yield was record from 200 kg ha⁻¹ seed rate.

On other hand at Selmamer kebele mean values result showed that the maximum grain yield of 3.6 t ha⁻¹ and the minimum 2.9t ha⁻¹ were obtained from seed rate of 125 kg ha⁻¹ and 250kg ha⁻¹, respectively (Table 4) this result was in agreement with the previous findings of [6].

Table 1: Mean Square Values for grain yield of Bread Wheat at Senegal

Sources	DF	Grain yield (t ha ⁻¹)
Replication(R)	2	0.34*
Sowing method (SM)	1	0.79**
Seed rate (SR)	5	0.99***
SM*SR	5	0.89***
Error	22	0.093

Note: *, ** and ***, Significant at p<0.05, P<0.01, P<0.001 respectively

Table 2: Grain Yield of Bread Wheat as Affected by Sowing Method and Seed Rate at Senegal

Treatments	Grain yield (t ha ⁻¹)
Sowing method (SM)	
Broad cast	3.2903b
Row planting	3.5870a
LSD 0.05	0.2117
Seed (kg ha⁻¹)	
125	3.9a
150	3.6b
175	3.6bc
200	2.7d
225	3.2c
250	3.5bc
LSD 0.05	0.3
CV (%)	8.90

Note: Means with different letters are significantly different, LSD=least Significant Different, CV=coefficient of variation and kg ha⁻¹=Kilo gram per hectare

Table 3: Mean Square Values for Grain Yield of Bread Wheat at Selmamer

Source	DF	Grain yield (t ha ⁻¹)
Replication(R)	2	0.06ns
Sowing method (SM)	1	1.38*
Seed rate (SR)	5	0.48*
SM*SR	5	1.59***
Error	22	0.18

Note: *, ** and ***, Significant at $p < 0.05$, $P < 0.01$, $P < 0.001$ respectively

Table 4: Grain Yield of Bread Wheat as Affected by Sowing Method and Seed Rate at Selmamer

Treatments	Grain yield (t ha ⁻¹)
Sowing method (SM)	
Broad cast	3.1b
Row planting	3.5a
LSD0.05	0.3
Seed (kg ha⁻¹)	
125	3.6a
150	3.6a
175	3.13b
200	3.2ab
225	3.5a
250	2.9b
LSD0.05	0.5
CV (%)	12.62

Note: Means with different letters are significantly different, LSD=least Significant Different, CV=coefficient of variation and kg ha⁻¹=Kilo gram per hectare

4. Conclusion

Wheat is one of the most important cereal crops in the world and it is a staple food for about one third of the world's population. Despite the significant area of wheat production in the country, the mean national yield 1.3t ha⁻¹ is 24% below than mean yield for Africa and 48% below than global mean yield. From this trail we suggested to use the seed rate of 125 kg ha⁻¹ and row planting for bread wheat production in the Senegal and Senmamer areas and their vicinity to increase wheat production and productivity in the tested areas and their vicinities.

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