

# Comparative Growth and Yield Performance of Various Wheat Cultivars

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## ABSTRACT

Investigations to study the growth and yield behavior of seven wheat cultivars were carried out at the Agronomic Research Area, University of Agriculture, Faisalabad during the year 1995-96. The experiment was laid out in a randomized complete block design with three replications. The net plot size was 2m x 3m. The maximum 1000-grain weight (50.93 g) was in case of cultivar Inqalab-91 but it was statistically at par with that of Parwaz-94. The minimum weight of 1000-grain (41.39 g) was recorded for cultivar Punjab-85. The grain yield ( $4.63 \text{ t ha}^{-1}$ ) was higher in case of Inqalab-91 followed watan-93 ( $4.35 \text{ t ha}^{-1}$ ).

**Key Words:** Growth; Yield; Wheat cultivars

## INTRODUCTION

In Pakistan, wheat is grown on an area of 8.17 million hectares with the annual production of 17.00 million tonnes while its average yield is  $2081.13 \text{ kg ha}^{-1}$  (Anonymous, 1997), which is much lower than average yield of other wheat growing countries of the world. There are many physiological and agronomic factors, which are responsible for low yield per unit area in Pakistan. The self-sufficiency in wheat can be achieved by the adoption of improved production technology of wheat especially by growing the most suitable varieties according to the environmental conditions.

Although many high yielding wheat varieties have been evolved and recommended for general cultivation in the past but their performance under the farmer's field conditions is not up to the mark. The reason is that either these varieties have lost their potential adaptability to changing edaphic and climatic conditions or these have become susceptible to various fungal diseases like rust and smut. So, there is a great need of continuous screening of wheat varieties with wide range of adaptability and high yield potential of better quality to boost the wheat production in Pakistan. The present study was, therefore, designed to find out wheat cultivars with high yield potential under the agro-ecological conditions of Faisalabad.

## MATERIALS AND METHODS

A field study to examine the growth and yield of different wheat cultivars was carried out at the Agronomic Research Area, University of Agriculture, Faisalabad during the year 1995-96. The experiment was laid out in a randomized complete block design with three replications, and the net plot size measured 2m x

3m. The cultivars were randomized in each replication. The following seven wheat cultivars were included in the experimental trial.  $V_1$  = Bahawalpur-79,  $V_2$  = Faisalabad-85,  $V_3$  = Punjab-85,  $V_4$  = Pasban-90,  $V_5$  = Inqalab-91,  $V_6$  = Watan-93 and  $V_7$  = Parwaz-94.

The experiment was sown on November 13, 1995 in rows 25 cm apart with a single row hand drill on a well-prepared seed bed. The seed was used @  $100 \text{ Kg ha}^{-1}$ . The crop was fertilized at the rate of 150-100-100 Kg NPK  $\text{ha}^{-1}$  in two splits i.e.  $\frac{1}{2}$  N, the whole P and K at sowing and remaining  $\frac{1}{2}$  N was applied at the time of first irrigation. In all, four irrigations were given to mature the crop. All other cultural practices were kept normal and uniform for all the experimental units. Data regarding number of fertile tillers  $\text{m}^{-2}$ , plant height at harvest, number of grains per spike, 1000-grain weight and grain yield were recorded during this field study. The data collected were analyzed statistically using Fisher's analysis of variance technique and difference among treatments means were compared by using least significant difference (LSD) test at  $P = 5\%$  (Steel & Torrie, 1984)

## RESULTS AND DISCUSSION

**Number of fertile tillers.** The highest number of fertile tillers (309.7) was observed in Pasban-90 which differed significantly from those of Bahawalpur-79, Faisalabad-85, Punjab-85, Watan-93 and Parwaz-94 but remained statistically at par with Inqalab-91, which produced 291.0 fertile tillers  $\text{m}^{-2}$  (Table I). The genotypes Bahawalpur-79, Faisalabad-85, Punjab-85, Watan-93 and Parwaz-94 produced statistically same number of fertile tillers per unit area ( $\text{m}^{-2}$ ). The minimum number of fertile tillers per unit area (254.3) was given by cultivar Punjab-85 which was at par with all other

**Table I. Comparative growth and yield performance of various wheat cultivars**

Treatment	No. of fertile tillers (m <sup>-2</sup> )	Plant height (cm)	No. of grains per spike	1000-grain weight (g)	Grain yield (t ha <sup>-1</sup> )
BWP-79	270.3 b	99.00 a	40.20 a	46.06 cd	3.46 d
Fsd-85	262.7 b	90.23 bc	51.43 b	44.12 d	3.86 c
Pb-85	254.3 b	89.53 bc	52.97 b	41.39 e	3.91 c
Pasban-90	309.7 a	87.40 bc	51.10 b	47.50 bc	3.98 bc
Inqalab-91	291.0 a	91.27 b	59.07 a	50.93 a	4.63 a
Watan-93	266.0 b	84.50 cd	46.80 c	47.82 bc	4.35 ab
Parwaz-94	258.3 b	80.43 d	45.20 c	49.11 ab	4.07 bc

cultivars except Pasban-90 and inqalab-91. Afzal and Nazir (1986) who observed the same number of fertile tillers in SA-75 and LU-26 which might have the same genetic potential for fertile tillers per unit area.

**Plant height.** The maximum plant height (99.00 cm) at final harvest was recorded in Bahawalpur-79, which significantly more than that of all other varieties followed by Inqalab-91 (91.27 cm), which was statistically differed. The cultivars Faisalabad-85, Punjab-85 and Pasban-90 and Watan-93 were statistically at par with one another while differed significantly from Parwaz-94. The maximum plant height (99.00 cm) was recorded in Bahawalpur-79, while minimum plant height (80.43 cm) was recorded in Parwaz-94, which was at par with Watan-93. The differences in plant height due to various cultivars might be due to varied genetic constitution of cultivars. These results are quite in line with the result of Afzal and Nazir (1986) who reported that plant height varied greatly among various wheat cultivars.

**Number of grains per spike.** The highest number of grains per spike (59.07) were produced by Inqalab-91, which differed significantly from all other cultivars. The number of grains per spike produced by Faisalabad-85, Punjab-85 and Pasban-90 did not differ significantly. Similarly Watan-93 and Parwaz-94 remained statistically at par with one another. Significantly the minimum grains per spike (40.20) were produced by Bahawalpur-79. The differences in grain number per spike were due to the variation in the genetic potential. These results are in conformity with those of Johnson *et al.* (1966), Afzal and Nazir (1986), Sadiq and Lalah (1986).

**1000-grain weight.** Inqalab -91 gave the maximum 1000-grain weight (50.93 g) and did not differ significantly from Parwaz-94 while Punjab-85 gave the minimum 1000-grain weight (41.39 g), which was statistically different from all other cultivars. However, Watan-93, Pasban-90 and Bahawalpur-79 gave statistically the same 1000-grain weight while Parwaz-94 differed significantly from Bahawalpur-79 but remained at par with the Watan-93 and Pasban-90. The cultivar Faisalabad-85 gave (44.12 g) 1000-grain weight

and did not differ significantly from Bahawalpur-79. The results are in close agreement with the findings of Afzal and Nazir (1986), and Sharar *et al.* (1989).

**Grain yield.** There were highly significant differences among various wheat cultivars regarding the grain yield per hectare. Inqalab-91 produced maximum grain yield (4.63 t ha<sup>-1</sup>) followed by Watan-93 (4.35 t ha<sup>-1</sup>) which did not differ significantly from one another. The minimum grain yield (3.46 t ha<sup>-1</sup>) given by Bahawalpur-79 was statistically different from all other cultivars. However, wheat cultivars Parwaz-94, Pasban-90, Punjab-85 and Faisalabad-85 were statistically at par but Watan-93 differed significantly from Faisalabad-85 and Punjab-85. The grain yield of Parwaz-94 (4.07 t ha<sup>-1</sup>) was more than that of Pasban-90 (3.98 t ha<sup>-1</sup>) but statistically were similar in grain yield. The findings of Afzal and Nazir (1986), Pandey and Agarwal (1991) and Aheer (1993), are in close agreement with the results of this experiment.

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