

EFFECT OF TIME OF SOWING ON SOME IMPORTANT CHARACTERS OF WHEAT, *TRITICUM AESTIVUM* GENOTYPES

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ABSTRACT

A study was conducted during 1999 to 2001 to find adequate planting time of newly evolved wheat cultivars under Bahawalpur conditions. The experiment included six sowing dates started from 1st November upto 15th January with equal intervals of fifteen days and six varieties/cultivars (93-BTO-22, Punjnad-1, BWP-2000, Uqab-2000, Iqbal-2000 with Inqalab-91 as standard one). The results showed that wheat sown between November 15-30 gave more grain yield. However, grains of wheat varieties Inqalab-91, BWP-2000 and Punjnad-1 gave significantly higher weights in a wide range of sowing period i.e. from 15th November to 15th December. The highest mean grain yield (5317 kg/ha) was obtained when crop was sown on 15th November followed by sowing on 30th November (5308 kg/ha).

KEYWORDS: *Triticum aestivum*; genotypes; sowing; timing; yield; Pakistan.

INTRODUCTION

Wheat (*Triticum aestivum* L.) is grown in Pakistan on an area of 8.5 million hectares with an annual production of 21 million tons. An average yield was 2.5 tons per hectare during the year 1999-2000 (1). This wheat yield is far below than the potential yield due to many factors sowing time being more important. It has been observed that grain yield of 3 long duration cultivars was improved when sowing date was advanced from November 15 to October 25 (7). The short duration varieties sonalika and WG-377 yielded higher when sown on November 15. A cultivar WL-711 produced more than all other cultivars. It has been further reported that number of tillers and 1000-grain weight were reduced by delayed sowing. Sufian *et al.* (9) investigated that wheat sown on October 31, November 22 and December 22 matured in

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93.4, 105.00 and 87.8 days yielding 2.71, 4.00 and 3.09 tons per hectare, respectively.

De *et al.* (2) reported that wheat yield increased considerably by adjusting the sowing date to favourable atmospheric temperature. Mid November sowing, when daily mean temperature was 19-21°C yielded 3.05 tons per hectare compared with mid October sowing (2.35 t/ha), with daily mean temperature of 24-26°C. High temperature at sowing of spring wheat shortened vegetative growth and initiated early differentiation, while night temperature was more than 13°C coupled with 33-35°C day temperature in the last fortnight of October. It adversely affected the tillering of spring wheat sown on October 15 and produced smaller ears with fewer fertile spikelets. Girothia *et al.* (4) reported that wheat sown on the optimum date (November 15-20) gave grain yield of 4.08 tons per hectare in 1983-84 and 3.60 tons per hectare in 1984-85, compared with 3.33 and 3.15 tons per hectare, respectively, for late sown crop (December 6-10) whereas tillering and 1000-grain weight were increased in the November sown crop.

Raj *et al.* (6) conducted field experiment on wheat during the rabi season of 1985-87 at Hisar, Haryana. They concluded that grain yield of a wheat cultivar WH-283 was decreased from delayed sowing after November 28. Dabre *et al.* (3) conducted a field experiment in 1985-87 with 14 wheat cultivars which were sown on 1st and 15th of each month for four months, beginning from October. The highest grain yield was obtained from mid November sowing. It was suggested that increasing the seeding rate where sowing is delayed may check some yield decrease. Kumar *et al.* (5) studied the effect of sowing dates and nitrogen levels on the growth and production potential of three wheat cultivars. They reported better wheat growth when crop was sown on 20th November than on 1st November or 10th December, although there was little grain yield difference between two dates of November. Cultivar WH-542 gave higher yield than HD-239 and WH-533.

The current study was conducted to find out the appropriate sowing time for newly evolved wheat varieties/cultivars under irrigated conditions of Bahawalpur.

MATERIALS AND METHODS

This study was carried out at Agronomic Research Station, Bahawalpur during the years 1999-2000 and 2000-2001. Six sowing dates viz. 1st November (D₁), 15th November (D₂), 30th November (D₃), 1st December (D₄), 30th December (D₅) and 1st January (D₆) and six varieties (Inqalab-91, 93BT-

22, Punjnad-1, BWP-2000, Iqbal-2000 and Uqab-2000) were included in the study. The trial was laid out in a split plot design with three replications. Plot size was 2.4 x 6.0 meter having varieties in main plots and sowing dates in sub-plots. Standard dose of NPK fertilizer (112-84-0 kg/ha) was applied as blanket application.

The observations were recorded for grain yield and yield components. Data collected were analyzed statistically using least significant difference (LSD) test at five percent probability level (8).

RESULTS AND DISCUSSION

The analysis of variance showed significant differences among wheat varieties/cultivars for all the characteristics at different sowing dates. A thorough scrutiny of the data revealed superiority of Inqalab-91, Punjnad-1 and BWP-2000 over others and among sowing dates, 15th November and 30th November.

Table 1. Wheat grain yield (kg/ha) of different varieties at different sowing dates during 1999 to 2001.

Varieties	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	Mean
Inqalab-91	4432.5cd	5600.0a	5517.5a	4776.0c	3603.0e	2155.5g	4347.3a
93-BTO-22	4284.0d	5088.5b	5051.5b	4573.0cd	3646.0e	1853.5h	4082.7b
Punjnad-1	4661.0d	5765.5a	5682.5a	4786.5c	3540.5e	2061.5g	4416.2a
BWP-2000	4271.0d	5510.0a	5561.0a	4736.0c	3747.5e	2209.5g	4339.7a
Iqbal-2000	4303.5cd	5071.0b	5110.0b	4663.0c	3439.5f	1903.0h	4072.6b
Uqab-2000	4220.0d	4867.0b	4926.0b	4724.0c	3469.0f	1814.0h	4003.0b
Mean	4362.0c	5317.0a	5308.0a	4709.75b	3574.25d	1999.41e	
Cd ₁ for varieties	= 102.80						
Cd ₁ for sowing dates	= 144.0						
Cd ₁ for varieties x sowing dates	= 265.76						

Means not sharing a letter differ significantly at 5% probability level.

The data (Table 1) showed that grain yield was greater when wheat was sown on 15th November closely followed by 30th November sowing. Before or after these dates lowered the yield of all cultivars significantly. Therefore, 15th to 30th November may be considered as the optimum time of wheat planting. Cultivars like Inqalab-91, Punjnad-1 and BWP-2000 gave significantly higher grain yield in all the cases even upto 15th December. These results are in line with several early findings (2, 3, 4, 6, 7, 9).

Table 2. 1000-grain weight (g) of different varieties at different sowing dates during 1999 to 2001 (average).

Varieties	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	Mean
Inqalab-91	39.80ab	42.70a	40.15a	35.0c	28.22d	19.17f	34.17
93-BTO-22	38.22b	40.10a	39.30b	34.70c	22.0ef	18.50f	32.13
Punjnad-1	36.15bc	40.70a	38.25c	36.10c	28.30d	20.0ef	33.26
BWP-2000	38.15bc	41.16a	39.90ab	35.10c	24.50e	19.38f	33.03
Iqbal-2000	38.70b	40.50a	39.30b	34.16 c	23.10e	20.25ef	32.66
Uqab-2000	38.15bc	42.10a	39.30b	34.50c	22.70ef	19.20f	32.65
Mean	38.19ab	41.20a	39.38a	34.52c	24.80d	19.41e	
Cd ₁ for sowing dates		= 3.03					
Cd ₁ for varieties x sowing dates		= 2.89					

Means not sharing a letter differ significantly at 5% probability level.

It is clear from Table 2 that maximum 1000-grain weight was attained on 15th November for all the varieties/cultivars followed non-significantly by 30th November. Before or after these dates, this growth parameter was decreased significantly. Similar findings were reported earlier (4, 7). Regardless of the sowing time, all the varieties/cultivars were statistically at par for 1000-grain weight.

Table 3. Number of fertile tillers/m² of different varieties at different sowing dates during 1999 to 2001 (average).

Varieties	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	Mean
Inqalab-91	315.0ab	368.0a	326.0ab	310.0b	280.0b	265.0b	310.6
93-BTO-22	318.0ab	350.0a	335.0a	305.0b	285.0b	260.0bc	308.8
Punjnad-1	350.0a	395.0a	388.0a	320.0ab	300.0b	260.0bc	335.5
BWP-2000	308.0b	355.0a	328.0ab	303.0b	280.0b	250.0c	304.0
Iqbal-2000	318.0ab	365.0a	340.0a	320.0ab	285.0b	252.0bc	313.3
Uqab-2000	333.0a	356.0a	335.0a	315.0ab	275.0b	243.0c	309.5
Mean	323.6a	364.8a	342.0a	312.1a	284.1b	255.0b	
Cd ₁ for sowing dates		= 63.39					
Cd ₁ for varieties x sowing dates		= 70.11					

Means not sharing a letter differ significantly at 5% probability level.

The data (Table 3) revealed that highly significant values for fertile tillers were recorded from 1st November to 15th December. After these dates, number of fertile tillers decreased significantly. Similar findings were recorded by Girothia *et al.* (4) and Randhawa *et al.* (7). The interaction between wheat varieties/cultivars and sowing dates was also significant. However, mean values for all the varieties/cultivars were statistically same for this yield component.

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