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Response of Wheat Varieties to Sowing Dates

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Abstract: The study was conducted to evaluate the appropriate sowing time of newly evolved wheat varieties/cultivars under Bahawalpur conditions. The study included 6 sowing dates started from 1st November up to 15th January of year 1999-2000 to 2000-2001 with equal intervals of fifteen days and five varieties/cultivars viz., 2236, 2098, 2219 punjnad-1 with inqlab, 91 as standard one. Regardless of varieties/ cultivars the best results were obtained when wheat was sown after 1st and before 15th November of year 1999 to 2000. However wheat variety punjnad-1 gave significantly higher weights in a wide range of sowing period i.e., 1st to 30th November. The highest mean grain yield of 5315 kg ha⁻¹ was obtained when crop was sown on 15th November (D2) followed by 5268 kg ha⁻¹ for sowing on 1st November (D1).

Key words: Sowing dates, wheat varieties, yield components, Pakistan

Introduction

Wheat (*Triticum aestivum* L.) is the main food crop of Pakistan, which is grown on an area of 8.463 million hectares with an annual production of 21.078 million tones of grains, giving an average yield of 2.491 tones per hectare during the year 1999-2000 (Anonymous, 2002). This yield of wheat is far below than the potential yield, Despite all out efforts made in this direction, yield of wheat is a result of many contributing factors, among these the time of sowing of wheat crop at its appropriate time is most important. Late sowing beyond certain limits lowers the grain yield significantly. Weights were reduced by delayed sowing. Randhawa *et al.* (1981) reported that short duration wheat varieties Sonalika and WG-377 yielded highest when sown on Nov. 15. They also reported that number of tillers and 1000- grain weight were reduced by delayed sowing. Ali *et al.* (1982) concluded that yield of all the cultivars were similar in spite of differences in yield components. They further observed that 1000- grain weight was maximum for Blue silver (41.6 gm) and the minimum for SA-75 (35.1 gm) while harvest index was higher in SA-75 than in other cultivars. They also concluded that delayed sowing reduced stand density, number of grains per ear and grain yield. Kalyan *et al.* (1985) said that the wheat crop sown on 21 Nov. resulted in 6.9 tones ha⁻¹ and 18% higher yield in both the year, respectively than those sown on 6 Dec. Phadnawis and Saini (1992) reported that grain yield decreased from 166.28 gm m⁻² with delay in sowing dates from 2 Nov. to 17 Feb. Grain yield positively correlated with total grain number m⁻² mean grain weight and number of ears m⁻². Raj *et al.* (1992) concluded that grain yield of wheat

cultivar WH-283 was decreased from delaying after Nov . 28. Dabre *et al.* (1993) observed that the highest grain yield were obtained from on Nov. 15. It was suggested that increasing the seeding rate where sowing is delayed may check any yield decrease. Lathwal and Thakral (1999) concluding that plant height, grain yield, straw yield and harvest index decreased with the delay in sowing. An increase of 48 and 39% in grain yield was observed from 5 and 15th November sowing compared with 5th December. Kumar *et al.* (2000) observed that wheat growth was better when sown on 20th November than on 1st November or 10th December, although there was little grain yield difference between the two dates in November. Wheat cv. WH 542 gave higher yield than HD 2329 and WH 533.

Keeping in view all these , this study was conducted to find out the appropriate sowing time for newly evolved wheat varieties/ cultivars under irrigated conditions of Bahawalpur, Pakistan.

Materials and Methods

The study was carried out at Regional Agricultural Research Institute Bahawalpur, Pakistan during the year 1999-2000 to find out the appropriate sowing time of newly evolved wheat varieties/ cultivars for maximum grain yield. The trial was laid out in Split Plot design, and a plot size of 2.4 X 6 m⁻² having varieties in main plots and sowing dates in sub-plots. Standard dose of NPK involved the following levels of two factors:

Factor 1

Varieties/ cultivars

V1 = Inqlab-91

V2 = 2098

V3 = 2219

V4 = 2236

V5 = Punjnad -1

Factor 2

Sowing dates

D1 = 1st November of year = 1999 to 2000

D2 = 15th November of year = 1999 to 2000

D3 = 30th November of year = 1999 to 2000

D4 = 15th December of year = 1999 to 2000

D5 = 30th December of year = 1999 to 2000

D6 = 15th January of year = 2000 to 2001

The observations were recorded for grain yield and yield components. Data collected were analysed statistically using least significant difference test at 5 % level of probability (Steel and Torrie, 1984).

Results and Discussion

Wheat grain yield (kg ha^{-1})

The analysis of variance Table 1 showed that significant differences among wheat varieties/cultivars for all the characteristics at different sowing dates. Data Table 1 revealed superiority of Punjnad 1 over others and among sowing dates, (D2) 15th Nov. and (D1) 1st Nov. were the best for all growth parameters and consequently the grain yield. The highest mean grain yield of 5315 kg ha^{-1} was obtained when crop was sown on 15th Nov. (D2) followed by 5268 kg ha^{-1} for sowing on 1st Nov. (D1). As far as variety was concerned Punjnad-1 gave reasonably higher grain yield in all the cases even up to 15th Dec (D4). Similar findings were reported by Kalyan *et al.* (1985), Phadnawis and Saini (1992), Raj *et al.* (1992) and Dabre *et al.* (1993).

No. of fertile tillers

The maximum number of fertile tillers were attained on 15th Nov. (D2) for all varieties/cultivars followed non significantly by 1st Nov. (D1). Before or after these dates, this growth parameter was decreased significantly (Table 2). Similar findings were reported by

Table 1: Wheat grain yield (kg ha^{-1}) of different wheat varieties (V) at different sowing dates (D) of year 1999-2000 to 2000-2001

Sowing dates	Wheat varieties					Mean
	V ₁	V ₂	V ₃	V ₄	V ₅	
D ₁	6054a	4202ijk	5451bcd	4618fghi	6017ab	5268a
D ₂	5144def	4366ghi	5742abc	5251cde	6074a	5351a
D ₃	4649fghi	4280hi	4246hij	4814dfgh	4930def	5484b
D ₄	3530l	3681jkl	3207l	3484l	3638kl	3508c
D ₅	3252l	3319l	3199l	3178l	3385l	3267c
D ₆	2176m	2582m	2227m	2108m	2248m	2268d
Mean	4134a	3738b	4012a	3909b	4382a	

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

Cd₁ for sowing dates = 432.7

Cd₁ for varieties = 419.9

Cd₁ for varieties X sowing dates = 507.6

Table 2: Number of fertile tillers (m^{-2}) of different wheat varieties (V) at different sowing dates (D) of year 1999-2000 to 2000-2001

Sowing dates	Wheat varieties					Mean
	V ₁	V ₂	V ₃	V ₄	V ₅	
D ₁	350cd	340de	360b	345de	360b	351ab
D ₂	345de	345de	370a	360b	362b	356a
D ₃	345de	344de	350cd	352c	344de	347b
D ₄	310g	312g	320f	316fg	320f	316c
D ₅	276l	383h	288h	288h	284j	284d
D ₆	256k	255k	266j	262j	265j	260e
Mean	318	318	324	321	323	

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

Cd₁ for sowing dates = 6.13 kg ha^{-1}

Cd₁ for sowing dates X Varieties = 6.161 kg ha^{-1}

Table 3: 1000-grain weight (g) different wheat varieties (V) at different sowing dates (D) of year 1999-2000 to 2000-2001

Sowing dates	Wheat varieties					Mean
	V ₁	V ₂	V ₃	V ₄	V ₅	
D ₁	43a	38cd	39bc	37de	40b	39.4a
D ₂	39bc	39bc	40b	40b	40b	39.6a
D ₃	37de	38cd	36ef	39bc	37de	37.4b
D ₄	35f	35f	33g	32gh	33g	33.6c
D ₅	33g	32gh	31hi	30i	30i	31.2d
D ₆	20j	20j	20j	18k	19jk	19.4e
Mean	34.5	33.6	33.2	33.6	33.2	

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

Cd1 for sowing dates = 1.89 kg ha⁻¹

Cd1 for sowing dates X varieties = 1.701 kg ha⁻¹

Randhawa *et al.* (1981). Phadnawis and Saini (1992). 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. On the basis of two years results it was concluded that sowing of wheat crop from 1st Nov. (D1) to 30th Nov. (D3) resulted in a significantly higher values as compared to rest of sowing dates.

1000-grain weight (g)

The maximum 1000-grain weight was attained in 15th Nov. (D2) for all the varieties/cultivars followed non significantly by 1st Nov. (D1). Table3. After these dates the growth parameter was decreased significantly. Similar findings were reported by Randhawa *et al.* (1981), Phadnawis and Saini (1992). Regardless of the sowing time, all the varieties/cultivars were statistically at par for 1000-grain weight.

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