PLANTING TIME EFFECT ON GRAIN AND QUALITY CHARACTERISTICS OF WHEAT

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To study the effect of planting time on quality characteristics of spring wheat varieties, Inqilab-91 and AS-2002, an experiment was conducted at Wheat Research Institute, Faisalabad from 2002-03 to 2004-05. The crop was sown from 25th Oct. to 10th Jan. with 15 days interval. At harvest, samples were taken from each plot and analyzed qualitatively. Characters such as 1000-grain weight, test weight and flour yield declined progressively with delayed sowing. These had shown maximum value in first planting date i.e.25th Oct. and minimum value in the last planting date i.e. 10th Jan. Protein content and bread quality improved by delayed sowing. Best chapati quality was obtained in mid and late sowings, however in case of AS-2002, chapati quality was adversely affected in last sowing date. Inqilab-91 proved superior for protein content, chapati and bread quality while AS-2002 was superior for rest of the characters. Year effects were non significant for all the characteristics.
Key words: Wheat, quality and planting time.

INTRODUCTION

In Punjab wheat sowing is normally delayed. The best planting time is up to 15th November while most of the sowing is accomplished during end November and first fortnight of December. Early sown wheat had higher grain yield (Qamar *et al., 2004*). The detrimental effect of delayed sowing on grain yield was maximum with reduction in 1000-grain weight (Singh and Pal, 2000; Subhan *et a*l., 2004). Delayed sowing also significantly reduced test weight (Kumar and Sharma,2003).High temperature and desicating winds during the month of April might caused forced maturity of late sown wheat, thus resulting in reduction of test weight (Singh and Dhaliwal,2000). Crude protein content increased with delayed sowing (Reents *et al*, 1997; Schemitt and Dewes, 1997; Yadava and Singh, 2003). Effects of late sowing on milling yield were statistically significant and bread quality was not badly affected (Flood *et al*, 1996). Higher grain crude protein content but lower grain sizes were obtained with delayed sowing (Patil *et al*, 2000). High temperature in the post anthesis period of late sown wheat shortened the grain filling period resulting in a smaller endosperm, lower grain weight and increased protein content (Ahmed *et al*, 1994).

MATERIAL AND METHODS

The experiment was devised to find the effect of sowing time on different wheat quality traits during 2002-03 to 2004-05.Two varieties of wheat Inqilab-91 and AS-2002 were sown at six sowing dates viz; 25 Oct., 10 Nov., 25 Nov., 10 Dec., 25 Dec. and 10 Jan. each year. The plot size per treatment was 1.8m x 6 m. The crop was sown with Norvegian drill by maintaining 27 cm inter row distance and seed was used at the rate of 100 kg/ ha. NPK fertilizer was applied at the rate of 115-85-0 kg/ha. To avoid moisture stress at critical growth stages i.e, tillering, booting and grain formation; the crop was irrigated 3-4 times with canal water. All other recommended agronomic practices were followed to raise the crop. At maturity crop was harvested and threshed and two kg seed sample from each plot was taken for analysis of following parameters,

1- 1000-grain weight
2- Test weight
3- Protein content
4- Flour yield
5- Chapatti quality
6- Bread quality

Bread quality scoring was done by following the method developed by Samuel (1960). The data was statistically analyzed (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

1000-grain weight (g)

Year effects for 1000 grain weight were non significant (table-1). However, the two varieties differed significantly for this character. The variety AS-2002 was superior for this character having 1000-grain weight 41.25g while that of Inqilab.91 was 37.56 g. (Table-2). The sowing dates effect for this character was highly significant. First sowing date i.e.25th October had shown maximum 1000 grain weight (49.23g). There was a gradual decrease in 1000 grain weight with delayed sowing and minimum grain weight (32.27g) was recorded (table-3) in the case of last sowing date. Varieties-sowing date interaction was highly significant showing different varietal behavior in different sowing dates. Similar results have been reported in the past (Qamar *et al.,* 2004; Singh and Pal, 2000; Subhan *et a*l, 2004).

Test weight (kg/hl)

Year effects for test weight were non significant (table-1). Similarly varietal effects for test weight were also found non significant (table-2). Sowing date effects for this character were highly significant. Maximum test weight was recorded in first three sowing dates which was 78.66, 78.83, 78.36 kg/hl for 25th Oct., 10th Nov. and 25th Nov. sowings respectively (table-3). Variety-sowing date interaction was non-significant showing that both the varieties responded similarly in different sowing dates for this character. Previous findings (Kumar and Sharma, 2003; Singh and Dhaliwal, 2000) are in accordance with these results.

Table 1. Mean squares.

Quality characteristics	Year	Varieties	Sowing date	Variety x sowing dates
1000 grain weight	11.32NS	122.80*	211.98**	14.39**
Test weight	2.33NS	0.01NS	19.50**	0.55NS
Protein content	1.87 NS	0.03 NS	0.66**	1.13 NS
Flour yield	5.00 NS	15.92 NS	36.26**	1.47 NS
Bread quality	0.01 NS	11.00**	5.81**	0.72**
Chapati Quality	-	-	-	-

Table 2. Varietal differences for quality characteristics

Quality characteristics	Inqilab-91	AS-2002
1000 grain weight	37.56	41.25
Test weight	77.24	77.27
Protein content	12.50	12.44
Flour yield	67.51	68.84
Bread quality	71.76	70.65
Chapati Quality	Good	Fairly good

Table 3. Sowing date effect for the quality characters studied.

Quality Characteristics	25th Oct.	10th Nov.	25th Nov.	10th Dec.	25th Dec.	10th Jan.
1000 grain weight	49.23	42.91	38.99	36.61	36.42	32.27
Test weight	78.66	78.83	78.36	77.20	76.36	74.13
Protein content	11.94	12.27	12.49	12.62	12.57	12.92
Flour yield	71.31	70.21	68.67	67.24	67.24	64.40
Bread quality	69.75	70.61	70.95	71.65	71.71	72.56
Chapati Quality	Fair to fairly good	Fairly good to good	Good	Good	Good	Fairly good to good

Protein content (%)

Effects of year were non significant for protein content (table-1). Varietal effects for this character were also non significant (table-2). However, sowing date effects for protein content were highly significant. Protein content increased gradually with delayed sowing and was maximum (12.92%) in last sowing date and minimum (11.94%) in first sowing date (table-3). Interaction of varieties with sowing date was non significant. Ahmed et al., 1994 and Patil et al., 2000, have also reported protein content increases with delayed sowing.

Flour yield (%)

Effects of year for flour yield were non significant (table-1). Varietal effects for this character were also non significant (table-2). However, effects of sowing date were highly significant for flour yield. Flour yield decreased gradually from first to last sowing date, (table-3) showing maximum value (71.31%) in first sowing date and minimum (64.40%) in last sowing date. Interaction of varieties with sowing date was non significant. Effects on milling yield (flour yield) have been reported statistically significant (Flood *et al., 1996*).

Bread quality (points/100).

Yearly effects for bread quality were non significant while effects of varieties for this character were highly significant (table-1). The variety Inqilab-91 was superior for this character showing a value of 71.76 points/100 over AS-2002, which had 70.65 points/100

(table 2). Similarly sowing date effects for bread quality were also highly significant. Bread quality score increased gradually from first to last sowing date and was maximum (72.56 points/100) in last sowing date while it was minimum (69.75 points/100) in first sowing date (table-3). In the same manner, a variety x sowing date interaction was also highly significant. Sowing time affected bread quality differently in each variety. Some workers (Flood *etal., 1996*) reported that bread quality was not badly affected by delayed sowing.

Chapati quality

The two varieties behaved differently for chapati quality in three years of study (table-1). Inqilab-91 was superior for chapati quality than AS-2002 (table-2). In case of Inqilab-91, chapati quality in 25th Oct. sowing was fairly good however, during rest of the sowing dates (10th Nov.-10th Jan.), its chapati quality was good. AS-2002 behaved differently as in 25th Oct. sowing, its quality was fair which improved to fairly good in 10th Nov. sowing and was of good quality in 25th Nov. to 25th Dec. sowings and declined in the last sowing date to fairly good (table-3).

CONCLUSION

Delayed planting adversely affects the 1000-grain weight, test weight and flour yield. However, protein content and bread quality improved with delayed planting. But chapatti quality was better in the mid and late sowings as compared to early sowing.

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