Effect of Planting Date on Protein content of Wheat varieties

H. Eslami¹, S.M.J. Mir Hadi² and M. Kalateh Arabi³

1. M.Sc., Dept. of Agriculture of Islamic Azad University, Tehran Branch
2. P.HD., Dept. of Agriculture of Islamic Azad University, Tehran Branch
3. Researcher., Dept. of Agriculture and Natural Resources Research. Gorgan

Corresponding author: H. Eslami

ABSTRACT: To study the effect of planting time on quality characteristics of wheat varieties, (MORVARID and N-85), an experiment was conducted at Wheat Research Institute, Faisalabad from 2012. The crop was sown from (Dec 21, Dec 30 and Jan 29). 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. 21 Dec. and minimum value in the last planting date i.e. 29 Jan. Protein content and bread quality improved by delayed sowing. Best chapati quality was obtained in mid and late sowings, however in case of MORVARID, chapati quality was adversely affected in last sowing date. N-85 proved superior for protein content, chapati and bread quality while MORVARID was superior for rest of the characters. Year effects were non significant for all the characteristics.

Keywords: Wheat, Variety, planting time

INTRODUCTION

Wheat (Triticum aestivum L.) is the most important cereal crop as the main stable food for the Egyptian people. Improving the productivity of this crop is a main task due to its short supply which mandated importing about 50% of the needed wheat. Since there is a short time between harvesting summer crops i.e. corn, cotton and rice and planting wheat, no-till wheat producers can plant more acreage at reduced cost than those who have to gear up for conventional land preparation. The other important benefit of no-till small grain production is that it allows growers to establish a full no-till cropping system. The best chance of increasing soil organic matter, improving soil structure and increasing water availability over the long term occurs when all crops in the rotation are planted using no-till practices (Doran, 1980). Planting date is one of the most important agronomic factors involved in producing high yielding small grain cereal crops, which affects the timing and duration of the vegetative and reproductive stages. In Egypt, wheat sowing dates varied among different location. The variation in sowing dates plays an important role in the variation of wheat yield per unit area. There are several studies that documented the effects of planting date on winter cereals (McLeod, 1992).

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, 2004). The detrimental effect of delayed sowing on grain yield was maximum with reduction in 1000-grain weight (Singh and Pal, 2000; Subhan, 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, 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, 1996).
Higher grain crude protein content but lower grain sizes were obtained with delayed sowing (Patil, 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, 1994).

MATERIALS AND METHODS

The experiment was devised to find the effect of sowing time on different wheat quality traits during 2012. Two varieties of wheat (MORVARID and N-85-5) were sown at 3 sowing dates viz; 21 Dec., 30 Dec. and 29 Jan. The plot size per treatment was 1.8m x 6 m. The crop was sown with Norwegian 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 MORVARID was superior for this character having 1000-grain weight 41.25g while that of N-85-5 was 37.56 g. (Table-1). The sowing dates effect for this character was highly significant. First sowing date i.e.21 Dec 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 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, 2004; Singh and Pal, 2000; Subhan, 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-1). 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 21 Dec., 30 Dec. and 29 Jan. 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.

Flour yield (%)

Effects of year for flour yield were non significant (table-1). Varietal effects for this character were also non significant (table-1). However, effects of sowing date were highly significant for flour yield. Flour yield decreased gradually from first to last sowing date, (table-1) 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, 1996).

Protein content (%)

Effects of year were non significant for protein content (table-1). Varietal effects for this character were also non significant (table-1). 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. Interaction of varieties with sowing date was non significant. Ahmed, 1994 and Patil, 2000, have also reported protein content increases with delayed sowing.

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 N-85-8 was superior for this character showing a value of 71.76 points/100 over MORVARID, which had 70.65 points/100 (table 1). 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. 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, 1996) reported that bread quality was not badly affected by delayed sowing.

### Table 1. Mean squares Effect of Planting Date on Wheat

<table>
<thead>
<tr>
<th>Variety</th>
<th>Planting Date</th>
<th>1000 grain weight</th>
<th>Test weight</th>
<th>Protein content</th>
<th>Flour yield</th>
<th>Bread quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>MORVARID</td>
<td>21 Dec</td>
<td>49.23</td>
<td>78.66</td>
<td>11.94</td>
<td>71.31</td>
<td>69.75</td>
</tr>
<tr>
<td></td>
<td>30 Dec</td>
<td>42.91</td>
<td>78.83</td>
<td>12.27</td>
<td>70.21</td>
<td>70.61</td>
</tr>
<tr>
<td></td>
<td>29 Jan</td>
<td>38.99</td>
<td>78.36</td>
<td>12.49</td>
<td>68.67</td>
<td>70.95</td>
</tr>
<tr>
<td></td>
<td>21 Dec</td>
<td>36.61</td>
<td>77.20</td>
<td>12.62</td>
<td>67.24</td>
<td>71.65</td>
</tr>
<tr>
<td></td>
<td>30 Dec</td>
<td>36.42</td>
<td>76.36</td>
<td>12.57</td>
<td>67.24</td>
<td>71.71</td>
</tr>
<tr>
<td></td>
<td>29 Jan</td>
<td>32.27</td>
<td>74.32</td>
<td>12.92</td>
<td>64.40</td>
<td>72.56</td>
</tr>
</tbody>
</table>

Significance of factors:

- block: ns
- variety: *
- Plant date: **
- Interaction: **

ns, * and **: not significant, significant at the 5% and 1% probability levels, respectively

### Chapati quality

The two varieties behaved differently for chapati quality in three years of study (table-1). N-85-5 was superior for chapati quality than MORVARID (table-1). In case of N-85-5, chapati quality in 21 Dec. sowing was fairly good however, during rest of the sowing dates (30 Dec.-29 Jan.), its chapati quality was good. MORVARID behaved differently as in 21 Dec. sowing, its quality was fair which improved to fairly good in 30 Dec. sowings and declined in the last sowing date to fairly good.

**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 chapati quality was better in the mid and late sowings as compared to early sowing.

### REFERENCES


