

EFFECT OF SOWING TIME, CROP DENSITY AND WEED CONTROL ON THE HEADING AND MATURITY OF BREAD WHEAT

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Abstract

A series of field experiments were conducted on sandy loam soil at Cereal Crops Research Institute, Pirsabak (Nowshera) NWFP, to study the effect of sowing time, crop density and weed control on heading and maturity of bread wheat. The data revealed that planting dates viz., October 15, November 15 and December 15 had significant effects on days to heading and days to maturity. Maximum days to heading and days to maturity were observed in November 15 planting. Further data indicated that maximum days to heading and maturity were in planting density of 100 and 150 kg per hectare seeding which was statistically at par with 100 kg seeding per hectare for days to maturity only. The results further demonstrated significant difference between weed control methods for days to maturity only. Maximum days to heading and maturity were found in no weeding plots whereas minimum days to maturity were found in chemical weeding and hand weeding plots.

Introduction

Wheat an important cereal crop is cultivated on large area than many other crops all over the world. The increase in yield per hectare in Pakistan is impressive but it is still lower than many countries of the world. It is imperative to further increase the production per unit area to meet the present requirement. Even though high yield varieties of wheat are under cultivation, but the average yield is still far below the potential yield. Sowing time and sowing rate are directly related to the provision of proper growth and yield. Similarly, presence of weeds in wheat crop is most important factor limiting the yield. There are reports that longest and shortest periods for maturity were taken by early and late sown crops respectively (Adary & El Sharma, 1974). Nerson *et al.*, 1979 found that early planted crop increased the number of days to anthesis. Khan *et al.* (1989) found that days to heading and maturity of wheat, barley and triticale decreased by delayed sowing. Razzaq *et al.*, 1986) reported that number of days to earing decreased with delay in planting. Grain yield and other parameters were significantly decreased when the weeds were not controlled after 6 weeks of crop emergence. Jalis & Brohi, (1980), Godinho & Costa, (1982) and Chaudhry *et al.*, (1992) observed that days to weeding and days to anthesis are positively correlated with grains per spike, grain size and grain yield.

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Table 1. Number of days to heading in wheat as affected by planting dates, seeding rates and weed control methods.

Treatments	Days to heading			M e a n
	1990-91	1991-92	1992-93	
Planting Date				
October 15	111 b	113 b	125 ns	116 b
November 15	129 a	120 a	132 ns	127 a
December 15	100 c	103 c	115 ns	106 c
Seeding Rate				
50 kg/ha	112 c	111 c	123 b	115 c
100 kg/ha	113 b	112 b	124 ab	116 b
150 kg/ha	115 a	113 a	125 a	118 a
Weeding Methods				
No weeding	114 ns	112 ns	125 ns	117 ns
Hand weeding	113 ns	112 ns	124 ns	117 ns
Chemical weeding	113 ns	112 ns	124ns	116 ns
Years Mean	113 b	112 b	124 a	116 -

ns = Non significant

Means followed by different letters are significantly different at 5% level of probability.

Days to heading are known as main indication of maturity which is an important factor for the production of crops. Therefore, both the traits in wheat crop are treated as main yield contributing traits like other agronomic yield contributing traits of wheat crop and very little attention has been given on days to heading and maturity as affected by sowing time, sowing rate and methods of weed control. The present study was therefore carried out to find out the effect of sowing date, sowing rate, weed control on days to heading and days to maturity of wheat crop.

Materials and Methods

Three years field study was carried out at Cereal Crops Research Institute, Pirsabak, NWFP, to find out the response of planting date, planting density and weed control, days to heading and days to maturity of bread wheat on sandy loam soil having organic matter 0.65-0.72%, pH 8.0-8.2, N.032-.036 %, P 8-9 mg/kg and K 120-134 mg/kg. Minimum and maximum temperatures ranged from 9.2-28.4°C and rainfall 9.8 - 116.8 mm. The treatments were three planting dates viz., October 15, November 15 and December 15; three seeding rates viz., 50, 100, 150 kg per hectare and three weed control methods viz., no weeding, hand weeding and chemical weeding.

A combination of planting dates, seeding rates and weeding methods were arranged in split, split plot design using 4 replications. Planting dates were kept as main plots,

seeding rates as sub-plots and weed control methods as sub-sub-plots. Each sub-plot consistent of 6 rows, 5 meter long with 30 cm row to row spacing. Wheat variety Pirsabak-85 was sown with single coulter hand drill at 5 cm depths. All the agronomic practices were carried out uniformly in all the treatments. The herbicides Dicuran-MA-60 WP chloroluran + MCPA @ 2.25 kg per hectare was sprayed with a Knapsack hand sprayer with 4T-Jet nozzles used as post emergence after 1st irrigation when crop was at 2-3 leaf stage and soil was at field capacity. First hand weeding was done 30 days after sowing and second 60 days after sowing with the help of a shovel.

Data on days to heading i.e., the number of days from germination to 50% flowering were recorded. Heading date was recorded when more than 50% of the spikes were fully extended. Days to maturity data i.e., the number of days from germination to physiological maturity were recorded when more than 50% of the panicles were ripe and turned yellow. The data were statistically analysed by using analysis of variance method (Steel & Torrie, 1980).

Results and Discussion

Days to heading is a good indicator of maturity. Data on days to heading indicated that planting dates had significant effect on days to heading in 1990-91, 1991-92 (Table 1). Seeding rates were significant in each year analyses and combined over years analysis, while the weed control methods and interactions were non significant.

Mean values showed that heading days decreased in early (15 October) and late (15 December) than medium sowing (15 November). However, there was a highly significant difference between medium and late than medium and early when medium and early sowing were better than late sowing.

Days to heading was also affected by different seeding rates. There was a linear decrease in number of days to heading as seeding rate decreased. The data indicated that maximum days to heading were found in 150 kg seeding rate and minimum days to heading by 50 kg seeding rate per hectare respectively, which may be due to variation in germination as well as plant population.

The analysis of variance indicated non significant effect in weed control methods each year and combined over years analysis. Mean value showed that minimum days to heading were taken by those plots where the weeds were controlled by herbicides. This could probably be that more moisture and nutrients became available to those plots where weeds were controlled and those where weeds were not controlled received less moisture and nutrients. Similar observations were made by Chaudhry *et al.*, (1992) and Razaq *et al.*, (1986) who found that days to heading and days to anthesis are positively correlated with grains per spike, grain size and grain yield.

Similarly, maturity is an important factor in production of crops (Table 2). The analysis of variance revealed that planting dates and seeding rates had significant effect on days to maturity in each year and combined over years analyses (Table 2). Weeding methods had also significant effects during 1991-92, 1992-93 and combined over years analyses. In 1990-91, the data were not significant. The interactions planting date x weeding method, seeding rate x weeding method and planting dates x seeding rate x weeding method were non significantly different.

Table 2. Number of days to maturity as affected by planting dates seeding rates and weed control methods.

Treatments	Days to maturity			M e a n
	1990-91	1991-92	1992-93	
Planting Date				
October 15	143 b	165 b	150 b	153 b
November 15	151 a	177 a	161 a	163 a
December 15	132 c	133 c	139 c	135 c
Seeding Rate				
50 kg/ha	140 c	156 c	149 b	148 b
100 kg/ha	142 b	158 b	150 ab	150 a
150 kg/ha	144 a	160 a	152 a	152 a
Weeding Methods				
No weeding	143 ns	159 a	152 a	151 a
Hand weeding	142 ns	158 ab	151 a	150 b
Chemical weeding	141 ns	157 b	149 b	149 b
Years Mean	142 c	158 b	150 a	150 -

ns = Non-significant.

Means followed by different letters are significantly different by the LSD test at $P = 0.05$.

The mean values showed that days to maturity decreased with delay in sowing from November 15. There was a highly significant difference between October 15 and December 15 sowing. A significant difference was also found between October 15 and November 15. The results were in agreement with the previous studies conducted by Adary *et al.*, (1974) and Razzaq *et al.*, (1986). They concluded that maximum and minimum time for maturity were taken by plots sown on the earliest and the latest, respectively. Number of days to maturity increased as the seeding rate increased. Maximum days to maturity were taken by those plots which were sown @ 150 kg per hectare, while minimum days to maturity were taken by those plots which were sown @ 50 kg per hectare.

Mean values for different methods of weed control showed that maximum days to maturity were taken by those plots where no weeding method was done, while minimum days to maturity were taken by those plots where chemical weeding was done. However, no significant difference was found between hand weeding and chemical weeding. The results showed that the plots where weeds were allowed to grow it took more days to maturity and weeds availed the moisture, nutrients and light which affected the wheat plants.

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