COMPETITION OF WILD OATS (*Avena fatua* L.) WITH DIFFERENT WHEAT CULTIVARS

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**ABSTRACT**

A field trial on competitive ability of various cultivars with wild oats density was conducted at NWFP Agricultural University, Peshawar, Pakistan during the crop season of 2005-06. The experiment was arranged in RCB design with six cultivars namely Khattakwal, Ghaznavi-98, Fakhar-e-Sarhad, Dera-91, Saleem-2000 and Pirsabak-85. In all plots of the wheat wild oats was sown at a constant density of 10 plants m\(^{-2}\). In the study effect of wild oat on some morphologic, growth and yield parameters of wheat was observed. Also some characteristics of the wild oat like tillers, seed per plant, plant height and leaf area were measured in the wheat cultivars. Most of the wheat parameters were significantly affected by wild oats infestation. Saleem-2000 and Ghaznavi-98 showed comparatively more vigorous growth and as result suppressed wild oat density. On the bases of present experiment highest yield and yield components were recorded for wheat cultivar Saleem-2000.

**Key Words:** wheat cultivars, wild oat, yield, competition

**INTRODUCTION**

Human being depends directly or indirectly on plants for their food. Wheat (*Triticum aestivum* L.) is the primary source of human food in most parts of the world. In Pakistan wheat has a lower yield as compared to other advanced wheat growing countries of the world. Reasons for low yield are many, but one of the most serious but less noticed causes of low yield is the presence of weeds in wheat.

A lot of research work has done on weed in wheat some of which that support our findings are given below.

Appleby, *et al.* (1976), observed plant height of wheat as in negative correlation with weeds; hence the taller cultivars of wheat were considered as more competitive with Italian ryegrass and wild oats as compared to the dwarfed cultivars. Goldberg (1990), stated that a competitive crop tolerate weed or suppress weeds. Balyan *et al.* (1991) quantified 17 to 62% losses in winter wheat yield due to wild oats competition depending on cultivars. Callaway (1992) reported increase in number of yield component in wheat with control of weeds. Jordan (1993) declared that a competitive cultivar should maintain its yield when competing with weeds and at the same time, reduce the growth and seed production of the weeds. Walia *et al.* (1998), conducted field trail in Ludhiana, Indian Punjab during 1993-95 in that he kept wheat density constant and changed wild oats density between 0 to 100 plants m\(^{-2}\). As the density of wild oats increased, wheat yield decreased. Wheat yield loss was below 1% up to 3 plants of wild oats m\(^{-2}\), reached 2.2% at 5 plants and was 50-60% at 100 plants of wild oats m\(^{-2}\). Pervaiz and Quazi (1999) reported that 17.25% losses are caused to wheat by weeds. Gonzalez-Ponce and Santin (2001) in a field experiment with different tall and dwarf varieties of wheat reported that the competition affected the production panicles and spikelets of *A. sterilis*. Korres *et al.* (2002), reported crop tillering capacity as suitable attributes for weed suppression and increased crop yield.

Among the weed *Avena fatua* L. has became a big problem in agriculture throughout the world (Hassan and Marwat, 2001). Keeping the problem of the *Avena fatua* L. in view the present study was conducted to find out most competent cultivar for weed control.

**MATERIALS AND METHODS**

Experiment entitled competitive ability of different wheat cultivars with wild oats (*Avena fatua* L.) was conducted at Malakandher Research Farm, NWFP Agricultural University, Peshawar, Pakistan for one growing season. Data were recorded on tillers m\(^{-2}\), plant height (cm), spike m\(^{-2}\), leaf area per tiller, spike length (cm), spikelets spike\(^{-1}\), grains spike, 1000 grain weight (g), biological yield (kg ha\(^{-1}\)), and grain yield (kg ha\(^{-1}\)) of wheat. In addition to data on wheat tillers/wild oat plant, seed/wild oat tiller, plant height (cm) of wild oat and leaf area of wild oat were determined.

**Statistical Analysis**

The data recorded for each trait were individually subjected to the ANOVA technique by using MSTATC Computer Software and means were separated by using Fisher's Protected LSD test (Steel and Torrie, 1980).

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RESULT AND DISCUSSION

Morphological Characters of Wheat

Results related to tiller m\(^{-2}\), Plant height at maturity, spikes m\(^{-2}\) and leaf area of wheat revealed significance difference under wild oat pressure (Fig. 1). The maximum numbers of tillers m\(^{-2}\) (273.5) were recorded in Saleem 2000, while minimum numbers of tillers m\(^{-2}\) (190.8) were counted in Khattakwal. Highest plant height (119.3cm) was recorded in Khattakwal variety, while lowest (82.5cm) was observed in Pirsaab-85. Large number of spikes m\(^{-2}\) (272.3) was recorded in Saleem 2000, while small number of spikes m\(^{-2}\) (190.0) was observed in Khattakwal. Leaf area of 84.07 cm\(^2\) tiller\(^{-1}\) was observed maximum in Saleem-2000 while leaf area tiller\(^{-1}\) of 74.07 cm\(^2\) was minimum in Khattakwal. The results shown in Fig. 1 are supported by findings of Appleby, et al., 1976; Goldberg, 1990; Jordan, 1993 and Korres et al., 2002 cited in introduction.

The effect of wild oat population on spike length, spikelet per spike, number of grains spike\(^{-1}\) and 1000 grain weight showed significant difference in various wheat cultivars as shown in Fig. 2. Maximum spike length (9.32cm) was recorded in Saleem 2000. All other cultivars possessed almost the same spike length. Highest value of 18.0 spikelets spike\(^{-1}\) was recorded for Saleem 2000 the lowest value of 14.0 spikelets spike\(^{-1}\) were recorded in Khattakwal. Grains spike\(^{-1}\) were almost similar for all cultivars except Khattakwal that showed lowest number (28.42). Saleem 2000 was record with highest 1000-grain weight (31.23g) that was statistically at same level with Fakhr-e-sarhad (28.50g), Ghaznavi-98 (28.15g) and Dera-91 (27.8g). The findings revealed in Fig. 2. have similarity with results of Balyan et al., 1991 and Callaway, 1992.

Biological yield and grain yield data shown in Fig. 3 indicated significant difference and maximum biological yield of 7137 kg ha\(^{-1}\) was produced by Khattakwal, while the other cultivars produced similar biological yield. The data related to grain yield of wheat indicated that maximum grain yield 2638 kg ha\(^{-1}\) was produced by Saleem 2000. The minimum grain yield 1483 kg ha\(^{-1}\) and 2024 kg ha\(^{-1}\) was produced by Khattawal and Prisabak-85, respectively Walia et al., 1998; Pervaiz and Quazi,1999 findings put in introduction of the paper conform the result related to biological yield and grain yield of wheat.

In Fig. 4, tillers/wild oat plant, seed/wild oat tiller, plant height and leaf area of wild oat are shown. The data indicated that minimum number of tillers/ plant in wild oats were recorded where Saleem 2000 cultivar was sown. All other plots possessed almost same number of tillers/ wild oat plant. Statistical analysis of the data related to seeds tiller\(^{-1}\) showed that different wheat cultivars had non- significant effect on seeds / wild oat tiller. Comparison of the treatment means reflects that wild oats height was same in all the wheat cultivars plots. Leaf area of wild oat tiller\(^{-1}\) indicated that wheat cultivar had significant effect on leaf area tiller\(^{-1}\)of wild oats. The maximum (89.38 cm\(^2\)) leaf area tiller\(^{-1}\) of wild oats was recorded in Khattakwal plot, while minimum (83.38 cm\(^2\)) leaf area tiller\(^{-1}\)of wild oats was observed in Saleem-2000 plot. The results of Fig. 4 are conformed by findings of Gonzalez-Ponce and Santin (2001)
Fig. 2 Comparative performance of some yield components of wheat cultivars under wild oat as weed intervention during 2005-06.

Fig. 3 Comparative performance of wheat cultivars for biological and grain yield (kg ha\(^{-1}\)) under wild oat as weed intervention during 2005-06.
Ijaz Ahmad Khan, et al. Competition of wild oats with different wheat ……

116

Fig. 4 Comparative performance of wheat cultivars for suppression of some growth parameters of wild oat during 2005-06.

REFERENCES


