

EFFECT OF WEED COMPETITION ON WHEAT  
(*TRITICUM AESTIVUM* L.)

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ABSTRACT

Wheat was sown in small plots (17' x 40') in rows. The weed seeds sown along with the crop were allowed to compete with the crop for different durations. The grain and straw yields decreased significantly when the weeds competed with the crop for full season or after the crop was 2-4 weeks old. The yield of wheat was not influenced significantly when the crop was kept weed free for 6 weeks after planting or when the crop was 6 to 10 weeks old.

INTRODUCTION

The performance of crops is the result of interaction of their genetic constitution and the environment. Unfortunately, the crop husbandry technology is beset with many intricate problems. Besides hazards of insect pests, plant diseases, floods, etc., the crops have to compete with weeds for water, mineral nutrients, light, space and other growth requirements. Thus they suffer substantial irreparable loss.

The influence of weed competition on the crop productivity depends upon a number of factors including the type and density of weeds, period of weed competition and type of crop grown. Little work has been reported on quantitative survey and weed-crop competition in Indo-Pak sub-continent. However, qualitative survey of flora (including weeds), weed control, herbicide evaluation, etc., were carried out by Kashyap (1936), Luthra (1933), Khan (1964), Chatha (1973), Nasir (1973) and Ansari (1976).

Dawson (1964) observed decrease in yield of field beans (*Phaseolus vulgaris* L.) when weeds competed with the crop for 5 to 7 weeks. Burnside and Wicks

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### Weeds compete with wheat

(1967, 1969) observed decreased yield in grain sorghum (*Sorghum bicolor* L.) Meonchy by weed competition. Saeed *et al* (1978) observed that wheat yield was reduced by full season competition with various weeds like *Chenopodium album* L./*C. murale* L. and *Carthamus oxyacantha* Bieb Bhan *et al.* (1982) reported that seed yield of cowpea increased by 98.6–156.4 per cent with one hand weeding at four weeks after sowing but further delay in hand weeding markedly decreased the yield. Beres (1983) found a decrease in fresh weight and leaf area of winter wheat with an increase in number of *Ambrosia* plants.

### MATERIALS AND METHODS

The wheat cultivar Chenab 70 (*Triticum aestivum* L.) was used for this study. The seed was obtained from Punjab Agricultural Research Institute, Faisalabad. The experiment was conducted in the experimental area of University of Agriculture, Faisalabad, for three successive years, i. e., 1972 to 1974. The soil of this area had a pH value of 7.9 and electrical conductivity 8.90 m. mols/cm. The sowing was done with the Hand Rabi Drill.

The experiment was laid out in randomized block design and it included 11 treatments and 4 replications. Each sub-plot measured 17' x 40'. The seeds of the following primary competing weeds, collected during the previous year, were mixed, distributed into uniform lots and sown along with the wheat crop with a view to get uniform stand of weeds in all the sub-plots :

*Asphodelus tenuifolius* cav. (Piazi), *Carthamus oxyacantha* Bieb. (Pohli), *Chenopodium album* L. (Bathu), *Chenopodium murale* L. (Karund), *Euphorbia helioscopia* L. (Dhodak), *Convolvulus arvensis* L. (Lehli), *Fumaria indica* (Hausak), *Papsley* (Pitpapr), *Medicago denticulata* Wild (Maica) and *Vicia* spp. (Rawari). Treatments 1 and 11 were used as control in each replication, while the required operations were carried out in the remaining treatments according to the schedule given below :

Treatment	Period during which weeds were allowed to grow
1	Full season control
2	Full season (no control)

With Treatment 10 (weeds were removed for first ten weeks after the emergence of the crop), the decrease in grain yield was negligible. Average

10 brought about some decrease in yield, but it was not significant statistically. In straw yield was not significant. The average number of weed plants per square foot was 14 in this treatment. Though the Treatments 3, 4, 5, 8, 9 and weeks old. The decrease in grain yield was 8.52 per cent, while the decrease in straw yield was 4. In this treatment the weeds were allowed to grow after the crop was 4 to the adverse effect. Treatment 7 was next to the above mentioned two treatments of 19 and 17 weed plants per square foot, respectively (Table I). As yield with these two treatments was 12.92 and 10.85 per cent with an average grow for full season or after the crop was 2 weeks old. The decrease in grain straw yield was caused by Treatments 2 and 6, in which weeds were allowed to grow for full season or after the crop was 2 weeks old. The decrease in grain as a result it was noted that highly significant adverse effect on wheat grain and In this experiment weeds were allowed to grow for different durations;

## RESULTS AND DISCUSSION

The data of grain and straw yield were obtained for each treatment for three successive years and was subjected to analysis of variance. Duncan's Multiple Range test was applied to make multiple comparison of means. The density of weeds was recorded in each sub-plot by quadrat method at the time of weeding and the mean number of weed plants was calculated in a treatment for each year.

11	Repeat of Treatment 1
10	After the crop was 10 weeks old
9	After the crop was 8 weeks old
8	After the crop was 6 weeks old
7	After the crop was 4 weeks old
6	After the crop was 2 weeks old
5	For 6 weeks after planting
4	For 4 weeks after planting
3	For 2 weeks after planting

### Weeds Compete with Wheat

number of weed plants per square foot was 16 in this treatment, but the greater portion of this population was formed by *Cyperus rotundus* L. Negligible decrease in yield may be due to the fact that this weed emerged very late when the wheat crop had so established that the emerging weeds did not exert significant adverse effect. It may also be noted that weeds caused greater decrease in yield when allowed to grow in the early stages of the crop growth as compared to the late stages. With Treatments 4 and 9 the yield was almost equal although the weeds were removed for 14 weeks in the later stage of the crop and for 10 weeks in the early stage of the crop. It appears that competition for water, nutrients, space, and light is most serious when the crop is young. These results corroborate the findings of Knake and Slife (1965) who found that foxtail (*Setaria faberii* Herm) planted at the same time when corn *Zea mays* L.) and soybeans (*Glycine max* (L.) Merr.) were planted, reduced yield of corn by 13 per cent and that of soybeans by 27 per cent. More or less similar results were reported by Burnside and Wicks (1967, 1969) in sorghum. They found that sorghum yields were reduced by 18 per cent when weeding was delayed until 5 weeks, compared with weeding done 2 weeks after planting. Bhan *et al.* (1982) also reported that cowpea yield was markedly decreased when the weeds were allowed to compete with the crop for more than four weeks after sowing.

Table I. Density of weed plants in wheat plots

Years/Treatments	Mean number of weed plants per treatment in quadrat size 1' x 1'								
	2	3	4	5	6	7	8	9	10
1972-73	12	2	5	7	14	11	15	8	11
1973-74	22	3	5	7	17	15	16	16	18
1974-75	22	4	9	8	19	17	15	19	20
Total	56	9	19	22	50	43	46	43	49
Average	19	3	6	7	17	14	15	14	16

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