Effect of Various Planting Patterns on Weed Population and Yield of Wheat

Gazi Mehmod Ali and Shamsuddin Tunio

Arid Zone Research Center, P. O. Box # 63, Brewery Road Quetta, Pakistan
Department of Agronomy, Sindh Agriculture University, Tandojam, Pakistan

Abstract: Seven weed management treatments viz., isolated planting patterns, combined treatments (planting pattern + Buctril-M) and weed check for full season were tested for their effect on weed population of wheat. All the treatments had highly significant effects on plant height, tillers, 1000 grains wt and grain yield, except number of grains/ear that was significantly affected by weed management practices. Combined treatment with cross row sowing + Buctril-M @ 1.0 lt ha–1 produced highest grain yield (39.20 kg ha–1). While that with skip row sowing produced lowest (248.65 kg ha–1). Weeds were controlled highest in skip row + Buctril-M @ 1.0 lt ha–1 (67%). Weeds population in planting pattern alone were increased but their weed biomass was decreased as compared to weed check. The highest weed biomass was decreased in cross row sowing. Combined treatment was the best for the control of various weeds of wheat crop and to harvest maximum crop yield.

Key words: Isolated planting pattern, combined planting pattern, broad leaved weeds, narrow leaved weeds, skip row sowing, cross row sowing, weed biomass, herbicide

Introduction

Wheat products are the principal cereal foods of an over whelming majority of the world inhabitants. At present, prosperity of many countries largely depends upon wheat production. In Pakistan it is planted on 8.1 million hectares with production of 17.0 million tons, and the average yield of the crop is 2081 kg ha–1. Pakistan has a low yield of wheat as compared with advanced growing countries of the world. The crop productivity could be raised by two possible ways, by increasing area under cultivation and by increasing per acre yield by adopting improved technologies such as use of improved seed of high yielding varieties, responsive doses of fertilizers, irrigation water, proper weed management, plant protection measures and other cultural practices (Khadeja et al., 1993).

There are many reasons of low production of wheat, but one of the most serious but less addressed cause of the low yield is the presence of weeds. Weeds compete with crops for nutrients, water, light, space etc. causing reduction in wheat vigor, tillering, head size and kernel weight (Zimdahl, 1980). Wheat yield can be increased up to 50% by controlling weeds (Makdood and shah, 1978). Weeds may reduce yield as much as 200% depending upon weed species present and their density (Majid, 1985). Weeds have serious negative effect on crop production and results in markedly great loss in crop yield despite the use of costly inputs. However, the input cost increased upon their control increase the cost of cultivation resulting in low returns. Very little information is available about integrated weed management in Pakistan. Agricultural yields could not be increased with out integrated weed management system(Halsen and kanwar, 1980). This study was undertaken to determine the effect of various planting patterns on weed population and wheat yield.

Materials and Methods

The study was conducted at Plant Physiology Section, Agriculture Research Institute, Tandojam, during the year 1997-98. It lies 26 to 260 N and 68 to 68°E. The experiment was conducted on silt loam soil following RCB design. The plot size was 8.24 m2. Seven treatments were used such as close row sowing + Buctril-M @ 1.0 lt ha–1, cross row sowing + Buctril-M @ 1.0 lt ha–1, close row sowing + Buctril-M @ 1.0 lt ha–1, close row sowing (15cm apart), skip row sowing (after every 4th row one row was missing), cross row sowing (normal i.e., 22.5 cm, both way East-West and North-South) and weed check for full season. The experimental land was prepared with two dry ploughings followed by planking and levelling to achieve fine seed bed. The wheat variety T.J.83 was sown on December 11th, 1997 with single coulters hand drill @ 126 kg ha–1. Fertilizers in the form of urea and DAP with 120-5 kg ha–1 were applied. Full dose of DAP and half dose of urea was applied as basal and remaining half of Urea was applied at 1st irrigation and wheat crop was irrigated 4 times. The herbicide Buctril-M was applied at 2-3 leaf stage i.e., about 20-25 days after sowing by knapsack sprayer. The weeds were counted two times during the study. The first count was done before herbicide application and second one week after the herbicide application. Herbicide was applied after first irrigation when soil came in condition. Weeds were counted in a quadrat of 1 m2 from each treatment at random. Weed density m–2 was measured and intensity of weeds was also calculated as percentage. The whole experimental area was harvested on April 25th, 1998, by sickles. The whole harvested material was kept in bundles and left to dry up under sun. The data were recorded for growth, and yield components on five randomly selected plants from each plot, where as yield ha–1 was recorded from each plot separately. The statistical analysis was made using test of significance Gomez and Gomez (1984).

Results and Discussion

Weeds found in experimental area were Chenopodium album, Convolvulus arvensis, Maluittis alta, Anagalis arvensis, Rumex accusus, Phalax minor, Cyanodon dactylon, Avena fatua, Cyperus rotundus and Asphodelus rufolusus. The results for weeds present before and after application (Table 1) revealed that weeds were controlled from (-48.81 to 67.00%) in planting pattern + Buctril-M @ 1.00 lt ha–1. Whilst in planting patterns alone where as weed population was increased from (7.71 to 13.38%), but their weed biomass was decreased as compared to weed check and highest weed biomass was decreased in cross row sowing treatment. These findings are in accordance with Bhan et al. (1982), who reported that cross row sowing reduces the dry weight of weeds. The lowest (-48.61%) weed control was recorded in skip row sowing combined with herbicide used Buctril-M. The highest (-67.00%) weed control was obtained in the skip row sowing combined with herbicide. The highest weed population (74.25) was recorded in skip row sowing combined with herbicide, the results are not in accordance with findings of (Sharma et al., 1985) who reported that less weed competition is occurred in cross row sowing and close row sowing. In planting pattern alone highest weed population was increased in skip row sowing (13.38%) and lowest weed population was recorded in cross row sowing (7.71%). This highest weed population and their control in skip row sowing is due to wide space, because in skip row sowing one row was missing after every fourth row and weed density was high in the space, where their was no sowing and herbicide sprayed in that area worked properly.

Therefore, weeds were highly controlled in skip row sowing combined with herbicide. Data for plant height (Table 2) were highly significant and it increased in all treatments from (4.32%) in skip row sowing alone to (13.10%) in cross row sowing combined with Buctril-M as compared to weed check. The highest (82.40cm) mean plant height was recorded in cross row sowing combined with herbicide Buctril-M. These results are not in accordance with (Muhammad, 1980), who reported that plant height was increased in wide row spacing (45cm). All the treatments except weed check behave alike. The lowest (72.85 cm) mean plant height was recorded under weed check for full season. The data for number of tillers m–2 were highly significant and revealed that mean number of tillers m–2 ranged from (202.00 to 338.75). The lowest (202.00) mean number of tillers m–2 was recorded in weed check, and the highest (338.75) mean number of tillers m–2 was obtained in cross row sowing combined with Buctril-M, which is in contrast to (Bajwa, 1977) who reported that increased row spacing increases the no of tillers. The mean number of tillers m–2 was increased in all
treatments from (2.69%) in skip row sowing alone to (18.19%) in cross row sowing combined with Buctril-M, as compared to weedy check (Table 2). The yield and yield contributing parameters showed significance for number of grains ear"""".1"""" and highly significant for 1000 grains wt and grain yield ha"""".1"""" (Table 3). Mean number of grains ear"""".1"""" increased in all treatments from (0.28%) in skip row sowing alone to (9.28%) in cross row sowing combined with Buctril-M. The highest (64.75) mean number of grains per ear was recorded in cross row sowing combined with Buctril-M. This finding is contradicting the results of (Thakar et al., 1974), who reported that the no. of grains spike"""".1"""" of wheat was not affected when sown at different row spacing and (Bajwa, 1997), who reported that increased row spacing increases the no. of grains ear"""".1"""". Where as, lowest (50.25) mean number of grains was obtained in skip row sowing alone as compared to weedy check. The combined application of planting patterns with herbicide Buctril-M treatment were better than their isolated applications. The results for 1000 grain wt showed that the maximum (48.54g) 1000 grain wt was recorded in cross row sowing combined with Buctril-M, these results are against the results of (Thakar, 1974) and (Mohammed, 1980), who reported that highest 1000 grain wt was obtained in normal row sowing i.e., 22.6 cm, where as, lowest (39.50g) was recorded in skip row sowing alone. The highest increase was recorded (30.41%) in cross row sowing combined with herbicide Buctril-M and the lowest was recorded (6.12%) in skip row sowing alone as compared to weedy check. The data for grains yield kg ha"""".1"""" revealed that cross row sowing combined with Buctril-M had highest (3820.95 kg ha"""".1"""") grain yield, these findings are according to (Bhan, 1982) and (Sharma, 1985) who reported that cross row sowing increases grain yield ha"""".1"""" and against the (Gill, 1985) who reported that maximum grain yield is obtained in skip row sowing. The skip row sowing alone recorded the lowest (2488.65 kg ha"""".1"""") grain yield with an increase of (5.12%) in skip row sowing to (61.53%) in cross row sowing combined with Buctril-M as compared to weedy check (Table 3). The results concluded that weed management in wheat is necessary to adopt at proper time and proper amount of herbicide to control weeds and increase the per acre yield. Along with this planting pattern(row spacing) also plays an important role in obtaining high yields, the cross row sowing with row spacing of 22.5 cm produced highest grain yield because of appropriate plant to plant distance.

References


