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Post Emergence Weed Control in Wheat

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Abstract: The experiment was carried at Student's Experimental Farm, Sindh Agriculture University Tandojam, Pakistan on post emergence weed control in wheat. It was noted that most of the weeds present in wheat were broad leaved weeds, whereas narrow leaved grasses and sedges were in small number. With the application of herbicides though the number of weeds of all species decreased but in most of the cases their intensity increased. All the growth, yield and yield parameters increased with the application of herbicides as compared to un-weeded plots. The additional yield (49.98%) was exhibited with the application of Topik 240WP at 250 g ha^{-1} herbicide followed by Arelon 50 dispersion at 0.75 l ha^{-1}, which increased 43.74% grain yield. It is concluded that weeds reduce the economic yield by competing for nutrients, light and moisture. The cost and maintenance of cultivation are increased and soil fertility is degraded due to weed problem. Thus, it is prime important to control weeds and an increase in the yield up to 50% or more can be achieved.

Key words: Wheat, weed, herbicides, yield, growth

Introduction

The yield of wheat is low as compared to other wheat growing countries of the world. The reason for low yield are many, but one of the most serious but less noticeable cause is presence of weeds which exhibits serious negative effect in crop production. The major loss in wheat yield are due to weed infestation, which is 1.25 to 2.5, million tones per year (Ahmed, 1984). Weeds decrease yield from 15 to 50% or in serious cases it may lead to complete failure of crop (Gill and Walid, 1979). Weed compete with crop plants for nutrients, soil moisture and sunlight and thus, reduction in crop yields has direct correlation with weed competition. However, an increase in one kilogram of weed growth corresponding to reduction in one kilogram of crop growth (Rao, 1988). Blair ***et al.*** (1999) suggested that there is the need to adopt weed control practices more precisely, both for economic and environmental reasons. Froud and Williams (1999) in order to predict the consequences of failure to control weeds in any single season, it is proposed that knowledge of the population dynamics of the species concerned is essential. While a wealth of literature is available, but the number of areas require further investigation with regard to reproductive output Considering the losses caused by weeds and their impact on crop growth, this study was conduct in the field on post emergence weed control in wheat.

Materials and Methods

The study was carried out at Student's Experimental Farm, Sindh Agriculture University Tandojam, Pakistan to determine the post emergence weed control in wheat, during Rabi Season

2002-2003. The experiment was laid out in Randomized Complete Block Design, with four replications. The treatments were various levels of herbicides (Topik 240 WP @ 250 g ha^{-1}, Topik 240 WP @ 200 g ha^{-1}, Topik 240 WP @ 300 g ha^{-1}, Arelon 50 dispersion @ 0.75 l ha^{-1}, Arelon 50 dispersion @ 1.0 l ha^{-1}, Arelon 50 dispersion @ 1.5 l ha^{-1}, hand weed control and weedy check full season were applied during weed post emergence.

Irrigation and fertilizer application

The first irrigation was applied at the crown root initiation stage or after 21 days after sowing. The subsequent irrigations were applied according to critical stage of the crop.

The fertilizer was applied at the rate of 120 N and 75 P kg ha^{-1}, in the form of Urea and DAP. The full dose of phosphorus and half of nitrogen was applied at the time of seedbed preparation. The remaining half of nitrogen was split applied at second and fourth irrigations.

Herbicides application

Herbicide treatments were applied as post-emergence level after first irrigation, when the crop was at 2-3 leaf stages through knapsack hand sprayer. The weeds were counted two times during study period i.e. before and after the application of each herbicide application. In hand weeding treatment, two weeding were done i.e. after the first and second irrigations. Weeds were counted on per m^2 basis, from each treatment at random. The weed density (m^2) was measured and intensity of weeds was also calculated as percentage. The list of weed flora recorded in the experiment is present in Table 1.

Weed spectrum (species)

Different weed species infesting the experimental area were recorded 48 h before the herbicide application.

Weed density (m^2)

Weed population were recorded 48 h before herbicide application, again weed population were recorded 15 days after herbicide applications. Weed density was counted in a quadrate of 1 m^2 from each treatment at random.

Statistical analysis

The data was statistically analyzed according to the experimental design and the test of significance were made where it was necessary, following the procedure out lined by Gomez and Gomez (1984).

Results and Discussion

Weed density (m^2) and intensity (%)

The results of the experiment revealed that with the application of herbicides though the number of weeds of all species decreased in all species, but in most of the cases their intensity

Table 1: Weed density/intensity (%) in wheat before and after application of herbicide

	Before application		After application	
Weed species (Local name and botanical name)	No. of weeds	Intensity (%)	No. of weeds	Intensity (%)
Bilibooti (*Anagallis arvensis*)	12.45	15.50	10.48	17.38
Bind weed(Naro)(*Convolvulus arvensis*)	17.46	21.29	8.67	14.38
Wild Oat (*Avena fatua*)	4015.0	5.06	9.47	15.71
Jangli Palak (*Rumex dentatus*)	4.27	5.20	3.23	5.35
Meno (*Medicago dentatus*)	7.92	9.65	6.33	10.50
Basri (*Asphodelus tentuilalius*)	13.24	16.14	8.27	13.72
Kabah (*Cyperus rotundus*)	11.58	14.12	8.18	13.57
Jhil (*Chenopodium album*)	10.95	13.55	5.64	9.35
Total	81.99	99.96	60.27	99.96

Weed intensity = Number of one weed species/Total number of all weed species

Table 2: Plant height, tillers, spikelets and grains per head as affected by post emergence weed control

	Plant height		Tillers per plant		Spikelets per plant		Grains per ear head	
Treatments	Mean	Decrease or increase over control (%)	Mean	Decrease or increase over control (%)	Mean	Decrease or increase over control (%)	Mean	Decrease or increase over control (%)
Topik 240WP at 250 g ha^{-1}	88.85	+3.25	5.25	+26.51	18.85	+12.87	50.10	+28.39
Topik 240WP at 200 g ha^{-1}	84.95	-1.28	4.30	+3.61	16.85	+0.89	41.35	+6.40
Topik240 WP at 300 g ha^{-1}	88.85	+3.25	3.45	-16.86	17.45	+4.49	44.35	+11.14
Arelon 50 Dispersion at 0.75 l ha^{-1}	90.10	+4.71	5.20	+25.30	18.20	+8.98	48.40	+21.61
Arelon 50 Dispersion at 1. 0 l ha^{-1}	84.90	-1.33	3.95	-4.82	16.55	-0.89	39.55	-0.26
Arelon 50 Dispersion at 1.5 l ha^{-1}	87.95	-2.20	4.15	-	17.95	+7.48	44.85	+12.69
Hand Control full Season	86.10	-0.05	4.40	+6.02	17.70	+5.98	43.85	+10.17
Weedy Check (Control)	86.05	-	4.15	-	16.70	-	39.80	-

Table 3: Weight of grains, seed index and grain yield of wheat as affected by post emergence weed control

	Weight of grains per ear head (g)		Seed index		Grain yield	
Treatments	Mean	Decrease or increase over control (%)	Mean	Decrease or increase over control (%)	Mean	Decrease or increase over control (%)
Topik 240WP at 250 g ha^{-1}	1.89	+29.45	39.24	+8.12	49999.00	+49.98
Topik 240WP at 200 g ha^{-1}	1.56	+6.84	38.23	+5.34	3437.00	+3.12
Topik240 WP at 300 g ha^{-1}	1.67	+14.38	38.36	+5.70	4480.00	+34.41
Arelon 50 Dispersion at 0.75 l ha^{-1}	1.84	+26.03	38.96	+7.35	4791.00	+43.74
Arelon 50 Dispersion at 1.0 l ha^{-1} 4.15	1.53	+4.79	36.23	-0.16	3683.00	+10.50
Arelon 50 Dispersion at 1.5l l ha^{-1}	1.67	+14.38	38.73	+6.72	4583.00	37.50
Hand Control full Season	1.66	+13.69	38.29	+5.51	4582.00	+37.47
Weedy Check (Control)	1.46	-	36.29	-	3333.00	-

increased which exhibits that weeds even with the application of herbicides and hand weeding continued their growth. It was also observed that in case of Billi Boti, Wild Oats and the Meno weed intensity increased. This shows that these weeds are very difficult to control (Table 1).

Wheat parameters as affected by post emergence weed control

The maximum plant height of 90.10 cm was obtained with the application of Arelon-50 dispersion at the rate of 0.750 l ha^{-1}(an increase of 4.71% over weedy check), followed by Topik-240 WP at 250 g ha^{-1} and Topik-240 WP at 300 g ha^{-1} where plant height was obtained as 88.85 with an increase of 3.25% over weedy check. The minimum plant height (84.90 cm) was obtained where Arelon-50 dispersion at the rate of 1.0 l ha^{-1} was applied (Table 2).

The results further showed that more number of tillers, spikelet count, maximum grains per ear head, heavy and bold grains, seed index and final seed yield per hectare were superior with the application of Topik-240 WP at 250 g ha^{-1}, followed by Arelon-50 dispersion at the rate of 0.750 l ha^{-1} over weedy check. The minimum number of these recorded crop parameters were recorded in the plots where no herbicide or any weed control practice was adopted (Table 2 and 3). This shows that application of herbicides not only control the weeds but also helps in enhancement of grain yield. This may be due to certain characteristics of herbicides which are helpful for development and growth and various yield components which increased and supported the grain yield of the crop. The results are in agreement with Jain ***et al.*** (1998), who reported that the application of herbicides in the wheat crop exhibited satisfactory and maximum grain yield. It may therefore be concluded that herbicide applications at proper rate may not only control weeds but also helps an increase in grain yield.

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