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STUDIES ON POST-EMERGENT CHEMICAL WEED CONTROL IN WHEAT (*TRITICUM AESTIVUM* L.)

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ABSTRACT

For the efficacy of different herbicides for controlling weeds in wheat, an experiment was conducted at Malkandher Research Farm, NWFP Agricultural University Peshawar, during Rabi season 2002-03. The experiment was laid out in randomized complete block design with 5 replications. The experiment comprised of 8 herbicides and a weedy check. The herbicidal treatments were the post-emergence application of Rocket 75 WDG (thifensulfuron-methyl) + Tribenuron-methyl (tirbenuron-methyl) 75 WDG @ 0.27 + 027, Rocket 75 WDG (thifensulfuron-methyl) + Tribenuron-methyl (tirbenuron-methyl) 75 WDG @ 0.37 + 0.037, Rocket 75 WDG (thifensulfuron-methyl) + Isoproturon (isoproturon) 50 WP @ 0.046 + 0.741, Tribenuron-methyl 75WDG (tirbenuron-methyl) + Isoproturon (isoproturon) 50 WP @ 0.046 + 0.741, Aim (chlorfluazuron) 40 WP @ 0.296. Logran Extra (triasulfuron + terbutryn) 64 WDG @ 0.158, Buctril-M (bromoxynil + MCPA) 40 EC @ 0.494 and Affinity (carfentrazone ethyl ester) 50 WDG @ 0.016 kg a.i ha^{-1}.Ghaznavi-98 variety of wheat was seeded in a plot size of 6 x 2 m^2 during third week of October 2002. The data were recorded on tillers plant^{-1}, 1000 grains weight (g), biological yield (t ha^{-1}), and grains yield (t ha^{-1}). the maximum grain yield (4.6 t ha^{-1}) was recorded in Affinity 50WDG. It was followed by plots receiving Buctril-M 40EC and Logran Extra 64 WDG with grain yield of 4.2 and 4.0 t ha^{-1}, respectively. Minimum yield of 2.8 t ha^{-1} was recorded in weedy check plots.

Key words: herbicide efficacy, wheat, *triticum aestivum* L. weed density

INTRODUCTION

Wheat (*Triticum aestivum* L.) belongs to family Poaceae, tribe Hordae, genus *Triticum* and species *aestivum*. Wheat is an annual self-pollinated and photoperiodically long day winter cereal. The best soil for wheat is medium loam. Wheat has adapted itself to the varied climatic and soil conditions to such an extent that it is being sown and harvested in every inhabited part of the world. It is the most widely cultivated of the cereals constituting principal food crop of the world.

Wheat ranks first among the cereal crops in Pakistan and is the staple food item of the Pakistani diet. Major wheat producing countries are USA, China, Germany, Argentina, Australia, India and Pakistan. The average yield of wheat in Pakistan does not go beyond 30-35% of its optimum potential. Wheat is used for grinding of flour for baking bread, pastry, biscuits and many other products. Wheat is also used for making macaroni as well as breakfast foods. Wheat grain is also used as one of the ingredient for poultry

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feed. Wheat straw is also an important by-product and is used as feed for livestock. Bran from wheat flour industry is fed to animals as concentrate. It supplies about 73% of the calories and protein of the average diet (Heyne, 1987). In Pakistan total area under wheat crop during 2001-02 was 8.058 million ha and production was 18.26 million tons. During the same year, total area and production in N.W.F.P was 0.747 million ha with a production of 0.89 million tons respectively (Anonymous 2002).

The integrated efforts of different governmental agencies have fortunately been successful during the past three years in not only achieving self-sufficiency in food but also leaving an export surplus of lacs of tons. The major interventions resulting in a quantum jump in production have been the balanced use of fertilizer, better availability of certified seed of high yielding cultivars and more importantly the introduction of Topik 15WP and Puma super 75EW grass killers for effective management of grassy weeds particularly wild oats. The tempo of accelerated production however, needs to be sustained. Still there exists a gap between the potential and actual yields. The major bottlenecks for these gaps are scarcity of water and lack of inputs, but the most challenging one is the weed competition.

Weeds use the soil fertility, available moisture and compete for space and sunlight with the crop plants, hence dwindling the crop yields. Weeds also deteriorate the quality of farm produce and consequently reduce the market value. Pervaiz and Quazi (1999) reported that 17.25% losses are caused to wheat crop by weeds. The losses on annual basis in wheat amount to more than 28 billion at the national level and 2 billion in NWFP (Hassan and Marwat, 2001). The infested situations need the development of package of weed management technology, helpful to avoid crop losses in our country. The control of weeds is a basic requirement and major component of management in most production systems (Young and Ogg, 1994).

The weeds competitive with wheat crop in NWFP are *Avena fatua, Phalaris minor, Anagallis arvensis, Poa annua, Cirsium arvense, Carthamus oxycantha. Cynodon dactylon, Coronopus didymus, Silybum marianum, Convolvulus arvensis, Alhagi camelorum* and *Euphorbia helioscopia*. Management of weeds has been practiced since the time immemorial by manual labor or animal drawn implements. These practices were hard, laborious and expensive due to increasing cost of labour. The growing mechanization of farm operations and ever increasing labour wages have stimulated interest in the use of chemical weed control. Non-judicious use of herbicides however, can do harm rather than good in productivity. The choice of best herbicide, proper time of application and proper dose of herbicide is the important consideration for lucrative returns. Nati (1994) reported that 2,4-D and MCPA were likely to be effective against broad leaved weeds in wheat. Diclfop-methyl applied alone of in combination with Isoproturon significantly increased the grain yield of wheat (Samar *et al.*, 1993).

In view of the weeds problem wheat crop, these studies will be initiated to investigate the efficacy of different herbicides against different weeds in wheat.

MATERIALS AND METHODS

The experiment entitled" Studies on chemical weed control in wheat' were conducted at Malkandher Research Farm, N.W.F.P Agricultural University, Peshawar during Rabi season 2002-03. The experiment was laid out in Randomized Complete Block (RCB)

design with five replications. Nine treatments were assigned to each replication randomly. The size of each plot was 6 x 2 m^2. Each treatment had eight rows, 25 cm apart. 'Ghaznavi' 98 variety of wheat was planted on October 5, 2002. Post emergence herbicides were applied after the complete germination of crop and weed. The herbicides were sprayed during the 3rd week of November 2002.

The detail of treatments during the study is as under:

S.No.	Treatments	Common Name	Rate (Kg a.i. ha^{-1})
1.	Weedy check	----------	----------
2.	Rocket 75 WDG + Tribenuron-methly 75 WDG	thifensulfuron-methly + tribenuron-methly	0.27 + 0.27
3.	Rocket 75 WDG + Tribenuron-methly 75 WDG	thifensulfuron-methly + tribenuron-methly	0.37 + 0.37
4.	Rocket 75 WDG + Isoproturon 50 WP	thifensulfuron-methly + isoproturon	0.046 + 0741
5.	Tribenuron-methly 75 WDG + Isoproturon 50 WP	tribenuron-methly + isoproturon	0.046 + 0.741
6.	Aim 40 WP	chlorfluazuron	0.296
7.	Logran-Extra 64 WDG	triasulfuron + terbutryn	0.158
8.	Buctril-M 40 EC	bromoxylin + MCPA	0.494
9.	Affinity 50 WDG	carnfentrazone ethyl ester	0.016

Data were recorded on the parameters like number of tillers $plant^{-1}$, number of spikes m^{-2}, number of grains $spike^{-1}$, 1000 grain weight (g), biological yield (t ha^{-1}) and grain yield (t ha^{-1}). The data for individual parameters were subjected to the ANOVA technique by using MSTATC computer software and the significant means were separated by using Fisher's protected LSD test (Steel and Torrie, 1980).

Results and Discussion

Statistical analysis of the data showed that the number of tillers $plant^{-1}$ were significantly affected by various herbicidal treatments (Table-1). The highest (9.29) number of tillers $plant^{-1}$ were observed in Affinity 50WDG treated plots. It was however, statistically similar with the Buctril-M 40 EC (7.83). The lowest (5.32) number of tillers $plant^{-1}$ were obtained in weedy check plots. The highest number of tillers $plant^{-1}$ obtained from Affinity 50 WDG were perhaps due to the best phytotoxic effect by it on weeds, while the lowest number of tillers $plant^{-1}$ obtained from weedy check plots were probably due to the weeds competition. These results are in line with those reported by Baldha *et al.*, (1998) who stated that there has been a significant increase in the number of tillers $plant^{-1}$ with the application of some herbicides.

The analysis of variance of the data showed that the different herbicidal treatments significantly affected the 1000-grain weight (Table-1). The data indicated that the highest 1000-grain weight (33.72 g) was obtained in the Affinity 50WDG treated plots followed by Logran Extra 64 WDG (32.89 g) and Buctril-M.40 EC (32.72), while lowest 1000 grains weight (26.99 g) was recorded in the weedy check plots. The increased grain weight is attributed to the availability of resources to the wheat crop. These results are in conformity with those reported by Sohail (1993), who stated that grain weight increases with application of some herbicides.

Statistical analysis of the data exhibited that different herbicides had significant effect on the biological yield (Table-1). The data indicated that maximum (9.13 t ha^{-1}) biological yield was produced by those plots to which Affinity 50 WDG was applied for weed control. However, it was statistically at par with Buctril-M (8.55 t ha^{-1}) and Logran Extra 64 WDG (7.46 t ha^{-1}). Minimum biological yield (5.83 t ha^{-1}) was recorded in weedy check plots. Biological yield of the top scoring treatments is attributed to the better weed control by the treatments under reference, which enable the better utilization of the resources (nutrients, solar radiations, water and space) by the wheat crop. These findings are in accordance with the work of Samar et al. (1993). They found that some herbicides are the best for increasing biological yield of wheat. Consequently the canopy closure of wheat occurred and further weed competition was not possible.

The statistical analysis of the data indicates that the different herbicidal treatments had significant effect on the grain yield. Perusal of the data in Table-1 exhibited that the maximum grain yield was observed in Affinity 50 WDG treated plots which was (4.6 t ha^{-1}) followed by Buctril-M 40 EC (4.3 t ha^{-1}) and Logran Extra 64 WDG (4.0 t ha^{-1}). The minimum grain yield (2.8 t ha^{-1}) was observed in weedy check plots and Rocket 75 WDG + Isoproturon 50 WP (2.9 t ha^{-1}). Maximum yield was recorded in Affinity 50 WDG treated plots, because it is more effective for weed control than any other herbicide. These results are in line with the work of Punia *et al.*, (1996).

Table-1. Effect of different herbicidal treatment on Number tillers $plant^{-1}$, 1000 grains weight, Biological yield (t ha^{-1}) and Grain yield (t ha^{-1})

Treatments	Tillers plant-1	1000 grains weight (g)	Biological yield (t ha-1)	Grain yield (t ha-1)
Rocket75WDG +Tribenuron-methyl75WDG	6.64bcd	30.17 c	6.54 cd	3.2 de
Rocket75WDG+Tribenuro-methyl75WDG	6.74bcd	30.43 c	7.07 bcd	2.9 e
Rocket75WDG + Isoproturon 50WP	6.5 bcd	30.33 bc	6.83 cd	2.9 e
Tribenuron- methyl+75WDG Isoproturon50 WP	6.84 bcd	30.26 c	6.41 cd	3.6 cd
Aim 40 WP	6.04 cd	30.16 abc	6.22 cd	3.1 de
Logran Extra 64 WDG	7.16 bc	32.89 ab	7.46 abc	4.0 bc
Buctril-M 40 EC	7.83 ab	32.72 abc	8.55 ab	4.3 ab
Affinity 50 WDG	9.29 a	33.72 a	9.13 a	4.6 a
Weedy check	5.32 d	26.99 d	5.83 d	2.8 e
LSD 0.05	1.523	2.348	1.603	0.492

Means not followed by the same letter (s) in the respective category significantly different by Fischer's protected LSD test at 5 % level of probability

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