

Studies on Chemical and Mechanical Weed Control in Barani Wheat

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ABSTRACT

Studies on the effect of five herbicides namely 2,4-D(sodium salt) at the rate of 0.5 kg/ha, methabenzthiazuron at the rate of 1.4 kg/ha, chlortoluron + MCPA at the rate of 2.2 kg/ha, bromoxynil + MCPA at the rate of 1.2 l/ha and isoproturon at the rate of 2.5 l/ha and hand, kasola and rumba weeding on weeds was carried out in barani wheat. Chlortoluron + MCPA (Dicuron-MA 60 w.p.) gave highest weed control (97.5%) in March and lowest weed weight after harvest (111 kg/ha). The highest grain yield was recorded in hand weeded plots being 3416.67 kg/ha followed by chlortoluron + MCPA (3256.67 kg/ha). The grain yield was enhanced by 45% over control by this chemical.

INTRODUCTION

Wheat has an important position in Pakistan's economy. It covers the largest area under cultivation. Country's economy is severely affected by the threatening increase in weed population. Competition with weeds, particularly in the early season, decrease the production of wheat. Thus creating a serious problem. In the past yield depression due to weeds has been recorded as 16.16% in 1978-79 and 29.03% in 1981-82 (Qureshi, 1982). Qureshi (1982) reported that out of 28 weeds, 11 species were responsible for

85% loss. In terms of grain, loss was around 2.5 million tons annually.

In Punjab, Saeed et al. (1982) stated that 100% control was obtained by methabenzthiazuron (Tribunal) while results of experiments carried out by Khan (1982) showed that when bromoxynil plus MCPA (Buctril-M) was used against weeds, 24.75% higher yield was obtained as compared to unweeded plots. Abbasi (1979) was able to double the yield by using ioxynil (Actril-D) that controlled 90% of weeds. Similarly, Makhdoom (1982) enhanced grain yield by 55-57% over weedy check by using chlortoluron plus MCPA (Dicuran-MA), bromoxynil plus MCPA (Brominal-M) and dicamba plus MCPA (Banvel-P) while mechanically weeding (3 times) gave maximum grain yield.

Under rainfed conditions Majid et al. (1985) showed that chlortoluron plus MCPA increased yield by 55% over control. The objective of the investigations presented in this paper was to compare the efficacy of 5 herbicides with hand weeding, kasola and rumba weeding and their effect on grain yield in barani areas.

MATERIALS AND METHODS

Studies were carried out at National Agricultural Research Centre during 1982-83. 'Sonalika' variety of wheat was used. Sowing was done in the first week of December. Experiment was laid out in a Randomized Complete Block Design and had 4 replications. Plot size was 1.5m x 6m. Typical barani conditions prevailed.

The following herbicides were used

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at post-emergence stage:

1. 2,4-D (sodium salt) at the rate of 0.5 kg/ha (DMA-6)
2. Methabenzthiazuron at the rate of 1.4 kg/ha (Tribunil 70WP)
3. Chlortoluron + MCPA at the rate of 2.2 kg/ha (Dicuran-MA 60wp)
4. Bromoxynil + MCPA at the rate of 1.2 l/ha (Buctril-M)
5. Isoproturon at the rate of 2.5 l/ha (Graminon 500FW)

Herbicides were sprayed with the help of a knapsack sprayer when weeds were of 2-3 leaf stage in the second week of February. Weeding by hand, kasola and rumba were done twice, first 2 and second 3 months after sowing.

Weed density was recorded from one square metre at 2 sites randomly selected in each plot till harvest in May. After harvest fresh weight of weeds and wheat was recorded in the field while dry weight was recorded after oven drying. Other yield components were calculated by taking the average of 4 readings.

RESULTS AND DISCUSSION

Weeds namely *Fumaria parviflora*, *Anagallis arvensis*, *Medicago polymorpha*, *Melilotus indica*, *Vicia sativa*, *Cirsium arvensis*, *Convolvulus arvensis*, *Coronopus didymus* and *Euphorbia helioscopia* were the major ones infesting wheat fields. Thus wheat crop was in competition with the broad-leaf weeds.

Data on weed density is presented in Table 1. The results indicate that maximum herbicidal control was apparent 3 weeks after spray. It was observed that in hand weeded plots, a large number of weeds germinated

after every weeding. The result of this was a comparably high weed population in March and April. Highest weed control was recorded in plots sprayed by chlortoluron + MCPA being 97.5% followed by isoproturon being 92.6% in April. Similarly studies by Saeed *et al.* (1980) resulted in 82.82% overall weed kill by chlortoluron + MCPA and those by Majid *et al.* (1985) in maximum control of weeds by the same herbicides. High weed density after April conforms with the findings of Majid *et al.* who stated that increase in weed population at later stage did not effect the crops return. Lowest fresh weed weight taken after harvest was recorded in plots sprayed by isoproturon (63 kg/ha) and chlortoluron + MCPA (111kg/ha). Both these treatments were significantly different from each other and all the other treatments at one percent level (Table 1).

Table 2 gives the yield components of wheat in different treatments. Fresh weight of wheat, productive tillers and 1000 grain weight though statistically non-significant, the highest values were present in hand weeding and 2,4-D treatments. Values of grains/spike were significant at 1% level. Grain yield in all the treatments was also significantly different at 1% level. Yield in hand weeded plots and chlortoluron + MCPA sprayed plots were statistically same and different from other treatments. Thus, of the herbicides chlortoluron + MCPA gave highest grain yield (3256.67 kg/ha). This conforms with the findings of Majid *et al.* who had similar results. Grain yield was enhanced by 55% over control and highest yields obtained by Dicuron-MA. In the present investigations yield was also high in case of hand weeded plots (3416.67 kg/ha), but this method is tedious and expensive costing about Rs. 500/ha. Chemical control

Table 1. Weed density and fresh weight weight fields

Treatments	Feb.	Density/m ²		Fresh weight after harvest		(kg/ha)
		Mar	Apr.	May		
Weedy control	12.0	12.2	13.0	7.9	236 abc	
Hand weeding	3.5	9.5	9.8	5.6	211 abc	
Kasola weeding	8.0	2.2	3.1	6.9	221 abc	
Rumba weeding	7.5	5.8	1.9	8.4	346 a	
Methabenzthiazuron (± 1.4 kg/ha)	9.0	7.5	9.6	7.2	237 abc	
2,4 - D(Sodium Salt) (± 0.5 kg/ha)	7.0	4.2	16.4	9.4	277 ab	
Chlortoluron + MCPA (± 2.2 kg/ha)	10.0	0.3	1.4	3.2	111 bc	
Isoproturon (± 2.5 l/ha)	14.0	0.9	1.6	8.3	63 c	
Bromoxynil + MCPA (± 1.2 l/ha)	20.5	5.2	5.9	8.2	246 ab	

Table 2. Wheat yield components in different treatment

Treatments	Fresh weight of wheat(kg/ha)	Productive tillers/m ²	Grains/spike	1000 grain weight(g)	Grain yield (kg/ha)
Weedy control	729 NS	193.0 NS	35.1 ABC	33.215 NS	2243.67 B
Hand weeding	804	241.0	41.8 AB	34.030	3416.67 A
Kasola weeding	668	232.7	34.0 ABC	34.745	2735.33 AB
Rumba weeding	764	226.7	32.0 BC	34.361	2827.33 AB
Methabenzthiazuron	733	235.3	32.5 BC	35.587	2808.33 AB
2,4 - D(Sodium Salt)	739	248.0	30.03 C	38.005	2322.00 B
Chlortoluron + MCPA	739	225.3	35.8 ABC	34.315	3256.67 A
Isoproturon	688	196.0	36.9 ABC	33.532	2937.67 AB
Bromoxynil + MCPA	764	207.0	43.5 A	35.225	2388.67 B

NS Non significant.

by chlortoluron + MCPA gave 45% increase in yield over control and that costs about Rs. 200/ha.

REFERENCES

- Abbasi, M.K. 1979. the study of weeds and their control in wheat, M.Sc thesis Sind Agri. Univ. Tandojam.
- Khan, M.S.K. 1982. Improving wheat production through weedicides. Lecture delivered at the National Seminar on Wheat Research and Production, PARC, 1982.
- Majid, A. ; Mahmood, T.Z. and Niaz, S.A. 1985. Impact of chemical weed control on wheat production under rainfed conditions. Pak. J. Agric. Res. 6(2):78-81.
- Makhdoom, M.U. 1982. Wheat grain yield as influenced by mechanical and chemical weed control. Paper read at the National Seminar on Wheat Research and Production, PARC, 1982.
- Qureshi, S.A. 1982. Weed problems of Pakistan. In: *Identification and Control of Weeds*. ed. T.Z. Mahmood. PARC: 5-13.
- Saeed, S.A.; Ahmad, A.M.; Sadiq, M. and Shaukat, M. 1982. Herbicides evaluation and impact of weed control in wheat. Paper read at the National Seminar on Wheat Research and Production, PARC, 1982.