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Efficacy of Different Herbicides for Controlling Broad Leaf Weeds in Wheat (*Triticum aestivum* L.)

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Abstract

The relative efficacy of hand weeding and six herbicides on the yield components and yield of wheat variety Inqalab 91 wa studied. Hand weeding and herbicides significantly increased the number of fertile tillers, spike length, number of Spikele per spike, number of grains per spike, 1000-grain weight, biological yield and grain yield. The herbicides applicati decreased the weed population. The grain yield corresponded with the weed mortality of the different treatments Buctril-M Tolkan and Logran produced the highest grain yield and comparable with the hand weeding. Buctril-M was in tu statistically at par with all other herbicidal treatments but it out yielded the weedy check. All other herbicides could n produced higher yield from the weedy check, statistically. It is recommended from the data that Buctril-M is a herbicide choice for controlling broad leaf weeds spectrum of D.I.Khan area.

Introduction

Wheat (*Triticum aestivum* L.) is the basic component of human diet. It is the staple food of Pakistan and meets the major dietary requirements. The introduction of high yielding, fertilizer responsive and short statured wheat varieties during the green revolution resulted in a tremendous increase in weed flora in wheat. These weeds are responsible for low yield of wheat by sharing a greater part of nutrient, moisture, space and light with the crop. Losses in wheat yield due to weed infestation may be upto 17-25 per cent (Shad, 1987). Conventional methods of weed control are weather dependent, laborious and costly due to high cost of labour. Chemical weed control has been proved to be relatively efficient and economical in controlling the weeds (Majid and Hussain, 1983). Klingaman *et al.* (1986) reported that the application of herbicides increased weed control in winter wheat and no injury was found to crop. Montazari (1994) studied the results of herbicides applied at the tillering stage of wheat. Bromoxynil @ 0.7 and 0.9 kg ha $^{-1}$ and 2,4-D @ 1.4 kg ha $^{-1}$ controlled a number of broad leaved weeds and significantly increased grain yield. Ahmed *et al.* (1991) studied different post emergence weedicides and reported that all the weedicides controlled broad leaved weeds and increased significantly grain yield of wheat. Sohail (1993) reported that application of Buctril M 40 EC @ 1.25 litre ha $^{-1}$ decreased broad leaved weed population by 90-94 per cent. Increase total number of tillers, number of grains/spike, 1000 grain weight, and straw yield was also retested. The study was aimed at elucidating the efficacy of various broad leaf weed killers and to compare their efficacy with the hand weeding and weedy check.

Materials and Methods

The efficacy of various herbicides on controlling broad leaved weeds and their effect on growth and yield of wheat was carried out at the Agronomic Research area of the Faculty of Agriculture, Gomal University, D.I.Khan during the year 1997-98. The experiment was laid out in Randomized Complete Block Design with four replicatio and eight treatments. The sub plot size was 5m x 1.5 The recommended cultural practices were uniformly appli to all sub plots. The data were recorded on the followi parameters. The individual data for each trait was subject to the analysis of variance technique, as out lined by St and Torrie (1980). The means were separated by Le Significant Difference Test.

Results and Discussion

Efficacy of Different Herbicides on Controlling Broad Leav Weeds in Wheat (*Triticum Aestivum* L.)

***Convolvulus arvensis* (field bindweed):** Table 1 exhibit that among the herbicides the lowest population and cent of weedy check was recorded in Buctril-M. It w followed by Tolkan and 2,4-D, respectively. Due to t perennial nature of the weed, the regeneration of weed w observed after 5 weeks. None of the herbicides could k the weeds suppressed beyond 5th week. However, it enunciated that at this stage of growth crop c successfully compete with weeds through shading an very developed root system. Similar findings were repor by Blank (1987), Heering and Peeper (1991) and So (1993) who reported the management of *Convolvu arvensis* with the application of a variety of herbicides.

***Rumex crispus* (curly dock):** *Rumex crispus* thrives well salt affected soils. Therefore, it is emerging as the w weed in the soils irrigated with Tube wells prior to commissioning of the Chashma Right Bank Canal D.I.Khan. The data in Table 1 exhibited a variability am the weed population and among the different *herbic* applications. The herbicide Buctril-M was the prominent in reducing the population gradually after s It was followed by Tolkan and Logran in weed count a time of harvesting. The herbicides Buctril-M, Tolka Logran showed the lowest and overlapping effect a time of harvesting. These findings draw a support fro research work undertaken by Cheema *et al.* (1985), A *et al.* (1991) and Bakes *et al.* (1991).

Table 1: Efficacy of different herbicides for controlling weeds in wheat.

Treatments	Lehli	Jangli Palak	Senji	Bathu
Dicuran MA 60	23.75b	03.25b	09.50b	03.50c
Buctril M	15.75d	00.25de	04.75cd	00.00e
Tolkan 70 WP	18.00cd	00.50de	00.50e	03.25c
Logran	24.75b	00.75d	07.00bc	05.00b
2, 4-D	19.75c	02.20c	03.75d	04.25bc
Sencor	23.75b	02.50c	03.50d	01.75d
Hand weeding	07.25e	00.00e	00.00e	00.00e
Weedy check	34.75a	21.75a	101.50a	35.00a

Table 2: Number of Sterile tillers, Number of fertile tillers and spike length (cm) as affected by application of different herbicides.

Treatments	Sterile tillers	Fertile tillers	Spike length
Dicuran MA 60	13.50c	383.5b	12.34a
Buctril M	12.50c	423.3a	12.49a
Tolkan 70 WP	21.50ab	356.3c	11.80ab
Logran	17.25bc	345.0c	12.16a
2,4-D	14.50c	361.3c	11.94ab
Sencor	23.00ab	353.3c	12.39a
Hand weeding	17.50bc	395.0b	11.84ab
Weedy check	24.50a	346.5c	11.05b

Letters sharing a letter in common in the respective column are statistically non-significant at 5 per cent level of probability.

***Melilotus parviflora* (Senji)**: *Melilotus parviflora* (Senji) infested the experimental site in the highest density among the major species. Senji is credited to be a Leguminous plant, thus when depriving the wheat crop of the nutrients, water and space, adds nitrogen into the soil by fixing the atmospheric nitrogen. Due to very higher number of seeds per plant, it becomes very difficult to control this weed from the infested soils. Perusal of data depicted a drastic reduction in population after application. At harvesting time only 0.5 plants m^{-2} were recorded in Tolkan. It was followed with Sencor (3.5) and 2,4-D (3.75). Buctril-M (4.75) after regeneration basis subsequently followed these treatments. The representation of data further confirmed the better performance of Tolkan, Sencor, 2,4-D and Buctril-M in controlling the weed under reference. These findings are in a greater analogy with the work reported by Singh *et al.* (1987), Halgren (1991) and Keefe *et al.* (1991).

***Chenopodium album* (Bathu)**: *Chenopodium album* (Bathu) is a very common weed of wheat fields in Pakistan. The perusal of data given in Table 1 revealed that herbicides were effective enough in managing the weed under reference. Almost all the herbicides were successful in reducing the weed population to a level well below the economic threshold. Among the herbicides Buctril-M reduced the *Chenopodium album* population to nil at the time of harvesting. It was followed by Sencor, Tolkan and Dicuran, respectively. Singh *et al.* (1987) and Nawamaki *et al.* (1991) reported the control of *Chenopodium album* with the application of different herbicides.

Efficacy of Different Herbicides on Yield Components and Yield of Wheat (*Triticum Aestivum* L.)

Number of sterile tillers/m^2: The data presented in Table 2 indicated that all treatments are statistically different from each other. Maximum sterile tillers were recorded in weedy check (24.50), while the minimum sterile tillers were recorded in Buctril M (12.50). There is no phytotoxicity of Buctril-M on wheat crop. Shah *et al.* (1989) found that Buctril-M @ 1.25 lit ha^{-1} post emergence proved selective and effective weed control in irrigated wheat.

Number of fertile tillers/m^2: The data presented in Table 2 indicated that number of fertile tillers were influenced by various herbicidal treatments and hand weeding. The highest no. of fertile tillers were recorded in Buctril M (423.3). It was followed by hand weeding (395) and Dicuran MA 60 (383.5). All other herbicidal treatments failed to surpass the control (weedy check) in no. of fertile tillers. The no. of fertile tillers in 2, 4-D were (361.3), Sencor 300 (353.3), Logran 250 (345) and weedy check (346.5). These findings are in agreement with the work of Cheema *et al.* (1985), Manzoor (1987), Shaktawat (1987) and Sohail (1993).

Spike length in (cm): It is clear from the data presented in Table 2 that all herbicidal applications and hand weeding treatment produced higher spike length than weedy check. In statistical terms Dicuran MA 60 (12.34 cm). Buctril M (12.49 cm), Logran (12.16 cm) and Sencor (12.39 cm) were at par with each other regarding spike length. But, the spike size of these treatments was in term statistically comparable with hand weeding (11.84), 2, 4-D (11.94) and Tolkan 70 WP (11.8 cm). These findings are in accordance with Jalis and Muhammad (1980) and Shakawat (1987).

Number of spikelets per spike: It is evident from the data that weedy check produced minimum numbers of spikelets per spike (16.17) which was significantly different from hand weeding and all herbicidal treatments (Table 3). The comparison of means among the hand weeding and herbicidal application showed that non-significant differences existed among hand weeding and all herbicides except Dicuran MA 60 (17.3) and Logran (17.25). However more spikelets per spike (18.38) were recorded in Buctril M treated plot which was significantly different from other treatments. The results in confirmation with the finding of Jalis and Muhammad (1980), Shaktawat (1987) and Stewart and Kebner (1989).

Number of grains per spike: The data regarding number of grains per spike are given in Table 3. The data showed that herbicidal treatments significantly increased the number of grains per spike. Buctril M and Sencor were not statistically different but gave higher number of grains per spike than weedy check. Dicuran MA 60, Tolkan, Logran and 2,4-D produced statistically equal and similar number of grains per

spike with the weedy check. Walia and Gill (1985), Borghain (1985) and Shaktawat (1987) also reported similar findings.

Grain yield (t/ha): It is clear from Table 3 that maximum grain yield of (4.694 t/ha) produced by hand weeding treatments. The herbicidal treatment Buctril M produced (4.422 t/ha) higher than all other herbicidal treatments. The lowest grain yield (3.313 t/ha) was obtained from weedy check. Increase in grain yield of weedicidal treatments and hand weeding might be due to increase in yield components resulting from weedy check of weeds and shifting of competition of moisture and nutrients in Favour of crops plants. Increase grain yield by the application of herbicides has been reported by Baldha *et al.* (1989), Varsheney and Singh (1990) and Ahmed *et al.* (1991).

Table 3: Number of spikelets per spike, number of grains per spike and grain yield tonnes per hectare as affected by application of different herbicides.

Treatments	Spikelets /spike	Grains /spike	Grain yield
Dicuran MA 60	17.30 b	57.80 ab	3.767 bc
Buctril M	18.38 a	61.65 a	4.422 ab
Tolkan 70 WP	17.67 ab	52.35 ab	4.097 abc
Logran	17.25 b	55.28 ab	4.076 abc
2,4-D	17.60 ab	57.97 ab	3.529 bc
Sencor	17.63 ab	60.25 a	3.838 abc
Hand weeding	17.90 ab	57.55 ab	4.694 a
Weedy check	16.17 c	50.75 b	3.313 c

Letters sharing a letter in common are statistically non-significant at 5 per cent level of probability.

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