

Yield of late sown wheat, *Triticum aestivum* L as affected by different herbicides in eastren UP

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ABSTRACT

A field experiment was conducted during Rabi season of 2010-11 at Faizabad to assess the bio-efficacy of fenoxaprop and clodinofof on weeds and productivity of late sown wheat. Fenoxaprop at higher doses effectively suppressed weeds and produced significantly lowest weed dry weight but it did not result in enhancing nitrogen removal by the crop at lower doses. Post-emergence application of Whip Super (fenoxaprop) 120 g, fenoxaprop 100 and 120 g and clodinofof 60 g/ha in late sown wheat eliminated the crop weed competition from early crop growth stages which ultimately provided congenial condition to crop for better harnessing of available crop growth resources and gave profitable grain yields.

Keywords: Clodinofof; fenoxaprop; late sown wheat; weeds

INTRODUCTION

Weeds are one of the prominent constraints in achieving potential yield in wheat. Wheat crop suffers with mix flora of weeds. The losses caused by weeds vary depending on the weed species, their abundance, crop management practices and environmental factors. It has been reported that with production of each kilogram of weed one kilogram wheat grains are reduced (Chaudhary et al 2008). Herbicides are one of the major groups of pesticides which contribute to the increased and economic

production of crops. However the continuous use of a single herbicide for many years results in development of resistance against some weeds what happened in case of isoproturon (Malik and Singh 1995). It becomes necessary to access the application time, method and doses at micro-farming level of herbicides which may vary according to soil type, microclimate, weed flora and its severity. Hence an attempt was made to find out efficacy of some herbicides at different doses on wheat growth, yield and its associated weeds.

MATERIAL and METHODS

Field experiment was conducted during Rabi season of 2010-11 at Agronomy Research Farm (26° 47' N latitude, 82° 12' E longitude and an altitude of 113 meters amsl) of ND University of Agriculture and Technology, Kumarganj, Faizabad, UP. The soil was slightly alkaline in reaction (7.9 pH), low in organic carbon (0.32%), available nitrogen (180 kg/ha) and phosphorus (8 kg/ha) and medium in potassium (210 kg/ha). The treatments consisted of ten weed control treatments viz fenoxaprop-p-ethyl 10 EC @ 75, 100, 120, 150, 200 and 240 g/ha, Whip Super (fenoxaprop-p-ethyl) @ 120g/ha, clodinofof @ 60 g/ha, weedy check and weed free check in completely randomized block design with three replications. Wheat cultivar HUW 234 was sown in second fortnight of December using seed rate of 125 kg/ha in rows 20 cm apart at 4-5 cm deep by seed drill. The crop was fertilized with NPK @ 120, 60 and 40 kg/ha through urea, single super phosphate and muriate of potash respectively. Four irrigations were given as per need of the crop. Herbicides were applied as post-emergence at 35 days after sowing (DAS) with the help of manually operated knapsack sprayer fitted with flat fan nozzle using 600 liters of water per hectare. The recommended cultural practices and plant protection measures were adopted to raise the healthy crop. Observations on weeds and crop were taken as per standard procedure followed and statistically analyzed.

RESULTS and DISCUSSION

Wheat crop was invaded by grassy (*Phalaris minor*, *Avena ludoviciana* and *Cynodon dactylon*), broad leaved (*Melilotus alba*, *Cheneopodium album* and *Anagallis arvensis*) and sedge group (*Cyperus rotundus*) weeds. Results revealed that weed density was significantly affected due to different weed control treatments (Table 1). Fenoxaprop applied at 240, 200 and 150 g/ha proved equally effective and recorded significantly less density of narrow leaved weeds over rest of the treatments. However lowest and highest density was recorded with weed free and weedy treatments. It was observed that the density of broad leaved weeds was found significantly ineffective among all the test parameters as fenoxaprop-p-ethyl and clodinofof are the narrow leaf herbicides. Similarly weed dry weight was also significantly lowest under these treatments. Application of fenoxaprop at 75, 100 and 120 g/ha and clodinofof @ 60 g/ha was found equally effective on same parameters. Selective bio-efficacy of same herbicides against narrow leaf weeds was also observed by Chhokar et al (2007). Whip Super (fenoxaprop) @ 120 g/ha showed its superiority to effectively suppress further weed population and registered highest weed control efficiency (95.4%) than remaining treatments except non-weedy situations. The lowest reduction in grain yield due to presence of weeds was associated with efficient herbicidal active treatments as found in all above test

Table 1. Effect of control treatments on weeds in late sown wheat crop

Treatment (g/ha)	Weed density (#/m ²) at 60 DAS	Weed dry weight (g/m ²) at 60 DAS	Weed control efficiency (%)	Weed index (%)	N uptake by weeds (kg/ha)
Fenoxaprop 75	13.04 (169.6)	10.2 (103.5)	44.0	15.1	3.43
Fenoxaprop 100	12.88 (165.3)	9.90 (97.5)	56.4	10.7	3.53
Fenoxaprop 120	12.81 (163.6)	9.00 (80.5)	65.2	7.3	2.10
Fenoxaprop 150	12.82 (163.9)	8.50 (71.8)	63.1	17.3	3.70
Fenoxaprop 200	12.60 (158.2)	7.80 (60.3)	57.2	22.5	4.62
Fenoxaprop 240	12.74 (161.9)	7.00 (48.5)	59.5	23.9	3.31
Whip Super (fenoxaprop) 120	12.88 (165.3)	9.20 (84.1)	95.4	6.5	2.01
Clodinofof 60	12.71 (161.1)	9.60 (91.7)	58.7	19.3	2.12
Weedy check	15.50 (239.9)	11.6 (134.0)	0.00	33.9	6.54
Weed free check	0.71 (0.00)	0.70 (0.00)	1000.0	0.00	0.00
LSD (P= 0.05)	2.50	0.91	-	-	0.56

Data are subjected to square root transformation, Values in the parentheses are original values

Table 2. Effect of weed control treatments on growth and yield of late sown wheat crop

Treatment (g/ha)	Plant height (cm)	Leaf area index at 60 DAS	Productive tillers/m ²	Spike length (cm)	Grain yield (q/ha)	N uptake by crop (kg/ha)	B:C ratio
Fenoxaprop 75	95.4	3.66	319.8	7.59	35.3	74.9	1.85
Fenoxaprop 100	98.4	3.86	322.1	7.95	37.2	77.8	1.93
Fenoxaprop 120	99.6	3.95	364.6	8.88	40.6	88.0	2.14
Fenoxaprop 150	91.4	3.61	318.6	7.87	36.2	75.4	1.76
Fenoxaprop 200	89.3	3.54	281.6	7.50	33.9	69.2	1.50
Fenoxaprop 240	87.0	3.39	278.4	6.75	3.33	67.3	1.39
Whip Super (fenoxaprop) 120	101.6	4.02	370.0	8.91	40.9	88.4	2.17
Clodinoxop 60	97.6	3.89	358.8	8.81	37.6	83.7	2.13
Weedy check	78.9	3.37	197.3	6.11	28.9	58.1	1.40
Weed free check	103.3	3.91	396.5	9.46	43.8	95.4	1.97
LSD (P= 0.05)	9.00	0.42	53.9	1.04	3.50	6.64	—

parameters. Nitrogen uptake by weeds was significantly influenced by weed control treatments and its uptake ranged to 1.5 to 3.0 times lesser than unchecked (6.54 kg/ha). The similar type of results have also been reported by Jain et al (2007).

Results presented in Table 2 reveal that plant height and leaf area index varied significantly due to weed control treatments. Among the herbicidal treatments Whip Super (fenoxaprop) @ 120 g registered taller plants and higher leaf area index than remaining treatments. The maximum number of productive tillers was recorded with Whip Super (fenoxaprop) @ 120 g (370.0/m²) followed by fenoxaprop 120 g (364.6/m²), clodinofof 60 g and fenoxaprop 100 g/ha but did not surpass the spike count under weed free check (396.5 m²). However productive tillers were found decreased at each successive increase in doses of fenoxaprop from 200 to 240 g/ha. It might be due to the phytotoxic effect of higher dose of fenoxaprop on wheat crop and it has inverse relationship with weed control parameters, crop growth, yield attributes and grain yield. These results are in conformity with the work done by Malik et al (2005). Herbicides applied at lower doses measured significantly longest spikes than higher doses of fenoxaprop at 200 and 240 g/ha. All weed control practices significantly influenced grain yield in comparison to uncontrolled weeds during crop period. Whip Super (fenoxaprop) 120

g, fenoxaprop 100 and 120 g and clodinofof 60 g/ha recorded statistically higher grain yield over rest of chemical weed control treatments and were at par with one another. These findings are well corroborated with the results obtained by Yadav et al (2009). Similarly these grain yield enhancing measures were also observed to be more remunerative by gaining higher benefit/cost ratio except repetitive manual weeding. The nitrogen depletion by crop is directly correlated to grain yield produced by the treatments and inversely associated to fenoxaprop at higher doses. However weeds under Whip Super (fenoxaprop) at 120 g/ha treatment significantly depleted nitrogen (2.01 kg/ha) followed by rest of treatments except season long weedy conditions (6.54 kg/ha).

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