International Journal of Farm Sciences **5(1)** : 110-115, 2015

Performance of sequential application of carfentrazone and pinoxaden in late sown wheat in eastern UP

AK SINGH, RAKESH K SINGH*, RK SINGH, R NAYAK and RR SINGH

Directorate of Extension
***Krishi Vigyan Kendra**
Kotwa, Tamouli (Rani Ki Sarai), Azamgarh 276207 UP, India
ND University of Agriculture and Technology
Kumarganj, Faizabad 224229 UP, India
Email for correspondence: rksagron@gmail.com

ABSTRACT

Field experiment was conducted during the winter season of 2009-10 at Agronomy Research Farm of ND University of Agriculture and Technology, Kumarganj, Faizabad, UP to study the effect of sequential application of different herbicides on late sown wheat of eastern Uttar Pradesh. Sequential application of pinoxaden 40 g followed by carfentrazone 25 g/ha (NH_2SO_4 1%) proved significantly effective in reducing density and biomass of weeds and gave complete control of grassy and broadleaf weeds without any phototoxic effect on crop as compared to carfentrazone at 35 days after sowing. The maximum grain yield 43.02 q/ha was recorded with completely weed free situation and it was statistically comparable with yield (41.6 q/ha) obtained under sequential application of pinoxaden 40 g followed by carfentrazone 25 g/ha (NH_2SO_4 1%) while lowest yield 31.4 q/ha in weedy condition and its vice versa without surfactant (NH_2SO_4 1%). Increase in grain yield due to treatments effect over weed free ranged from 23.8 to 37.0 per cent. B:C ratio also followed same path as in case of grain yield.

Keywords: Herbicides; grain yield; late sown wheat; weed control

INTRODUCTION

In Uttar Pradesh wheat, *Triticum aestivum* L occupies a prime position among the winter season crops. The productivity of wheat in eastern Uttar Pradesh is quite low (28 q/ha) and it might be due to the adoption of dominant rice-wheat cropping system, delayed sowing, poor weed management and imbalanced fertilization etc. Among the several causes of low productivity reduction in wheat yield has been very substantial due to serious competition posed by weeds. Weed management in specific time is a major challenge in crop production and chemical means provide a better opportunity to control weeds in close row crops like wheat where manual or mechanical weeding is not feasible and economical.

The resistant developed in control of *Phalaris minor* had dropped from an impressive 78 to a bleak 27 per cent within a time span of 3 years from 1990-1993 (Malik and Singh 1995) causing yield loss to the tune of 40-60 per cent in affected areas. Hence there is a need to find out some suitable alternate effective herbicides to tackle the problem of mixed weed flora. Therefore it was realized to evaluate sequential application of carfentrazone and pinoxaden against prominent seasonal weeds in wheat of eastern Uttar Pradesh.

MATERIAL and METHODS

The field experiment was conducted during the winter season of 2009-10 at Agronomy Research Farm of ND University of Agriculture and Technology, Kumarganj, Faizabad, UP. The soil of experimental field was silty loam in texture, slightly alkaline in reaction (pH 8.4) and low in available nitrogen, phosphorus and potash viz 180, 8.0 and 210 kg/ha respectively. Ten weed control treatments viz carfentrazone 15 g/ha followed by pinoxaden 30 g/ha, carfentrazone 20 g/ha followed by pinoxaden 35 g/ha, carfentrazone 25 g/ha followed by pinoxaden 40 g/ha, pinoxaden 30 g/ha followed by carfentrazone 15 g/ha (NN_2SO_4 1%), pinoxaden 35 g/ha followed by carfentrazone 20 g/ha (NH_2SO_4 1%), pinoxaden 40 g/ha followed by carfentrazone 25 g/ha (NH_2SO_4 1%), carfentrazone 25 g/ha, pinoxaden 40 g/ha, weed free and weedy check were tested in randomized block design with three replications. Wheat variety UP 2425 was sown on 12 December 2009. The crop was raised in accordance with recommended package of practices. The crop was fertilized with 60 kg N, 60 kg P_2O_5 and 60 kg K_2O per hectare as basal and remaining half dose of nitrogen (60 kg/ha) in two equal splits. The herbicides were spread with knapsack sprayer fitted with flat fan nozzle using 600 litres of water per hectare after 35 days after sowing (DAS) while second herbicides in sequence was applied one week after the application of first herbicide. Weed count and dry weight were recorded at 30 days interval to harvest from two randomly selected spots (0.25 m^2) in each plot and expressed as number/m^2 and g/m^2 respectively. The data on count and dry weight of weeds were subjected to $\sqrt{x+1}$ (square root transformation) for statistical analysis. Crop was harvested from net plot (4.0 m x 4.2 m= 16.8 m^2).

The major weeds infesting the experimental plots were *Phalaris minor* and *Avena ludoviciana* of grassy group, *Chinopodium album*, *Melilotus alba*, *Melilotus indica, Rumex sp, Vicia sativa*, *Convolvulus arvensis*, *Anagallis arvensis* and *Solanum nigrum* of broad leaf and *Cyperus rotundus* of sedge group.

RESULTS and DISCUSSION

The weed presence and its dry matter accumulation were significantly reduced in all the herbicidal treated plots at 60 DAS in comparison to uncontrolled weedy condition but not surpassed the level of fully controlled weeds in wheat crop (Table 1). Among the treatments sequential application of pinoxaden 40 g followed by carfentrazone 25 g/ha (NH_2 SO_4 1%) was found more effective against mixed weed population and their weight in term of lowest weed count and gain of dry weight (Singh et al 2011). Further this set of treatment did not differ statistically from rest of the treatments on weed density whereas weed weight varied with efficacy of applied herbicides. Pinoxaden 40 g/ha alone did not show any herbicidal characteristics and was found similar to weedy check on both test parameter whereas carfentrazone at higher rate 25 g/ha was as effective as couple of herbicides applied in sequence. The highest weed control efficiency and lowest weed index were associated with higher dose of pinoxaden followed by carfentrazone and decreasing trends were noticed with lower doses in sequence. However weeds were not able to deplete nitrogen significantly from treated plots except lower rate of carfentrazone 15 g followed by pinoxaden 30 g/ha and pinoxaden 40 g/ha alone. Punia et al (2006) and Yadav et al (2001) reported similar findings with the application of carfentrazone at 20-35 g/ha and pinoxaden 10 EC at 40 g/ha against weeds in wheat.

The data given in Table 2 show that maximum grain yield 43.02 q/ha was recorded with completely weed free situation and it was statistically comparable with yield (41.6 q/ha) obtained under sequential application of pinoxaden 40 g followed by carfentrazone 25 g/ha (NH_2SO_4 1%) while lowest yield 31.4 q/ha in weedy condition and its vice versa without surfactant (NH_2SO_4 1%). Increase in grain yield due to treatments effect over weed free ranged from 23.8 to 37.0 per cent. Majority of treatments produciing statistically more grain yield might be due to elimination of crowd created by weeds which provided better light interception to crop and utilization of other applied resources. As per the economic parameter the maximum grain yield under weed free situation did not support to obtain higher B:C ratio (1.68). However sequential use of pinoxaden 40 g followed by carfentrazone 25 g/ha (NH_2SO_4 1%) was more profitable by receiving higher benefit:cost ratio (1.87) followed by same treatment of 5 g lower dose (1.72) and again 1.75 ratio associated with reverse of same treatment (carfentrazone 25 g followed by pinoxaden 40 g/ha) on same dose without surfactant.

Table 1. Effect of weed control treatments on weeds and nitrogen removal by weeds

Treatment/sequence	Weed density (#/m^2) 60 DAS	Weed dry weight (g/m^2) at 60 DAS	Weed control efficiency (%)	Weed index (%)	Nitrogen removal by weeds (kg/ha)
Carfentrazone 15 g - pinoxaden 30 g/ha	6.32 (39.49)	5.45 (29.3)	59.37	19.24	8.22
Carfentrazone 20 g - pinoxaden 35 g/ha	6.01 (35.63)	4.89 (23.4)	66.64	10.11	7.30
Carfentrazone 25 g - pinoxaden 40 g/ha	5.76 (32.74)	4.45 (19.3)	72.09	6.90	6.57
Pinoxaden 30 g - carfentrazone 15 g/ha (NH_2SO_4 1%)	6.08 (36.52)	4.87 (23.2)	64.24	16.24	6.99
Pinoxaden 35 g - carfentrazone 20 g/ha (NH_2SO_4 1%)	5.67 (31.70)	4.99 (24.4)	69.91	9.34	6.33
Pinoxaden 40 g - carfentrazone 25 g/ha (NH_2SO_4 1%)	5.54 (30.16)	3.56 (21.2)	73.90	3.30	5.99
Carfentrazone 25 g/ha	7.23 (51.83)	4.22 (17.4)	69.25	18.80	7.27
Pinoxaden 40 g/ha	12.42 (153.82)	11.86 (140.2)	13.76	13.15	14.58
Weed free	0.71 (0.00)	0.71 (0.00)	100.0	1.00	0.00
Weedy check	15.15 (222.94)	14.63 (213.6)	0.00	29.33	19.10
LSD (P= 0.05)	5.12	0.95	-	-	1.95

DAS= Days after sowing

Table 2. Effect of weed control treatments on wheat crop and its economics

Treatment/sequence	# tillers/m^2 at 60 DAS	# spikes/m^2	1000-grain weight (g)	Grain yield (q/ha)	B:C ratio
Carfentrazone 15 g - pinoxaden 30 g/ha	323.6	314.7	38.3	34.74	1.41
Carfentrazone 20 g - pinoxaden 35 g/ha	397.2	316.0	38.5	38.67	1.65
Carfentrazone 25 g - pinoxaden 40 g/ha	408.8	318.0	40.0	40.05	1.75
Pinoxaden 30 g - carfentrazone 15 g/ha (NH_2SO_4 1%)	346.8	317.0	38.4	35.03	1.48
Pinoxaden 35 g - carfentrazone 20 g/ha (NH_2SO_4 1%)	354.6	319.0	40.5	39.00	1.72
Pinoxaden 40 g - carfentrazone 25 g/ha (NH_2SO_4 1%)	381.7	320.2	41.2	41.60	1.87
Carfentrazone 25 g/ha	350.2	317.7	40.0	37.36	1.49
Pinoxaden 40 g/ha	330.7	321.3	37.6	34.90	1.62
Weed free	432.7	330.3	42.4	43.02	1.68
Weedy check	280.9	295.3	37.1	31.40	1.22
LSD (P= 0.05)	7.92	2.49	1.95	3.90	-

DAS= Days after sowing

REFERENCES

Malik RK and Singh S 1995. Littleseed canary (*Phalaris minor*) resistance to isoproturon in India. Weed Technology **9:** 419-425

Punia SS, Singh S, Malik RK, and Yadav D 2006. Studies on herbicide mixture in wheat. Indian Journal of Weed Science **38(1&2):** 1-4

Singh S, Punia SS, Yadav A and Hooda VS 2011. Evaluation of carfentrazone-etyl+ metsulfuron-methyl against broadleaf weeds of wheat. Indian Journal of Weed Science **43(1&2):** 12-22.

Yadav RP, Srivastava UK and Dwivedi AC 2001. Response of wheat (*Triticum aestivem*) and associated weeds to irrigation schedule and pendimethalin. Indian Journal of Agronomy **46(1):** 122-125.

Received: 28.9.2014 ***Accepted: 20.12.2014***