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Effect of various herbicides to control of weeds in wheat and associated weeds

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Abstract
An experiment was conducted at Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya to study the "Effect of various herbicide to control weeds in wheat (*Triticumaestivum* L.)" during rabi seasons of 2014 to 2015 in randomized block design with three replications. The experiment comprised of twelve treatments of weed management viz.,T1-Pendimethalin @ 0.75 kg ha^{-1}, T2-Sulfosulfuron @ 0.025 kg ha^{-1}, T3-Metribuzin @ 0.21 kg ha^{-1}, T4-Clodinafop @ 0.06 kg ha^{-1}, T5-Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1}, T6-Pendimethalin fbsulfosulfuron @ 1.0+0.018 kg ha^{-1}, T7- Sulfosulfuron+metsulfuron (Total) @ 0.03+0.002 kg $ha^{-1,}$ T8- Pinoxaden+ metsulfuron (Premix) @ 0.06+0.004 kg ha^{-1}, T9-Mesoulfuron+ iodosulfuron (Atlantis) @ 0.012+0.0024 kg ha^{-1}, T10-Clodinafop+metsulfuron (Vesta) @ 0.06+0.004 kg ha^{-1}, T11-Weed free, T12-un-weeded control.Wheat (*Triticumaestivum* L.) is staple food of the world and falls under *poaceae* family. Weeds are considered as one of the major constraints in wheat cultivation. The prominent weeds noted in wheat fields are *Phalaris minor*, *Chenopodium album*, *Anagallisarvensis*, *Avenafatua*, *Convolvulus arvensis*, *Lathyrusaphaca*, *Cyperusrotundus* and *Cynodondactylon* etc. application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} has been found most effective to control the weeds as compared to other herbicide at all the stages. Post emergence application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} was found at par with most effective to control the weeds followed by post emergence application of Sulfosulfuron+metsulfuron (Total) @ 0.03+0.002 kg $ha^{-1}$and both were significantly superior than weedy check. Pre emergence application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} was most effective to reduce the weed dry weight g m^{-2} which remained at par with Post emergence application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} and weed free. Application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} provided the highest weed control efficiency (93.33%) followed by Post emergence Application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} (92.23%). This was mainly due to lowest weed dry weight under the effects of above treatment.

Keywords: PRE – Pre- emergence, POE – Post emergence, DAS- Day after Sowing, WCE – Control Efficiency and WI – Weed Index

Introduction
Wheat (*Triticumaestivum* L.) is staple food of the world and falls under *poaceae* family. It is primarily grown in temperate regions and also at higher altitude under tropical climatic areas in winter season. It is the single most important cereal crop. It has been considered as integral component of the food security system of the several nations. It is eaten in various forms more than one thousand million humans being in the world. In the terms of production wheat occupies the prime position among the food crop in the world. It ranks first in the world among the cereals both in respect of acreage (221.26 million hectare) and production (726.94 million tons) (USDA Report 2014-15). In India, it is cultivated on an area of 30.47 million hectare having productions of 95.85 million tones with a productivity of 3.15 tons' ha^{-1}. It contributes about 34 percent of total food grain production of the country (Anonymous, 2015) [1]. Uttar Pradesh rank first with respect to area 9.67 million hectare and production 33.66 million tones but the productivity is much lower 3.48 tones ha^{-1} as compared to Punjab and Haryana 4.50 tones h^{-1} (Anonymous, 2015) [1].

Weeds are considered as one of the major constraints in wheat cultivation. The prominent weeds noted in wheat fields are *Phalaris minor, Chenopodium album, Anagallisarvensis, Avenafatua, Convolvulus arvensis, Lathyrusaphaca, Cyperusrotundus*and *Cynodondactylon* etc. which alone cause 33 per cent reduction in wheat yield. Rice-wheat is one of the most important cropping systems in northern part of the country. The *Phalaris minor* is one of the very serious problems in wheat in this cropping system and sometimes almost 65 per cent crop losses have been reported, (Chhokar*et al.*, 2008) [4].

Many methods of weed control are being practiced but no one is absolute. The manual weeding besides expensive and pains taking cannot be practiced until weeds put forth sufficient vegetative growth. Introduction of herbicides has made it possible to control a wide spectrum of weeds in wheat effectively. Herbicide like metribuzin @ 210 g *a.i.*/ha or Sulfosulfuron @ 25-30 g *a.i.*/ha, applied either early post emergence (15 DAS) or post emergence (30-42 DAS) was effective in controlling both *Phalaris minor* and dicotyledonous weeds in wheat (Chhokar*et al.,* 2006) [4]. In the present investigation, some of the new herbicides molecules (combinations) having its very high potency at lower doses to kill grassy along with broad leaved weeds have been developed as ready mixed. These molecules may be proved more effective to control various weed species as well as relatively safer for environmental pollution point of view.

Materials and Methods

Field trial conducted at the Agronomy Research Farm of the Narendra Deva University of Agriculture & Technology, Kumarganj, Faizabad (U.P.) during R*abi* season 2014-15. The field was well leveled having good irrigation and drainage facilities. The geographical experimental site is situated in main campus of the university, about 42 km. away from Faizabad on Raibareli road at $26^0$47' N latitude, $82^0$12' E longitudeand an altitude of 113 meters above mean sea level in north indo-Gangetic plain**.** Pre-emergence pendimethalin @ 0.75 kg ha^{-1} and 10 kg ha^{-1} were applied on 2^{nd} day of sowing and post-emergence Sulfosulfuron @ 0.025 kg ha^{-1}, Clodinafop @ 0.06 kg ha^{-1} and Sulfosulfuron+metsulfuron (Total) @ 0.03 + 0.02 kg ha^{-1}, were applied at 30 days after sowing of crop. Herbicides were sprayed with the help of manually operated knapsack sprayer fitted with that fan nozzle using 600 litres water per hectare. Species-wise number of weeds were recorded from three places selected at random in each plot at 30^{th}, 60^{th}, 90^{th}, day and harvest stage of the crop. A quadrant of 50 cm × 50cm made of 0.25 inch diameter mild bar was used for recording the density. Appropriate calculations were applied to find out average weed density of every plot. Weed dry weight at 60 day and harvest stages were recorded. For this purpose the weeds of an area of 0.25m^2 were cut close to the ground surface and sun dried. After sun drying, weed samples were dried in hot air oven at 70 ^{0}C for 48 hours to obtain a constant weight. It was calculated in gm^{-2}.Weed control efficiency of different weeds management practices was calculated on the basis of weed dry weight by the following formula:

$$W.C.E.(\%) = \frac{W_0 - W_1}{W_0} \times 100$$

Where,
W_0-Weed dry weight of weedy check
W_1-Weed dry weight of treated plot

Weed index

Weed index of different weed management practices was calculated by following formula:

$$W.I. = \frac{Y_{wf} - Y_1}{Y_{wf}} \times 100$$

Where,
Y_{wf}-Grain yield of weed free plot
Y_1-Grain yield of treated plot

Results and Discussion

Divergent weed flora like *Phalaris minor, Cynodondactylon, Avenafatua*of grassy weeds, *Chenopodium album, Angallisarvensis, Convolvulus arvensis, Melilotusindica, Asphodeluespp, Viciahirsuta* and *Lathyrusaphaca* of broad leaf weed and *Cyperusrotundus* of sedges were noted. Similar weed flora of wheat crop under normal as well as late sown condition have also reported by Tripathi and Vaishya (1997) [11], Singh *et al.* (2006) [10] and Malik *et al.* (2006) [5]. By and large, all the herbicidal treatments reduced the weed population significantly over un-weeded control at 60^{th}, 90^{th} day and harvest stages of crop growth. Next to weed free, pre emergence application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} has been found most effective to control the weeds as compared to other herbicide at all the stages. Post emergence application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} was found at par with mosteffective to control the weeds followed by post emergence application of Sulfosulfuron+metsulfuron (Total) @ 0.03+0.002 kg $ha^{-1}$and both were significantly superior than weedy check. Effective weed control in wheat by the use of isoproturon and 2,4-D has also been observed by Sharma (2003) [8], Nayak *et al.* (2003) [6]. Synonymous to weed density, weed dry weight was also reduced significantly by the different weed management practices as compared to un-weeded control at all the stages of crop growth. The weed dry weight recorded at harvest stage was lower than 90^{th} day stage due to senescence of weed plants with the advancement of age. Pre emergence application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} was most effective to reduce the weed dry weight g m^{-2} which remained at par with Post emergence application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} and weed free. Reduced weed density under these treatments have resulted in reduced weed dry weight. Similar findings were also reported by Wani*et al.,* 2005 [13], Chhipa*et al.* (2005) [2], Singh (2005) [9] and Malik *et al.* (2006) [5]. The spectrum of weeds has a bearing on the efficiency of the management practices adopted. Pre emergence application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} provided the highest weed control efficiency (93.33%) followed by Post emergence application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} (92.23%). This was mainly due to lowest weed dry weight under the effects of above treatment. Nayak*et al.* (2003) [6] and Chhipa*et al.* (2005) [2] have also reported increase in weed control efficiency with use of herbicides in wheat. Weed index is the measure of reduction in yield caused by weed infestation and directly related with weed density and weed dry matter. Pre emergence application of Pendimethalin+metribuzin @ 1.0+0.175 kg ha^{-1} recorded lowest weed index of 5.12 followed by post emergence application of Pendimethalinfbsulfosulfuron @ 1.0+0.018 kg ha^{-1} of 6.99 as compared to weed index of 32.50 noted with weedy check. This was mainly due to lesser crop weed competition in herbicidal treatment as compared to weedy check within term resulted higher yield vis-à-vis reduce weed index. The results are in agreement with Chhipa*et al.* (2005) [2].

Table 1: Effect of various weed control treatments on weed density m^{-2} at 90 days after sowing.

Treatment		*C. album*	*A. arvensis*	*P. minor*	*C. dactlyon*	*M.alba*	*C. rotundus*	*Other*	Total
T_1	Pendimethalin 0.75	(6.89) 2.81	(13.77) 3.84	(4.11) 2.26	(7.22) 2.86	(10.77) 3.43	(17.25) 4.28	(14.66) 3.95	(74.67) 8.69
T_2	Sulfosulfuron 0.025	(6.66) 2.77	(12.77) 3.71	(4.00) 2.23	(6.33) 2.71	(9.33) 3.21	(15.55) 4.07	(13.41) 3.80	(68.05) 8.31
T_3	Metribuzin 0.21	(8.11) 3.02	(14.33) 3.92	(4.22) 2.28	(7.00) 2.82	(10.68) 3.42	(17.25) 4.27	(16.66) 4.20	(78.25) 8.90
T_4	Clodinafop 0.06	(10.66) 3.41	(18.66) 4.43	(5.00) 2.44	(7.44) 2.91	(12.00) 3.61	(18.11) 4.37	(18.44) 4.41	(91.94) 9.64
T_5	Pendimethalin+metribuzin1.0+0.175	(0.55) 1.00	(3.46) 1.97	(0.78) 1.09	(1.66) 1.47	(5.00) 2.33	(10.66) 3.34	(8.66) 3.02	(33.21) 5.85
T_6	Pendimethalin+fbsulfosulfuron 1.0+0.018	(1.30) 1.34	(3.46) 1.98	(1.88) 1.53	(1.88) 1.53	(6.89) 2.72	(11.88) 3.51	(9.00) 3.07	(36.31) 6.11
T_7	Sulfosulfuron+metsulfuron(Total)0.03+0.002	(5.00) 2.34	(3.78) 2.07	(1.99) 1.57	(2.33) 1.66	(7.33) 2.80	(12.33) 3.52	(9.11) 3.10	(41.87) 6.55
T_8	Pinoxaden+ metsulfuron (Premix) 0.06+0.004	(4.55) 2.25	(6.11) 2.55	(3.22) 1.92	(3.77) 2.04	(7.44) 2.81	(12.39) 3.59	(11.44) 3.44	(48.92) 7.06
T_9	Mesoulfuron+iodosulfuron(Atlantis) 0.012+0.0024	(4.89) 2.29	(7.89) 2.90	(3.55) 2.01	(3.78) 2.06	(8.66) 3.01	(12.55) 3.61	(11.44) 3.45	(52.77) 7.33
T_{10}	Clodinafop+metsulfuron(Premix) (Vesta) 0.06+0.004	(5.00) 2.44	(10.78) 3.36	(3.78) 2.05	(3.89) 2.09	(9.00) 3.08	(13.88) 3.79	(11.44) 3.45	(56.04) 7.55
T_{11}	Weed free	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00
T_{12}	Un-weeded control	(20.89) 4.68	(23.11) 4.91	(22.22) 4.82	(23.89) 4.99	(21.11) 4.70	(22.66) 4.86	(21.78) 4.77	(155.66) 12.52

* The value in parentheses are original value.

** Value transformed by $\sqrt{x+1}$

Table 2: Effect of various weed control treatments on weed density m^{-2} at harvest

Treatment		*C. album*	*A arvensis*	*P. minor*	*C.Dactlyon*	*M. alba*	*C. rotundus*	*Other*	*Total*
T_1	Pendimethalin 0.75	(9.55) 3.25	-	(4.66) 2.38	-	-	(18.03) 4.36	(19.11) 4.48	(51.35) 7.23
T_2	Sulfosulfuron 0.025	(5.58) 2.56	-	(3.77) 2.18	-	-	(13.22) 3.77	(11.44) 3.53	(34.01) 5.91
T_3	Metribuzin 0.21	(8.09) 3.01	-	(4.00) 2.23	-	-	(15.22) 4.03	(13.44) 3.80	(40.75) 6.46
T_4	Clodinafop 0.06	(8.33) 3.05	-	(4.44) 2.33	-	-	(17.33) 4.28	(15.99) 4.12	(46.09) 6.86
T_5	Pendimethalin+metribuzin1.0+0.175	(0.55) 1.24	-	(1.00) 1.41	-	-	(10.33) 3.37	(8.00) 3.00	(19.88) 4.57
T_6	Pendimethalin+fbsulfosulfuron 1.0+0.018	(1.22) 1.49	-	(1.88) 1.69	-	-	(11.22) 3.49	(8.55) 3.09	(22.87) 4.88
T_7	Sulfosulfuron+metsulfuron (Total) 0.03+0.002	(2.44) 1.85	-	(1.88) 1.69	-	-	(11.99) 3.60	(8.88) 3.14	(25.19) 5.12
T_8	Pinoxaden+ metsulfuron (Premix) 0.06+0.004	(4.44) 2.33	-	(3.11) 2.03	-	-	(11.76) 3.43	(9.96) 3.31	(29.27) 5.50
T_9	Mesoulfuron+ iodosulfuron (Atlantis) 0.012+0.0024	(4.89) 2.43	-	(3.66) 2.16	-	-	(12.39) 3.66	(10.55) 3.40	(31.49) 5.70
T_{10}	Clodinafop+metsulfuron (Premix) (Vesta) 0.06+0.004	(5.42) 2.53	-	(3.77) 2.18	-	-	(12.55) 3.68	(11.66) 3.56	(33.40) 5.86
T_{11}	Weed free	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00	(0.00) 1.00
T_{12}	Un-weeded control	(13.77) 3.84	-	(16.22) 4.16	-	-	(20.33) 4.62	(19.88) 4.57	(70.20) 8.44

Table 3: Effect of various weed control treatments on weed density at different growth stages

Treatments		Weed density (No. m^{-2})	
		90 DAS	At Harvest
T_1	Pendimethalin (0.75)	(74.67)8.69	(51.35)7.23
T_2	Sulfosulfuron (0.025)	(68.05)8.31	(34.01)5.91
T_3	Metribuzin (0.21)	(78.25)8.90	(40.75)6.46
T_4	Clodinafop (0.06)	(91.94)9.64	(46.09)6.86
T_5	Pendimethalin+metribuzin(1.0+0.175)	(33.21)5.85	(19.88)4.57
T_6	Pendimethalinfbsulfosulfuron (1.0+0.018)	(36.31)6.11	(22.87)4.88
T_7	Sulfosulfuron+metsulfuron(Total) (0.03+0.002)	(41.87)6.55	(25.19)5.12
T_8	Pinoxaden+metsulfuron(Premix) (0.06+0.004)	(48.92)7.06	(29.27)5.50
T_9	Mesoulfuron+iodosulfuron(Atlantis) (0.012+0.0024)	(52.77)7.33	(31.49)5.70
T_{10}	Clodinafop+metsulfuron (Vesta)(0.06+0.004)	(56.04)7.55	(33.40)5.86
T_{11}	Weed free	(0.00)1.00	(0.00)1.00
T_{12}	Un-weeded control	(155.66)12.52	(70.20)8.44
	SEm ±	1.93	1.58
	CD at 5%	5.67	4.64

* The value in parentheses are original value.

** Value transformed by $\sqrt{x+1}$

Table 4: Effect of various weed control treatments on dry matter of weeds gm^{-2} at various growth stages

Treatments		Dry matter of weeds	
		90 DAS	At harvest
T_1	Pendimethalin (0.75)	(84.24)9.23	(70.2)4.44
T_2	Sulfosulfuron (0.025)	(66.2)8.20	(62.3)7.96
T_3	Metribuzin (0.21)	(70.4)8.45	(66.1)8.19
T_4	Clodinafop (0.06)	(91.8)9.63	(77.5)8.86
T_5	Pendimethalin+metribuzin(1.0+0.175)	(30.0)5.57	(20.1)4.59
T_6	Pendimethalinfbsulfosulfuron (1.0+0.018)	(38.3)6.27	(23.4)4.94
T_7	Sulfosulfuron+metsulfuron(Total) (0.03+0.002)	(42.7)6.61	(26.2)5.22
T_8	Pinoxaden+metsulfuron(Premix) (0.06+0.004)	(43.8)6.69	(30.2)5.58
T_9	Mesoulfuron+iodosulfuron(Atlantis) (0.012+0.0024)	(45.4)6.81	(33.8)5.90
T_{10}	Clodinafop+metsulfuron (Vesta)(0.06+0.004)	(48.8)7.06	(35.7)6.05
T_{11}	Weed free	(0.0)1.00	(0.0)1.00
T_{12}	Un-weeded control	(320.6)17.93	(301.2)17.38
	SEm ±	0.97	1.05
	CD at 5%	2.84	3.07

Table 5: Effect of various weed control treatments on weed control efficiency and weed index.

Treatment		W.C.E. (%)	W.I. (%)
T_1	Pendimethalin (0.75)	76.70	25.75
T_2	Sulfosulfuron (0.025)	79.32	22.38
T_3	Metribuzin (0.21)	78.05	25.39
T_4	Clodinafop (0.06)	74.27	26.07
T_5	Pendimethalin+metribuzin (1.0+0.175)	93.33	5.12
T_6	Pendimethalinfbsulfosulfuron (1.0+0.018)	92.23	6.99
T_7	Sulfosulfuron+metsulfuron(Total) (0.03+0.002)	91.30	11.13
T_8	Pinoxaden+metsulfuron(Premix) (0.06+0.004)	89.97	14.06
T_9	Mesoulfuron+iodosulfuron(Atlantis) (0.012+0.0024)	88.77	15.07
T_{10}	Clodinafop+metsulfuron (Vesta)(0.06+0.004)	88.15	15.56
T_{11}	Weed free	100	0
T_{12}	Un-weeded control	0	32.50

Table 6: Effect of various weed control treatments on yield.

Treatment		Grain yield q/h	Straw yield q/h	Harvest index %
T_1	Pendimethalin (0.75)	33.00	47.26	41.12
T_2	Sulfosulfuron (0.025)	34.5	49.2	41.22
T_3	Metribuzin (0.21)	33.16	47.4	41.16
T_4	Clodinafop (0.06)	32.86	47	41.15
T_5	Pendimethalin+metribuzin (1.0+0.175)	42.17	57	42.52
T_6	Pendimethalinfbsulfosulfuron (1.0+0.018)	41.34	56.4	42.30
T_7	Sulfosulfuron+metsulfuron(Total) (0.03+0.002)	39.50	55	41.79
T_8	Pinoxaden+metsulfuron(Premix) (0.06+0.004)	38.20	54.1	41.39
T_9	Mesoulfuron+iodosulfuron(Atlantis) (0.012+0.0024)	37.75	53.5	41.37
T_{10}	Clodinafop+metsulfuron (Vesta)(0.06+0.004)	37.53	53.3	41.32
T_{11}	Weed free	44.45	60	42.56
T_{12}	Un-weeded control	30.00	43	41.10
	SEM +	1.28	1.59	-
	C.D. at 5%	3.74	4.66	-

References

1. Anonymous. Economic survey of India. Economics Division, Ministry of Finance, Govt. of India, 2015.
2. Chhipa KG, Pareek RG, Jain NK. Evaluation of metsulfuron-methyl and sulfosulfuron alone in combination with other herbicides against weed in wheat. Haryana J Agron. 2005;21(1):72-73.
3. Chhokar RS, Sharma RK, Verma RPS. Pinoxaden for controlling grassy weeds in wheat and Barley. Indian J Weed Sci. 2008;40(1-2):0253-8040.
4. Chhokar RS, Sharma RK, Chauhan DS, Mongia AD. Evaluation of herbicides against *Phalaris minor* in wheat in north-western Indian plains. Weed Res. 2006;46(1):40-49.
5. Malik RS, Yadav Ashok, Malik RK, Balyan RS. Effect of nitrogen and sulfosulfuron against Chenopodium album and *Rumexretroflexus* in wheat. Haryana J Agron. 2006;16(1-2):44-47.
6. Nayak S, Rawat AK, Sharma RS. Effects of metsulfuron-methyl and 2,4-D alone and in combination for control of broad leaf weeds in irrigated wheat. JNKVV Research Journal. 2003;37(1):104-106.
7. Prasad Ram, Tripathi SS, Mishra OP, Singh Rohitashva. Effect of wheat genotypes on weed suppression. Abstracts of papers, Biennial Conference of ISWS held at B.H.U. Varanasi on Fe. 5-7, 1999, 26.
8. Sharma Rajvir. Effect of low dose of sulfonylurea herbicides on weeds and yield of wheat. Annals of Agricultural research. 2003;24(1):217-219.
9. Singh J, Singh KP. Effect of organic manure and herbicides on yield and yield attributing characters of wheat. Indian J Agron. 2005;50(4):289-291.

10. Singh R, Dhiman SR, Kumar S, Singh VK, Singh RG. Efficacy of dicamba alone and in combination with isoproturon on wheat and associated weeds Indian J Agron. 2006;51(2):139-141.
11. Tripathi JS, Vaishya RD. Weed infestation in different cropping systems of eastern U.P. Indian J Weed Sci. 1997;29(142):50-52.
12. USDA. Foreigen Agricultural Service Grain Voluntary Update - April 2015 GAIN Report Number:IN5041.
13. Wani Smeia, Lone BA, Ansar-ul-Haq S, Bahari FA, Sofi KA, Sofi NA. Weed management in late sown wheat using different herbicides. Environment and Ecology. 2005;3:546-548.