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EFFICACY OF DIFFERENT HERBICIDES ON WHEAT YIELD

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ABSTRACT

A field experiment was conducted during 2010-11 to study efficacy of herbicide and their mixture in wheat at Agricultural Research Institute, Patna under Rajendra Agricultural University, Bihar, Pusa. The soil of experimental Site was clay loam in texture, medium in organic carbon, medium in available phosphorus and potassium with pH 7.2. The experiment was laid out in randomized block design with four replications, ten treatments consisting weedy, weed free, Pendimethalin @ 1.25 kg/ha as P.E., isoproturon @ 750 gm + 2, 4D @ 250 gm/ha as POE, isoproturon @ 1.0 kg/ha,Metribuzin @ 200 gm/ha, Metribuzin @ 250 gm as POE, Sulfosulfuron @ 25 gm/ha, Clodinafop propargyl 60 gm/ha + Metsulfuron Methyl (MSM) 4 gm/ha as POE, Fenoxaprop @ 120 gm/ha+ MSM 4 gm as POE. The major weed flora observed in experimental plots included chenopodium album, Anagalisarvensis, oxalis corniculata, melilotusindica and spergulaarvensis among the broad leaf weeds and phalaris minor, Avenafatua, cynokondactylon and cyperusrotundus among the narrow leaf weeds through out the crops season.

Key words : *Efficacy, Herbicides, isoproturon and weed control efficiency.*

All the weed control measures lead to significant reduction in weed population and weed dry matter as compared to weedy check. There was significant decrease in weed Population and weed dry matter as compared to weedy check. There was significant decrease in weed population and weed dry matter accumulation in weeds with the application of sulfosulfuron @ 25 g/ha as POE compared to other herbicidal treatments. Ear length, no. of spike,no. of spikelets, ear, no. of grains/ear, 1000-grain weight and grain yield of wheat was significantly increased over weedy check. The highest grain yield was recorded under weed free condition through in remained at par with sulfosulfuron @ 25 g/ha and clodinafoppropargyl 60 g/ha+MSM 4gm/ha. Thus, post emergence application of sulfosulfuron @ 25 gm/ha and clodinafoppropargyl 60 g/ha+MSM 4g/ha proved most effective for controlling weeds and grain yield of wheat crop.

MATERIALS AND METHODS

A field experiment was conducted at the Agricultural Research Institute, Lohanagar, Patna campus, Rajendra Agricultural University, Bihar, Pusa during winter season of 2007-08. The soil was clay loam neutral in reaction (pH 7.2), medium in organic carbon (0.65 %), available phosphorus (40 kg/ha) and available potash (189 kg/ha). Wheat variety PBW 372 was sown in line 18 cm apart on 18thDecember using 150 kg seed/ha. Recommended dose of fertilizers (80 kg N, 40 kg P_2O_5 and 20 kg K_2O/ha) was uniformly applied to all treatments. Full dose of P & K and half dose of N Were applied as basal at the time of sowing and rest nitrogen was given as top dressing after first irrigation.

The experiment comprised 10 treatments i.e. T_1- Weedy check T_2– weed free treatment T_3– Pendimethalin as pre. Emg. (1250 g a.i./ha) T_4– Isoproturon (750 gm) + 2,4-D as POE (250gm) T_5- Isoproturon (1000 gm/ha)T_6– Metribuzin (200 gm) T_7– Metribuzin (250 g/ha),T_8– Sulfosulfuran (25 g/ha), T_9– Clodinafoppropargyl (60 g) + Metsulfuron Methyl (4g), T_{10}– Fenoxaprop (120g)+MSM (4 g/ha). These were arranged in rasdomized block design with four replications. Herbicides treatments were applied 30 days after sowing with help of knapsack sprayer with flat fan T-jet nozzle, at a spray volume of 600 litre/ha. Observations on weed composition and dry matter were recorded from two random quadrates of 0.25 m^2 in each plot.

RESULTS AND DISCUSSION

Weed flora : The major weed flora observed in experimental plots included *Chenopodium album, Anagalis arvensis, Oxalis corniculata, Melilotus indica* and *Spergula arensis* among broad leaf weeds and *Phalaris minor, Avenafatua, Cynodon dactylon* and

Table-1 : Effect of various treatments on weed population, dry weight and weed control efficiency in wheat at 60 DAS.

Treatments	Dose (g. a.i./ha)	Weed population (no./m^2)	Dry weight (g./m^2)	Weed control efficiency (%)
T_1-Weedy check	-	18.67	5.90	-
T_2-Weed free	-	0.00	0.00	100.00
T_3-Pendimethalin as pre. emg.	1250	10.83	3.31	43.89
T_4-Isoproturon + 2,4-D as POE	750 + 250	8.88	3.02	48.81
T_5-Isoproturon	1000	9.81	3.05	48.30
T_6-Metribuzin	200	7.38	2.71	54.06
T_7-Metribuzin	250	6.47	2.50	57.02
T_8-Sulfosulfuran	25	5.84	1.41	76.10
T_9-ClodinafopPropargyl+ Metsulfuron Methyl as POE	60+4	5.71	1.51	74.40
T_{10}-Fenoxaprop + MSM	120+4	6.57	1.81	69.32
CD (P=0.5)	-	1.56	1.15	-

Table-2 : Yield attributes and benefit cost ratio of wheat as influenced by various herbicides.

Treatments	Dose (g. a.i./ha)	Effective tillers/m^2	Grain/ear	1000 grain weight (g.)	Grain yield (Q/ha)	Benefit cost ratio
T_1-Weedy check	-	37.37	29.57	34.05	21.21	1.11
T_2-Weed free	-	49.62	43.60	41.59	37.28	1.15
T_3-Pendimethalin as pre. emg.	1250	39.33	36.57	35.98	29.80	1.65
T_4-Isoproturon + 2,4-D as POE	750 250	40.98	35.88	35.09	30.98	1.59
T_5-Isoproturon	1000	41.39	35.06	36.02	31.61	1.48
T_6-Metribuzin	200	41.41	35.07	36.03	30.03	1.56
T_7-Metribuzin	250	42.01	35.16	36.10	31.50	1.50
T_8-Sulfosulfuran	25	48.50	40.37	40.88	34.77	1.90
T_9-ClodinafopPropargyl + Metsulfuron Methyl as POE	60+4	48.38	40.36	40.57	34.38	1.78
T_{10}-Fenoxaprop + MSM	120+4	48.03	40.57	4.38	34.09	1.71
CD (P=0.5)		4.05	4.06	0.84	3.51	-

Cyperus rotundus among the narrow leaf weeds through out the crop season.

Weed population and dry weight : Different weed control treatments significantly decreased the total number of weeds and their dry weights compared with the weedy check at 60 DAS during the season. Among the herbicides application sulfosulfuron (25 g) gave better results which was statistically at par with clodinafop and Isoproturan along with 2, 4D were found average result which were superior over weedy check in weed count and dry matter case. Pisal *et al.* (2009) also reported clodinafop resulted in excellent control of grassy weeds while post-emergence application of metsulfuron-methyl and 2,4-D amine controlled broad leaf weeds efficiently. Application of Metribuzin alone both at 200 and 250 g a.i./ha, reduced the total weed population significantly than the weedy check. In case of weed control efficiency all the treatments were statistically superior over weedy check. Among all treatments weed free check was shown superior most while treatment T_8 and T_9 were superior and statistically at par with each other.

Yield and yield attributes : Maximum yield attributes and yield were recorded in weed-free plots during the crop season, because no weed were observed in weed free plots, which may have resulted in increased nutrient, water, space and light supply to the wheat crop due to absence of crop weed competition. This turn might have resulted in greater photosynthesis and hence better translocation of photosynthates besides larger sink and stronger reproductive phase, as reflected in maximum effective tillers/m, grain/ear and 1000-grain weight. Among the herbicides, tank mix application of sulfosulfuran (25g a.i./ha) Clodinafop (60

g) + MSM (4 g a.i./ha) statistically superior over other chemical treatment in all type of yield attributes and yield of wheat. Both the treatments were at par with each other. All other chemical treatments were statistically superior over weedy check in all character of observations. In case of benefit cost ratio Treatment T_8 and T_9 were obtained highest among all the treatment. Weed free check was most effective weed control method but least cost effective Method due to high labour cost incurred in weeding as manually. Whereas chemical method of T_8 and T_9 was the most cost effective method of weed control.

CONCLUSIONS

The highest grain yield was obtained under weed free condition through it remained at par with sulfosulfuran @25 g/ha and Clodinafop propargyl 60 g/ha+MSM 4 gm/ha. Thus post emergence application of sulfosulfuran @ 25 g/ha and clodinafoppropargyl 60 g/ha + MSM 4 g/ha proved most effective for controlling weeds and grain yield of wheat crop. Hence it is recommended for adopting by farmers in their farming practices of wheat cultivation.

REFERENCES

1. Anonymous. 2002. Digest of Statistics, Directorate of Economics and Statistics, Planning and Development Department, Government of Jammu and Kashmir, PP. 82-85.
2. Azad. B.S. Reen, A.S., Singh. M. and Singh. M. 2003 Efficacy of herbicides for controlling weeds in wheat with special reference to *Phalaris minor*. *Annals of Plant Protection Sciences 11:* 119-122.
3. Dwivedi. R.K. Bajpai, R.P. Chaudhary. S.K. and Mishra, R.K. 1996. Integrated weed control in wheat in northern hill region of Chhattisgarh. *Indian Journal of Weed Science 28:* 189-190.
4. Malik. R.K. and Singh, Samunder 1995. LittleseedcanarygrassPhalaris minor resistance to Isoproturon in India. *Weed Technology* 9: 414-425
5. Pisal R.R., Sagarka B.K. and MeenaBabulal. 2009. Efficacy of new herbicides in wheat under south Saurashtraregion of Gujarat. *Indian Journal of Weed Science 41(1&2) :* 109-110.
6. Punia–S.S. Malik, R.K. and Shocren, Parvinder 2004. Bio efficacy of tank mis combinations of Fenoxaprop and clodinafop with broad leaf herbicides for broad spectrum weed control in wheat (*Triticum aestivum* L.) *Indian Journal of Ecology 31:* 128-132
7. Sharma Raivir 2001 Evaluation of sulfonylurea herbicides for weed control in wheat (*Triticum aestivum* L.) *Ph.D thesis CCS HAU,* Hisar, Haryana.
8. Sharma, R. 2003 Effect of low dose of sulfonyl urea herbicides on weeds and yield of wheat (*Triticum aestivum* L.) *Annals of Agricultural Research 24 (1):* 217-219.
9. Singh, G. Singh, V.P. Singh. Mahendra and Singh, R.K. 2003 Effect of doses and stages of application of sulfosulfuron on weeds and wheat yields. *Indian Journal of Weed Science 35:* 183-185.
10. Singh. Samar, Malik. R.K. and Singh, Vireshwar. 1998. Evaluation of Fenoxaprop against *Phalaris minor* in wheat. *Indian Journal of weed Science 30:* 176-178.