International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 6 Issue 3, March-April 2022 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Effect of Post-Emergence Herbicides on Growth of Wheat Crop and Their Associated Weeds

Neeraj Prajapati[1], Dr. Shrish Kumar Singh[2]

[1]M.Sc. (Ag) Agronomy Student, TDPG College, Jaunpur, Uttar Pradesh, India
[2]Associate Professor & Head, Department of Agronomy, TDPG College, Jaunpur, Uttar Pradesh, India

ABSTRACT

The field experiment was conducted during *Rabi* season of 2019-20 on sandy loam soil at Agricultural Research Farm (Pili Kothi), Department of Agronomy, Tilak Dhari Post Graduate College, Jaunpur (U.P.). The "Effect of post-emergence herbicides on growth of wheat crop and their associated weeds" The experiment comprised of nine treatment combinations and tested in randomized block design (RBD) with four replications. Experiment consisted of one factors, *viz.* seven different herbicides in different doses different time applied weed control of wheat crop analysis in superior herbicide in weed control of wheat crop t_1 Sulfosulfuron at 0.03 kg a.i/ha. Post-emergence 28 DAS, t_2 Metribuzin at 0.2kg a.i/ha. Post-emergence 28 DAS, t_3 Carfentrazone-ethyl at 0.025kg a.i/ha. Post-emergence 28 DAS, t_4 Carfentrazone-ethyl at 0.02kg a.i/ha. Post-emergence 28DAS, t_5 Metsulfuron-methyl at 0.004kga.i/ha.Post-emergence 28 DAS, t_6 Sulfosulfuron + Metsulfuron-methyl at 0.03+0.004 kg a.i/ha. Post-emergence 28 DAS, t_7 2, 4-D at 0.500 kg a.i/ha. Post-emergence 32 DAS, t_8 Weed free (two hand weeding), t_9 Weedy check and results obtained in t_6 Sulfosulfuron + metsulfuron-methyl @ 0.030+0.004 kg a.i/ha (28 DAS) superior compare to weedy check and similar in t_8 weed-free plots. Application of t_6 Sulfosulfuron + metsulfuron-methyl @ 0.030+0.004 kg a.i/ha (28 DAS) Were recorded in minimum density of weeds/m^2 more number of tillers, recorded crop dray matter and at remain least weeds dry matter recorded (gm^2) as compare to other treatments.

KEYWORD: *Herbicide, Wheat, Weed*

How to cite this paper: Neeraj Prajapati | Dr. Shrish Kumar Singh "Effect of Post-Emergence Herbicides on Growth of Wheat Crop and Their Associated Weeds" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-6 | Issue-3, April 2022, pp.1084-1087, URL: www.ijtsrd.com/papers/ijtsrd49687.pdf

IJTSRD49687

INTRODUCTION

Wheat [*Triticum aestivum* (L.) emend. Fiori & Paol] is one of the most important crop of our country which make us self sufficient in food grain production. The total area occupied by wheat in India is 31.45 million hectares with the production of 107.59 million tonnes through the yield of 3421kg/ha. Uttar Pradesh is a top leading state in respect to area and production of wheat crop with total area 9.50 million hectares (30.19%) and production of 32.59 million tonnes (30.29%) during 2019-20 ***(Agriculture Statistics at a glance, 2020).***

As per Indian Council of Agricultural Research, the demand for wheat in the country will reach 140 million tones. By 2050. Most of this demand in production will have to manage by increasing productivity as the land area under wheat is not expected to expand. Efficient input management along with varietal improvement is the two basic elements that can help in achieving the target.

Wheat is more nutritive as compared to the other cereals. It has good nutrition profile with 12.1 per cent protein, 1.8 per cent lipids, 1.8 per cent ash, 2.0 per cent reducing sugars, 6.7 per cent pentose's, and provides 314 Kcal/100g of food. Wheat is also a good source of minerals and vitamins viz., calcium (37 mg/100g), iron (4.1mg/100g), thiamine (0.45mg/100g), riboflavin (0.13mg/100g) and nicotinic acid (5.4mg/100mg). Unlike other cereals, wheat contains a high amount of gluten, the protein that provides the elasticity necessary for excellent bread making. Hard wheat is high in protein (10-

17%) and yields a flour rich in gluten, making it particularly suitable for yeast breads.

Weeds cause economic losses by competing with crop plants for nutrients, water and space resulting in significant reductions in crop yield. The losses caused by weeds (33 %) are more than losses caused by either diseases (20 %) or insect pests (26 %) in India weed not only reduce the quantity of crop produce it also decrease quality of whole farm produce, increase cost of cultivation and serve as alternate hosts for pest and diseases.

Wheat crop field are infested with grassy, non- grassy and sedges weeds. The major grassy weeds are *Phalaris minor*, *Avena sp*., *Polypogan monspeliensis* and *Cynodon dactylon*, Non- grassy weeds include *Chenopodium sp., Fumaria Parviflora, Cirsium arvense, Anagallis arvensis, Vicia sativa, Melilotus sp., Lathyrus spp*. etc. of the sedges *Cyperus rotundus* is most prevalent.

Conventional method of weed removal i.e. hand weeding is prevalent in different part of the country. However due to unavailability of adequate labour, weeding operation is often delayed and high wages of labours, secondary hand weeding has been proved in effective because of morphological similarity of little seed canary grass, wild oat and wheat plant, particularly in intial stages of growth. In this view, herbicidal application for controlling weeds in wheat crop has been found effective and economical.

Materials and Methods:

The experiment was conducted at the Agronomy Research Farm of the Tilak Dhari Post Graduate Collage, Jaunpur, (UP). The experimental site is situated in the Pili-Kothi in *rabi* season of 2019-20. Exprimental site fall under sub-tropical zone to semi-tropical zone in north Gangetic alluvial plains on the right side of the river Gomati the latitude. Of 25°43'58" N, along with longitude of 82°41'10"E at altitude of 83 meter above mean sea level. The weather parameters like maximum and minimum temperature, relative humidity and rainfall during the period of experimentation. As recorded from meteorological observatory of the total of 96.9 mm rainfall was recorded during the crop period. The weekly mean maximum and minimum temperature varied from 38.1 to 13.6°C and 24.8 to 7.0°C respectively, whereas maximum and minimum relative humidity varies from 95 to 60 percent and 99 to 21 per cent, respectively during growth period. The experiment comprised of ten treatment combinations and tested in randomized block design (RBD) with four replications. Experiment consisted of one factors, *viz*. seven different herbicides, dose and different time of application in wheat crop t_1 Sulfosulfuron at 0.03 kg a.i/ha. Post-emergence 28 DAS, t_2 Metribuzin at 0.2kg a.i/ha. Post-emergence 28 DAS, t_3 Carfentrazone-ethyl at 0.025kg a.i/ha. Post-emergence 28 DAS, t_4 Carfentrazone-ethyl at 0.02kg a.i/ha. Post-emergence 28 DAS, t_5 Metsulfuron-methyl at 0.004kga.i/ha.Post- emergence 28 DAS, t_6 Sulfosulfuron + Metsulfuron-methyl at 0.03+0.004 kg a.i/ha. Post-emergence 28 DAS, t_7 2, 4-D at 0.500 kg a.i/ha. Post-emergence 32 DAS, t_8 Weed free (two hand weeding), t_9 Weedy check. Was sowing date of 23 November and variety HD-2967 significantly influenced the weed control of wheat crop in different types of weeds *viz*. grassy, non-grassy and sedges weeds, Major dominant weeds are *Cyprus rotandus, parthenium hysrophorus, anagalis arvensis, chenopodium album, cynodon dactylon, coronopus didymus* and other weeds are visible in the experimental field. The experimental field soil having pH (7.4), Electrical conductivity (0.890 ds m^{-1}), organic carbon (0.43%), nitrogen (96.75 kg ha^{-1}), phosphorus (13.5 kg ha^{-1}) and potassium (123 kg ha^{-1}), and applied dose in NPK 150:60:40kg/ha, full dose of P_2O_5, K_2O and half dose of N_2 applied in dose and at remain quantity of nitrogen in top-dressing.

Result and Discussion:

Weed flora

The experimental field crop was infested by seventeen weed species out of them three were grassy, thirteen were non-grassy and one was sedge. *Cyperus rotundus, Parthenium hyterophorus, Anagallis arvensis, Chenopodium album, Cynodon dactylon* and *Carnopus didymus* but most dominant weed species sedge in *Cyperus rotundus* respectively (table-1)

Weed population (density)

Density of *Cyperus rotundus* was most dominant weed contributing alone 35.19, 39.95, 30.67 and 25.33 per cent of total weed present at 30, 60, 90 and 120 days stage of crop growth, respectively under T_1 weedy check. Among the non grassy weeds *Parthenium hyterophorus* second and *Anagallis arvensis* third were the most dominant weed species with respective contributed of 18.38, 16.16, 20.08, & 30.99, and 15.45, 12.59, 13.45, & 20.26 per cent of total weeds at 30, 60, 90 and 120 days after sowing of crop growth stages. The maximum population of monocot weeds was observed under weedy check, **Singh *et al.*, (2014)** and **chhokar et al., (2011)** recorded significant reduction in weed growth with the application of herbicides. The 30 DAS maximum density of weed noticed in weedy check and minimum T_6 Sulfosulfuron + Metsulfuron-methyl at 0.03+0.004 kg a.i/ha. At 120 DAS maximum density of weed noticed in weedy check and minimum T_6

sulfosulfuron + metsulfuron-methyl at 0.03+0.004 kg a.i/ha treated plots. **Paighan *et al.*, (2013)**

Weed dry weight (g/m^2)

At 60 DAS post- emergence application of application of T_6 sulfosulfuron + metsulfuron-methyl at 0.030+0.004 kg a.i/ha treated plots lower density (11.44/m^2) of weeds and weed dry matter **Bharat et al., (2012)** recorded in (3.136g/m^2) recoded lowest compare to weedy check. Statically similar in T_8 weed-free condition, And higher weed density (25.97/m^2), dry matter (8.50g/m^2) recorded at harvesting time noticed T_9 weedy check.

Weed control efficiency

Maximum weed control efficiency was recorded in weed free (T8) treatment (Table 1). Under different treatments, maximum weed control efficiency was noted with Sulfosulfuron + Metsulfuron treatment (T6) and it was followed by Carfentrazon-ethyl, sulfosufuron, and Metribuzin, weed control efficiency, respectively. Because of better control of weeds under the herbicide mixture, weed control efficiency under these treatments was comparable to weed free. Meena et al., (2017) reported that application of tank mixed metsulfuron + sulfosulfuron mixture provided maximum reduction in density and dry matter of total weeds over unwedded control followed by Carfentrazon-ethyl, sulfosufuron, and Metribuzin, at 60 DAS which resulted into highest weed control efficiency and proved significantly superior over rest of the herbicidal treatments. Application of herbicide alone gave poor control of weeds, therefore had lower weed control efficiency. These results are in close conformity with findings of **Yadav *et. al.*, (2009).**

Yield attributes

The number of ear-heads per meter row length; length of ear head, number of grain per ear-head, weight of ear head and test weight were significantly influenced due to weed control treatments. The longest ear head and maximum number of ear-heads were recorded application of sulfosulfuron+metsulfuron-methyl was closely followed by weed free treatment but least or lower effective of weed control in applied herbicides of 2, 4-D is lower grain yield recorded.

CONCLUSION:

On the basis of result obtained in the experimental field the following conclusion are being made, which could be usefull both by scientist and farmer. The experimental field was infested with seventeen weeds (three grassy, thirteen non grassy and one sedges). The dominant weed of experimental field was *Cyperus rotundus, Parthenium hyterophorus, Anagallis arvensis, Chenopodium album, Cynodon ductylon* and *Carnopus didymus.*

1. The cultivation of wheat along with weed resulted 20.63 per cent lower grain yield as compared to weed-free plot.
2. The post emergence application of Sulfosulfuron + Metsulfuron-methyl at 0.03+0.004 kg a.i/ha was proved as most effective herbicide for weed control in wheat crop.
3. The grain yield recorded under Sulfosulfuron + Metsulfuron-methyl at 0.03+0.004 kg a.i/ha was statistically differ with weed-free condition.

Table 1 Total dry matter accumulation [g/m^2] as affected by weed management practices in wheat crop

Treatment	Rate of application kg ae or a.i/ha	Days after sowing			
		30	60	90	120
Sulfosulfuron	0.03	2.15 (3.64)	2.84 (7.12)	3.04 (8.29)	3.14 (8.92)
Metribuzin	0.2	2.10 (3.70)	2.90 (7.42)	3.04 (8.29)	3.12 (8.74)
Carfentrazone-ethyl	0.025	2.16 (3.68)	1.71 (1.95)	1.75 (2.07)	1.97 (2.91)
Carfentrazone-ethyl	0.02	2.19 (3.80)	2.92 (7.53)	2.99 (7.95)	3.01 (8.11)
Metsulfuron-methyl	0.004	2.12 (3.51)	2.78 (6.73)	3.08 (8.52)	3.15 (8.96)
Sulfosulfuron + Metsulfuron-methyl	0.03+0.004	2.14 (3.60)	1.41 (1.00)	1.52 (1.34)	1.72(1.97)
2,4-D	0.500	2.16 (3.68)	2.92 (7.58)	3.14 (8.91)	3 .15 (8.98)
Weed free	-	1.00 (00)	1.00 (00)	1.00 (00)	1.00 (00)
Weedy check	-	2.21 (3.90)	3.03 (8.21)	3.12 (8.78)	3.16 (9.01)
SEm±	-	0.007	0.023	0.16	0.014
CD at 5 %	-	0.019	0.068	0.470	0.041

*Original value in parentheses and data is subjected to $\sqrt{x+1}$ transformation.

Table - 02 Yield (kg/ha) and harvest index of wheat as affected by weed management practices in wheat:

Treatment	Rate of application kg ae or a.i/ha	Grain yield (kg/ha)	Straw yield (kg/ha)	Biological yield (kg/ha)	Harvest index
Sulfosulfuron	0.03	3613.00	6212.00	9825	0.36
Metribuzin	0.2	3612.00	6212.00	9824	0.37
Carfentrazone-ethyl	0.025	3908.25	6111.50	10019.75	0.40
Carfentrazone-ethyl	0.02	3613.00	6215.50	9828.50	0.37
Metsulfuron-methyl	0.004	3616.75	6214.50	9831.25	0.38
Sulfosulfuron+ Metsulfuron-methyl	0.03+0.004	4546.00	5811.50	10357.50	0.42
2,4-D	0.500	3609.00	6213.25	9822.25	0.37
Weed free	-	4535.25	6011.50	10546.75	0.43
Weedy check	-	3608.25	6211.50	9819.75	0.37
SEm±	-	3.942	0.64	0.406	0.004
CD at 5 %	-	11.574	1.879	1.192	0.012

References:

[1] Agricultural statistics at a glance, 2020, Agricultural Statistics, Department of Agriculture cooperation of Agriculture, Government of India, New Delhi.

[2] Bharat, R. Kachroo, D., Dharma, R., Gupta, M. and Sharma, A. K. 2012. Effect of different herbicides on weed growth and yield performance of Wheat, Indian Journal of Weed Science 44(2): 106-109.

[3] Chhokar, R. S., Sharma, R. K. and Chander, S. 2011 Optimizing the surfactant dose for sulfosulfuron and carfentrazone against weeds in wheat, Indian Journal of Weed Science 43(3&4): 153-162

[4] Paighan, V. B., Gore, A. K. and Chavan, A. S. 2013. Effect of new herbicides on growth and yield of Wheat. Indian Journal of Weed Science 45(4): 291 296.

[5] Singh, A. K. Singh, R. K. and Singh, P. R. 2014. Herbicides effect on weeds and yield of late sown Wheat. Indian Journal of Weed Science 46(3): 289-290.

[6] Yadav, D. B. ; Yadav, A. ; Singh, S. and Lal, R. (2009) Compatibility of fenoxaprop-pethyl with carfentrazone-ethyl metsulfuron-methyl and 2, 4-D for controlling complex weeds of wheat Indian Journal of Weed Science 41 (3): 157-160.