International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(2): 1705-1707

Received: 26-01-2020
Accepted: 28-02-2020

Rahul Kumar Jaiswal
Ph. D. scholar at department of agronomy, College of agriculture Raipur, Indira Gandhi Krishi Vishwavidyalaya Raipur, Chhattisgarh, India

Dinesh Pandey
Scientist department of agronomy, Indira Gandhi Krishi Vishwavidyalaya Raipur, Chhattisgarh, India

HP Agrawal
Principal Scientist department of agronomy, Indira Gandhi Krishi Vishwavidyalaya Raipur, Chhattisgarh, India

AP Agrawal
Senior Scientist department of genetics and plant breeding, BTC, CARS Bilaspur, Indira Gandhi Krishi Vishwavidyalaya Raipur, Chhattisgarh, India

Lovekesh gilhare
Junior Research Fellow on millets, department of agronomy, SGCARS Jagdalpur, Indira Gandhi Krishi Vishwavidyalaya Raipur, Chhattisgarh, India

Corresponding Author:
Rahul Kumar Jaiswal
Ph. D. scholar at department of agronomy, College of agriculture Raipur, Indira Gandhi Krishi Vishwavidyalaya Raipur, Chhattisgarh, India

Effect of broad leaf herbicides on yield and yield attributes of irrigated wheat

Rahul Kumar Jaiswal, Dinesh Pandey, HP Agrawal, AP Agrawal and Lovekesh gilhare

DOI: https://doi.org/10.22271/chemi.2020.v8.i2z.9008

Abstract
Experiment was carried out during *rabi* 2016 and 2017 under All India co-ordinate Wheat & Barley Improvement Project, at BTC, College of agriculture and Research Station Sarkanda, Bilaspur (C.G.). The highest grain yield was obtained under weed free situations during both the year of experiment (45.98 & 50.41 q/ha). Among herbicidal weed control treatments post emergence application of Metsulfuron + Carfentrazone + S, producing higher yield (44.95 & 47.32 q/ha) which was at par with Halauxifen + Florasulam + Carfentrazone + S (44.56 & 47.18 q/ha) during both the year of experiment. Gain in yield was due to better weed control as a result higher number of earheads/sq.m & test weight (g).

Keywords: Broad leaf herbicides, irrigated

Introduction
Wheat (*Triticum aestivum* L.*)* ranks first among the world food crops, in terms of cultivated area (223.8 m ha), production (733.1 mt) and productivity of (3280 kg ha^{-1}) (USDA 2016). Wheat is important staple food basket of the country contributed 30-35 per cent to total food grain (Singh *et al.* 2013) [6]. It is grown across a wide range of environment throughout the country and has the highest adaptation among all the crop species. In India, wheat occupies an area of 30.72 m ha with a production of 98.51 mt and an average national productivity of 32.07 q ha^{-1}. (Anonymous, 2017) [1]. In Chhattisgarh, wheat occupies 114 (000 ha) with a production of 153 (000, metric tonnes) and average productivity of 13.37 q/ha (Ministry of Agriculture and Farmers Welfare, India, 2017). Major wheat growing regions in the state are Chhattisgarh plains and Northern hills region of Chhattisgarh. Productivity of wheat is much lower compared to national average because of high temperature and low humidity coupled with rain-fed cultivation of the crop (Tomar *et al*., 2010) [8].

Weed infestation during early stages of crop growth is one of the major factors responsible for lower wheat productivity. The short stature of new dwarf varieties coupled with higher fertilizers and irrigation requirements creates favourable ecological conditions for weed growth. Weeds compete with crop for sunlight, space, nutrients and moisture. Studies conducted in Palampur revealed that uncontrolled weed growth depleted 83.4, 18.7 and 80.8 kg ha^{-1} of nitrogen, phosphorus and potassium, respectively which was 47.1, 11.5 and 55.21 kg ha^{-1} higher than the total uptake of these nutrients by wheat crop (Kumar *et al.*, 2005). Weed management is one of the major input costs of production. weed reduce wheat grain yield up to 10 – 70% and major weed competition is during first 30-60 days after sowing. For control of broadleaved weeds in wheat, three major herbicides used are metsulfuron.2.4-D and carfentrazone (Rana, *et al*. 2017) [10]. Weeds can be controlled by adopting different methods. However, each weed control method has its own limitations. Mechanical methods are laborious and time consuming, besides weeds with similar morphological characters like crops are likely to be escaped. Herbicides have benefited the agricultural community in many ways. Heavy reliance on herbicides creates an environment favourable for weed resistance to herbicides, weed population shifts and off-site movements of herbicides (Rao and Nagmani, 2010) [9]. Traditional methods of weed control such as crop rotation, manual hoeing or tractor drawn cultivator and costly labour have made the use of herbicides more popular among the

Indian farmers. The eradication of weeds through chemicals is considered more suitable as they cover more area during short period of time. Therefore, for sustaining food grain production to feed ever- increasing population and ensuring food security, effective weed management is very essential.

Material and methods

Experiment was carried out during *rabi* 2016-17 and 2017-18 under All India co-ordinate Wheat & Barley Improvement Project, at BTC, College of agriculture and Research Station Sarkanda, Bilaspur (C.G.) under timely sown irrigated condition. The Research Farm is situated at 22˚09 N′ latitude and 82˚15 E′ longitude and at an altitude of 298 m above mean sea level. The region falls under the Eastern plateau and hill region (Ago-climatic zone-7) of India. The soil was neutral in reaction, medium in organic carbon, low in nitrogen and medium in phosphorus and potash content. Wheat variety HI- 1544, was grown on test crop. The eleven weed control treatment combinations i.e. (i) Halauxifen-methyl ester + Florasulam 40.85% WG + surfactant (ii) Metsulfuron methyl 20 WG + surfactant iii) Carfentrazone 40DF iv) 2,4-D Na 80 WP v) 2,4-D E 38 EC vi) Metsulfuron + carfentrazone + surfactant vii) 2,4-D Na + Carfentrazone viii) 2,4-D E + Carfentrazone ix) Halauxifen methyl + florasulam + carfentrazone + surfactant x) Weedy check *and* xi) Weed free. Broadleaved herbicides were applied at30-35 days after sowing. A blanket dose of clodinafop 60 g/pinoxaden 50 g/fenoxaprop-P-ethyle 100 g/ha was applied about 5 days before the broad leaf herbicide application to control grassy weeds. For irrigation and fertilization, the recommended package of practices is applied.

Result and discussion

The experimental findings pertaining to length of ear head per m^{-2}, no. of grains earhead^{-1}, and test weight, grain & straw yield (q/ha), and harvest index as influenced by weed management has been presented in Table 1&2. Weed flora of wheat differs from field to field depending on environmental conditions, irrigation, fertilizer use, soil type, weed control practices and cropping sequences. The predominant broad leaf weeds associated with wheat in experimental field are *Chenopodium album* L., *Melilotus alba*, *Euphorbia hirta*., *Convolvulus arvensis* L., *Amaranthus* viridi., *Anagallis arvensis* L., *Convolvulus arvensis* L., *Medicago denticulate, Melilotus alba. and flavaria countriarva.* Among this all broad leaf weeds *Chenopodium album* L., and *Medicago denticulate* were occurs in highest number as compared to others, among grassy weeds, *Phalaris minor* and among broad-leaved weeds *Rumex dentatus* L. and *Medicago denticulta* are of major concern in irrigated wheat under rice-wheat system in India (Singh *et al.*, 1995; Chhokar *et al.*, 2006) [4, 5]. Major population of broad leaf weeds were found in both the year of experiments. The experimental findings pertaining to length of ear head per sq.m., no. of grains earhead^{-1}, and test weight, grain yield (q/ha), straw yield as influenced by weed management has been presented in Table 1 & 2. The highest grain yield was obtained under weed free situations during both the year of experiment (45.98 & 50.41 q/ha). Among herbicidal weed control treatments post emergence application of Metsulfuron + Carfentrazone + S, producing higher yield (44.95 & 47.32 q/ha) which was at par with Halauxifen + Florasulam + Carfentrazone + S (44.56 & 47.18 q/ha) during both the year of experiment. Almost similar trained was observed for straw yield (q/ha). Gain in yield was due to better weed control as a result higher number of earheads/sq.m & test weight (g). Similar results were also observed by Bhardwaj *et al.*, 2004 [3]. Weedy check was observed to be the significantly most inferior for grain yield (30.65 & 31.79 qha^{-1}) compared to other treatments taken for study. Unchecked weed growth decreased the yield to the tune of 50.01 & 58.57% compared to weed free plots during both year. No significant difference was observed for harvest index during both the year of experiment.

Table 1: Effect of herbicides on yield and yield attributes of irrigated wheat.

Treatments	Dose g a.i./ha	Ear head/sq. m.		Grains/Ear head		Test Weight g.	
		2016	2017	2016	2017	2016	2017
Halauxifen + Florasulam + S	12.76	240	293.0	36.42	25.73	38.32	38.45
Metsulfuron + S	4	269	329.0	33.39	29.37	42.37	43.87
Carfentrazone	20	293	311.0	31.67	27.20	43.26	42.31
2,4-D Na	500	248	299.0	35.61	26.28	40.05	40.11
2,4-D E	500	307	321.0	29.87	28.56	41.26	43.34
Metsulfuron + Carfentrazone + S	4+20	338	397.0	28.83	32.02	46.06	46.48
2,4-D Na + Carfentrazone	400+20	303	333.0	30.70	30.00	44.21	43.75
2,4-D E + Carfentrazone	400+20	314	343.9	30.76	30.17	43.56	44.31
Halauxifen+Florasulam+Carfentrazone+S	10.21+20	324	373	30.08	31.34	45.94	45.36
Weedy check	-	232	261.0	35.87	24.99	37.42	38.24
Weed free	-	360	409.3	27.30	33.04	46.86	48.15
CD (0.05)		31.35	60.18	NS	3.50	5.48	3.48

Table 2: Effect of herbicides on yield and yield attributes of irrigated wheat.

Treatments	Dose g a.i./ha	Grain Yield, q/ha		Straw Yield, q/ha		Harvest index	
		2016	2017	2016	2017	2016	2017
Halauxifen + Florasulam + S	12.76	33.28	36.54	34.24	34.98	49.28	51.08
Metsulfuron + S	4	38.21	41.27	37.45	42.14	50.50	49.64
Carfentrazone	20	39.12	40.33	40.31	39.60	49.25	50.46
2,4-D Na	500	35.15	37.75	36.12	37.74	49.31	50.03
2,4-D E	500	37.29	40.87	36.89	41.55	50.26	49.68
Metsulfuron + Carfentrazone + S	4+20	44.95	47.32	46.56	50.08	49,12	48.62
2,4-D Na + Carfentrazone	400+20	40.80	42.52	41.76	42.49	49.41	50.15
2,4-D E + Carfentrazone	400+20	42.02	44.75	44.37	45.76	48.63	49.43

Halauxifen+Florasulam+Carfentrazone+S	10.21+20	44.56	47.18	49.77	55.70	47.23	45.90
Weedy check	-	30.65	31.79	31.25	30.75	49.51	51.10
Weed free	-	45.98	50.41	48.75	57.77	48.53	46.61
CD (0.05)		5.50	1.74	4.38	7.47	NS	NS

References

1. Anonymous, 2017. (agricoop.gov.in/sites/default/files/3rd_advance_eng_2018.pdf)
2. Anonymous. PD, Report of All India Coordinated Wheat & Barley Improvement Project 2016-17, Directorate of Wheat Research, Karnal, India, 2012, 4p.
3. Bhardwaj AK, Singh RK, Singh SP, Singh Y, Singh G, Mishra RD *et al*. Weed management in zero-till sown wheat. Indian Journal of Weed science. 2004; 36:175-177.
4. Singh S, Malik RK, Balyan RS, Singh S. Distribution of weed flora of wheat in Haryana. Indian J. Weed Sci. 1995; 27:114-121.
5. Chhokar RS, Sharma RK, Chauhan DS, Mongia AD. Evaluation of herbicides against *Phalaris minor* in wheat in north-western Indian plains. Weed Res. 2006; 46:40-4.
6. Singh B, Dhaka AK, Pannu RK, Kumar S. Integrated weed management-a strategy for sustainable wheat production-a review. Agriculture Reviews. 2013; 34(4):243-255.
7. Kumar D, Angiras NN, Singh Y, Rana SS. Influence of integrated weed management practices on weed competition for nutrients in wheat. Indian J. Agric. Res. 2005; 39(2):110-115.
8. Tomar GS, Tomar IPS, Khajanji SN. Science of crop production part-II. Kushal publication and distributers, Varanasi, 2010.
9. Rao AN, Nagamani A. Integrated Weed Management in India– Revisited. Indian J. Weed Sci. 2010; 42(3-4):123-135.
10. Rana SS, Badiyala D, Parita Brari. Evatuation of herbicides combinations for controlling complex weed flora in wheat. Indian Journal of Weed Science. 2017; 49(4):335-340.