Comparative efficiency of cultural and Chemical methods of weed control in Wheat (Triticum aestivum L).

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Abstract

Four methods of sowing (Broad casting, Line sowing, criss-cross sowing and furrow irrigated raised bed system), and four methods of weed control (unweeded weed free manually, clodinafop@ 60g/ha and sulfo-sulfuron 25g/ha). Treatments were evaluated during winter season of Rabi 2018-19 and 2019-20 at Agricultural Research Form, S. D. J. Post Graduate College chandeshwar Azamgarh U.P. Maximum weed population and dry weight were recorded in broadcasting method of sowing andanother methods of sown crop, while the maximum values were obtained in criss-cross sowing method of wheat. The significantly lowest values were observed in clodinafop@ 60g/ha treated plots. Criss-cross sowing significantly gave maximum grain yield of wheat in the both the years. clodinafop@ 60g/ha were at par with sulfo-sulfuron 25g/ha and significantly higher yield produced weed-free manually treated plots.

Introduction

Due to rapid increase in machnization in agriculture wheat is sown by broad casting or in line sowing18-22 cm apart through seed drill thoughout the country. Criss-cross sowing has also been found very advantageous in suppressing the weed growth in wheat cultivation, due to plant population of crop plants. furrow irrigated raised bed system is another resource of conservation irrigation technology, which saved seed, fertilizers, other tillage preparation cost, irrigation and other inputs.

Weed play important role in deciding the production of any crops, and can enormous damage to wheat crop, the magnitude of this varying with the nature and persistence of weed population. The high fertiliser and irrigation requirement of dwarf wheat favours high intensity of infestation of certain grassy as well as various broad leaved weed species. Effective herbicides are beyond the purchasing under such power of the farmers due to their high cost and non-availability under such circumstances integrated weed control measures can give cheaper and effective comfort of weed. Therefore, there is a need to focus on integrated weed management and succession of weeds in a cropping sequence. Besides Cultural, physical, chemical and biological weed control in wheat crop using plant pathogenesis need to be focused in future. Timely weed

control is an important factor governing the yield of wheat crop. The present investigation was planned to find out the suitable cultural and chemical application practices to suppress weed population and growth under Eastern U.P.

Materials and Methods

An experiment was conducted during live consecutive seasons of 2018-19 and -2019-20 at Research farm of Shri Durga Post Graduate college Chandeshwar, Azamgarh, U.P. The farm is situated geographically at 26°.4' north latitude, 83°.11' east longitude, 92.60 meter above mean sea level in the sub- humid eastern plain zone. The treatments tested in a completely randomized block design (CRBD) with four replications comprised four methods of sowing viz broadcasting, line sowing, criss-cross sowing, and furrow irrigated raised bed system along with four weed control such as un-weeded, weed free manually. clodinafop60g/ha and sulfo-sulfuron 25g/ha, all weed control methods were applied 30 days after sowing Crop wheat-variety (PBW-343) was sown third week of Nov in both years. The soil was sandy loam with average pH 8.6, 0.41% Organic carbon 225 kg/ha available N 13.50kg^{ha} available phosphorus and 130.2kg^{ha} and K_2O. The recommended dose of fertilizer 120kg N, 60kg P_2O_5 and 60kg K_2Okg^{ha} was applied as half amount of N and full amount of P_2O_5 and K_2O as basel at time of sowing and remaining half N in two splits first at after first irrigation and second at before heading stage of crop. All the agronomical practices were applied time to time on experimental field. Soil analysis data presented in Table-1.

Results and Discussion

Important weed species like mono-cot and die-cot recorded in the experimental plots. The weed population/m^2 was found significantly higher under broadcasting method of sowing than other methods of sowing such as line sowing, criss-cross sowing and furrow irrigated raised bed system (Table-2 and 3) weed control treatments were found significantly effective in controlling the weeds in first year. Effective weeds population was recorded with weed free manually than after application of clodinafop 60g/ha it was more effective on weeds.

The Table-2 and 3 clearly indicated that the sowing systems were significantly influenced weeds dry weight (kg/ha) and with the broadcasting system of sowing was produced significantly more weeds dry weight. Over FIRBS, criss-cross sowing and line sowing respectively in both the year. The different weed control practices were significantly influenced the weeds dry weight (kg/ha) and with un-weeded plot was produced significantly weight of weeds, and free practices of weed control was observed dry weight.

The Sowing methods were significantly influenced the grain and show yield (q/ha) and with criss-cross sowing was produced significantly more grain and straw yield. The line sowing and broad-costing sowing were produced at par grain & straw yield but both significantly superior over furrow irrigated raised bed system in both the year.

The above finding were supported various research workers as Chhokar *et.al.* Malik *et.al.* Singh *et.al.* Punia *et.al.* and Mali and Chaudhari(2013).

The sowing methods were Significantly influenced nitrogen phosphorus and potash uptake (Kg/hs) by wheat grain and using criss-cross sowing method was produced significantly the more uptake of N. P.K. Over rest tested sowing method in both the year (Table 4). Different weed control practices on N.P.K by crop the weed free manually was produced significantly more uptake of N.P.K followed by clodinafop propargyl @ 60g/ha, sulfo-sulfuron 25g/ha over un weeded plot. The N.P.K. uptake were significantly increased in weed free manually followed by clodinafop 60 g/ha and sulfo-sulfuron 25 g/ha the over concerned (Table 4). It is increased due to increased the availability of NPK to wheat crop because the weed competition reduced because the weed population controlled by various method of sowing and weed control practices. The finding supported by Pandey & Kumar (2005).

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Table-1. Results of mechanical and chemical analysis of the experimential plots.

Machanical Analysis		
Components	Value	
	2018-19	2019-20
Sand %	52.30	51.92
Silt %	24.15	24.50
Clay %	18.20	18.40
Mousture at field capacity(%)	24.25	23.45
Mousture at permanent wilting point(%)	6.75	7.60
Chemical Analysis		
Organic corbon(%)	0.41	0.42
Available Nitrogen(kg/ha)	226.10	225.11
Available phosphorus(kg/ha)	13.21	14.10
Available potaissium(kg/ha)	131.10	129.68
Electrical conductivity(mm hos/mmat25°c)	0.45	0.43
p^H	8.5	8.9

Table-2 Effects of methods of sowing and weed control of population, and dry weight of weeds.

Treatmens	**Weed Population**										**Dry Weight (kg/ha)**	
	Coronopus didimus		Phalaris minor		Speragula arvensis	Angallis arvensis			Chenopodium album			
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
Methods of sowing Broadcasting	220.25	225.75	18.22	22.85	19.44	20.54	30.41	33.41	74.48	71.51	751.69	790.04
Line sowing	178.75	185.25	16.67	18.85	2.08	2.84	20.42	22.42	49.02	52.73	559.30	590.98
Criss-cross	162.50	173.00	15.47	17.72	8.68	9.60	20.10	23.10	57.98	61.43	554.62	596.77
FIRBS	195.00	204.00	17.40	18.22	10.41	11.47	26.36	28.65	47.11	41.14	625.38	633.27
CD(P=0.05)	18.71	23.41	2.38	2.96	3.20	3.47	4.77	6.34	9.07	15.77	65.90	63.03

Weed Control												
Un-weeded	340.00	352.50	56.05	63.42	17.36	19.11	43.55	46.74	104.57	111.45	1176.39	1242.79
Weed free manually	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clodinotop 60kg/ha	201.75	209.50	6.73	7.72	23.26	25.34	41.35	52.94	67.84	72.05	730.58	722.11
sulfo sulfuron 25 g/ha	214.75	226.00	5.35	6.50.	0.00	0.00	5.21	6.90	52.98	46.37	583.01	598.70
CD(P=0.05)	161.71	23.41	2.38	2.96	3.20	3.47	4.77	6.34	9.07	15.77	65.90	63.03

Table -3 Effects of methods of sowing and weed control on yield attributing and yield of wheat.

Treatmens	**Length of cor (cm)**		**Weight of cor (g)**		**No. of grains/cor**		**Test weight (g)**		**Grain Yield q/ha**		**Strow yield q/ha**	
Methods of sowing	2014-15	2015-16	2014-15	2015-16	2014-15	2015-16	2014-15	2015-16	2018-19	2019-20	2018-19	2019-20
Broadcasting	7.98	7.91	1.54	1.52	39.01	38.68	42.53	42.17	40.14	38.42	61.55	59.69
line sowing	8.02	7.96	1.55	1.53	39.20	38.89	42.73	42.40	41.17	39.38	62.89	60.82
Criss-cross sowing	7.56	7.52	1.46	1.45	36.95	36.75	43.29	40.07	42.72	41.30	63.61	62.23
FIRBS	8.11	8.05	1.57	1.55	39.44	39.34	43.21	42.88	36.52	34.08	60.82	59.05
CD(P=0.05)	0.08	0.07	0.01	0.01	0.92	1.01	0.22	0.36	1.52	1.26	1.77	1.87
Weed Control method												
Un-weeded	7.73	7.68	1.41	1.48	37.77	37.56	41.18	40.94	35.6	34.23	58.90	57.50
Weed free manually	8.18	8.11	1.38	1.56	39.97	39.66	43.57	43.24	42.64	41.07	63.74	61.98
Clodinotop 60kg/ha	7.90	7.84	1.62	1.51	38.59	38.31	42.07	41.76	41.28	31.61	63.34	61.60

sulfo sulfuron 25 g/ha	7.87	7.80	1.52	1.50	38.47	38.14	41.94	41.57	40.17	39.08	62.90	60.71
CD(P=0.05)	0.08	0.07	0.01	0.01	0.92	1.01	0.44	0.36	1.52	1.26	1.77	1.87

Table-4. Effect of method of sowing and weed control on nutrient uptake.

Treatmens	Nitrogen		Phosphorus		Potassium	
Methods of sowing	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
Broadcasting	67.40	64.59	14.19	13.58	12.60	12.14
line sowing	69.21	66.20	14.55	13.92	13.01	12.44
Criss-cross sowing	71.82	69.42	15.10	14.60	13.50	13.05
FIRBS	61.42	58.64	12.91	12.33	11.54	11.02
CD(P=0.05)	2.44	2.38	0.62	0.60	0.55	0.49
Weed Control method	59.97	57.55	12.61	12.10	11.27	10.82
Un-weeded	71.68	69.04	15.07	14.52	13.47	12.98
Weed free manually	69.39	68.59	14.59	14.00	13.04	12.52
Clodinotop 60kg/ha	68.88	65.89	14.48	13.81	12.95	12.35
sulfo sulfuron 25 g/ha	2.44	2.38	0.62	0.60	0.55	0.49
CD(P=0.05)						