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WEEDS INFESTING WHEAT CROP IN ROHTAK, HARYANA

KEY WORDS: wheat, weed, grassy, broad-leaved

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ABSTRACT

Multiple field visits were performed to investigate weed flora of wheat fields in Rohtak district of Haryana, conducted during 2018 which revealed infestation of 28 weed species comprising 15 families of grasses and broadleaf weeds. The weeds were identified with the help of available literature and through comparison with the already identified weed species. *Poa annua*, *Polypogon monspeliensis* and broadleaf weeds *Chenopodium album*, *Rumex retroflex*, *Coronopus didymus* were the pre-dominant weeds in moist region, whereas *Cynodon dactylon*, *Fumaria parviflora*, *Chenopodium album*, *Polypogon monspeliensis* in light soil with low salinity. There was a greater variety of weeds in Bohar and Kharawar villages and the least was found in village Sheria and Garnavati from vegetative to fully grown stage. Maximum number of species were of family Poaceae and Asteraceae. This study will be helpful as an additional tool in maintaining the floristic composition of District Rohtak as well as in controlling the weed problem.

INTRODUCTION

The state of Haryana has a total geographical area of 4.421 million hectare and located between 27°39' to 30°35' N latitude and between 74°28' and 77°36' E longitude. Haryana is primarily an agricultural state in which approximate 70% of its residents are engaged in agriculture where Wheat and Rice are grown chiefly (Goel et al. 1979). Wheat is a Rabi food grains with highest production and harvested area in Haryana which contribution to the national production is 13.3%, with an average productivity of nearly 4 tones/hectare (Yadav 2017). The area, production and productivity over the last five years are almost constant i.e. 2.3 million hectare, 9.3 tones and 4 tones /hectare respectively but weeds are a great threat to wheat cultivation. Weeds sometime also become host for pests but in general they do more harm than benefit and result is loss in the yield of the crop (Khan et al. 2004).

Weeds not only in the field of wheat but mostly all agricultural crops reduce crop yield (Van Heemst 1985) as well compete with crops are; thus like Pandora's box for cultivated arable lands and designed farms. They are seen as a nuisance, an anathema with respect to agricultural practices. Weeds are an integral part of plant society which are famous mostly because of their negative impacts. Weeds are the result of crop domestication (Dekker 2011). Major crops of Rohtak district is wheat, rice and sugarcane. Therefore, in the present study an attempt has been made to focus and compile the type of weeds present in the wheat fields of district Rohtak, Haryana.

MATERIAL AND METHOD

The survey was conducted during months of January, 2018 to March, 2018 in the fields of wheat covering all surrounding villages of District Rohtak, Haryana. Rohtak lies in the eastern zone, where rice-wheat is the main cropping pattern, soils are heavy (clay-loam to loam) (Singh et al. 1985). Soil also comprises of high level of potassium, medium phosphorus and low nitrogen. A total of 18 villages across the district were surveyed. It lies between 28°40' : 29 ° 05' north latitudes and 76° 13' : 76° 51' east longitudes. The district area is occupied by Indo-Gangetic alluvium. The texture of the soils varies from fine to medium which mainly constitutes of sandy loam soil.

Annual rainfall is about 592 mm (Duggal 1970). Jawahar Lal Nehru feeder and Bhalaut sub Branch are main canals of the district.

Location:-

Numerous villages (18) were visited for field work namely- Kharawar, Shimli, Kabulpur, Karontha, Sheria, Madankalan, Dighal (Dhandlan), Sunariya, Kakrana, Garnavati, Sundana, Ballab, Jassia, Chamariya, Bhalot, Bohar, Garhi-Bohar, Rurki. The road map of Haryana state was followed, the fields selected for collection of samples were done with one objective – to cover the main district (Rohtak) area.

Procedure:-

Samples were collected using Quadrate method. Total number of five fields randomly selected per village for the study. The soil in the fields was loamy to sandy and texture did not vary from field to field. Four observations on density of individual weeds were recorded per field at one spot by using quadrate of 0.5 x 0.5 m, the spots inside the field were taken at random. Predominantly three kinds of cropping pattern were seen, namely, Jai-mustard-wheat-barseem in Dhigal, Bhalot, Garhi Bohr etc., Sugarcane-wheat-rice in Sundana, Garnavati, Kakrana etc. and Mustard-wheat-rice in Bhalot, Bohr, Kharawar, Chamariya etc. The farmers were relied on canal irrigation system and not aware about the other patterns of irrigation. Samples were collected and stored using standard techniques. Samples were identified using previously identified flora and known literature.

Fields were visited several times at both vegetative state and reproductive state. It was done to see what type of weeds were early invaders and which was present at all the stages of wheat crop however, no significant differences were observed except *A. ludoviciana* which was more prevailing at vegetative stage.

RESULT AND DISCUSSION

A total of 28 weeds were collected and identified in surveyed villages which are presented in (Table 1). Presence of such diverse weeds is due to different agricultural practices, variations in soil, moisture level, pH, salinity etc. Weeds were classified into two categories namely Grassy and Broadleaf as

described in (Table 1) since sedges were not observed in the visited field.

Table 1- Names of identified weeds and its classification

S. No.	Scientific name	Common name	Family	Grassy /Broad-leaved
1.	<i>Cynodon dactylon</i>	Dhoob	Poaceae	Grassy
2.	<i>Cannabis sativa</i>	Bhang	Cannabaceae	Broad leaved
3.	<i>Fumaria parviflora var. indica</i>	Indian fumitory, gajri	Fumariaceae	Broad leaved
4.	<i>Rumex retroflex</i>	Jungli palak	Polygonaceae	Broad leaved
5.	<i>Coronopus didymus</i>	Swine cress, pitpapra	Brassicaceae	Broad leaved
6.	<i>Anagallis arvensis</i>	Krishmaneel, Scarlet pimpernel	Primulaceae	Broad leaved
7.	<i>Sonchus oleraceus</i>	Sow thistle, Dudhi	Asteraceae	Grassy
8.	<i>Chenopodium album</i>	Bathua	Amaranthaceae	Broad leaved
9.	<i>Chenopodium murale</i>	Nettle leaved goosefoot	Amaranthaceae	Broad leaved
10.	<i>Melilotus indicus</i>	Sweet clover, ban methi	Fabaceae	Broad leaved
11.	<i>Vicia sativa</i>	Common vetch, chatri	Fabaceae	Broad leaved
12.	<i>Trigonella polycerata</i>	Jangli fenugreek, maini	Fabaceae	Broad leaved
13.	<i>Polypogon monspeliensis</i>	Annual beard grass, lomarghas	Poaceae	Grassy
14.	<i>Evolvulus nummularius</i>	Roundleaf bindweed, vishnufranthal	Convolvulaceae	Broad leaved
15.	<i>Malva parviflora</i>	Cheese weed, gogisag	Malvaceae	Broad leaved
16.	<i>Polygonum plebeium</i>	Machechi, knotweed	Polygonaceae	Broad leaved
17.	<i>Artemisia scoparia</i>	Virgate wormwood, redstem wormwood	Asteraceae	Grassy
18.	<i>Spergula arvensis</i>	Corn spurry	Caryophyllaceae	Broad leaved
19.	<i>Conyza sumatrensis</i>	Fleabane	Asteraceae	Broad leaved
20.	<i>Nicotiana plumbaginifolia</i>	Tex-Mex tobacco	Solanaceae	Broad leaved
21.	<i>Poa annua</i>	Meadow grass	Poaceae	Grassy
22.	<i>Cucumis trigonus</i>	Chibberbel	Cucurbitaceae	Broad leaved
23.	<i>Solanum nigrum</i>	Black nightshade	Solanaceae	Broad leaved
24.	<i>Phalaris minor</i>	Canary grass	Poaceae	Grassy
25.	<i>Cirsium arvense</i>	Kateli, creeping thistle	Asteraceae	Broad leaved
26.	<i>Gnaphalium purpureum</i>	Purple cudweed	Asteraceae	Broad leaved

27.	<i>Asphodelus tenuifolius</i>	Pyazi, onion weed	Asphodelaceae	Broad leaved
28.	<i>Avena ludoviciana</i>	Jangli jai, wild oat	Poaceae	Grassy

The documented weeds belong to a diverse flora in which 28 species which belonged to 15 families as given in (Table 1). The diverse occurrence of weeds may be due to differences in cropping pattern, soil moisture, soil type etc. as already explained by (Singh *et al.* 1995). Maximum diversity of weeds (Table 2 & Table 3) was recorded in village Bohar and least in Sheria and Garnavati. Their descending order in type of weed found is as follows- Bohar(12)> Kharawar(11)> Bhalot(8)>Sundana(7)=Shimli(7)>Kabulpur(6)=Ballab(6)=Garhi-bohar= Rurki(6)= Sunariya(6)> Dighal (Dhandlan)(5)=Karontha(5)= Madankalan(5)= Kakrana(5)= Chamariya(5)>Jassia(4)> Sheria(3)= Garnavati(3).

Table 2- Name and number of weeds collected from different locations

S.No	Village	Number (type)	Weed name
1.	Kharawar	11	<i>C. arvense</i> , <i>C. sativa</i> , <i>F. parviflora</i> , <i>R. retroflex</i> , <i>C. didymus</i> , <i>A. arvensis</i> , <i>S. oleraceus</i> , <i>C. album</i> , <i>M. indicus</i> , <i>V. sativa</i> , <i>T. polycerata</i>
2.	Shimli	7	<i>R. retroflex</i> , <i>C. album</i> , <i>P. minor</i> , <i>V. sativa</i> , <i>P. monspeliensis</i> , <i>E. nummularius</i> , <i>M. parviflora</i>
3.	Kabulpur	6	<i>P. minor</i> , <i>C. album</i> , <i>C. trigonus</i> , <i>R. retroflex</i> , <i>V. sativa</i> , <i>S. arvensis</i>
4.	Karontha	5	<i>R. retroflex</i> , <i>A. ludoviciana</i> , <i>C. album</i> , <i>C. dactylon</i> , <i>A. tenuifolius</i>
5.	Sheria	3	<i>R. retroflex</i> , <i>V. sativa</i> , <i>C. album</i>
6.	Madankalan	5	<i>V. sativa</i> , <i>R. retroflex</i> , <i>C. album</i> , <i>N. plumbaginifolia</i> , <i>A. arvensis</i>
7.	Dighal (Dhandlan)	5	<i>S. nigrum</i> , <i>M. indicus</i> , <i>A. scoparia</i> , <i>C. album</i> , <i>R. retroflex</i>
8.	Sunariya	6	<i>P. annua</i> , <i>C. morale</i> , <i>P. minor</i> , <i>C. album</i> , <i>R. retroflex</i> , <i>N. plumbaginifolia</i>
9.	Kakrana	5	<i>P. minor</i> , <i>C. album</i> , <i>R. retroflex</i> , <i>V. sativa</i> , <i>E. nummularius</i>
10.	Garnavati	3	<i>R. retroflex</i> , <i>C. album</i> , <i>A. ludoviciana</i>
11.	Sundana	7	<i>M. parviflora</i> , <i>R. retroflex</i> , <i>N. plumbaginifolia</i> , <i>G. purpureum</i> , <i>C. album</i> , <i>C. didymus</i> , <i>P. monspeliensis</i>
12.	Ballab	6	<i>V. sativa</i> , <i>F. parviflora</i> , <i>R. retroflex</i> , <i>C. album</i> , <i>T. polycerata</i>
13.	Jassia	4	<i>G. purpureum</i> , <i>R. retroflex</i> , <i>C. album</i> , <i>A. tenuifolius</i>
14.	Chamariya	5	<i>P. plebeium</i> , <i>P. monspeliensis</i> , <i>R. retroflex</i> , <i>A. ludoviciana</i> , <i>C. album</i>
15.	Bhalot	8	<i>M. indicus</i> , <i>V. sativa</i> , <i>S. nigrum</i> , <i>C. trigonus</i> , <i>N. plumbaginifolia</i> , <i>C. album</i> , <i>S. arvensis</i> , <i>R. retroflex</i>
16.	Bohar	12	<i>C. album</i> , <i>M. parviflora</i> , <i>T. polycerata</i> , <i>E. nummularius</i> , <i>V. sativa</i> , <i>A. scoparia</i> , <i>R. retroflex</i> , <i>C. didymus</i> , <i>A. arvensis</i> , <i>S. oleraceus</i> , <i>M. indicus</i> , <i>S. arvensis</i>
17.	Garhi-bohar	6	<i>R. retroflex</i> , <i>S. oleraceus</i> , <i>P. annua</i> , <i>C. album</i> , <i>T. polycerata</i> , <i>M. parviflora</i>
18.	Rurki	6	<i>P. minor</i> , <i>C. sumatrensis</i> , <i>C. album</i> , <i>R. retroflex</i> , <i>M. indicus</i> , <i>P. monspeliensis</i>

Table 3- Density, Frequency and Abundance of Weed Species

s.no	Name of Weed Species	Total no. of weeds occurred	Density	Total no. of quadrats in which weed occurred	Frequency	Abundance	Relative density (RD)	Relative frequency (RF)	Relative abundance (RA)	Importance Value Index (IVI)
1.	<i>C. arvense</i>	10	0.03	8	0.02	1.25	0.43	0.86	49.41	50.70
2.	<i>C. sativa</i>	10	0.03	9	0.03	1.11	0.43	0.97	43.87	45.27
3.	<i>F. parviflora</i>	30	0.09	19	0.05	1.57	1.31	2.05	62.06	65.42
4.	<i>R. retroflex</i>	451	1.25	205	0.57	2.20	19.18	22.14	86.96	128.28
5.	<i>C. didymus</i>	64	0.18	21	0.06	3.04	2.72	2.27	120.16	125.15
6.	<i>A. arvensis</i>	61	0.17	23	0.06	2.65	2.59	2.48	104.74	109.82
7.	<i>S. olaraceus</i>	28	0.08	17	0.05	1.64	1.19	1.84	64.82	67.85
8.	<i>C. album</i>	475	1.32	166	0.46	2.86	20.20	17.93	113.04	151.17
9.	<i>M. indicus</i>	118	0.33	38	0.11	3.10	5.02	4.10	122.53	131.65
10.	<i>V. sativa</i>	195	0.54	67	0.19	2.91	8.29	7.24	115.02	130.55
11.	<i>T. polycerata</i>	80	0.22	28	0.08	2.85	3.40	3.02	112.65	119.07
12.	<i>P. minor</i>	158	0.44	46	0.13	3.43	6.72	4.97	135.57	147.26
13.	<i>P. monspeliensis</i>	71	0.20	31	0.09	2.29	3.02	3.35	90.51	96.88
14.	<i>E. nummularius</i>	40	0.11	19	0.05	2.10	1.70	2.05	83.00	86.76
15.	<i>M. parviflora</i>	64	0.18	23	0.06	2.78	2.72	2.48	109.88	115.09
16.	<i>C. trigonus</i>	28	0.08	13	0.04	2.15	1.19	1.40	84.98	87.58
17.	<i>S. arvensis</i>	44	0.12	18	0.05	2.44	1.87	1.94	96.44	100.26

18.	<i>A. tenuifolius</i>	32	0.09	16	0.04	2.00	1.36	1.73	79.05	82.14
19.	<i>A. ludoviciana</i>	107	0.30	34	0.09	3.14	4.55	3.67	124.11	132.33
20.	<i>C. dactylus</i>	30	0.08	9	0.03	3.33	1.28	0.97	131.62	133.87
21.	<i>N. plumbagifolia</i>	71	0.20	28	0.08	2.53	3.02	3.02	100.00	106.04
22.	<i>S. nigrum</i>	16	0.04	11	0.03	1.45	0.68	1.19	57.31	59.18
23.	<i>A. scoparia</i>	35	0.10	14	0.04	2.50	1.49	1.51	98.81	101.81
24.	<i>P. annua</i>	50	0.14	22	0.06	2.27	2.13	2.38	89.72	94.23
25.	<i>C. murale</i>	25	0.07	9	0.03	2.77	1.06	0.97	109.49	111.52
26.	<i>G. purpureum</i>	18	0.05	11	0.03	1.63	0.77	1.19	64.43	66.38
27.	<i>P. plebeium</i>	10	0.03	8	0.02	1.25	0.43	0.86	49.41	50.70
28.	<i>C. sumatrensis</i>	30	0.08	13	0.04	2.30	1.28	1.40	90.91	93.59

It is because of the invasiveness of these weeds and their adaptive nature that has led to the diversity of weeds establishment. In moist regions like Shimli, Sunariya there was increase in number of grassy weeds- *P. minor* and broadleaf weeds *C. album*, *R. retroflex*, and in areas with light soil, salinity and low fertility such as Kharawar, Bohar there was increase in frequency of -*C. album*, *M. indicus*, *R. retroflex*, *C. didymus*, *A. arvensis*, *S. olaraceus*, *V. sativa*, *T. polycerata* etc. which is in quite accordance with previous study (Singh *et al.* 1995). In zero tillage fields there was increase in number of *R. retroflex* and *M. parviflora* which is similar to previous reports (Punia *et al.* 2017).

The village i.e. Chamariya, Garnavati, Karontha etc. where soil type is acidic *A. ludoviciana* was more prevailing (Table 3). In soils with high fertility and saturation, wild oats had suppressing effect on broadleaf weeds. *A. ludoviciana* was found high in number during early growth periods.

P. minor was found in most of the places where rice-wheat cropping system was used with high irrigation. *C. album*, *R. retroflex*, *F. parviflora*, *V. sativa*, *T. polycerata* are the weeds that were present from early stages of sowing to later stages of development. *C. album* and *R. retroflex* were present in most of the fields (Table 3).

It was observed that there was increase in number of broadleaf weeds where there was over indulgence of fertilizers (Bhagwati *et al.*, 1990) and where field were highly dense and showed grid pattern that represented 50-60% less weed biomass as compared to normal practices adopted by the farmer and our results were in accordance with (Weiner *et al.*, 2001).

Despite the precautions taken weeds like to pop up anywhere and everywhere and its presence in a field is a dilemma that every farmer in a field faces. Farmers are not aware of them, in addition to this, farmers seem to have less knowledge about the type of weeds that occur in their fields, their aggressive nature and other properties that helps to decide the proper dosage of fertilizers, herbicides therefore this study will provide a valid document to deal with weeds in the area.

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