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Weed Flora of Potato in North-Eastern Haryana

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ABSTRACT

A survey of weed flora of potato in north-eastern Haryana conducted during 2004-05 revealed that a total of 23 species were found to infest potato fields, out of which three were grassy, 16 broadleaf weeds and only one sedge *Cyperus rotundus*. *C. album, A. arvensis, P .minor, Poa annua, Rumex retroflexus, Melilotus indica, Polypogon monspliensis, Coronopus didymus* and *Medicago denticulata* were the major weeds of potato in all districts. In Panchkula and Ambala *Anagallis arvensis* was the most dominant weed with a relative density of 15.8, 13.6 and 19.64%, respectively, while in Kaithal and Panipat, *Poa annua* dominated weed flora with 48.4 and 35.7% of total weed flora followed by *C.album. Malwa parviflora* a robust dicotyledonous weed, which was considered to be weed of non-cropped areas, has also shown its presence in Kurukshetra and Kaithal districts. **Kharif** weeds *Trianthema portulacastrum* and *Digera arvensis* were found to infest early sown crop in Kurukshetra, while *Portulaca oleracea* was recorded in Kaithal and Panipat districts.

INTRODUCTION

Potato is the major cash crop of north-eastern Haryana grown in an area of 60,000 ha in the state after rice. Crop-weed competition has been established as major deterrent for its low productivity. Potato, being slow growing at early stages of growth, takes more time to attain close canopy and also wider spacing and frequent irrigations provide congenial atmosphere for weeds to grow resulting in 30-50% decrease in tuber yield in different ecological situations (Bourde *et al*., 2001; Singh *et al*., 2002). Crop type and soil properties had greatest influence on the occurrence of weed species (Andreasen *et al.,* 1991). The type of irrigation, cropping pattern, weed control measures and environmental factors had a significant influence on the intensity and infestation of weeds. So, knowledge of weed species associated with crops in a region is necessary for planning an effective weed control programme. The present survey was the first attempt in totality to cover all potato growing districts of Haryana state to study the composition of weed flora of potato crop.

MATERIALS AND METHODS

To study the floristic composition of weeds in potato in Ambala, Kurukshetra, Panipat, Kaithal and Panchkula, 116 fields were surveyed during November and December as this period depicted most appropriate representation of majority of weed species as the weeds have cumulative effects of all agronomic practices, soil type, fertilizer and irrigation application and weed control measures adopted during initial crop growing period. The road map of Haryana state was followed and routes were planned to establish sampling localities as equidistantly as possible (about10 Kms) avoiding inhabited areas. Four observations on density of individual weeds were recorded per field from four fields at one spot by using quadrate of (0.5 x 0.5 m), 100 metre deep inside the fields. Pooled average values (of 16 observations) of weed density and per cent occurrence of individual weeds were thus calculated as given below :

$$\text{Relative density} = \frac{\text{No. of individuals in all quadrates}}{\text{No. of all species in all quadrates}} \times 100$$

$$\text{Per cent occurrence} = \frac{\text{No. of occurrences of a species in a district}}{\text{Total No. of observations recorded in a district}} \times 100$$

RESULTS AND DISCUSSION

In all, 25 weeds were found to infest the crop after 30-50 days after planting. In Panchkula and Ambala, *Anagallis arvensis* was the most dominant weed with a relative density of 20.5 and 37.0%, respectively, while in Kaithal and Panipat, *Poa annua* dominated weed flora with 48.4 and 35.7% of total weed flora followed by *C. album.* In Panchkula district, infestation of *P. minor* and *C. album* was noticed at all locations, whereas in Ambala

Rumex retroflexus, C. album, A. arvensis, Medicago denticulata and *Coronopus didymus* were present in 100% of sites surveyed (Table 1). In district Ambala, *P. minor, C. album, Rumex retroflexus* and *Coronopus didymus* were other important weeds found to infest potato fields.

Infestation of *Chenopodium album, P. minor, Poa annua, Rumex retroflexus, Trianthema*

Table 1. Weed flora of potato in Panchkula and Ambala districts of Haryana

Name of weed	Panchkula			Ambala		
	Weed density/m^2	R. D. (%)	% occurrence	Weed density/m^2	R. D. (%)	% occurrence
P. minor	14.7	12.9	100	24.8	18.9	87
Rumex retroflexus	6.42	5.6	56	11.6	8.9	100
C. album	18	15.8	100	17.9	13.6	100
Melilotus indica	11.2	9.8	100	10.1	7.7	87
Anagallis arvensis	23.8	20.9	86	48.6	37.0	100
Vicia sativa	3.85	3.4	86	2.4	1.8	56
Poa annua	1.0	0.87	77	2.3	1.7	26
Medicago denticulata	5.57	4.9	35	6.4	3.7	100
Polypogon monspliensis	2.14	1.9	68	10.6	8.1	80
Coronopus didymus	4.0	3.5	56	11.5	8.8	100
Fumaria parviflora	13.3	11.6	86	7.2	5.4	76
Stellaria media	3.6	3.1	56	4.9	3.7	60
Veronica persica	6.57	5.8	86	4.3	3.2	66

Table 2. Weed flora of potato in Karnal, Kurukshetra and Panipat districts

Weeds	Kurukshetra (Nov. 3rd week)		Kaithal (Nov. 3rd week)		Panipat (Jan. 1st week)	
	R. D. (%)	% occurrence	R. D. (%)	% occurrence	R. D. (%)	% occurrence
Phalaris minor	15.38	55	1.78	50.0	5.99	33.3
Rumex retroflexus	9.69	60	6.04	87.5	1.32	33.3
Chenopodium album	19.64	60	6.63	62.5	6.29	44.4
Melilotus indica	2.67	45	6.15	100.0	20.32	66.7
Anagallis arvensis	4.71	25	0.47	25.0	4.09	44.4
Vicia sativa	1.60	25	0.12	12.5	0.29	11.1
Poa annua	9.78	30	48.40	75.0	35.67	55.6
Medicago denticulata	1.07	20	6.63	75.0	0.00	0.0
Polypogon monspliensis	3.11	25	8.64	75.0	5.85	44.4
Coronopus didymus	2.13	40	0.00	0.0	2.34	55.6
Fumaria parviflora	0.09	5	0.00	0.0	0.00	0.0
Stellaria media	0.53	15	0.00	0.0	1.32	33.3
Veronica persica	0.00	0	0.24	25.0	0.15	11.1
Malwa parviflora	0.89	25	0.95	25.0	0.00	0.0
Lathyrus aphaca	0.18	5	0.00	0.0	0.00	0.0
Chenopodium murale	0.09	5	0.59	25.0	3.51	33.3
Sisimbrium imbrio	0.00	0	0.00	0.0	0.15	11.1
Spergula arvensis	0.00	0	0.00	0.0	0.15	11.1
Portulaca oleracea	1.24	25	10.89	75.0	4.09	55.6
Trianthema portulacastrum	10.84	35	0.00	0.0	0.00	0.0
Digera arvensis	12.71	25	0.00	0.0	0.00	0.0
Cyprus rotundus	2.84	40	2.49	50.0	6.73	55.6
Parthenium hysterophorus	0.00	10	0.00	0.0	1.75	33.3

portulacastrum and *Digera arvensis* was more as compared to other weeds in Kurukshetra district. In this district, infestation of *Chenopodium album* and *Rumex retroflexus* was at 60% places, *P. minor* at 55% places, *Melilotus indica* at 45% and *Coronopus didymus* at 40% places. In Kaithal, *Poa annua* had the maximum RD (48%) followed by *Trianthema portulacastrum, C. album, M. indica, R. retroflexus*. In this district, *M. indica* had 100% occurrence, followed by *R. retroflexus, P. annua, M. denticulata, Polypogon monspliensis, Portulaca oleracea, C. album, P. minor* and *Cyperus rotundus* having >50% occurrence. In district Panipat, *P. annua* had the highest RD (35%), followed by *M. indica, C. rotundus, C. album, P. minor.* In this district, weeds with >50% occurrence were *M. indica, P. annua, C. didymus, P. oleracea* and *C. rotundus.* (Table 2).

P. minor was second most dominating weed of Ambala and Kurukshetra, while in Kaithal relative density of *P. minor* was only 1.8%. *Parthenium hysterophorus* with a relative density of 1.75% showed its presence only in Panipat district at 33% fields surveyed. A new moisture loving broadleaf weed *Veronica persica* was present in all districts except Kurukshetra. *Malwa parviflora,* a robust dicotyledonous weed, which was considered to be weed of non cropped areas has also shown its presence in Kurukshetra and Kaithal districts. **Kharif** weeds *Trianthema portulacastrum* and *Digera arvensis* were found to infest early sown crop in Kurukshetra, while *P. oleracea* was recorded in Kaithal and Panipat districts. *F. parviflora* broadleaf weed was present in Panchkula, Ambala and Kurukshetra in light textured soils.

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