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DENSITY AND FREQUENCY OF WEEDS IN WHEAT FIELDS OF THE PANJAB PROVINCE (PAKISTAN)

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A survey of weeds endemic to wheat crop was carried out in seventeen districts of the Punjab Province (Pakistan) with a view to determine their density and frequency. It was ascertained that *Asphodelus tenuifolius* Cav. (Piazi) was the most prominent weed in the districts of Jhelum, Campbellpur and Rawalpindi followed by *Carthamus oxyacantha* Bieb. (Pohli). In the other districts *Chenopodium album* L. (Bathu)/*C. murale* L. (Karund) was of most frequent occurrence and formed denser stand than the other weeds.

INTRODUCTION

The cultivated crops are infested with different weed species differing in their competitive ability in various countries of the world. The weeds compete with cultivated crops for water, mineral nutrients, light, space and other growth requirements, adversely affecting the quantity and quality of the produce (Muzik, 1970). Besides, the geographical distribution of plant species depends upon the various climatic and edaphic factors. The altitude, temperature and precipitation are considered to be the most important factors influencing the distribution pattern of weeds.

Though some work on qualitative survey, weed control aspect and weedicide evaluation has been reported by Kashyap (1936), Luthra (1938), Ahmad (1954), Khan (1964), Chaudhary (1969), Chatha (1973), Nasir (1973) and Ansari (1976), but virtually no work has been done on quantitative aspect of weed survey in Pakistan.

The objective of the present study was to determine the density and frequency of common weeds of wheat crop in various districts of the Panjab Province (Pakistan), which is divided into two major ecological regions namely sub-mountainous region and plains. The sub-mountainous region lies between 300—600 meters above sea level and includes Campbellpur, Rawalpindi and Jhelum districts. The culturable area is mainly rainfed. The plains of the Panjab Province are primarily canal irrigated and include Bahawalnagar,

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Bahawalpur, D.G. Khan, Gujranwala, Gujrat, Jhang, Lahore, Lyallpur, Mianwali, Multan, Muzaffargarh, R.Y. Khan, Sahiwal, Sargodha, Sheikhupura and Sialkot districts.

MATERIALS AND METHODS

Seventeen districts in the Punjab Province (Pakistan) were surveyed for weeds in wheat fields. Quadrat method was used to find out the number of weed plants (Pound and Clements 1898). The preliminary survey data revealed that *Asphodelus tenuifolius* Cav. (Piazi), *Carthamus oxyacantha* Bieb. (Pohli) *Chenopodium album* L. (Bathu). *Chenopodium murale* L. (Karund), *Cyperus rotundus* L. (Deela), *Euphorbia helioscopia* L. (Chatri *Dodhak*), and *Sorghum halepense* L. (Baru) were of frequent occurrence in wheat fields of this province. Their density and frequency were calculated separately, while all the remaining weeds were included under the sub-head "Other Weeds", and their density was determined collectively.

Density

The number of sites surveyed in different districts varied from 7 to 11. In each town data was taken from 48 fields covering all the four sides of the town. The number of each weed plant per squaare foot and per square yard was noted by quadrat method. The percentage of each weed per square foot and per square yard was worked out separately from the total number of weed plants found in each district. These two percentages for each weed calculated on the basis of per square foot and per square yard were pooled and their mean was taken to be the final percentage as shown in Table 1.

Frequency

The frequency of each weed was calculated by counting the number of times it occurred out of the total number of quadrats recorded for the district concerned. The percentage of frequency in a district was worked out by the same procedure as used for calculating the density of weeds and is presented in Table II.

RESULTS AND DISCUSSION

Density

It is seen from Table I that the most prominent weed in wheat fields of Jhelum, Campbellpur and Rawalpindi districts was *Asphodelus tenuifolius* Cav. with 38, 25 and 23 per cent density respectively. The second abnoxious weed

in these districts was *Carthamus oxyacantha* Bueb. The density of *Chenopodium* spp. was 12 per cent in Jhelum district while in Campbellpur and Rawalpindi districts it was found to be 5 and 2 per cent respectively.

The population of *Cyperus rotundus* L. was found to be 2 per cent in all the above mentioned three districts while *Eurphobia helioscopia* L. ranged between 2—6 per cent. *Sorghum halepense* L. was recorded more in Rawalpindi district with a density of 3 per cent.

The "Other Weeds" were found distributed in Jhelum, Rawalpindi and Campbellpur districts but their density was minimum (37 per cent) in Jhelum while in the other two districts it was 53 per cent.

Chenopodium album L./*Chenopodium murale* L. gave the maximum density in Muzaffargarh, Sialkot, Sheikhupura, D.G. Khan, Lahore, Bahawalpur, R.Y. Khan, Faisalabad, Gujranwala, Multan, Sargodha, Gujrat and Jhang districts. However, in Muzaffargarh and Sialkot districts its density was 46 per cent, while in Sheikhupura, D.G. Khan, Lahore, Bahawalpur, R.Y. Khan, Faisalabad, Gujranwala, Multan, Sargodha, Gujrat and Jhang districts its density was 44, 40, 40, 37, 35, 31, 26, 26, 26, 21 and 20 per cent respectively. In Bahawalnagar, although, the density of *Chenopodium* spp. was very high (40 per cent), but it stood next to *Asphodelus tenuifolius* Cav. (46 per cent). This variation in distribution pattern can be attributed to the shortage of water supply and cropping scheme being followed in that district.

Asphodelus tenuifolius Cav. and *Cyperus rotundus* L. followed *Chenopodium* spp. *Asphodelus tenuifolius* Cav. stood next to *Chenopodium* in the districts of Bahawalpur, Gujrat, Jhang, Lahore, Faisalabad, Muzaffargarh, Sargodha and Sheikhupura. The density of this weed in these districts ranged between 9 and 19 per cent.

The second position was occupied by *Cyperus rotundus* L. in R.Y. Khan, D.G. Khan, Multan, Sialkot and Gujranwala districts with 17, 14, 14, 11 and 7 per cent density respectively.

The density of *Carthamus oxyacantha* Bueb. was very low in all the above mentioned districts and its maximum density of only 4 per cent was found in Gujrat district.

The population of *Euphorbia helioscopia* L. was below 1 per cent in Bahawalnagar, Bahawalpur, Jhang, Lahore and R.Y. Khan, while it varied

from 1 to 6 per cent in D.G. Khan, Gujranwala, Gujrat, Multan, Sargodha, Sheikhupura, Sialkot, Faisalabad and Muazffargarh districts.

Sorghum halepense L. occurred rarely and its density in most of the districts was recorded to be below 1 per cent.

The density of "Other Weeds" was quite variable in these districts. The minimum density of these weeds was noted in Bahawalnagar (12 per cent), while in all the other districts it ranged between 25—60 per cent with the maximum representation in Gujranwala district.

Frequency

The review of Table 2 reveals that *Chenopodium album* L./*C. murale* L. and *Asphodelus tenuifolius* Cav. were distributed throughout the province of Panjab and were of most frequent occurrence of all the weeds. *Asphodelus tenuifolius* Cav. was found more frequent in Jhelum, Campbellpur and Rawalpindi districts, while *Chenopodium* was more frequently found in wheat fields of the other districts.

Cyperus rotundus L. was also found to be distributed throughout the province with a minimum frequency of 3 per cent in Bahawalnagar and Campbellpur districts and maximum of 21 per cent in R.Y. Khan. The frequency range in the other districts was between 5—18 per cent.

Carthamus oxyacantha Bieb. was observed rarely in the districts of D.G. Khan and Muzaffargarh (1 per cent). In plains as a whole, this weed was not of frequent occurrence as compared to the sub-mountanous region with a maximum frequency of 18 and 42 per cent in these two regions respectively.

Frequency of *Euphorbia helioscopia* ranged between 1—7 per cent in Bahawalnagar, Bahawalpur, Campbellpur, D.G. Khan, Gujranwala, Jhang, Lahore, Faisalabad, Multan, Muzaffargarh, R.Y. Khan and Sheikhupura. It was found to be of more frequent occurrence in Gujrat, Jhelum, Rawalpindi, Sargodha and Sialkot districts with a frequency range between 14—20 per cent.

Sorghum halepense L. was observed rarely in wheat fields of Bahawalnagar, Bahawalpur, D.G. Khan, Gujranwala, Jhang, Jhelum, Multan, Muzaffargarh, R.Y. Khan, Sargodha and Sheikhupura districts. However, frequency of 1-2 per cent was recorded in Campbellpur, Gujrat, Lahore, Faisalabad, and Sialkot. It was only Rawalpindi district in which this weed occurred more frequently, where it was calculated to be 20 per cent.

Table 1. *Pencentage density of weeds in wheat fields of the Punjab Province:*

Weeds/Districts	Bahawalnagar	Bahawalpur	Campbellpur	D. G. Khan	Gujranwala	Gujrat	Jhang	Jhelum	Lahore	Faisalabad	Multan	Muzaffargarh	R. Y. Khan	Rawalpindi	Sargodha	Sheikhupura	Sialkot
Asphodelus tenuifolius Cav.	46	19	25	8	5	19	12	38	13	16	11	18	9	23	10	9	4
Carthamus oxyacantha Bieb.	1	2	13	0	1	4	1	8	2	1	1	0	0	11	1	1	1
Chenopodium album L./*C. murale* L.	40	37	5	40	26	21	20	12	40	31	26	46	35	2	26	44	46
Cyperus rotundus L.	1	10	2	14	7	9	11	2	4	7	14	9	17	2	8	7	11
Euphorbia helioscopia L.	0	0	2	1	1	5	0	3	0	2	1	2	0	6	3	1	6
Sorghum halepense L	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
*"Other Weed"**	12	32	53	37	60	42	56	37	41	43	47	25	39	53	52	38	32

Table 2. *Percentage Frequency of weeds in wheat fields of the Punjab Province*

Asphodelus tenuifolius Cav.	45	30	41	14	12	26	19	48	23	29	24	23	15	36	18	18	8
Carthamus oxyacantha Bieb.	3	11	42	1	4	18	5	20	9	4	3	1	1	39	6	3	3
Chenopodium album L./*C. murale* L.	48	51	7	47	43	42	44	14	59	48	46	59	56	30	47	30	54
Cyperus rotundus L.	3	14	3	17	13	14	14	5	5	10	18	15	21	6	14	10	18
Euphorbia helioscopia L.	1	1	5	2	4	18	2	14	2	7	4	6	1	20	15	2	20
Sorghum halepense L.	0	0	2	0	0	2	0	0	1	1	0	0	0	20	0	0	1

* *Anagallis arvensis* L. (Billi Booti), *Circium arvensis* (L.) Scop. (Laih), *Convolvulus arvensis* L. (Lehli) *Cynodon dactylon* Pers. (Khabbal), *Fumaria indica* (Hausak) Pugsley. (Pit papra) etc.

CONCLUSIONS

It is, therefore, inferred that environmental factors are predominantly responsible for variation in density and frequency of various weeds in wheat fields of the Panjab Province. It is also speculated that factors like temperature, water and crop rotation pattern may influence the distribution pattern of weeds in the wheat crop.

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