WEED DIVERSITY OF WHEAT CROP IN KHAIRPUR DISTRICT, SINDH

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ABSTRACT

The survey of weeds of Wheat crop was carried out in the fields of district Khairpur during 1999-2001. Twenty-four weed species were recorded representing nine families in the 2 X 2 m quadrats. Status of weed species based on their frequency percentage also proposed as assertive, ascendant, average and below average. Furthermore the family importance values (FIV) were used to compare the relative contribution of each taxonomic family to weed species composition.

Key words: Wheat, weed diversity, weed status, FIV.

INTRODUCTION

Wheat (*Triticum aestivum* L.) has an important position in the economy of Pakistan. As compared to advanced wheat growing countries Pakistan has low wheat production. Many factors are responsible for low wheat production, among these factors, the weed management has become a serious peril to wheat productivity as weeds not only reduce yield of crop but also deteriorate quality of the produce in many cases. Holm *et al.* (1979) estimated that there are about 8000 plant species act as weeds. of them only 250 species are important for world agriculture. Such species compete with harvested crops and share in all requirements. According to Anderson (1983) weeds compete with crop mainly for light, nutrients, water and carbon dioxide. The damage caused by weeds through the loss of nutrients and water is major cause of concern to the growers. Schwerzel and Thomas (1971) observed that the weeds consumed three to four times more nitrogen. potassium and magnesium than a weed-free crop.

There are different views about the magnitude of weed losses in Pakistan. According to Qureshi (1982) weeds were responsible for causing up to thirty- percent loss in wheat yield under normal conditions. Gill *et al.* (1979) estimated loss from 15-50 percent. Hepworth (1979) and Shad (1987) reported that yield losses due to weeds were in proximity of 17-25 percent which in terms of wheat grains come to about 2.43 to 3.57 million tonnes annually. Muzik (1970) reported that weeds species cause greater losses than either insects or plant diseases, but unfortunately the capital investment on weed research is relatively much less as compared with the amount spend on insects or plant diseases research.

On the distribution of species Memon (2000) and Memon *et al* (2001) have compiled list of plants species from Wheat and Cotton crops of Khairpur District respectively. Keeping in view such constant threat to wheat crop across the country, the present study was carried out focusing on District Khairpur. This study aims to determine the diversity of weed species, their spectrum. density and frequency in wheat crop of Khairpur. This study will help in provide guidelines for effective weed control programme in wheat

MATERIALS AND METHODS

Twenty five sites/fields of wheat crop were selected from District Khairpur. In this regard Quadrat method (following Pound and Clements 1898) was applied for the collection of data. Five quadrats of 1m² were selected from each site. Percentage of frequency and density was acquired with the help of following formula:

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$$\text{Frequency \%} = \frac{\text{No. of quadrats in which weed species occur}}{\text{Total number of quadrats laid out}} \times 100$$

$$\text{Density \%} = \frac{\text{Total number of individual species in all quadrats}}{\text{Total number of quadrats laid out}}$$

Number of genera and species were also determined. Finally, family importance values (following Mori et al. 1983) were used to compare the relative contribution of each taxonomic family to weed species composition. It was calculated as the sum of the following two variables:

$$\text{Relative Diversity} = \frac{\text{No. of species in family}}{\text{Total number of species}} \times 100$$

$$\text{Relative Density} = \frac{\text{No. of individuals in family}}{\text{Total number of individuals}} \times 100$$

Specimens collected from the fields were pressed and mounted on herbarium sheets. These herbarium sheets are deposited in the herbarium of Shah Abdul Latif University, Khairpur.

RESULTS AND DISCUSSION

In all twenty four species were identified. Of them, six were of monocot group. *Cyperus rotundus* was only species representing family Cyperaceae. Frequency, density and status of all weed species are shown in Table 2.

In addition to recognized different categories of weeds such as Broad Leaf Weeds (BLW), Grassy Weeds (GW) and Sedges Weeds (SW), Memon (2000) determined two more categories of weeds as surpassing one, which are either taller than or somehow equal to actual crop in height, and underneath, which are smaller than the crop. The recorded weeds were assigned in aforementioned categories, which are present in Table 1.

The present statistics revealed a wide range of frequency percentage of all weed taxa from 3.20 to 64.80. Hence, these species were grouped into following four categories based on their frequency:

1. Assertive   Weed species having frequency more than 60%.
2. Ascendant   Weed species having frequency of 50-60%.
3. Average   Weed species having frequency of 30-49%.
4. Below average Weed species having frequency below 30%.

Chenopodium ficifolium, and *Anagallis arvensis* were found most dominant having frequency of 64.80, and 64.00 %, respectively which fall under "Assertive" category. Whereas only single species *Melilotus indica* with 60.00 frequency % comes under "Ascendant" category. *Medicago polymorpha* a densely populated was recorded only from one site. *Spergula arvensis. Spergularia marina* and *S. media* were in mixed population, quite common and dominant weed species of saline soil. These species got a lot of morphological resemblance with each other. Each producing more than 5000 seeds plant[-1]. Their seed maturation takes place before wheat harvesting. Thus they shed their seeds into wheat crop field and are remained in the soil to emerge as a huge population in coming season. Hence, it is a constant peril to wheat. *Chenopodium ficifolium Spergularia marina and S. media* were reported for the first time as weeds. No one documented their occurrence as weed in Pakistan before. Marwat (1993) reported two species emerging as a weed in NWFP, one was *Phragmites australis* which is also found in Khairpur District. The plants of this species attain height of more than 3 meters.

In fact, two parameters i.e. relative diversity and relative density were calculated to show the family importance values (FIV). which depicted the potential diversity among weed species as. presented in Table 3. The most common family in wheat weeds was Papilionaceae having 58.04 FIV. Family Primulaceae, which stood among the top 4 families, contained just one species but was represented by 24.92% of individuals. In marked contrast Poaceae having 5 species and Caryophyllaceae having 4 species accounted for 8.87% and 5.69% of individuals respectively.

In order to assess the size of the families. the number of species to their respective genera was determined which are also indicated in Table 3. It suggested that all the twenty four weed species were belonging to nine families. Family Poaceae was represented by five genera and five species. Papilionaceae with five genera and seven species, Caryophylaceae with 3 genera and four species. whereas Chenopodiaceae was the only family having one genus with three species.

Table 1. Showing surpassing and underneath weeds.

Surpassing			Underneath		
Botanical Name	Vernacular Name	Family Name	Botanical Name	Vernacular Name	Family Name
Sonchus oleraceus	P li Docak	Asteraceae	Spergula arvensis	Hazar Dani	Caryophyaceae
Vaccaria hispanica	-----	Caryophylaceae	Spergularia marina	Hazar Dan	Caryophylaceae
Chenopodium album	Chil	Chenopodiaceae	Spergularia media	Hazar Dani	Caryophyaceae
Chenopodium ficifolium	Chill	Chenopodiaceae	Convolvulus arvensis	Naro	Convolvulaceae
Chenopodium murale	Chil	Chenopodiaceae	Cyperus rotundus	Kabbah	Cyoeraceae
Plypogon fugax	Gidar Puchh	Poaceae	Vicia sativa	Matri	Papilionaceae
Phragmites australis	Narro	Poaceae	Vicia hirsute	Marti	Papilonaceae
Phalaris minor	Nor Puchh	Poaceae	Melilotus indica	Sinjh	Papilionaceae
Avena fatua	Jaww	Poaceae	Melilotus alba	S.njh	Papilionaceae
Rumex dentatus	Jhangl Palak	Polygonaceae	Medicago polymorpha	Luceni	Pap lionaceae
			Lathyrus aphaca	Jhang i Mater	Papilonaceae
			Alhaji maurarum	Kandero	Papilonaceae
			Cynodon dactylon	Chabbar	Poaceae
			Anagallis arvensis	Billi Booti	Primulaceae

Table 2.   Showing frequency, density and status of weeds.

S No	Status	Weed species	Frequency %	Density
1	Assertive	*Chenopodium ficifolium* Sm	64 80	5 09
2	Assertive	*Anagallis arvensis* L	64 00	38.56
3	Ascendant	*Melilotus indica* (L) All	60 00	30 33
4	Average	*Spergula arvensis* L	33 60	27 97
5	Average	*Chenopodium album* L	33 60	1 78
6	Average	*Rumex dentatus* L	32.00	8.74
7	Below average	*Cyperus rotundus* L	28 00	2 46
8	Below average	*Phalaris minor* Retz	25 60	5 13
9	Below average	*Convolvulus arvensis* L	24.80	2 66
10	Below average	*Avena fatua* L	20 80	2 66
11	Below average	*Spergularia media* (L) Prest	20 00	4 02
12	Below average	*Lathyrus aphaca* L	18 40	2 34
13	Below average	*Chenopodium murale* L	17 60	1 94
14	Below average	*Cynodon dactylon* (L) Pers	16 60	3 75
15	Below average	*Spergularia marina* (L) Griseb	16 00	1 90
16	Below average	*Melilotus alba* Desr	12 00	0 59
17	Below average	*Sonchus oleraceous* L	11 20	0 96
18	Below average	*Vicia sativa* L	11 20	0 97
19	Below average	*Phragmites australis* (Cav) Trin ex Steud	10 40	0 81
20	Below average	*Polypogon fugax* Nees ex Steud	8 80	1 38
21	Below average	*Alhaji maurorum* Medic	7 20	0 32
22	Below average	*Vicia hirsute* (L) S F Grey	4 80	0 21
23	Below average	*Medicago polymorpha* L	4 00	9 92
24	Below average	*Vaccaria hispanica* (Miller) Rauschert.	3 20	0.22

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