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QUANTITATIVE STUDIES ON THE WEEDS OF WHEAT FIELDS OF RIWAT AREA, ISLAMABAD

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A study of the weeds of wheat fields of Riwat area, Islamabad, showed the presence of 51 species of which about 84% were dicots, the rest being monocots. The families Asteraceae (7 spp.), Papilionaceae (6 spp.) and Poaceae (6 spp.) contained the largest number of species. On the basis of importance value index the five most dominant weed species were *Convolvulus arvensis, Anagallis arvensis, Fumaria indica, Oxalis corniculata* and *Taraxacum officinale*. Nearly 79% of the species were annual.

Key words: Weed, Wheat, Quantitative, Islamabad.

Introduction

Although a large number of plants are said to behave as weeds, only 250 of these are important for world agriculture [1]. It is estimated that weeds cause a decrease in yield by 10 to 59% which results in an annual loss of Rs. 1144 million in Pakistan (PARC Brochure, 1989). Riwat is situated at the south-eastern corner of Islamabad. It is located at latitude 33° 30'N and longitude 73°22' E. Like other parts of the Potohar plateau agriculture relies solely on rainfall in this area. The vegetation of the study area is of dry subtropical broad leaf forest type [2] and the flora is a mixture of Saharo-Sindian and Himalayan floristic regions [3].

Stewart [4] working on the flora of Rawalpindi district gave sporadic reports of weeds of the area. Hussain [5] conducted a survey of the vegetation of Ayub National Park, Rawalpindi. The same area was studied by Amin and Ashfaque [6] who noted *Acacia modesta, Cannabis sativa, A. modesta-Cynodon dactylon, A. modesta- Lantana camara communities*. Ahmad [7] working on the flora of Islamabad reported 793 dicotyledonous species from the area. Amin *et al.* [8] studied the vegetation and soil of Lohibhar Range, Islamabad. As wheat is the major crop of the area this study was undertaken to make a quantitative assessment of the weeds of this crop.

Materials and Methods

Field trips to the study area were undertaken in March, 1989. Wheat fields were surveyed and sampled for weeds using 100 1 sq. m. quadrats. Weeds were identified with the help of floras and weed manuals [4,7,9,10] and were confirmed by comparing them with specimens lying in Herbaria of (PMNH). Quantitative data was collected to determine parameters like abundance (A), density (D), relative density (RD), cover (C), relatve cover (RC), frequency (F) and relative frequency (RF) after Brower and Zar [11], Pandeya [12], Mueller-Dombois [13] and Greig-Smith [14]. Importance value index [11] was determined as follows:

$$\text{Importance Value Index (IVI)} = \frac{RC + RD + RF}{3}$$

Species diversity index [15] was calculated as SDI = S/N where, S = total number of species encountered and N = total abundance for all species

Results and Discussions

The weeds of wheat fields of Riwat area, Islamabad, were represented by 51 species of which 43 (84.31%) were dicotyledonous and 8 (15.69%) monocotyledonous (Table 1). These were distributed in 22 families and 49 genera. Two families were monocotyledonous, viz. Liliaceae and Poaceae and the rest were dicotyledonous. The maximum number of weed species belonged to the families Asteraceae (7 spp.), Papilionaceae (6 spp.) and Poaceae (6 spp.), followed by Brassicaceae (3 spp.) and Lamiaceae (3 spp.). Two genera *viz. Chenopodium* and *Euphorbia* were represented by 2 weed species each. Rest of the genera had one weed species each.

Anagallis arvensis L. (180), *Fumaria indica* (Hausskn.) H.N. Pugs. (170), *Oxalis corniculata* L. (164), *Asphodelus tenuifolius* Cav. (162) and *Taraxacum officinale* Weber (160) were the five most abundant weed species of the area. Consequently these five species had the highest relative densities. Most of the species had an insignificant relative cover (1.07 or 2.15) except for *Centauria iberica* Trev., *Convolvulus arvensis* L., *Silybum marianum* Gaertn., *Sonchus oleraceus* L. and *Xanthium strumarium* L. which had a RC of 4.30. *Anagallis arvensis* L. (3.05), *Fumaria indica* (Hausskn.) H.N. Pugs. (3.05), *Convolvulus arvensis* L. (2.75), *Oxalis corniculata* L. (2.75) and *Rumex nepalensis* Spreng. (2.75) had the highest relative frequencies.

TABLE 1. QUANTITATIVE VALUES FOR WEEDS OF WHEAT FIELDS OF RIWAT AREA, ISLAMABAD.

S. No.	Name/family	DN	A	D	RD	C	RC	F	RF	IVI
	DICOTYLEDONAE									
	I. Amaranthaceae									
1.	*Amaranthus viridis* L.	A	90	0.90	2.08	0.5	1.07	85	2.60	1.91
	II Apiaceae									
2.	*Torilis leptophylla* (L) Reichb. f.	A	80	0.80	1.85	1.0	2.15	75	2.30	2.10
3.	*Scandix pecten-veneris* L.	A	70	0.70	1.62	0.5	1.07	55	1.68	1.45
	III. Asteraceae									
4.	*Calendula arvensis* L.	A	86	0.86	1.99	1.0	2.15	70	2.13	2.09
5.	*Centaurea iberica* Trev. ex Spreng.	P	74	0.74	1.71	2.0	4.30	70	2.13	2.71
6.	*Conyza canadensis* (L) Cronq.	A	100	1.00	2.31	0.5	1.07	55	1.68	1.68
7.	*Silybium marianum* Gaertn.	P	62	0.62	1.43	2.0	4.30	45	1.37	2.36
8.	*Sonchus oleraceus* L.	A	72	0.72	1.67	2.0	4.30	70	2.13	2.70
9.	*Taraxacum officinale* Weber	A	160	1.60	3.71	1.0	2.15	85	2.60	2.82
10.	*Xanthium strumarium* L.	A	64	0.64	1.48	2.0	4.30	50	1.52	2.43
	IV. Boraginaceae									
11.	*Buglossoides arvensis* (L.) John.	A	48	0.48	1.11	1.0	2.15	45	1.37	1.54
12.	*Trichodesma indicum* (L.) R. Brown	A	54	0.54	1.25	1.0	2.15	35	1.06	1.48
	V. Brassicaceae									
13.	*Brassica rapa* L/ ssp. *Campestris* (L.) Clapham	A	104	1.04	2.41	1.0	2.15	80	2.44	2.33
14.	*Capsella bursa-pastoris* (L.) Medic.	A	120	1.20	2.78	1.0	2.15	80	2.44	2.12
15.	*Coronopus didymus* (L.) Smith	A	142	1.42	3.29	1.0	2.15	85	2.60	2.68
16.	*Sisymbrium irio* L.	A	66	0.66	1.53	4.0	2.15	60	2.60	2.55
	VI. Cannabaceae									
17.	*Cannabis sativa* L.	A	96	0.96	2.22	1.0	2.15	70	2.13	2.16
	VII Caryophyllaceae									
18.	*Silene conoidea* L.	A	52	0.52	1.20	1.0	2.15	50	1.52	1.62
19.	*Stellaria media* (L.) Vill.	A	146	1.46	3.38	0.5	1.07	75	2.30	2.25
	VIII Chenopodiaceae									
20.	*Chenopodium album* L.	A	76	0.76	1.76	1.0	2.15	80	2.44	2.25
21.	*C. murale* L.	A	34	0.34	0.78	0.5	1.07	30	0.91	0.92
	IX. Convolvulaceae									
22.	*Convolvulus arvensis* L.	P	114	1.14	2.64	2.0	4.30	90	2.75	3.32
	X. Euphorbiaceae									
23.	*Euphorbia helioscopia* L.	A	120	1.20	2.78	1.0	2.15	70	2.13	2.35
24.	*E. prostrata* Ait.	A	92	0.92	2.13	0.5	1.07	30	0.01	1.37
	XI. Fumariaceae									
25.	*Fumaria indica* (Hausskn.) H.N. Pugs	A	170	1.70	3.94	1.0	2.15	100	3.05	3.04
	XII. Lamiaceae									
26.	Ajuga bracteosa Wall. ex Benth.	P	42	0.42	0.97	0.5	1.07	40	1.22	1.08
27.	*Lamium amplexicaule* L.	A	46	0.46	1.06	0.5	1.07	45	1.37	1.16
28.	*Salvia moorcroftiana*. Wall. ex Benth	P	62	0.62	1.43	2.0	4.30	85	2.60	2.77
	XIII. Malvaceae									
29.	*Malva parviflora* L.	A	88	0.88	2.04	1.0	2.15	70	2.13	2.10
30.	*Malvastrum coromande lianum* (L) Garcke	A	70	0.70	1.62	0.5	1.07	70	2.13	1.60

(Table 1, Cont.d.)

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XIV. Oxalidaceae									
31. *Oxalis corniculata* L.	A	164	1.64	3.80	1.0	2.15	90	2.75	2.90
XV. Papilionacae									
32. *Crotalaria medicaginea* Lam. var. *medicaginea*	P	30	0.30	0.69	0.5	1.07	30	0.91	0.89
33. *Lathyrus aphaca* L.	A	136	1.36	3.15	1.0	2.15	80	2.44	2.58
34. *Medicago polymorpha* L.	A	130	1.30	3.01	1.0	2.15	75	2.30	2.49
35. *Melilotus indica* (L.) Pall.	A	82	0.82	1.90	0.5	1.07	65	1.99	1.65
36. *Trigonella monantha* C.A. Mey. ssp. *incisa* (Benth.) Ali	A	66	0.66	1.53	0.5	1.07	55	1.68	1.42
37. *Vicia monantha* Retz.	A	92	0.92	2.13	1.0	2.15	75	2.30	2.19
XVI. Polygonaceae									
38. *Polygonum plebeium* L.	P	78	0.78	1.80	0.5	1.07	70	2.13	1.66
39. *Rumex nepalensis* Spreng.	P	108	1.08	2.50	1.0	2.15	90	2.75	2.46
XVII. Primulaceae									
40. *Anagallis arvensis* L.	A	180	1.80	4.17	1.0	2.15	100	3.05	3.12
XVIII. Ranunculaceae									
41. *Ranunculus muricatus* l.	A	40	0.40	0.92	1.0	2.15	30	0.91	1.32
XIX. Scrophulariaceae									
42. *Veronica polita* Fries	A	44	0.44	1.02	0.5	1.07	40	1.22	1.10
XX. Solanaceae									
43. *Solanum nigrum* L.	A	136	1.36	3.15	1.0	2.15	80	2.44	2.58
MONOCOTYLEDONAE									
XXI. Liliaceae									
44. *Asphodelus tenuifolius* Cav.	A	162	1.62	3.75	1.0	2.15	90	2.75	2.26
45. *Tulipa stellata* Hook. f.	P	56	0.56	1.29	0.5	1.07	55	1.68	1.34
XXII. Poaceae									
46. *Avena fatua* L.	A	72	0.72	1.67	0.5	1.07	65	1.99	1.45
47. *Cynodon dactylon* (L.) Pers.	P	88	0.88	2.04	0.5	1.07	45	1.37	1.73
48. *Dichanthium annulatum* (Forssk.) Stapf	P	112	1.12	2.59	0.5	1.07	80	2.44	1.84
49. *Phalaris minor* Retz.	A	84	0.84	1.94	0.5	1.07	60	1.83	1.42
50. *Poa annua* L.	A	42	0.42	0.97	0.5	1.07	30	0.91	0.98
51. *Polypogon fugax* Nees ex Steud.	A	44	0.44	1.02	0.5	1.07	20	0.61	0.85

Abbreviations used: DN = Duration (A = annual, P= perennial), A = Abundance, D = Density, RD - Relative density, C = Cover, RC = Relative cover, F=Frequency, RF = Relative frequency, IVI = Importance value index.

Five species having the highest importance value indices were *Convolvulus arvensis* L. (3.23), *Anagallis arvensis* L. (3.12), *Fumaria indica* (Hausskn). H.N. Pugs. (3.04), *Oxalis corniculata* L. (2.90) and *Taraxacum officinale* Weber (2.82). These were the five dominant weed species of the study area.

Eleven species (21.5%) were perennial and the remaining 40 (78.5%) were annual. *Brassica rapa* L. ssp. *campestris* (L.) Clapham, mustard, cultivated in the adjacent fields were commonly present as an escape. The diversity index of the weed species of the study area was calculated as 0.01.

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