

Pre-harvest Weeds of a Wheat Field at Biratnagar, Nepal

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Abstract

Sixty eight species of weeds belonging to 22 families and 59 genera were recorded from a wheat field at Biratnagar during the pre-harvest condition. Based on species prevalence the dominant weed families were Asteraceae (17 species), Poaceae (13 species) and Fabaceae (6 species). *Anagallis arvensis*, *Crepis japonica*, *Grangea maderaspatana*, *Polygonum plebeium* were abundant and *Fumaria indica*, *Leucas lavandulifolia*, *Rumex dentatus*, *Vicia angustifolia*, *V. hirsuta* and *V. tetrasperma* were common species of weeds.

Key words: Weed flora, dicots, monocots, asteraceae, *Anagallis arvensis*, phenophase

Introduction

Weed interference is a major production constraint in agriculture (Rajbhandari and Joshi, 1998). A survey of the major weeds and their composition in cultivated fields of a particular crop and agro-climatic zone is essential. Wheat (*Triticum aestivum* L., Poaceae) is an important cereal crop of Nepal. Economic weed management measures of wheat field require information on weed species associated with the crop. In view of evolving a sustainable weed control strategy knowledge of their ecology and biology is highly desirable (Bhowmik, 2000).

Weed flora of wheat field in Nepal have been studied by Chaudhary (1979), Devkota (1983), Ranjit (1983), Rajbhandari and Joshi (1998), Rajbhandary and Ojha (1998) and Dangol (2000-2002). Present study aims to communicate the species composition, abundance and phenophase of weeds occurring in a wheat field at Biratnagar.

The study area (35 ha) is located in Biratnagar sub-metropolitan city (Lat 26°22'N Long 87°16'E, Alt. 72 msl) in eastern Terai plain of Nepal. The climate of Biratnagar is tropical and monsoon. There are three distinct seasons viz. summer (March-June), rainy (July-October) and winter (November-February). Soil is alluvial and loamy in texture (sand 40%, silt 40% and clay 20%). The average pH of the soil (0-10 cm depth) is 6.5. The farmland is characterized by periodic cultivation of annual crops, paddy and wheat by rotation. It remains fallow for two months in both winter and summer seasons after harvesting. The land is subjected to grazing during the post harvest durations.

Materials and methods

The study was carried out in March 2013, two weeks before the harvest of wheat. Weeds were identified using standard literature (Hooker, 1872-1897). Nomencl-

Table 1. Occurrence and phenophase of weeds in pre-harvest wheat field.

SN	Species/family	Local name	Phenophase	Occur.
Dicotyledonae				
Acanthaceae				
1.	<i>Hemigraphis hirta</i> (Vahl) T. Ander	-	Veg	++
2.	<i>Rungia pectinata</i> (L.) Nees	-	Fl	++
Amaranthaceae				
3.	<i>Alternanthera paronychioides</i> St.-Hill	-	Veg	+
4.	<i>A. philoxeroides</i> (Mart.) Griseb.	Jaljamboo	Veg	++
5.	<i>A. sessilis</i> (L.) R. Br.	Bhiringi jhaar	Fl	+++
6.	<i>Amaranthus viridis</i> L.	Lunde	Fl	++
Apiaceae				
7.	<i>Centella asiatica</i> (L.) Urb.	Ghodtapre	Veg	++
8.	<i>Hydrocotyle sibthorpioides</i> Lam.	Ghodtapre	Veg	++
Asteraceae				
9.	<i>Ageratum haustonianum</i> Mill.	Ilame jhaar	Fl	++
10.	<i>Bidens sp.</i>	Kuro	Veg	+
11.	<i>Blumea mollis</i> (D. Don) Merr	Gande jhaar	Fl	++
12.	<i>Breea arvensis</i> (L.) Less.	Gaidakande	Fl	++
13.	<i>Centipeda minima</i> (L.) A. Br. and Asch	Hachhiu jhaar	Fl	++
14.	<i>Cotula hemispherica</i> (Roxb.) Wall. ex C.B. Clarke	-	Fl	++
15.	<i>Crepis japonica</i> (L.) Benth.	-	Fr	+++
16.	<i>Eclipta prostrata</i> (L.) L.	Bhringaraj	Fr	++
17.	<i>Gnaphalium polycaulon</i> Pers	Buki jhaar	Fr	+++
18.	<i>Grangea maderaspatana</i> (L.) Poir	Gobre jhaar	Fr	++++
19.	<i>Ixeris polycephala</i> Cass.	Dudhe jhaar	Fl	++
20.	<i>Parthenium hysterophorus</i> L.	Congress jhaar	Fl	++
21.	<i>Senecio sp.</i> Wall	-	Fl	+
22.	<i>Senecio vulgaris</i> L.	-	Veg	++
23.	<i>Sphaeranthus indicus</i> L.	Purpure jhaar	Fl	++
24.	<i>Spilanthes labadicensis</i> A. H. Moore	Purpure jhaar	Veg	++
25.	<i>Xanthium strumarium</i> L.	Bhende kuro	Fl	++
Boraginaceae				
26.	<i>Heliotropium strigosum</i> Wild	Hatisunde	Veg	++
Chenopodiaceae				
27.	<i>Chenopodium album</i> L	Bethe	Veg	++
28.	<i>C. ambrosioides</i> L.	Gande jhaar	Veg	++
Euphorbiaceae				
29.	<i>Croton bonplandianum</i> Baill.	Khursane jhaar	Veg	+++
Fabaceae				
30.	<i>Cassia tora</i> L.	Tapre	Fl	+
31.	<i>C. occidentalis</i> L.	Tapre	Veg	+
32.	<i>Lathyrus aphaca</i> L.	Bankerau	Fr	++
33.	<i>Vicia angustifolia</i> L.	Narkat	Fr	+++
34.	<i>V. hirsuta</i> (L.) S. F. Gray	Kutuli kosa	Fr	+++
35.	<i>V. tetrasperma</i> (L.) Moench	Kutuli kosa	Fr	++
Fumariaceae				
36.	<i>Fumaria indica</i> Pugsley	Banganjar	Fr	+++
Lamiaceae				
37.	<i>Leucas lavandulifolia</i> Smith	Drona puspi	Veg	+++
38.	<i>Salvia plebeia</i> R. Br.	Bantuls i	Fr	++
Meliaceae				

39.	<i>Melilotus alba</i> Medik ex Desr.	-	Fr	++
	Oxalidaceae			
40.	<i>Oxalis corniculata</i> L.	Chariamilo	Veg	++
	Pedaliaceae			
41.	<i>Sesamum indicum</i> (Linn.)	Til	Veg	+
	Polygonaceae			
42.	<i>Polygonum hydropiper</i> L.	Pirre	Veg	++
43.	<i>P. plebeium</i> R. Br.	Sukul jhaar	Fr	++++
44.	<i>Rumex dentatus</i> L.	Banpalungo	Fr	+++
	Primulaceae			
45.	<i>Anagallis arvensis</i> L.	Armale	Fr	++++
	Rubiaceae			
46.	<i>Hedyotis diffusa</i> Wild	Majithe jhaar	Fl	++
	Scrophulariaceae			
47.	<i>Mazus pumilus</i> (Brum. f.) Van Steenis	Malati jhaar	Fl	++
48.	<i>Mecardonia procumbens</i> (Mill.) Small	-	Veg	++
49.	<i>Scoparia dulcis</i> L.	Baghejhaar	Veg	+
	Solanaceae			
50.	<i>Nicotiana plumbaginifolia</i> Viv.	Bansurti	Fl	++
51.	<i>Solanum nigrum</i> L.	Jangalibihi	Fr	++
	Verbenaceae			
52.	<i>Lippia nodiflora</i> (L.) Rich.	Kurkure jhaar	Fl	++
	Monocotyledonae			
	Commelinaceae			
53.	<i>Commelina benghalensis</i> L.	Kanejhaar	Veg	+
	Cyperaceae			
54.	<i>Cyperus rotundus</i> L.	Mothe	Veg	++
55.	<i>Kyllinga brevifolia</i> Rottb.	Mothe	Fl	+++
	Poaceae			
56.	<i>Axonopus compressus</i> (Sw.) P. Beauv.	-	Veg	+
57.	<i>Brachiaria ramosa</i> (L.) Stapf	-	Veg	+
58.	<i>Cynodon dactylon</i> (L.) Pers	Dubo	Fl	+++
59.	<i>Digitaria setigera</i> Roth ex R. and S.	-	Veg	++
60.	<i>Hemarthria compressa</i> (L. f.) R. Br.	Ghode dubo	Veg	++
61.	<i>Lolium temulentum</i> L.	Ghodejai	Fr	+
62.	<i>Oryza sativa</i> L.	Dhan	Veg	+
63.	<i>Paspalum distichum</i> L.	Banso	Seed	++
64.	<i>Phalaris minor</i> var. <i>nepalensis</i> (Trin.) Bor	Ragate jhaar	Fr	++
65.	<i>Polypogon monspeliensis</i> (L.) Desf	-	Veg	++
66.	<i>Setaria pumila</i> (Poiret.)	Ghoge banso	Seed	++
67.	<i>Setaria</i> sp.	Ghoge banso	Seed	++
68.	<i>Sorghum halpense</i> (L.) Pers	-	Seed	++

ature of the plant is based on Hara *et al.* (1978-1982). Herbarium specimens have been deposited in the T.U. Herbarium, Department of Botany, Post Graduate Campus, Tribhuvan University, Biratnagar, Nepal. When a phenophase was noticed in about 10% samples under observation the

phenophase was considered to be initiated and to be in peak when it occurred in more than 80% individuals (Lodhiyal *et al.*, 1998). Occurrence of weed was recorded visually as ++++ (abundant), +++ (frequent), ++ (occasional) and + (scarce).

Results and discussion

Sixty eight weed species belonging to 22 families and 59 genera were collected and identified (Tab. 1). Dicots dominated the weed flora (52 species, 44 genera and 19 families). Based on species prevalence the dominant families were in the order: Asteraceae (17 species) > Poaceae (13 species) > Fabaceae (6 species) > Amaranthaceae (4 species) > Polygonaceae, Scrophulariaceae (3 species). The dominance of these families in the wheat field agrees with the earlier reports (Manandhar, 1978; Dangol, 1987; 2000-2002; Regmi *et al.*, 1986). *Anagallis arvensis*, *Grangea maderaspatana* and *Polygonum plebeium* were abundant weeds. Frequent weeds in the wheat field were *Alternanthera sessilis*, *Crepis japonica*, *Cynodon dactylon*, *Croton bonplandianm*, *Gnaphalium polycaulon*, *Fumaria indica*, *Kyllinga brevifolia* *Leucas lavandulifilia*, *Vicia angustifolia* and *V. hirsuta* (Tab. 1).

Abundant (*A. arvensis*, *C. japonica*, *G. polycaulon* *P. plebeium*) and frequent weed species (*F. indica*, *Leucas lavandulifilia*, *Rumex dentatus*, *Vicia angustifolia*, *V. hirsuta* and *V. tetrasperma*), were recorded in fruiting and seed stage, respectively. *Cynodon dactylon* and *Kyllinga brevifolia* in flowering form were also frequent. In general, weeds recorded in the vegetative phase were occasional and scarce in the pre-harvest wheat field. Dangol (2001) reported top 5 major species (*Anagallis arvensis*, *Chenopodium album*, *Digittaria sanguinalis*, *Oxalis corniculata* and *Polygonum plebeium*) of wheat from Rampur, Chitwan. In terms of dry biomass *Anagallis arvensis*, *Cynodon dactylon*, *Grangea maderaspatana*, *Rumex dentatus* and *Vicia angustifolia* are the major weeds

in the wheat fields at Biratnagar (Niroula *et al.*, 2006). Ability of enormous seed production, variety of seed dormancies, ability to grow and multiply in stressed conditions are the features of their ecological successes (Sen, 2000). A weed of minor status in one region/country may have the potential to become a major or serious pest in a new environment (Yaduraju *et al.*, 2000).

Table 2. Weed families with number of genera and species.

Family	Genus	Species
Dicots		
Acanthaceae	2	2
Amaranthaceae	2	4
Apiaceae	2	2
Asteraceae	16	17
Boraginaceae	1	1
Chenopodiaceae	1	2
Euphorbiaceae	1	1
Fabaceae	3	6
Fumaricaceae	1	1
Lamiaceae	2	2
Meliaceae	1	1
Pedaliaceae	1	1
Oxalidaceae	1	1
Polygonaceae	2	3
Primulaceae	1	1
Rubiaceae	1	1
Scrophulariaceae	3	3
Solanaceae	2	2
Verbenaceae	1	1
Monocots		
Commelinaceae	1	1
Cyperaceae	2	2
Poaceae	12	13
Total	59	68

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