

DIVERSITY IN THE WEED FLORA OF SWABI KHWAR – A WATER BODY IN SWABI DISTRICT KHYBER PAKHTUKHWA PAKISTANIjaz Ahmad^{1*}, Munsif Khan², Wiqar Ahmad³ and Sultan Akber¹[https://doi.org/10.28941/25-3\(2019\)-4](https://doi.org/10.28941/25-3(2019)-4)**ABSTRACT**

A total of 24 species of weeds belonging to 22 genera were collected from the research area. The collected genera were placed in 15 families of angiosperms relating to both dicot and monocot classes. Majority of the families were belonging to dicot while only one family (Poaceae) was the sole representative of monocot. Poaceae had 4 genera and 4 species. Poaceae was closely followed by two dicot families i.e Brassicaceae (Cruciferae) and Polygonaceae each with 3 species. Ranunculaceae, Asteraceae and Euphorbiaceae were represented by two species each. The most important families in terms of species representation were Poaceae (4 genera and 4 species) followed by Brassicaceae and Polygonaceae with 3 genera and 3 species each, Papilionaceae and Apiaceae (2 genera and 2 species each). While, Nyctaginaceae, Verbenaceae, Primulaceae, Euphorbiaceae, Ranunculaceae, Caryophyllaceae, and Amaranthaceae with 1 genus and 1 species each. The present research work is a way forward towards the identification of a weed flora, which could be equally useful for both botanists as well as other plant scientists.

Keywords: Weed distribution, weed diversity, district Swabi, hydrophytes.

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INTRODUCTION

Research area (Swabi Khwar) is located in district Swabi. Swabi Khwar is a small water body which enters into district Swabi from district Bunir of Khyber Pakhtunkhwa province. This water body becomes a part of Indus river merging with it after crossing the motor way (M-1) near Indus River bridge on Motor way. During its course of flow it passes beside different villages of the district Swabi like Saleem Khan, Maneri Bala, Maneri Payan, Swabi Khas, Kala, Dara, Panj-Pir, Zaida, Anbar and Pak-Kia. This water body is quite rich in term of flora especially aquatic weeds and terrestrial weeds on the sides.

Weeds are plants considered as undesirable or out of place which are growing on land, in crop fields adversely affecting them through competition for light, space, nutrients, allelopathy and seed contamination. Even some weeds like *Eichhornia crassipes* are growing in aquatic habitat which can cause eutrophication followed by decomposition and foul smelling of the aquatic habitats especially of ponds and lakes etc. During harvesting of crops like wheat, rapeseed and mustard etc. weeds like *Cirsium arvense* (L) Scop., *Silybium marianum* (Geartn.) and *Carthamus oxycantha* L. which are thorny species become very difficult for the farmers to eradicate them from the crops. Quality of the milk of lactating cattle is highly deteriorated by feeding on some of the weeds like *Coronopus didymus* L. and *Euphorbia helioscopia* L. during grazing. In contrast to these harms there are weeds which can provide fresh fodders to cattle during grazing like *Cynodon dactylon* (L.)

Pers., *Echinochola crus-galli* (L.) Beauv. Weeds like *Cynodon dactylon* (L.) Pers. and *Paspalum distichum* L. are also used as soil binders in eroding soils. Some of the weeds are used in medicines such as *Verbena officinalis* L., *Phyla nodiflora* (L.) Greene., *Plantago lanceolata* L., *Datura inoxia* Mill. and *Calotropis procera* Aiton. Muzlik (1970) reported that weeds cause greater losses than either insects or plant diseases. The allelopathic (Amensilism) actions of weeds affect germination, growth, productivity and distribution of species in natural and cultivated ecosystems. Farmers who practice no weed control get 50% less yield as compared to those who practice weed control (Munir et al. 1987). Hussain and Shah (1978) have observed that weeds not only rob the cultivated plants of their essential food elements but also harbor insects pests and diseases injurious to the crop. Stewart (1972) prepared an animated catalogue to the flora of Pakistan which is the only representative literature covering almost all the plants of Khyber Pakhtunkhwa. Bedunah (1992) has studied the ecology of weeds, grazing wildlife in western wild lands of USA. Khan et al. (2004) have worked on chemical control of weeds in *Glycine max* (L) Merr in Mingora (Swat) Pakistan. Sultan and Nasir (2003) performed two weed surveys of gram fields of District Chakwal. They observed ecological status of different weed communities due to inter specific competition. Khan et al. (2003) have worked on allelopathic effect of *Eucalyptus camaldulensis* Dehnh leaf extract on seed germination and growth of maize. Hassan et al. (2003)

tested the weed dynamics in the rice growing areas in D.I. Khan and Sheikhpura. Khan *et al.* (2004) conducted a survey in district Bannu to collect information about the distribution, management of major Rabi, Kharif crops and parasitic weeds. Khan *et al.* (2004) investigated the population dynamics and management of *Orobanche* species and major Rabi weeds in District Swabi. Marwat *et al.* (2003) studied the efficiency of different herbicides for controlling weeds in onion. Hanif *et al.* (2004) have determined the importance value of weeds of wheat using quadrat method. Studied on weeds in wheat fields of Peshawar (Hussain *et al.*, 1985), Kotli (Malik and Hussain, 1990), Mayar Jandool, Dir (Ayaz *et al.*, 1995), Attock (Shinwari *et al.*, 1990), Chitral (Hussain *et al.*, 2004) and Gojra, Toba Tek Singh (Muhammad *et al.*, 2005) have been reported.

MATERIAL AND METHODS

Research Design

The research area was diverse in terms of fertility as some patches lush green due to deposition of sandy loam by flood in moon soon season and some patches were barren due to soil erosion by flood. Fertile patches are generally provided by different crops and weed flora. Villages included in the research area in Swabi Khawar are Saleem Khan, Maneri Bala, Maneri Payan, Swabi Khas, Kala, Dara, Panj-Pir, Zaida, Anbar and Pak-Kia for the collection of weeds. Collection of plant materials i.e. fresh weeds samples as research materials were collected from various areas of District Swabi, Khyber Pakhtunkhwa Pakistan during the year 2017. Plant specimens were collected along with

extensive field notes including habit, habitat, life form, phenological status, and abundance etc.

Drying and preservation

Soon after collection all specimens were individually covered with paper and properly dried with the help of plant presser under room temperature in an open space. The dried specimens were then mounted on standard herbarium sheets for preservation by adopting the standard method of Judd *et al.* (2002).

Identification

All specimens collected from research area were then subjected to identification. Weed samples were identified with the help of flora of Pakistan (Stewart, 1972; Nasir and Ali, 1971-1995; Nasir and Rafiq, 1995) and for future reference all specimens were submitted to the herbarium of Amir Muhammad Khan Campus Mardan, Khyber Pakhtunkhwa, Pakistan.

RESULTS AND DISCUSSION

There are 22 genera and 24 species which are placed in 14 families in district Swabi (Table-1). Poaceae of monocot emerged as the most dominant family among the 14 families which contained four genera and four species. Dicot group of angiosperms was presented by 13 families, comprising 18 genera and 20 species. The most important families in terms of species representation after Poaceae were Brassicaceae and Polygonaceae having 03 genera and 03 species each. Asteraceae, Ranunculaceae and Euphorbiaceae were recorded with two genera and two species each. Families like Chenopodiaceae, Papilionaceae, Apiaceae, Verbenaceae, Caryophyllaceae, Primulaceae, Papilionaceae and Fumariaceae were represented by one genus and one species each. Many weeds behaved and compete in different ways in

different habitats. The following weeds were more frequent regarding their density and frequency in different villages in the research area where they were reported. In monocots, *Cynodon dactylon* L., *Poa annua* L., *Paspalum distichum* L. and *Setaria viridis* (L.) P. Beauv. while in dicotyledons *Capsella bursa-pastoris* (L.) Medik. and *Euphorbia helioscopia* L. were the most abundant weed species in the research area. Local farmers were also of the opinion that the mentioned weed species were also

a great menace to the wheat crop in the adjacent fields due to their dense occurrence in the area. *Convolvulus arvensis* L. and *Poa annua* L. were the weed species with more density and abundance in district Swabi. Here the crop was dense due to low interspacing which might be a cause for abundance of *Poa annua* L. and *Convolvulus arvensis* L. because these weeds grow in shady places and prefer support for growth (Akhtar and Hussain, 2007).

Table-I. Botanical origin and habitat of weeds in Swabi Khwar (wetland).

S.No	Botanical Origin	Family	Flowering Time	Habitat	Habit	Intens.
1	<i>Paspalum distichum</i> L.	Poaceae	May-June	Aquatic	A	C
2	<i>Poa annua</i> L.	Poaceae	Jan- Feb	Water bank	A	C
3	<i>Arundo donax</i> L.	Poaceae	March	Water bank	B	R
4	<i>Setaria viridis</i> (L.) Beauv	Poaceae	March	Water bank	A	C
5	<i>Coronopus didymus</i> L.	Brassicaceae	Jan-Mar	Waste lands	A	C
6	<i>Sisymbrium irio</i> L.	Brassicaceae	March-April	Waste Lands	A/ B	C
7	<i>Capsella bursa-pastoris</i>	Brassicaceae	March-April	Waste Lands	A/ B	C
8	<i>Polygonum persicaria</i> L.	Polygonaceae	April	Aquatic	A	C
9	<i>Polygonum barbatum</i>	Polygonaceae	April	Aquatic	A	C
10	<i>Rumex dentatus</i> L.	Polygonaceae	March	Aquatic	A	C
11	<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Feb-Apr	Water bank	A	C
12	<i>Ricinus communis</i> L.	Euphorbiaceae	Feb-May	Waste lands	A	C
13	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Feb-Apr	Field	A	C
14	<i>Silybum marianum</i> (L.) Gaertn	Asteraceae	Feb-May	Agri field	A	C

15	<i>Parthenium hysterophorus</i> L.	Asteraceae	Feb-May	Waste lands	A	C
16	<i>Medicago polymorpha</i> L.	Papilionaceae	Mar-April	Water bank	A	C
17	<i>Fumaria indica</i> L.	Papavaraceae	Mar-Apr	Agri Fields	A	C
18	<i>Ranunculus muricatus</i> L.	Ranunculaceae	March	Water bank	A	C
19	<i>Ranunculus sceleratus</i> L.	Ranunculaceae	March	Aquatic	A	R
20	<i>Annagalis arvensis</i> L.	Primulaceae	April	Fields	A	C
21	<i>Cannabis sativa</i> L.	Cannabaceae	May	Water bank	A	C
22	<i>Eichhornia crassipes</i> (Mart) Solms.	Pontederiaceae	August	Aquatic	A	C
23	<i>Silene conoidea</i> L.	Caryophyllaceae	March	Land	A	C
24	<i>Coriandrum sativum</i> L.	Apiaceae				

C*=Common A*= Annual R= Rare Flow= Flowering Int= Intensity

Family Poaceae (Graminae)

Mostly the plants are annual, biennial or perennial herbs or shrubs. Leaves are isobilateral with parallel venation. The inflorescence is somewhat complex. Flowers may be sessile, bracteate, hermaphrodite, or unisexual and zygomorphic. Fruit is caryopsis. Seed is endospermic. The species included in the study area are *Paspalum distichum*, *Arundo donax*, *Poa annua* and *Seteria viridis*.

Family Cruciferae (Brassicaceae)

Coronopus didymus L.

Annual or biennial herbs. Leaves stalked. Flowers minute. Petals white. Fertile stamens usually 2, rarely 4. Valves separating at maturity into 1-seeded achene like nutlets, style very minute. Distribution: Zaida. Period: March-April. Two other species of the family were collected from the research area

Sisymbrium irio and *Capsella bursa-pastoris*

Family Polygonaceae

Rumex dentatus L.

Annual erect 30-60 cm tall with large basal leaves and oblong to linear leaves; Flowers in distinct whorls minute green. Distribution: Throughout the banks of swabi khwar Floral period: March

Polygonum barbatum L.

An annual herbs 2-3 feet high or decumbent below. Stem glabrous or nearly so. Leaves 2-7 inch long sessile or sub-sessile, linear to lanceolate or acuminate or acute, tapering or sometimes rounded at the base, margin and midrib beneath shortly ciliate; strigose. Flowers white; bracts crowded, perianth leaves 1 over 10 inch long, stamens 5-8; Styles always 3, connate below. Distribution: Kia Kabal. Floral Period: May-October. Other species of the family from the area was *Polygonum persicum*.

Family Euphorbiaceae

Annual, erect, glabrous herbs. Leaves alternate on the main stem in whorls above, shortly stalked or not, finally toothed. Involucres in umbellate cymes. Glands 4. Capsule globose, smooth, rounded at the back. Distribution: Maneri Payan. Flowering Period: September-May. Euphorbiaceae was presented by two species in the area *Euphorbia helioscopia* L. and *Ricinus communis*.

Family Asteraceae (Compositae)

Parthenium hysterophorus L.

The plants of this family are mostly annual, biennial or perennial herbs. The leaves are radical, cauline, alternate, simple and possess hairs. Inflorescence of the family may be racemose and corymb. Flowers are pedicellate, actinomorphic, hermaphrodite, complete, and cruciform. Four sepals make polysepalous calyx. Corolla is cruciform and is composed of four petals with cross shaped arrangement. Stamens are 6 with 2 small and 4 large in size. Fruit is siliqua or silicula.

Flowering: June-December
Distribution: Most common in all villages.

Silybium marianum

Milk thistles can grow from 30 to 200 cm (12 to 79 in) tall, and have an overall conical shape. The approximate maximum base diameter is 160 cm (63 in). The stem is grooved and more or less cottony. The largest specimens have hollow stems. The leaves are oblong to lanceolate. They are either lobate or pinnate, with spiny edges. They are hairless, shiny green, with milk-white veins. The flower heads are 4 to 12 cm long and wide, of red-purple colour.

Flowering: April-June
Distribution: Most common in all villages.

Family Ranunculaceae.

Ranunculus muricatus L.

An erect or diffused annual or biennial herbs, glabrous, leaves long-stalked shortly lobed, base round or cuneate. Flowers yellow. Sepals reflexed rather shorter than the petals. Achene in large globose heads, flate, and beak hooked. Distribution: Maneri Payan. Flowering Period: Spring.

Ranunculus sclereta

Convolvulaceae

Convolvulus arvensis

Family Papilionaceae

Medicago polymorpha L.

Plants are annual, herbaceous, climbing and prostrate. Leaves are compound (trifoliate), stipulate, stipules leafy and alternate. Inflorescence racemose. Flower bisexual with five gamosepalous sepals, five petals in which makes polypetalous corolla. Androecium composed of 10 stamens which are diadelphous. Monocarpellary and superior ovary makes gynoeceum. Fruit is spiny or coiled pod.

Papavaraceae

Fumaria indica (Hauskn.) Pugsley

Family Primulaceae

Anagallis arvensis L.

Annual herb, erect or procumbent, 12-30 (-40) cm tall, glabrous, leaves ovate, sessile, entire, opposite, shorter than the peduncles. Flowers solitary on long axillary peduncles, variable in size and color, bluish scarlet or whitish. Capsule about 6 mm across, with single persistent style, many seeded, seed tricho-gonous. Distribution: Maneri Payan. Flowering Period: February - May.

Family Cannabaceae

Cannabis sativa L

Annual herbaceous flowering plant indigenous to eastern Asia but now of cosmopolitan distribution due to widespread cultivation in many countries of the world. It has been

cultivated throughout recorded history, used as a source of industrial fiber, seedoil, food, recreation, religious and spiritual moods and medicine. Each part of the plant is harvested differently, depending on the purpose of its use. Most commonly distributed in all villages on the bank of Swabi Khwar

Pontederiaceae

Eichhornia crassipes (Mart.) Solms

The initial leaves of seedling *Eichhornia crassipes* are elongated and strap-like, but soon develop the familiar spathulate form and, under suitable unshaded conditions, swollen petioles which ensure that, once dislodged, the seedlings will float from the mud into open water. Plants in an un-crowded situation tend to have short, spreading petioles with pronounced swelling, while in a dense stand they are taller, more erect and with little or no swelling of the petioles.

The plant system consists of individual shoots/crowns each with up to 10 expanded leaves arranged spirally (3/8 phyllotaxy) and separated by very short internodes. Leaves consist of petiole (often swollen, 2-5 cm thick) and blade (roughly round, ovoid or kidney-shaped, up to 15 cm across). The

base of the petiole and any subsequent leaf is enclosed in a stipule up to 6 cm long.

Family Caryophyllaceae

Silene conoidea L.

Annual, erect, glandular and pubescent herb. Stem dichotomously branched. Leaves sessile, 3-5 multiplying by 0.4 cm oblong or oblanceolate, spathulate below, lanceolate above, acute and entire. Flowers in terminal panicles and pedicellate. Calyx 2-3 cm, many nerves, glandular, 5-parted. Petals pink, entire emarginated. Stamens 5, style one, stigma 3. Capsule ovoid contracted above, included in the calyx. Distribution: Bank of Swabi Khwar. Flowering Period: February – March.

Family Verbenaceae

Verbena officinale Linn.

It is perennial herb with creeping nature. Roots are arising from nodes which may be glabrous or pubescent. Leaves opposite, spathulate, sub-sessile, toothed towards the rounded apex, peduncles with 1-3 cm long flowering heads. Flowers white or pinkish, 2-lipped. Fruit globose-oblong, glabrous, splitting into 2-1 seeded pyrenes. Distribution: Village Kala. Flowering period: Throughout the year.



Medicago polymorpha



Parthenium hysterosporus



Polygonum persica



Silybium marianum



Ranunculus muricatus



Verbena officinale



Euphorbia helioscopia



Coronopus didyma



Ricinus communis



Coriandrum sativum



Paspalum distichum (Water grass)



Sisymbrium irio



Anagallis arvensis



Poa annua



Ranunculus sceleratus



Eichhornia crassipes



Arundo donax



Cannabis sativa



Rumex crispus



Polygonum hydropiper



Capsela bursa-pastoris



Seteria viridis



Fumaria indica



Silene conoidea

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