

WEED FLORA OF PIR MEHR ALI SHAH ARID AGRICULTURE UNIVERSITY RAWALPINDI: WINTER ASPECT

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ABSTRACT

Weeds inventory survey was conducted in the PMAS-Arid Agriculture University, Rawalpindi campus during October, 2007 to February, 2008. Plant specimens were collected, dried, pressed and mounted on sheet and deposited in the Department of Botany, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi. The status of each taxa was determined by taking frequency percentage. During the survey, a total of 42 weed species belonging to 37 genera and 18 families were identified. Among them, 27 species were dicot and 15 monocot. Poaceae was found to be the most dominant family in the campus that contributed 30.95% followed by Amaranthaceae (14.29%), Euphorbiaceae and Fabaceae (9.52% each). Most of the species recorded were annual (54%), followed by perennial (29%) and biennial (17%). The most common species were *Alternanthera pungens* Linn., *Cannabis sativa* Linn., *Convolvulus arvensis* Linn., *Euphorbia hirta* Linn., *Malvestrum coromendilianum* (Linn.) Garcke, *Oxalis corniculata* Linn., *Parthenium hysterophorus* Linn. and *Tribulus terrestris* Linn.

Key words: Weed, flora, identification, survey, winter

INTRODUCTION

Worldwide there are about 206 weed species important to human beings. Of them, 43% weed species belong to only four families (Haas and Striebig, 1982). Sit *et al.* (2007) reported that dicots were predominant in palm garden. They identified a total of 20 angiospermic families in the study area and among them 17 belonging

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to dicot and 3 to monocots and 5 pteridophytes. Galera and Sudnik (2004) recorded a total of 190 species of vascular plants that had been found as weeds in botanical garden and revealed that botanical gardens were important dispersion centers of alien species.

The extent of plant introduction and some of the naturalized species are rapidly emerging as highly invasive weeds in Australia (Jacob *et al.*, 2002). Thomas and Abraham (1996) recorded major weeds of coconut garden from 19 locations and identified 85 weed species. They determined relative density and frequency for each weed species and summed dominance ratio, which was calculated to express the ecological significance of each species. Sridhara *et al.* (1995) carried out a survey of weed composition of mulberry orchard and reported 25 species from 25 genera and 11 weed species, the dominance order was Asteraceae > Poaceae > Leguminosae > Fabaceae > Amaranthaceae.

A number of research programs are oriented towards modeling crop-weed interaction and garden weeds are ignored. This type of research is very weak in our country. Only sporadic studies have been undertaken in the past in other parts of the world (Holm *et al.*, 1977).

There has been an excellent taxonomic work on the flora of Pakistan, which mostly dealt with systematic classification. Therefore, the weed flora is ignored by scientific community and only some work is reported on the weed flora of different crops of Pakistan (Ayaz *et al.*, 1993; Qureshi and Bhatti, 2001a&b; Qureshi *et al.*, 2001 & 2002; Memon, 2004; Hussain *et al.*, 2004; Jakhar *et al.*, 2005; Mohammad *et al.*, 2005; Naveed and Hussain, 2007).

The lawns and Garden of Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi is infested with many weed species and their management needs proper identification of weeds which could make the management easier. Since, no attention has been paid to the identification of weeds of Parks and Botanical gardens so relevant literature is very scanty from Pakistan. While, there are many studies on the weeds of aforesaid areas across the world (Melendo *et al.*, 1999; Isaiarasu and Ganeson, 2005; Sit *et al.*, 2007). Keeping in view the importance of identification of weed species, the present study was carried out to provide the baseline information about the weeds of the study area. This work will serve as a manual for weed identification and recognizing their diversity in lawn and garden of the campus.

MATERIALS AND METHODS

i. Study Area

Pir Mehr Ali Shah Arid Agriculture University Rawalpindi is situated in North West corner of Punjab, Pakistan. It lies between 33° and 34° north latitude and 72° and 74° east longitude (Anon, 1998). Topography of the area is undulating and regulation depends upon natural precipitation for their survival.

ii. Specimen Collection

Plant specimens were collected during the period of October, 2007 to February, 2008. The area was surveyed regularly once in a month by walking all sides of the campus. Wide ranges of plant specimens were collected. All specimens were dried, pressed and mounted on herbarium sheets.

iii. Identification and Preservation of Specimens

The collected specimens were identified with the help of floras (Stewart, 1972; Nasir and Ali, 1972-1994; Ali and Qaiser, 1995-2007; Nasir and Rafiq, 1995). These were confirmed with the already determined specimens in the Herbarium of Quaid-e-Azam University Islamabad and National Agricultural Research Centre (NARC). The identified specimens were deposited in the Department of Botany, Pir Mehr Ali Shah Arid Agriculture University for record.

iv. Constancy Classes of Species

Through the use of walk through method, frequency of each weed species was determined. For this purpose, at every 10 step, the species touching the toe was observed and frequency percentage was calculated. Based on frequency classes the status of each species was determined.

RESULTS AND DISCUSSION

A total of 42 weed species belonging to 37 genera and 18 families were identified from the lawns and garden of PMAS-AAUR campus (Table-1). Among them, 27 species were dicot and 15 monocot. Poaceae was found to be the most dominant family in the weed flora of the campus that contributed 30.95% followed by Amaranthaceae (14.29%), Euphorbiaceae and Fabaceae (9.52% each) (Fig-1). It was observed that most of the species recorded were annual (54%) followed by perennial (29%) and biennial (17%) (Fig.-2). There are 18 species which were commonly found, whereas 14 species are rare (Table-1). The most common species were *Alternanthera pungens* Linn., *Cannabis sativa* Linn., *Convolvulus*

arvensis Linn., *Euphorbia hirta* Linn., *Malvestrum coromendilianum* (Linn.) Garcke, *Oxalis corniculata* Linn., *Parthenium hysterophorus* Linn. and *Tribulus terrestris* Linn. All weed species were grouped into Monocotyledons and Dicotyledons.

Almost all collected species were found in flowering during the month of October (11 species) followed by November (6 species each) [Table-1]. Most of the weed flora was indigenous with few exceptions like *Parthenium hysterophorus*. This species is an exotic weed infesting a large area at the campus. This is well known weed infesting many countries (Williams & Grovers, 1980). Like other Asteraceous species, it has minute seeds armed with hairy attachment that facilitate its dispersal by wind. Therefore, it is spreading at an alarming pace in various parts of the country (Shah and Khan, 2006). Grassy weeds were mostly present in the campus along with sedge species. Whereas, *Alternanthera pungens*, *Cannabis sativa*, *Malvestrum coromendelianum* and *Tribulus terrestris* were other invasive weeds which were also infesting a large area. These are problematic weeds, which require continuous hoeing and weeding to reduce the competition amongst the desired species. The weed flora also expresses the ecological significance of each species (Thomas and Abraham, 1996).

It was observed that most of the annual species were forming dominance on area and spreading in the large area. The possible reason could be the availability of plentiful moisture during the studied period. Furthermore, the common species found were more competitive due to rapid growth than rest of the species.

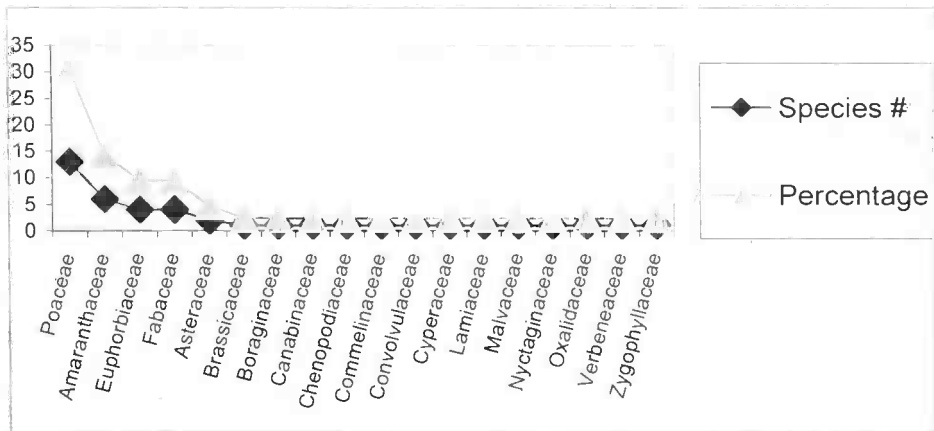


Fig-1. Contribution of families to weeds of campus during winter, 2007.

Table-1. Botanical names, local names, family, status, flowering period, habit and life forms of the weeds of Campus of PMAS-Arid Agriculture University, Rawalpindi.

Botanical Name	Family	Local Name	Status	Flowering/fruiting period	Habit	Life Form
<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Puth Kanda	Common	Sept.- Aug.	Erect	Biennial
<i>Alternanthera pungens</i> Kunth	Amaranthaceae	-	Common	Oct.-Nov.	Prostrate	Annual
<i>A. sessilis</i> (Linn.) DC.	Amaranthaceae	-	Rare	Sept.-Nov.	Prostrate	Annual
<i>Alysicarpus bupleurifolius</i> (Linn.) DC.	Fabaceae	-	Common	Sept.-Oct.	Sub-erect	Annual
<i>Amaranthus viridis</i> Linn.	Amaranthaceae	Cholai	Rare	Aug.- Sep.	Erect	Annual
<i>Boerhavia procumbens</i> Banks ex Roxb	Nyctaginaceae	Itsit	Rare	Sept.-Au g.	Straggler	Biennial
<i>Bracharia reptans</i> (L.) Gard. & C.E. Hubb.	Poaceae	-	Common	June-Oct	Grass	Annual
<i>B. eruciformis</i> (J. E. Smith) Griseb.	Poaceae	-	Frequent	June-Oct.	Grass	Annual
<i>Cannabis sativa</i> Linn.	Cannabaceae	-	Common	Apr.-Oct.	Erect	Perennial
<i>Cenchrus setigerus</i> Vahl.	Poaceae	-	Rare	Aug.-Jan.	Grass	Annual
<i>Chenopodium album</i> Linn.	Chenopodiaceae	Bathu	Frequent	Jan-Sep	Erect	Annual
<i>Chloris barbata</i> Sw.	Poaceae	-	Rare	Apr.-May	Grass	Perennial
<i>Chrysopogon aucheri</i> (Boiss.) Stapf	Poaceae	-	Frequent	March-May	Grass	Perennial
<i>Commelina benghalensis</i> Linn.	Commelinaceae	-	Rare	June-Sept.	Erect	Annual
<i>Convolvulus arvensis</i> Linn	Convolvulaceae	Lehli	Rare	Whole year	Climber	Perennial
<i>Cynodon dactylon</i> (Linn) Pers.	Poaceae	Khabbal Ghas	Common	Whole year	Grass	Perennial
<i>Cynoglossum lanceolatum</i> Forssk.	Boraginaceae	-	Rare	June-Aug.	Erect	Biennial
<i>Cyperus compressus</i> Linn.	Cyperaceae	-	Frequent	July & then Aug.	Sedge	Perennial
<i>Dicliptera roxburghiana</i> Nees	Acanthaceae	-	Rare	June-October	Semi-erect	Annual
<i>Digera muricata</i> (Linn.) Mart	Amaranthaceae	Tar Rara	Common	Sept.-Oct.	Erect	Annual
<i>Digitaria setigera</i> Roth ex Roem. & Schult.	Poaceae	-	Frequent	September	Grass	Annual
<i>Eleusine indica</i> (Linn.) Gaertn.	Poaceae	Mandhani Ghas	Rare	June-Aug.	Grass	Annual
<i>Eragrostis minor</i> Host.	Poaceae	-	Rare	Oct.-Nov.	Grass	Annual
<i>E. cilianensis</i> (All) Lut. ex	Poaceae	-	Rare	Aug.-Jan.	Grass	Annual

Botanical Name	Family	Local Name	Status	Flowering/fruiting period	Habit	Life Form
Hubbard						
<i>Euphorbia granulata</i> Forssk.	Euphorbiaceae	Dudhi Khurd	Common	Whole year	Prostrate	Perennial
<i>E. hirta</i> Linn.	Euphorbiaceae	Dodak	Common	Sept.-Oct.	Erect-decumbent	Annual
<i>E. indica</i> Lam.	Euphorbiaceae	Dudhi Kalan	Common	Oct.-Nov.	Suberect-erect	Annual
<i>E. thymifolia</i> Linn.	Euphorbiaceae	Dudhi Khurd	Rare	Whole year	Prostrate	Perennial
<i>Imperata cylindrica</i> (Linn.) Rauschel.	Poaceae	Dab Ghas	Common	Aug. and then Jan.	Grass	Perennial
<i>Lepeidium apetalum</i> Willd.	Brassicaceae	-	Common	April-June	Erect	Biennial
<i>Leucas cephalotes</i> (Roth) Spreng	Lamiaceae	-	Frequent	Jul.-Oct.	Erect	Annual
<i>Malvastrum coromendelianum</i> (Linn.) Garcke.	Malvaceae	-	Common	Aug.--Jan.	Erect	Annual
<i>Medicago polymorpha</i> Linn.	Fabaceae	Maina	Frequent	March-May	Decumbent	Annual
<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Khati Buti	Frequent	Nov.-Dec.	Prostrate	Biennial
<i>Paspalidium flavidum</i> (Retz.) A. Camus.	Poaceae	-	Frequent	Oct.-Nov.	Grass	Perennial
<i>Parthenium hysterophorus</i> Linn.	Asteraceae	Gandi Buti	Common	June-Nov	Erect	Biennial
<i>Poa annua</i> Linn.	Poaceae	-	Frequent	March-September	Grass	Annual
<i>Rhynchosia minima</i> (Linn) DC.	Fabaceae	-	Rare	Jan.-Mar.	Climber	Perennial
<i>Sonchus asper</i> (Linn.) Hill.	Asteraceae	Dodhak	Common	Feb-Apr	Erect	Biennial
<i>Tribulus terrestris</i> Linn.	Zygophyllaceae	Bhakra	Common	Jul.-Sep.	Decumbent	Annual
<i>Verbena officinalis</i> Linn.	Verbeneaceae	-	Frequent	June-Dec	Erect	Perennial
<i>Vicia sativa</i> Linn.	Fabaceae	Matri	Common	July.-Aug.	Climber	Annual

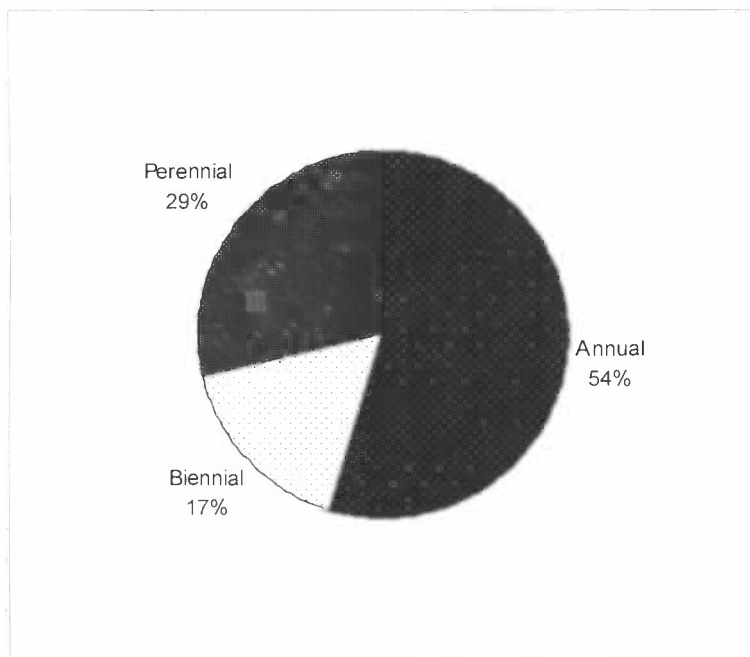


Fig. 2. Life forms percentage of weed flora of the campus.

The floristic enumerations of recorded weed species of the campus were grouped into monocotyledons and dicotyledons. All species were alphabetically arranged and described as under:

MONOCOTYLEDONS

CYPERACEAE

Cyperus compressus Linn., Sp. Pl. 46 (1753); Stewart in Nasir & Ali., Ann. Cat. Vasc. Pl. W. Pak. & Kashm., 87 (1972); Kukkonen in Ali and Qaiser, Fl. Pak; 206: 113 (2001).

Annual, 20cm long. Inflorescence anthelodium. Leaves are greenish grey.

Distribution: Pantropical except Australia extending from India to Pakistan. A common weed found in grassland (Kukkonen, 2001).

POACEAE

Brachiaria reptans (Linn.) Gardner & Hubbard in Hook., Icon. Pl. 34: t. 3363 (1938); Cope in Nasir & Ali., Fl. Pak., 143:205- 207 (1982).

Syn. *Panicum reptans* Linn.; *P. prostratum* Lam.; *Brachiaria prostrata* (Lam.) Griseb.; *Urochloa reptans* (Linn.) Stapf.

Annual, usually with decumbent stems rooting at the nodes; culms 15-60 cm high. Leaf-blades narrowly lanceolate to lanceolate, 2 - 7 cm long, 3 - 15 mm wide.

Distribution: Pakistan (Punjab, Kashmir, N.W.F.P., tropical Asia, introduced throughout the tropics (Cope, 1982).

Brachiaria eruciformis (J. E. Smith) Griseb. In Ledeb., Fl. Ross. 4: 469 (1853); Cope in Nasir & Ali., Fl. Pak., 143:205- 207 (1982).

Syn. *Panicum erucifome* J. E. Smith; *P. isachne* Roth ex Roem. & Schult.; *Brachiaria isachne* (Roth ex Roem. & Schult.) Stapf.

Loosely tufted annual; culms 10-60 cm high, slender, geniculately ascending. Leaf-blades linear to narrowly lanceolate, 2-8 cm long, 2-5 mm wide.

Distribution: Pakistan (Sind, Baluchistan, Punjab, N.W.F.P. & Kashmir; South Africa to the Mediterranean; eastwards to India (Cope, 1982).

Cenchrus setigerus Vahl, Enum. Pl. 2: 395 (1806); Cope in Nasir & Ali., Fl.Pak., 143: 245 (1982).

Syn. *Pennisetum vahlii* Kunth, *nom. superfl.*, based on *C. setigerus*; *C. montanus* Nees ex Royle; *C. bulbifer* Hochst. ex Bois.; *C. uniflorus* Her. ex Boiss.; *C. biflorus* of Hook. f., Fl. Brit. Ind. 7: 89. (1896).

Perennial, forming clumps from a bulbous base; culms 5 – 80 cm height, geniculately ascending. Leaf-blades 2 – 20 cm long, 2 – 7 mm wide.

Distribution: Pakistan (Sindh, Punjab & N. W. F. P); tropical East Africa, through Arabia to India (Cope, 1982).

Chrysopogon aucheri (Boiss.) Stapf in Kew Bull. 1907: 211 (1907); Cope in Nasir & Ali., Fl. Pak., 143: 303 (1982).

Syn. *Andropogon aucheri* Boiss.; *Chrysopogon ciliolatus* (Steud.) Boiss. var. *aucheri* (Boiss.) Boiss.; *Andropogon aucheri* Boiss. var. *subpungens* Hack.; *A. aucheri* Boiss. var. *quinque-plumis* Hack.; *Chrysopogon aucheri* (Boiss.) Stapf. var. *quinque-plumis* (Hack.) Stapf.

Tufted glaucous perennial often with silky villous basal sheaths; culms up to 60 cm high, erect or ascending, slender. Leaf-blades up to 25 cm long, 2 – 4 mm wide.

Distribution: Pakistan (Sind, Baluchistan, Punjab, N. W. F. P. & Kashmir); Egypt, Arabia, Iran, Afghanistan and northern India (Cope, 1982).

Chloris barbata Sw., Fl. Ind. Occ. 1: 200 (1797); Cope in Nasir & Ali., Fl. Pak., 143: 121-123 (1982).

Syn. *Andropogon barbatus* Linn. *nom. illegit*; *Chloris barbata* Link., *C. refuscens* Steud.

Perennial; culms up to 1 m high, loosely tufted, stoloniferous, glabrous below the inflorescence. Leaf-blades flat, rarely involute, up to 40 cm long, 2-3 mm wide.

Distribution: Pakistan (Sindh); widespread throughout the tropics (Cope, 1982).

Cynodon dactylon (Linn) Pers., Syn. Pl. 1: 85, (1805); Cope in Nasir & Ali., Fl. Pak., 143: 117 (1982).

Syn. *Panicum dactylon* Linn., Sp. Pl. 1: 58 (1753); *Cynodon occidentalis* Willd.ex Steud., Nom. Bot., ed. 2, 1:463 (1840); *C. glabratus* Seud., Syn. Pl. Glum. 1: 212 (1854); *Capriola dactylon* (Linn). O. Ktze., Rev. Pl. 2: 764 (1891).

Stoloniferous sward-forming perennial with slender underground rhizomes. Culms slender, up to 40 cm high.

Distribution: Pakistan (Sindh, Baluchistan, Punjab, N.W.F.P. & Kashmir) tropical and warm temperate regions throughout the world (Cope, 1982).

Digitaria setigera Roth ex Roem. & Schult., Syst. Veg. 2: 474 (1817); Cope in Nasir & Ali., Fl. Pak., 143: 226 (1982).

Syn. *Panicum corymbosum* Roxb.; *P. pruriens* Trin.; *P. Microbachne* Presl; *Digitaria pruriens* (Trin) Buse; *Panicum dilatatum* Steud.; *Paspalum sanguinale* (L.) Lam. var. *pruriens* (Trin). Hook. f.; *Digitaria microbachne* (Presl) Henr.

Annual; culms 20-80 cm high, geniculately ascending from a decumbent base. Leaf-blades broadly linear to lanceolate, 3-25 cm long, 3-12 mm wide.

Distribution: Pakistan (Punjab and Kashmir); Tanzania, Mauritius and the Seychelles; throughout Asia to the Pacific Islands (Cope, 1982).

Eleusine indica (Linn) Gaertn., Sem. Pl. 1 : 8 (1788); Cope in Nasir & Ali., Fl. Pak., 143: 103 (1982).

Syn. *Cynosurus indicus* Linn., Sp Pl. I : 72 (1753).

Tufted annual; culms 15 – 85 cm high, erect or geniculately ascending. Leaf-blades usually folded, 5-35 cm long, 2.5 – 6 mm wide.

Distribution: Pakistan (Sindh, N.W.F.P & Kashmir); tropical and subtropical regions throughout the world (Cope, 1982).

Eragrostis minor Host, Gram. Austr. 4:15 (1809); Cope in Nasir & Ali., Fl. Pak., 143: 95 (1982).

Syn. *Poa eragrostis* Linn., Sp. Pl. 1 : 68 (1753); *Eragrostis poaeoides* P Beauv., Ess, Agrost. 162 (1812); based on *poa eragrostis* Linn., Bioss., Fl. or – 5: 580 (1884).

Loosely tufted annual; culms 6 – 60 cm high ascending leaf blades flat, up to 12 cm long and 5 cm wide, mostly glabrous and usually with a row of watery glands along the margin.

Distribution: Pakistan (Sindh, Baluchistan, Punjab, N.W.F.P. Gilgit and Kashmir) warm temperate and subtropical regions of the old world, occasionally found as an introduction in the tropics and the new world (Cope, 1982).

E. cillianensis (All) Lut. ex F. T. Hubbard in Philipp. J. Sci. C., bot. 8: 159 (1913).

Syn. *Briza eragrostis* L. non *Poa eragrostis* L.; *Poa cilianensis* All.; *P. megastachya* Koel.; *Eragrostis major* Host based on *Briza eragrostis* L.

Loosely tufted annual; culms 10-90 cm high, erect or ascending. Leaf-blades flat, up to 15 cm long and 8 mm wide, mostly glabrous and usually with a row of warty glands along the margin.

Distribution: Pakistan (Sindh, Baluchistan, Punjab, N.W.F.P., & Kashmir); tropical and warm temperate regions of the Old World; introduced to the New World (Cope, 1982).

Imperata cylindrica (Linn.) Raeuschel., Nom. Bot., ed. 3, 10 (1797).

Syn. *Lagurus cylindricus* L.; *Saccharum cylindricum* (L.), Encycl. *S. koenigii* Retz., *S. thunbergii* Retz.; *Imperata arundinacea* Cyr.; *I. Allang* Jungh. *I. Koenigii* (Retz.) P. Beauv. var. *major* Nees; *I. Arundinacea* Cyr. var. *africana* Anderss.; *I. Arundinacea* Cyr. var. *europaea* Anderss.

Aggressively rhizomatous perennial, forming tufts of leaves from a scaly rhizome; culms 10-120 cm high, erect.

Distribution: Pakistan (Sindh, Baluchistan, Punjab, N.W.F.P., Gilgit & Kashmir), throughout the Old World tropics, extending to the Mediterranean and the Middle East; also in Chile.

Paspalidium flavidum (Retz) A. Camus in Lecomte, Fl. Gen. Indo-China 7: 419 (1922); Cope in Nasir & Ali., Fl. Pak., 143: 190 (1982).

Syn. *Panicum flavidum* Retz.; *P. brizoides* Jacq.

Tufted perennial; culms 10-120 cm high, erect or ascending from prostrate base. Leaf-blades 8-30 cm long, 4-13 mm wide, flat or folded, blunt at the tip and sometimes hooded.

Distribution: Pakistan (Punjab, N.W.F.P. & Kashmir); tropical Asia.

Poa annua Linn., Sp. Pl. 1:68 (1753); Cope in Nasir & Ali., Fl. Pak., 143: 397 (1982).

Syn. *Poa royleana* Steud.

Tufted annual or short-lived perennial; culms 5-30cm high, erect, spread. erect, spreading or prostrate, sometimes with a creeping base rooting from the nodes.

Distribution: Pakistan (Punjab, N.W.F.P. and Kashmir) cosmopolitan but avoiding deserts and hot climates (Cope, 1982).

DICOTYLEDONS

AMARANTHACEAE

Achyranthes aspera Linn., Sp. Pl. 1:204, (1753); Townsend in Nasir & Ali., Fl. Pak., 71:33-37 (1974).

Annual or sometimes perinating, erect-suberect, upto 90 cm tall, often woody below.

Distribution: Throughout the world in tropical and warmer regions (Townsend, 1974).

Alternanthera pungens Kunth in H.B.K., Nov. Gen. & sp. 2: 206 (1817); Townsed in Nasir and Ali, Fl. Pak., 71: 39 (1974).

Prostrate, mat forming, perennial herb with stout, vertical rootstock, rooting at the lower nodes, much branched from the base.

Distribution: A native of tropical America and now widespread as a

weed of waste ground in tropics, subtropics of both new and old world (Townsend, 1974).

A. sessilis (Linn.) DC. Cat. Hort. Monsp. 77 (1813); Townsed in Nasir and Ali, Fl. Pak., 71: 41 (1974).

Syn. *A. triandra* Lamk.; *Gomphrena sessilis* L.

Annual or usually perennial herb upto 30 cm long. Stem erect and much branched, terete, ascending or commonly prostrate with stem, rooting at the nodes.

Distribution: Widespread in tropics, subtropics of both new and old world, in waste & cultivated ground, especially in damp or wet conditions (Townsend, 1974).

Amaranthus viridis Linn., Sp. Pl. ed. 2, 1405 (1762); Townsed in Nasir and Ali, Fl. Pak., 71: 14-16 (1974).

An annual erect or ascending herb up to 35 cm high. Stem much branched, terete or obtuse-angular, thinly pubescent when young, glabrous at length.

Distribution: The most widely distributed species of the genus, found throughout the tropical regions of the world and further into the temperate regions than most of the tropical species (Townsend, 1974).

Digera muricata (Linn.) Mart. In Nov. Act. Acad. Caes. Leop.- Carol. 13(1): 285 (1826); Townsed in Nasir and Ali, Fl. Pak., 71: 21-23 (1974).

Syn: *Achyranthes muricata* L.; *A. alternifolia* L.; *Digeria arvensis* Forssk; *D. alternifolia* (Linn.) Aschers.

An annual herb up to 65 cm tall. Stem woody below, much branched, erect or ascending; branches spreading, glabrous, pinkish.

Distribution: Widespread in southern Asia from tropical Arabia and the Yemen to Afghanistan, India, Ceylon, Malaysia and Indonesia, S. C. and E. tropical Africa and Madagascar (Townsend, 1974).

ACANTHACEAE

Dicliptera roxburghiana Nees in Wall. Pl. As. Rar.3 III (1832); Malik & Ghafoor in Nasir and Ali, Fl. Pak., 188: 23 (1988).

An erect up to 90 cm much branched herb with hairy twigs, leaves on 4-20 mm long petioles, lamina elliptic ovate to lanceolate.

Distribution: Afghanistan, Pakistan, Nepal, Bhutan, Bangladesh, India to Indo-China and W. China (Malik & Ghafoor, 1988).

ASTERACEAE

Sonchus asper (Linn.) Hill, Herbar. Brit. 1:47 (1769); Stewart in Nasir & Ali., Ann. Cat. Vasc. Pl. W.Pak. & Kashm., 784 (1972).

Syn. *S. oleraceus* Linn. var. *asper* Linn.

Annual or biennial, glabrous, stout, sub-umbellately branched upto 65 cm long. Leaves ca. 20 x 5-7.5 cm in size, lanceolate with rounded basal lobes, semi-amplexicaul.

Distribution: Widespread in cooler climate and many tropical countries (Jafri, 1966).

Parthenium hysterophorus Linn. Sp. Pl. 2: 988 (1753).

Annual erect, deep rooted herb up to 40cm.

Distribution: Central and S. America, Mexico, S. Africa, Australia and India (Stewart, 1972).

BRASSICACEAE

Lepidium apetalum Willd., Sp. Pl. ed. 3:439 (1800); Stewart in Nasir & Ali., Ann. Cat. Vasc. Pl. W.Pak. & Kashm., 318 (1972).

Syn. *L. ruderale* Hk. Anders.

Annual or biennial up to 30cm long, glabrous stem with sparsely hair. Inflorescence is raceme, flowers are minute.

Distribution: Sindh, Swat, Mingora, Hazara, Gilgit, Hunza, Murree (Stewart, 1972).

BORAGINACEAE

Cynoglossum lanceolatum Forssk. Fl. Aegypt.-Arab. 41(1775); Yasin J. Nasir in Nasir & Ali., Fl. Pak., 191: 159 (1989).

Syn. *C. micranthum* Desf.

Biennial or perennial herb upto 120 cm long. Stem branched and much woody at the base, herbaceous above, terete, rigid, hairy.

Flowering period: June-August

Distribution: Africa, Arabia, Pakistan, Kashmir, India, Sri Lanka, Burma, Nepal, Eastward to China, Malaysia (Y.J. Nasir, 1989).

CANNABACEAE

Cannabis sativa Linn., Sp. Pl. 1027(1753): FBI 5. 487 (1888); Qaiser in Nasir & Ali., Fl. Pak., 44: 3 (1973).

Syn: *C. indica* Lamk

Annual herb upto 1.5 m tall. Stem cylinder and branches slightly angular with appressed hairs (dense on younger shoots). Leaves palmately foliolate, petiolate.

Distribution: Russia, China, India, Pakistan, Iran and cultivated elsewhere (Qaiser, 1973).

CHENOPODIACEAE

Chenopodium album Linn., Sp. Pl., 219 (1753); Jafri in Fl.Kar., 95 (1966); Stewart in Ali and Nasir , Ann. Cat. Vasc. Pl. W. Pak. And Kashm., 220 (1972)

Annual, Erect usually 40cm, stem yellowish-green. Uppermost leaves are lanceolate while lower and medium leaves are petiolate.

Distribution: Almost cosmopolitan, Common in subtropical to temperate zones, more infrequent in tropics and colder regions.

COMMELINACEAE

Commelina benghalensis Linn. Sp. Pl. 41 (1753): FBI 6: 370 (1775); Jafri & Qaiser in Nasir and Ali, Fl. Pak, 84: 10-12 (1975).

Erect to prostrate perennial herb, 20-60 cm long, often dichotomously branched from the base, glabrous to pubescent.

Distribution: Tropical and subtropical Asia and Africa (Qaiser & Jafri, 1975).

CONVOLVULACEAE

Convolvulus arvensis Linn., Sp. Pl. 153(1753); Austin & Ghazanfar in Nasir and Ali, Fl. Pak.126: 28-29(1979).

A climbing or prostrate biennial to perennial herb upto 90 cm long. Stem terete, twisting and much branched.

Distribution: Throughout the temperate and tropical regions of the world, except Australia. Very commonly found throughout Pakistan (Austin & Ghazanfar, 1979).

EUPHORBIACEAE

Euphorbia granulata Forssk ., Fl. Aegypt-Arab 94 (1775); Radcliffe-Smith in Nasir & Ali., Fl. Pak., 172: 101 (1986).

Syn: *E. iurcomanica* Boiss.

Rarely densely pubescent to almost glabrous prostrate annual or perennial herb almost 20 cm long. Petiole ca. 0.5 mm long; leaf ovate-oblong, round.

Distribution: From the canary and North Africa to tropical Africa and Eastward to central Asia and Northern India. Common in desert and semi desert by roadsides and in gardens from near sea level to 5000/1525 m (Radcliffe-Smith, 1986).

E. hirta Linn., Sp. Pl. 454 (1753); Radcliffe-Smith in Nasir & Ali., Fl. Pak., 172: 95 (1986).

Syn: *E. pilulifera* Hook. f., *auct non* Linn.

An annual erect to decumbent herb up to 30 cm high. Stem simple or dichotomously branched, clothed with coarsely pilose of yellow, spreading.

Distribution: A pantropical weed; in grassy plots & roadsides and in flooded area near cultivation (Radcliffe-Smith, 1986).

E. indica Lam., Dict. . Bot . 2: 423(1786); Radcliffe-Smith in Nasir & Ali., Fl. Pak., 172: 96 (1986).

Syn . *E. hypericifolia* Hk . f., non Linn.

A decumbent ascending, sub erect or erect Annual herb upto 60 cm long, hairs small, mostly unicellular, white..

Distribution: Africa, Arabia, Iran, Afghanistan, India, China, open roadsides, grasslands, forests, etc (Radcliffe-Smith, 1986).

E. thymifolia Linn., Sp. Pl. 454 (1753; Radcliffe-Smith in Nasir & Ali., Fl. Pak., 172: 95 (1986).

A Prostrate annual herb with stem flattened and puberulous or pubescent and glabrous beneath. Leaf blades ovate, subsacuate to obtuse or rounded.

Distribution: Widespread in tropical Asia and America and introduced in to E. Tropical Asia. .Locally found in Shahdra, Rumil, Subban, Nurpur and Rawal lake (Radcliffe-Smith, 1986).

FABACEAE

Alysicarpus bupleurifolius (Linn.) DC. Prodr.2: 352 (1825); S.I. Ali and Nasir., Fl. Pak., 100:344 (1977).

Syn: *Hedysarum bupleurifolium* L .

An annual, erect herb ca. 30-60 cm long, with a line of hairs on stem. Stipule ca. 6-9 mm long, scarious. Leaf unifoliolate; petiole ca. 1.5-2.5 mm long, petiolule small.

Distribution: Pakistan, India, Burma, Malaysia, China, Philippines, Mauritius, Polynesia (Ali, 1977).

Medicago polymorpha Linn., Sp. Pl. 779 91753); S.I. Ali in Nasir & Ali., Fl. Pak., 100: 302 (1977).

Syn: *M. denticulata* Willd.

Annual somewhat spreading. About 20cm long. Raceme type of inflorescence. flower is yellowish in color.

Distribution: Pakistan, widely distributed throughout the world except tropical region and desert (Ali, 1977).

Rhynchosia minima (Linn) DC., Prodr., 2:385(1825); S. I. Ali and Nasir., Fl. Pak., 100: 231(1977).

Syn. *Dolichos minimus* L.

A perennial, climbing or prostrate herb up to 120 cm long. Stem fairly branched, slender, angular, sulcate, pubescent.

Distribution: Pakistan, India, Ceylon, Lower Burma, Tropical Africa, West Indies, U.S.A. & Australia (Ali, 1977).

Vicia sativa Linn., Sp. Pl. 736 (1753); S. I. Ali in Nasir and Ali .,Fl. Pak., 100: 269 (1977).

Annual, climbing herb, upto 50 cm high.

Flowering Period: July-December

Distribution: Pakistan, Kashmir, India, Russia, Europe and Far East (Ali, 1977).

LAMIACEAE

Leucas cephalotes (Roth) Spreng, Syst. Veg. 2: 743 (1825); Stewart in Nasir and Ali., Ann. Cat. Vas. Pl. W. Pak and Kashm., 615 (1972); Hedge in Nasir & Ali., Fl. Pak., 192: 161 (1990).

Syn. *L. capitata* Desf.; *Phlomis cephalotes* Roth.

An annual erect, slightly branched herb up to 35 cm high. Stems leafy, pubescent with spreading appressed, retrose hairs.

Distribution: East Afghanistan, Pakistan, Kashmir, Assam, Deccan (Hedge, 1990).

MALVACEAE

Malvastrum coromandelianum (Linn.) Garcke in Bonplandia 5: 297 (1857); S. Abdin in Nasir & Ali., Fl. Pak., 130: 89-90 (1979).

Syn: *Malva coromandeliana* L.; *M. carpimfolia* Desr.; *M. tricuspadata* R. Br.; *Malvastrum tricuspadata* (R. Br.) A. Gray.

An erect herb up to 60 cm tall. Stem terete, more or less woody at the base, herbaceous above, much branched, clothed with stellately hairs.

Distribution: Tropical regions of both New and Old World (Abedin, 1979).

NYCTAGINACEAE

Boerhavia procumbens Banks ex Roxb., Fl. Ind. 1: 148 (1820); Nasir in Nasir & Ali., Fl. Pak., 115: 4-6 (1977).

Syn. *B. diffusa* auct. Mult., non Linn.; *B. coccinea* sensu R.R. Stewart.
A perennial diffuse, straggling, puberulous herb up to 70 cm; roots elongated, fusiform tuberous tap root.

Distribution: S. Asia, India and Pakistan (Nasir, 1977).

OXALIDACEAE

Oxalis corniculata L. Sp. Pl. 4351(753); Stewart in Nasir and Ali, Ann. Cat. Vas. Pl. W. Pak and Kashm., 431 (1972).

Syn. *O. villosa* M. Bieb., *O. foliosa* Blatter

A prostrate or creeping herb with many radical leaves, up to 35 cm long. Stem soft, filiform, much branched, rooting at the nodes, greenish, sparsely hairy.

Distribution: A ubiquitous, ruderal, Sindh, Baluchistan, NWFP, Punjab, Chitral, Hunza, Hazar, Kashmir, etc. from the plains to ca. 9000' (Stewart, 1972).

VERBENACEAE

Verbena officinalis Linn., Sp.Pl.20 1753., : FBI I (436); Jafri & Ghafoor in Nasir & Ali., Fl. Pak., 77: 4 (1974).

Erect perennial, 25-100cm tall somewhat woody at base, branched above. Leaves oblong to oblong lanceolate long and broad.

Distribution: Fairly common near water in wastelands and cultivated fields in North and Western parts of Pakistan. Mostly in Europe and Asia, N. Africa introduced in N. America and S. Africa (Jafri & Ghafoor, 1974).

ZYGOPHYLLACEAE

Tribulus terrestris Linn., Sp. Pl. 387 (1753); Ghafoor in Nasir & Ali., Fl. Pak., 76:26 (1974).

Annual hirsute, decumbent herb up to 60 cm long. Stem woody below, herbaceous above, branched, spreading, terete.

Distribution: Tropical and subtropical countries in Asia, Africa, S. Europe, North Australia and introduced in New World tropics (Ghafoor, 1974).

CONCLUSION

This study is based on taxonomic approach of weeds of winter season, which provides a preliminary data of the campus of Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi. It will be helpful to gardeners, students and researchers for identification of plants. Further studies may also be done to check their allelopathic effects on agricultural crops and ornamental plants.

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