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CAMPARATIVE STUDY OF WEED SPECIES RECORDED IN DIFFERENT FIELD CROPS OF BANNU, KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT

Relative density of weeds, found in different fields of cereal crops (wheat, rice and maize) and sugarcane (a cash crop) of District Bannu was determined by using the Oosting scale method during 2013. In this research work, a total of 135 weeds belonging to 37 families were collected, identified botanically, preserved and documented. Results showed that 20 species belonged to Asteraceae which comprised 54% of the whole collected weeds followed by 19 species of Poaceae (51%), eight species each of Solanaceae, Amaranthaceae and Boraginaceae (21%). Seven species were recorded each from Papilionaceae, Euphorbiaceae and Brassicaceae (18.9%), five species from Polygonaceae and Malvaceae (13.5%), four from Chenopodiaceae and three from Plantaginaceae which were 10.8 and 8%, respectively. About 5.4% contribution was made by Asclepiadaceae, Convolvulacea, Caryophyllaceae, Cucurbitaceae, Genetaceae, Apiaceae, and Verbenaceae with two species each. The remaining seventeen families (Aizoaceae, Cyperaceae etc.) were represented by 2.7% with only one species each. There were seven weeds found in all of the above mentioned crops which were Cirsium arvense, Convolvulus arvensis, Conyza bonariensis, Cynodon dactylon, Cyperus rotundus, Parthenium hysterophorus, and Sonchus aspera. According to the Oosting Scale, the very abundant weeds in sugarcane fields were Leptochloa panicea, Enneapogon avrnuceus, E. alba, E. crus-galli and C. dactylon; while abundant weeds were S. halepense, P. hysterophorus, C. rotundus, C. arvense, Carduus argentatus, and A. viridis. Wheat, rice and maize fields were dominated by C. dactylon, C. rotundus, Asphodelus tenuifolius, Astragalus hamosus, C. arvensis, and E. helioscopia.

Key words: Bannu Pakistan, cereal crops, oosting scale, sugarcane, weeds.

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INTRODUCTION

Bannu is a district of Khyber Pakhtunkhwa. Its land is fertile. By the grace of Almighty Allah enough water is available to cultivate these lands. About 45% land is irrigated through canals (Rura canal, Kachkot, Vial Shah, Vial Durana Khan and Vial Ghulam Muhammad) while 10 % people have their own tube wells. The rest of the land (35 %) consists of rain fed area. That's why abundant crops of both summer and winter seasons are harvested each year. The major crop species of district Bannu are *Triticum aestivum* L. (wheat), *Zea mays* L. (maize), *Oryza sativa* L. (rice), *Hordium vulgare* L. (barly) and *Saccharum officinarum* L. (sugarcane).

Weeds are strong competitors and hidden enemies of crops because of their profuse growth under different environmental conditions, hence cause huge losses to crop yields amounting to Rs. 115 to 200 billion annually (Atta and Khaliq, 2002). Likewise, 42-56% decreased yield in cereal crops was reported by Hamid *et al*. (1998). Several studies have been conducted on the density, distribution and frequency percentage of weed species of different crops from different regions. These studies include those of Hussain *et al. (*1985) (Peshawar), Khan *et al.* (2004) (Bannu), Hashim and Marwat (2002) (Abbotabad), Hussain *et al. (*2004) (Chitral), Akhtar and Hussain (2007) (Swat), Wazir *et al. (*2007) (Karak) and Memon *et al.* (2003) (Khairpur). Moreover, Waheed *et al.* (2009), Qureshi *et al.* (2009), Naveed and Hussain (2007), and Mohammad *et al.* (2005) have reported losses due to weeds in other areas of Pakistan. Present research provides an inventory of fully identified challenging weeds of different crops of District Bannu in the crops like Sugarcane *(Saccharum officinarum* L.), Rice (*Oryza sativa* L.), Maize (*Zea mays* L.), and Wheat (*Triticum aestivum* L.) which will help in weed management.

MATERIALS AND METHODS

A large number of field trips were arranged in the year 2013 throughout Bannu district and the target research area was thoroughly scrutinized for each and every weed species infesting the fields of wheat, rice, maize and sugar cane. Specimens collection and preservation was made according to standard protocols. The collected specimens were pressed, dried, and mounted on herbarium sheets and then identified.

The identification was also confirmed using the Flora of Pakistan and other related literature of Khalid (1995), Ali and Fefever (1996), Rubina (1998), Nasir and Ali (1971-2007) and Stewart (1972) were utilized to confirm the identification process. The weed species distribution was calculated by using Oosting (1956) scale on the basis of which the weeds were categorized in five classes (Table-1).

Table-1. Oosting (1956) Scale

S.No	Class	Rarity
1.	Class I	Very Rare
2.	Class II	Rare
3.	Class III	Infrequent
4.	ClassIV	Abundant
5.	Class V	Very abundant

RESULTS AND DISCUSSION

The research work presented was initiated during 2013 to get information and report the relative density of weeds, found in different fields of cereal crops (Wheat, Rice, Maize) and cash crops (sugarcane) of District Bannu. Oosting scale method was used for this purpose. In this research work 135 weed plants belonging to 37 families were collected, identified botanically, preserved and documented. Results showed that that 20 species belonged to Asteraceae which is 54% of the whole collected weeds followed by 19 species in Poaceae (51%), 8 species each of Solanaceae, Amaranthaceae and Boraginaceae (21%). 7 species of each of Papilionaceae, Euphorbiaceae and Brassicaceae (18.9%). 5 species each of Polygonaceae and Malvaceae (13.5%). Chenopodiaceae contribute 4 species while Plantaginaceae 3 species which is 10.8% and 8%, respectively. Moreoverf, 5.4% is contributed by Asclepiadaceae, Convolvulacea, Caryophyllaceae, Cucurbitaceae, Genetaceae, Apiaceae, and Verbenaceae with 2 species each. Aizaaceae, Apocynaceae, Cyperaceae, Fumariaceae, Iridaceae, Lamiaceae, Linaceae, Nycraginaceae, Orchidaceae, Orobanchaceae, Oxalidaceae, Papaveraceae, Primulaceae, Ranunculaceae, Resedaceae, Tiliaceae and Typhaceae were represented by 2.7% with only one species each. The 7 weeds found in all of the above mentioned crops were *Cirsium arvense*, *Convolvulus arvensis, Conyza bonariensis, Cynodon dactylon, Cyperus rotundus, Parthenium hysterophorus,* and *Sonchus asper.*

According to Oosting Scale very abundant (Class V) weeds in sugarcane fields were *Leptochloa panicea, Enneapogon avrnuceus, Eclipta alba, Echinochloa crus-galli* and *Cynodon dactylon* while Abundant (class IV) weeds were *Sorghum halepense, Polygonum barbatum, Phalaris minor, Parthenium hysterophorus, Dichanthium*

annulatum, Eleusine indica, Cyperus rotundus, Oxalis corniculata, Cirsium arvense, Carduus argentatus, Alopecurus nepalensis and *Amaranthus viridis*. Wheat, Rice and Maize fields were dominated by *Cynodon dactylon, Cyperus rotundus, Asphodelus tunifolius, Astragalus hamosus, Convolvulus arvensis, Euphorbia helioscopia*. The weeds happened abundantly in Maize fields were *Aristida cyanantha, Eleusine indica, Leptochloa panacea* and *Tribulus terrestris*.

Table-2. Osting Scale of weeds in sugarcane crop of Bannu Pakistan

Classes	Weed species
V	*Leptochloa panicea, Enneapogon avrnuceus, Eclipta alba, Echinochloa crus-galli* and *Cynodon dactylon*
IV	*Sorghum halepense, Polygonum barbatum, Phalaris minor, Parthenium hysterophorus, Dichanthium annulatum, Eleusine indica, Cyperus rotundus, Oxalis corniculata, Cirsium arvense, Carduus argentatus, Alopecurus nepalensis* and *Amaranthus viridis.*
III	*Xanthium strumarium* L., *Vicia hirsuta, Sonchus aspera, Poa bulbosa* L., *Physalis angulata* L., *Phyllanthus niruri* L., *Phyla nodiflora* Linn., *Melilotus parviflora, Conyza bonariensis, Convolvulus arvensis* L., *Chenopodium murale* L., *C. album* L., *Boerhavia procumbens, Alternanthera sessile, Achyranthes japonica* and *Achyranthes aspera* L.
II	*Portulaca oleracea* L., *Torilis nodosa (*L.*)* Gaertn., *Echinops echinatus* L., *Launaea procumbens, Taraxacum officinale, Galium tricorne* Stokes, B*rassica campestris* L., *Convolvulus spicatus* Hallier F., *Ricinus communis* Linn., *Erythraea ramosissima, Salvia plebeia* R.Br., *Abutilon indicum* (L) Sweet, *Malvastrum coromandelianum, Sida cardifolia* L., *Astragalus hamosus* L., *Plantago lanceolata* L., *Veronica agrestis* L., *Setaria pumila* (Poir.) Poam, *Polygonum plebejum* R.Br., *Anagallis arvensis* L., *Ranunculus muricatus* L., *Nicotiana plumbaginifolia* Viv. *Typha orientallis* C.Presl. and *Verbena officinalis* L.

Table-3. Osting scale of weeds in wheat crop of Bannu, Pakistan

Class V	Class IV	Class III	Class II	Class I
Cynodon dactylon	*Asphadelus tunifolius, Astragalus hamosus, Convolvulus arvensis, Euphorbia oblongata, Euphorbia helioscopia, Psammogeton biternatum, Silene vulgaris Trigonella corniculata*	*Amaranthus viridis, Aristida adscensionis, Atriplex stoksii, Avena fatua, Carduus argentatus,Carthamus persicus, Chenopodium murale, Cirsium arvense, Cyperus rotundus, Datura alba, Euphorbia prostrate, Farsetia jacquemontii, Galium tricrne, Hypecoum pendulum, Lathyrus aphaca, Launaea angustifolia, Malcomia africana, Medicago polymorpha, Melilotus indica, Nonea philistaea, Oligomeris linifolia, Onosma chitralicum, Oxyria digyna, Peganum harmala, Phalaris minor, Plantago lanceolata, Poa bulbosa, Polygonum biaristatum, P. plebejum, Ranunculus muricatus, Rumex dentatus, Sisymbrium irio, Sonchus asper, Solanum surattense, Taraxacum officinale, Tribulus terrestris, Verbena officinalis Vicia hirsute*	*Aerva javanica, Alopecurus nepalensis, Anagallis arvensis, Boerhavia procumbens, Calendula officinalis, Calotropis procera, Citrullus colocynthis, Conyza bonariensis, Cymbopogon distensa, Eragrostis pilosa, Fagonia cretica, Filago pyramidata, Fumaria indica, Heliotropium europaeum, Hyoscyamus niger, Ifloga spicata, Linum corymbulosum, Malva neglecta, Neslia apiculata, Nonea pulla, Parthenium hysterophorus, Plantago ovate, Portulaca oleracea, Setaria pumila, Spergula fallax, Torilis nodosa, Trichosanthes dioica Withania coagulans*	*Alhagi maurorum, Amaranthus blitoides, Aristida cyanantha, Arnebia hispidissima, Brassica tournefortii, Carthamus tinctorus, Celosia argentea, Centaurea iberica, Centaurium pulchellum, Cistanche tubulosa, Convolvulus spicatus, Echinops echinatus, Eruca sativa, Heliotropium strigosum, Nerium indicum, Saccharum arundinaceum Zeuxine strateumatica*

Table-4. Oosting scale of weeds in maize crop of Bannu Pakistan

Class V	Class IV	Class III	Class II
Cynodon dactylon	*Aristida cyanantha, Cyperus rotundus, Eleusine indica, Leptochloa panacea Tribulus terrestris*	*Achyranthes aspera, Aerva javanica, Boerhavia procumbens, Cenchrus ciliaris, Convolvulus arvesis, Conyza bonariensis, Corchorus depressus, Dichanthium annulantum, Digera muricata, Dinebra retroflexa, Echinochloa crus-galli, Eragrostis pilosa, Euphorbia prostrata, Heliotropium europaeum, Lactuca serriola, Malvastrum coromendelianum, Nicotiana plumbajinifolia, Parthenium hysterophorus, Poa botryoides, Portulaca oleracea Sorghum halepense*	*Amaranthus viridis, Atriplex stocksii, Chenopodium murale, Chrozophora plicata, Cirsium arvense, Citrullus coelocynthis, Croton bonplandianus, Datura alba, Euphrobia helioscopia, Galium tricorne, Heliotropium crispum, Irirrs lacteal, Oligomeris linifolia, Oxalis corniculata, Ranunculus muricatus, Solanum surattense, Sonchus asper and Withania somnifera*

Table-5. Oosting scale of weeds in rice crop of Bannu Pakistan

Class V	Class IV	Class III	Class II
Cynodon dactylon Cyperus rotundus	*Achyranthes aspera, Aerva javanica, Conyza bonariensis, Corchorus depressus, Digera muricata, Dinebra retroflexa, Echinochloa crus-galli, Euphorbia prostrata, Iris lacteal, Lactuca serriola, Malvastrum coromendelianum, Parthenium hysterophorus, Poa botryoides, Sorghum halepense*	*Cirsium arvense, Convolvulus arvensis, Datura alba, Dichanthium annulatum, Euphorbia helioscopia, Nicotiana plumbaginifolia, Oligomeris linifolia, Setaria pumila Verbena officinalis*	*Oxalis corniculata, Plantago lanceolata, Sonchus asper and Xanthium strumarium*

Table-6. Comparative study of Oosting (1956) scale of weed species found in different crops of district Bannu, Pakistan

S.NO	Botanical Name	Family	S	M	R	W
	Portulaca oleracea L.	Aizaaceae	II	II	-	II
	Achyranthes aspera L.	Amaranthaceae	III	III	III	-
	Achyranthes bidentata Blume	Amaranthaceae	III	III	-	-
	Aerva javanica (Burm. f.) Juss.	Amaranthaceae	-	III	III	II
	Alternanthera sessiles (L) R.Br.Ex.Dc	Amaranthaceae	III	-	-	-
	Amaranthus blitoides S. Watson	Amaranthaceae	I	-	-	I
	Amaranthus viridis L	Amaranthaceae	IV	II	-	III
	Celosia argentea L.	Amaranthaceae	-	-	-	I
	Digera muricata (L.) Mart	Amaranthaceae	-	III	III	-
	Psammogeton biternatum Edgew.	Apiaceae	-	-	-	IV
	Torilis nodosa (L.) Gaertn.	Apiaceae	II	-	-	II
	Nerium indicum Mill.	Apocynaceae	-	-	-	I
	Calotropis procera (willd.) R. Br.	Asclepiadaceae	-	-	-	II
	Asphadelus tunifolius Car.	Asphodelaceae	I	-	-	IV
	Calendula officinalis L.	Asteraceae	-	-	-	II
	Carduus argentatus L.	Asteraceae	IV	-	-	III
	Carthamus persicus Willd	Asteraceae	-	-	-	III
	Carthamus tinctorus L.	Asteraceae	-	-	-	I
	Centaurea iberica Spreng.	Asteraceae	-		-	I
	Cirsium arvense (L) Scop	Asteraceae	IV	II	II	III
	Conyza bonariensis (L.) Cronquist	Asteraceae	III	III	III	II
	Echinops echinatus L.	Asteraceae	II	-	-	I
	Eclipta alba (L.) Hassk.	Asteraceae	V	-	-	-
	Eleusine indica (L) Gaertn	Asteraceae	IV	IV	-	-
	Filago pyramidata L.	Asteraceae	-	-	-	II
	Helianthus annus L.	Asteraceae	I	-	-	-

Ifloga spicata Forssk.	Asteraceae	-	-	-	II
Lactuca serriola L.	Asteraceae	-	III	III	-
Launaea angustifolia (Desf.) Kuntze	Asteraceae	-	-	-	III
Launaea procumbens Pravin Kawale	Asteraceae	II	-	-	III
Parthenium hysterophorus L.	Asteraceae	IV	III	III	II
Sonchus asper (L.) Hill	Asteraceae	III	II	I	III
Taraxacum officinale F.H Wiggers	Asteraceae	II	-	-	III
Xanthium strumarium L.	Asteraceae	III		I	-
Arnebia hispidissima (Lehm.) A. DC.	Boraginaceae	-	-	-	I
Galium tricorne Stokes	Boraginaceae	II	II	-	III
Heliotropium crispum Desf.	Boraginaceae	-	II	-	-
Heliotropium europaeum (F. & M.) Kazmi	Boraginaceae	-	III	-	II
Heliotropium strigosum Willd.	Boraginaceae	-	-	-	I
Nonea philistaea Boiss.	Boraginaceae	-	-	-	III
Nonea pulla (L.) DC.	Boraginaceae	-	-	-	II
Onosma chitralicum I. M. Johnston	Boraginaceae	-	-	-	III
Brassica compestris L.	Brassicaceae	II	-	-	I
Brassica tournefortii Gouan	Brassicaceae	-	-	-	I
Eruca sativa Mill.	Brassicaceae	-	-	-	I
Farsetia jacquemontii (Hook.f. & Thoms.) Jafri	Brassicaceae	-	-	-	III
Malcolmia africana (L.) R.Br.	Brassicaceae	-	-	-	III
Neslia apiculata Fisch.	Brassicaceae	-	-	-	II
Sisymbrium irio L.	Brassicaceae	-	-	-	III
Silene vulgaris (Moench.) Garcke,	Caryophyllaceae	-	-	-	IV
Spergula fallax (Lowe) E. H. L. Krause	Caryophyllaceae	-	-	-	II
Atriplex stocksii Boiss.	Chenopodiaceae	-	II	-	-
Chenopodium ambrosioides L	Chenopodiaceae	I	-	-	
Chenopodium album L.	Chenopodiaceae	III	II	-	
Chenopodium murale L	Chenopodiaceae	III	II	-	III

Convolvulus arvensis L	Convolvulaceae	III	III	I	IV
Convolvulus spicatus Hallier F	Convolvulaceae	II	-	-	I
Citrullus colocynthis (L.) Shred.	Cucurbitaceae	-	II	-	II
Trichosanthes dioica Roxb	Cucurbitaceae	-	-	-	II
Cyperus rotundus L.	Cyperaceae	IV	IV	IV	III
Chrozophora plicata (Vahl) A. Juss. ex Spreng	Euphorbiaceae	-	II	-	-
Croton bonplandianus Bat.	Euphorbiaceae	-	II	-	-
Euphorbia helioscopia L.	Euphorbiaceae	III	II	II	IV
Euphorbia oblongata Griseb.	Euphorbiaceae	-	-	-	IV
Euphorbia prostrata Ait.	Euphorbiaceae	-	III	III	III
Phyllanthus niruri L.	Euphorbiaceae	III	-	-	-
Ricinus communis Linn.	Euphorbiaceae	II	-	-	-
Fumaria parviflora Lamarck	Fumariaceae	I	-	-	II
Centaurium pulchellum (Sw.) Druce	Gentianaceae	-	-	-	I
Erythraea ramosissima DC, Prodr	Gentianaceae	II	-	-	-
Iris lactea Pallas	Iridaceae	-	II	III	-
Salvia plebeia R.Br	Lamiaceae	II	-	-	-
Linum corymbulosum Reichenb.	Linaceae	-	-	-	II
Abutilon indicum (L) sweet	Malvaceae	II	-	-	-
Hibiscus trionum L.	Malvaceae	I	-	-	-
Malva neglecta Wallr	Malvaceae	-	-	-	II
Malvastrum coromandelianum (L.) Garcke	Malvaceae	II	II	III	-
Sida cardifolia L.	Malvaceae	II	-	-	-
Boerhavia procumbens Banks ex Roxb	Nycraginaceae	III	III	-	II
Zeuxine strateumatica (L.) Schlechter	Orchidaceae	-	-	-	I
Cistanche tubulosa (Shehenk.) Wight.	Orobanchaceae	-	-	-	I
Oxalis corniculata L.	Oxalidaceae	IV	II	I	
Hypecoum pendulum L.	Papaveraceae	-	-	-	III
Alhagi maurorum Medic.	Papilionaceae	-	-	-	I

Astragalus hamosus L.	Papilionaceae	II	-	-	IV
Lathyrus aphaca Linn.	Papilionaceae	I	-	-	III
Medicago polymerpha/ sativa L.	Papilionaceae	III	-	-	III
Melilotus parviflora/ indica (L) All	Papilionaceae	III	-	-	III
Trigonella corniculata (L.) Linn.	Papilionaceae	-	-	-	IV
Vicia hirsute (L) S.F. Gray.Nat.	Papilionaceae	III	-	-	III
Plantago lanceolata L.	Plantaginaceae	II	-	I	III
Plantago ovate Forssk	Plantaginaceae	-	-	-	II
Veronica agrestis L.	Plantaginaceae	II	-	-	-
Alopecurus nepalensis Trin Ex	Poaceae	IV	-	-	II
Aristida adscensionis	Poaceae	-	-	-	III
Aristida cyanantha Nees ex Steud.	Poaceae	-	IV	-	I
Avena fatua L	Poaceae	I	-	-	III
Cenchrus ciliaris L.	Poaceae	-	III	-	-
Cymbopogon distense Schutt.	Poaceae	-	-	-	-
Cynodon dactylon (L.) Pers	Poaceae	V	V	IV	V
Dichanthium annulatum Forssk	Poaceae	V	III	II	-
Dinebra retroflexa (Vahl) Panzer	Poaceae	-	III	III	-
Echinochloa crus-galli (L) P. Beauv	Poaceae	V	III	III	-
Enneapogon avrnuceus (Lindl.) C. E. Hubbard	Poaceae	V	-	-	-
Eragrostis pilosa (L.) P. Beauv.	Poaceae	-	III	-	II
Leptochloa panicea (Retz) Ohwi	Poaceae	V	IV	-	-
Phalaris minor Retz	Poaceae	IV	-	-	III
Poa botryoides (Trin. ex Griseb.) Kom.	Poaceae	-	III	III	-
Poa bulbosa L.	Poaceae	III	-	-	III
Sacharum arundinaceum H. K. F	Poaceae	-	-	-	I
Setaria pumila (Poir.) Poam	Poaceae	II	-	II	II
Sorghum halepense (L.) Pers	Poaceae	IV	III	III	-
Oxyria digyna (L.) Hill	Polygonaceae	-	-	-	III

Polygonum barbatum L.	Polygonaceae	IV	-	-	-
Polygonum biaristatum Aitch and Hemsl	Polygonaceae	III	-	-	III
Polygonum plebejum R.Br	Polygonaceae	II	-	-	III
Rumex dentatus (Meisn)Rech.f	Polygonaceae	III	-	-	III
Anagallis arvensis L.	Primulaceae	II	-	-	II
Ranunculus muricatus L.	Ranunculaceae	II	II	-	III
Oligomeris linifolia (Vahl.) Macbride	Resedaceae	-	II	II	III
Datura alba Nees.	Solanaceae	-	II	II	III
Hyoscyamus niger L.	Solanaceae	-	-	-	II
Nicotiana plumbaginifolia Viv.	Solanaceae	II	III	II	-
Physalis angulata L	Solanaceae	III	-	-	-
Solanum nigrum L	Solanaceae	I	-	-	-
Solanum surattense Burm. F	Solanaceae	I	II	-	III
Withania coagulans Dunal.	Solanaceae	-	-	-	II
Withania somnifera L.	Solanaceae	IV	II	-	-
Corchorus depressus (L.) Stocks	Tiliaceae	I	III	III	-
Typha orientallis C.Presl	Typhaceae	II	-	-	-
Phyla nodiflora Linn	Verbenaceae	III	-	-	-
Verbena officinalis L.	Verbenaceae	II	-	II	III
Fagonia cretica L.	Zygophyllaceae	-	-		II
Pegnum harmala L.	Zygophyllaceae	-	-	-	III
Tribulus terrestris L.	Zygophyllaceae	-	IV	-	III

Key: S= Sugarcane, M= Maize, R=Rice, W= Wheat, - = Absence of weed,
Class I = Very Rare, Class II = Rare, Class III = Infrequent,
Class IV = Abundant, Class V = Very abundant

Table-7. Common weeds found in all the four crops of Bannu Pakistan

SN	Botanical Name	Family	Sugarcane	Maize	Rice	Wheat
1.	*Cirsium arvense*	Asteraceae	+	+	+	+
2.	*Convolvulus arvensis*	Convolvulaceae	+	+	+	+
3.	*Conyza bonariensis*	Asteraceae	+	+	+	+
4.	*Cynodon dactylon*	Poaceae	+	+	+	+
5.	*Cyperus rotundus*	Cyperaceae	+	+	+	+
6.	*Parthenium hysterophorus*	Astraceae	+	+	+	+
7.	*Sonchus asper*	Asteraceae	+	+	+	+

Table-8. Percentage of different families of the recorded weed species

SN	Family	No of plants	% age	SN	Family	No of plants	% age
1	Zygophyllaceae	3	8.1	20	Lamiaceae	1	2.7
2	Verbenaceae	2	5.4	21	Iridaceae	1	2.7
3	Typhaceae	1	2.7	22	Gentianaceae	2	5.4
4	Tiliaceae	1	2.7	23	Fumariaceae	1	2.7
5	Solanaceae	8	21.6	24	Euphorbiaceae	7	18.9
6	Resedaceae	1	2.7	25	Cyperaceae	1	2.7
7	Ranunculaceae	1	2.7	26	Cucurbitaceae	2	5.4
8	Primulaceae	1	2.7	27	Convolvulaceae	2	5.4
9	Polygonaceae	5	13.5	28	Chenopodiaceae	4	10.8
10	Poaceae	19	51.4	29	Caryophyllaceae	2	5.4
11	Plantaginaceae	3	8.1	30	Brassicaceae	7	18.9
12	Papilionaceae	7	18.9	31	Boraginaceae	8	21.6
13	Papaveraceae	1	2.7	32	Asteraceae	20	54.1
14	Oxalidaceae	1	2.7	33	Asclepiadaceae	2	5.4
15	Orobanchaceae	1	2.7	34	Apocynaceae	1	2.7
16	Orchidaceae	1	2.7	35	Apiaceae	2	5.4
17	Nycraginaceae	1	2.7	36	Amaranthaceae	8	21.6
18	Malvaceae	5	13.5	37	Aizaaceae	1	2.7
19	Linaceae	1	2.7				

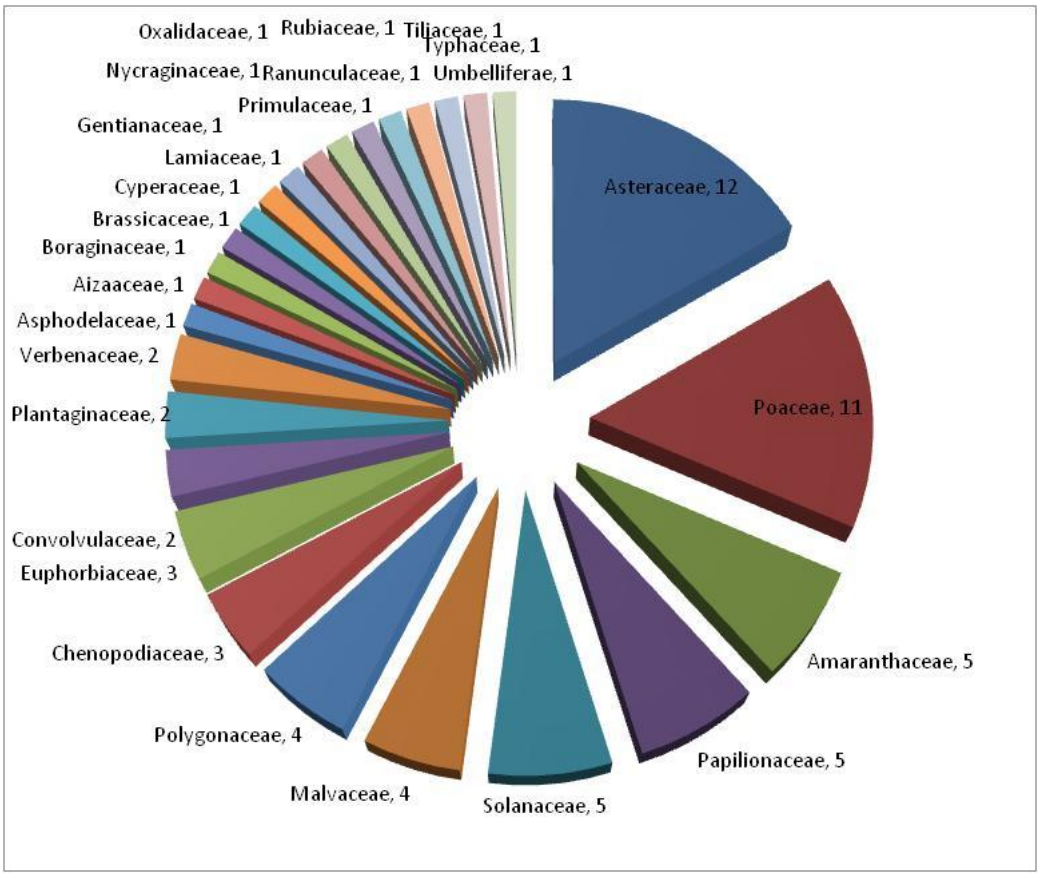

Figure 1. Percentage of weeds families in sugarcane fields of Bannu, Pakistan

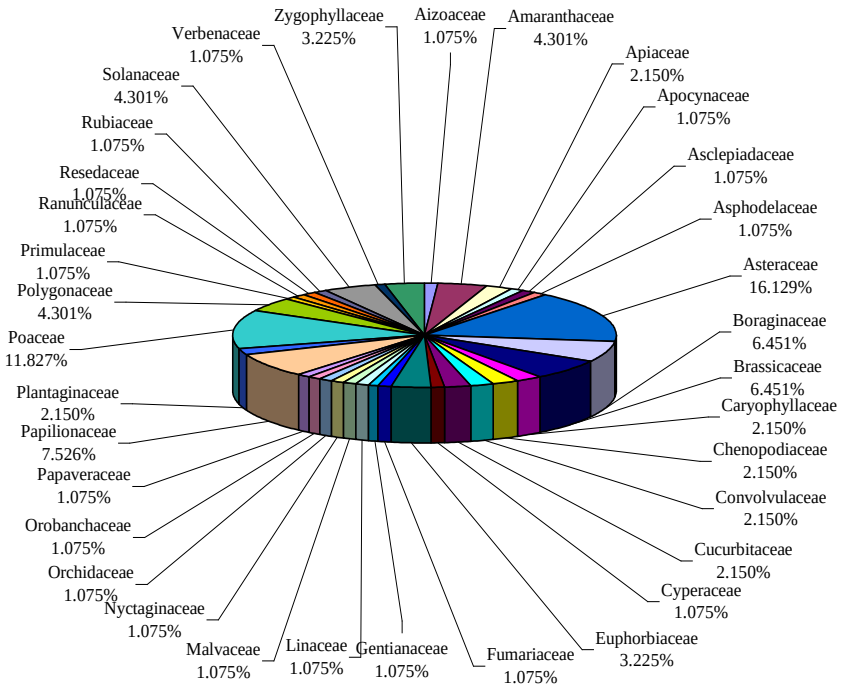

Figure 2. Family percentage data of weeds in wheat crop

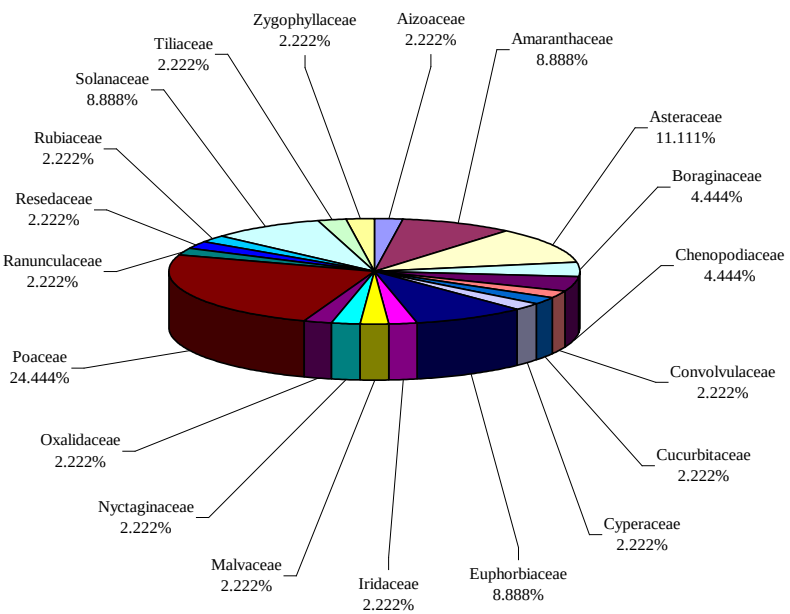

Figure 3. Family percentage data of weeds in maize crop

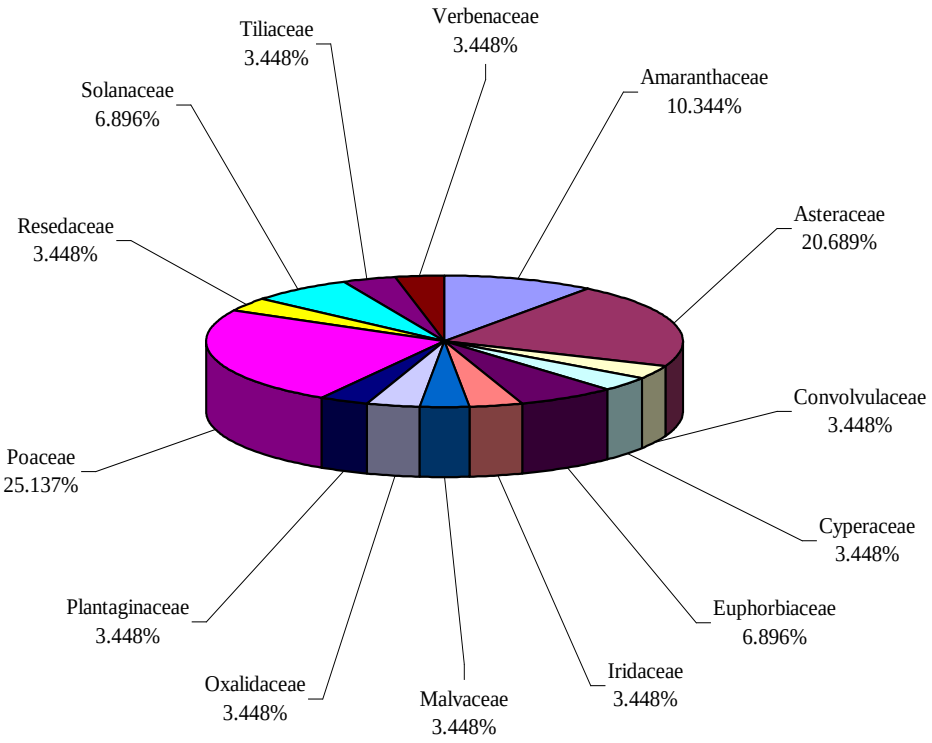

Figure 4. Family percentage data of weeds in rice crop

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