



## Floristics of weeds in *Triticum aestivum* L. fields of Tehsil Shabqadar, District Charsadda, KP, Pakistan

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### Abstract

a comprehensive survey of weed flora was conducted in the wheat (*Triticum aestivum* L.) fields of Tehsil Shabqadar, District Charsadda during February and end of April. This preliminary survey shows that there were 32 weed species belonging to 17 families. Out of these 17 families, 1 family belongs to monocots while 16 families belong to dicots. The family with largest number of species was Asteraceae having 6 species, followed by Poaceae (5 species), Fabaceae (4 species), Amaranthaceae (2 species), Brassicaceae (2 species), Polygonaceae (2 species). Rests of the families were represented by 1 species each. *Biological spectrum shows that Therophytes were the major life form class (78.1%) and Hemicyptophytes were (9.3%) Chamaephytes (6.2%) and Geophytes were (6.2%). Leaf size classification shows that Microphylls (40.6%) were the major leaf size class followed by Nanophylls (21.8%), Leptophylls (18.7%) and Mesophylls (18.7%) respectively. Life span of the reported weed taxa shows that annual weeds (23 sp, 71.85%) are more rapidly grow in single season while Perennial (7 sp, 21.87%) and Biennial (2 sp, 6.25%) required more time for growth. The most disastrous species were *Avena sativa*, *cannabis sativa*, *convolvulus arvensis*, *Emex spinosa* and *Euphorbia helioscopia*.*

**Keywords:** floristics, weeds, *Triticum aestivum* L, shabqadar

### Introduction

Shabqadar is situated on the outskirts of Mohmand Agency and falls under the jurisdiction of District Charsadda of Khyber Pakhtunkhwa. Geographically it is located at 34°16' and 34°47'N latitude 71°33' and 71°59'E longitude (Fig.1). It has an altitude of 343m (1128 feet). Here the average value for temperature and precipitation is 22.4 °C and 417 mm respectively per annum. It is situated in the North-Western direction of District Charsadda at a distance of 35.3 km via Shabqadar road. Most of its land is used for agricultural purposes. Wheat is the major rabi crop of this area which is grown in canal irrigated fields as well as rain irrigated fields.

### Wheat

Bread wheat (*Triticum aestivum* L.) is a king cereal crop in all the agro-ecological zones of the World. It is staple food of masses and enjoys the pivotal position in the Pakistan agricultural system and occupying the largest area in Punjab, Pakistan of wheat cultivation during 2005-08 which was 6.10 million hectares; producing 15.36 million tons. It contributes a major share of the agricultural economy of the country, providing around 72% of wheat to the national food basket every year (Hussain and Bangash, 2017) [12]. Wheat is the most important stable food crop for more than one third of the world population and contributes more calories and proteins to the world diet than any other cereal crops. It is nutritious, easy to store and transport and can be processed into various types of food.

### Weeds

Weed is an everyday term which is used in variety of senses, usually to describe a plant considered undesirable within a certain context (Hanif *et al.* 2004) [8]. Indeed, a number of plants that may consider weeds are often intentionally grown in gardens and other cultivated settings. Weeds are the major challenging agents in this area. They are undesirable plant species growing in the agricultural fields along with domesticated crops (Dangwall *et al.* 2010). They affect crops through struggle for light, space, nutrients, allelopathy and seeds contamination (Jan *et al.* 2012) [14]. The intake of essential nutrients like nitrogen, potassium and magnesium is three to four times faster by weeds containing crops in comparison with weed free crops (Schwerzeland Thomas, 1971) [16].

The grouping of a plant as a weed is not grounded on any inherent character or living feature, but depends on human beliefs related with a specific point of reference (Perrins *et al.* 1992) [23]. Different literature is available on the weed flora of wheat crop from different areas of Khyber pakhtunkhwa by (Shah *et al.* 2006, Hadi *et al.* 2014, Hussain *et al.* 2009, Akhtar and Hussain 2007, Shah *et al.* 2014, Sher *et al.* 2011, Hussain *et al.* 2012, Ullah *et al.* 2011 and Marwat *et al.* 2013) [27, 30, 5, 6, 1, 16, 31, 34, 19]. Floristic composition and ecological prevalence of weeds in the wheat and sugarcane fields of Tehsil Charsadda has been reported (Inayat *et al.* 2014, Khan *et al.* 2017, Khan *et al.* 2018) [13, 16, 17] but no such work is done in the villages of Tehsil Shabqadar, District Charsadda.

The present work will help in taxonomic assessment of the weed flora from different wheat fields of Matta Mughal Khel, Tehsil Shabqadar. In regard to the present study Family Asteraceae was the dominant weed family, followed by Poaceae, and Fabaceae as the 3<sup>rd</sup> largest family. The

Current paper reports the dispersal of weeds species within wheat fields of Charsadda and will be helpful for recognizing the severity of weeds invasion in wheat crop and weed competition in the area.

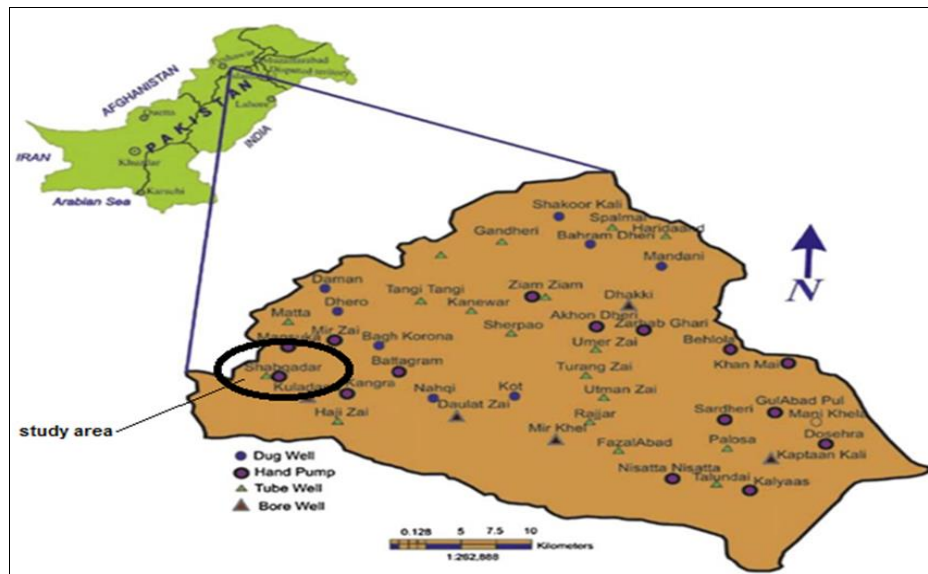


Fig 1: Map of study area

### Material and Methods

This research work was done in the villages of Tehsil Shabqadar of District Charsadda in the wheat growing season during 2014-15. Five different stations were selected viz. Matta Mughal Khel, Haji zai, Battagram, Katozai and Khwajawos in the flowering season.

The data about density and frequency of weed species was determined using 1x1 m<sup>2</sup> quadrats in each of the designated spots after (Hussain, 1989) [10]. Weeds were collected via hand picking, digging through agricultural tools and local information (Spiny weeds), field photographs of the specimens were taken by using cannon digital camera.

The specimens were cleaned by removing the soil particles, dust, attached insects and other plant parts. The specimens were then wrapped in blotter papers and newspapers for absorbing moisture content and then placed in a wooden plant presser (locally designed) for drying and pressing.

The pressed specimens were then mounted on herbarium sheets using glue, preserved for long time by using naphthalene powder spray, identified with the help of Flora of Pakistan (Nasir and Ali, 1970-1989; Ali and Nasir, 1989-1991; Ali and Qaisar, 1993-2018) [21-22, 22] and by comparing it already available weed specimens in herbarium of University of Peshawar. The specimens were then assigned botanical names, common names, family names and deposited in Herbarium at Department of Botany, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.

### Results and Discussion

The study area is encompassed by 32 weed species comprising 31 genera and 32 species across 17 families (1 monocot and 16 dicot) (Table 1). The most prominent weeds developing in wheat crops were *Avena sativa*, *Chenopodium album*, *Cirsium vulgare*, *Convolvulus arvensis*, *Cynodon dactylon*, *Emex spinosa*, *Euphorbia helioscopia*, *Medicago polymorpha*, *Melilotus indica*, and *Rumex dentatus*. The rest of reported weeds were of

infrequent existence. The detail list of weeds reported from wheat fields in the study area beside their botanical names, families, English, local names and main diagnostic characters are specified in Table 1 and 2.

The pre dominance was presented by Asteraceae, Poaceae and Fabaceae representing 6, 5 and 4 weed species respectively. Amaranthaceae, Brassicaceae and Polygonaceae included two weed species each. The remaining families were represented by one weed species each.

Family having highest relative percentage is Asteraceae (18.75%), followed by Poaceae (15.625%), Fabaceae (12.50%), Amaranthaceae, Brassicaceae and Polygonaceae (6.25%) each while all the remaining families have a relative percentage of (3.125%) each.

The data is mostly related with the findings agree with (Malik and Hussain, 1990, Rashid *et al.*, 1998, Murad *et al.*, 1995, Nasir *et al.*, 2002, Shah *et al.*, 2006; Ullah and Rashid, 2007; Sher and Khan, 2007; Hussain *et al.*, 2009; Hadi *et al.*, 2009a; Hadi *et al.*, 2009b and Shah and Hussain, 2011) [18, 24, 20, 22, 27, 33, 32, 9, 6, 7, 29]. (Akhtar *et al.* 2007, Ullah *et al.*, 2011, Sher *et al.*, 2011, Hussain *et al.* 2012, Marwat *et al.* 2013, Khan *et al.* 2018) [1, 34, 31, 11, 19, 17]. All these reporters have shown nearly similar floristic configuration of the weed flora for various crops and some of the species are of common scattering pattern definitely in the case of wheat.

The yield of wheat crop is basically loss by abundant of weeds in wheat crop, 60-70% yield losses due to 6 main weeds which effect the crop (Iffat *et al.* 2010). Life form of the plants is more reliable which is based upon principle of position and degree of protection during the unfavorable or adverse condition (Raunkiaer, 1934) [25]. In contrast to life form species, 25 species (78.125%) were classified as Therophytes, 3 species (9.375%) Geophytes and 2 species (6.25%) each in Hemicryptophytes and Chaemophyte (Fig.2). According to leaf size spectra Microphylls are the

leading one (13 species, 40.625%), followed by Nanophylls (7 species, 21.875%), Leptophylls and Mesophylls having 6 species, 18.75% (Fig.3).

These values meet with the findings of Inayat *et al.* 2014, who reported that most of the weed species belong to Microphylls. Most of the weeds are annuals if eradication before maturation is carried out in vegetative condition then these weeds can be easily controlled. According to Hadi *et al.* (2009) most of the weeds taxa are leptophylls which need sunlight, less food and grow well in any adverse condition. Some weeds are very important medicinally as they were effective against any diseases like *Galium aparine* is used against skin diseases; *Convolvulus arvensis* is useful against joint pain.

There are many sources like wind, contaminated seed,

animals and water through which weed seed enter to the cultivated field, therefore complete eradication of weed flora is very difficult (Hadi *et al.*, 2014) [5]. For the increases in crop yield; chemical, biological and physical eradication are recommended to control these weeds. Some weeds are very important medicinally as they were effective against any diseases like *Galium aparine* is used against skin diseases; *Convolvulus arvensis* is useful against joint pain. However, no such work is available from this study area.

The present effort therefore was aimed at all ecological assignment of some weeds species for the first time from weeds fields of Shabqadar, District Charsadda.

The findings helped in the management of weeds in wheat crops fields.

**Table 1:** Floristic Inventory of Weeds in Wheat Crop of Shabqadar, Charsadda

S.NO.	Botanical Name	Family	English name	Local name	Group
1.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Prickly chaff flower	Puthkanda.	Dicot
2.	<i>Amaranthus viridis</i> L.		Green pigweed	Ganhar	Dicot
3.	<i>Anagallis arvensis</i> L.	Myesinaceae	Blue pimpernel	Mangotegul/billibooti	Dicot
4.	<i>Avena fatua</i> Retz.	Poaceae	Common wild oat	Jamdar	Monocot
5.	<i>Avena sativa</i> L.		Oat	Jamdar	Monocot
6.	<i>Cynodon dactylon</i> L.		Bahama grass	Kabal	Monocot
7.	<i>Polypogon monspeliensis</i> L.		Annual beard grass	Gidarpucch	Monocot
8.	<i>Sorghum halepensis</i> L.		Johnson grass	Dhrab	Monocot
9.	<i>Brassica napus</i> L.		Brassicaceae	Field mustard	Sharsham
10.	<i>Sisymbrium irio</i> L.	Wild mustard		Zangliwoeri	Dicot
11.	<i>Cannabis sativa</i> L.	Cannabaceae	Marijuana	Bhang	Dicot
12.	<i>Chenopodium album</i> L.	Chenopodiaceae	Goose foot	Sarme	Dicot
13.	<i>Cirsium vulgare</i> (savi) Ten.	Asteraceae	Common thistle	Azghake	Dicot
14.	<i>Conyza Canadensis</i> L.		Horseweed	Janglihaloon	Dicot
15.	<i>Eclipta prostrata</i> L.		False daisy	Theriza	Dicot
16.	<i>Silybum marianum</i> L.		Gaertner Milk thistle	Kandiali/ kareza	Dicot
17.	<i>Taraxacum officinale</i> L.		Dandelion	Zeergulay	Dicot
18.	<i>Xanthium stromarium</i> L.		Rough cocklebur	Malkonday	Dicot
19.	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Field bindweed	Lehli/prewata	Dicot
20.	<i>Emex spinosa</i> L.	Polygonaceae	Spiny dock	KabalayMalkunday	Dicot
21.	<i>Rumex dentatus</i> (Meissin) Rich.		Dock	Shalkhay/janglipalak	Dicot
22.	<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Sunspurge	Chhatridodak/ Mandaro	Dicot
23.	<i>Fumaria officinalis</i> L.	Papaveraceae	Earth smoke	Sua	Dicot
24.	<i>Mazus japonicus</i> (Thunb.) O. Kuntze	Scrophulariaceae	Japanese mazus	Sqabotay	Dicot
25.	<i>Medicago polymorpha</i> L.	Fabaceae	California burclover	Pishtaray	Dicot
26.	<i>Melilotus indicus</i> L.		Sweet clover	Lewanay/sengi	Dicot
27.	<i>Trifolium repens</i> L.		White clover	Shaotal	Dicot
28.	<i>Vicia sativa</i> L.		Common witch	Kharawara/rewari	Dicot
29.	<i>Mentha longifolia</i> L.	Lamiaceae	Wild mint	Enalay	Dicot
30.	<i>Oxalis corniculata</i> L.	Oxalidaceae	Creeping woodsorrel	Trewakay	Dicot
31.	<i>Ranunculus muricatus</i> L.	Ranunculaceae	Rough seed butter cup	Chaghana	Dicot
32.	<i>Stellaria media</i> L.	Caryophyllaceae	Chickweed	Phullanbooti	Dicot

**Table 2:** Floristic composition and Biological spectrum of weeds

S.NO.	Botanical Name	Family	Life Form	Leaf Size	Life Span
1.	<i>Achyranthes aspera</i> L.	Amaranthaceae	TH	Mes	Perennial
2.	<i>Amaranthus viridis</i> L.		TH	Mic	Annual
3.	<i>Anagallis arvensis</i> L.	Myesinaceae	TH	Lep	Annual
4.	<i>Avena fatua</i> Retz.	Poaceae	TH	Mic	Annual
5.	<i>Avena sativa</i> L.		TH	Mic	Annual
6.	<i>Cynodon dactylon</i> L.		H	Lep	Perennial
7.	<i>Polypogon monspeliensis</i> L.		TH	Nan	Annual
8.	<i>Sorghum halepensis</i> L.		H	Mic	Perennial
9.	<i>Brassica napus</i> L.		Brassicaceae	TH	Mes
10.	<i>Sisymbrium irio</i> L.	TH		Nan	Annual
11.	<i>Cannabis sativa</i> L.	Cannabaceae	TH	Mic	Biennial
12.	<i>Chenopodium album</i> L.	Chenopodiaceae	TH	Mic	Annual
13.	<i>Cirsium vulgare</i> (savi) Ten.	Asteraceae	TH	Mic	Annual

14.	<i>Conyza Canadensis</i> L.		TH	Lep	Annual
15.	<i>Eclipta prostrate</i> L.		G	Lep	Perennial
16.	<i>Silybum marianum</i> L.		TH	Mes	Annual
17.	<i>Taraxacum officinale</i> L.		H	Mic	Annual
18.	<i>Xanthium stromarium</i> L.		CH	Mes	Biennial
19.	<i>Convolvulus arvensis</i> L.	Convulvulaceae	TH	Mic	Perennial
20.	<i>Emex spinosa</i> L.		TH	Mes	Annual
21.	<i>Rumex dentatus</i> (Meissin) Rich.	Polygonaceae	TH	Mes	Annual
22.	<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	TH	Nan	Annual
23.	<i>Fumaria officinalis</i> L.	Papaveraceae	TH	Lep	Annual
24.	<i>Mazus japonicus</i> (Thunb.) O. Kuntze	Scrophulariaceae	TH	Nan	Annual
25.	<i>Medicago polymorpha</i> L.		TH	Nan	Annual
26.	<i>Melilotus indicus</i> L.		TH	Nan	Annual
27.	<i>Trifolium repens</i> L.	Fabaceae	TH	Nan	Annual
28.	<i>Vicia sativa</i> L.		TH	Mic	Annual
29.	<i>Mentha longifolia</i> L.	Lamiaceae	G	Mic	Perennial
30.	<i>Oxalis corniculata</i> L.	Oxalidaceae	CH	Mic	Perennial
31.	<i>Ranunculus muricatus</i> L.	Ranunculaceae	TH	Mic	Annual
32.	<i>Stellaria media</i> L.	Caryophyllaceae	TH	Lep	Annual

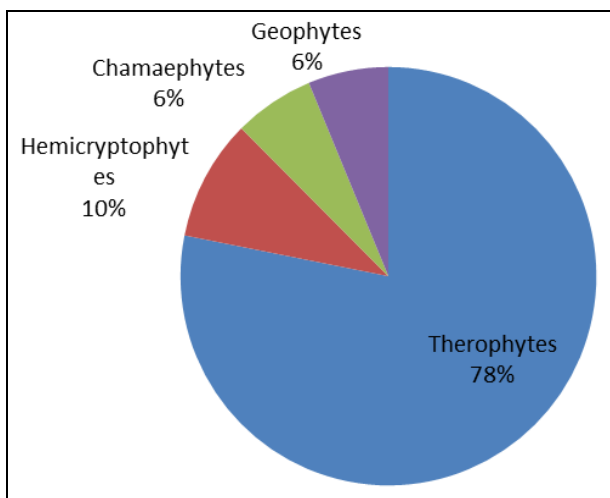
**Key:**

**Life form:** TH=Therophytes, H=Hemicryptophytes, CH= Chamaephytes, G=Geophytes

**Leaf size:** Lep=Leptophylls, Nan=Nannophylls, Mic=Microphylls, Mes=Mesophylls

**Table 3:** Life form percentage

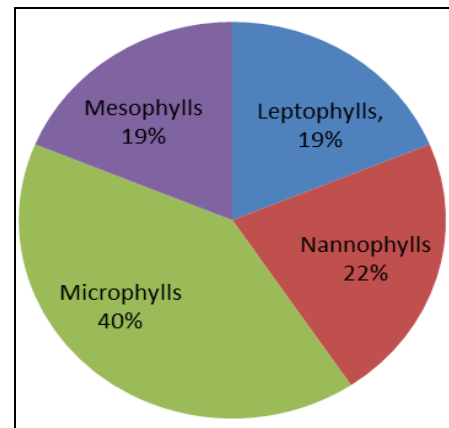
Life form classes Percentage Table			
S.NO.	Life Form Classes	No. of Species	Percentage
1	Therophytes	25	78.125
2	Hemicryptophytes	03	9.375
3	Chamaephytes	02	6.25
4	Geophytes	02	6.25



**Fig 2:** Percentage of life form classes

**Table 4:** Leaf size Percentage

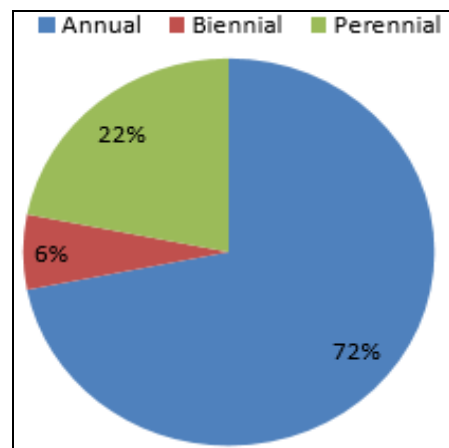
Leaf Classes Percentage Table			
S.NO.	Leaf Classes	No. of Species	Percentage
1	Leptophylls, 25sq. mm.	06	18.75
2	Nannophylls, 9x25sq. mm.	07	21.875
3	Microphylls, 9²x25sq. mm.	13	40.625
4	Mesophylls, 9³x25sq. mm.	06	18.75



**Fig 3:** Percentage of leaf size classes

**Table 5:** Life span percentage

Life Span Percentage Table			
S.NO.	Life Span Classes	No of Species	Percentage
1	Annual	23	71.85
2	Biennial	02	6.25
3	Perennial	07	21.875



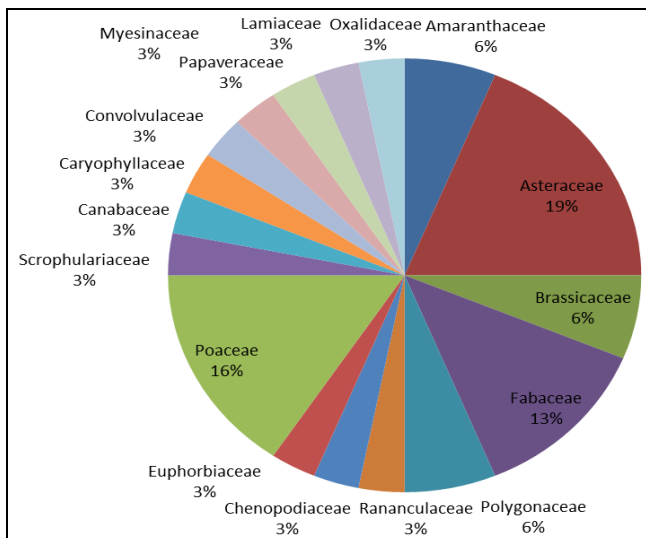
**Fig 4:** Percentage of life span

**Table 6:** Family wise distribution of weeds of Shabqadar

S. No	Family	No	Group
1.	Amaranthaceae	02	Dicot
2.	Asteraceae	06	Dicot
3.	Brassicaceae	02	Dicot
4.	Fabaceae	04	Dicot
5.	Polygonaceae	02	Dicot
6.	Ranunculaceae	01	Dicot
7.	Chenopodiaceae	01	Dicot
8.	Euphorbiaceae	01	Dicot
9.	Poaceae	05	Monocot
10.	Scrophulariaceae	01	Dicot
11.	Canabaceae	01	Dicot
12.	Caryophyllaceae	01	Dicot
13.	Convolvulaceae	01	Dicot
14.	Myesinaceae	01	Dicot
15.	Papaveraceae	01	Dicot
16.	Lamiaceae	01	Dicot
17.	Oxalidaceae	01	Dicot



**Fig 2:** *Amaranthus viridis* L



**Fig 5:** Family wise % distribution of weeds



**Fig 3:** *Anagallis arvensis* L

**Some Key Plates**



**Fig 1:** *Achyranthes aspera* L



**Fig 4:** *Avena fatua* Retz



**Fig 5:** *Avena sativa* L



**Fig 8:** *Chenopodium album* L



**Fig 6:** *Brassica napus* L



**Fig 9:** *Cirsium vulgare* (savi) ten



**Fig 7:** *Cannabis sativa* L



**Fig 10:** *Convolvulus arvensis* L



**Fig 11:** *Conyza canadensis* L



**Fig 12:** *Cynadon dactylon* L

### Conclusion

The present study of floristics of Weeds revealed that 32 weed species which belonged to 17 families are worked out in Wheat fields of Shabqadar Charsadda. This is the first work which has been done for the first time in Shabqadar Charsadda. It was concluded that Hoeing and Weeding, Tillage, Bar Harrowing, Crop Rotation and Chemical Control are the basic methods for the eradication of these weeds from the crop fields of Wheat because these weeds severely threatened the important crop flora in the area.

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