The Species Composition of Weed Plants in Winter Wheat

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Abstract: This article presents the results of the study of agrobiocenosis of wheat field. On the basis of the phytosanitary monitoring for 2020-2022 on the territory of the Tashkent region, it was determined that weeds belong to 14 families, 35 genera and 37 species on the crops of winter wheat. The dominant and most dangerous species were field *C.dactylon (L) Pers*. - Bermuda Grass, *S.halepense (L) Pers*. – Johnsongrass, *S.viridis (L) P.B.* - Green Foxtail, *Ph.australis (Cav) Trin*. - Common Reed, *A.retroflexus L.* - Red Amaranth, *D.sophia (L) Webb ex Prantl*. - Flixweed, *A.repens (L) DC.* - Russian Knapweed, *X.strumarium L*. - Common Cocklebur, *C.ochrolepideum Juz.* - Cirsium arvense.

1 INTRODUCTION

One of the main economic directions of the agriculture of our country is to ensure grain independence. In order to ensure food security, one of the urgent issues is to expand the planting of wheat from grain crops and increase its productivity, as well as obtaining a quality harvest. One of the main tasks facing agricultural specialists and scientific workers in our republic is the creation of theoretical and scientific foundations of wheat cultivation technology in irrigated farms. One of the most urgent problems in the creation of this technology is the development of measures to combat weeds and diseases in wheat fields (Sheraliev et al., 2001).

In recent years, the yield of wheat crops has decreased, and weeds play a major role in the deterioration of product quality. Weeds found in wheat fields not only absorb water and mineral substances dissolved in the soil, but also have a negative effect on the normal development of wheat. As a result, weeds found in wheat fields interfere with harvesting and cause a decrease in the quality and quantity of grain. In addition, weeds remain a source of transmission and infection of insects and diseases in wheat fields (Sheraliev et al., 2001).

This scientific article systematically interprets the composition of the most common weed species that negatively affect the good growth and high grain yield of winter wheat in irrigated fields, and the degree of weed contamination of wheat field.

2 MATERIALS AND METHODS

Geobotanical methods and programs were used during the research. During the study of the composition of weed species in the fields, more than 2000 herbariums were collected, 100 details were written in the fields of more than 35 farms specializing in grain growing in the Tashkent region.

The following indicators were used to determine the species composition of weeds: Flora of Uzbekistan, chapters I-VI (1941-1962), Indicator of Central Asian plants, chapters I-IX (1980-1987); S.K. Cherepanov, Vascular plants of the USSR (1981), A. Hamidov, M. Nabiev, T. Odilov's indicator of plants of Uzbekistan (1987). U.P.Pratov, T.Odilov (1995),

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methodical recommendations were used in writing new Uzbek names of weeds.

A 5-point scale based on the methods of N.F. Komarov (1935), M.V. Markov, and N.M. Kulikov (1964) was used to determine the degree of weed spread. In this - very rare species "un" - 1 point, rare species - "sol" - 2 points, common species - "sp" - 3 points, very common species - "cop" - 4 points, a lot common types - "soc" - 5 points.

Layer formation of weeds was determined by the method of A.I. Maltsev (1962). Weed Growth Layer: Layer I - the height of the weed is higher than that of the cultivated crop; II Layer - the height of the weed is equal to or half of that of the cultivated crop; III Layer - the height of the weed is less than half of the height of the cultivated crop.

Methodical manual of A.Zhorakulov, V.Solovev, K.Babaev (1985) was used to calculate the degree of weed coverage of the field (Zhurakulov et al.,1985).

Table 1: Level of weed contamination of fields (5 points).

Points	Annual $см^2$/pc	The perennials		Contamination degree
		Convolvulus arvensis, Sorghum halepense 10 m^2/pc	Weed, m^2/ha	
1	up to 9	up to 14	up to 23	Very weak
2	9-28	14-42	23-71	Weak
3	28-65	42-98	71-164	Average
4	65-93	98-140	164-234	Strong
5	More than 93	More than 140	More than 234	Very strong

The degree of contamination of wheat fields with weeds is calculated using the following formula:

$$S = a \cdot n_1 + b \cdot n_2 + c \cdot n_3$$

In this:

S - level of contamination;

a, b, c - various weed quotient;

n_1, n_2 - number of annual and perennial weeds;

n_3 - the spread area of the weeds.

Fertilization of wheat grain in laboratory conditions (Naumova, 1960), germination in field conditions, preservation after wintering, determination of plant thickness is studied. For this, by calculating the number of seedlings in the designated area, the number of seedlings per 1 ha was determined based on three times the number of seedlings per 1 m2 on the basis of the information on the planting rate per 1 ha and the fertility of seeds (Zhurakulov et al., 1985).

The essence of the computational technique is the collection of samples and its observation. When considering diseases, its prevalence and intensity were taken into account.

Weed prevalence in the field was determined 2 times per season, and the collected data were recorded in a special diary. This information should reflect the following:

Farm name, number or name of the field, type and variety of the crop, types of weeds returned in the field and their development phases (grassing, tufting, tuber wrapping, earing, flowering and ripening), damaged area, type of damage (flat, partially damaged form), degrees of damage (determined on the basis of a 5-point scale given below) (Sheraliev et al., 2001)

Enumeration is carried out during the period when the main and most serious weeds are growing.

The route method. The number of weeds in relation to cultivated crops is calculated according to the following 5-point scale:

The 1st type of weed is rare here and there;

The 2nd type of weeds is more common, but their quantity does not exceed the number of cultivated crops;

The 3rd type of weeds is very common, but their amount does not exceed the number of cultivated crops;

The 4th type of weeds is more than the number of crops;

The 5th type of weeds is much more than the number of cultivated crops.

Each weed species is weighted according to the scale and an average score of weed infestation in the field is calculated.

Stationary (permanent plot) method. Monitoring and recording 4 times in October-November (after full germination of seeds), March-April (heading), May (ear formation) and June (before harvesting). In each case, the number of weeds is first estimated by eye (as in the route method), then the crop and weed species are counted separately and directly. For this, 10-15 sample plots of 1 m2 each diagonally are determined in the field. All phenological observations are carried out in the fields. The development phase and growth stage of each type of weed are determined, weed and crop samples are cut from the base and weight is measured. The number of weed seeds mixed with soil and grain is determined using biological and physical methods (Sheraliev et al., 2001, Ruziev et al., 2023, Boynazarov et al., 2023).

3 RESULTS AND DISCUSSION

Like all types of crops, winter irrigated wheat has its own biocomplex. Specific weeds, microorganisms and insects are involved in this process. Cultivation of plants in a certain environment, under the same conditions, leads to the widespread spread of microorganisms and weeds adapted to the type of crop, and the productivity of crops is sharply reduced due to their negative effects.

In order to correctly determine the agrotechnical and chemical control measures used against weeds among agricultural crops, geobotanical and floristic studies should be carried out together with the study of their biology, ecology and role in the accumulation of infection. Given that information on the species composition of weeds in irrigated winter wheat fields is not available in the literature at all Floristic research was carried out in wheat fields of companies and farms in Qibray, Tashkent, Pskent, Parkent, Orta Chirchik, Yangiyol, Chinoz and quyi Chirchik districts of Tashkent region (table 2) (Bukhorov et al., 2003, Bukhorov et al., 2023, Zhurakulov et al., 1985, Sheraliev et al., 2001, Sheraliev et al., 2001, Ruziev et al., 2023, Boynazarov et al.,2023).

As it can be seen from the data in Table 2, the largest number of weed species was found in cotton fields and wheat fields in fields and districts where agrotechnical activities were poorly conducted. In particular, the number of weed species is the majority in the farms of orta Chirchik, quyi Chirchik, and Pskent districts.

Table 2: Distribution of weeds in irrigated wheat fields in Tashkent region by districts

	Districts	Researched areas ha	Number of families, pcs	Number of categories, pcs	Number of types, pcs
1.	Kibrai	200	14	48	70
2.	Tashkent	180	15	53	78
3.	orta Chirchik	350	30	100	116
4.	Pskent	300	23	75	100
5.	Parkent	150	16	60	86
6.	Yangyol	160	17	62	87
7.	Chinaz	250	21	70	95
8.	quyi Chirchik	300	28	86	108

Table 3 shows the composition of weed species determined in the results of geobotanical and floristic research conducted in the region and the level of their contamination of cultivated fields.

It can be seen from the data in Table 3 that the weeds found in the agrocenosis of wheat fields of the region belong to 14 families, 35 genera and 37 species of higher plants.

Table 3: Species composition of the most common weeds in irrigated winter wheat fields of Tashkent region (2020-2022).

№		Family, genus, species	Biological type	Contamination degree (points)		
				2020	2021	2022
I		**Poaceae Barnhart**				
		1. *Bromus L.*				
	1.1.	1.2. *B.tectorum L.*	Annual	2	2	2
		2. *Poa L.*				
		2.1. *P.bulbosa L.*	Perennial	2	2	2
		3. *Avena L.*				
		3.1. *A.fatua L.*	Annual	2	2	2
		4. *Cynodon Rich.*				
		4.1. *C.dactylon (L) Pers.*	Perennial	3	3	3
		5. *Sorghum Pers.*				
		5.1. *S.halepense (L) Pers.*	Perennial	3	3	3
		6. *Agropyron Gaertn.*				
		6.1. *A.repens (L) P.B.*	Perennial	2	2	2
		7. *Setaria P.B.*				
		7.1. *S.viridis (L) P.B.*	Annual	3	3	3
		8. *Phragmites Adans.*				
	1.1.	1.2. *Ph.australis (Cav) Trin .*	Perennial	3	3	3
II		***Cyperaceae Juss.***				
		1. *Cyperus L.*				
	1.1.	1.2. *C.rotundus L.*	Perennial	2	2	3
III		***Polygonaceae Juss.***				

		1. *Rumex L.*				
	1.1.	1.2. *R.Drobovi Korov.*	Perennial	2	2	2
		2. *Polygonum L.*				
		2.1. *P.aviculare L.*	Annual	2	2	2
IV		***Chenopodiaceae Vent.***				
		1. *Atriplex L.*				
	1.1.	1.2. *A.micrantha C.A.Mey.*	Annual	2	2	2
	1.3.	1.4. *A.tatarica L.*	Annual	2	2	2
		2. *Chenopodium L.*				
		2.1. *Ch.album L.*	Annual	2	2	2
V		***Amaranthaceae Juss.***				
		1. *Amaranthus L.*				
	1.1.	1.2. *A.retroflexus L.*	Annual	3	3	3
VI		***Caryophyllaceae Juss.***				
		1. *Stellaria L.*				
	1.1.	1.2. *S.media (L) Cyr.*	Annual	2	2	2
		2. *Lepyrodiclis Fenzl.*				
		2.1. *L.holosteoides (CAM) F. et M.*	Annual	3	3	3
VII		***Ranunculaceae Juss.***				
		1. *Ceratocephalus Moench.*				
	1.1.	1.2. *C.testiculatus (Crantz) Bess.*	Annual	2	2	2
VIII		***Brassicaceae Burnelt***				
		1. *Sisymbrium L.*				
	1.1.	1.2. *S.loeselii L.*	Annual	2	2	2
		2. *Capsella Medic.*				
		2.1. *C.bursa-pastoris (L) Medic.*	Annual	3	2	2
		3. *Descurainia Webb et Berth.*				
		3.1. *D.sophia (L) Webb ex Prantl.*	Annual	3	3	3
IX		***Fabaceae Lindl.***		2	2	2
		1. *Alhagi Adans.*				
	1.1.	1.2. *A.pseudalhagi Desf.*	Perennial	2	2	2
		2. *Glycirrhiza L.*				
		2.1. *G.glabra L.*	Perennial	2	2	2
		3. *Vexibia Rafin.*				
		3.1.*V.pachycarpa (Schrenk ex C.A.Mey) Jakovl.*	Perennial	2	2	2
		4. *Medicago L.*				
		4.1. *M.lupulina L.*	Biennial	2	2	2
		5. *Melilotus Mill.*				
		5.1. *M.officinalis (L.) Pall.*	Biennial	2	2	3
X		***Zygophyllaceae R.Br.***				
		1. *Tribulus L.*				
	1.1.	1.2. *T.terrestris L.*	Annual	2	2	2
XI		***Convolvulaceae Juss.***				
		1. *Convolvulus L.*				
	1.1.	1.2. *C.arvensis L.*	Perennial	2	2	2
XII		***CuscutaceaeDumort***				
		1. *Cuscuta L.*				
	1.1.	1.2. *C.approximata Babling.*	Annual	2	2	2
XIII		***Boraginaceae Juss.***				
		1. *Asperugo L.*				
	1.1.	1.2. *A.procumbens L.*	Annual	2	2	2
XIV		***Asteraceae Dumort.***				
		1. *Acroptilon Cass.*				
	1.1.	1.2. *A.repens (L) DC.*	Perennial	3	3	3
		2. *Xanthium L.*				

		2.1. *X.strumarium L.*	Annual	3	3	3
		2.2. *X.spinosum L.*	Annual	2	1	2
		3. *Lactuca L.*				
		3.1. *L.serriola L.*	Biennial	2	2	2
		4. *Cichorium L.*				
		4.1. *C.intybus L.*	Perennial	2	2	2
		5. *Taraxacum L. Ex Wigg.*				
		5.1. *T.officinale Web.*	Perennial	2	2	2
		6. *Cirsium Adans.*				
		6.1. *C.ochrolepideum Juz.*	Perennial	3	3	3

The most common family is Poaceae Barnhart, which includes 4 genera and 4 species. Amaranthaceae Juss. - Aerva Lanata Juss 1 category, 1 species, Caryophyllaceae Juss. - Dianthus 1 category, 1 species, Brassicaceae Burnelt – Plumboginaceae 1 category, 1 species, Asteraceae Dumort. - asteridae Weeds in 3 categories and 3 types are an example (Bukhorov et al., 2003, Bukhorov et al., 2023, Ruziev et al., 2023).

Most importantly, during the research, it was found that the number of weeds in the cultivated fields is increasing year by year. An increase in the types of weeds detected over time is observed from the third year.

The composition of weed species found in the wheat agrocenosis is largely related to the occurrence of weeds specific to the type of crop sown in rotation. Annual fall and overwintering weeds in cotton fields germinate from the same period as winter wheat. Such weeds include species such as Descurainia sophia, Capsella bursa-pastoris, Sisymbrium loeselii, Thlaspi perfoliatum, Brassica campestris, Vaccaria segetalis, Turgenia latifolia, Spinacia turkestanica, Stellaria media, Lepyrodiclis holosteoides, Scandix pectin-veneris, Lamium amplexicaule, Cirsium ochrolepideum (Table 4).

Table 4: The amount of weeds per 1 м^2

№	Types of weeds	Number of weeds, pieces/ м^2	Contamination degree, points
1	*Capsella bursa-pastoris*	43-60	3
2	*Ceratocephalus testiculatus*	22-48	2
3	*Lamium amplexicaule*	21-28	2
4	*Fumaria vaillantii*	14-28	1
5	*Spinacia turkestanica*	18-27	2
6	*Stellaria media*	28-48	2
7	*Euphorbia helioscopia*	7-14	1
8	*Nonnea melanocarpa*	28-56	2
9	*Lepyrodiclis holosteoides*	22-46	3
10	*Sisymbrium loeselii*	7-22	2
11	*Descurainia sophia*	38-78	3

As can be seen from the data in the table, the largest number of weeds was Descurainia Sophia - 38-78, Capsella bursa-pastopis - 43-60, Nonnea melanocarpa - 28-56. The level of these weeds contaminating the fields was also 2-3 points. This ephemeral weed does not cause severe damage to winter wheat, as its vegetation period is completed until the winter wheat plant produces an ear, i.e. in the first decade of May.

Among the winter weeds that continue their vegetation in the spring, such as Roemeria refracta, Papaver pavoninum, Nonnea melanocarpa, Fumaria vaillantii, Ranunculus arvensis, Neslia apiculata, Atriplex tatarica do not have a negative effect on the growth and development of winter wheat.

For crops in winter wheat fields, weeds that continue to grow after the earing phase cause significant damage to winter wheat. They are located in the upper layer of the crop ear in the wheat field, and when harvesting, their seeds are collected mixed with wheat grain. Weeds whose seeds are found together with wheat grain include Cirsium ochrolepideum, Descurainia sophia, Sisymbrium loeselii, Sorghum halepense, Melilotus officinalis, Vicia ervilia, Convolvulus arvensis, Galium tricorne, Galium aparine, Acroptilon repens.

According to the researches, annual weeds found around wheat fields are Avena fatua, Bromus tectorum, Setaria viridis, Echinochloa crus-galli, Sisymbrium loesellii, Descurainia sophia, Euclidium syriacum, Xanthium strumarium, belonging to families such as Poaceae, Brassicaceae, Asteraceae, Papaveraceae, Chenopodiaceae, Roemeria refracta,

Atriplex tatarica species are dangerous weeds for wheat fields.

4 CONCLUSIONS

In conclusion, it can be said that the lack of timely control of such weeds around the fields causes a sharp decrease in the winter wheat yield in the wheat agrocenosis. Because such weeds are representatives of local wild flora, they have the characteristic of rapid vegetative reproduction. Especially, among them, *Acroptilon repens, Hyoscyamus niger, Datura stramarium, Heliotropium lasiocarpum*, etc are also found around the plantations.

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