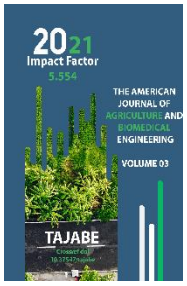
The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06

IMPACT FACTOR
2021: 5. 554

OCLC - 1121105746



Wild Relatives Of Cultivated Plants Of Karakalpakstan And Khorezm And Their Systematic Review

A.B. Ajiev
Associate Professor Of The Department Of Methods Of Teaching Botany And Ecology, Nukus State Pedagogical Institute Named After Ajiniyaz, Nukus, Uzbekistan

ABSTRACT

The results of systematic review of wild relatives of cultivated plants (WRCP) of the Republic of Karakalpakstan and Khorezm are presented.

In the flora of Karakalpakstan and Khorezm, 171 species of wild relatives of cultivated plants belonging to 117 genera and 39 families are recorded. The largest number of WRCP species is found in the Chenopodiaceae. Family, there are 11 general, 29 species in it, which is 9.44 and 16.9 %%, respectively. The family Poaceae has 25 species of wild relatives, concentrated in 20 genera (14.6% and 17.12%, respectively). The third place belongs to the Fabaceae family and Asteraceae: 15 (8.77%) and 13 (7.6%) species, respectively, belonging to 10 (8.56%) genera were recorded in it. Family - Brassicaceae - represented in the outbreak by 11 (9.44%) genera, in which 13 (7.6%) species are wild relatives of cultivated plants or are close to cultivated.

KEYWORDS

Wild relatives of cultivated plants, flora, natural plant communities, biodiversity protection, etc.

INTRODUCTION

The needs of mankind in providing food are increasing every year. In this connection, the search for new sources of genes for cultivated species in order to increase their productivity, early maturity, resistance to pathogens and unfavorable growing conditions is becoming more and more urgent. Thus, the value and role of plant genetic resources as a starting

The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06
IMPACT FACTOR
2021: 5. 554
OCLC - 1121105746

material, of which wild relatives of cultivated plants (WRCP) are an integral part, increases. As an integral part of any flora, relatives of cultivated plants are under pressure from an ever increasing anthropogenic load. Considering the listed problems, the main task of our work was to study the spread of WRCP in the north of Uzbekistan in connection with the development of recommendations for the preservation of their gene pool.

It is known that hybridization of cultivated varieties with their wild relatives is the most radical way in breeding for immunity, resistance to extreme meteorological factors, product quality, and architectonics of cultivated plants (Nikitin V.V., Bondarenko O.N., 1973). In this regard, the study, use in selection and conservation of wild relatives of cultivated plants in nature are of great importance for the development of agriculture. And, as practice has shown, the attraction of wild plants opens up wide opportunities in breeding. Consequently, the wild relatives of cultivated plants are a valuable source material, the value of which increases with the growth of our knowledge and the improvement of the art of selection. Therefore, the disappearance of representatives of wild relatives, cultivated plants, as well as any other species from nature, means a partial irreversible death of the germ plasma, the loss of potential genetic material valuable for humanity (Takhtajyan A.L., 1978). Now we cannot fully foresee which types of wild flora will be needed by a person, which of them will be introduced into culture, which germplasm will be needed in the future to improve varieties.

The first stage in the study of WRCP is their inventory as part of the regional flora. Literary sources, herbarium collections, field research materials, etc. were used to fully identify WRCP in the flora of Karakalpakstan and Khorezm.

To determine the features of the WRCP of the study area and identify priority species for conservation, we carried out an analysis, including the characteristics of their taxonomic, geographic and ecological-cenotic features, directions of economic use and the degree of relationship with cultural species.

Taxonomic analysis allows you to get an idea of the richness of the investigated flora with WRCP species and their systematic diversity.

As a result of an inventory of wild relatives of cultivated plants found in the flora of the former USSR (Brezhnev D. D, Korovina O.N., 1981), 584 species and 374 intraspecific taxa belonging to 36 families and 132 genera have been identified and described.

The Central Asian focus is home to 249 species of wild relatives of cultivated plants, which is 42.4% of all wild relatives growing on the territory of the former USSR (unpublished data of B. Sarybaev).

However, in relation to the total number of wild species of the Central Asian focus (and there are about 7000 of them there), wild relatives of modern cultivated plants make up only 3.6% of the flora. These are the species that were used in the creation of varieties of cultivated plants (with the help of a person or spontaneously) and have not lost their significance in it at the present time. Their small number indicates that mankind has not yet used all the possibilities of the wild flora of the Central Asian focus, therefore, its study should be intensified. Having supplemented the indicated number of species with intraspecific taxa of different ranks (subspecies and varieties), it can be assumed that in the Central Asian focus there are a total of 285 taxa (or 249

species) of wild relatives of cultivated plants belonging to 98 genera and 29 families (unpublished data of B. Sarybaev).

The work is based on materials from herbarium collections and geobotanical descriptions from the entire study area of Karakalpakstan and Khorezm.

For the inventory of WRCP species in the flora of Karakalpakstan and Khorezm, the herbarium collections of the funds of the Institute of Natural Sciences of the KCO AS RUz, the Institute of Botany of the AS RUz, the Herbarium of the GBS RAS named after Tsitsin, herbarium of prof. Elenevsky Department of Botany, Moscow State Pedagogical University - more than 2500 herbarium sheets were viewed in total. When compiling the list of WRCP, the materials of the expeditions of the Institute of Natural Sciences of the KCO AS RUz were also taken into account.

The main literary sources for the compilation of the annotated list of WRCP were the Keys to Higher Plants of Karakalpakstan and Khorezm (1981, 1982); Keys to plants of Central Asia, Flora of Uzbekistan, Red Book of RUz, catalog "Wild relatives of cultivated plants in Russia" (2005), Wild relatives of cultivated plants of the flora of the USSR (Brezhnev, Korovina, 1981), Cultural plants and their relatives (Zhukovsky, 1971), Flora Karakalpakstan (Erezhepov, 1978), Wild fibrous plants of Uzbekistan (Burygin, 1942), Wild useful plants of Russia (Budantsev, Lisovskaya, 2001), State register of breeding achievements allowed for use (2014).

The object of the analysis was the WRCP species that have food, forage, medicinal, decorative, melliferous and technical significance (Catalog, 2005; State Register, 2014). The names of taxa are given in accordance with the summary by S.K.Cherepanov (1995).

To compare the taxonomic composition of the WRCP in various natural areas, the Jaccard coefficient was used, calculated by the formula: $Kj = c/(a+b-c)$, where a is the number of taxa in the first flora, b is the number of taxa in the second flora, c is the number of taxa common for the 1st and 2nd flora (Jaccard, 1901; Schmidt, 2005).

We found that the taxonomic structure of the WRCP has its own characteristics in comparison with the flora as a whole. In the flora of Karakalpakstan and Khorezm, 171 species of wild relatives of cultivated plants belonging to 117 genera and 39 families are recorded. The largest number of species of wild relatives of cultivated plants is found in the family of Compositae (Chenopodiaceae Vent.), There are 11 general, 29 species, which is 9.44 and 16.9 %%, respectively. The family of cereals (Poaceae Barnbart) has 25 species of wild relatives, concentrated in 20 genera (14.6% and 17.12%, respectively). The third place in the flora of Karakalpakstan and Khorezm in terms of the number of wild relatives of cultivated plants belongs to the legume family (Fabaceae Lindl.) And Asteraceae (Asteraceae Dumort.): 15 (8.77%) and 13 (7.6%) species, respectively, are noted in it, belonging to 10 (8.56%) genera. The next family - cabbage (Brassicaceae Burnett.) - is represented in the outbreak by 11 (9.44%) genera, in which 13 (7.6%) species are wild relatives of cultivated plants or are close to cultivated ones (Ajiev, 2020).

The families Polygonaceae Juss., Apiaceae Lindl., Rosaceae Juss and Solonaceae Juss are represented by 4 genera each, but with a different number of species. The number of species in these families ranged from 10 in buckwheat, 6 in celery, and 5 each in Rosaceae and Solanaceae.

This was followed by the families of bindweed - Convolvulaceae Juss., (4 species in 2 genera),

The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06
IMPACT FACTOR
2021: 5. 554
OCLC - 1121105746

plantains - Plantaginaceae Juss., (3 species in 1 genus), mallow - Malvaceae Juss., (3 species in 3 genera).

There were 2 species in one genus in the families of suckers - Elaeagnaceae Juss., Caperceae - Capparaceae L., amaranths - Amaranthaceae Vent., And onions - Alliaceae J. Agardn.

There were 2 species of wild-growing relatives of cultivated plants in 2 genera in 4 families, these are: double-leaved - Zygophillaceae L., sedge - Cyperaceae Juss., Labiate - Lamiaceae Lindl., and buttercup - Ranunculaceae Juss. The rest of the families were represented by 1 species from 1 genus (Table 1).

Table 1.

Quantitative composition of genera and species of wild relatives of cultivated plants in families

№	Families	Quantity			
		genera	%	Species	%
1.	Chenopodiaceae Vent.	11	9,44	29	16,96
2.	Poaceae Barnbart	20	17,12	25	14,62
3.	Fabaceae Lindl.	10	8,56	15	8,77
4.	Asteraceae Dumort.	10	8,56	13	7,60
5.	Brassicaceae Burnett	11	9,44	13	7,60
6.	Polygonaceae Juss.	4	3,50	10	5,85
7.	Apiaceae Lindl.	4	3,50	6	3,51
8.	Rosaceae Juss.	4	3,50	5	2,92
9.	Solonaceae Juss.	4	3,50	5	2,92
10.	Salicace Mirbel.	2	1,75	5	2,92

The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06

IMPACT FACTOR
2021: 5. 554

OCLC - 1121105746

11.	Cucurbitaceae Juss.	1	0,86	1	0,58
12.	Zygophillaceae L.	2	1,75	2	1,17
13.	Convolvulaceae Juss.	2	1,75	4	2,34
14.	Malvaceae Juss.	3	2,60	3	1,75
15.	Plantaginaceae Juss.	1	0,86	3	1,75
16.	Cyperaceae Juss.	2	1,75	2	1,17
17.	Lamiaceae Lindl.	2	1,75	2	1,17
18.	Ranunculaceae Juss.	2	1,75	2	1,17
19.	Alliaceae J. Agardn	1	0,86	2	1,17
20.	Amaranthaceae Vent.	1	0,86	2	1,17
21.	Capparaceae L.	1	0,86	2	1,17
22.	Elaeagnaceae Juss.	1	0,86	2	1,17
23.	Rutaceae Juss.	1	0,86	1	0,58
24.	Equisetaceae Rich. Ex DC.	1	0,86	1	0,58
25.	Ephedraceae Dumort.	1	0,86	1	0,58
26.	Alismataceae Vent.	1	0,86	1	0,58
27.	Apocynaceae Juss.	1	0,86	1	0,58
28.	Asclepiadaceae R.Br.	1	0,86	1	0,58
29.	Boraginaceae Juss.	1	0,86	1	0,58

The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06
IMPACT FACTOR
2021: 5. 554
OCLC - 1121105746

30.	Caryophyllaceae Juss.	1	0,86	1	0,58
31.	Fumariaceae DC	1	0,86	1	0,58
32.	Iridaceae Juss.	1	0,86	1	0,58
33.	Peganaceae Tiegh	1	0,86	2	1,17
34.	Plumbaginaceae Juss.	1	0,86	1	0,58
35.	Portulacaceae Juss.	1	0,86	1	0,58
36.	Tamaricaceae Link	1	0,86	1	0,58
37.	Typhaceae Juss.	1	0,86	1	0,58
38.	Urticaceae Juss	1	0,86	1	0,58
39.	Nitrariaceae Bercht. & J.Presl.	1	0,86	1	0,58
Total		**117**	**100**	**171**	**100**

The five largest families are distinguished by a special diversity of taxonomic composition: Chenopodiaceae, Poaceae, Fabaceae, Asteraceae and Brassicaceae, which include 62 genera and 95 species or, respectively, 52.9 and 55.5% of the total number of wild relatives of cultivated plants.

Among the wild relatives of cultivated plants in the flora of Karakalpakstan and Khorezm, there are 3 endemic and 1 relict species that require separate study and protection.

The areas of the latter are narrowly limited within the study area (Table 2.). Of the endemics found here, the most widespread is Stipa barchanica Lomonosova, it is found in 2 districts of Ustyurt and Kzylkum.

Lagochilus acutiloba (Ledeb.) Fisch are narrowly localized endemic species for the studied flora. end C.A. Mey found in Ustyurt and Calligonum colubrinum Borszcz found in Kyzylkum.

The relict species is Malacocarpus crithmifolius (Retz.) C.A. Mey., Which is found only in the eastern part of the Ustyurt plateau.

The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06
IMPACT FACTOR
2021: 5. 554
OCLC - 1121105746

Table 2.

Endemic taxa growing in the territory of Karakalpakstan and Khorezm

№	Taxa	Growing subareas	Number of subareas
Endemic			
1	*Lagochilus acutiloba* (Ledeb.) Fisch. end C.A.Mey	Ustyurt, Kyzylkum	2
2	*Calligonum colubrinum* Borszcz.	Kyzylkum	1
3	*Stipa barchanica* Lomonosova	Ustyurt	1
Relict			
4	*Malacocarpus crithmifolius* (Retz.) C.A.Mey.	Ustyurt	1

Such localization of endemic species also allows us to assert that in a number of subregions, careful protection of wild relatives of cultivated plants by creating protected areas is necessary. To compare the systematic similarity of the WRCP of different areas of the Republic of Karakalpakstan and Khorezm, we calculated the Jaccard coefficient of composition (Jaccard, 1901; Schmidt, 2005). Comparisons were made on the composition of the WRCP of the Amudarya delta (DA), Ustyurt (Us), Kyzylkum (Kk), Aralkum (Ak), and Khorezm (Khz) (Table 3).

Table 3.

Similarity coefficients of the taxonomic composition WRCP of different areas of the Republic of Karakalpakstan and Khorezm, (Jaccard, 1901; Schmidt, 2005)

№	Comparative Floras	Jaccard coefficient
1.	DA – Ak	0,1186
2.	Khz – Ak	0,1262
3.	Kk – Ak	0,1538
4.	Us – Ak	0,1777

The American Journal of Agriculture and Boimedical Engineering
(ISSN – 2689-1018)
Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06

IMPACT FACTOR
2021: 5. 554

OCLC - 1121105746

5.	Us – Khz	0,2317
6.	Us – DA	0,2317
7.	Kk Kk DA	0,3051
8.	Kk – Khz	0,3120
9.	Us – Kk	0,4583
10.	DA – Khz	0,8119

It can be seen from this table that the most similar floras of the Amu Darya and Khorezm Delta where the indicators were equal to 0.81, and the least similar were the Khorezm-Aralkum 0.13 and the Amu Darya and Aralkum where the indicators were 0.12.

Comparatively the same indicators were observed when comparing the flora of Kyzylkum-Khorezm and Kyzylkum-Amu Darya (0.31 and 0.30, respectively), the same indicators were in the flora of Ustyurt-Amu Darya and Ustyurt-Khorezm (0.23).

Concluding the review on the use of wild relatives of cultivated plants of the Karakalpakstan and Khorezm, we can say about the great diversity of its genetic wealth, which is fraught with a huge valuable material for breeding.

Analysis of wild relatives of cultivated plants in the outbreak showed that only 171 species have been identified so far, however, with further progress in agriculture, the use of new material and the introduction of new valuable species of flora into culture, the list of wild relatives of cultivated plants will increase.

Each species, occupying a vast area in the outbreak, at different points of it bears its own unique characteristics, the best of which a person can use in breeding.

Further research and the establishment of intraspecific polymorphism make it possible to reveal a huge additional source material that humanity can use to create even more advanced varieties.

REFERENCES

1. Nikitin, V. V. Synopsis of wild relatives of cultivated plants and their distribution on the territory of the USSR / V. V. Nikitin, O. N. Bondarenko. 1974. - L., 69 p.
2. Takhtajyan A. L. Floristic areas of the earth. L.: Nauka, 1978. -247 p.
3. Brezhnev, D. D., Korovina O. N. 1981. Wild relatives of cultivated plants of the flora of the USSR-L.: Kolos. 376 p.
4. Korovina O. N., Bakhiev. A. et al. Illustrated determinant of the higher plants of Karakalpakstan and Khorezm.- Tashkent.: "Fan»Ties of the USSR, 1982, vol. 1, 225 p.
5. Korovina O. N., Bakhiev. A., Tajitdinov U. T., Sarybaev. B. Illustrated determinant of higher plants of Karakalpakstan and Khorezm. Tashkent.: "Fan" Uz SSSR 1983. vol. 2. - . 201 p.
6. Zhukovsky P. M. Cultural plants and their relatives. - L.: Kolos, 1964. - p. 501.
7. 33. State register of breeding achievements allowed for use. Volume

Published: January 31, 2021| **Pages:** 31-39
Doi: https://doi.org/10.37547/tajabe/Volume03Issue01-06

1. Plant varieties [Electronic resource]. - M., 2014. - 456 p. - Access mode: http://old.gossort.com/ree_cont.html.

8. Catalog of the VIR world Collection. Wild relatives of cultivated plants / T. 46. N. Smekalova, I. G. Chukhina; ed. by N. I. Dzyubenko. - St. Petersburg: SSC RF VIR, 2005. - 54 p.
9. Cherepanov S. K. 1995. Vascular plants of Russia and neighboring states. St. Petersburg: Mir i semya-95, 990 p.
10. Ajiev A. B. To study the species composition of wild relatives of cultivated plants of Karakalpakstan and Khorezm // Bulletin of Science and Education. 2016. No. 9 (21). - pp. 24-28. DOI: 10.20861 /2312-8089-2016-21-001.
11. Azhiev, A. B., G. A. Nazarbayev, Bahodirova D. Distribution of wild relatives of cultural plants of the Republic of Karakalpakstan on economically valuable groups // Scientific medical Herald, 2016. N4(6). –S. 51-58.
12. Azhiev, A. B., Bahodirova D. B., G. A. Nazarbayev analysis of the distribution of economically valuable species of wild relatives of cultivated plants in the Republic of Karakalpakstan // problems of modern science and education. 2017. No. 6 (88). - pp. 14-16. DOI: 10.20861/2304-2338-2017-88.
13. Schmidt, V. M. 2005. Flora of the Arkhangelsk region / V. M. Schmidt. - St. Petersburg: Publishing House of St. Petersburg University, 346 p.
14. Ajiev A.B. Wild Relatives of cultivated plantsof the republic of Karakalpakstan AND Khorezm and their economic significance. Vol. 21 No. 6 (2020): October 2020. Journal of Natural Remedies (JNR) c ISSN: 2320-3358
15. Jaccard, P. 1901.Distribution de la flore alpine dans le Basin de Dranses et dans quelques regions voisines / P. Jaccard // Bull. Soc. vaud. Sci. natur. – Vol. 37. – №140. – P. 241-272.