

Tashkent New Airport Project

Flora and Habitat Survey Report



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1. Aims and objectives

1. In accordance with TOR, the main tasks of expert-botanist are following:

- Field survey of the flora and habitats of the Project area and processing of field data.
- Literature review (analysis of publications, reports and other available data devoted to the flora and habitats of the Project area).
- Compilation of the habitat map and the check-list of plant species recorded within the Project area (in particular, threatened species included in the Red Data Book of Uzbekistan and/or the IUCN Red List).

2. Project area

2. The Project area is situated in the Quyi Chirchiq and Urta Chirchiq districts of Tashkent Region 6–11 km south of Tashkent city, 7–12 km east of the town Yangiyul (Figure 1). Physiographically, the Project area is located in the valley of the river Chirchiq (right tributary of Syrdarya River), 3–12 km east of the river banks, on the alluvial-proluvial plain occupied mainly with anthropogenic landscapes (irrigated arable lands, gardens, woodland belts, channels and settlements), at the elevations of 300–360 m a.s.l. This area belongs to the ancient Tashkent oasis, a region with the most valuable agricultural lands and with the best and most fertile soils of Uzbekistan. Within the project area, the terrain is flat and dissected with irrigation network (numerous channels and ditches).

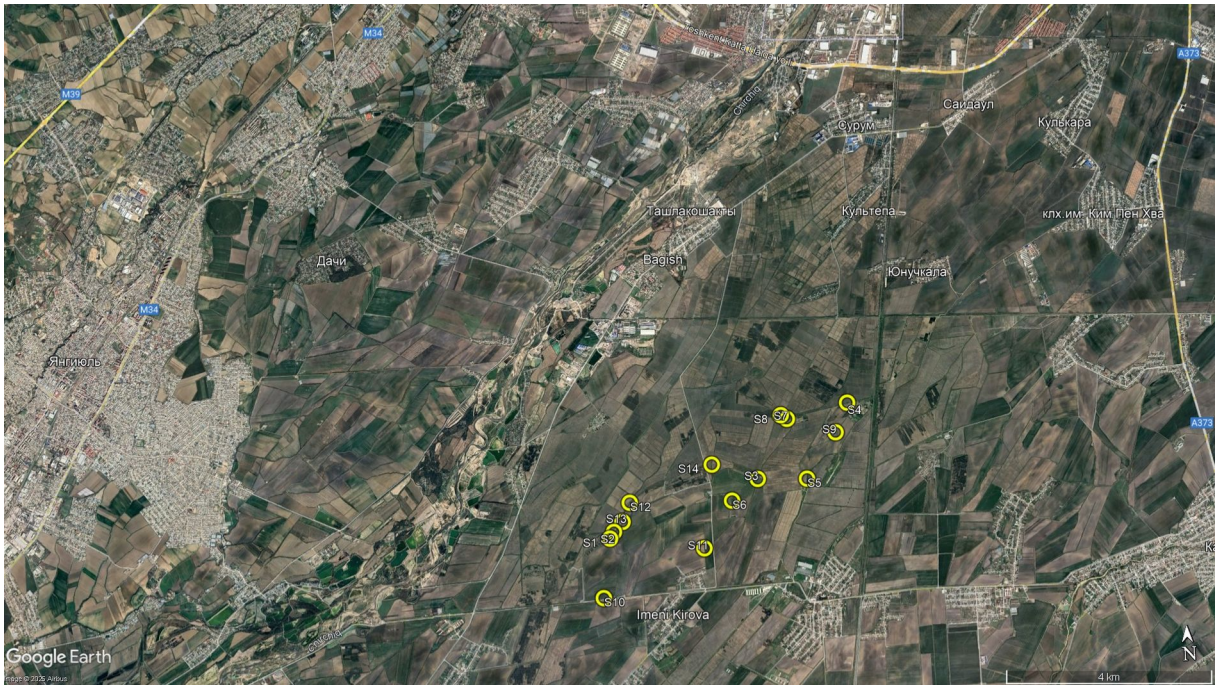


Figure 1: Study area and locations of sample plots (yellow markers)

3. According to the Köppen climate classification (Kottek & al., 2006), the Project area belongs to the zone of hot-summer Mediterranean climate (Csa) characterized by hot and dry summers and fairly mild winters. The mean annual temperature is 14.1° C, mean annual rainfall is 427 mm. Most of the precipitation falls in winter and springtime.

4. According to the scheme of phytochoria of Uzbekistan, the project area belongs to Chinaz phytogeographical region of the Middle Syrdarya district of Turan province (Tojibaev et al., 2017; Beshko et al., 2024).

3. Materials and methods

5. The field survey of flora and habitats was conducted 19 April 2025 using the traditional methods of botanical survey commonly used for sampling and mapping of vegetation, recognition of floristic composition and spatial patterns of plant communities (Field geobotany, 1959–1976; Granitov, 1980; Shcherbakov, Mayorov, 2006; Kent, 2011; Methodological guidelines, 2021). It total, 14 sample plots (quadrats of 50x50 m) were surveyed within the Project area (Table 1, Figure 1).

Table 1:Coordinates of botanical survey points (sampling quadrats)

ID	Coordinates (Decimal degrees, WGS 1984)	
	Latitude	Longitude
S-1	41.084836	69.183881
S-2	41.085949	69.184874
S-3	41.093706	69.21899
S-4	41.106106	69.240965
S-5	41.093246	69.230457
S-6	41.090181	69.212726
S-7	41.103891	69.226675
S-8	41.104606	69.225308
S-9	41.101048	69.237804
S-10	41.074603	69.181664
S-11	41.08693	69.205833
S-12	41.090865	69.188936
S-13	41.087615	69.187015
S-14	41.096669	69.208525

6. At each survey plot, habitat type and quality (phytosociological indicators, land use and disturbance factors) were assessed. Habitat categories were verified on the ground, with regards to the definition of Natural Habitats and Modified Habitats (IFC 2012, PS 6). The structure of plant communities was described on 50x50 m squares. For each sample plot, photographs of the habitat were taken using a digital camera, location and physical environment (including GPS coordinates, elevation, topography, and soil type), canopy cover (%), all plant species present at the plot, their cover and abundance, phenological stage and height were recorded.

7. The abundance of plant species was determined using the DAFOR scale (D = Dominant; A = Abundant, F = Frequent, O = Occasional, R = Rare) and the Braun-Blanquet scale (+ – occasional and less than 1% of canopy cover; 1 – abundant with low cover, or less abundant but with higher cover, 1–5%; 2 – abundant with >5–25% of canopy cover, irrespective of the number of individuals; 3 – >25–50% of canopy cover, irrespective of the number of individuals; 4 – >50–75% cover of the sample plot area, irrespective of the number of individuals; 5 – >75% of canopy cover, irrespective of the number of individuals). Both scales allow a rapid and reasonably accurate visual assessment of the cover and abundance of each species in plant community.

8. Plant species were identified using special literature, as “Conspectus Florae Asiae Mediae” (1963–2015), “Flora of Uzbekistan” (1941–1963, 2016, 2017, 2019, 2022, 2023a, 2023b) and “Flora of USSR” (1934–1964). Available publications and online databases (Nikitin, 1983; IUCN/ISSG, 2014; CABI, 2017; Sennikov et al., 2018) were used for identification of alien species, while the Red Data Book of Uzbekistan (1984, 1998, 2006, 2009, 2019) and the IUCN Red List (2025) were used for identification of threatened species.

9. The total check-list of plant species recorded for the project area was compiled (Annex 1), and the global and national status of each species was provided (according IUNC Red List

and Red Data Book of Uzbekistan). Species in the checklist are arranged in alphabetic order. Accepted scientific names are provided in accordance with the online global databases Plants of the World Online, POWO (www.powo.science.kew.org), International Plant Names Index, IPNI (www.ipni.org) and Global Biodiversity Information Facility, GBIF (www.gbif.org), as well as with recently published treatments of different families of the flora of Uzbekistan (Sennikov, 2016, 2017, 2019, 2022, 2023a, 2023b).

10. The habitat map was created using QGIS 3.32.3 free software on the basis of visual interpretation of Google Earth free satellite imagery and the data of field survey. Since Uzbekistan has not developed the national system of classification of habitats, IUCN Habitats Classification Scheme ver. 3.1 (https://www.iucnredlist.org/resources/habitat-classification-scheme) and IUCN Global Ecosystem Typology ver. 2.0 (Keith et al., 2020) were used for the classification of habitats of project area. As far it was applicable to the local conditions, we also followed the pan-European system, EUNIS habitat classification scheme.

11. For the purposes of implementation of International Finance Corporation Performance Standard 6 (IFC PS6), habitats are divided into modified, natural, and critical. Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition. Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Critical habitats are a subset of modified or natural habitats.

12. As defined in the IFC PS6, critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

13. Numerical thresholds have been defined for the first four critical habitat criteria (i.e., CR/EN species; endemic/restricted-range species; migratory/congregatory species; threatened and unique ecosystems); these thresholds are based on these published by IUCN in "A Global Standard for the Identification of Key Biodiversity Areas" (2016) and "IUCN Red List Categories and Criteria" (2012). According to the IFC Guidance Note 6, quantitative thresholds of critical habitat are following:

14. Criterion 1 – CR/EN species. Criterion 1 is triggered by species listed as CR or EN on the IUCN Red List, and nationally/regionally listed species assessed using similar criteria: a) habitat required to sustain at least 10% of global population of CR or EN species, where there are known, regular occurrences of the species and where that habitat could be considered a discrete management unit for that species; (b) habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management sites globally for that species; (c) habitat supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally important concentrations of a red-listed EN species where that habitat could be considered a discrete management unit for that species/subspecies; (d) habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species; (e) as appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing.

15. Criterion 2 – Endemic / restricted range species. Criterion 2 is triggered by habitats of significant importance for endemic or restricted-range species: (a) habitat known to sustain ≥95% of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species (e.g. a single-site endemic); (b) habitat known to sustain ≥1% but <95 % of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that

species, where data are available and/or based on expert judgment. Assessment parameters are: i) number of mature individuals, ii) area of occupancy, iii) extent of suitable habitat, iv) range, v) number of localities, vi) distinct genetic diversity.

16. Criterion 3 (migratory species) in inapplicable for plants. As for Criterion 4, unfortunately, the officially approved national list of highly threatened and/or unique ecosystems and habitats does not exist in Uzbekistan. For Criterion 5, there are no numerical thresholds.

17. It should be noted that currently only 289 taxa of more than 4380 species recorded for the flora of Uzbekistan were assessed by IUCN (6.6% of the flora), 27 species of them were included in the IUCN Red List as threatened (7 – CR, 10 – EN, 10 – VU), 17 of them are red-listed at the national level. 12 plant species were assessed as Near Threatened (NT), 227 – Least Concern (LC), and 23 species belong to the category DD (Data Deficient). The majority of species of the flora of Uzbekistan has not yet been assessed by IUCN and belongs to the category NE (Not Evaluated).

18. To date, 5 editions of the Red Data Book of Uzbekistan have been published. The first (1984) included 163 plant species, the second (1998) – 301, the third (2006) – 302, the fourth (2009) – 321, and an actual, fifth edition (2019), includes 314 plant species. There are 4 categories of threatened plant species in the Red Data Book of Uzbekistan (1-5th editions):

19. 0 (probably extinct species) – species that have not been recorded for several decades, but may have survived in remote inaccessible places or ex situ. Approximately corresponds to EX or EW categories of the IUCN Red List.

20. 1 (endangered, disappearing species) – extremely rare species with very low population that are on the verge of extinction. Approximately meets CR and EN categories of the IUCN Red List.

21. 2 (rare species) – species that are not currently under direct risk of extinction, but have such low population or grow in very limited and specific habitats that they may quickly extinct in the future. Approximately meets VU category of the IUCN Red List.

22. 3 (decreasing species) – species whose population and range have been steadily declining due to natural and/or anthropogenic factors. Approximately corresponds with NT category of the IUCN Red List.

4. Literature review

23. The flora and vegetation of the mountainous part of Tashkent Region are well studied and described in numerous publications, but the plant diversity of the plain part is still insufficiently explored.

24. The first scientific data on plant diversity of this territory has been obtained during the 19th Century by famous Russian naturalists and explorers Nikolai Severtzov (expeditions of 1864–1868 in Tien Shan, including basin of the river Chirchiq and surroundings of Tashkent), and Aleksei and Olga Fedtschenko (expeditions of 1866–1871 in Central Asia, including valley of the river Syrdarya, basin of the river Akhangaran and surroundings of Tashkent). Materials of these first expeditions were published in "Traveling around the Turkestan region and exploring the mountainous country of the Tien Shan" by Severtzov (1873), 24 issues of "Fedtschenko's Reisen in Turkestan" (1874–1902) by Olga Fedtschenko. Later, in 1897–1915, Olga Fedtschenko together with his son Boris Fedtschenko carried out four expeditions to Central Asia, including the environs of Tashkent.

25. Albert Regel, a physician and naturalist who worked in Russian Turkestan in 1875–1885 and conducted numerous excursions to the most remote places of Central Asia, explored the flora of basin of the river Chirchiq and surroundings of Tashkent in 1876, 1880–1882, 1884 and 1885. Extensive material was also collected by Regel's local assistant, Mahmud Musa

Ruzin, who accompanied Regel on his trips and carried out independent expeditions in basin of the river Akhangaran and surroundings of Tashkent in 1880.

26. In 1881, French scientists and explorers Guillaume Capus and Pierre Gabriel Bonvalot performed large-scale travel to Central Asia, collected plants and described vegetation and landscapes in several books devoted to their expedition. In particular, the route of their expedition passed on the right bank of the Syrdarya between the throat of the Ferghana Valley and Tashkent, in the surroundings of Tashkent, and along the rivers Chirchiq, Chatkal and Pskem. Herbarium material collected by Capus and Bonvalot has been processed by French botanist A.R. Franchet, who published “Plantes du Turkestan: Mission Capus” in 1883. At the present, these specimens are kept mainly in the Herbarium of the National Museum of Natural History, Paris (P).

27. At the end of the 19th Century and the beginning of the 20th Century, V.I. Lipsky, D.I. Litvinov, B.A. Fedtschenko, O. Paulsen and other major Russian and foreign botanists of that time also collected herbarium specimens and contributed to the accumulation of botanical data. Vladimir Lipsky published a detailed history of botanical research in Central Asia in the 19th Century and early 20th Century in the book “Flora of Central Asia, i.e. Russian Turkestan and Bukhara and Khiva Khanates” (1902–1905). In 1908–1917, the Migration Department of Russian government organized a number of expeditions for investigation of soils and vegetation of Central Asia within the framework of colonization of this region. In particular, Z.A. Minkwitz in 1914 and M.V. Kultiasow, I.I Sprygin and K.M. Zalessky in 1916 studied the flora and vegetation of Chirchiq River basin and surroundings of Tashkent. The supervisor of botanical studies of these expeditions was Boris Fedtschenko, a head botanist of the Imperial Botanical Garden in Saint Petersburg. As a result of these large-scale researches, a huge amount of herbarium was collected, numerous new taxa and a diversity of plant communities were described for the first time, and the first geobotanical maps were compiled. Main results of these expeditions were published in series of reports (Fedtschenko, 1912–1915; Minkwitz, 1916), 6 volumes of «Conspectus florae Turkestanicae» (Fedtschenko, 1906–1916), a detailed synopsis of the flora of Central Asia with the information on localities, 13 issues of «Flora of Asiatic Russia» (Fedtschenko, 1913–1918), «List of weedy plants of Turkestan» (Fedtschenko, 1915). These preliminary results of the inventory of the plant diversity of Central Asia became the basis for further botanical studies of the Soviet period.

28. In 1918, the Turkestan State University was established in Tashkent (it was given a name of Central Asian State University from 1923 to 1960, Tashkent State University in 1960–2000, and National University of Uzbekistan since 2000). Since early 1920s, botanists of the University performed field surveys covering the entire territory of Central Asia (first of all, Tashkent Region) and focused mainly on the inventory of the flora, investigation of the vegetation cover and identification of plant resources. The history of botanical studies performed by Central Asian State University in 1920–1945 was described in detail by R.U. Rakhimbekov in the book «From the history of studying of nature of Central Asia» (1970).

29. In the 1930–1940s, geobotanical studies (first of all, inventory of flora and survey of pastures) were also carried out in different regions of Uzbekistan by special expeditions of the Committee of Sciences (which in 1940 was reorganized into the Academy of Sciences of Uzbekistan). In particular, K. Koroleva studied the synanthropic and weedy vegetation of the Chirchik River basin in 1931. A.Ya. Butkov studied the vegetation of the whole plain part of the Tashkent region in 1938.

30. The results were used for creation of the first geobotanical map of Uzbekistan and publication of “Flora of Uzbekistan” (1941–1962, in 6 volumes), which reported 4148 plant species (3663 native, 485 – alien, introduced and cultivated). A huge volume of herbarium material collected by Uzbek botanists in Tashkent Region during the Soviet period currently is stored in the National Herbarium of Uzbekistan (TASH).

31. In 1950–1980, the Institute of Botany of the Academy of Sciences of Uzbekistan carried out large-scale expeditions focused mainly on investigation of the vegetation and plant

resources. Results of geobotanical studies were published in the book “Vegetation cover of Uzbekistan and the ways of its practical use” (1971–1984, in 4 volumes).

32. Main publications of the Soviet period containing data on flora and vegetation of Project area are “An identification guide of plants of surroundings of Tashkent” (Popov, 1923), “An identification guide of plants of the Tashkent oasis” (Lapin, 1938, 1941), “Vegetation of Central Asia and South Kazakhstan” (Korovin, 1934, 1961, 1962), “Vegetation cover of Uzbekistan and the ways of its practical use” (1971–1984, in 4 volumes), “Tugay vegetation of Angren River valley and its peculiarities” (Usmanov, 1953), “Medicinal plants of Tashkent Region” (Pulatova et al., 1980), as well as fundamental taxonomical treatments “Flora of the U.S.S.R.” (1934–1964, in 30 volumes), “Flora of Uzbekistan” (1941–1962, in 6 volumes), “Flora of Kazakhstan” (1956–1966, in 9 volumes) and “Conspectus Florae Asiae Mediae” (1963–2015, in 11 volumes).

33. The modern data on the plant diversity of Tashkent Region were published in following works of the post-Soviet period: "Flora of the South-Western Tien Shan (within the Republic of Uzbekistan)" (Tojibaev, 2010), “Plants of Syrdarya Valley” (Sulaymonov et al., 2015), “Botanical geography of Uzbekistan” (Tojibaev et al., 2017), “Checklist of vascular plants of the Tian-Shan Mountain System” (Sennikov, Tojibaev, 2021) and “Inventory of the flora of Uzbekistan: Tashkent Region” (Beshko et al., 2024), dissertations "Wild food plants of the Tashkent region" (Umarov, 1992), "Medicinal plants of the Western Tien Shan" (Khojimatov, 2008) and "Vegetation cover of the Akhangaran river basin" (Azimov, 2018), as well as some papers in scientific journals listed in References. Literature devoted to the flora of Kazakhstan also can be useful, especially “State cadaster of plants of South Kazakhstan Region” (Aralbaev et al., 2002).

34. Information about endemic and rare plant species is given in the Red Data Book of Uzbekistan (1984, 1998, 2006, 2009, 2019).

35. Modern online platforms, including Plantarium (www.plantarium.ru), iNaturalist (www.inaturalist.org), Global Biodiversity Information Facility, GBIF (www.gbif.org), as well as digital herbaria, also are very important in studying the plant diversity of the Project area. For example, a regularly updated online check-list of the flora of the Tashkent Region (with a photo gallery) was created on the Plantarium Internet portal (https://www.plantarium.ru/page/flora/id/1123.html).

36. The most important sources of information on the flora of the Project area are recently published first 6 volumes of the 2nd edition of the “Flora of Uzbekistan” (Sennikov, 2016, 2017, 2019, 2022, 2023a, 2023b) and “Inventory of the flora of Uzbekistan: Tashkent Region” (Beshko et al., 2024). The first 6 volumes of the new national “Flora” (Sennikov, 2016, 2017, 2019, 2022, 2023a, 2023b) contain the treatment of 20 families with 184 genera and 820 species (18.9% of the national flora); for each species, herbarium specimens are cited and distribution maps based on their georeferencing are given. “Inventory of the flora of Uzbekistan: Tashkent Region” (Beshko et al., 2024) contains the check-list of the flora of the Tashkent Region with 2364 species of 667 genera and 105 families, including 6 species listed in the IUCN Red List as globally threatened (CR, EN, VU) and 71 species listed in the Red Data Book of Uzbekistan (2019). In particular, 966 species are reported for the plain part of Tashkent Region (Chinaz phytogeographical region of the Middle Syrdarya district) in this book. According to the data published in “Inventory of the flora of Uzbekistan: Tashkent Region” (Beshko et al., 2024), globally and nationally red-listed plant species occur predominantly in the mountainous part of Tashkent Region, and only one nationally red-listed plant species, Colchicum kesselringii Regel, is recorded in the lower part of Chirchiq River basin and potentially can be found in the Project area.

5. Results of the field survey

37. The field survey was carried out 19 April 2025, and 14 sample plots (quadrats of 50x50 m) were described within the Project area. The description of these sample plots, including photographs and check-lists of plants recorded for each sample plot are represented below.

5.1. Sample plot S-1

38. 41.084836° N 69.183881° E, 356 m a.s.l. Old abandoned cemetery among irrigated arable lands, surrounded with planted trees (Elaeagnus angustifolia, Gleditsia triacanthos, Morus alba, Ulmus pumila). Modified habitat with anthropogenic herbaceous weedy vegetation, mostly annual (Hordeum murinum subsp. leporinum, Poa annua, Poa bulbosa, Alhagi pseudalhagi, Carduus pycnocephalus, Capsella bursa-pastoris, Conium maculatum, Descurainia sophia, Euphorbia helioscopia) on fertile, moderately humid soils (photo 1, 2). In accordance with the typology of vegetation published in the “Vegetation of Middle Asia” (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. In accordance with IUCN habitatы classification, this habitat belongs to the type 14 Artificial – Terrestrial and subtype 14.2 Pasture Land. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome and subtype T7.5 Derived semi-natural pastures and old fields. In accordance with EUNIS habitat classification, it corresponds with type V – Vegetated man-made habitats and subtype V37 Annual anthropogenic herbaceous vegetation.

39. Canopy cover 100%; 47 plant species were recorded (Table 2); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: low (grazing); the cemetery is very old and has not been used for burials for a long time. Probably, this is an archaeological site.

***Table 2: Check-list of plants recorded for annual herbaceous weedy community (Hordeum murinum subsp. leporinum, Poa annua, Poa bulbosa, Alhagi pseudalhagi, Carduus pycnocephalus, Capsella bursa-pastoris, Conium maculatum, Descurainia sophia, Euphorbia helioscopia) on the old cemetery* (sample plot S-1, 41.084836 N 69.183881 E)**

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Acanthocephalus amplexifolius	annual	20-25	O	+	flowering
Aeluropus littoralis	perennial	20-25	O	+	flowering
Alhagi pseudalhagi	perennial	30-40	F	1	vegetation
Allium suworowii	perennial	40-50	O	+	flowering
Astragalus filicaulis	annual	15-20	O	+	flowering
Bromus tectorum	annual	20-25	O	+	flowering
Capsella bursa-pastoris	annual	30-40	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	A	2	flowering
Carthamus turkestanicus	annual	30-40	O	+	vegetation
Cerastium glomeratum	annual	15-20	F	1	Flowering, fruiting
Conium maculatum	biennial	40-50	A	3	vegetation
Convolvulus arvensis	perennial	20-25	O	+	vegetation
Cruciata pedemontana	annual	12-15	F	1	Flowering, fruiting
Descurainia sophia	annual	30-40	F	1	Flowering, fruiting
Elaeagnus angustifolia	tree	3-3.5 m	R	+	vegetation
Equisetum ramosissimum	perennial	30-40	O	+	vegetation
Euphorbia helioscopia	annual	20-25	A	2	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting

Galium humifusum (*Asperula humifusa*)	perennial	20-25	O	+	vegetation
Galium spurium	annual	40-50	O	+	Flowering, fruiting
Geranium pusillum	annual	20-25	F	1	flowering
Gleditsia triacanthos	tree	7-8 m	O	1	vegetation
Glycyrrhiza glabra	perennial	40-50	O	+	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	D	4	budding
Hordeum spontaneum	annual	40-50	F	1	vegetation
Lactuca serriola	Annual, biennial	30-40	F	1	vegetation
Lamium amplexicaule	annual	12-15	O	+	flowering
Lepyrodiclis holosteoides	annual	40-50	F	1	flowering
Lycium dasystemum	shrub	70-100	R	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Milium vernale	annual	15-20	O	+	flowering
Morus alba	tree	4-5 m	R	+	vegetation
Onopordum acanthium	biennial	30-40	R	+	vegetation
Papaver pavoninum	annual	20-25	O	+	flowering
Poa annua	annual	15-20	F	1	flowering
Poa bulbosa	perennial	25-30	A	2	flowering
Potentilla reptans	perennial	12-15	O	+	vegetation
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Sisymbrium altissimum	annual	30-40	R	+	Flowering, fruiting
Spinacia turkestanica	annual	20-25	R	+	Flowering, fruiting
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	F	1	Flowering, fruiting
Tripidium ravennae (*Erianthus ravennae*)	perennial	2-2.5 m	R	+	vegetation
Ulmus pumila	tree	7-8 m	O	1	fruiting
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica persica	annual	15-20	O	+	Flowering, fruiting



Photo 1. Sample plot S-1. Old abandoned cemetery among irrigated arable lands, surrounded with planted trees. Modified habitat with weedy herbaceous vegetation (*Hordeum murinum* subsp. *leporinum*, *Poa annua, Poa bulbosa, Alhagi pseudalhagi, Carduus pycnocephalus, Capsella bursa-pastoris, Conium maculatum, Descurainia sophia, Euphorbia helioscopia*)



Photo 2. Sample plot S-1. Old abandoned cemetery among irrigated arable lands, surrounded with planted trees. Modified habitat with weedy herbaceous vegetation (*Hordeum murinum* subsp. *leporinum*, *Poa annua, Poa bulbosa, Alhagi pseudalhagi, Carduus pycnocephalus, Capsella bursa-pastoris, Conium maculatum, Descurainia sophia, Euphorbia helioscopia*)

5.2. Sample plot S-2

40. 41.085949° N 69.184874° E, 355 m a.s.l. Banks of irrigation channel among arable lands. Modified habitat with hygrophilous perennial herbaceous vegetation formed of tall perennial grasses and sedges (Phragmites australis, Typha latifolia, Imperata cylindrica, Aeluropus littoralis, Carex acutiformis, Eleocharis uniglumis) on fertile, wet gravelly-loamy soil (photo 3, 4). In accordance with the typology of vegetation published in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies of Eurasia. This vegetation occupies both natural (river banks, littoral zones of lakes) and modified wet habitats (ponds, ditches, edges of rice fields, etc.) across lowlands of Central Asia. According IUCN habitat classification, type 15 Artificial – Aquatic and subtype 15.9 Canals and Drainage Channels, Ditches. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type F3 Artificial wetlands biome and subtype F3.5 Canals, ditches and drains. In accordance with EUNIS habitat classification, it corresponds with type C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

41. Canopy cover 90%; 38 plant species were recorded (Table 3); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation).

Table 3: Check-list of plants recorded for hygrophilous perennial herbaceous community (Phragmites australis, Typha latifolia, Imperata cylindrica, Aeluropus littoralis, Carex acutiformis, Eleocharis uniglumis) on the banks of irrigation channel (sample plot S-2, 41.085949 N 69.184874 E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	D	4	flowering
Bidens frondosa	annual	20-25	R	+	vegetation
Bolboschoenus maritimus	perennial	40-50	O	+	flowering
Capsella bursa-pastoris	annual	30-40	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	A	2	flowering
Carex acutiformis	perennial	30-40	F	1	flowering
Cerastium glomeratum	annual	15-20	F	1	Flowering, fruiting
Conium maculatum	biennial	40-50	R	+	vegetation
Convolvulus arvensis	perennial	20-25	F	1	vegetation
Descurainia sophia	annual	30-40	F	1	Flowering, fruiting
Elaeagnus angustifolia	tree	3-4 m	R	+	vegetation
Eleocharis uniglumis	perennial	12-15	F	1	Flowering, fruiting
Equisetum ramosissimum	perennial	30-40	O	+	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering
Fallopia convolvulus	annual	40-50	O	+	vegetation
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Geranium pusillum	annual	20-25	O	+	flowering
Glycyrrhiza glabra	perennial	30-40	A	2	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	F	1	budding
Imperata cylindrica	perennial	25-30	F	1	flowering

Lepidium chalepense (*Cardaria repens)*	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	40-50	F	1	flowering
Lycopus europaeus	perennial	30-40	O	+	vegetation
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	R	+	vegetation
Microphysa elongata	perennial	30-40	R	+	vegetation
Morus alba	tree	5-5.5 m	R	+	vegetation
Persicaria maculosa	annual	20-25	O	+	vegetation
Phragmites australis	perennial	40-50	F	2	vegetation
Poa bulbosa	perennial	25-30	O	+	flowering
Potentilla reptans	perennial	12-15	O	+	vegetation
Ranunculus sceleratus	Annual, biennial	20-25	O	+	Flowering, fruiting
Rumex conglomeratus	perennial	40-50	R	+	vegetation
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	O	+	Flowering, fruiting
Tripidium ravennae (*Erianthus ravennae)*	perennial	120-150	O	1	vegetation
Typha latifolia	perennial	40-50	F	1	vegetation





Photo 3, 4. Sample plot S-2. Banks of irrigation channel among arable lands. Modified habitat with mesic perennial herbaceous vegetation (*Phragmites australis, Typha latifolia, Imperata cylindrica, Aeluropus littoralis*, *Carex acutiformis, Eleocharis uniglumis*)

5.3. Sample plot S-3

42. 41.093706° N 69.21899° E, 364 m a.s.l. Banks of irrigation channel, and a boundary strip between the channel and arable lands and fruit gardens. Modified habitat with planted trees, mesic and hygrophilous perennial herbaceous vegetation formed of reed and liquorice (Phragmites australis, Glycyrrhiza glabra) on fertile, muddy soils on the banks of channel, and anthropogenic herbaceous weedy vegetation, mostly annual (Hordeum marinum subsp. gussoneanum, Hordeum murinum subsp. leporinum, Hordeum spontaneum, Carduus pycnocephalus, Centaurea iberica, Artemisia annua, Descurainia sophia) on a boundary strip between the channel and arable lands and fruit gardens (photo 5, 6). In accordance with the typology of vegetation published in the “Vegetation of Middle Asia” (Nowak et al., 2025), the community of reed and liquorice on the banks of channel belongs to the type of reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies of Eurasia. The community of annual weeds on a boundary strip belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, type 15 Artificial – Aquatic and subtype 15.9 Canals and Drainage Channels, Ditches. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type F3 Artificial wetlands biome and subtype F3.5 Canals, ditches and drains. In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtype V37 Annual anthropogenic herbaceous vegetation) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

43. Canopy cover 100%.; 42 plant species were recorded (Table 4); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent Anthropogenic disturbance: medium (grazing, irrigation).

**Table 4: Check-list of plants recorded for reed-liquorice community (*Phragmites australis, Glycyrrhiza glabra*) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum marinum subsp. gussoneanum, Hordeum murinum subsp. leporinum,*

***Hordeum spontaneum, Carduus pycnocephalus, Centaurea iberica, Artemisia annua, Descurainia sophia*) on a boundary strip (sample plot S-3, 41.093706° N 69.21899° E)**

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	O	+	flowering
Althaea armeniaca	perennial	30-40	R	+	vegetation
Artemisia annua	annual	15-20	F	1	vegetation
Bromus scoparius	annual	15-20	O	+	flowering
Bromus sterilis	annual	25-30	O	+	flowering
Bromus tectorum	annual	20-25	O	+	flowering
Calystegia sepium	perennial	100-150	O	+	vegetation
Capsella bursa-pastoris	annual	30-40	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	F	1	flowering
Carex acutiformis	perennial	30-40	O	+	flowering
Centaurea iberica	biennial	20-25	F	1	vegetation
Convolvulus arvensis	perennial	20-25	O	+	flowering
Cynoglossum creticum	Annual, biennial	25-30	R	+	flowering
Descurainia sophia	annual	30-40	A	2	Flowering, fruiting
Dodartia orientalis	perennial	25-30	O	+	flowering
Equisetum ramosissimum	perennial	30-40	R	+	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering
Fallopia convolvulus	annual	40-50	O	+	vegetation
Festuca ambigua (*Vulpia ciliata)*	annual	15-20	O	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa)*	perennial	20-25	F	1	vegetation
Geranium pusillum	annual	20-25	F	1	flowering
Glycyrrhiza glabra	perennial	30-40	A	2	vegetation
Hordeum marinum subsp. *gussoneanum*	annual	20-25	F	1	flowering
Hordeum murinum subsp. leporinum	annual	20-25	A	2	flowering
Hordeum spontaneum	annual	30-40	F	1	flowering
Leymus multicaulis (*Elymus multicaulis)*	perennial	40-50	O	+	flowering
Malva neglecta	Annual, perennial	15-20	O	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	R	+	vegetation
Phleum paniculatum	annual	20-25	O	+	flowering
Phragmites australis	perennial	40-50	A	2	vegetation
Poa bulbosa	perennial	20-25	O	+	flowering
Poa pratensis	perennial	25-30	O	+	flowering
Rosa canina	shrub	150-170	R	1	flowering
Rubus caesius	shrub	40-50	O	+	vegetation
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Salix alba	tree	4-4.5 m	R	1	vegetation
Taraxacum officinale	perennial	20-25	O	+	fruiting
Trifolium repens	perennial	12-15	O	+	vegetation
Tripidium ravennae (*Erianthus ravennae)*	perennial	120-150	O	1	vegetation





Photo 5, 6. Sample plot S-3. Modified habitat with reed-liquorice community (Phragmites australis, Glycyrrhiza glabra) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum marinum subsp. gussoneanum, Hordeum murinum subsp. leporinum, Hordeum spontaneum, Carduus pycnocephalus, Centaurea iberica, Artemisia annua, Descurainia sophia*) on a boundary strip between the channel and fruit garden

5.4. Sample plot S-4

44. 41.106106° N 69.240965° E, 371 m a.s.l. The boundary strip between the irrigation channel and arable land. Modified habitat with planted trees and anthropogenic herbaceous weedy vegetation, mostly annual (Bromus scoparius, Hordeum marinum subsp. gussoneanum, Hordeum murinum subsp. leporinum, Poa bulbosa, Carduus pycnocephalus, Centaurea iberica, Cirsium vulgare, Conium maculatum, Capsella bursa-pastoris, Descurainia sophia) on fertile, humid loamy soils (photo 7, 8). In accordance with the typology of vegetation published in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtype V37 Annual anthropogenic herbaceous vegetation) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

45. Canopy cover 90%; 48 plant species were recorded (Table 5); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: strong (grazing, irrigation, ground road, garbage).

Table 5: Check-list of plants recorded for anthropogenic herbaceous weedy community (*Bromus scoparius, Hordeum marinum subsp. gussoneanum, Hordeum murinum subsp. leporinum, Poa bulbosa, Carduus pycnocephalus, Centaurea iberica, Cirsium vulgare, Conium maculatum, Capsella bursa-pastoris, Descurainia sophia*) on the boundary strip between the irrigation channel and arable land (sample plot S-4, 41.106106° N 69.240965° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Aeluropus littoralis	perennial	20-25	O	+	flowering
Ambrosia artemisiifolia	Annual, perennial	30-40	R	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Bidens frondosa	annual	20-25	R	+	vegetation
Bromus scoparius	annual	15-20	F	1	flowering
Calystegia sepium	perennial	100-150	O	+	vegetation
Capsella bursa-pastoris	annual	25-30	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	25-30	A	2	flowering
Carex acutiformis	perennial	30-40	O	+	flowering
Centaurea iberica	biennial	20-25	F	1	vegetation
Cerastium glomeratum	annual	12-15	O	+	Flowering, fruiting
Cirsium vulgare	biennial	30-40	A	2	vegetation
Conium maculatum	biennial	30-40	O	1	vegetation
Convolvulus arvensis	perennial	15-20	O	+	vegetation
Descurainia sophia	annual	25-30	F	1	Flowering, fruiting
Elaeagnus angustifolia	tree	3-4 m	R	+	vegetation
Equisetum ramosissimum	perennial	30-40	R	+	vegetation
Euphorbia helioscopia	annual	15-20	O	+	flowering
Festuca ambigua (*Vulpia ciliata)*	annual	15-20	O	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting

Galium humifusum (*Asperula humifusa*)	perennial	12-15	O	+	vegetation
Geranium pusillum	annual	12-15	R	+	flowering
Glycyrrhiza glabra	perennial	30-40	F	1	vegetation
Hordeum marinum subsp. *gussoneanum*	annual	20-25	F	1	flowering
Hordeum murinum subsp. leporinum	annual	20-25	A	2	flowering
Hordeum spontaneum	annual	30-40	O	+	flowering
Imperata cylindrica	perennial	25-30	O	+	flowering
Lepidium chalepense (*Cardaria repens*)	perennial	20-25	O	+	flowering
Lepyrodiclis holosteoides	annual	30-40	O	+	flowering
Lycopus europaeus	perennial	30-40	O	+	vegetation
Medicago sativa	perennial	20-25	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	O	+	vegetation
Morus alba	tree	4-4.5 m	R	+	vegetation
Phragmites australis	perennial	100-150	O	1	vegetation
Plantago lanceolata	perennial	12-15	F	1	vegetation
Poa bulbosa	perennial	15-20	F	1	flowering
Poa trivialis	perennial	25-30	O	+	budding
Potentilla reptans	perennial	10-12	R	+	vegetation
Rubus caesius	shrub	40-50	R	+	flowering
Rumex conglomeratus	perennial	40-50	R	+	vegetation
Salix alba	tree	4-4.5 m	R	1	vegetation
Salix babylonica	tree	3.5-4 m	O	2	vegetation
Sclerochloa dura	annual	10-12	R	+	budding
Stellaria neglecta	annual	12-15	R	+	flowering
Taraxacum officinale	perennial	20-25	O	+	Flowering, fruiting
Torilis nodosa	annual	25-30	R	+	flowering
Tripidium ravennae (*Erianthus ravennae*)	perennial	120-150	O	1	vegetation
Ulmus pumila	tree	4-4.5 m	R	1	fruiting





Photo 7, 8. Sample plot S-4. Modified habitat with planted trees, the irrigation channel and anthropogenic herbaceous weedy vegetation (*Bromus scoparius, Hordeum marinum subsp. gussoneanum, Hordeum murinum subsp. leporinum, Poa bulbosa, Carduus pycnocephalus, Centaurea iberica, Cirsium vulgare, Conium maculatum, Capsella bursa-pastoris, Descurainia sophia*) along the boundary strip between channel and arable land.

5.5. Sample plot S-5

46. 41.093246° N 69.230457° E, 365 m a.s.l. The boundary strip between the irrigation channel and arable land. Modified habitat with planted mulberry trees (woodland belts) and anthropogenic herbaceous weedy vegetation, mostly annual (*Hordeum murinum subsp. leporinum, Hordeum spontaneum, Imperata cylindrica, Poa bulbosa, Carduus pycnocephalus, Capsella bursa-pastoris, Descurainia sophia*) on fertile, humid loamy soils, and hydrophilous vegetation (*Phragmites australis, Typha latifolia, Imperata cylindrica, Mentha longifolia var. asiatica, Rubus caesius*) on the banks of irrigation channel (photo 9, 10). In accordance with the typology of vegetation published in in the “Vegetation of Middle Asia” (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtypes V37 Annual anthropogenic herbaceous vegetation and V64 Lines of planted trees) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

47. Canopy cover 100%; 53 plant species were recorded (Table 6); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation, ground road).

**Table 6: Check-list of plants recorded for hydrophilous vegetation (*Phragmites australis, Imperata cylindrica, Mentha longifolia var. asiatica, Rubus caesius*) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum murinum subsp.*

***leporinum, Hordeum spontaneum, Imperata cylindrica, Poa bulbosa, Carduus pycnocephalus, Capsella bursa-pastoris, Descurainia sophia*) on the boundary strip between the irrigation channel and arable land (sample plot S-5, 41.093246° N 69.230457° E)**

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	O	+	flowering
Alcea nudiflora	perennial	40-50	O	+	vegetation
Artemisia annua	annual	25-30	O	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Bromus scoparius	annual	20-25	O	+	flowering
Bromus sterilis	annual	25-30	O	+	flowering
Bromus tectorum	annual	25-30	O	+	flowering
Capsella bursa-pastoris	annual	25-30	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	A	2	flowering
Carex acutiformis	perennial	30-40	O	+	flowering
Carthamus turkestanicus	annual	30-40	O	+	vegetation
Centaurea iberica	biennial	20-25	F	1	vegetation
Cerastium glomeratum	annual	15-20	O	+	Flowering, fruiting
Cichorium intybus	perennial	20-25	O	+	vegetation
Conium maculatum	biennial	30-40	F	1	vegetation
Convolvulus arvensis	perennial	20-25	O	+	vegetation
Descurainia sophia	annual	25-30	F	1	Flowering, fruiting
Dodartia orientalis	perennial	25-30	R	+	flowering
Equisetum ramosissimum	perennial	30-40	O	+	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa*)	perennial	20-25	O	+	vegetation
Geranium dissectum	annual	20-25	O	+	flowering
Geranium pusillum	annual	20-25	O	+	flowering
Glycyrrhiza glabra	perennial	30-40	F	1	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	A	2	flowering
Hordeum spontaneum	annual	40-50	A	2	flowering
Imperata cylindrica	perennial	25-30	A	2	flowering
Lactuca tatarica	perennial	40-50	R	+	flowering
Lepidium chalepense (*Cardaria repens*)	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	40-50	O	+	flowering
Malva neglecta	Annual, perennial	10-12	R	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	25-30	O	+	vegetation
Morus alba	tree	3.5-4 m	A	3	vegetation
Myosotis caespitosa	perennial	25-30	O	+	flowering
Onopordum acanthium	biennial	25-30	R	+	vegetation
Phragmites australis	perennial	100-120	A	2	vegetation
Plantago lanceolata	perennial	12-15	O	+	vegetation
Plantago major	perennial	12-15	R	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Rubus caesius	shrub	40-50	O	1	vegetation
Rumex conglomeratus	perennial	40-50	R	+	vegetation

Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	O	+	Flowering, fruiting
Tripidium ravennae (*Erianthus ravennae)*	perennial	120-150	R	+	vegetation
Typha latifolia	perennial	40-50	F	1	vegetation
Verbascum blattaria	Annual, biennial	25-30	R	+	vegetation
Verbena officinalis	perennial	20-25	R	+	vegetation
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica hederifolia	annual	12-15	O	+	Flowering, fruiting
Xanthium orientale	annual	20-25	R	+	vegetation





Photo 9, 10. Sample plot S-5. Modified habitat with woodland belt, mesic community (*Phragmites australis, Typha latifolia, Imperata cylindrica, Mentha longifolia var. asiatica, Rubus caesius*) on the banks of irrigation channel and anthropogenic herbaceous weedy vegetation (*Hordeum murinum subsp. leporinum, Hordeum spontaneum, Imperata cylindrica, Poa bulbosa, Carduus pycnocephalus, Capsella bursa-pastoris, Descurainia sophia*) on boundary strip between the channel and arable land

5.6. Sample plot S-6

48. 41.09018° N 69.212726° E, 363 m a.s.l. Old abandoned cemetery among irrigated arable lands and fruit gardens, surrounded with planted trees (*Morus alba, Ulmus pumila*). Modified habitat with anthropogenic herbaceous weedy vegetation (*Hordeum spontaneum*, *Conium maculatum, Carduus pycnocephalus, Glycyrrhiza glabra*) on fertile, moderately humid soils (photo 11, 12). In accordance with the typology of vegetation published in the “Vegetation of Middle Asia” (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. In accordance with IUCN habitatы classification, this habitat belongs to the type 14 Artificial – Terrestrial and subtype 14.2 Pasture Land. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome and subtype T7.5 Derived semi-natural pastures and old fields. In accordance with EUNIS habitat classification, it corresponds with type V – Vegetated man-made habitats and subtype V37 Annual anthropogenic herbaceous vegetation.

49. Canopy cover 100%; 55 plant species were recorded (Table 7); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: low (grazing); the cemetery is very old and has not been used for burials for a long time. Probably, this is an archaeological site.

Table 7: Check-list of plants recorded for herbaceous weedy community (*Hordeum spontaneum, Conium maculatum, Carduus pycnocephalus, Glycyrrhiza glabra*) on the old cemetery (sample plot S-6, 41.09018° N 69.212726° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	40-50	R	+	vegetation

Acanthocephalus amplexifolius	annual	20-25	O	+	flowering
Alhagi pseudalhagi	perennial	30-40	R	+	vegetation
Allium suworowii	perennial	70-100	F	1	flowering
Astragalus filicaulis	annual	15-20	O	+	flowering
Astragalus ishkamishensis	perennial	25-30	O	+	flowering
Bromus tectorum	annual	20-25	O	+	flowering
Callipeltis cucullaris	annual	7-10	R	+	flowering
Capsella bursa-pastoris	annual	30-40	O	+	Flowering, fruiting
Carduus pycnocephalus	annual	50-60	F	1	flowering
Carex melanostachya	perennial	20-25	O	+	flowering
Carthamus turkestanicus	annual	30-40	R	+	vegetation
Centaurea iberica	biennial	25-30	O	+	vegetation
Cerastium glomeratum	annual	15-20	O	+	Flowering, fruiting
Conium maculatum	biennial	50-70	F	2	vegetation
Convolvulus arvensis	perennial	30-40	O	+	vegetation
Cruciata pedemontana	annual	12-15	O	+	Flowering, fruiting
Descurainia sophia	annual	30-40	O	+	Flowering, fruiting
Dodartia orientalis	perennial	25-30	R	+	flowering
Elaeosticta allioides	perennial	20-25	O	+	vegetation
Erodium cicutarium	annual	12-15	O	+	Flowering, fruiting
Euphorbia helioscopia	annual	20-25	O	+	flowering
Filago arvensis	annual	12-15	O	+	budding
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa*)	perennial	20-25	O	+	vegetation
Galium spurium	annual	40-50	O	+	Flowering, fruiting
Geranium pusillum	annual	20-25	O	+	flowering
Glaucium fimbrilligerum	biennial	20-25	R	+	budding
Glycyrrhiza glabra	perennial	40-50	F	1	vegetation
Hordeum marinum subsp. *gussoneanum*	annual	25-30	O	+	flowering
Hordeum murinum subsp. leporinum	annual	25-30	O	+	flowering
Hordeum spontaneum	annual	50-70	D	5	budding
Ixiolirion tataricum	perennial	25-30	R	+	budding
Lamium amplexicaule	annual	12-15	O	+	flowering
Lepyrodiclis holosteoides	annual	40-50	O	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Morus alba	tree	3.5-4 m	F	2	vegetation
Onopordum acanthium	biennial	30-40	O	+	vegetation
Papaver pavoninum	annual	20-25	O	+	flowering
Phragmites australis	perennial	100-150	F	1	vegetation
Plantago lanceolata	perennial	15-20	O	+	vegetation
Plantago major	perennial	12-15	R	+	vegetation
Poa bulbosa	perennial	25-30	O	+	flowering
Pseudohandelia umbellifera	perennial	50-70	R	+	vegetation
Rubus caesius	shrub	40-50	O	1	vegetation
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Sinapis arvensis	annual	25-30	R	+	flowering
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	F	1	Flowering, fruiting

Ulmus pumila	tree	3.5-4 m	R	1	fruiting
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica capillipes	annual	15-20	O	+	Flowering, fruiting
Veronica hederifolia	annual	15-20	O	+	Flowering, fruiting
Veronica persica	annual	15-20	O	+	Flowering, fruiting
Vicia sativa subsp. *nigra*	annual	25-30	O	+	flowering





Photo 11, 12. Sample plot S-6. Old abandoned cemetery among irrigated arable lands and fruit gardens, surrounded with woodland belts. Modified habitat with anthropogenic herbaceous weedy vegetation (*Hordeum spontaneum*, *Conium maculatum, Carduus pycnocephalus, Glycyrrhiza glabra*)

5.7. Sample plot S-7

50. 41.103891° N 69.26675° E, 371 m a.s.l. Old abandoned cemetery among irrigated arable lands, surrounded with a channel, ditches and planted mulberry trees (*Morus alba*). Modified habitat with anthropogenic herbaceous weedy vegetation (*Hordeum spontaneum*, *Bromus tectorum, Poa bulbosa, Conium maculatum, Arctium umbrosum, Glycyrrhiza glabra, Capsella bursa-pastoris, Descurainia sophia*) on fertile, moderately humid soils (photo 13, 14). In accordance with the typology of vegetation published in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. In accordance with IUCN habitatы classification, this habitat belongs to the type 14 Artificial – Terrestrial and subtype 14.2 Pasture Land. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome and subtype T7.5 Derived semi-natural pastures and old fields. In accordance with EUNIS habitat classification, it corresponds with type V – Vegetated man-made habitats and subtype V37 Annual anthropogenic herbaceous vegetation.

51. Canopy cover 100%; 46 plant species were recorded (Table 8); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: low (grazing); the cemetery is very old and has not been used for burials for a long time. Probably, this is an archaeological site.

Table 8: Check-list of plants recorded for herbaceous weedy community (*Hordeum spontaneum, Bromus tectorum, Poa bulbosa, Conium maculatum, Arctium umbrosum, Glycyrrhiza glabra, Capsella bursa-pastoris, Descurainia sophia*) on the old cemetery (sample plot S-7, 41.103891° N 69.26675° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Alcea nudiflora	perennial	40-50	R	+	vegetation
Alhagi pseudalhagi	perennial	30-40	O	+	vegetation
Allium suworowii	perennial	70-100	O	+	flowering
Arctium umbrosum (Cousinia umbrosa)	perennial	50-60	A	3	vegetation
Artemisia annua	annual	15-20	O	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Astragalus filicaulis	annual	15-20	O	+	flowering
Bromus scoparius	annual	20-25	O	+	flowering
Bromus sterilis	annual	30-40	O	+	flowering
Bromus tectorum	annual	25-30	F	1	flowering
Capparis spinosa	perennial	30-40	R	+	vegetation
Capsella bursa-pastoris	annual	30-40	A	2	Flowering, fruiting
Carduus pycnocephalus	annual	50-60	O	+	flowering
Carthamus turkestanicus	annual	30-40	O	+	vegetation
Centaurea iberica	biennial	25-30	O	+	vegetation
Cerastium glomeratum	annual	15-20	O	+	Flowering, fruiting
Conium maculatum	biennial	50-70	F	2	vegetation
Convolvulus arvensis	perennial	30-40	O	+	vegetation
Descurainia sophia	annual	30-40	A	2	Flowering, fruiting
Dodartia orientalis	perennial	25-30	R	+	flowering

Erodium cicutarium	annual	12-15	O	+	Flowering, fruiting
Euphorbia helioscopia	annual	20-25	F	1	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa)*	perennial	20-25	O	+	vegetation
Galium spurium	annual	40-50	O	+	Flowering, fruiting
Geranium pusillum	annual	20-25	F	1	flowering
Glycyrrhiza glabra	perennial	40-50	F	1	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	F	1	flowering
Hordeum spontaneum	annual	50-70	A	4	budding
Ixiolirion tataricum	perennial	25-30	R	+	budding
Lepyrodiclis holosteoides	annual	40-50	O	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Morus alba	tree	3.5-4 m	O	1	vegetation
Onopordum acanthium	biennial	30-40	O	+	vegetation
Phragmites australis	perennial	100-150	O	1	vegetation
Plantago lanceolata	perennial	15-20	O	+	vegetation
Plantago major	perennial	12-15	O	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Rubus caesius	shrub	40-50	O	1	vegetation
Rumex conglomeratus	perennial	40-50	R	+	vegetation
Sisymbrium altissimum	annual	30-40	R	+	flowering
Taraxacum officinale	perennial	20-25	F	1	Flowering, fruiting
Tripidium ravennae (*Erianthus ravennae)*	perennial	1.5-2 m	O	1	vegetation
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica hederifolia	annual	15-20	O	+	Flowering, fruiting
Veronica persica	annual	15-20	O	+	Flowering, fruiting





Photo 13, 14. Sample plot S-7. Old abandoned cemetery among irrigated arable lands. Modified habitat with anthropogenic herbaceous weedy vegetation (*Hordeum spontaneum*, *Bromus tectorum, Poa bulbosa, Conium maculatum, Arctium umbrosum, Glycyrrhiza glabra, Capsella bursa-pastoris, Descurainia sophia*), , and reeds (*Phragmites australis*) on the banks of irrigation channel

5.8. Sample plot S-8

52. 41.104606° N 69.225308° E, 368 m a.s.l. The boundary strip between two irrigation channels among arable land. Modified habitat with planted mulberry trees (woodland belts) and anthropogenic herbaceous weedy vegetation, mostly annual (*Hordeum murinum subsp.*

leporinum, Bromus tectorum, Poa bulbosa, Capsella bursa-pastoris, Descurainia sophia, Geranium pusillum, Euphorbia helioscopia) on fertile, humid loamy soils, and reeds (*Phragmites australis*) on the banks of irrigation channel (photo 15, 16). In accordance with the typology of vegetation published in in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtypes V37 Annual anthropogenic herbaceous vegetation and V64 Lines of planted trees) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

53. Canopy cover 100%; 52 plant species were recorded (Table 9); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation, ground road).

Table 9: Check-list of plants recorded for anthropogenic herbaceous weedy community (*Hordeum murinum subsp. leporinum, Bromus tectorum, Poa bulbosa, Capsella bursa-pastoris, Descurainia sophia, Geranium pusillum, Euphorbia helioscopia*) on the boundary strip between two irrigation channels among arable land (sample plot S-8, 41.104606° N 69.225308° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	O	+	flowering
Alcea nudiflora	perennial	30-40	O	+	vegetation
Alhagi pseudalhagi	perennial	30-40	O	+	vegetation
Artemisia annua	annual	15-20	O	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Brassica napus	Annual, biennial	30-40	R	+	flowering
Bromus scoparius	annual	25-30	O	+	flowering
Bromus sterilis	annual	25-30	O	+	flowering
Bromus tectorum	annual	25-30	A	2	flowering
Cannabis sativa (*Cannabis ruderalis*)	annual	25-30	R	+	vegetation
Capsella bursa-pastoris	annual	30-40	A	2	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	F	1	flowering
Carthamus turkestanicus	annual	30-40	O	+	vegetation
Centaurea iberica	biennial	20-25	O	+	vegetation
Cerastium glomeratum	annual	15-20	O	+	Flowering, fruiting
Conium maculatum	biennial	30-40	O	1	vegetation
Convolvulus arvensis	perennial	20-25	O	+	vegetation
Descurainia sophia	annual	25-30	D	3	Flowering, fruiting
Dodartia orientalis	perennial	30-40	O	+	flowering
Erodium cicutarium	annual	12-15	O	+	Flowering, fruiting
Euphorbia helioscopia	annual	20-25	F	1	flowering
Fumaria vaillantii	annual	15-20	O	+	flowering

Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa)*	perennial	20-25	O	+	vegetation
Geranium pusillum	annual	20-25	F	1	flowering
Glycyrrhiza glabra	perennial	30-40	O	+	vegetation
Hordeum marinum subsp. *gussoneanum*	annual	30-40	F	1	flowering
Hordeum murinum subsp. leporinum	annual	30-40	D	4	flowering
Lamium amplexicaule	annual	12-15	O	+	flowering
Lepidium chalepense (*Cardaria repens)*	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	40-50	O	+	flowering
Malva neglecta	Annual, perennial	10-12	O	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	25-30	R	+	vegetation
Morus alba	tree	3-3.5 m	F	2	vegetation
Onopordum acanthium	biennial	25-30	R	+	vegetation
Phragmites australis	perennial	100-120	O	+	vegetation
Plantago lanceolata	perennial	12-15	O	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Rubus caesius	shrub	40-50	R	+	vegetation
Sisymbrium altissimum	annual	30-40	R	+	flowering
Stellaria neglecta	annual	15-20	O	+	flowering
Tamarix ramosissima	shrub	150-170	R	+	vegetation
Taraxacum officinale	perennial	20-25	O	+	Flowering, fruiting
Tripidium ravennae (*Erianthus ravennae)*	perennial	120-150	R	+	vegetation
Verbascum blattaria	Annual, biennial	25-30	R	+	vegetation
Verbena officinalis	perennial	20-25	R	+	vegetation
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica hederifolia	annual	12-15	O	+	Flowering, fruiting
Vicia sativa subsp. *nigra*	annual	25-30	O	+	flowering
Xanthium orientale	annual	20-25	R	+	vegetation





Photo 15, 16. Sample plot S-8. Modified habitat with planted mulberry trees (woodland belts) and anthropogenic herbaceous weedy vegetation (*Hordeum murinum subsp. leporinum, Bromus tectorum, Poa bulbosa, Capsella bursa-pastoris, Descurainia sophia, Geranium pusillum, Euphorbia helioscopia*)

5.9. Sample plot S-9

54. 41.101048° N 69.237804° E, 369 m a.s.l. The boundary strip between the irrigation channel and arable land. Modified habitat with planted mulberry trees (woodland belts) and anthropogenic herbaceous weedy vegetation, mostly annual (Hordeum murinum subsp. leporinum, Hordeum spontaneum, Bromus scoparius, Bromus tectorum, Poa bulbosa,

Imperata cylindrica, Conium maculatum, Carduus pycnocephalus, Capsella bursa-pastoris) on fertile, humid loamy soils, and mesic community (Phragmites australis, Imperata cylindrica, Mentha longifolia var. asiatica, Rubus caesius) on the banks of channel (photo 17, 18). In accordance with the typology of vegetation published in in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtypes V37 Annual anthropogenic herbaceous vegetation and V64 Lines of planted trees) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

55. Canopy cover 90%; 50 plant species were recorded (Table 10); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation).

Table 10: Check-list of plants recorded for mesic community (*Phragmites australis, Imperata cylindrica, Mentha longifolia var. asiatica, Rubus caesius*) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum murinum subsp. leporinum, Hordeum spontaneum, Bromus scoparius, Bromus tectorum, Poa bulbosa, Conium maculatum, Carduus pycnocephalus, Capsella bursa-pastoris*) on the boundary strip between the irrigation channel and arable land (sample plot S-9, 41.101048° N 69.237804° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	F	1	flowering
Artemisia annua	annual	15-20	O	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Bromus scoparius	annual	15-20	F	1	flowering
Bromus sterilis	annual	25-30	O	+	flowering
Bromus tectorum	annual	20-25	F	1	flowering
Calystegia sepium	perennial	40-50	O	+	vegetation
Capsella bursa-pastoris	annual	25-30	A	2	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	F	1	flowering
Carthamus turkestanicus	annual	30-40	O	+	vegetation
Centaurea iberica	biennial	20-25	F	1	vegetation
Cichorium intybus	perennial	20-25	O	+	vegetation
Conium maculatum	biennial	30-40	A	2	vegetation
Convolvulus arvensis	perennial	20-25	O	+	vegetation
Descurainia sophia	annual	25-30	O	+	Flowering, fruiting
Dodartia orientalis	perennial	25-30	R	+	flowering
Elaeagnus angustifolia	tree	2.5-3 m	R	+	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa*)	perennial	20-25	O	+	vegetation
Geranium dissectum	annual	20-25	O	+	flowering
Geranium pusillum	annual	20-25	O	+	flowering
Glycyrrhiza glabra	perennial	30-40	O	+	vegetation

Hordeum murinum subsp. leporinum	annual	25-30	A	2	flowering
Hordeum spontaneum	annual	40-50	A	2	flowering
Imperata cylindrica	perennial	25-30	A	2	flowering
Lepidium chalepense (*Cardaria repens)*	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	2530	R	+	flowering
Malva neglecta	Annual, perennial	10-12	R	+	flowering
Medicago sativa	perennial	25-30	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	25-30	F	1	vegetation
Morus alba	tree	3-3.5 m	O	1	vegetation
Onopordum acanthium	biennial	25-30	R	+	vegetation
Phragmites australis	perennial	100-120	O	+	vegetation
Plantago lanceolata	perennial	12-15	O	+	vegetation
Plantago major	perennial	12-15	R	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Rhaponticum repens (*Acroptilon repens)*	perennial	25-30	O	+	vegetation
Rubus caesius	shrub	30-40	O	+	vegetation
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Sisymbrium altissimum	annual	30-40	O	+	Flowering, fruiting
Spinacia turkestanica	annual	20-25	R	+	Flowering, fruiting
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	R	+	Flowering, fruiting
Verbascum blattaria	Annual, biennial	25-30	R	+	vegetation
Verbena officinalis	perennial	20-25	O	+	vegetation
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica hederifolia	annual	12-15	O	+	Flowering, fruiting
Xanthium orientale	annual	20-25	R	+	vegetation



Photo 17, 18. Sample plot S-9. Modified habitat with planted mulberry trees (woodland belts) and anthropogenic herbaceous weedy vegetation (*Hordeum murinum subsp. leporinum, Hordeum spontaneum, Bromus scoparius, Bromus tectorum, Poa bulbosa, Imperata cylindrica, Conium maculatum, Carduus pycnocephalus, Capsella bursa-pastoris*), and mesic vegetation (*Phragmites australis, Imperata cylindrica, Mentha longifolia var. asiatica, Rubus caesius*) along the channel

5.10. Sample plot S-10

56. 41.07603° N 69.181664° E, 350 m a.s.l. The large irrigation channel among arable lands. Modified habitat with planted and wild-growing trees and shrubs (Gleditsia triacanthos, Morus alba, Salix alba, Salix blakii, Elaeagnus angustifolia, Rosa canina, Rosa beggeriana), hydrophilous perennial vegetation on the banks of channel (Phragmites australis, Carex acutiformis, Poa pratensis, Poa trivialis, Aeluropus littoralis, Equisetum ramosissimum, Mentha longifolia var. asiatica, Rubus caesius) and anthropogenic herbaceous weedy vegetation, mostly annual (Bromus tectorum, Bromus scoparius, Hordeum murinum subsp. leporinum, Poa bulbosa, Carduus pycnocephalus, Capsella bursa-pastoris, Euphorbia helioscopia, Centaurea iberica, Marrubium anisodon) on fertile, humid loamy soils along the boundary strip between the channel and arable land (photo 19, 20). In accordance with the typology of vegetation published in in the “Vegetation of Middle Asia” (Nowak et al., 2025), this community belongs to the types of reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies of Eurasia, and annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtypes V37 Annual anthropogenic herbaceous vegetation and V64 Lines of planted trees) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

57. Canopy cover 90%; 63 plant species were recorded (Table 11); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation, ground road).

Table 11: Check-list of plants recorded for hydrophilous perennial vegetation on the banks of channel (*Phragmites australis, Carex acutiformis, Poa pratensis, Poa trivialis, Aeluropus littoralis, Equisetum ramosissimum, Mentha longifolia var. asiatica, Rubus caesius*) and anthropogenic herbaceous weedy community (*Bromus tectorum, Bromus scoparius, Hordeum murinum subsp. leporinum, Poa bulbosa, Carduus pycnocephalus, Capsella bursa-pastoris, Euphorbia helioscopia, Centaurea iberica, Marrubium anisodon*) on the boundary strip between the channel and arable land (sample plot S-10, 41.07603° N 69.181664° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Aeluropus littoralis	perennial	20-25	F	1	flowering
Ambrosia artemisiifolia	Annual, perennial	30-40	R	+	vegetation
Artemisia vulgaris	perennial	40-50	R	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Bidens frondosa	annual	20-25	R	+	vegetation
Bromus scoparius	annual	25-30	F	1	flowering
Bromus tectorum	annual	25-30	A	2	flowering
Calystegia sepium	perennial	100-150	O	+	vegetation
Capsella bursa-pastoris	annual	30-40	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	A	2	flowering
Carex acutiformis	perennial	40-50	F	1	flowering
Carthamus turkestanicus	annual	30-40	F	1	vegetation
Centaurea iberica	biennial	25-30	F	1	vegetation
Cerastium glomeratum	annual	15-20	O	+	Flowering, fruiting

Cirsium vulgare	biennial	40-50	R	+	vegetation
Conium maculatum	biennial	30-40	O	1	vegetation
Convolvulus arvensis	perennial	25-30	O	+	vegetation
Cynanchum acutum subsp. *sibiricum*	perennial	70-100	R	+	vegetation
Descurainia sophia	annual	30-40	O	+	Flowering, fruiting
Echium vulgare	biennial	30-40	R	+	vegetation
Elaeagnus angustifolia	tree	2.5-3 m	F	2	vegetation
Equisetum ramosissimum	perennial	30-40	A	2	vegetation
Euphorbia helioscopia	annual	20-25	F	1	flowering
Fumaria vaillantii	annual	15-20	R	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa*)	perennial	12-15	O	+	vegetation
Galium spurium	annual	40-50	O	+	Flowering, fruiting
Geranium pusillum	annual	20-25	O	+	flowering
Gleditsia triacanthos	tree	4-5 m	R	1	vegetation
Glycyrrhiza glabra	perennial	30-40	O	+	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	A	2	flowering
Imperata cylindrica	perennial	30-40	O	+	flowering
Lepidium chalepense (*Cardaria repens*)	perennial	25-30	F	1	flowering
Lepyrodiclis holosteoides	annual	40-50	O	+	flowering
Lycopus europaeus	perennial	40-50	O	+	vegetation
Malva neglecta	Annual, perennial	15-20	O	+	flowering
Marrubium anisodon	perennial	30-40	F	2	vegetation
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	A	2	vegetation
Morus alba	tree	5-6 m	O	2	flowering
Nonea caspica	annual	12-15	R	+	flowering
Phragmites australis	perennial	120-150	F	2	vegetation
Plantago lanceolata	perennial	15-20	F	1	vegetation
Plantago major	perennial	15-20	O	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Poa pratensis	perennial	30-40	A	3	budding
Poa trivialis	perennial	30-40	A	3	budding
Polygonum aviculare	Annual, perennial	10-12	O	+	vegetation
Potentilla reptans	perennial	12-15	R	+	vegetation
Rosa beggeriana	shrub	150-200	O	1	vegetation
Rosa canina	shrub	150-200	R	+	vegetation
Rubus caesius	shrub	40-50	R	+	flowering
Rumex conglomeratus	perennial	40-50	R	+	vegetation
Salix alba	tree	7-8 m	R	1	flowering
Salix blakii	shrub	3-3.5 m	R	1	flowering
Sclerochloa dura	annual	12-15	R	+	budding
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	O	+	fruiting
Torilis nodosa	annual	25-30	R	+	flowering
Trachomitum lancifolium	perennial	100-120	O	+	vegetation
Tripidium ravennae (*Erianthus ravennae*)	perennial	3-3.5 m	O	1	vegetation
Veronica argute-serrata	annual	15-20	R	+	Flowering, fruiting

Veronica hederifolia	annual	15-20	O	+	Flowering, fruiting





Photo 19, 20. Sample plot S-10. Modified habitat. Hydrophilous perennial vegetation on the banks of channel (Phragmites australis, Carex acutiformis, Poa pratensis, Poa trivialis, Aeluropus littoralis, Equisetum ramosissimum, Mentha longifolia var. asiatica, Rubus caesius) and anthropogenic herbaceous weedy community (Bromus tectorum, Bromus scoparius, Hordeum murinum subsp. leporinum, Poa bulbosa, Carduus pycnocephalus, Capsella bursa-pastoris, Euphorbia helioscopia, Centaurea iberica, Marrubium anisodon) on the boundary strip between the channel and arable land

5.11. Sample plot S-11

58. 41.08693° N 69.205833° E, 360 m a.s.l. Modified habitat with woodland belt of planted trees (*Morus alba, Populus nigra*), reeds on the banks of channel (*Phragmites australis, Rubus caesius*) and anthropogenic herbaceous weedy vegetation, mostly annual (*Hordeum spontaneum, Hordeum murinum subsp. leporinum, Bromus scoparius, Poa bulbosa, Poa trivialis*) on fertile, humid loamy soils along the boundary strip between the channel and arable land (photo 21, 22). In accordance with the typology of vegetation published in in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the types of reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies of Eurasia, and annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtypes V37 Annual anthropogenic herbaceous vegetation and V64 Lines of planted trees) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

59. Canopy cover 100%; 52 plant species were recorded (Table 12); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation, ground road).

Table 12: Check-list of plants recorded for woodland belt (*Morus alba, Populus nigra*), reeds on the banks of channel (*Phragmites australis, Rubus caesius*) and anthropogenic herbaceous weedy community (*Hordeum spontaneum, Hordeum murinum subsp. leporinum, Bromus scoparius, Poa bulbosa, Poa trivialis*) on the boundary strip between the channel and arable land (sample plot S-11, 41.08693° N 69.205833° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	O	+	flowering
Ambrosia artemisiifolia	Annual, perennial	30-40	R	+	vegetation
Artemisia vulgaris	perennial	40-50	R	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Brassica napus	Annual, biennial	30-40	R	+	flowering
Bromus scoparius	annual	25-30	F	1	flowering
Calystegia sepium	perennial	100-150	O	+	vegetation
Capsella bursa-pastoris	annual	30-40	O	+	Flowering, fruiting
Carduus pycnocephalus	annual	30-40	O	+	flowering
Carthamus turkestanicus	annual	30-40	R	+	vegetation
Centaurea iberica	biennial	25-30	O	+	vegetation
Conium maculatum	biennial	30-40	R	+	vegetation
Convolvulus arvensis	perennial	25-30	O	+	vegetation
Cynanchum acutum subsp. *sibiricum*	perennial	100-150	O	+	vegetation
Descurainia sophia	annual	30-40	O	+	Flowering, fruiting
Dodartia orientalis	perennial	30-40	R	+	flowering
Equisetum ramosissimum	perennial	30-40	R	+	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering

Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa)*	perennial	12-15	O	+	vegetation
Galium spurium	annual	40-50	O	+	Flowering, fruiting
Geranium pusillum	annual	20-25	O	+	flowering
Glycyrrhiza glabra	perennial	30-40	O	+	vegetation
Hordeum spontaneum	annual	50-70	D	3	flowering
Hordeum murinum subsp. leporinum	annual	25-30	A	2	flowering
Lepidium chalepense (*Cardaria repens)*	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	50-70	O	1	flowering
Lycopus europaeus	perennial	30-40	R	+	vegetation
Malva neglecta	Annual, perennial	15-20	R	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	O	+	vegetation
Morus alba	tree	3.5-4 m	F	2	flowering
Phragmites australis	perennial	150-200	A	3	vegetation
Plantago lanceolata	perennial	15-20	O	+	vegetation
Plantago major	perennial	15-20	O	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Poa pratensis	perennial	30-40	O	+	budding
Poa trivialis	perennial	30-40	F	1	budding
Populus nigra	tree	3-3.5 m	O	1	vegetation
Potentilla reptans	perennial	12-15	R	+	vegetation
Rhaponticum repens (*Acroptilon repens)*	perennial	25-30	O	+	vegetation
Rosa canina	shrub	150-200	R	+	vegetation
Rubus caesius	shrub	70-100	A	3	flowering
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Sclerochloa dura	annual	12-15	R	+	budding
Sisymbrium altissimum	annual	30-40	R	+	flowering
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	O	+	fruiting
Trachomitum lancifolium	perennial	70-100	O	+	vegetation
Veronica hederifolia	annual	15-20	O	+	Flowering, fruiting
Xanthium orientale	annual	20-25	O	+	vegetation



Photo 21, 22. Sample plot S-11. Modified habitat. Woodland belt (*Morus alba, Populus nigra*), reeds on the banks of channel (*Phragmites australis, Rubus caesius*) and anthropogenic herbaceous weedy community (*Hordeum spontaneum, Hordeum murinum subsp. leporinum, Bromus scoparius, Poa bulbosa, Poa trivialis*) on the boundary strip between the channel and arable land

5.12. Sample plot S-12

60. 41.090865° N 69.188936° E, 355 m a.s.l. The boundary strip between the irrigation channel and arable land. Modified habitat with planted mulberry trees (woodland belts) and anthropogenic herbaceous weedy vegetation, mostly annual (Hordeum murinum subsp.

leporinum, Cynodon dactylon, Poa bulbosa, Carduus pycnocephalus, Conium maculatum, Capsella bursa-pastoris, Artemisia annua) on fertile, humid loamy soils, and hydrophilous vegetation (Phragmites australis, Typha laxmannii, Imperata cylindrica, Equisetum ramosissimum) on the banks of irrigation channel (photo 23, 24). In accordance with the typology of vegetation published in in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, this habitat belongs to the types 14 Artificial – Terrestrial (subtype 14.1 Arable Land) and 15 Artificial – Aquatic (subtype 15.9 Canals and Drainage Channels, Ditches). In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the types T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands) and F3 Artificial wetlands biome (subtype F3.5 Canals, ditches and drains). In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtypes V37 Annual anthropogenic herbaceous vegetation and V64 Lines of planted trees) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

61. Canopy cover 80%; 50 plant species were recorded (Table 13); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: strong (grazing, irrigation, agriculture).

Table 13: Check-list of plants recorded for hydrophilous vegetation (*Phragmites australis, Typha laxmannii, Imperata cylindrica, Equisetum ramosissimum*) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum murinum subsp. leporinum, Cynodon dactylon, Poa bulbosa, Carduus pycnocephalus, Conium maculatum, Capsella bursa-pastoris, Artemisia annua*) on the boundary strip between the irrigation channel and arable land (sample plot S-12, 41.090865° N 69.188936° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Achillea arabica	perennial	20-25	O	+	vegetation
Aeluropus littoralis	perennial	20-25	O	+	flowering
Ambrosia artemisiifolia	Annual, perennial	30-40	R	+	vegetation
Artemisia annua	annual	25-30	F	1	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Bromus scoparius	annual	15-20	O	+	flowering
Bromus tectorum	annual	15-20	O	+	flowering
Calystegia sepium	perennial	70-100	R	+	vegetation
Cannabis sativa (*Cannabis ruderalis)*	annual	25-30	O	+	vegetation
Capsella bursa-pastoris	annual	25-30	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	A	2	flowering
Carthamus turkestanicus	annual	30-40	O	+	vegetation
Centaurea iberica	biennial	20-25	O	+	vegetation
Cichorium intybus	perennial	20-25	O	+	vegetation
Conium maculatum	biennial	30-40	F	1	vegetation
Convolvulus arvensis	perennial	20-25	O	+	vegetation
Cynodon dactylon	perennial	15-20	A	2	vegetation
Descurainia sophia	annual	25-30	O	+	Flowering, fruiting
Dodartia orientalis	perennial	25-30	R	+	flowering
Equisetum ramosissimum	perennial	30-40	F	1	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting

Galium humifusum (*Asperula humifusa)*	perennial	20-25	O	+	vegetation
Geranium pusillum	annual	20-25	O	+	flowering
Glycyrrhiza glabra	perennial	30-40	F	1	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	A	2	flowering
Hordeum spontaneum	annual	40-50	F	1	flowering
Imperata cylindrica	perennial	25-30	F	1	flowering
Lepidium chalepense (*Cardaria repens)*	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	25-30	R	+	flowering
Malva neglecta	Annual, perennial	10-12	O	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	25-30	R	+	vegetation
Onopordum acanthium	biennial	25-30	R	+	vegetation
Phragmites australis	perennial	100-120	F	2	vegetation
Plantago lanceolata	perennial	15-20	O	+	vegetation
Plantago major	perennial	15-20	O	+	vegetation
Poa bulbosa	perennial	20-25	F	1	flowering
Potentilla reptans	perennial	12-15	O	+	vegetation
Rhaponticum repens (*Acroptilon repens)*	perennial	25-30	O	+	vegetation
Rumex conglomeratus	perennial	40-50	R	+	vegetation
Sisymbrium altissimum	annual	30-40	O	+	Flowering, fruiting
Taraxacum officinale	perennial	20-25	O	+	fruiting
Tripidium ravennae (*Erianthus ravennae)*	perennial	120-150	R	+	vegetation
Typha laxmannii	perennial	40-50	F	1	vegetation
Verbena officinalis	perennial	20-25	R	+	vegetation
Veronica hederifolia	annual	12-15	O	+	Flowering, fruiting
Xanthium orientale	annual	15-20	R	+	vegetation
Xanthium spinosum	annual	20-25	R	+	vegetation



Photo 23, 24. Sample plot S-12. Modified habitat. Hydrophilous vegetation (*Phragmites australis, Typha laxmannii, Imperata cylindrica, Equisetum ramosissimum*) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum murinum subsp. leporinum, Cynodon dactylon, Poa bulbosa, Carduus pycnocephalus, Conium maculatum, Capsella bursa-pastoris, Artemisia annua*) on the boundary strip between the irrigation channel and arable land

5.13. Sample plot S-13

62. 41.087615° N 69.187015° E, 356 m a.s.l. Banks of irrigation channel, and a boundary strip between the channel and arable lands. Modified habitat with hygrophilous perennial

herbaceous vegetation (Phragmites australis, Typha latifolia, Tripidium ravennae, Imperata cylindrica, Aeluropus littoralis, Carex acutiformis, Glycyrrhiza glabra) on fertile, muddy soils on the banks of channel, and anthropogenic herbaceous weedy vegetation, mostly annual (Hordeum murinum subsp. leporinum, Hordeum spontaneum, Carduus pycnocephalus, Conium maculatum, Capsella bursa-pastoris) on a boundary strip between the channel and arable lands (photo 25, 26). In accordance with the typology of vegetation published in the "Vegetation of Middle Asia" (Nowak et al., 2025), the community of hygrophilous perennial herbs on the banks of channel belongs to the type of reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies of Eurasia. The community of annual weeds on a boundary strip belongs to the type of annual weed vegetation of arable crops, gardens and vineyards. According IUCN habitat classification, type 15 Artificial – Aquatic and subtype 15.9 Canals and Drainage Channels, Ditches. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type F3 Artificial wetlands biome and subtype F3.5 Canals, ditches and drains. In accordance with EUNIS habitat classification, it can be classified as types V – Vegetated man-made habitats (subtype V37 Annual anthropogenic herbaceous vegetation) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

63. Canopy cover 100%; 54 plant species were recorded (Table 14); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation).

Table 14: Check-list of plants recorded for hygrophilous perennial herbaceous vegetation (*Phragmites australis, Typha latifolia, Tripidium ravennae, Imperata cylindrica, Aeluropus littoralis, Carex acutiformis, Glycyrrhiza glabra*) on the banks of irrigation channel and anthropogenic herbaceous weedy community (*Hordeum murinum subsp. leporinum, Hordeum spontaneum, Carduus pycnocephalus, Conium maculatum, Capsella bursa-pastoris*) on a boundary strip (sample plot S-13, 41.087615° N 69.187015° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	F	1	flowering
Artemisia annua	annual	15-20	O	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Brassica napus	Annual, biennial	30-40	R	+	flowering
Bromus scoparius	annual	15-20	O	+	flowering
Bromus sterilis	annual	25-30	O	+	flowering
Bromus tectorum	annual	20-25	O	+	flowering
Calystegia sepium	perennial	70-100	O	+	vegetation
Capsella bursa-pastoris	annual	30-40	F	1	Flowering, fruiting
Carduus pycnocephalus	annual	40-50	F	1	flowering
Carex acutiformis	perennial	30-40	F	1	flowering
Centaurea iberica	biennial	20-25	O	+	vegetation
Cirsium vulgare	biennial	30-40	O	+	vegetation
Conium maculatum	biennial	40-50	A	2	vegetation
Convolvulus arvensis	perennial	20-25	O	+	flowering
Cruciata pedemontana	annual	12-15	F	1	Flowering, fruiting
Cynoglossum creticum	Annual, biennial	25-30	R	+	flowering
Descurainia sophia	annual	30-40	O	+	Flowering, fruiting
Dodartia orientalis	perennial	25-30	O	+	flowering
Equisetum ramosissimum	perennial	30-40	O	+	vegetation

Euphorbia helioscopia	annual	20-25	O	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa*)	perennial	20-25	F	1	vegetation
Geranium pusillum	annual	20-25	F	1	flowering
Glycyrrhiza glabra	perennial	30-40	A	2	vegetation
Hordeum marinum subsp. *gussoneanum*	annual	20-25	O	+	flowering
Hordeum murinum subsp. leporinum	annual	20-25	D	3	flowering
Hordeum spontaneum	annual	30-40	A	2	flowering
Imperata cylindrica	perennial	25-30	F	1	flowering
Malva neglecta	Annual, perennial	15-20	O	+	flowering
Medicago sativa	perennial	30-40	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	R	+	vegetation
Morus alba	tree	2.5-3	R	+	vegetation
Onopordum acanthium	biennial	25-30	R	+	vegetation
Phleum paniculatum	annual	20-25	O	+	flowering
Phragmites australis	perennial	40-50	A	2	vegetation
Plantago lanceolata	perennial	15-20	O	+	vegetation
Plantago major	perennial	15-20	O	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Poa pratensis	perennial	25-30	O	+	flowering
Ranunculus arvensis	annual	15-20	R	+	Flowering, fruiting
Ranunculus sceleratus	Annual, biennial	20-25	O	+	Flowering, fruiting
Rubus caesius	shrub	40-50	O	1	vegetation
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Sophora alopecuroides	perennial	25-30	O	+	vegetation
Spinacia turkestanica	annual	20-25	R	+	Flowering, fruiting
Taraxacum officinale	perennial	20-25	O	+	fruiting
Trifolium repens	perennial	12-15	O	+	vegetation
Tripidium ravennae (*Erianthus ravennae*)	perennial	120-150	F	1	vegetation
Typha latifolia	perennial	40-50	F	1	vegetation
Verbena officinalis	perennial	20-25	R	+	vegetation
Veronica arvensis	annual	12-15	O	+	Flowering, fruiting
Veronica hederifolia	annual	12-15	O	+	Flowering, fruiting





Photo 25, 26. Sample plot S-13. Modified habitat. Hydrophilous vegetation (*Phragmites australis, Typha latifolia, Tripidium ravennae, Imperata cylindrica, Aeluropus littoralis, Carex acutiformis, Glycyrrhiza glabra)* on the banks of irrigation channel and anthropogenic herbaceous weedy community *(Hordeum murinum subsp. leporinum, Hordeum spontaneum, Carduus pycnocephalus, Conium maculatum, Capsella bursa-pastoris)* on a boundary strip between the channel and arable lands

5.14. Sample plot S-14

64. 41.096669° N 69.208525° E, 360 m a.s.l. The irrigation channel with hygrophilous perennial herbaceous vegetation (*Phragmites australis, Typha latifolia, Imperata cylindrica*) among arable lands (rice fields) (photo 27, 28). Modified habitat. In accordance with the typology of vegetation published in in the "Vegetation of Middle Asia" (Nowak et al., 2025), this community belongs to the type of reed swamp, sedge bed and herbland vegetation of freshwater or brackish water bodies of Eurasia. This vegetation occupies both natural (river banks, littoral zones of lakes) and modified wet habitats (ponds, ditches, edges of rice fields, etc.) across lowlands of Central Asia. According IUCN habitat classification, type 15 Artificial – Aquatic and subtype 15.9 Canals and Drainage Channels, Ditches. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type F3 Artificial wetlands biome and subtype F3.5 Canals, ditches and drains. In accordance with EUNIS habitat classification, it corresponds with types R – Grasslands (subtype R3 Seasonally wet and wet grasslands) and C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

65. Canopy cover 100%; 47 plant species were recorded (Table 15); threatened species listed in the Red Data Book of Uzbekistan or IUCN Red List are absent. Anthropogenic disturbance: medium (grazing, irrigation, ground road).

Table 15: Check-list of plants recorded for hygrophilous perennial herbaceous community (*Phragmites australis, Typha latifolia, Imperata cylindrica*) on the banks of irrigation channel (sample plot S-14, 41.096669° N 69.208525° E)

Species	Life form	Height, cm	Abundance		Phenol. Stage
			DAFOR	Braun-Blanquet	
Abutilon theophrasti	annual	30-40	R	+	vegetation
Aeluropus littoralis	perennial	20-25	F	1	flowering
Artemisia annua	annual	25-30	O	+	vegetation
Asperugo procumbens	annual	25-30	O	+	Flowering, fruiting
Bromus scoparius	annual	15-20	O	+	flowering
Bromus tectorum	annual	20-25	O	+	flowering
Calystegia sepium	perennial	40-50	O	+	vegetation
Capsella bursa-pastoris	annual	25-30	O	+	Flowering, fruiting
Carduus pycnocephalus	annual	30-40	O	+	flowering
Carex acutiformis	perennial	30-40	O	+	flowering
Carthamus turkestanicus	annual	30-40	R	+	vegetation
Centaurea iberica	biennial	20-25	F	1	vegetation
Cerastium glomeratum	annual	15-20	O	+	Flowering, fruiting
Cichorium intybus	perennial	20-25	R	+	vegetation
Conium maculatum	biennial	30-40	F	1	vegetation
Convolvulus arvensis	perennial	20-25	O	+	vegetation
Descurainia sophia	annual	25-30	O	+	Flowering, fruiting
Equisetum ramosissimum	perennial	30-40	F	1	vegetation
Euphorbia helioscopia	annual	20-25	O	+	flowering
Fumaria vaillantii	annual	15-20	R	+	flowering
Galium aparine	annual	40-50	O	+	Flowering, fruiting
Galium humifusum (*Asperula humifusa*)	perennial	20-25	O	+	vegetation
Geranium dissectum	annual	20-25	O	+	flowering
Geranium pusillum	annual	20-25	O	+	flowering
Glycyrrhiza glabra	perennial	40-50	F	1	vegetation
Hordeum murinum subsp. leporinum	annual	25-30	F	1	flowering

Imperata cylindrica	perennial	30-40	A	3	flowering
Lactuca tatarica	perennial	40-50	R	+	flowering
Lepidium chalepense (*Cardaria repens*)	perennial	25-30	O	+	flowering
Lepyrodiclis holosteoides	annual	40-50	O	+	flowering
Medicago sativa	perennial	25-30	O	+	vegetation
Mentha longifolia var. *asiatica*	perennial	30-40	O	+	vegetation
Phragmites australis	perennial	120-150	A	3	vegetation
Plantago lanceolata	perennial	15-20	O	+	vegetation
Plantago major	perennial	15-20	O	+	vegetation
Poa bulbosa	perennial	25-30	F	1	flowering
Rubus caesius	shrub	40-50	F	1	vegetation
Rumex conglomeratus	perennial	40-50	O	+	vegetation
Stellaria neglecta	annual	15-20	O	+	flowering
Taraxacum officinale	perennial	20-25	O	+	Flowering, fruiting
Torilis nodosa	annual	25-30	O	+	flowering
Trachomitum lancifolium	perennial	100-120	O	+	vegetation
Tripidium ravennae (*Erianthus ravennae*)	perennial	150-180	O	1	vegetation
Typha latifolia	perennial	50-70	A	2	vegetation
Verbena officinalis	perennial	20-25	R	+	vegetation
Veronica hederifolia	annual	12-15	O	+	Flowering, fruiting
Veronica persica	annual	15-20	O	+	Flowering, fruiting





Photo 27, 28. Sample plot S-14. Modified habitat, the irrigation channel with reeds (*Phragmites australis, Typha latifolia*) among the rice fields

6. Conclusion

66. In total, 132 plant species of … families (116 native, 16 alien) were recorded within the Project area during the field survey (Annex I). Generally, the flora of the Project area is composed with native plant species and alien weeds widely spread and typical for anthropogenic landscapes of Uzbekistan. Threatened species listed as CR, EN or VU in the IUCN Red List or in the Red Data Book of Uzbekistan, endemic or other sensitive plant species are absent. The number of plant species recorded per sample plot varies from 38 to 63.

67. The Project area is located on the alluvial-proluvial plain between the rivers Chirchiq and Akhangaran, which belongs to the ancient Tashkent oasis, a valuable land intensively used in agriculture. The field survey and analysis of Google Earth free satellite imagery showed that only anthropogenic (modified) habitats occur in the study area. Critical habitats are not found.

68. Following 8 types of modified habitats can be identified within the Project area:

69. 1. Irrigated arable land. According to IUCN Habitats Classification Scheme (Version 3.1), this habitat belongs to the type 14 Artificial – Terrestrial, subtype 14.1 Arable Land. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome (subtype T7.1 Short-rotation croplands). This habitat type corresponds with EUNIS habitat type V – Vegetated man-made habitats, subtypes V1 Arable land and market gardens and categories V11 Intensive unmixed crops, V14 Inundated or inundatable croplands, including rice fields. This habitat prevails within the Project area. Irrigated arable lands are used mainly under cotton (Gossypium hirsutum), wheat (Triticum aestivum), rice (Oryza sativa) and corn (Zea mays).

70. 2. Fruit gardens. According to IUCN Habitats Classification Scheme (Version 3.1), this habitat belongs to the type 14 Artificial – Terrestrial, subtypes 14.3 Plantations and 14.4 Rural Gardens. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome (subtype T7.3 Plantations). According EUNIS classification, it belongs to habitat type V – Vegetated man-made habitats and subtype V6 Tree dominated man-made habitats (V61 Broadleaved fruit and nut tree orchards). This habitat is represented with plantations of fruit trees, including apple (Malus domestica), apricot (Prunus armeniaca), cherry (Prunus avium, Prunus cerasus), peach (Prunus persica). Alfalfa (Medicago sativa) and different vegetables (Solanum tuberosum, Lycopersicon esculentum, Allium cepa, etc.) usually are planted between the rows of fruit trees; wild grasses and weeds grow along the ditches and margins of the gardens.

71. 3. Woodland belts are composed of mulberry (Morus alba), poplar (Populus alba, P. nigra), elm (Ulmus pumila), oleaster (Elaeagnus angustifolia), willow (Salix alba), common honey-locust (Gleditsia triacanthos), and other native and non-native trees (3 to 10 m high). This habitat type occupies narrow strips (10–30 m in width) along the roads, channels and between the fields. According to IUCN Habitats Classification Scheme (Version 3.1), this habitat belongs to the type 14 Artificial – Terrestrial, subtype 14.1 Arable Land and 14.2 Pasture Land. According EUNIS classification, it belongs to habitat type V – Vegetated man-made habitats and subtype V6 Tree dominated man-made habitats (V64 Lines of planted trees).

72. 4. Boundary-strips between fields and along the roadsides (10–30 m in width) are occupied with anthropogenic herbaceous weedy vegetation, mostly annual, dominated by grasses (Bromus scoparius, Bromus tectorum, Hordeum murinum subsp. leporinum, Hordeum spontaneum, Poa bulbosa, Cynodon dactylon) and other native and non-native weedy plants (Artemisia annua, Carduus pycnocephalus, Centaurea iberica, Conium maculatum, Capsella bursa-pastoris, etc.), sometimes with solitary trees of mulberry (Morus alba), poplar (Populus alba, P. nigra), elm (Ulmus pumila), oleaster (Elaeagnus angustifolia), willow (Salix alba), common honey-locust (Gleditsia triacanthos), etc. According to IUCN Habitats Classification Scheme (Version 3.1), this habitat belongs to the type 14 Artificial – Terrestrial, subtypes 14.1

Arable Land and 14.2 Pasture Land. According EUNIS classification, it belongs to habitat type V – Vegetated man-made habitats and subtype V37 Annual anthropogenic herbaceous vegetation. The species composition of weedy communities varies significantly on different areas.

73. 5. Irrigation channels and ditches. Banks of channels and ditches are occupied with reeds (Phragmites australis, Typha latifolia, Typha laxmannii), sedges (Carex acutiformis), liquorice (Glycyrrhiza glabra) and other hygrophilous and mesophilous perennial plants (Imperata cylindrica, Aeluropus littoralis, Mentha longifolia var. asiatica, Rubus caesius, etc.). In Central Asia, this vegetation occupies both natural (river banks, littoral zones of lakes) and modified wet habitats (ponds, ditches, edges of rice fields, etc.). This vegetation can be classified as semi-natural. According IUCN habitat classification, this habitat belongs to the type 15 Artificial – Aquatic and subtype 15.9 Canals and Drainage Channels, Ditches. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type F3 Artificial wetlands biome and subtype F3.5 Canals, ditches and drains. In accordance with EUNIS habitat classification, it corresponds with type C – Inland surface waters (subtype C3.2 Water-fringing reedbeds and tall helophytes other than canes).

74. 6. Old cemeteries. Among irrigated arable lands, there are several hills with old cemeteries or archaeological sites with planted trees and anthropogenic herbaceous weedy vegetation, mostly annual. The vegetation is similar with the boundary strips, but with some elements of natural communities (Allium suworowii, Arctium umbrosum, etc.), and can be classified as semi-natural. In accordance with IUCN habitatы classification, this habitat belongs to the type 14 Artificial – Terrestrial and subtype 14.2 Pasture Land. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome and subtype T7.5 Derived semi-natural pastures and old fields. In accordance with EUNIS habitat classification, it corresponds with type V – Vegetated man-made habitats and subtype V37 Annual anthropogenic herbaceous vegetation.

75. 7. Settlements. There are several villages and farmsteads with single-storey buildings and rural gardens. The vegetation is represented with This habitat is represented with planted fruit and ornamental trees and shrubs (Malus domestica, Prunus armeniaca, Prunus avium, Prunus cerasus, Prunus persica, Vitis vinifera, etc.), alfalfa (Medicago sativa), vegetables (Solanum tuberosum, Lycopersicon esculentum, Allium cepa, etc.), and weeds. According to IUCN Habitats Classification Scheme (Version 3.1), this habitat belongs to the type 14 Artificial – Terrestrial, subtype 14.4 Rural Gardens. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome (subtype T7.4 Cities, villages and infrastructure). According EUNIS classification, it belongs to habitat type J – Constructed, industrial and other artificial habitats and subtype J1.2 Residential buildings of villages and urban peripheries.

76. 8. Roads. According to IUCN Habitats Classification Scheme (Version 3.1), this habitat belongs to the type 14 Artificial – Terrestrial. In accordance with IUCN Global Ecosystem Typology, this habitat belongs to the type T7 Intensive land-use biome (subtype T7.4 Cities, villages and infrastructure). According EUNIS classification, it belongs to habitat type J – Constructed, industrial and other artificial habitats and subtype J4.2 Road networks.

77. Thus, all habitats of the Project area are modified, and vegetation is represented mainly with agricultural crops, planted trees and secondary weedy communities, except for semi-natural vegetation on the old cemeteries and along the irrigation network. The loss of vegetation during construction of the new airport can have some negative impacts on flora and vegetation, affect habitat conditions of wildlife, and potentially reducing biodiversity in the Project region. Taking into account the current state of modified habitats and mostly cultural and secondary vegetation of the study area, the negative impact can be assessed as insignificant.

78. In accordance with the national legislation of Uzbekistan, compensation must be paid for damage caused to vegetation as a result of airport construction. The amount of payment is

determined in accordance with the Decree of the Cabinet of Ministers No. 290 dated October 20, 2014.

References

A Global Standard for the Identification of Key Biodiversity Areas. Version 1.0. 2016. IUCN, Gland, Switzerland. 37 p.

Aralbaev N.K., Kudabaeva G.M., Japarova N.K. et al. 2002. State cadaster of plants of South Kazakhstan Region. Book 1. Check-list of species of vascular plants. Gylym, Almaty. 316 p. (in Russian).

Aralbaev N.K., Kudabaeva G.M., Japarova N.K. et al. 2002. State cadaster of plants of South Kazakhstan Region. Book 2. Rare and threatened species of vascular plants. Gylym, Almaty. 148 p. (in Russian).

Azimov I.T. 2018. Vegetation of the Akhangaran river basin. Abstr. PhD Diss. Tashkent. 45 p. (In Uzbek and Russian with English resume).

Beshko N.Yu., German D.A., Gaziev A.D., Malzev I.I., Khojimatov O.K., Kodyrov U.Kh., Kosimov Z.Z., Madaminov F.M., Daminova N.E. 2024. Cadaster of the flora of Uzbekistan: Tashkent region. Kaleon Press, Tashkent. 366 p. (In Russian)

Braun-Blanquet J. 1951. Pflanzensoziologie. Grundzuge der Vegetationskunde. 2. Wien: Springer-Verlag. 631 p.

Brauneder K.M., Montes C., Blyth S., Bennun L., Butchart S.H., Hoffmann M., Burgess N.D., Cuttelod A., Jones M.I., Kapos V., Pilgrim J., Tolley M.J., Underwood E.C., Weatherdon L.V., Brooks S.E. 2018. Global screening for Critical Habitat in the terrestrial realm. PloS one, 13(3), p.e0193102. doi:10.1371/journal.pone.0193102

CABI. 2017. Invasive Species Compendium. CAB International, Wallingford, UK. Available from: www.cabi.org/isc.

Conspectus Florae Asiae Mediae. In 11 vol. 1963–2015. Fan Publishers, Tashkent. (In Russian).

EUNIS habitat classification. 2021. Available from: https://eunis.eea.europa.eu/habitats.jsp

Fedtschenko B.A. 1925. Essays on the vegetation of Turkestan. Leningrad. 55 p. (In Russian).

Fedtschenko B.A. (ed). 1912–1915. Preliminary reports on botanical research in Siberia and Turkestan in 1911–1914 г. Migration Depertment, St. Petersburg (In Russian).

Fedtschenko B.A. 1913–1918. Flora of Asiatic Russia. In 13 iss. Resettlement Department of the Land Regulation and Agriculture Administration, St. Petersburg - Petrograd. (In Russian).

Fedtschenko B.A. 1915. List of weedy plants of Turkestan. Botanicheskie Materialy Gerbariya Imperatorskogo Botanicheskogo Sada Petra Velikogo 1: 1–81. (in Russian).

Fedtschenko O.A., Fedtschenko B.A. 1906–1916. Conspectus florae Turkestanicae. In 6 vol. Izvestia Turkestanskogo Otdela Imperatorskogo Russkogo Geograficheskogo Obschestva. (in Russian).

Field geobotany. In 5 vol. 1959–1976. Academy of Sciences of the USSR, Moscow & Leningrad. (In Russian).

Flora of Kazakhstan. 1956–1966. In 10 vol. Academician Scientific press, Almaty. (in Russian)

Flora of the U.S.S.R. In 30 vol. 1934–1964. Academy of Sciences of the USSR, Moscow & Leningrad. (In Russian).

Flora of Uzbekistan. In 6 vol. 1941–1963. Academy of Sciences of the Uzbek SSR, Tashkent. (In Russian).

Gaziev A.D. 2021—2025. Flora of Tashkent Region (check-list). Plantarium. Plants and lichens of Russia and neighboring countries: open online galleries and plant identification guide. Available from: https://www.plantarium.ru/lang/en/page/flora/id/1123.html

GBIF. 2025. Global Biodiversity Information Facility. Available from: https://www.gbif.org/

Geographical atlas of Uzbekistan. 2012. Goskomgeodeskadastr, Tashkent. 119 p. (In Russian).

Granitov A.I. (ed.). 1980. Methodological guidelines for geobotanical survey of natural rangelands in Uzbekistan. Uzgiprozem, Tashkent. 170 pp. (In Russian)

IFC (International Finance Corporation) (January 1, 2012, updated June 27, 2019) Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. Word Bank Group, Washington, DC. 69 p.

iNaturalist. 2025. Available from: https://www.inaturalist.org/

International Plant Names Index. 2025. Available from: http://www.ipni.org.

IUCN Habitats Classification Scheme (Version 3.1). Available from: https://www.iucnredlist.org/resources/habitat-classification-scheme

IUCN Red List of Threatened species. 2025. Available from: http://www.iucnredlist.org.

IUCN/SSC Invasive Species Specialist Group (ISSG). 2014. Global Invasive Species Database version 2014-2. Available from: http://193.206.192.138/gisd/

Keith D.A., Ferrer-Paris J.R., Nicholson E. et al. 2022. A function-based typology for Earth's ecosystems. Nature 610: 513–518. DOI: https://doi.org/10.1038/s41586-022-05318-4

Kent M. 2011. Vegetation Description and Data Analysis: A Practical Approach, 2nd Edition. Wiley-Blackwell. 428 pp.

Khodjimatov O.K. 2008. Medicinal plants of Western Tien Shan (within the Republic of Uzbekistan). Abstr. DSci. Diss. Tashkent. 40 p. (In Russian).

Korovin E.P. 1934. Vegetation of Middle Asia and South Kazakhstan. Moscow & Tashkent. 479 p. (In Russian).

Korovin E.P. 1961. Vegetation of Middle Asia and South Kazakhstan. Vol. 1. Tashkent. 452 p. (In Russian).

Korovin E.P. 1962. Vegetation of Middle Asia and South Kazakhstan. Vol. 2. Tashkent. 547 p. (In Russian).

Lapin A.M. 1938. An identification guide of plants of the Tashkent oasis. Part 1. An illustrated guide for identification of herbaceous cultural and wild plants. State publishing house of UzbekSSR, Tashkent. 343 p. (In Russian).

Lapin A.M. 1931. An identification guide of plants of the Tashkent oasis. Part 2. An illustrated guide for identification of trees and shrubs. Uzbek state publishing house, Tashkent. 117 p. (In Russian).

Lipsky V.I. 1902–1905. Flora of Central Asia, i.e. Russian Turkestan and Bukhara and Khiva Khanates. Vol. 1–3. Herald Publishers, St. Petersburg (In Russian).

Mountains of Central Asia Biodiversity Hotspot: Ecosystem Profile. 2017. CEPF, Switzerland. 183 p.

Nikitin V.V. 1983. Weeds of the flora of the USSR. Science Publishers, Leningrad. 454 p. (In Russian).

Nowak A., Nobis M., Nowak S., Kotowski M., Klichowska E., Nobis A., Swierszcz S. 2025. Vegetation of Middle Asia with a special reference to Tajikistan. Monographiae Botanicae 111. Polish Botanical Society, Wroclaw. 623 p.

Plantarium: open on-line atlas and key to plants and lichens of Russia and neighbouring countries. 2025. Available from: https://www.plantarium.ru/

Popov M.G. (ed.) 1923. An identification guide of plants of surroundings of Tashkent. Botanical Institute of Turkestan State University, Tashkent. 126 p. (In Russian).

POWO. 2025. Plants of the World Online. Available from: http://powo.science.kew.org/

Pulatova T.P., Khalmatov Kh.Kh., Dzhuraev I.N. 1980. Medicinal plants of Tashkent Region. Medicine, Tashkent. 136 p. (In Russian).

Rachkovskaya E.I., Volkova E.A. & Khramtsov V.N. (eds.). 2003. Botanical geography of Kazakhstan and Middle Asia. Leningrad. 425 p. (In Russian and Engl.).

Recommendations for protected areas system development in Uzbekistan. 2013. Ismatov A. T. (ed.). UNDP, GEF, Main Department of Forestry of Ministry of Agriculture and Water Resources of the Republic of Uzbekistan. Baktria Press, Tashkent. 256 p. (In Russian).

Red Data Book of the Uzbek SSR. 1984. Vol. 2. Plants. Tashkent. 150 p. (in Uzbek and Russian).

Red Data Book of the Republic of Uzbekistan. 1998. Vol. 1. Plants. Chinor ENK, Tashkent. 335 p. (in Uzbek and Russian).

Red Data Book of the Republic of Uzbekistan. 2006. Vol. 1. Plants and Fungi. Chinor ENK, Tashkent. 250 p. (in Uzbek, Russian and English).

Red Data Book of the Republic of Uzbekistan. 2009. Vol. 1. Plants and Fungi. Chinor ENK, Tashkent. 360 p. (in Uzbek, Russian and English).

Red Data Book of the Republic of Uzbekistan. 2019. Vol. 1. Plants. Tasvir, Tashkent. 356 p. (in Uzbek, Russian and English).

Regulation on the order of geobotanical survey of pastures and hayfields. Appendix No. 3 to the Decree of the Cabinet of Ministers of the RUz No. 299 of 23.04.2018. "On measures to further improve the procedure for determining the boundaries of administrative-territorial units, inventory of land resources and geobotanical survey of pastures and hayfields" (in Uzbek). Yaylov va pichansorlarda geobotanik tadkikot ishlirini uzkazish tartibi tugrisidagi nizom (National Law Database, 01.05.2018, No. 09/18/299/1105, https://www.lex.uz/docs/3713566)

Sennikov A.N. (ed.) 2016. Flora of Uzbekistan, 2nd Edition. Vol. 1. Amaryllidaceae. Navro‘z Publishers, Tashkent. Xxviii + 173 p. (In Russian).

Sennikov A.N. (ed.) 2017. Flora of Uzbekistan, 2nd Edition. Vol. 2. Navro‘z Publishers, Tashkent. Xii + 200 pp. (In Russian)

Sennikov A.N. (ed.) 2019. Flora of Uzbekistan, 2nd Edition. Vol. 3. Ma’naviat Publishers, Tashkent. Xii + 201 pp. (In Russian)

Sennikov A.N. (ed.) 2022. Flora of Uzbekistan, 2nd ed. Vol. 4. Fan Publishers, Tashkent. xviii + 238 pp. (In Russian)

Sennikov A.N. (ed.) 2023. Flora of Uzbekistan, 2nd ed. Vol. 5. Fan Publishers, Tashkent. Xiv + 469 pp. (In Russian)

Sennikov A.N. (ed.) 2023. Flora of Uzbekistan, 2nd ed. Vol. 6. Ma’naviat Publishers, Tashkent. Xiv + 209 pp. (In Russian)

Sennikov A.N., Tojibaev K.Sh., Beshko N.Yu., Esanov H.K., Jenna Wong L. & Pagad S. 2018. Global Register of Introduced and Invasive Species - Uzbekistan. Version 1.3. Invasive Species Specialist Group ISSG. Available from: https://doi.org/10.15468/m5vdwk.

Shcherbakov A.V., Mayorov S.R. Field study of flora and herbarization of plants: A training manual. - Moscow: Publishing house of Moscow State University, 2006. 84 p.

Sulaymonov N.O., Kushiev K.K., Shomurodov Kh.F. 2015. Plants of Syrdarya Valley. Gulistan. 278 p. (in Uzbek).

Tojibaev K.Sh. 2010. Flora of the South-Western Tien Shan (within the Republic of Uzbekistan). Tashkent. 98 p. (In Russian).

Tojibaev K.Sh., Beshko N.Yu., Popov V.A., Jang C.G. & Chang K.S. 2017. Botanical Geography of Uzbekistan. Korea National Arboretum, Pocheon, Republic of Korea. 250 p.

Umarov T.A. 1992. Wild food plants of Tashkent Region. Abstr. Cand. Diss. Tashkent. 21 p. (In Russian).

Usmanov A.U. 1953. Riparian vegetation of Angren river valley and its peculiarities. Academy of Sciences of the Uzbek SSR, Tashkent. 62 p. (In Russian).

Vegetation cover of Uzbekistan and the ways of its practical use (1971–1984) In 4 vol. Fan Publishers, Tashkent. (In Russian).

Annex 1. Checklist of plant species recorded within the Project area

Species	Family	Life form	Status IUCN Red List	Status UzbRDB	Endemic / Restricted-range	Alien
1. *Abutilon theophrasti*	Malvacaceae	annual	Not Evaluated (NE)	No	No	Yes
2. Acanthocephalus amplexifolius	Asteraceae	annual	Not Evaluated (NE)	No	No	No
3. Achillea arabica	Asteraceae	perennial	Not Evaluated (NE)	No	No	No
4. Aeluropus littoralis	Poaceae	perennial	Least Concern (LC)	No	No	No
5. Alcea nudiflora	Malvacaceae	perennial	Not Evaluated (NE)	No	No	No
6. Alhagi pseudalhagi	Fabaceae	perennial	Not Evaluated (NE)	No	No	No
7. Allium suworowii	Amaryllidaceae	perennial	Not Evaluated (NE)	No	No	No
8. Althaea armeniaca	Malvacaceae	perennial	Not Evaluated (NE)	No	No	No
9. Ambrosia artemisiifolia	Asteraceae	Annual, perennial	Not Evaluated (NE)	No	No	Yes (quarantine weed)
10. Arctium umbrosum (Cousinia umbrosa)	Asteraceae	perennial	Not Evaluated (NE)	No	No	No
11. Artemisia annua	Asteraceae	annual	Not Evaluated (NE)	No	No	No
12. Artemisia vulgaris	Asteraceae	perennial	Least Concern (LC)	No	No	No
13. Asperugo procumbens	Boraginaceae	annual	Not Evaluated (NE)	No	No	No
14. Astragalus filicaulis	Fabaceae	annual	Not Evaluated (NE)	No	No	No
15. Astragalus ishkamishensis	Fabaceae	perennial	Not Evaluated (NE)	No	No	No
16. *Bidens frondosa*	Asteraceae	annual	Least Concern (LC)	No	No	Yes
17. *Bolboschoenus maritimus*	Cyperaceae	perennial	Least Concern (LC)	No	No	No
18. Brassica napus	Brassicaceae	Annual, biennial	Not Evaluated (NE)	No	No	Yes (introduced)
19. Bromus scoparius	Poaceae	annual	Not Evaluated (NE)	No	No	No
20. Bromus sterilis	Poaceae	annual	Not Evaluated (NE)	No	No	No

21. Bromus tectorum	Poaceae	annual	Not Evaluated (NE)	No	No	No
22. Callipeltis cucullaris	Rubiaceae	annual	Not Evaluated (NE)	No	No	No
23. Calystegia sepium	Convolvulaceae	perennial	Least Concern (LC)	No	No	No
24. Cannabis sativa (*Cannabis ruderalis)*	Cannabaceae	annual	Not Evaluated (NE)	No	No	No
25. Capparis spinosa	Capparaceae	perennial	Least Concern (LC)	No	No	No
26. *Capsella bursa-pastoris*	Brassicaceae	annual	Least Concern (LC)	No	No	No
27. *Carduus pycnocephalus*	Asteraceae	annual	Not Evaluated (NE)	No	No	No
28. Carex acutiformis	Cyperaceae	perennial	Least Concern (LC)	No	No	No
29. Carex melanostachya	Cyperaceae	perennial	Not Evaluated (NE)	No	No	No
30. *Carthamus turkestanicus*	Asteraceae	annual	Not Evaluated (NE)	No	No	No
31. Centaurea iberica	Asteraceae	biennial	Not Evaluated (NE)	No	No	No
32. *Cerastium glomeratum*	Caryophyllaceae	annual	Not Evaluated (NE)	No	No	No
33. Cichorium intybus	Asteraceae	perennial	Least Concern (LC)	No	No	No
34. Cirsium vulgare	Asteraceae	biennial	Not Evaluated (NE)	No	No	No
35. *Conium maculatum*	Apiaceae	biennial	Not Evaluated (NE)	No	No	No
36. *Convolvulus arvensis*	Convolvulaceae	perennial	Not Evaluated (NE)	No	No	No
37. *Cruciata pedemontana*	Rubiaceae	annual	Not Evaluated (NE)	No	No	No
38. Cynanchum acutum subsp. *sibiricum*	Apocynaceae	perennial	Least Concern (LC)	No	No	No
39. Cynodon dactylon	Poaceae	perennial	Not Evaluated (NE)	No	No	No
40. Cynoglossum creticum	Boraginaceae	Annual, biennial	Not Evaluated (NE)	No	No	No
41. *Descurainia sophia*	Brassicaceae	annual	Not Evaluated (NE)	No	No	No
42. Dodartia orientalis	Mazaceae	perennial	Not Evaluated (NE)	No	No	No
43. Echium vulgare	Boraginaceae	biennial	Not Evaluated (NE)	No	No	No
44. *Elaeagnus angustifolia*	Elaeagnaceae	tree	Least Concern (LC)	No	No	No
45. Elaeosticta allioides	Apiaceae	perennial	Not Evaluated (NE)	No	No	No
46. Eleocharis uniglumis	Cyperaceae	perennial	Least Concern (LC)	No	No	No

47. *Equisetum ramosissimum*	Equisetaceae	perennial	Least Concern (LC)	No	No	No
48. Erodium cicutarium	Geraniaceae	annual	Not Evaluated (NE)	No	No	No
49. *Euphorbia helioscopia*	Euphorbiaceae	annual	Not Evaluated (NE)	No	No	No
50. *Fallopia convolvulus*	Polygonaceae	annual	Not Evaluated (NE)	No	No	No
51. Festuca ambigua (Vulpia ciliata)	Poaceae	annual	Not Evaluated (NE)	No	No	No
52. Filago arvensis	Asteraceae	annual	Not Evaluated (NE)	No	No	No
53. Fumaria vaillantii	Papaveraceae	annual	Not Evaluated (NE)	No	No	No
54. *Galium aparine*	Rubiaceae	annual	Not Evaluated (NE)	No	No	No
55. *Galium humifusum* (*Asperula humifusa)*	Rubiaceae	perennial	Not Evaluated (NE)	No	No	No
56. *Galium spurium*	Rubiaceae	annual	Not Evaluated (NE)	No	No	No
57. Geranium dissectum	Geraniaceae	annual	Not Evaluated (NE)	No	No	No
58. *Geranium pusillum*	Geraniaceae	annual	Not Evaluated (NE)	No	No	No
59. Glaucium fimbrilligerum	Papaveraceae	biennial	Not Evaluated (NE)	No	No	No
60. *Gleditsia triacanthos*	Fabaceae	tree	Least Concern (LC)	No	No	Yes (introduced)
61. *Glycyrrhiza glabra*	Fabaceae	perennial	Least Concern (LC)	No	No	No
62. *Hordeum marinum* subsp. *gussoneanum*	Poaceae	annual	Least Concern (LC)	No	No	No
63. Hordeum murinum subsp. leporinum	Poaceae	annual	Least Concern (LC)	No	No	No
64. *Hordeum spontaneum*	Poaceae	annual	Least Concern (LC)	No	No	No
65. *Imperata cylindrica*	Poaceae	perennial	Least Concern (LC)	No	No	Yes
66. Ixiolirion tataricum	Ixioliriaceae	perennial	Not Evaluated (NE)	No	No	No
67. *Lactuca serriola*	Asteraceae	Annual, biennial	Least Concern (LC)	No	No	No
68. Lactuca tatarica	Asteraceae	perennial	Not Evaluated (NE)	No	No	No
69. *Lamium amplexicaule*	Lamiaceae	annual	Not Evaluated (NE)	No	No	No
70. Lepidium chalepense (*Cardaria repens)*	Brassicaceae	perennial	Not Evaluated (NE)	No	No	No
71. *Lepyrodiclis holosteoides*	Caryophyllaceae	annual	Not Evaluated (NE)	No	No	No

72. Leymus multicaulis (*Elymus multicaulis)*	Poaceae	perennial	Not Evaluated (NE)	No	No	No
73. *Lycium dasystemum*	Solanaceae	shrub	Not Evaluated (NE)	No	No	No
74. Lycopus europaeus	Lamiaceae	perennial	Least Concern (LC)	No	No	No
75. Malva neglecta	Malvaceae	Annual, perennial	Least Concern (LC)	No	No	No
76. Marrubium anisodon	Lamiaceae	perennial	Not Evaluated (NE)	No	No	No
77. *Medicago sativa*	Fabaceae	perennial	Least Concern (LC)	No	No	Yes (introduced)
78. Mentha longifolia var. *asiatica*	Lamiaceae	perennial	Least Concern (LC)	No	No	No
79. Microphysa elongata	Rubiaceae	perennial	Not Evaluated (NE)	No	No	No
80. *Milium vernale*	Poaceae	annual	Not Evaluated (NE)	No	No	No
81. *Morus alba*	Moraceae	tree	Not Evaluated (NE)	No	No	Yes (introduced)
82. Myosotis caespitosa	Boraginaceae	perennial	Not Evaluated (NE)	No	No	No
83. Nonea caspica	Boraginaceae	annual	Not Evaluated (NE)	No	No	No
84. *Onopordum acanthium*	Asteraceae	biennial	Not Evaluated (NE)	No	No	No
85. Papaver pavoninum	Papaveraceae	annual	Not Evaluated (NE)	No	No	No
86. Persicaria maculosa	Polygonaceae	annual	Least Concern (LC)	No	No	No
87. Phleum paniculatum	Poaceae	annual	Not Evaluated (NE)	No	No	No
88. Phragmites australis	Poaceae	perennial	Least Concern (LC)	No	No	No
89. Plantago lanceolata	Plantaginaceae	perennial	Least Concern (LC)	No	No	No
90. Plantago major	Plantaginaceae	perennial	Least Concern (LC)	No	No	No
91. *Poa annua*	Poaceae	annual	Least Concern (LC)	No	No	No
92. Poa bulbosa	Poaceae	perennial	Not Evaluated (NE)	No	No	No
93. Poa pratensis	Poaceae	perennial	Least Concern (LC)	No	No	No
94. Poa trivialis	Poaceae	perennial	Least Concern (LC)	No	No	No
95. Polygonum aviculare	Polygonaceae	Annual, perennial	Not Evaluated (NE)	No	No	No
96. Populus nigra (Populus afghanica)	Salicaceae	tree	Data Deficient (DD)	No	No	No

97. *Potentilla reptans*	Rosaceae	perennial	Not Evaluated (NE)	No	No	No
98. Pseudohandelia umbellifera	Asteraceae	perennial	Not Evaluated (NE)	No	No	No
99. Ranunculus arvensis	Ranunculaceae	annual	Not Evaluated (NE)	No	No	No
100. Ranunculus sceleratus	Ranunculaceae	Annual, biennial	Least Concern (LC)	No	No	No
101. Rhaponticum repens (Acroptilon repens)	Asteraceae	perennial	Not Evaluated (NE)	No	No	No
102. Rosa beggeriana	Rosaceae	shrub	Not Evaluated (NE)	No	No	No
103. Rosa canina	Rosaceae	shrub	Least Concern (LC)	No	No	No
104. Rubus caesius	Rosaceae	shrub	Least Concern (LC)	No	No	No
105. *Rumex conglomeratus*	Polygonaceae	perennial	Least Concern (LC)	No	No	No
106. Salix alba	Salicaceae	tree	Least Concern (LC)	No	No	No
107. Salix babylonica	Salicaceae	tree	Data Deficient (DD)	No	No	Yes (introduced)
108. Salix blakii	Salicaceae	shrub	Not Evaluated (NE)	No	No	No
109. Sclerochloa dura	Poaceae	annual	Least Concern (LC)	No	No	No
110. Sinapis arvensis	Brassicaceae	annual	Least Concern (LC)	No	No	Yes
111. *Sisymbrium altissimum*	Brassicaceae	annual	Not Evaluated (NE)	No	No	No
112. Sophora alopecuroides	Fabaceae	perennial	Not Evaluated (NE)	No	No	No
113. *Spinacia turkestanica*	Amaranthaceae	annual	Not Evaluated (NE)	No	No	No
114. *Stellaria neglecta*	Caryophyllaceae	annual	Not Evaluated (NE)	No	No	No
115. Tamarix ramosissima	Tamaricaceae	shrub	Least Concern (LC)	No	No	No
116. *Taraxacum officinale*	Asteraceae	perennial	Least Concern (LC)	No	No	Yes
117. Torilis nodosa	Apiaceae	annual	Not Evaluated (NE)	No	No	Yes
118. Trachomitum lancifolium	Apocynaceae	perennial	Not Evaluated (NE)	No	No	No
119. Trifolium repens	Fabaceae	perennial	Least Concern (LC)	No	No	No
120. *Tripidium ravennae (Erianthus ravennae)*	Poaceae	perennial	Least Concern (LC)	No	No	No
121. Typha latifolia	Typhaceae	perennial	Least Concern (LC)	No	No	No
122. Typha laxmannii	Typhaceae	perennial	Least Concern (LC)	No	No	No

123. *Ulmus pumila*	Ulmaceae	tree	Least Concern (LC)	No	No	No
124. Verbascum blattaria	Scrophulariaceae	Annual, biennial	Not Evaluated (NE)	No	No	No
125. Verbena officinalis	Verbenaceae	perennial	Least Concern (LC)	No	No	No
126. Veronica argute-serrata	Plantaginaceae	annual	Not Evaluated (NE)	No	No	No
127. *Veronica arvensis*	Plantaginaceae	annual	Not Evaluated (NE)	No	No	No
128. Veronica hederifolia	Plantaginaceae	annual	Not Evaluated (NE)	No	No	No
129. *Veronica persica*	Plantaginaceae	annual	Not Evaluated (NE)	No	No	Yes
130. Vicia sativa subsp. *nigra*	Fabaceae	annual	Least Concern (LC)	No	No	Yes
131. *Xanthium orientale*	Asteraceae	annual	Not Evaluated (NE)	No	No	Yes
132. *Xanthium spinosum*	Asteraceae	annual	Not Evaluated (NE)	No	No	Yes

Annex 2. Photographs of plant species



Allium suworowii



Ambrosia artemisiifolia, non-native annual weedy plant, invasive quarantine weed



Asperugo procumbens, native annual weedy plant



Astragalus ishkamishensis



Bromus tectorum, native annual weedy grass



Cannabis sativa (*Cannabis ruderalis),* native annual weedy plant



Carduus pycnocephalus, native annual weedy plant



Carex acutiformis



Conium maculatum, native biennial weedy plant



Cynoglossum creticum, native annual or biennial weedy plant



Descurainia sophia, native annual weedy plant



Dodartia orientalis



Gleditsia triacanthos, introduced non-native tree



Hordeum murinum subsp. *leporinum,* native annual weedy grass



Lepidium chalepense (*Cardaria repens*), native perennial weedy plant



Lycium dasystemum



Mentha longifolia var. *asiatica*



Persicaria maculosa



Poa bulbosa



Rubus caesius



Salix babylonica, introduced non-native tree



Torilis nodosa, non-native annual weedy plant