



ECOSYSTEM OF THE KARADARYA VALLEY

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ABSTRACT

Based on data on the geographical structure of the Kara-Darya, one of the largest water basins in the Fergana Valley, starting from the Fergana and Alay mountain ranges, information on the current ecological status of the middle and lower reaches of the river valley, negative and positive aspects of anthropogenic impact, taxonomic analysis of unique vegetation life forms adapted to the tugai environment and their importance in the economy is provided.

KEY WORDS: Fergana Valley, Andijan region, Karadarya, taxonomic, anthropogenic, ecological, mountain, hill, soil, tugai, plant, life form.

INTRODUCTION

The Fergana Valley attracts the people of the world with its beautiful nature. The charming mountains, gardens, hills, fertile fields, diverse flora and fauna of the valley have aroused the interest of scientists.

Plants play a key role in the survival and life activities of humans and animals. Because they are sources of food, fodder, medicine, clothing, oxygen, which is important for living organisms, and many vital substances. The Karadarya basin has such a rich vegetation cover. It forms tugai forests on the river banks. The diversity of plants here has a special significance in the national economy, food, light industry, pharmaceuticals and medicine.

The current state of the plants of the Karadarya Valley, the preservation of existing species, the identification of medicinal plants, the specificity of the plants of the Karadarya and various other important aspects are extremely interesting. It is important to identify the problems associated with the extinction of wild plant species as a result of the development of natural areas of the Karadarya Valley as cultural lands by the population, as well as the preservation of existing species in this area.

MATERIAL AND METHODS

The vegetation cover of the study area is described on the basis of geobotanical maps created by R.S. Wernick and T. Rakhimova (1982) [6], [76].

The assessment of anthropogenic transformation of vegetation was carried out according to the method of V.L. Kotelnikov (1950). In determining the degree of degradation and transformation of vegetation cover in geobotanical studies, the following characteristics were taken into account:

a) the general condition of the plants in the grazing areas of livestock, ie the presence of vegetation by sheep and goats, the presence of trails formed by the constant movement of ungulates, etc.:

b) the composition and structure of plant populations, ie the decrease and status of forage species, the increase of ephemeral and xerophytes, the increase of non-livestock species, poisonous, adventitious plants:

c) the condition of trees, shrubs and bushes, living plants, increase in their number, growth and development:

d) natural and anthropogenic soil erosion and their nature;

e) the presence of endemic and rare plant species, their vegetative status.

RESULTS

Andijan region is richer in fresh water resources than other regions of our Republic. The rivers of the region receive water mainly from precipitation and perennial snow glaciers. The largest river is Karadarya [1],[196].



Karadarya is formed by the confluence of the Tor and Karagulcha rivers, starting from the Fergana and Alay ridges. After that, only two large tributaries, the Yassi on the right and the Kurshab on the left, flow into it. The subsequent tributaries of the Karadayo, the Kogart, the Karatur, the Maylisay on the right, and the Akbora on the left, also do not reach the Karadarya for a long time because the water of the Aravan River is used for irrigation. Only the excess water from irrigation is discharged into the Karadarya [2], [45].

The average annual water consumption of the Kara-Darya near the village of Balikchi is 123 m³ per second, of which corresponds to 46.4% in March-June, 14.4% in July-September and 39.2% in October-February.

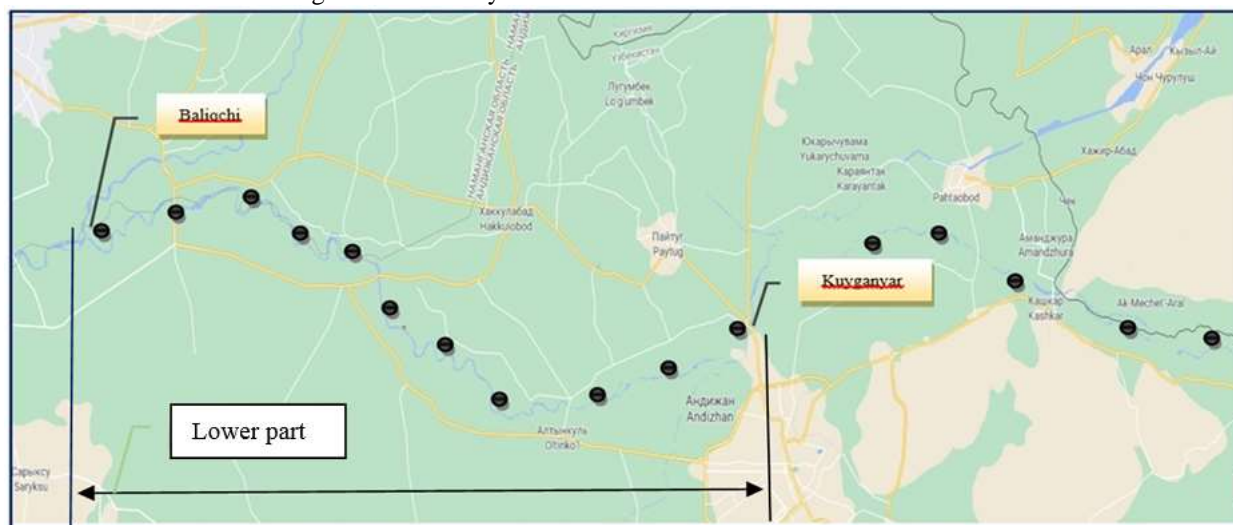
It is known that humid air flows to Andijan region come mainly from the west. Mount Fergana, which is the catchment area of the Kara-Darya, is 500-700 mm, as it is located across these streams. Some years are even longer. Therefore, for every 1 km² of the catchment area of the Karadarya corresponds to more than 10 meters of water per second. The onset of flooding in the Karadarya River

falls on averagely March 18, with the maximum flooding until June, and the end of flooding on September 18. [3], [365].

As a result of the irrigation of the Karadarya River through canals, after passing through the town of Kuyganyor, during the period when the crops are most irrigated, the water level decreases. However, at the confluence with the Naryn River, a large amount of water flows, and this water consists of groundwater and discharge water. Karadarya water temperature is -1 -7°C in winter and +15 +20°C in summer. The hottest months for water are July and August.

The average perennial turbidity of Karadarya water is 1.7 kg / m³, and in some years 4.2 kg / m³. Muddy water flows most often in April and August.

The characteristics of the Karadarya natural elements are not the same in all parts of it, the complexity of the relief, lithological structure and diversity of hydrological conditions, climate and vegetation have led to the formation of different soil types. [4].



Picture 1. Areas designated for research in the Karadarya Valley.

In the mountainous part of the Karadarya, the soil types formed three zones: the gray-soil hill region, the brown mountain-forest zone, and the light-colored brown meadow high mountain region. In the foothills of the Karadarya, on the high slopes of the river, in the foothills of the low mountains, light gray soil is widespread. The soil-forming rocks in these places are alluvial-proluvial deposits of loess and induction cones. Light gray soil is distinguished from clear gray soil by the fact that the top layer of grass is light gray, with a low amount of humus, close to the surface of the carbonate layer. [29],[38].

In the upper part of the river there is a gray soil zone. Here, too, as the amount of precipitation is

much higher, the plant species multiply and grow thicker. These in turn affect the process of soil formation and, consequently, the amount of humus in the soil. Hydromorphic soil types such as meadow-gray, swamp-meadow, gray, swamp-gray are also found in the gray hill region. Such gray soil types are located in the old upper reaches of the Kara-Darya, in the deltas, in the lower parts of the plains at the foot of the mountains. Meadow soils are also found in the lower reaches of the Karadarya, with humus content up to 2%. Today, this type of soil has been converted to irrigated grassland in many places [8].

In the mountainous part of the Karadarya, the air temperature is much lower, on the contrary,



the amount of precipitation increases, resulting in specific plants, various shrubs and trees forming forests [11], [36]. The plants that grow here are adapted to grow in the sernam (mesophyte) region of the river basin. [12],[19].

Many tugai forests have formed in the river valley, of which very few remain today. Even so, sparse plants gives hope for restoring the tugai forests.

When we say tugai and tugai forest plants, the local people understand the places near the river banks and the plants that grow there [9], [124]. In many places, tugai forests consist of trees, shrubs, semi-shrubs, and grasses growing together. Occasionally there are liana plants. Tugai forests are found along the rivers of Central Asia, including the desert region of Uzbekistan. But its main area is associated with the middle and lower reaches of rivers.

In the mountainous region, such areas form a thin self-network. On the banks of rivers flowing through mountain ranges and streams, a variety of plants grow in abundance, including trees, shrubs, and shrubs. From them grow willow, poplar, birch, mountain ash, hawthorn, spruce, and occasionally walnuts, apples, oleaster. In addition, shrubs such as dogwood, barberry are also common. In these places, annual and perennial plants such as agrostis, rhizome, sagebrush, dog-bane, sedge, mint, etc. form grass on the banks of rivers. [5], [18].

The tugai in the Adir region cover a much larger area. This is because sometimes when rivers overflow, they expand and flow to the shores. [7], [19] Later, the waters receded, and the rivers formed a narrow stream, and on its banks formed tugai forests. In the tugai in this region, shrubs and deciduous shrubs (juniper, populus diversifolia, willow, hippophae, tamarix gallica) grow more than perennials, such as jiida, white lily, Capparis spinosa. In addition, there are many plants from the family of alfalfa, licorice, various astragalus and wheat. [15], [16].

Rocky areas are also found in the upper regions of the tugai, consisting of gray and brown soils. Fertile soils are used for agriculture, to some extent as pastures for livestock.

Taxonomic analysis of the vegetation of the Karadarya basin shows that the flora here is very diverse, including tree, shrub, semi-shrub, perennial and annual grasses, several families. According to the taxonomic analysis of the identified species, there are 25 tribes, 27 families, 45 genera and 61 species. [10],[316].

The following tugai plants can be found on the river banks [22].

Elaeagnus angustifolia, *Populus diversifoliya*, *Populus pruinosa*, *Salix songarica*,

Salix Wilhelm jana, *Fraxinus turkestanica*, *Hippophae rhamnoides*, *Clematis orientalis*, *Halimodendron halodendron*, *Lycium ruthenicum*, *Tamarix ramosissima*, *Tamarix hispida*, *Tamarix Laxa*, *Glycyrrhiza glabra*, *Capparis spinosa*, *Alhagi sparsifolia*, *Alhagi kirghisorum*, *Phragmites communis Trin.*, *Typha laxmannii*, *Imperata cylindrica*, *Trifolium pratense*, *Equisetum arvense*, *Cennodom daktelon*, *Mentha aquatica*, *Plantago major L.*, *Plantago lanceolata*, *Apocynum lancifolium*, *Karelinia caspia*, *Aeluropus litoralis*, *Artemisia ferganensis*, *Cichorium intybus*, *Zygophyllum fabago*, *Asparagus persicus*, *Lepidium latifolium*, *Dadortia orientales*, *Saccharum spontaneum*, *Urtica urens*, *Typha minima*, *Potamogeton natans*, *Potamogeton nodosus pour ex Lam*, *Erianthus ravennae*, *Hordeum bulbosum*, *Polygonum hydropiper*, *Leersia oryzoides*, *Juncos gerardii*, *Cyperus oryzoides* and many other species are the main constituents of the river valley flora [19],[16].

The characteristics of the natural elements of the Karadarya valley are not the same in all its parts, the diversity of hydrological conditions, climate and diversity of plant species have led to the formation of specific soil types. [26],[34].

Although various ecological environments have been formed in the Karadarya Valley, mainly plants adapted to mesophytic conditions, we can sometimes find plants specific to the arid zone [13], [54]. These plants have formed unique life forms. In the upper reaches of the river there are more trees, shrubs, semi-shrubs, and a variety of annual, perennial plant species. In the middle and lower part, there are fewer trees and shrubs, and mainly a variety of plants are common [30], [346]. The plants found in the Karadarya basin have a variety of life forms, including the *Ailanthus altissima mill.*, *Salix songarica*, *Fraxinus turkestanica*, *Salix excelsa*, *Populus diversifolia*, *Populus pruinosa*, *Elaeagnus angustifolia*, small trees such as *Hippophae rhamnoides*, *Tamarix laxa*, shrub plants such as *Tamarix romosissime*, *Tamarix hispida*, Чилвир *Salix wilhelm*, *Halimodendron halodendron*, *Lycium L.Ruthehicum*, *Clematis orientalis*, *Glucythiza glabra*, *Amorphaa fruticos Al*, *Rosa canina L.*, Small fruit namatakdog-rose - *Roza biggeryana*, large shrub-shaped *Salix olgaerl*) are the only species in the river valley vegetation [14],[8].

The fact that the most common form of life in the river valley is perennial grasses indicates that mesophytic conditions are high. [16],[123]. The most common species of such plants are *Alhagi sparsifolia*, *Alhagi kirhizorm*, *Alhagi pseudo*, *Trifolium pratense*, *Trifolium repens*, *Capparis spinosa*, *Typha laxmannii*, *Typha minima*, *Calamagrostis biya*, *Imperata cylindrica*, *Cynodon*



dactylon, *Aeluropus littoralis*, *Saccharum pont*, *Erianthus ravennae*, *Hordeum bulbosum*, *Phragmites communis*, *Equisetum arvense*, *Euphorbia lamprocorpa*, *Mentha aquatica*, *Plantago major L*, *Plantago Lanceolata*, *Apocynum lancifolium*, *Karelinia caspia*, *Artemisia Ferganensis*, *Cichorium intybus*, *Zygophyllum fabago*, *Asparagus persicus*, *Lepidium latifolium*, *Urtica urens*, *Rumex drobovii*, *Bolboschoenus maritimus*, *Juncus Gerardii*, annual plants such as *Aeluropus littoralis*, *Dadartia avientalis L.*, *Bidens tripartita*, *Carthamus turkish*, *Cannabis ruderalis L.*, *Potamogeton natans*, *Polygonum hydropiper*, *Cyperus Oryzoides*.

SUGGESTIONS

The old riverbeds of the Karadarya, with the planting of assimilated crops, led to the deterioration of soil composition as a result of the mixing of various mineral fertilizers into the soil. Due to the use of various toxic chemicals to remove weeds from cultivated crops, tugai plants are disappearing. [18],[342].

High concentrations of water flowing into the river without washing away mineral salts from plows, various industrial wastes, pollute the river water and adversely affect the plants on the river banks.

Many wild species of plants that still grow naturally can be found in the Karadarya basin. If we study the importance of these wild species on the farm, we can see that some of them are at a higher level than the cultivated plants. Unfortunately, the number of some medicinal plant species has greatly decreased. For example, the plant types such as *Hippophae rhamnoides*, *Rosa canina L*, *Glycyrrhiza glabra* are now very scarce [20],[24].

The following is a discussion of the importance of some conservation-affected wild plant species in the Karadarya basin.

Elaeagnus angustifolia has sweet and sour fruit, and it is food. As the stem is thorny, it is dangerous as a fuel for the locals; it is used as a wall around the garden. It is a quality fuel in remote villages and neighborhoods. *Populus diversifolia* is used as a building material [21], [86].

Salix songarica, *Salix wilhelm jana*. Local people transplant them by the roots and use them as living walls and baskets.

Hippophae rhamnoides - the fruit of the plant is a very valuable medicinal plant. It is an effective remedy for various internal diseases, diseases of the esophagus, stomach and intestines. From its fruits can be prepared various jam varina. The leaves of the retail plant are used in the treatment of various skin diseases [23],[139].

Halimodendron halodendron – this thorny shrub grows in groups in the drier parts of the riverbed, on the gravelly hills. From them the locals make barns where cattle cannot pass. It is also used as a broom to sweep the hay under the cattle and to clean the scattered grain from the straw fields.

Tamarix ramosissima – this plant, since ancient times, has been made of whip stalks, sticks, because their stems are stiff. As firewood, fuel is prepared [24],[216].

Tamarix Laxa – the plant can be propagated as an ornamental plant because of its beauty.

Glycyrrhiza glabra – scientists have shown that the sweetness in the root of this plant is several times sweeter than sugar. *Glycyrrhiza glabra* is a valuable medicinal, fodder plant.

Capparis spinosa – in some places the fruit of *Capparis spinosa* is consumed as much as melons. Its buds and fruits and now sprouted twigs can be eaten as a spice. Oil can be extracted from the seeds. Indigenous people use *Capparis spinosa* fruit to treat various ailments, including gum and toothache [25],[92].

Alhagi sparsifolia – this plant has medicinal properties in addition to being a fodder, wood fuel. Very rich in honey and sugar..

Phragmites communis Trin. – The cane is a good food plant in the spring for cattle. During the summer, the animals eat only its leaves because the stem is woody. High quality silage can be obtained from these plants. The cane is dried and paved on the roof.

Typha Laxmannii – fodder, mats, rough rugs are made from this plant [26],[28].

Cennodom Daktelon – this plant is used as fodder for cattle and sheep. *Cennodom Daktelon* is used as a natural rug for playgrounds.

Mentha aquatica – this plant is an essential oil plant that belongs to the group of meadow plants. This plant is made from young grasses and eaten. Tincture is an effective remedy for nervous disease.

Plantago major L – it is a valuable medicinal plant. In the treatment of liver disease in humans, the juice of this plant "rliantaglutiline" is sold in pharmacies [27],[126].

Cichorium intybus – it is a medicinal plant. The roots and stems are rich in alkali. It is therefore registered as a medicinal plant. Scorpion grass or yeast (*urtica urens*) is a plant rich in vitamin C. *Typha minima* is a plant that is eaten by sheep. It is made into various baskets, buckets and boxes.

Bidens tripartita - this plant is a valuable medicinal plant. Children affected by heat, covered with rash are bathed, cooling the boiled water of *Bidens tripartita*.

Polygonum hydropiper – This plant is also medicinal [28],[16].



CONCLUSION

The Karadarya River, which flows through the Andijan region of the Fergana Valley, has different geographical structures, different natural zones, different soils across zones.

The soil of the tugai consists of gray and brown soils. Rocky areas are also found in the upper regions.

Specific plant species are spread in the Karadarya basin. In the upper part, tree shrubs are more common, while in the middle and lower parts, perennial grasses are more common.

According to the study of the vegetation of the Karadarya Valley, 3 species, 4 ancestors, 7 sub-ancestors, 25 tribes, 62 genera of 45 species were identified.

The current ecological condition of the Karadarya basin is in poor condition. Existing natural tugai and lakes are being destroyed and turned into cultural crops. The result is the application of various chemical mineral fertilizers to the soil; the use of toxic chemicals against wild plants is disrupting the natural ecosystem of various industrial wastes.

It is determined that the life forms of the existing plant species in the Karadarya basin include 9 types of trees, 10 types of shrubs, 34 types of perennial grasses, and 9 types of annual plants.

Karadarya plants are very important in the economy. Of the rare, medicinal plants, the importance of *Hippophae rhamnoides*, *Capparis spinosa*, *Plantago major* L., *Mentha aquatica*, *Rosa canina* L., *Glucythis glabra*, *Bidens tripartita* and other plants should be emphasized.

Given the growing demand for wild plant species in natural areas, especially in the current conditions, in the treatment of various diseases, medical preventive measures among the population, in-depth study of river valley flora and fauna and strong conservation measures is a requirement of the time.

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