

Section 2. Biology

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FEATURES OF EXPANSION OF SPECIES OF *LAMIACEAE* FAMILY IN THE NATURE OF UZBEKISTAN

Abstract. This paper presents data about the family of Lamiaceae Lindl., plants of which were ecologically investigated on the level of frequency in vertical zones, different edaphic locations and it was defined which groups they belong to. In the process of research such books as “Flora of Uzbekistan”, monograph of I. V. Belolipov “Introduction to herbaceous plants by nature of Central Asia (ecological-introductory analysis)”, “Vegetation cover of Uzbekistan and ways of its rational use”.

Keywords: *Lamiaceae*, *Eremostachys*, ecological analysis, upland gypsophytes, petrophytes, tropophytes.

1. Introduction

Flora of Uzbekistan is reach and fertile. It includes around 4350 species of vascular plants. *Lamiaceae* Lindl., with 206 species, is considered one of the largest families of the region’s flora, which is in the first ten systematic spectrum [1, 263–416].

Majority of plain territories of Uzbekistan lies under the same width with southern France, Italy, Spain, northern Africa. However, climate of the plain territories is unusually severe for these widths. It can be explained by inland location of Central Asia, lying almost in the centre of European-Asian continent and remote distance from seas and oceans.

Geographic and climate conditions of Uzbekistan are various: large irrigation areas, broad deserts and sands, also mountain massifs. Rivers (Sirdarya, Amudarya, Zarafshan and etc.), lakes and Aral sea form basins, rich with vegetation. Therefore, in the territory of the republic one can find vegetation characteristics of mountainous and high-mountainous

areas, deserts and sands, irrigated lands and oases, floodplains of rivers and tugais. The classification of mountain and alpine vegetation in Central Asia is still debatable. In recent decades, a number of vegetation classifications have been created, based on traditional physiognomic ecological and morphological principles [2–5], taking into account the climate and edaphic features of environmental factors affecting the process of adaptation of species and the formation of ecobiomorphs [6–9].

2. Results and discussion

The climate of the Central Asian deserts is characterized by a sharp continentality, due to the inland position at a great distance from the seas and oceans; extremely small and uneven precipitation; high temperatures during the hot summer months (around 40 °C), an acute shortage of moisture in the soil and air; low temperature in winter (–30–35 °C) [8, 24].

K. Z. Zakirov and P. K. Zakirov [7, 135–156] distinguish five edapotypes in the vegetation cover of

steppes, of which there are three main ones: halophyta, psammophyta and gypsophyta.

In the sandy deserts occur *Eremostachys transoxana*, *Eremostachys Boissieriana*, *Eremostachys Rege-liana*; In stony-clay deserts *Eremostachys desertorum* grows; On fixed sands *Eremostachys aralensis* grows; in clay deserts-*Eremostachys tuberosa*; On gray-brown soils in the desert-*Eremostachys eriolarynx*; In the artemisia and saltwort deserts-*Lagochilus acutilobus*; On sands and crushed-sand soils-*Chamaesphacos il-icifolius*; From deserts to middle zone of mountains, particularly in the foothills species of ephemers-*Lal-lemantia Royleana* [1, 316, 319–345].

According to Kh. Shomurodov [9, 27, 40–41], fodder flora of Kyzylkum consists of 908 vascular plant species belonging to 345 genera and 68 families. Leading position in the spectrum of fodder flora of Kyzylkum are possessed by such families as *Che-nopodiaceae* (148 species), *Asteraceae* (112), *Poaceae* (106), *Fabaceae* (67), *Lamiaceae* (24). Rare species of *Eremostachys eriolarynx* identified, which is growing in sandy places of Kyzylkum.

On the saline soils of Kyzylkum, not a single representative of such large families as *Boraginaceae*, *Lamiaceae*, *Apiaceae* [9, 43] was identified.

Adyr (foothills) – hilly foothills and low mountains, a characteristic part of the natural landscapes of Central Asia. Adyr is a natural-historical zone that surrounds all the mountains of Central Asia with a wide belt. They occupy the space between two contrasting ecological regions – xerothermic desert, on the one hand, and mesothermal tau, on the other.

Precipitation falls unevenly, mainly confined to the autumn-winter-spring period. Summer is hot, comes quickly. Precipitation is very rare, and soil drought is increasing rapidly. All this has developed a special rhythm of plant development. The main type of vegetation is ephemeral. Many ephemeras and ephemerooids are part of the formation of shliblaka-xerophylic shrub and wood vegetation [8, 42; 10, 3].

The representative plants of adyr include species of genera *Phlomis*. *Phlomis thapsoides* is distributed on

adyrs between Zarafshan and Karshi plains, as well as on the rivers of Kashkadarya accompanying the valley. To the south within the Surkhandarya region at the same height, this species is replaced by another genera *Phlomis bucharica*. In the north foothills of the Western Tien-Shan *Phlomis salicifolia* distributed, which is found in the southern regions as well, grows on fine-gravelly soils. In the described band of adyr there are several species of the *Eremostachys* genus, particularly common are *E. labiosa*, *E. napuligera*, in the higher parts of adyr on fine-earth and fine-gravelly slopes – *E. sogdiana*, *E. labiosissima*, *E. eriocalix*, in the upper parts of adyr – *E. speciosa* [10, 44]. As mentioned I. V. Belolipov [8, 40–44], in adyr zones there are ephemeres of such species as *Ziziphora tenuior*, *Ziziphora persica*, and perennial, vegetative herbs – *Phlomis thapsoides*, *Phlomis bucharica*.

The description of the main features of the habitat of upland gypsophytes in Central Asia is given in various monographic works [2; 8]. Upland gypsophyte plants from these areas have a narrow ecological range. The peculiarities of the natural habitats of upland gypsophytes (abundance of gypsum, high salinity of the substrate, high flight temperatures and dry air) have quite specific effects on the biology and ecology of plants [8, 46].

On the slopes of lowlands, sometimes 2000 meters above the sea levels, there are variegated outcrops of red, violet, green, orange, and other colors of clay richly impregnated with salts of different chemical composition, mainly carbonate. Many variegated plants are strictly confined to a particular substrate. Upland gypsophytes are highlighted heliophytes. A small number of plants of the *Lamiaceae* family includes variegated gypsum rocks as: *Otostegia bucharica*, *Ajuga turkes-tanica*, *Lagochilus Nevskii*, *Salvia bucharica*. I. V. Belolipov [8, 46–56] engaged in the introduction of these plants, and divided them into two groups: optional gypsophyte and obligatory gypsophyte.

In the vegetation cover of the mountains of Central Asia, E. P. Korovin [2] distinguishes 11 types of vegetation: half-savannahs or turanian dry grass

steppes; mountain steppes; upland xerophytes; deciduous mountain forests; coniferous mountain forests; overgrown valleys; mountain meadows, petrophilic and cryophilic types of vegetation; vegetation of water bodies.

In the lower tau there are tropophytes, such as *Scutellaria bucharica*, *Ziziphora persica*, *Salvia glabri-caulis*, *Salvia Margaritae*, *Nepeta Olgae*, *Scutellaria haematochlora*. In the upper tau genus of *Scutellaria*, *Nepeta*, *Ziziphora* can be found.

In the rocks of the upper mountain zones – *Scutellaria holosericea*; In the upper mountain zones – *Scutellaria filicaulis*; On taluses and in the rocks of the upper mountain zones – *Scutellaria microphysa*; On taluses of the upper mountain zones – *Nepeta Lipskyi*; On gravelly and stony slopes of the upper mountain zones – *Ziziphora pamiralaica* (figure-1); On the stony slopes of the upper zone of mountains – *Lagochilus Nevskii* [1, 263–416].

Upland xerophytes are sharply presented heliophytes. An equally important ecological factor in the habitats of upland xerophytes is the extreme erosion of the mountain slopes. These are steep, stony-gravelly mountain slopes, mostly of southern exposure, where a very special and harsh ecological regime is taking shape. Plants on such slopes are exposed to wind, water, and physical erosions.

According to I. V. Belolipov [8, 69–77], some representatives of upland xerophytes of Uzbekistan flora are *Scutellaria glabra*, *S. intermedia*, *S. microdasis*, *S. squarrosa*, *Lagochilus platycalyx*, *Salvia drobovii*, *S. komarovii*, *S. korolkovii*, *S. submutica*. They are considered representatives of upland xerophytic tomilarii for adaptation to harsh habitats [10, 77–86].

In the mountain conditions on the rocks, stony outcrops, talus and pebbles are found such petrophyte species as *Stachys hissarica*, *Hyssopus zeravschanicus*, *Perovskia scrophulariifolia*, *Nepeta Olgae* [8, 78–86].



Figure 1. Hissor. Locality Village Kaltakul 1000 meters above the sea level: a) *Phlomis salicifolia*; b) *Ziziphora pamiralaica*. Picture: N. Z. Arabova (2017)

Conclusion

In the study of taxonomy, geography and ecological features of *Lamiaceae* in Uzbekistan, much attention was paid to the study of mid-mountain and alpine plants.

1. In the deserts of the representatives of the species *Lamiaceae* is rare. In the sandy deserts psammophytes including *Eremostachys transoxana*, *Eremostachys Boissieriana*, *Eremostachys Regeliana* and etc are found.

2. The representative plants of adyrs include species of the genera of *Phlomis*, *Eremostachys*. Some species pertaining to this genus are referred to as edificatory species. In the adyr zones, among the

ephemeres there are species like *Ziziphora tenuior*, *Ziziphora persica*.

3. In the lower tau (mid-mountain zone) there are tropophytes comprising *Scutellaria bucharica*, *Ziziphora persica*, *Salvia glabricaulis*, *Salvia Margari-tae*, *Nepeta Olgae*, *Scutellaria haematochlora*; Upland gypsophytes – *Otostegia bucharica*, *Ajuga turkestanica*, *Lagochilus Nevskii*, *Salvia bucharica*; upland xerophytic tomillarii – *Perovskia angustifolia*, *Perovskia scrophulariifolia*, *Thymus zerafschanicus*, *Dracocephalum integrifolium*, *Scutellaria adenostegia*, *Scutellaria comosa*, *Scutellaria intermedia*, *Salvia bucharica*, *Ajuga turkestanica*; petrophytes – *Stachys hissarica*, *Hyssopus zerafschanicus*, *Perovskia scrophulariifolia*, *Nepeta Olgae*.

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