

G.J. Sultangazina<sup>1\*</sup>, A.N. Kuprijanov<sup>2</sup>, D.K. Ermekova<sup>1</sup>, A.U. Utebasova<sup>1</sup>

<sup>1</sup>A. Baitursynov Kostanay Regional University, Kostanay, Kazakhstan;

<sup>2</sup>Kuzbass botanical garden – Federal Research Center of Coal and Coal Chemistry SB RAS, Kemerovo, Russian Federation

\*Corresponding author: gul\_sultan@mail.ru

## Flora synopsis of the “Kamenny lake tract” natural monument (Kostanay region)

The article presents the results of the floristic diversity study of the state natural monument of local significance – “Kamenny lake tract” with a total area of 2.5 hectares. According to natural conditions, this territory is included in the subzone of arid forb-feather grass steppes on low-humus southern chernozems and dark chestnut soils, plowed up to 80%. Under the birch forest soils are dark gray, loamy, and sandy; on slopes they are leached chernozem; near-shore soils are meadow-marsh soils. The studies were carried out in 2019-2022. On the basis of field studies, five main ecotopes were identified: shrub thickets on slopes, birch forest on steep slopes, upland meadows with shrub thickets, meadow-marsh communities on coasts, and meadow-steppe communities. A synopsis containing species' habitat information within the specially protected natural area was compiled. In the study area, the total list of higher vascular plants includes 177 species from 48 families and 132 genera. The leading families are *Asteraceae*, *Rosaceae*, *Poaceae*, *Fabaceae*, *Lamiaceae*, and *Caryophyllaceae*. The basis of the flora is herbaceous plants, followed by woody, aquatic plants. The steppe ecological-coenotic group is the richest by the volume of species. In the flora of the “Kamenny lake tract” a large proportion of species has significant extent areas: cosmopolitan, holarctic, and palearctic. The holarctic and palearctic types are the largest number of species. The Red Book of Kazakhstan species in the study area are *Adonis wolgensis*, *Stipa pennata*, and *Tulipa biebersteiniana*.

*Keywords:* flora, specially protected natural area, natural monument “Kamenny lake tract”, higher vascular plants, rare and endangered plants.

### Introduction

The study of flora of specially protected natural areas plays an important role in the identification and conservation of biological diversity [1]. In the valley of the Tobol River there is a unique natural monument – “Kamenny lake tract”, which in 1992 received its conservation status. The natural monument itself is a remnant of the ancient old town of Tobol, the flora of which includes a large number of boreal elements.

However, to date, a flora summary has not been compiled for this object, which allows planning monitoring and environmental measures.

The purpose of this work is to compile a summary of the flora of the natural monument “Kamenny lake tract”.

### Experimental

The object of the study is the botanical natural monument “Kamenny lake tract”, located 3 km from the village of Zarechnoye. According to natural conditions, this territory is included in the subzone of arid forb-feather grass steppes on low-humus southern chernozems and dark chestnut soils, plowed up to 80% [1, 2].

The soils under the birch forest are dark gray, loamy, and sandy, on the slopes they are formed by leached chernozem, near the shore they are meadow-marsh soils. The studies were carried out in 2019-2022. During the floristic study, the following ecotopes were identified: birch forest on a steep slope, shrub thickets on a slope, upland meadows with shrub thickets, meadow-marsh communities on the shore, meadow-steppe communities.

The collections of the authors are stored in the funds of the Kostanay Regional University named after A. Baitursynov. The collected herbarium material was supplemented with literature data [3-6].

The synopsis contains a list of wild (native and adventitious) species of vascular plants of the natural monument “Kamenny lake tract”. Families of angiosperms are located according to the system of A.L. Takhtadzhyan (2009) [7], and genera within families and species within genera alphabetically in Latin names. The Latin and Russian names of the species are given according to S.A. Abdulina (1999) [8], taking

into account modern data. Phytoprotective status was assessed on the basis of the Red Book of Kazakhstan [9].

### Results and Discussion

On the territory of 2.5 hectares, there 177 species concentrated belonging to 132 genera and 48 families. Description includes the following data: taxa names, habitat, life form, ecological group, period of reproduction, areal type, and useful properties.

#### **Division Equisetophyta, Class Equisetopsida**

##### **Family Equisetaceae Rich. ex DC.**

*Equisetum arvense* L. Northern slope to the lake basin. Meadow-marsh communities on the shore. Long-rhizome herbaceous horsetail. Cosmopolitan. Mesophyte. Weedy. V. Medicinal, food, dyeing.

*Equisetum hyemale* L. Northern slope to the lake basin. Birch forest on a steep slope; meadow-marsh communities on the shore. Long-rhizome herbaceous horsetail. Holarctic. Xeromesophyte. Forest. VII–VIII. medicinal, technical.

*Equisetum pratense* Ehrh. Meadow-marsh communities on the shore. Long-rhizome herbaceous horsetail. Holarctic. Mesophyte. Swamp. V–VI.

#### **Division Polypodiophyta, Class Polypodiopsida**

##### **Family Athyriaceae Ching**

*Athyrium filix-femina* (L.) Roth. Birch forest. Short rhizome herbaceous fern. Holarctic. Mesophyte. Forest. VI–IX. Decorative, poisonous.

*Cystopteris fragilis* (L.) Bernh. Wet ravine. Short rhizome herbaceous fern. Cosmopolitan. Hygromesophyte. Petrophytic. VII–IX. Decorative.

##### **Family Onocleaceae Pichi Sermolli**

*Matteuccia struthiopteris* (L.) Tod. Shore of the lake. Short rhizome herbaceous fern. Holarctic. Hygromesophyte. Forest. VII–IX. Decorative, insecticidal, poisonous.

#### **Division Pinophyta, Class Ephedropsida**

##### **Family Ephedraceae Dumert.**

*Ephedra distachya* L. 1753, Shore of the lake. Evergreen shrub. Pannono-Black Sea-Kazakhstan. Xerophyte. Steppe. VI. Medicinal, food, poisonous.

#### **Division Magnoliophyta, Class Magnoliopsida, Subclass Magnoliidae, Order Nymphaeales**

##### **Family Nymphaeaceae Salisb.**

*Nuphar lutea* (L.) Smith. Meadow-marsh communities on the shore. Floating and underwater long-rhizome polycarp. South Mediterranean. Hydrophyte. Aqueous. VI–VIII. Medicinal, food, dyeing, tanning, insecticidal, decorative.

#### **Order Ceratophyllales**

##### **Family Ceratophyllaceae S.F. Gray**

*Ceratophyllum demersum* L. Meadow-marsh communities on the shore. Floating and underwater long shoot polycarp. Plerctic. Hydrophyte. Aqueous. VII–VIII.

#### **Subclass Ranunculidae, Superorder Ranunculanae, Order Ranunculales**

##### **Family Ranunculaceae Juss.**

*Adonis wolgensis* Steven. Birch forest on a steep slope. Short rhizome polycarp. Pannono-Black Sea-Kazakhstan. Mesophyte. Steppe. V–VI. Medicinal, decorative, poisonous.

*Ranunculus lingua* L. Coast of the lake. Amphibious long-rhizome polycarp. Eastern Mediterranean. Hygrophyte. Coastal water. VI–VIII. Pinnate, ornamental, poisonous.

*Ranunculus repens* L. Northern slope to the lake basin. Birch forest on a steep slope; meadow-marsh communities on the shore. Long-rhizome polycarp. Holarctic. Hygrophyte. Coastal water. V–VIII. Medicinal, melliferous, poisonous.

*Ranunculus sceleratus* L. Northern slope to the lake basin. Meadow-marsh communities on the shore. Long vegetative annuals. Holarctic. Hygrophyte. Coastal water. VI–IX. Medicinal, melliferous, poisonous.

*Thalictrum minus* L. Dry meadows with shrubs. Kistekornevy polycarpic. Holarctic. Mesophyte. Forest. VI–VII. Medicinal, dyeing, perganate, poisonous.

*Thalictrum simplex* L. Meadow-steppe communities. Kistekornevy polycarpic. Palearctic. Mesophyte. Forest. VI–VIII. Medicinal, perganic, poisonous.

#### **Subclass Caryophyllidae, Superorder Caryophyllanae, Order Caryophyllales**

##### **Family Caryophyllaceae Juss.**

*Elisanthe viscosa* (L.) Rupr. Shrubs on the slope. Biennial, perennial monocarpic. Kazakh-Turano-Central Asian. Xeromesophyte. Steppe. VI–VIII. Melliferous.

*Eremogone koriniana* (Fischer ex Fenzl) Ikonn. Dry meadows with shrubs. Semi-shrub. Zavolzhsko-Kazakhstan. Xeromesophyte. Steppe. VI–VII. Fodder.

*Eremogone longifolia* (M.Bieb.) Fenzl. Northern slope to the lake basin. Birch forest on a steep slope; meadow-steppe communities. Taprooted polycarpic. Trans-Volga-Kazakhstan-Mongolian. Xeromesophyte. Steppe. VI–VII. Fodder.

*Gypsophila paniculata* L. Northern slope to the lake basin. Shrubs on the slope; meadow-marsh communities on the shore. Taprooted polycarpic. East Palearctic. Xeromesophyte. steppe. VI–VII. Medicinal, decorative, poisonous.

*Melandrium album* (Mill.) Garcke, Northern slope to the lake basin. Birch forest on a steep slope. Taproot polycarpic, perennial monocarpic, annual. Holarctic. Mesophyte. Weedy. VI–VIII. Fodder.

*Otites wolgensis* (Hornem.) Bess. ex Spreng. Dry meadows with shrubs. Perennial, biennial monocarpic. South Palearctic. Xeromesophyte. Steppe. VI–VII.

*Silene nutans* L. Shrubs on the slope. Long-rhizome polycarp. Euro-Siberian. Mesophyte. Forest. VI–VIII. Melliferous, food, fodder.

*Stellaria graminea* L. Northeast slope to the lake basin. Dry meadows with shrubs; meadow-steppe communities. Long-rhizome polycarp. Palearctic. Mesophyte. Meadow. V–VIII. Melliferous, poisonous.

#### **Family Chenopodiaceae Vent.**

*Chenopodium album* L. Northern slope to the lake basin. Meadow-steppe communities. Long vegetative annual. Cosmopolitan. Xeromesophyte. Weedy. VI–IX. Food, fodder, perganic, dyeing, technical.

#### **Superorder Polygonanae, Order Polygonales**

##### **Family Polygonaceae Juss.**

*Persicaria lapathifolia* (L.) Gray. Northern slope to the lake basin. Meadow-steppe communities. Long vegetative annual. Palearctic. Hygrophyte. Coastal water. VII–IX. medicinal, food, fodder, melliferous.

*Polygonum aviculare* L. Northern slope to the lake basin. Birch forest on a steep slope. Long vegetative annual. Palearctic. Mesophyte. Weedy. VII–IX. Medicinal, fodder, dyeing, tanning.

*Rumex confertus* Willd. Northern slope to the lake basin. Meadow-marsh communities on the shore. Short rhizome polycarp. Palearctic. Meadow. VI–VII. Medicinal, fodder, dyeing, tanning.

*Rumex crispus* L. Meadow-steppe communities. Short rhizome polycarp. Holarctic. Hygrophyte. Meadow. VI–VIII. Food, medicinal, melliferous, fodder, dyeing, tanning.

#### **Order Plumbaginales**

##### **Family Limoniaceae Ser.**

*Limonium gmelinii* (Willd.) Kuntze. Dry meadows with shrubs. Taprooted polycarpic. Common Mediterranean. Xeromesophyte. Saline. VII–VIII. Tanning, dyeing, melliferous, decorative.

#### **Subclass Hamamelidae, Superorder Hamamelidanae, Order Betulales**

##### **Family Betulaceae S.F. Gray**

*Betula pendula* Roth. Northern slope to the lake basin. Shrub thickets on a slope, birch forest on a steep slope, meadow-marsh communities on the shore, meadow-steppe communities. Tree. Western Palearctic. Mesophyte. Forest. V. Wood, tannic, medicinal, sugar-bearing, essential oil, ornamental, perganic, dyeing, fodder, decorative.

#### **Superorder Primulanae, Order Primulales**

##### **Family Primulaceae Batsch ex Borkh.**

*Androsace filiformis* Retz. Meadow-steppe communities. Ephemera. Palearctic. Hygrophyte. Steppe. V–VIII.

*Lysimachia vulgaris* L. Northeast slope to the lake basin. Birch forest on a steep slope: meadow-marsh communities on the shore. Long-rhizome polycarp. Western Palearctic. Mesophyte. Forest. VI–VII. Medicinal, melliferous, dyeing.

*Naumburgia thyrsoiflora* (L.) Rchb. Meadow-marsh communities on the shore. Amphibious long-rhizome polycarp. Holarctic. Hygrophyte. Swamp. VI–VII.

#### **Superorder Violanae, Order Violales**

##### **Family Salicaceae Mirb.**

*Populus tremula* L. Shrub thickets on a slope, birch forest on a steep slope, meadow-marsh communities on the shore, meadow-steppe communities. Tree. Palearctic. Mesophyte. Forest. V. Wood, medicinal, tannic, perganic, dyeing, fodder.

*Salix caprea* L. Northern slope to the lake basin. Birch forest on a steep slope. Bush. Palearctic. Mesophyte. Forest. V. Medicinal, woody, ornamental, melliferous, perganic, fodder, tannic, dyeing.

*Salix triandra* L. Northern slope to the lake basin. Birch forest on a steep slope, meadow-steppe communities. Bush. Palearctic. Mesophyte. Forest. V. Melliferous, perganate, ornamental, fodder, tannic, dyeing.

**Family Brassicaceae Burnett**

*Alyssum tortuosum* Waldst. & Kit. ex Willd. Northern slope to the lake basin. Dry meadows with shrubs. Semi-shrub. Western Mediterranean. Xerophyte. steppe. V-VI. Melliferous, decorative.

*Capsella orientalis* Klokov. Northern slope to the lake basin. Shrubs on the slope. Long vegetative annual. Black Sea-Central Kazakh. Xeromesophyte. Weedy. V-IX. Medicinal, food, fatty oil.

*Lepidium ruderalis* L. Shrubs on the slope. Long vegetative annual. Western Palearctic. Xeromesophyte. Weedy. V-VIII. Fatty oil, insecticidal.

*Sisymbrium loeselii* L. Northeast slope to the lake basin. Dry meadows with shrubs. Long vegetative annual. Palearctic. Xeromesophyte. Weedy. V-VIII. Fodder, melliferous, fatty oil.

**Family Cannabaceae Martinov**

*Humulus lupulus* L. Northern slope to the lake basin. Meadow-steppe communities. Lianoid polycarpic. Holarctic. Mesophyte. Forest. VI-VIII. Medicinal, food, spicy, fibrous, perganic, decorative.

**Family Urticaceae Juss.**

*Urtica dioica* L. Northern slope to the lake basin. Shrub thickets on a slope, birch forest on a steep slope, upland meadows with shrub thickets, meadow-marsh communities on the shore. Long-rhizome polycarp. Western Palearctic. Mesophyte. Weedy. VI-VIII. Medicinal, food, fodder, fiber, dyeing.

**Superorder Euphorbianaes, Order Euphorbiales**

**Family Euphorbiaceae Juss.**

*Euphorbia subcordata* C.A.Mey. Meadow-steppe communities. Long-rhizome polycarp. Transvolgo-central-Kazakhstan. Xeromesophyte. steppe. V-VI. poisonous.

*Euphorbia virgata* Waldst. & Kit. Northern slope to the lake basin. Birch forest on a steep slope, meadow-marsh communities on the shore, meadow-steppe communities. Long-rhizome polycarp. Panno-Black Sea-Kazakhstan. Xeromesophyte. Weedy. VI-VIII. Medicinal, dyeing, melliferous, insecticidal, poisonous.

**Subclass Rosidae, Superorder Rosanaes, Order Saxifragales**

**Family Crassulaceae J. St.-Hil.**

*Hylotelephium triphyllum* (Haw.) Holub (*Sedum telephium* L.). Northern slope to the lake basin. Shrubs on a slope birch forest on a steep slope, upland meadows with shrubs, shrubs. Succulents. Eurosiberian. Mesophyte. Forest. VII-VIII. Medicinal, melliferous, perganic, decorative.

**Family Grossulariaceae DC.**

*Ribes nigrum* L. Northern slope to the lake basin. Birch forest on a steep slope. Bush. Eurosiberian. Hygrophyte. Forest. V-VI. Food, medicinal, spicy, tea substitute, melliferous.

**Order Rosales**

**Family Rosaceae Juss.**

*Amygdalus nana* L. Birch forest on a steep slope. Bush. Pannono-Black Sea-Kazakhstan. Xeromesophyte. steppe. V. Medicinal, melliferous, essential and fatty oil, ornamental, poisonous.

*Cerasus fruticosa* (Pall.) G. Woron. Northeast slope to the lake basin. Dry meadows with shrubs. Bush. Pannono-Black Sea-Kazakhstan. Xeromesophyte. Forest. V-VI. Food, melliferous, decorative.

*Cotoneaster melanocarpus* Fisch. Ex Blytt. Northeast slope to the lake basin. Shrubs on the slope. Bush. Palearctic. Xeromesophyte. Forest. V-VI. Food, melliferous, decorative.

*Crataegus sanguinea* Pall. Northeast slope to the lake basin. Shrubs on the slope. Tree. Trans-Volga-Kazakhstan-Mongolian. Xeromesophyte. Forest. V-VI. Medicinal, food, melliferous, dyeing, decorative.

*Filipendula vulgaris* Moench. Northeast slope to the lake basin. Shrubs on the slope; upland meadows with shrubs. Tuber-forming polycarpic. South Palearctic. Xeromesophyte. steppe. VI-VII. Food, Fodder, melliferous, tea substitute, decorative.

*Fragaria viridis* (Duchesne) Weston. Northeast slope to the lake basin. Birch forest on a steep slope. Stolon-forming polycarpic. Western Palearctic. Xeromesophyte. steppe. V-VI. Food (berry), medicinal, tea substitute, melliferous.

*Malus domestica* Borkh. Meadow-steppe communities. Tree. Originated in culture. Mesophyte. Cultivated and wild. V. Food (fruit), melliferous.

*Padus avium* Mill. Northern slope to the lake basin. Birch forest on a steep slope; meadow-marsh communities on the shore. Bush. Western Palearctic. Mesophyte. Forest. V-VI. Medicinal, food, melliferous, ornamental, decorative.

*Potentilla anserine* L. Northern slope to the lake basin. Birch forest on a steep slope; meadow-steppe communities. Stolone-forming and creeping polycarp. Cosmopolitan. Mesophyte. Coastal water. VI-IX. Medicinal, food, melliferous, dyeing.

*Potentilla argentea* L. Northeast slope to the lake basin. Dry meadows with shrubs. Stolone-forming polycarpic. Eurosiberian. Xerophyte. Meadow. VI-IX. Medicinal, melliferous, fodder, tannic, dyeing.

*Potentilla bifurca* L. Northern slope to the lake basin. Birch forest on a steep slope, shrub thickets on the slope, upland meadows with shrub thickets. Long-rhizome polycarp. Trans-Volga-Kazakhstan-Mongolian. Xeromesophyte. Steppe. VI-VIII. Fodder, melliferous.

*Potentilla canescens* Besser. North slope. Meadow-steppe communities. Short rhizome herbs. Western Palearctic. xeromesophyte. Steppe. VI-VII.

*Potentilla humifusa* Willd. Ex Schldl. Northeast slope to the lake basin. Dry meadows with shrubs. Short rhizome herbs. Black Sea-Kazakhstan. Xeromesophyte. Steppe. V-VI.

*Rosa acicularis* Lindl. Shrubs on the slope. Bush. Holarctic. Mesophyte. Forest. VI-VII. Medicinal, food, melliferous, essential and fatty oil, decorative.

*Rosa majalis* Herrm. Northern slope to the lake basin. Shrub thickets on the slope, meadow-marsh communities on the shore, meadow-steppe communities. Bush. Eurosiberian. Xeromesophyte. Forest. VI-VII. Medicinal, food, melliferous, perganic, essential and fatty oil, dyeing, decorative.

*Rosa spinosissima* L. Shrubs on the slope. Bush. Western Palearctic. Xeromesophyte. steppe. V-VI. food, melliferous.

*Rubus caesius* L. Northern slope to the lake basin. Meadow-marsh communities on the shore. Creeping shrub. Western Palearctic. Mesophyte. Forest. VI-VIII. Medicinal, food, fodder, melliferous, perganate, dyeing, decorative.

*Rubus idaeus* L. In the undergrowth of a birch forest. Bush. Eurosiberian. Mesophyte. Forest. VI-VII. Food, medicinal, tea substitute, melliferous.

*Sanguisorba officinalis* L. Northern slope to the lake basin. Birch forest on a steep slope, meadow-marsh communities on the shore, meadow-steppe communities. Long-rhizome polycarp. Holarctic. Mesophyte. Meadow. VI-VII. Medicinal, food, melliferous, fodder, dyeing, tanning.

*Spiraea hypericifolia* L. Northern and northeastern slope to the lake basin. Shrub thickets on a slope, birch forest on a steep slope, meadow-steppe communities. Bush. Kazakh-Turano-Central Asian. Xeromesophyte. steppe. V-VI. Ornamental, melliferous, decorative.

#### **Family Onagraceae Juss.**

*Chamaenerion angustifolium* (L.) Scop. Northern slope to the lake basin. Birch forest on a steep slope. Long-rhizome polycarp. Holarctic. Mesophyte. Forest. VII-VIII. Medicinal, Melliferous, Food, Fodder, Tea Surrogate, Tannic, Fibrous, Fatty Oil, Decorative.

*Epilobium montanum* L. Meadow-marsh communities on the shore. Stolone-forming and creeping polycarp. Holarctic. Mesophyte. Coastal water. VI-VII. Fodder.

#### **Superorder Fabanae, Order Fabales**

##### **Family Fabaceae Lindl.**

*Amoria repens* (L.) C. Presl. Northern slope to the lake basin. Birch forest on a steep slope; meadow-steppe communities. Stolone-forming and creeping polycarp. Cosmopolitan. Mesophyte. Weedy. VI-IX. Fodder, melliferous, medicinal, dyeing.

*Astragalus danicus* Retz. North slope. Meadow-steppe communities. Long-rhizome polycarp. Eurosiberian. Mesophyte. meadow. VI-VII. Fodder, melliferous.

*Astragalus cornutus* Pall. Lug, June 29, 2004, collections of KSPI students. Semi-shrub. Black Sea-Kazakhstan. xeromesophyte. Steppe. V-VI.

*Astragalus onobrychis* L. North slope. Meadow-steppe communities. Taprooted polycarpic. Western Palearctic. Xeromesophyte. Steppe. VI-VII. Fodder, melliferous.

*Astragalus varius* S.G. Gmel. North slope. Meadow-steppe communities. Semi-shrub. Black Sea-Kazakhstan. Xeromesophyte. Steppe. VI-VII. Fodder.

*Caragana frutex* (L.) K. Koch. Northern slope to the lake basin. Shrub thickets on the slope, upland meadows with shrub thickets. Bush. Black Sea-Kazakhstan-Mongolian. Xeromesophyte. steppe. V-VI. Ornamental, fodder, melliferous, dyeing, decorative.

*Genista tinctoria* L. Northern slope to the lake basin. Shrubs on the slope. Bush. Pannono-Black Sea-Kazakhstan. Xeromesophyte. steppe. VI–VIII. Medicinal, dyeing, decorative, poisonous.

*Medicago falcata* L. Northeast slope to the lake basin. Dry meadows with shrubs, meadow-marsh communities on the coast, meadow-steppe communities. Taprooted polycarpic. Palearctic. Xeromesophyte. Steppe. VI–VIII. Fodder, melliferous.

*Melilotus officinalis* (L.) Pall. Northern slope to the lake basin. Shrubs on the slope. Taprooted polycarpic. Western Palearctic. Xeromesophyte. Weedy. VI–IX. Medicinal, Fodder, spicy, melliferous, insecticidal, dyeing.

*Oxytropis pilosa* (L.) DC. Dry meadows with shrubs. Taprooted polycarpic. South Palearctic. Xerophyte. steppe. VI–VIII. Melliferous, ornamental, poisonous.

**Superorder Rhamnanae, Order Rhamnales**

**Family Rhamnaceae Juss.**

*Rhamnus cathartica* L. Meadow-marsh communities on the shore. Bush. Western Palearctic. Mesophyte. Forest. V–VI. Medicinal, dyeing, tannic, melliferous, ornamental, decorative.

**Order Geraniales**

**Family Geraniaceae Juss.**

*Geranium collinum* Stephan ex Willd. Northern slope to the lake basin. Meadow-marsh communities on the shore. Long-rhizome polycarp. South Palearctic. Hygromesophyte. Meadow. VI–VII. Tanning, dyeing

*Geranium pratense* L. Northern slope to the lake basin. Meadow-steppe communities. Short rhizome polycarp. Palearctic. Mesophyte. Forest. VI–VIII. Medicinal, fodder, melliferous, dyeing, decorative.

**Order Apiales**

**Family Apiaceae Lindl**

*Falcaria vulgaris* M. Bernh. Meadow-steppe communities. Taprooted polycarpic. Western Palearctic. xeromesophyte. Steppe. VII–VIII.

*Heracleum sibiricum* L. Northern slope to the lake basin. Birch forest on a steep slope, meadow-marsh communities on the shore. Taprooted polycarpic. Eurosiberian. Mesophyte. Forest. VI–VII. Medicinal, food, fodder, dyeing, melliferous.

*Kadenia dubia* (Schkuhr) Lavrova & V.N.Tikhom. Northern slope to the lake basin. Birch forest on a steep slope, meadow-steppe communities. Short rhizome polycarp. Western Palearctic. Mesophyte. Forest. VII–VIII.

*Seseli ledebourii* G. Don. Dry meadows with shrubs. Taprooted polycarpic. Zavolzhsko-Kazakhstan. xeromesophyte. Steppe. V–VI.

*Seseli strictum* Ledeb. Birch forest on a steep slope. Taprooted polycarpic. Kazakh. Mesophyte. Meadow. VII–VIII.

**Family Caprifoliaceae Juss.**

*Lonicera tatarica* L. Northern and northeastern slope to the lake basin. Birch forest on a steep slope, upland meadows with shrubs, meadow-marsh communities on the shore. Bush. Zavolzhsko-Kazakhstan. Mesophyte. Forest. VI. Melliferous, decorative, poisonous.

**Family Valerianaceae Batsch**

*Valeriana tuberosa* L. Northeast slope to the lake basin. Dry meadows with shrubs. Tuber-forming polycarpic. Western Mediterranean. Mesophyte. Steppe. V–VI.

**Subclass Lamiales, Superorder Lamiales, Order Rubiales**

**Family Rubiaceae Juss.**

*Galium boreale* L. Shrubs on the slope. Long-rhizome polycarp. Holarctic. Mesophyte. Forest. VI–VIII. Dyeing, melliferous.

*Galium palustre* L. Meadow. Long-rhizome polycarp. Holarctic. Hygromesophyte. Swamp. VI–VIII.

*Galium verum* L. Northeast slope to the lake basin. Dry meadows with shrubs meadow-steppe communities. Short rhizome polycarp. Holarctic. Xeromesophyte. steppe. VI–VIII. Dyeing, melliferous, fodder.

**Order Solanales**

**Family Solanaceae Juss.**

*Hyoscyamus niger* L. Meadow-steppe communities. Biennial monocarpic. Palearctic. Xeromesophyte. Weedy. VI–VIII. Medicinal, melliferous, insecticidal, poisonous.

**Family Convolvulaceae Juss.**

*Calystegia sepium* (L.) R. Br. Meadow-marsh communities on the shore. Lianoid polycarpic. Cosmopolitan. Mesophyte. Forest. VI–VIII. Medicinal, melliferous, decorative.

*Convolvulus arvensis* L. Shrub thickets on the slope meadow-steppe communities. Long-rhizome polycarp. Cosmopolitan. Mesophyte. Weedy. VI–IX. Medicinal, melliferous, fodder.

**Family Boraginaceae Juss.**

*Cynoglossum officinale* L. Meadow-marsh communities on the shore. Biennial. Western Palearctic. Xeromesophyte. Weedy. VI–VIII. Melliferous, insecticidal, poisonous.

*Nonea rossica* Steven. Meadow-steppe communities. Taprooted polycarpic. Eurosiberian. Xeromesophyte. Weedy. V–VIII. Melliferous.

*Onosma simplicissima* L. Northern slope to the lake basin. Shrub thickets on the slope, upland meadows with shrub thickets. Long-rhizome polycarp. Eastern Black Sea-Kazakhstan. Xeromesophyte. Steppe. V–VIII. Dyeing, melliferous, decorative.

**Family Scrophulariaceae Juss.**

*Veronica longifolia* L. Meadow-steppe communities. Long-rhizome polycarp. Palearctic. Mesophyte. Lugovoi. VI–VIII. Melliferous, fodder, decorative.

*Veronica prostrata* L. Shrubs on the slope. Long-rhizome polycarp. Western Palearctic. Xeromesophyte. Steppe. V–VI.

*Veronica spicata* L. Northern slope to the lake basin. Shrub thickets on the slope, meadow-steppe communities. Long-rhizome polycarp. Western Palearctic. Xeromesophyte. Forest. VI–VIII. Perganate, fodder, decorative.

*Veronica spuria* L. Northern and northeastern slope to the lake basin. Shrub thickets on the slope dry meadows with shrub thickets. Long-rhizome polycarp. Eurosiberian. Xeromesophyte. Steppe. VI–VIII. Decorative.

**Family Plantaginaceae Juss.**

*Plantago major* L. Meadow-marsh communities on the shore. Kistekornevy polycarpic. Holarctic. Mesophyte. Weedy. V–IX. medicinal, food, fodder.

*Plantago media* L. Northeast slope to the lake basin. Dry meadows with shrubs. Kistekornevy polycarpic. Holarctic. Xeromesophyte. Weedy. V–IX. Medicinal, fodder.

*Plantago urvillei* Opiz. Steppe. Kistekornevy polycarpic. Pannono-Black Sea-Kazakhstan. Mesophyte. Lugovoi. V–VIII. Medicinal, fodder.

**Family Lamiaceae Lindl.**

*Dracocephalum thymiflorum* L. Northeast slope to the lake basin. Dry meadows with shrubs. Long-term vegetative one-biennial plants. Kazakh-Turano-Central Asian. Xeromesophyte. Weedy. VI–VIII. Melliferous.

*Glechoma hederacea* L. Northern slope to the lake basin. Shrub thickets on the slope, upland meadows with shrub thickets, meadow-marsh communities on the shore. Stolon-forming polycarpic. Palearctic. Mesophyte. Forest. V–VI. Medicinal, essential oil, food, melliferous.

*Hyssopus ambiguus* (Trautv.) Iljin. Mesophilic meadow-forest community (Pugachev, 1994). Semi-shrub. Trans-Volga Kazakh-Mongolian. Xeromesophyte. Steppe. VI–VIII.

*Leonurus glaucescens* Bunge. Dry meadows with shrubs meadow-steppe communities North-eastern slope to the lake basin, shrubs; meadow community northern slope. Short rhizome polycarp. Common Mediterranean. Xeromesophyte. Weedy. VI–VIII.

*Phlomis tuberosa* L. Northeast slope to the lake basin. Dry meadows with shrubs, meadow-steppe communities. Tuber-forming polycarpic. Palearctic. Xeromesophyte. Steppe. V–VIII.

*Salvia stepposa* Des.-Shost. Dry meadows with shrubs. Short rhizome polycarp. Common Mediterranean. Xerophyte. steppe. VI–VIII. Medicinal, essential oil, melliferous.

*Scutellaria dubia* Taliev et Sirj. Meadow-forest community. Long-rhizome polycarp. Eurosiberian. Hygromesophyte. Forest. VI–IX. Medicinal, dyeing, melliferous.

*Stachys palustris* L. Meadow-steppe communities. Long-rhizome polycarp. Western Palearctic. Hygromesophyte. Coastal water. VI–IX. food, melliferous.

*Thymus marschallianus* Willd. Northeast slope to the lake basin. Dry meadows with shrubs. Semi-shrub. South Palearctic. Xeromesophyte. steppe. VI–VIII. medicinal, essential oil, melliferous, spicy, decorative.

**Superorder Asteranae, Order Campanulales**

**Family Campanulaceae Juss.**

*Campanula wolgensis* P.A. Smirn. Northern slope to the lake basin. Birch forest on a steep slope. Short rhizome polycarp. Eurosiberian. Mesophyte. Steppe. VI–VII. Melliferous, decorative.

**Order Asterales****Family Asteraceae Berht. et J. Presl**

*Achillea millefolium* L. Northern and northeastern slopes to the lake basin. Birch forest on a steep slope, upland meadows with shrubs, meadow-marsh communities on the shore. Long-rhizome polycarp. Holarctic. Mesophyte. VI–IX. medicinal, essential oil, spicy, melliferous, dyeing, insecticidal.

*Achillea setacea* Waldst. & Kit. Dry meadows with shrubs. Long-rhizome polycarp. Western Palearctic. Xeromesophyte. Forest. VI–VIII. medicinal, essential oil, spicy, melliferous, dyeing, insecticidal.

*Arctium tomentosum* Mill. Northern slope to the lake basin. Birch forest on a steep slope. Meadow-marsh communities on the shore. Biennial monocarpic. Palearctic. Xeromesophyte. Weedy. VII–VIII. Medicinal, melliferous, food, fodder.

*Artemisia austriaca* Jacq. Meadow-steppe communities. Long-rhizome polycarp. Western Palearctic. Mesoxerophyte. steppe. VII–IX. Essential oil.

*Artemisia commutata* Besser. Meadow community northern slope. Short rhizome polycarp. Central Kazakh-Mongolian. Xeromesophyte. Steppe. VII–VIII

*Artemisia dracuncululus* L. Northern slope to the lake basin. Shrub thickets on the slope meadow-steppe communities. Short rhizome polycarp. Holarctic. Xeromesophyte. steppe. VII–IX. Spicy, essential oil, fodder.

*Artemisia proceraeformis* Krasch. Meadow-marsh communities on the shore. Semi-shrub. Western Palearctic. Mesophyte. Steppe. VII–IX.

*Artemisia vulgaris* L. Northern slope to lake. Birch forest on a steep slope, upland meadows with shrubs, meadow-marsh communities on the shore. Short rhizome polycarp. Holarctic. Mesophyte. Weedy. VII–IX. Medicinal, spicy, insecticidal

*Centaurea scabiosa* L. Northeast slope to the lake basin. Dry meadows with shrubs. Taprooted polycarpic. Western Palearctic. Xeromesophyte. Forest. VII–VIII. Melliferous, fodder.

*Centaurea sibirica* L. Dry meadows with shrubs. Taprooted polycarpic. Zavolzhsko-Kazakhstan. Xerophyte. steppe. V–VII. Melliferous, decorative.

*Centaurea stoebe* L. Dry meadows with shrubs. Biennial. Black Sea-Central Kazakh. Mesophyte. Forest. VII–VIII. Melliferous, decorative.

*Cichorium intybus* L. Shrubs on the slope. Taprooted polycarpic. Western Palearctic. Xeromesophyte. Weedy. VII–IX. Medicinal, food, coffee substitute, fodder, melliferous.

*Cirsium setosum* (Willd.) Besser. Meadow-marsh communities on the shore. Long-rhizome polycarp. Palearctic. Xeromesophyte. Weedy. VII–IX. Melliferous, medicinal.

*Echinops ritro* L. Northern slope to the lake basin. Shrub thickets on the slope, meadow-steppe communities. Taprooted polycarpic. Common Mediterranean. Xeromesophyte. steppe. VII–VIII. Medicinal, melliferous, ornamental, poisonous.

*Helichrysum arenarium* (L.) Moench. Northeast slope to the lake basin. Dry meadows with shrubs. Long-rhizome polycarp. South Palearctic. Xerophyte. Steppe. VII–VIII. Medicinal, decorative.

*Lactuca serriola* Torner. Meadow-marsh communities on the shore. Long vegetative annuals. Palearctic. Xeromesophyte. Weedy. VI–IX. Medicinal, fodder.

*Ptarmica salicifolia* (Bess.) Serg. Meadow-marsh communities on the shore. Long-rhizome polycarp. Palearctic. Mesophyte. Meadow. VII–IX. Melliferous.

*Scorzonera austriaca* Willd. Meadow-steppe communities. Long-rhizome polycarp. South Palearctic. Mesoxerophyte. steppe. V–VI. Fodder, decorative.

*Scorzonera parviflora* Jacq. Meadow-marsh communities on the shore. Long-rhizome polycarp. Common Mediterranean. Hygrophyte. Meadow. VI–VIII.

*Scorzonera purpurea* L. Shrubs on the slope. Long-rhizome polycarp. South Palearctic. Xeromesophyte. Steppe. V–VII. decorative.

*Senecio jacobaea* L. Meadow-steppe communities. Long vegetative annual. Palearctic. Mesophyte. Forest. VII–VIII. Poisonous.

*Solidago virgaurea* L. Northern slope to the lake basin. Birch forest on a steep slope. Long-rhizome polycarp. Western Palearctic. Mesophyte. Forest. VII–IX. Melliferous, dyeing.

*Tanacetum vulgare* L. Northeast slope to the lake basin. Meadow-steppe communities. Long-rhizome polycarp. Holarctic. Mesophyte. Forest. VII–IX. Medicinal, essential oil, spicy, insecticidal, poisonous.

*Taraxacum officinale* F.H. Wigg. Northern and northeastern slopes to the lake basin. bushes on the slope, birch forest on a steep slope, upland meadows with shrubs. Long vegetative annual. Cosmopolitan. Mesophyte. Weedy. V-VI. Medicinal, melliferous.

*Tragopogon pratensis* L. Shrubs on the slope. Perennial, biennial. West Palearctic. Xeromesophyte. Meadow. V-VI.

*Tripleurospermum inodorum* (L.) Sch.Bip. Shrubs on the slope, meadow-marsh communities on the shore. Perennial, biennial. Pannono-Black Sea-Kazakhstan. Mesophyte. Weedy. VI-IX. Insecticidal.

*Trommsdorffia maculata* (L.) Bernh. Northeast slope to the lake basin. Dry meadows with shrubs, meadow-steppe communities. Short rhizome polycarp. South Palearctic. Xeromesophyte. Forest. VI-VIII.

**Class Liliopsida, Subclass Alismatidae, Superorder Alismatanae, Order Butomales**

**Family Butomaceae Mirb.**

*Butomus umbellatus* L. Meadow-marsh communities on the shore. Amphibian short-rhizome polycarp. Palearctic. Hydrohygrophyte. Coastal water. VI-VII. Food, fodder, melliferous.

**Family Hydrocharitaceae Juss.**

*Hydrocharis morsus-ranae* L. Meadow-marsh communities on the shore. Floating and underwater grasses. West Palearctic. Hydrophyte. Aqueous. VII-VIII.

*Stratios aloides* L. Meadow-marsh communities on the shore. Floating and underwater grasses. Western Palearctic. Hydrophyte. Aqueous. VII-VIII. Fodder

**Family Potamogetonaceae Dumort**

*Potamogeton lucens* L. Meadow-marsh communities on the shore. Floating and underwater grasses. Holarctic. Hydrophyte. Aqueous. VII.

**Order Liliales**

**Family Liliaceae Juss.**

*Fritillaria meleagroides* Patrin ex Schult. et Schult. fil. Northeast slope to the lake basin. Dry meadows with shrubs. Bulbous polycarp. Black Sea-Kazakhstan. Hygromesophyte. Meadow. V. Decorative.

*Fritillaria ruthenica* Wikstr. Northern slope to the lake basin. Shrubs on the slope, birch forest on the steep slope. Bulbous polycarp. Black Sea-Kazakhstan. Xeromesophyte. Steppe. V. Decorative.

*Tulipa biebersteiniana* Schult. et Schult. f. Northern and northeastern slope to the lake basin. N53.28597°, W63.77815°, h=141 m a.s.l. Shrubs on the slope, upland meadows with shrubs. Bulbous polycarp. Black Sea-Kazakhstan. Mesophyte. Steppe. IV-V. Decorative.

**Family Alliaceae Agardh**

*Allium lineare* L. Northern and northeastern slope to the lake basin. Shrub thickets on the slope, upland meadows with shrub thickets. Bulbous polycarp. Black Sea-Kazakh-Mongolian. Xeromesophyte. Steppe. VI-VII. Food.

**Order Asparagales**

**Family Convallariaceae Horan.**

*Polygonatum odoratum* (Mill.) Druce. Northern slope to the lake basin. Birch forest on a steep slope. Long-rhizome polycarp. Palearctic. Mesophyte. Forest. V-VI. Medicinal, decorative, poisonous.

**Family Asparagaceae Juss.**

*Asparagus officinalis* L. Northeast slope to the lake basin. Dry meadows with shrubs. Short rhizome polycarp. Eurosiberian. Mesophyte. Forest. VI-VII. Medicinal, food, perganic, decorative.

**Family Cyperaceae Juss.**

*Carex riparia* Curtis. Meadow-marsh communities on the shore. Long-rhizome polycarp. Western Palearctic. Hygrophyte. Coastal water. V-VI. Fodder, pulp, technical.

*Carex supina* Willd. ex Wahlenb. Northeast slope to the lake basin. Dry meadows with shrubs. Long-rhizome polycarp. Pannono-Black Sea-Kazakhstan. xerophyte. Steppe. IV-V. Fodder.

**Superorder Poanae, Order Typhales**

**Family Typhaceae Juss.**

*Typha angustifolia* L. Meadow community on the shore. Amphibious long-rhizome polycarp. Cosmopolitan. Hydrohygrophyte. Coastal water. VI-VII. Technical, cellulose, ornamental, food.

*Typha latifolia* L. Meadow-marsh communities on the shore. Amphibious long-rhizome polycarp. Cosmopolitan. Hydrohygrophyte. Coastal water. VI-VII. Technical, cellulose, ornamental, food.

**Order Poales****Family Poaceae Barnhart**

*Achnatherum splendens* (Trin.) Nevski. Northern slope to the lake basin. Dry meadows with shrubs. Short rhizome polycarp. South Palearctic. Xeromesophyte. steppe. VI–VII. Cellulosic, technical.

*Agropyron cristatum* (L.) Gaertn. North slope. Meadow-steppe communities. Short rhizome polycarp. Western Mediterranean. Xeromesophyte. Steppe. VI–VII.

*Agrostis gigantea* Roth. Northern slope to the lake basin. Birch forest on a steep slope. Soddy loose bushy polycarp. Palearctic. Mesophyte. Lugovoi. VI–VIII. Fodder, decorative.

*Agrostis stolonifera* L. Northern slope to the lake basin. Meadow-marsh communities on the shore. Stolniforming friable bush polycarpic. Eurosiberian. Hygrophyte. Meadow. VI–VIII. Fodder, decorative.

*Bromopsis inermis* (Leys.) Holub. Northeast slope to the lake basin. Meadow-marsh communities on the shore, meadow-steppe communities, upland meadows with shrubs. Long-rhizome polycarp. Palearctic. Mesophyte. Weedy. VI–VII. Fodder.

*Calamagrostis epigeios* (L.) Roth. Meadow-steppe communities. Long-rhizome polycarp. Palearctic. Xeromesophyte. Meadow. VII. Fodder, technical.

*Elytrigia repens* (L.) Nevski. Northern slope to the lake basin. Birch forest on a steep slope. Long-rhizome polycarp. Palearctic. Mesophyte. Meadow. VI–VIII. medicinal, food, fodder.

*Festuca valesiaca* Gaudin. Northern and northeastern slopes to the lake basin. Shrub thickets on a slope, birch forest on a steep slope, meadow-steppe communities. Sod dense bush polycarpic. Black Sea-Kazakhstan. Xerophyte. Steppe. VI–VII. Fodder, decorative (lawn).

*Hierochloe odorata* (L.) Beauv. Northern slope to the lake basin. Birch forest on a steep slope. Long-rhizome polycarp. Holarctic. Mesophyte. Forest. V–VI. Medicinal, technical, fodder.

*Leymus angustus* (Trin.) Pilg. North slope. Meadow-steppe communities. Long-rhizome polycarp. Turano-Central Asian. xerophyte. Steppe. VI–VII. Fodder.

*Melica altissima* L. Birch forest on a steep slope. Long-rhizome polycarp. Western Palearctic. Mesophyte. Forest. VI–VII. Decorative, poisonous.

*Poa angustifolia* L. Northern and northeastern slope to the lake basin. Birch forest on a steep slope, upland meadows with shrubs, meadow-marsh communities on the shore. Long-rhizome polycarp. Palearctic. Xeromesophyte. Meadow. VI–VII. Fodder.

*Poa pratensis* L. Northern and northeastern slope to the lake basin. Birch forest on a steep slope, upland meadows with shrubs, meadow-marsh communities on the shore. Long-rhizome polycarp. Palearctic. Xeromesophyte. Meadow. VI–VII. Fodder.

*Puccinellia distans* (Jacq.) Parl. Northeast slope to the lake basin. Meadow-steppe communities. Turf loose polycarpic. Eurosiberian. Mesophyte. Weedy. VI–VIII. Fodder.

*Stipa capillata* L. Northern slope to the lake basin. Shrubs on the slope. Sod dense bush polycarpic. Western Mediterranean. Xerophyte. Steppe. VI–VII. Fodder.

*Stipa lessingiana* Trin. et Rupr. Northeast slope to the lake basin. Dry meadows with shrubs meadow-steppe communities. Sod dense bush polycarpic. Eastern Black Sea-Kazakhstan. Xerophyte. Steppe. V–VI. Fodder, decorative.

*Stipa pennata* L. Northern and northeastern slopes to the lake basin. Shrubs on the slope. Sod dense-bush polycarpic West Palearctic. Xerophyte. Steppe. V–VI. Fodder, decorative.

**Superorder Aranae, Order Arales****Family Lemnaceae Martinov**

*Lemna minor* L. In the water of stagnant and slow-flowing water bodies. Floating and underwater monocarpic. Holarctic. Hydrophyte. Aqueous. VI–VII. Fodder.

*Lemna trisulca* L. Meadow-marsh communities on the shore. Floating and underwater monocarpic. Holarctic. Hydrophyte. Aqueous. VI–VII. Fodder.

*Conclusion*

In the flora of "Kamenny lake tract" 177 species of vascular plants belonging to 132 genera and 48 families have been registered. The leading families are *Asteraceae*, *Rosaceae*, *Poaceae*, *Fabaceae*, *Lamiaceae*, *Caryophyllaceae*. The richest genera are: *Artemisia*, *Astragalus*, *Potentilla*, *Centaurea*, *Galium*, *Plantago*, *Ranunculus*, *Veronica*.

The basis of the flora is herbaceous plants, followed by woody and aquatic plants. The steppe ecological-coenotic group is the richest in terms of the volume of species.

In the flora of the “Kamenny lake tract” a large proportion of species has a significant area of distribution – Cosmopolitan, Holarctic, Palearctic. The Holarctic and Palearctic types are the largest in terms of the number of species.

Three species of plants *Stipa pennata*, *Tulipa biebersteiniana*, and *Adonis wolgensis* listed in the Red Book of Kazakhstan were found on the territory of the natural monument [9].

The presented summary of the “Kamenny lake tract” flora is the basis for further work on plant monitoring of this unique territory.

## References

- 1 Закон Республики Казахстан «Об особо охраняемых природных территориях» от 07.07.2006 г. № 175. — [Электронный ресурс]. — Режим доступа: [https://adilet.zan.kz/rus/docs/Z060000175\\_](https://adilet.zan.kz/rus/docs/Z060000175_)
- 2 Пугачев П.Г. Сосновые леса Тургайской впадины / П.Г. Пугачев. — Костанай, 1994. — 406 с.
- 3 Пережогин Ю.В. Ревизия гербария Костанайского государственного педагогического института (род *Centaurea* L. семейства *Asteraceae* Dumort.) / Ю.В. Пережогин, О.В. Бородулина, Д.Т. Конысбаева, С.И. Курлов // Вестн. Костанай. гос. пед. ин-та. — 2012. — № 3 (27). — С. 96–98.
- 4 Пережогин Ю.В. Ревизия гербария Костанайского государственного педагогического института (род *Ranunculus* L. семейства *Ranunculaceae* Juss.) / Ю.В. Пережогин, О.В. Бородулина, Д.Т. Конысбаева // Вестн. Костанай. гос. пед. ин-та. — 2010. — № 3 (20). — С. 89–96.
- 5 Пережогин Ю.В. Ревизия родов *Astragalus* L. и *Oxytropis* DC. флоры Костанайской области / Ю.В. Пережогин, О.В. Бородулина, М.С. Тарасов // Вестн. Костанай. гос. пед. ин-та. — 2021. — Т. 61, 62, № 1, 2. — С. 89–96.
- 6 Пережогин Ю.В. Ревизия гербария Костанайского государственного педагогического института (семейства *Onocleaceae–Ephedraceae*) / Ю.В. Пережогин, О.В. Бородулина, М.С. Тарасов // Вестн. Костанай. гос. пед. ин-та. — 2009. — № 4. — С. 50–52.
- 7 Takhtajan A.L. Flowering plants. – Springer Link, 2009. – 891 p.
- 8 Абдулина С.А. Список сосудистых растений Казахстана / С.А. Абдулина. — Алматы, 1999. — 187 с.
- 9 Красная книга Казахстана. — Т. 2: Растения. — Астана: ТОО «ArtPrint XXI», 2014. — 452 с.

## Г.Ж. Султангазина, А.Н. Куприянов, Д.К. Ермакова, А.У. Утебасова «Каменное озеро» табиғи ескерткіші флорасының конспектісі (Костанай облысы)

Мақалада жалпы ауданы 2,5 га құрайтын, жергілікті маңызы бар Мемлекеттік табиғи ескерткіш «Каменное озеро» шатқалының флористикалық алуантүрлілігін зерттеудің нәтижелері берілген. Табиғат жағдайларына сәйкес бұл аумақ 80%-ға дейін жыртылған, қарашірігі аз оңтүстік қара топырақты және қоңыр-қызғылт топырақты, құрғақ түрлі шөпті ақ селеулі далалардың аймағына кіреді. Қайыңды орманының топырағы қара-сұр, сазды және құмды, беткейлерде олар сілтісізденген қара топырақпен, жағалауының маңы шалғынды-батпақты топырақтармен қалыптасқан. Зерттеулер 2019-2022 жылдары жүргізілді. Далалық зерттеулер негізінде бес негізгі экотоптар анықталды: беткейдегі бұталы өсімділер, тік беткейдегі қайың орманы, құрғақ шалғындардағы бұталы тоғай, жағалаудағы шалғынды-батпақты қауымдастықтар, шалғынды-дала қауымдастықтары. Далалық зерттеулер негізінде ерекше қорғалатын табиғи аймақ шегіндегі түрлердің мекен ортасы туралы мәліметтер бар конспект жасалды. Зерттелетін аумақта 48 тұқымдастан және 132 туыстан жоғары сатылы өсімдіктердің 177 түрі өседі. Олардың ішінде *Asteraceae*, *Rosaceae*, *Poaceae*, *Fabaceae*, *Lamiaceae*, *Caryophyllaceae* жетекші орын алады. Флораның негізін шөптесін өсімдіктер, одан кейін ағаш және су өсімдіктері құрайды. Дала экологиялық-ценоздық тобы түр көлемі жағынан ең бай түр болып саналады. «Каменное озеро» шатқалының флорасында таралу аумағы бойынша космополиттік, голарктикалық, палеарктикалық сияқты түрлердің үлесі едәуір үлкен. Оның ішінде саны жағынан ең үлкені — голарктикалық және палеарктикалық түрлер. Зерттелген аймақта Қазақстанның Қызыл кітабына енгізілген *Adonis wolgensis*, *Stipa pennata* және *Tulipa biebersteiniana* деген түрлер өседі.

*Кілт сөздер:* флора, ерекше қорғалатын табиғи аймақ, «Каменное озеро» шатқалы табиғи ескерткіші, жоғары сатылы өсімдіктер, сирек кездесетін және жойылып бара жатқан өсімдіктер.