DOI 10.31489/2020BMG2/37-44

UDC 581.93

M.Yu. Ishmuratova[1], M.K. Butumbayeva[1,2], D.A. Takhanova[2],
K.B. Zholdybayeva[2], M.M. Silant'eva[3]

[1]E.A. Buketov Karaganda State University, Kazakhstan;
[2]Nasarbayev Intellectual School of Chemical and Biological Direction, Karaganda, Kazakhstan;
[3]Altai State University, Barnaul, Russia
(E-mail: margarita.ishmur@mail.ru)

Analysis of representatives of *Lamiaceae* family in the flora of the Central Kazakhstan

The work presents the results of research of *Lamiaceae* family's plants of flora of vascular plants of the Central Kazakhstan (Karaganda region). Studies have found the growth of 48 species belonging to 20 genera. This composition is 29.6 % of the total number of species and 42.6 % of the total number of genera of Kazakhstan's flora. The largest number of species recorded in the genera *Thymus* and *Scutellaris*. In the territory of the Central Kazakhstan there is a growth of 6 endemics (*Hyssopus ambiguus, Lagochillus acutilobus, Thymus lavrenkoanus, Th. crebrifolius, Th. rasitatus, Th.eremita*), 9 species are defined as objects for protection in nature. Life forms are dominated by perennial herbaceous plants, and environmental groups include mesophytes and xerophytes. Among members of *Lamiaceae* family are allocated 9 practical-useful groups: fodder — 28 species, technical — 6, medicinal — 32, honey — 46, ornamental-decorative — 17, food — 7, vitamin — 5, essential-oil — 43, insecticidal — 6. The distribution of species in the territory of Karaganda region, which depends on soil and climatic conditions, has been determined.

Keywords: *Lamiaceae* family, flora, Karaganda region, distribution, life forms, ecological groups, endemics, гические группы, эндемики, phytosecurity status, practical-used species.

Introduction

The study of flora of certain regions of the Republic of Kazakhstan has important theoretical and applied significance. The last comprehensive studies on flora were carried out in the 60–70 years of the 20th century [1], so it is necessary to study the flora of separated regions with a detailed characteristic of taxonomic groups.

Our attention has been drawn to the family *Lamiaceae*, many species of which have value as virtually potential valuable species [2–5]. For this family in the flora of Central Kazakhstan there is no full data on the full species and morphological composition, there is no information on the general distribution of species, places of localization and phytoprotective status [6]. It is of great importance to identify promising species, as this will allow to fully exploring the possibilities of using individual species in different industries.

The study of plant resources of certain regions of the Republic will allow creating a complete characteristic of valuable and rare plants, which will ensure the preservation of species diversity [7]. New botanical data and comprehensive research on selected species will allow them to be applied in new fields of science and industry, providing the local population with the necessary plant stocks.

The aim of present research is to carry out the analysis of family *Lamiaceae* of flora of the Karaganda region, including the taxonomical analysis, the analysis of vital forms and ecological groups, distribution, the phytosecurity status and economic and valuable properties.

Objects and methodology

The material for carrying out the research was the herbal duties stored in the herbarium funds of JSC "Scientific and production holding "Phytochemistry", Department of Botany of Ye.A. Karaganda State University, Zhezkazgan Botanical Garden and Zhezkazgan University named after O. Baikonurov, as well as the results of its own long field.

The species of the family *Lamiaceae* have become objects of study. Field studies in the territory of Karaganda region have been carried out by route method with the aim of the most complete detection of taxonomic composition, study of their areas, peculiarities of ecological development and biological factors [8]. Determination of species was carried out according to conventional determinants [1, 9–11], names of taxa were indicated in accordance with S.K. Cherepanov's summary [12].

The species belonging to the ecological group was determined in relation to the humidification conditions [13], life forms were indicated by the method of I.G. Serebryakov [14].

The allocation and justification of the status of rare endangered species of the region was carried out on the basis of the own materials and works of M.S. Baytenov [15], the Red Book of Kazakhstan (2014) [16], the list of rare and endangered plants of Karaganda region [17]. The status of the species characterizes the state of populations in nature and corresponds to the designations adopted in the IUCN Plant Red Data Book (1978):

1 (E) are species found in single instances, known from one or two or more places, endangered — endangered species.

2 (V) are species whose populations are declining due to natural causes or human-induced effects of habitat change (destruction) and other factors — vulnerable species. These species are not directly threatened with extinction, but are found in either small numbers or limited territories and in specific ecological niches.

3 (R) are species whose distribution is restricted to small territories or scattered in significant territories not currently endangered, but whose numbers are declining — shrinking species (10 species).

Practical-useful groups of species are identified according to the data of scientific publication [18–26].

Results and discussion

The territory of the Central Kazakhstan (Karaganda region) is located within the continental West Siberian steppe zone and occupies a middle position in the republic. The following floristic districts are located on the territory of the Central Kazakhstan: Western small-scale miner, Eastern small-scale miner, Ulytau, Kararaly, Betpakdala [27, 28]. The climate of the Central Kazakhstan is sharply continental. Summers are hot and dry; winters are low-white, harsh, with winds and burans. The territory of the region is almost all year round in the region of high pressure.

Taxonomic analysis. At the present stage, the family *Lamiceaea* of the Central Kazakhstan's flora is represented by 48 species belonging to 20 genera (Table 1), which is 29.6 % of the total number of species of the flora family of Kazakhstan and 42.6 % of the total number of genera.

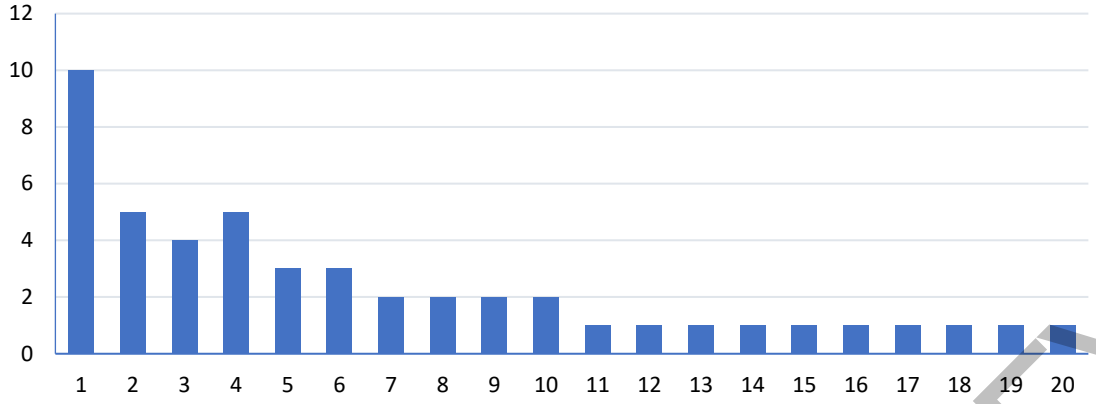
Table 1

Taxonomical structure *Lamiceaea* family in the flora of the Central Kazakhstan

№	Genus	Total number of species in the Central Kazakhstan, pieces	Total number of species in Kazakhstan, pieces	% from total number of species in Kazakhstan
1	*Thymus* L.	10	22	45.5
2	*Scutellaria* L.	5	35	14.3
3	*Dragocephalum* L.	4	20	20.0
4	*Nepeta* L.	5	14	35.7
5	*Mentha* L.	3	8	37.5
6	*Phlomoides* Moench.	3	4	75.0
7	*Galeopsis* L.	2	3	66.7
8	*Hyssopus* L.	2	4	50.0
9	*Lycopus* L.	2	2	100.0
10	*Salvia* L.	2	8	25.0
11	*Ziziphora* L.	1	7	14.3
12	*Glechoma* L.	1	1	100.0
13	*Lagochillus* Bunge	1	16	6.3
14	*Lallemantia* Fisch. et Mey	1	1	100.0
15	*Lamium* L.	1	3	33.3
16	*Leonurus* L.	1	4	25.0
17	*Lophanthus* Adans.	1	3	33.3
18	*Prunella* L.	1	1	100.0
19	*Sideritis* L.	1	1	100.0
20	*Stachys* L.	1	5	20.0

By species diversity, 2 genera are central positions: *Thymus* L. and *Scutellaria* L.

So, genera *Thymus* L. in the flora of the Central Kazakhstan has 10 species: *Th.mongolicus* (Ronn.) Ronn., *Th.crebrifolius* Klok., *Th.eremita* Klok., *Th. guberlinensis* Iljin, *Th.kirgisorum* Klok., *Th. lavrenkoanus* Klok., *Th. marschallianus* Willd., *Th. minussinensis* Serg., *Th. rasitatus* Klok., *Th. roseus* Schipz. (Fig. 1).



By vertically — number of species (in pieces); genus: 1 — *Thymus*, 2 — *Scutellaria*, 3 — *Dragocephalum*, 4 — *Nepeta*, 5 — *Mentha*, 6 — *Phlomoides*, 7 — *Galeopsis*, 8 — *Hyssopus*, 9 — *Lycopus*, 10 — *Salvia*, 11 — *Ziziphora*, 12 — *Glechoma*, 13 — *Lagochillus*, 14 — *Lallemantia*, 15 — *Lamium*, 16 — *Leonurus*, 17 — *Lophanthis*, 18 — *Prunella*, 19 — *Sideritis*, 20 — *Stachys*

Figure 1. Distribution of species in genera of *Lamiceae* family of the Central Kazakhstan's flora

Genus *Scutellaria* L. consists from 5 species: *S. dubia* Taliev et Sirj., *S. galericulata* L., *S. grandiflora* Sims., *S. scordiifolia* Fisch. ex Schrank., *S. supina* L.

The most of the genera are arranged in descending order as follows:

– genus *Dragocephalum* L. — 4 species (*D. nutans* L., *D. peregrinum* L., *D. ruyschiana* L., *D. thymiflorum* L.);
– genus *Nepeta* L. — 4 species (*N. cataria* L., *N. micrantha* Bunge, *N. pannonica* L., *N. ucranica* L.);
– genus *Mentha* L. — 3 species (*M. arvensis* L., *M. longifolia* (L.) Huds., *M. micrantha* (Fisch. ex Benth.) Litv.);
– genus *Phlomoides* Moench. — 3 species (*Ph. agraria* (Bunge) Adyl., *Ph. puberula* (Kryl. et Serg.) Adyl., R. Kam. et Machmedov; *Ph. tuberosa* (L.) Moench.);
– genus *Galeopsis* L. — 2 species (*G. bifida* Boenn., *G. ladanum* L.);
– genus *Hyssopus* L. — 2 species (*H. ambiguus* (Trautv.) Iljin, *H. macranthus* Boriss.);
– genus *Lycopus* L. — 2 species (*L. europaeus* L., *L. exaltatus* L.);
– genus *Salvia* L. — 2 species (*S. nemerosa* L., *S. stepposa* Schost.);

The remaining genera are represented by only 1 species:

– genus *Ziziphora* L. (*Z. clinopodioides* Lam.).
– genus *Glechoma* L. (*G. hederacea* L.);
– genus *Lagochillus* Bunge (*L. acutilobus* (Ledeb.) Fisch. et Mey);
– genus *Lallemantia* Fisch. et Mey (*L. royleana* (Benth.) Benth.);
– genus *Lamium* L. (*L. amplexicaule* L.);
– genus *Leonurus* L. (*L. glaucescens* Bunge);
– genus *Lophanthus* Adans. (*L. schrenkii* Levin);
– genus *Prunella* L. (*P. vulgaris* L.);
– genus *Sideritis* L. (*S. montana* L.);
– genus *Stachys* L. (*S. palustris* L.).

Among the 48 species, there is a growth of 6 endemic species (*Hyssopus ambiguus, Lagochillus acutilobus, Thymus lavrenkoanus, Th. crebrifolius, Th. rasitatus, Th. eremita*), which is 14 % of the total species composition.

The largest species diversity of *Lamiaceae* family grows in the northern, north-eastern and central regions of Karaganda region (the Central Kazakhstan), smaller number of species grows in the southern and south-western regions, which is due to the existing difference in soil, temperature conditions and annual precipitation.

Regionally rare 8 species are proposed by us to be added to the list for protection (Table 2).

Table 2

List of the Central Kazakhstan rare vascular plants and the plants in need of protection

№	Species	Status	Condition of the population	Protection measures	Comment
1	*Thymus lavrenkoanus*	2(V)	Vulnerable specie	Monitoring the condition of the population. Protection of habitats	Endemic specie
2	*Th. crebrifolius*	3(R)	Rare specie	Protection of habitats	Endemic specie
3	*Th. eremita*	3(R)	Rare specie	Protection of habitats	Endemic specie
4	*Th. minussinensis*	2(V)	Vulnerable specie	Monitoring the condition of the population. Protection of habitats	Endemic specie
5	*Hyssopus macranthus*	3(R)	Rare specie	Monitoring the condition of the population. Protection of habitats	Endemic specie
6	*Glechoma hederacea*	1(E)	Endangered specie	Monitoring the condition of the population. Protection of habitats	Relict specie
7	*Lophanthus schrenkii*	3(R)	Rare specie	Protection of habitats	
8	*Prunella vulgaris*	1(E)	Endangered specie	Monitoring the condition of the population. Protection of habitats	Relict specie

Analysis of life forms. As a result of the ranking of plants by life forms, it was found that the following groups grow on the territory of the Central Kazakhstan: herbaceous perennials, annual, biennial and semi-shrub plants (Table 3).

Table 3

Distribution of *Lamiaceae* plants of the Central Kazakhstan's flora by life forms (according to I.G. Serebryakov)

Life form	Number of species, pieces	% from total number of species
Perennials herbaceous plants	27	56.3
Annual and biennial herbaceous plants	8	16.6
Semi-shrub plants	13	27.1
Total:	48	100.0

Most species in the flora of the Central Kazakhstan are represented by herbaceous plants — 35 species or 72.9 %. Share of perennials herbaceous plants is 27 species or 72,9 % (*Mentha arvensis, M.longifolia, Nepeta cataria, Nepeta pannonica, Nepeta ucranica, Lycopus europaeus, Phlomiodes tuberosa* and other); annual and biennial herbaceous species are 8 or 16,6 % (*Galeopsis bifida, Lamium amplexicaule, Galeopsis ladanum, Sideritis montana*).

The rest of the species belongs to semi-shrub life form — 13 species or 27,1 % (*Hyssopus ambiguus, H.macranthus, Thymus lavrenkoanus, Th.rasitatus, Th. minussinensis* and others).

Ecological analysis. Analysis of species by degree of alignment with different humidification conditions allowed to distinguish 5 groups: xerophytes and mesophytes — by 14 species, xeromesophytes — 5 species, mesoxerophytes — 6 species and hygrophytes — 9 species (Table 4).

Table 4

Distribution of *Lamiaceae* plants of the Central Kazakhstan's flora by ecological groups

Ecological group	Number of species, pieces	% from total number of species
Xerophytes	14	29.1
Xeromesophytes	5	10.4
Mesoxerophytes	6	12.5
Mesophytes	14	29.1
Hygrophytes	9	18.9
Total:	48	100.0

Mesophytes include species such as *Nepeta micrantha, Dragocephalum nutans, Lophanthus schrenkii, Phlomoides agraria*. Among xerophytes are *Thymus rasitatus, Th. crebrifolius, Hyssopus macranthus*. Among

hygrophytes are *Mentha arvensis, Mentha micrantha, Prunella vulgaris, Lycopus europaeus* and other. Group of xeromesophytes includes 5 species, among them *Ziziphora clinopodioides, Phlomoides tuberosa, Thymus marschallianus*. The remaining species are classified as mesoxerophytes.

Analysis of practical-useful plants. Studying of plants of *Lamiaceae* family have revealed that most species exhibit not one but several useful properties. Thus, mint species are fodder, decorative, food, medicinal, essential oil plants, contain vitamins, can be used to stain wool and fabrics.

It has been revealed that among 48 taxa 43 species are classified as essential oil plants, 32 species are medicinal plants, 46 species are honey plants, 28 species are fodder plants, 6 species are technical plants, 7 species are food plants, 17 species are decorative plants and 5 species are vitamin plants (Table 5).

Table 5

Distribution of *Lamiaceae* plants of the Central Kazakhstan's flora by practical-useful groups

Practical-useful group	Number of species, pieces	% from total number of species	Number of genera, pieces	% from total number of genera
Fodder	28	56	14	70
Technical	6	12	4	20
Medical	32	64	16	80
Honey	46	94	18	90
Ornamental-decorative	17	36	11	55
Food	7	14	6	30
Vitamin	5	10	4	20
Essential oily	43	86	17	85
Insecticide	6	12	4	20

Of greatest practical importance is the representative of the genera *Mentha, Thymus, Dragocephalum, Phlomis*.

Based on the extent and value of species, we have attempted to assess the possibilities of practical use of plants of *Lamiaceae* family, growing in the flora of the Central Kazakhstan.

Thus, pharmaceutical, food, perfumery and cosmetic industries are promising directions in developing Kazakhstan at the moment. One of the most important components for them is the use of their own renewable and environmentally friendly raw materials. As a supplement, the use of natural agents, that is, not of chemical origin, as the basis for the preservation of human health.

According to the available literary information [16–20], practical interest for medicine and pharmacy as medicinal plants has *Ziziphora clinopodioides, Thymus marschallianus, Th.crebrifolius, Th. rasitatus, Nepeta cataria, Nepeta ucranica*. These species are quite widespread in the territory of the Central Kazakhstan, there are semi-industrial reserves of raw materials.

Essential and other volatile compounds from *Nepeta, Thymus* and *Mentha* can be used to aromatize lollipops, candy, creams, soft drinks and liquor products.

Last researches [2, 4, 21] showed the possibility of using essential oils from *Hyssopus ambiguus, Glechoma hederaceae, Thymus roseus* for the pharmaceutical industry as the sources of antimicrobial and antifungal ointments, mixtures for inhalation, in aromatherapy, as well as for making flavors and flavorings.

Conclusion

Thus, 48 species of plants from Lamiaceae family grow in the natural flora in the territory of the Central Kazakhstan, which belonging to 20 genera, which is 29.6 % of the total number of species of the flora family of Kazakhstan and 42.6 % of the total number of genera.

Among the 48 species, 6 endemic species (*Hyssopus macranthus, Lagochillus acutilobus, Thymus lavrenkoanus, Th. crebrifolius, Th. rasitatus, Th. eremita*), which is 12.5 % of the total species composition.

The leading genera are *Thymus* and *Scutellaria*. The ecological spectrum is dominated by mesophytes and xerophytes; among the life forms are herbaceous perennial, annual and biennial plants. By practical-useful species the largest group belongs to medicinal, fodder, essential oil and honey plants. The largest species diversity of *Lamiaceae* family' plants locate in the northern, north-eastern and central regions of Karaganda region (the Central Kazakhstan), less diversity — in the southern and south-western regions, which is due to soil and climatic conditions.

The research work, analysis of literary data and herbal materials allowed for the first time to make a complete conspectus of the flora of *Lamiaceae* family of the Central Kazakhstan and maps of areas of identified plant species.

References

1 Флора Казахстана. — Т. 1–9. — Алма-Ата: Наука, 1956–1966.

2 Мяделенец М.А. Губоцветные Хакасии: видовой состав, экология и перспективы использования: автореф. дис. ... канд. наук / М.А. Мяделенец. — Новосибирск, 2008. — 17 с.

3 Veres K. Variability and biological active components of some *Lamiaceae* species: PhD Thesis / K. Veres. — Szeged, 2007. — 95 p.

4 Абышева Л.Н. Дикорастущие полезные растения России / Л.Н. Абышева, Л.М. Беленовская, Н.С. Бобылева. — СПб.: Изд-во СПХФА, 2001. — 663 с.

5 Khoury M. Report on the medicinal use of eleven *Lamiaceae* species in Lebanon and rationalization of their antimicrobial potential by examination of the chemical composition and antimicrobial activity of their essential oils / M. Khoury, D. Stien, V. Eparvier, N. Ouaini, M. El Beyrouthy // Evidenced-Based Complementary and Alternative Medicine. — 2016. — Vol. 2016. Article ID 2547169. — 17 p. https://doi.org/10.1155/2016/2547169

6 Атлас ареалов и ресурсов лекарственных растений Казахстана. — Алматы: Ғылым, 1994. — 168 с.

7 Кукенов М.К. Ботаническое ресурсоведение Казахстана / М.К. Кукенов. — Алматы: Ғылым, 1999. — 160 с.

8 Щербаков А.В. Полевое изучение флоры и гербаризация растений / А.В. Щербаков, А.В. Майоров. — М.: Изд-во МГУ, 2006. — 84 с.

9 Куприянов А.Н. Определитель сосудистых растений Каркаралинского национального парка / А.Н. Куприянов, И.А. Хрусталева, Ю.А. Манаков, С.М. Адекенов. — Кемерово: КРЭОО «Ирбис», 2009. — 276 с.

10 Куприянов А.Н. Определитель сосудистых растений Баянаульского национального парка / А.Н. Куприянов, И.А. Хрусталева, Ю.А. Манаков, С.М. Адекенов. — Новосибирск: Изд-во СО РАН, 2013. — 216 с.

11 Мырзалы Г.Ж. Определитель сосудистых растений гор Улытау / Г.Ж. Мырзалы, В.И. Ивлев, М.Ю. Ишмуратова, А.Н. Матвеев. — Караганда: Изд-во ТОО «Полиграфист», 2016. — 221 с.

12 Czerepanov S.K. Vascular plants of Russia and adjacent state (the former USSR) / S.K. Czerepanov. — Cambridge: University Press, 1995. — 516 p.

13 Радкевич В.А. Экология / В.А. Радкевич. — Минск: Высш. шк., 1998. — 159 с.

14 Серебряков И.Г. Жизненные формы высших растений и их изучение / И.Г. Серебряков // Полевая геоботаника. — Т. 3. — М.; Л.: Наука, 1964. — С. 146–205.

15 Байтенов М.С. В мире редких растений / М.С. Байтенов. — Алма-Ата: Наука, 1985. — 176 с.

16 Красная книга Казахстана. — Т. 2. Растения. — Астана: АО «Арт Print XXI», 2014. — 452 с.

17 Куприянов А.Н. Охраняемые растения Карагандинской области / А.Н. Куприянов. — Караганда, 1993. — 37 с.

18 Грудзинская Л.М. Аннотированный список лекарственных растений Казахстана: справоч. изд. / Л.М. Грудзинская, Н.Г. Гемеджиева, Н.В. Нелина, Ж.Ж. Каржаубекова. — Алматы, 2014. — 200 с.

19 Compendiums of Medicinal and Aromatic Plants. Vol. II. Asia. — Triestre: ICS-UNIDO, 2006. — 305 p.

20 Растительные ресурсы России. Дикорастущие цветковые растения, их компонентный состав и биологическая активность. — Т. 1–5. — СПб.; М.: Изд-во КМК, 2008–2012.

21 Joy P.P. Medicinal Plants / P.P. Joy, J. Thomas, S. Mathew, B.P. Skaria. — Kerala: Kerala Agricultural University, 1998. — 221 p.

22 Государственная фармакопея Казахстана. — Т. 2. — Астана, 2000. — 400 с.

23 Ross I.A. Medicinal Plants of the World: Vol. 1 Chemical Constituents, Traditional and Modern Medicinal Uses / I.A. Ross. — New-York: Humana Press, 2003. — 496 p.

24 Bonhage-Freund M.T. Handbook of Medicinal Plants / M.T. Bonhage-Freund // Economic Botany. — 2006. — Vol. 60, Iss. 2. — 196 p. DOI: 10.1663/0013–0001(2006)60[196a: HOMP]2.0.CO;2

25 Ишмуратова М.Ю. Лекарственные растения народной медицины: учеб.-метод. пос./ М.Ю. Ишмуратова. — Караганда: Болашак-Баспа, 2014. — 137 с.

26 Муравьева Д.А. Фармакогнозия / Д.А. Муравьева, И.А, Самылина, Г.П. Яковлева. — М.: Медицина, 2002. — 415 с.

27 Джаналиева К.М. Физическая география Республики Казахстан / К.М. Джаналиева, Т.И. Будникова, Е.Н. Веселова. — Алматы: Қазақ ун-ті, 1998. — 266 с.

28 Максутова П.А. Физическая география Карагандинской области / П.А. Максутова, Ш.Е. Дюсекеева, А.О. Кульмаганбетова. — Караганда, 2005. — 59 с.

М.Ю. Ишмуратова, М.К. Бутумбаева, Д.А. Таханова, К.Б. Жолдыбаева, М.М. Силантьева

Орталық Қазақстан флорасындағы Ерінгүлділер тұқымдасының өкілдерін талдау

Мақалада Орталық Қазақстанның (Қарағанды облысы) тамырлы өсімдіктер флорасының *Lamiaceae* тұқымдас өсімдіктерін зерттеу нәтижелері келтірілген. Негізгі жүргізілген зерттеулердің сараптамасы бойынша Орталық Қазақстанның флорасынан алынған өсімдіктердің 48 түрінің 20-сы ерінгүлділер тұқымдасына жатады. Бұл құрам түрлердің жалпы санының 29,6 % және тұқымдастардың жалпы санының 42,6 % құрайды. Осы 50 түрдің ішіндегі 6-ы эндемик өсімдік болып табылады (*Hyssopus ambiguus, Lagochillus acutilobus, Thymus lavrenkoanus, Th. crebrifolius, Th. rasitatus, Th. eremita*), 9 түрі қорғау объектілері ретінде анықталған. Осы таралған түрлердің ішінде маңызды орын алатыны *Thymus* L. және *Scutellaria* L. Зерттеу қорытындысы бойынша бұл аумақта өсімдіктердің бірнеше экологиялық тобы айқындалды, олардың ішінде көп кездесетіні мезофиттер және ксерофитттер. Олар көбінесе көпжылдық мен бір жылдықтар шөптесін өсімдіктер. Бұл аумақта Ерінгүлділердің 9 экономикалық құнды топтары анықталған, олар: дәрілік — 32, жемшөп — 28, техникалық — 6, эфир майы — 43, бал өсімдіктер — 46, қолданбалы — 17, дәрумендi — 5, тамақ — 7, инсектицидтер — 6. Топырақ пен климаттық жағдайларға байланысты Қарағанды облысының аумағында түрлердің таралуы анықталған.

Кілт сөздер: *Lamiaceae* тұқымдасы, флора, Қарағанды облысы, таралуы, тіршілік формасы, экологиялық топтар, эндемиктер, экономикалық құнды түрлер.

М.Ю. Ишмуратова, М.К. Бутумбаева, Д.А. Таханова, К.Б. Жолдыбаева, М.М. Силантьева

Анализ представителей семейства *Губоцветные* во флоре Центрального Казахстана

В статье приведены результаты исследования растений семейства *Lamiaceae* флоры сосудистых растений Центрального Казахстана (Карагандинская область). Установлено произрастание 48 видов, относящихся к 20 родам. Данный состав составляет 29,6 % от общего числа видов и 42,6 % от общего числа родов. Наибольшее число видов зафиксировано в родах *Thymus* и *Scutellaris*. На территории Центрального Казахстана отмечено произрастание 6 эндемов (*Hyssopus ambiguus, Lagochillus acutilobus, Thymus lavrenkoanus, Th. crebrifolius, Th. rasitatus, Th. eremita*), 9 видов определены в качестве объектов для охраны. Среди жизненных форм преобладают многолетние травянистые растения, в экологических группах — мезофиты и ксерофиты. Среди представителей семейства *Губоцветные* выделено 9 хозяйственно-ценных групп: кормовые — 28 видов, технические — 6, лекарственные — 32, медоносные — 46, декоративные — 17, пищевые — 7, витаминные — 5, эфирно-масличные — 43, инсектицидные — 6. Определено распространение видов по территории Карагандинской области, которое зависит от почвенных и климатических условий.

Ключевые слова: семейство *Lamiaceae*, флора, Карагандинская область, распространение, жизненные формы, экологические группы, эндемики, фитоохранный статус, хозяйственно-ценные виды.

References

1 *Flora Kazakhstana [Flora of Kazakhstan]* (1956–1966). Vol. 1–9. — Alma-Ata: Nauka [in Russian].

2 Myadelenec, M.A. (2008). *Hubotsvetnye Khakassii: vidovoi sostav, ekolohiia i perspektivy ispolzovaniia [Lamiaceae of Khakassiya: species composition, ecology and perspectives of using. Thesis]*. Novosibirsk [in Russian].

3 Veres, K. (2007). Variability and biological active components of some *Lamiaceae* species. *PhD Thesis. Szeged*.

4 Abysheva, L.N., Belenovskaya, L.M., & Bobylyeva, N.S. (2001). *Dikorastushchie poleznye rasteniia Rossii [Wild useful plants of Russia]*. Saint-Petersburg: Publ. SPChPhA [in Russian].

5 Khoury, M., Stien, D., Eparvier, V., Ouaini, N., & Beyrouthy, El M. (2016). Report on the medicinal use of eleven *Lamiaceae* species in Lebanon and rationalization of their antimicrobial potential by examination of the chemical composition and antimicrobial activity of their essential oils. *Evidenced-Based Complementary and Alternative Medicine, 2016, Article ID 2547169*. https://doi.org/10.1155/2016/2547169

6 *Atlas arealov i resursov lekarstvennykh rastenii Kazakhstana [Atlas of areas and resources of medicinal plants of Kazakhstan]*. (1994). Almaty: Hylym [in Russian].

7 Kukenov, M.K. (1999). *Botanicheskoe resursovedenie Kazakhstana [Botanical resources study of Kazakhstan]*. Almaty: Hylym [in Russian].

8 Shcherbakov, A.V., & Maiorov, A.V. (2006). *Polevoe izuchenie flory i herbarizatsiia rastenii [Field study and herbarization of plants]*. Moscow: Publ. MSU [in Russian].