QUALITY OF SPECIES COMPOSITION AND EXTENT OF KNOWLEDGE OF MEDICINAL PLANTS OF THE RIDGE KUNGEI ALATAU OF THE NORTHERN TIEN SHAN

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Abstract: *Kazakhstan is landlocked country, the relief of the territory is complex and varied, only 10% of the territory of Kazakhstan occupied by mountains, which they are located mainly in the East and South-East of the Republic of Kazakhstan, despite their small area, they are extremely diverse landscapes and contain in their ecosystems more than half of the biological diversity of the vast territory of Kazakhstan. The studied object Kungei Alatau is one of the ridges of the Northern Tien Shan. Flora Kungei Alatau has great potential as a source of official and promising medicinal plants presented in the Annotated list of medicinal plants of Kazakhstan.*

Key words*: Northern Tien Shan, Kungei Alatau, medicinal plants, ecosystem, traditional medicine*

INTRODUCTION

The preservation and rational use of the plant resources of our planet is today a global problem of the interstate level [16, 6]. The influence of anthropogenic factor leads to the change of natural complexes, reduction of areas of medicinal plants, reducing the number of their populations, and this is an urgent problem of our planet and our study area of the Kungei Alatau ridge of the Northern Tien Shan. The process that has begun threatens the preservation of natural vegetation and the human habitat itself [2, 7, 15, 17]

Years of experience in the study of medicinal plants has shown that plants have a healing effect [1,7,19,20]. Due to the wide distribution, availability and valuable properties of medicinal plants are used since ancient times. [1,14]

In today's pharmaceutical market, most drugs - synthetic. If you make a comparison between synthetic and herbal drugs, then both can identify disadvantages and advantages. The advantages of synthetic drugs-prolonged action, more selective effect on organs and systems, dosing accuracy [9, 10, 11, 8]. Medicinal plants have fewer contraindications, side effects; they are more often less toxic to the body.

On the territory of our country grows a large number of different types of plants, many of which have medicinal properties. Plants are a source for a variety of drugs. It is known that more than 30% of all medicines are obtained from plants. Medicinal plants are traditionally widely used in traditional (folk) and scientific medicine [5, 4, 3, 17]. The area of their use is expanding every year.

Among of the medicinal plants of Kazakhstan of particular importance are the species whose raw materials are used in pharmaceutical production, such as 170 species in Kazakhstan. These are the most popular medicinal plants, the raw materials of which go without processing directly into the pharmacy network, among them 27 official species [12, 2, 17,18].

MATERIALS AND METHODS

Tien Shan is one of the largest mountain systems in Asia. Tien Shan means in Chinese language "Heavenly Mountains". On the territory of Kazakhstan are almost entirely Northern Tien Shan, part of the Central and Western Tien Shan. The Northern Tien Shan is divided into the following orographic areas: Ketmen ridge, Zailiyskiy Alatau, Kungei Alatau, Kyrgyz [18, 19, 20].

Kungei Alatau is located within the folded region of the Northern Tien Shan, the average height of the ridge according to S. S. Shultz, ranges from 3300-4400 m. Kungei Alatau Ridge is characterized by a significant variety of hypsometric heights and a variety of terrain alignment surfaces, extremely steepness of forms and a clear tiered relief [6, 12, 7, 13].

The climatic features of the Kungei Alatau ridge are pronounced belt character and are dependent on a complex of natural factors [6, 12, 7, 2, 9]. Of particular importance in this case affects the height of the terrain, exposure and steepness of the slopes.

Kungey Alatau – is a unique, interesting region and the floristic composition is preserved in a natural state and therefore represents a benchmark in the floristic relation to the whole of the Northern Tien Shan.

Kungey Alatau's vegetation, just like its soils, conforms to the altitudinal zonality patterns. Plains surrounding mountain ridges are occupied by sagebrush and saltwort deserts followed higher by sagebrush-sod-grass steppes. Within the lowlands at 700-900m to 1200-1700m altitudes the vegetation is represented by mountain sod-grass steppes prevailed by fescue *(Festuca sulcata)* and feather grass *(Stipa capillata, S. Lessingiana* и др.) [19, 5, 10]. The study addressed wild-growing and cultivated species of medicinal plants of the ridge Kungey Alatau of the Northern Tien Shan [6, 12, 7, 20, 9]. The key research method was used botany. Also, the comprehensive list of the ridge Kungey Alatau of the Northern Tien Shan medicinal plants was built on the basis of various floristic and specialized sources, mostly with the use of "Kazakhstan's Flora" (1956-1966), "Illustrated Index of Kazakhstan Plants" (1969-1972), and the "Kazakhstan's Wild-Growing Useful Plants" catalog (2008), multi-volume collection "USSR Plant Resources" (1984-1993), "Russia's Useful Wild-Growing Plants" (2001), Checklist of Kazakhstan's Medicinal Plants (2014), "Central Asia Plant Index", and the paper titled "USSR Cereals", families and genera were determined with the use of "Kazakhstan's Flora" of M.S. Baytenov. The spelling of Latin names, and changes in the list of taxons were checked in accordance with S.K. Cherepanov [3, 10, 15, 16].

Distribution, cultivation, and, especially, the resources of medicinal species were estimated in reliance on the papers issued by Kazakh researchers of the mid-last century, mostly represented by the scientists of the Institute of Botany and Phytointroduction of the Kazakh Ministry of Science and Education, as well as on the papers of Kazakh botanists employed by other institutions of the same specialization [11, 13].

RESEARCH RESULTS

The Kazakhstan's flora offers huge opportunities as a source of official and prospective medicinal plants represented by 1406 species of 612 genera belonging to 132 families of higher flowering plants. Also, 110 families, 436 genera, and 829 species of medicinal plants were found in the Northern Tien Shan, also in the Kungei Alatau ridge 83 families, 330 genera and 548 species of medicinal plants have been identified, from these we have identified 14 leading families of flora (medicinal plants), 224 genera and 378 species [6, 12, 7, 2, 11].

Among the abundant medicinal plants of Kungei Alatau the top spot is occupied by the Asteraceae family that includes of 80 species and 37 genera, This is the most multi-genus family followed by the family of *Lamiaceae* that includes 40 species. The third family, Brassicaceae contains 39 species, which is 7,1 % of the total species count. The fourth is the *Rosaceae family*, with 38 species. Those are followed by the Fabaceae family, with 26 species, *Apiaceae family with* 24 species, and *Chenopodiaceae* family, that contains 24 species. A total of 23 species were identified within *Ranunculaceae* family, next to it is the *Scrophulariaceae family*, that contains 18 species. The *Caryophyllaceae family is represented by* 16 species, with *Poaceae family of* 15 species (Table 1). Also, the *Boraginaceae and Crassulaceae families are* represented by 12 species, and the Malvaceae family, that contains 11 species [6, 12, 7, 2, 9].

Table 2 - illustrate the leading flora families of the Kungei Alatau ridge of the Northern Tien Shan.

As we can see from the table 1, these species account for more than a half of all the genera and species (69%) of flora that occur in Kungei Alatau [6, 12].

Also, a small species diversity of 10 species have one family: Polygonaceae, one family is represented by 9 species**:** Euphorbiaceae, 4 families are represented by 6 species**:** Primulaceae, Rubiaceae, Violaceae and Geraniaceae, also 3 families are represented by 5 species: Cuscutaceae, Gentianaceae and Plantaginaceae, more than 6 families are represented by 4 species: Berberidaceae, Campanulaceae, Grossulariaceae, Hypericaceae, Onagraceae, Salicaceae and Solanaceae, 6 families are represented by 3 species: Convolvulaceae, Dipsacaceae, Orchidaceae, Rutaceae, Tamaricaceae and Valerianaceae, 20 families are represented by 2 species: Aspleniaceae, Athyriaceae, Balsaminaceae, Cannabaceae, Caprifoliaceae, Elaeagnaceae, Ephedraceae, Equisetaceae, Fumariaceae, Iridaceae, Juncaceae, Juncaginaceae, Nitrariaceae, Orobanchaceae, Papaveraceae, Polemoniaceae, Pyrolaceae, Saxifragaceae, Zygophyllaceae and Urticaceae, 27 families are represented by 1 species: Adoxaceae, Alliaceae, Asphodelaceae, Biebersteiniaceae, Callitrichaceae, Cupressaceae, Cyperaceae, Datiscaceae, Dryopteridaceae, Ericaceae, Haloragaceae, Hippuridaceae, Lentibulariaceae, Limoniaceae, Linaceae, Lythraceae, Melanthiaceae, Monotropaceae, Oleaceae, Paeoniaceae, Parnassiaceae, Polygalaceae, Polypodiaceae, Portulacaceae, Rhamnaceae, Thymelaeaceae and Verbenaceae [6, 12, 18].

Table 1.

Leading floral families (medicinal plants) of the ridge Kungei Alatau

Family	Genera	Species	% of the total number of species
Apiaceae	19	24	4,4
Asteraceae	37	80	14,6
Boraginaceae	11	12	2,2
Brassicaceae	29	39	7,1
Caryophyllaceae	12	16	2,9
Chenopodiaceae	15	24	4,4
Crassulaceae	6	12	2,2
Fabaceae	15	26	4,7
Lamiaceae	23	40	7,3
Malvaceae	6	11	2,0
Poaceae	15	15	2,7
Ranunculaceae	12	23	4,2
Rosaceae	15	38	6,9
Scrophulariaceae	9	18	3,3
Total:	224	378	69

Source: Grudzinskaya L.M., Gemejiyeva N.G., Annotirovannyy spisok lekarstvennykh rasteniy Kazakhstana: Spravochnoye izdaniye (Annotated list of medicinal plants of Kazakhstan: Reference edition), Almaty, 2014

Table 2.

The leading flora family of the Kungei Alatau ridge of the Northern Tien Shan.

Family	**Genus**	**Species of flora**	
		Kazakhstan	***Kungei Alatau***
1	**2**	**3**	**4**
Asteraceae Dumort.	*Achillea*	**7 (4)**	**4** (*Achillea asiatica* Serg., *A. biebersteinii* Afan., A. *filipendulina* Lam., A. *millefolium* L.)
	Ajania	**2 (1)**	**1***(Ajania fastigiata (C. Winkl.) Poljak.)*
	Arctium	**3 (1)**	**1** *(Arctium tomentosum Mill.)*
	Artemisia	**42 (16)**	**16** *(Artemisia absinthium L.,* *A. annua* L., *A. aschurbajewii* C.Winkl., *A. austriaca Jacq.,* *A. dracunculus* L., *A. gmelinii* Web., *A. macrocephala* Jacq. ex Bess *A. rupestris* L. A. *rutifolia* Steph. ex Spreng. *A. santolinifolia* Turcz. ex Bess A. *scoparia Waldst. et Kit,* *A. serotina Bunge,* A. *sieversiana* Willd, A. *sublessingiana* Krasch. ex Poljak, A.*tianschanica* Krasch. ex Poljak, A. *vulgaris* L.)
	Bidens	**3**	**2** *(Bidens cernua* L. B. *radiata Thuill.)*
	Carduus	**2**	**1** *(Carduus nutans* L.)
	Carthamus	**1**	**1** *(Carthamus lanatus L.)*
	Centaurea	**8 (5)**	**5** *(Centaurea cyanus* L., *C. iberica Trev. ex Spreng.,* C. *ruthenica* Lam. C. *scabiosa* L. C. *squarrosa* Willd.)
	Cichorium	**1**	**1** *(Cichorium intybus L.)*
	Cirsium	**6**	**4** *(Cirsium arvense* (L.) Scop., *C. esculentum* (Siev.) C. A. Mey., C. *ochrolepideum Juz.* C. *vulgare* (Savi) Ten.*)*
	Cnicus	**1**	**1** *(Cnicus benedictus L.*)
	Cousinia	**2**	**1** *(Cousinia umbrosa Bunge.*
	Crepis	**2 (1)**	**1** *(Crepis sibirica* L.)
	Handelia	**1**	**1** *(Handelia trichophylla* (Schrenk) Heimerl)
	Helichrysum	**2**	**1***(Helichrysum maracandicum* M. Pop. ex Kirp)
	Heteropappus	**1**	*1(Heteropappus altaicus* (Willd.) Novopokr. (=*Aster altaicus*)
	Hieracium	**5 (3)**	**3***(Hieracium echioides* Lumn., H. *umbellatum* L., H. *virosum* Pall.)
	Inula	**8**	**6** *(Inula britannica L.,* *I. caspica* Blume ex Ledeb., *I. helenium* L., I. *macrophylla* Kar. et Kir. (=*I. grandis*), I. *rhizocephala Schrenk,* *I. salicina L.)*
	Koelpinia	**1**	**1** *(Koelpinia linearis Pall.*)

	Lactuca	**2**	**1** *(Lactuca serriola* L.)
	Leontopodium	**2**	**2** *(Leontopodium fedtschenkoanum* Beauverd (=*L. campestre*), L. *ochroleucum* Beauverd.)
	Lepidotheca	**1**	**1** *(Lepidotheca suaveolens* (Pursh) Nutt. (=*Chamomilla suaveolens*))
	Onopordum	**1**	**1** (*Onopordum acanthium* L.)
	Picris	**2**	**2** (*Picris hieracioides L.*, *P. japonica* Thunb.*)*
	Pseudohandelia	**1**	**1** (*Pseudohandelia umbellifera* (Boiss.) Tzvel.)
	Pyrethrum	**4 (1)**	**1** *(Pyrethrum alatavicum (Herd.) O. et B. Fedtsch*)
	Saussurea	**9 (2)**	**2** *(Saussurea involucrata (Kar. et Kir.) Sch. Bip*., *S.schanginiana* (Wydl.) Fisch. ex Herdz)
	Scorzonera	**3 (1)**	**1** *(Scorzonera purpurea* L.)
	Senecio	**6 (3)**	**3** *(Senecio erucifolius* L., S. *jacobaea* L., S. *nemorensis* L.)
	Serratula	**4 (2)**	**2** *(Serratula algida* Iljin, *S. coronata* L.)
	Solidago	**2**	**2***(Solidago dahurica* Kitag., S. *virgaurea L.)*
	Sonchus	**3**	**3** *(Sonchus arvensis* L. S. *asper* (L.) Hill. S. *oleraceus* L.)
	Stizolophus	**1**	**1** *(Stizolophus balsamita (Lam.) Cass. ex Takht. (=Centaurea balsamita))*
	Tanacetum	**3 (2)**	**2** (*Tanacetum boreale* Fisch. ex DC, T. *vulgare* L.*)*
	Taraxacum	**1**	**1**(*Taraxacum officinale* Wigg.)
	Tripleurospermum	**1**	**1***(Tripleurospermum perforatum (Merat) M.Lainz)*
	Tussilago	**1**	**1** *(Tussilago farfara* L.)

Source: Grudzinskaya L.M., Gemejiyeva N.G., Annotirovannyy spisok lekarstvennykh rasteniy Kazakhstana: Spravochnoye izdaniye (Annotated list of medicinal plants of Kazakhstan: Reference edition), Almaty, 2014

Only those plant species appear on the medicinal plants list, for which confirmed published data is available with regard to the classes of biologically [6, 12] active substances and, first of all, regarding their therapeutic action.

CONCLUSIONS

The main research of medicinal plants in Kazakhstan was carried out in 80-90 years of the last century, when they covered the largest number of species. In recent years, the work to determine the reserves of medicinal plants in Kazakhstan again intensified.

Among 1406 species of medicinal plants in Kazakhstan [6, 12], only 230 species are actually used in official medicine. The types of official medicine are primarily pharmacopoeial species that were included in the State Pharmacopoeia of different years of publication - 124 species, and also-in the state Pharmacopoeia of Kazakhstan, where today there are only 29 species.

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