

Ydyrys A., Mukhitdinov N.M.,  
Ametov A.A., Abidkulova K.T.,  
Akhmetova A.B., Tynybekov B.M.

Al-Farabi Kazakh National University,  
Kazakhstan, Almaty

**Assessment species communities  
of population rare, endemic  
and medical plant *Ferula iliensis*  
Krasn. ex Korov. on the left bank  
of the Ili River Almaty region**

Ыдырыс Ә., Мухитдинов Н.М.,  
Әметов Ә.Ә., Абидкулова К.Т.,  
Ахметова А.Б., Тыныбеков Б.М.

Әл-Фараби атындағы Қазақ ұлттық  
университеті, Қазақстан, Алматы қ.

**Алматы облысы Іле өзенінің  
сол жағалауындағы сирек  
кездесетін, эндемдік және  
дәрілік *Ferula iliensis*  
Krasn. ex Korov өсімдігі  
популяциясы кездесетін  
өсімдіктер қауымдарын  
бағалау**

Ыдырыс А., Мухитдинов Н.М.,  
Аметов А.А., Абидкулова К.Т.,  
Ахметова А.Б., Тыныбеков Б.М.

Казахский национальный университет  
им. аль-Фараби, Казахстан, г. Алматы

**Оценка растительных  
сообществ с участием  
популяций редкого,  
эндемичного и лекарственного  
вида *Ferula iliensis* Krasn. ex  
Korov. на левом берегу реки  
Или Алматинской области**

In the article, the authors to assess and current a complete geobotanical characterization and floristic analysis *Ferula iliensis* communities in conditions of on the left bank of the Ili river. We have been identified the population of 91 species of vascular plants belonging to 72 genus, 24 families. Community floristic composition of the population is classified as follows. Belonging to 1 species of gymnosperms, 90 species of angiosperms, although only 13 species from monocots, 77 species from dicots with common family including Chenopodiaceae Vent. (18 species) and Asteraceae Dumort. (18 species) of these major families contains 36 species or 39,6 % species of this association belong to the upper two families. Out of the total 91 plant species identified, 38 species (41.7%) were therophytes (grasses). Of the total species, 5 (5.5%) species are endemic. According to the economic value of the *Ferula iliensis* communities we have identified 14 groups of useful plants. They note that here the population of this rare, endemic and valuable medicinal plants is not in danger.

**Key words:** *Ferula iliensis*, endemic, medical plant, population, species composition.

Мақалада *Ferula iliensis* Krasn өсімдігінің Алматы облысы Іле өзенінің сол жағалауында орналасқан популяциясы кездесетін өсімдіктер қауымына толық геоботаникалық сипаттама беріліп, флоралық құрамына талдау жасалынған. Зерттелген популяция кездесетін өсімдіктер қауымы көлемінде тамырлы өсімдіктердің 24 тұқымдас, 72 туысқа бірігетін 91 түрін анықтадық. Өсімдіктер қауымының флоралық құрамы төмендегідей жіктеледі. Жалаңаш тұқымдылардан жалғыз түр болды. Қалған 90 түр жабық тұқымды, олардың 77 түрі қосжарнақтылар классына, 13 түрі даражарнақтылар классына жатады. Жетекші тұқымдастар Chenopodiaceae Vent. және Asteraceae Dumort., бұл аумақта олардың әрқайсысынан 18 түрден бар, бұл дегеніміз өсімдіктер қауымы флорасының 39,6%-ын құрайды деген сөз. Тіршілік формаларынан қысқа мерзімдік даму цикліне ие терофиттер, бір және екіжылдық өсімдіктер – 38 түр (41,7%). Ал эндемдік түрлерден бес түр өседі. Шаруашылық маңызына қарай Іле сасырының популяциясы кездесетін өсімдіктер қауымын 14 пайдалы өсімдіктер тобына топтастыруға болады. Осы сирек кездесетін, эндемдік және құнды дәрілік өсімдіктің популяциясына және популяция кездесетін өсімдіктер қауымына төніп тұрған қауіп жоқ. Табиғи жолмен оның қалпына келуі қалыпты жағдайда жүріп жатыр.

**Түйін сөздер:** *Ferula iliensis*, популяция, дәрілік өсімдіктер, эндемдік, түрлік құрам.

В статье дается геоботаническая характеристика растительных сообществ с участием *Ferula iliensis* и флористический анализ сообществ с участием *Ferula iliensis* на левом берегу реки Или Алматинской области. В пределах изученных сообществ популяции нами были собраны и определены 91 вид цветковых растений, относящихся к 72 родам и 24 семействам. Голосеменные были представлены одним видом. Покрытосеменные были представлены 90 видами, из них 77 видов относились к классу однодольных. Ведущими семействами являются Chenopodiaceae Vent. и Asteraceae Dumort. В каждом из них имеется по 18 видов, что вместе взятое составляет 39,6% флоры. Из жизненных форм преобладали терофиты, т.е. одно- и двулетние растения с коротким циклом развития – 38 (41,7%). Их особенно много из семейств Chenopodiaceae и Brassicaceae, по 7 видов в каждом. Эндемичных видов пять. По хозяйственному значению во флоре изученных сообществ нами выделены 14 групп полезных растений. Отмечается, что здесь популяции этого редкого, эндемичного и ценного лекарственного растения ничего не угрожает. Возобновление *Ferula iliensis* идет вполне нормально.

**Ключевые слова:** *Ferula iliensis*, популяция, лекарственные растения, эндем, видовой состав.

**ASSESSMENT SPECIES  
COMMUNITIES OF  
POPULATION RARE,  
ENDEMIC AND MEDICAL  
PLANT *FERULA ILIENSIS*  
KRASN. EX KOROV.  
ON THE LEFT BANK OF  
THE ILI RIVER ALMATY  
REGION****Introduction**

At that time, the problem of save and protection of relict, endemic and rare species, got now relevance [1]. For preservation of species of the plants, which condition in the nature causes serious fear and the accounting of all species of the plants needing protection in necessary for rational use of vegetable resources [2]. Especially in the case of medicines, rare and endemic species. *Ferula iliensis* Krash.ex.Korov – a plant widely has been used in ancient medicine of location Kazakh medicine, which called Ilan or Ile sasyry – taken medicine used treat colds, headaches, if you feel unwell, sciatica, and in the treatment of eczema, rashes, venous ulcers, non-healing wounds. Decoction of the roots is used, ointments and extracts prepared from the resin. About this plant written in the own book «Shipagerlik Bayan» by Kazakh famous healer Oteyboydaq Tilewqabiluly, that is called Sasyr [3]. There are many buyers folded up to the present day, it is illegal. Day by day, so their natural resources are reduced to a minimum amount. For this reason we have to find out the status of natural populations of this research work has been carried out.

It must be mentioned that umbelliferone derivatives have also been isolated previously from giant fennels of the *Pachycarpa* group, of which *Ferula iliensis* is also a representative. The comminuted plant roots were extracted with acetone and the concentrated acetone extract was chromatographed on alumina in the petroleum ether-ethyl acetate system with increasing concentrations of the latter. On the basis of characteristics of their UV, IR, and PMR spectra and the absence of depressions of the melting points with authentic samples, substance was identified as conferone, as conferol, as samarkandin, and as feterin [4]. In addition to the conferral, conferone, samarkandin, feterin, and moschatol isolated previously, from an acetone extract of the roots of *Ferula iliensis* Krasn. ex Korov. Ferrules are some of the useful plants to humans, used since ancient times as food, medicines, essential-oil and food. *Ferula iliensis* gum used in folk medicine for all kinds of colds and headaches. These resins have been described by the classics of medieval science Avicenna and Biruni. They were used as a styptic, tonic and stimulant for the treatment of respiratory diseases, rheumatism, dia-

thesis, lymphadenitis, gastritis and hysteria. Some of these resins are the official therapeutic agents in India, Pakistan, Iran, the USA, Sweden, Germany, and Portugal. Now the interest in medicinal properties of *Ferula* is revived on a new basis. Deciphering the chemical nature of resins showed that their medicinal value due to the presence of biologically active compounds belonging mainly to the terpenoids [5]. Cryopreservation is the only technique ensuring the safe and cost-effective long-term conservation of a wide range of plant species. Slow growth storage is routinely used in many laboratories for medium-term conservation of numerous plant species. Significant progress has been made for conserving endangered, rare, medicinal species. Seed survival after storage in liquid nitrogen ( $-196^{\circ}\text{C}$ ) was examined in endangered medicinal plant *Ferula iliensis* grown in Kazakhstan [6, 7]. A comparison of the anatomical structure of the *F. iliensis* blades of different ages and of different populations showed they had a strong resemblance. The planar polarity of the blade multilayer of palisade mesophyll is characteristic for all plants [8].

The purpose of the study – the primary goal of research was to study and assess the population of rare, endemic and medical *Ferula iliensis* on the left bank of the Ili River, Almaty region, as listed in the Red Book of the Republic of Kazakhstan, noting their cenopopulation's characteristics such as the community floristic composition of the cenopopulations and useful, economic, endemic species.

### Materials and Methods

*Ferula iliensis* Krasn. ex Korov – a rare, narrowly endemic, medical and Red Data Book species of flora in Kazakhstan. The stem is thick, chunky, branched, and hemispherical. The leaves are soft, early withering, both sides their plates about 30 cm long, with large 5 cm and 3 cm wide end portions. Umbrellas are twofold: the central large, sessile, lateral on long stalks, flowers, and petals pale yellow. Fruits obovate, 12-14 mm and 6-8 mm width, with protruding ribs. Monocarpic perennial plant about 1 m tall. In addition, it is resiniferous and valuable medicinal plants. For centuries the roots of *Ferula iliensis* widely used in folk medicine. As medical raw material, the plant is its underground part, its habitat and stocks are sharply reduced from year to year, as the annual harvesting roots *Ferula iliensis* as raw materials leads to the destruction of the plant. This is the main reason for the sharp reduction in the area of natural populations *Ferula iliensis* [9].

Ecological isolation of population is defined by environment factors (climatic, etc.). Distinguish the following populations at plants – climatic, endemic of this region *Ferula iliensis* by the resolution of the Government of the Republic of Kazakhstan of 21.06.2007 No. 521 are included in the list of objects of environmental protection having important ecological, scientific and cultural value [10].

The study of the rare species in the plant community begins with the geographical location, date, description, and author. Then, the main parameters are set phytocenotical and ecological characteristics of the habitat.

For the study of the age structure in each of the sites investigated were laid longitudinal transects. Transects at 10-20 m, depending on the topography of the site, laying the user site area of 4 square meters (only 60 sites). At each site carried a record of all individuals of a given species with a distribution by age conditions. Population density was estimated as the number of individuals of a given species to 4 meters.

Studied population of *Ferula iliensis* was conducted by route-reconnaissance method using GPS-navigation. Geobotanical description performed by conventional methods [11]. The isolation and characterization of age states use the procedural provisions that are in the works T.A. Rabotnov [12], A.A. Uranov [13].

### Results and Discussion

**The population** was found and described in the east-north of mountains of Ulken Qalqan, which are one of the southern spurs of the river Ile, in the Park «Alten-Emel». High level sea 494 m. In this population we allocated three vegetable associations (coenopopulations 1,2,3) with *Ferula iliensis* participation.

**The first association** *Artemisia terrae-albae* – *Salsola arbuscula*, *Salsola orientalis* – *Ferula iliensis* occupied hollow wide gorge. Valley from the north and south surrounding a small parallel ridges. The relief was a gently sloping plain. The soil was light brown slightly gravelly. Atmospheric moistening. Projective cover is 60-65%. Vegetation of river Ili has the highest productivity and its plant composition is the richer. Only in the first coenopopulations meet 45 species of vascular plants. The main plants of first association are the following: *Ferula iliensis*, *Artemisia terrae-albae*, *Salsola orientalis* and *Salsola arbuscula*. In the flora meeting other Shrub/sapling next species: *Nanophyton erinaceum*, *Artrophytum iliensis*, *Anabasis salsa* (C.A.Mey)

Benth., *Ephedra distachya* L., *Krascheninnikovia ceratoides*, *Kochia prostrata*. At semi-shrubs there growing *Calligonum aphyllum*. Here, have been ephemeral and ephemerides plants are summer-rather than spring-flowering.

We identified characteristic five layers in the floristic composition. The highest layer, formed by shrubs (*Haloxylon aphyllum*) 200 to 230 cm in height, the second layer approximately 180 cm in height, formed by semi-shrubs (*Calligonum aphyllum*), the third layer, 80-100 cm in height, formed by high herbs (*Ferula iliensis*, *Salsola arbuscula*), the fourth layer, formed by perennials (*Krascheninnikovia ceratoides*, *Ephedra distachya*) 40-60 cm in height, the fifth layer, 10-25 cm in height, formed by biannuals and annuals (*Anabasis salsa*, *Salsola orientalis*, *Kochia prostrata*, *Artemisia terrae-albae*).

**The second association** *Salsola arbuscula*, *Salsola orientalis* – *Artemisia terrae-alba* – *Ferula iliensis* occupies the second cenopopulation whichever greater area. The communities of *ferula*, with a cover of about 50-55% are usually normal dense. The relief was introduced gently sloping plain. In the second coenopopulations we found 84 species of vascular plants. The following plants of second association can be mentioned: *Salsola arbuscula*, *Salsola orientalis*, *Ferula iliensis*, *Artemisia terrae-albae*. But also the vegetation of clay deserts is mainly formed by shrubs, semi-shrubs and herbs; *Calligonum aphyllum*, *Ephedra distachya*, *Nanophyton erinaceum*, *Krascheninnikovia ceratoides* and *Kochia prostrata*. There are growing weeds *Acroptilon repens* (L.) DC., *Peganum harmala* L., *Orobancha kelleri* Novopokr., *Prangos didyma*.

We recommend in this cenopopulation the use of the following height classes each stratum, if they are appropriate, because they can make the process less subjective. The association consists of five layers the same first cenopopulation. The high layer is about 230 cm, composed of shrubs (*Haloxylon aphyllum*), the second layer could include any plants taller than 80 cm (In shorter semi-shrubs and taller herbs, this might be lowered to 1 or 2 m. as appropriate). For example, *Ferula iliensis*, *Ferula schtschurowskiana* Regel & Schmalh., *Schumannia karelinii* (Bunge) Korovin. The perennials layer could then established at between 50 cm to 70 cm. (*Prangos didyma*, *Peganum harmala*, *Acroptilon repens*). The fourth layer include any biannuals and annuals plants less than 40 cm tall (*Anabasis salsa*, *Artemisia terrae-albae*, *Jurinea semenowii* (Herd.)

C.Winkl.). The fifth layer refers ground – appressed, low carpet, less than 10-15 cm high (*Carex physoides* M.B., *Senecio dubius* Ledeb., *Senecio noeanus* Rupr., *Allium pallasii* Murr.) and include ephemeral and ephemeroids.

**The third association** *Artemisia terrae-albae* – *Nanophyton erinaceum* – *Artrophytum iliensis*. Thus, in the area occupied by the cenopopulation of *Ferula iliensis*, in total we had collected and identified herbarium of 35 species. Because there be of the national park at that time there had been minimal farming, cattle grazing and the vegetation had suffered minimal disturbance. Perennial vegetation (*Artemisia terrae-albae*, *Artrophytum iliensis*, *Nanophyton erinaceum*) along a major wash covered 55-60% of the ground, whereas nearby desert pavement and sandy-gravel flats supported less than 20% perennial plants cover.

Analysis of the vertical structure of the vegetation at the boundary of river and semi-desert showed that in the contact zone significant changes occur in the number of layers and high of plants. At the cenopopulation edge five layers can be distinguished; *Haloxylon aphyllum* reaches dominance, formed the highest vegetation layer (200 cm), second layer *Ferula iliensis* reaching a high of 75 cm, individuals of *Artemisia terrae-albae* which reached, at the desert meadow boundary 30-35 cm. *Artrophytum iliensis* and *Nanophyton erinaceum* from the third layer, 10-20 cm high, attain in the association barely 5-10 cm, and from, beside *Erodium oxyrrhynchum*, *Roemeria hybrida* (L.) DC., *Eremopyrum orientale* and other plants, the lowest herb layer.

Population of *Ferula iliensis* in the Park Altyn Emel. The length of the 12 km, a width of 300 to 500 m. We have been identified the population of 91 species of vascular plants belonging to 72 genus, 24 families (Table 1). Community floristic composition of the population is classified as follows. Belonging to 1 species of gymnosperms, 90 species of angiosperms, although only 13 species from monocots, 77 species from dicots with common family including *Chenopodiaceae* Vent. (18 species) and *Asteraceae* Dumort. (18 species) of these major families contains 36 species or 39, 6 % species of this association belong to the upper two families. *Poaceae* Barnhart, *Brassicaceae* Burnett and *Boraginaceae* Juss were found to be the dominant families in the population community represented by 8 (8.6%) species 7 (7.6%) species and 7 (7.6%) respectively (Table 1). 19 families were represented by less than three species and contributed about 33 (36,3%) of the total species (Fig 2).



**Table 1** – Community floristic composition of the cenopopulations *Ferula iliensis*

№	Name Plants	Cenopoulation		
		1	2	3
<b>Division. Gymnospermatophyta -</b>				
Phylum <i>Ephedrales</i> – Эфедровые				
<b>Class Gnetopsida</b>				
I	Family. <i>Ephedraceae</i> Dumort.			
1	<i>Ephedra distachya</i> L.	+	+	+
<b>Division. Angiospermatophyta</b>				
<b>Class Monocotyledoneae</b>				
II	Family. <i>Poaceae</i> Barnhart			
2	<i>Aeluropus intermedins</i> Regel	+	-	+
3	<i>Acroptilon repens</i> (L.) DC.	+	+	-
4	<i>Anisantha tectorum</i> (L.) Nevski (= <i>Bromus testorum</i> L.)	+	+	-
5	<i>Eremopyrum orientale</i> (L.) Jacub. et Spach.	+	+	+
6	<i>Eremopyrum triticeum</i> (Gaerth.) Nevski	+	-	+
7	<i>Poa bulbosa</i> L.	+	+	+
8	<i>Stipa orientalis</i> Trin.	-	+	-
9	<i>Stipa richterana</i> Kar. et Kir.	-	+	+
III	Family. <i>Cyperaceae</i> Juss.			
10	<i>Carex physoides</i> M.B.	+	+	+
IV	Family. <i>Liliaceae</i> Juss.			
11	<i>Rhinopetalum karelinii</i> Fisch. ex Alexander	+	-	+
V	Family. <i>Asphodelaceae</i> Juss.			
12	<i>Eremurus cristatum</i> Vved.	-	+	-
VI	Family. <i>Alliaceae</i>			
13	<i>Allium pallasii</i> Murr.	+	+	+
14	<i>Allium praescissum</i> Reichenb.	+	+	+
<b>Class Dicotyledoneae</b>				
VII	Family. <i>Polygonaceae</i> Lindl.			
15	<i>Atraphaxis virgata</i> (Regel) Krasn.	+	+	-
16	<i>Calligonum aphyllum</i> (Pall.) Guerke	+	+	+
17	<i>Calligonum leucocladum</i> (Schrenk) Bunge	+	+	+
18	<i>Polygonum corrigioloies</i> Jaub.	+	-	+
VIII	Family. <i>Chenopodiaceae</i> Vent.			
19	<i>Anabasis salsa</i> (C.A.Mey) Benth.	+	+	+
20	<i>Artrophytum iliensis</i> Iljin	+	+	+
21	<i>Ceratocarpus utriculosus</i> Bluk.	+	-	+
22	<i>Chenopodium acuminatum</i> Wild.	-	-	+
23	<i>Chenopodium chenopodioides</i> (L.) Aellen	-	+	+
24	<i>Corispermum lehmannianum</i> Bunge	+	+	+
25	<i>Haloxylon aphyllum</i> (Minkw.) Iljin	+	+	+
26	<i>Kalidium foliatum</i> (Pall.) Mog.	+	+	+
27	<i>Kochia iranica</i> (Hauskn. et Bornm.) Litw.	+	-	+

Continued table 1

№	Name Plants	Cenopoulation		
		1	2	3
28	<i>Kochia prostrata</i> (L.) Schrad.	+	+	+
29	<i>Krascheninnikovia ceratoides</i> (L.) Gueldenst.	+	+	+
30	<i>Londesia eriantha</i> Fisch. et Mey.	+	-	-
31	<i>Nanophyton erinaceum</i> (Pall.)Bunge	+	-	+
32	<i>Salsola arbuscula</i> Pall.	-	-	+
33	<i>Salsola dshungarica</i> Iljin.	+	+	+
34	<i>Salsola foliosa</i> (L.) Schrad.	+	+	+
35	<i>Salsola orientalis</i> S.G.Gmel.	+	-	+
36	<i>Salsola pestifera</i> A.Nelson.	+	+	+
IX	Family. <i>Caryophyllaceae</i> Juss.			
37	<i>Cerastium inflatum</i> Link.	+	+	-
38	<i>Holosteum polygamum</i> C.Koch.	+	+	-
X	Family. <i>Ranunculaceae</i> Juss			
39	<i>Ceratocephalus testiculata</i> (Grantz) Bess. (= <i>C. orthoceras</i> DC.)	-	+	+
XI	Family. <i>Papaveraceae</i> Juss			
40	<i>Hypecoum parviflorum</i> Kar. et Kir.	+	+	+
41	<i>Roemeria hybrida</i> (L.) DC.	-	+	-
XII	Family. <i>Brassicaceae</i> Burnett			
42	<i>Alissum desertorum</i> Stapf	+	+	+
43	<i>Isatis minima</i> Bunge	+	+	+
44	<i>Leptaleum filifolium</i> (Willd.) DC.	+	+	-
45	<i>Meniocus linifolius</i> (Steph.) DC.	+	+	+
46	<i>Strigosella scorpioides</i> (Bunge) Botsch. (= <i>Malcolmia scorpioides</i> (Bunge) Boiss.)	-	-	+
47	<i>Tauscheria lasiocarpa</i> Fisch. ex DC.	+	-	-
48	<i>Torularia brevipes</i> (Kar. & Kir.) O.E. Schulz	-	-	+
XIII	Family. <i>Rosaceae</i> Juss.			
49	<i>Potentilla orientalis</i> Juz.	-	-	+
50	<i>Astragalus bakaliensis</i> Bunge	+	+	+
51	<i>Astragalus harpilobus</i> Kar. Et Kir.	+	+	+
52	<i>Astragalus scabrisetus</i> Bong.	+	+	-
53	<i>Trigonella arcuata</i> C.A.Mey	+	+	+
XIV	Family. <i>Geraniaceae</i> Juss.			
54	<i>Erodium oxyrhynchum</i> M.Bieb.	+	+	+
XV	Family. <i>Nitrariaceae</i> Bercht.& J.Presl.			
55	<i>Nitraria schoberi</i> L.	+	-	+
XVI	Family. <i>Peganaceae</i> (Engl.) Tiegh. ex Takht.			
56	<i>Peganum harmala</i> L.	-	+	-
XVII	Family. <i>Malvaceae</i> Juss.			
57	<i>Ferula iliensis</i> Krasn. et Korov.	+	+	+
58	<i>Ferula karelinii</i> Bunge	+	+	-

Continued table 1

№	Name Plants	Cenopoulation		
		1	2	3
59	<i>Prangos didyma</i> Regel M.Pimen. et V.Tichomirov (= <i>Cryptodiscus didymus</i> (Regel) Korov.).	+	-	-
XVIII	Family. <i>Boraginaceae</i> Juss.			
60	<i>Arnebia decumbens</i> (Vent.) Coss. et Kral.	+	-	+
61	<i>Heliotropium acutiflorum</i> Kar. & Kir.	+	+	+
62	<i>Heliotropium parvulum</i> M.Pop.	-	-	+
63	<i>Heliotropium dasycarpum</i> Ledeb.	-	+	+
64	<i>Lappula microcarpa</i> (Ledeb.) Gurke.	+	+	-
65	<i>Nonnea caspica</i> (Willd.) G.Don.	+	-	-
66	<i>Onosma dichroanthum</i> Boiss.	+	+	+
XIX	Family. <i>Lamiaceae</i> Lindl.			
67	<i>Chamaesphacos ilicifolius</i> Schrenk	+	-	+
68	<i>Eremostachys molucelloides</i> Bunge	+	+	+
69	<i>Marrubium vulgare</i> L.	+	-	+
XX	Family. <i>Solanaceae</i> Juss.			
70	<i>Hyoscyamus pusillus</i> L.	+	-	+
XXI	Family. <i>Orobanchaceae</i> Vent.			
71	<i>Cistanche salsa</i> (C.A.Mey) G.Beack.	-	+	+
72	<i>Orobanche kelleri</i> Novopokr.	+	+	+
XXII	Family. <i>Plantaginaceae</i> Juss.			
73	<i>Plantago minuta</i> Pall.	+	+	+
XXIII	Family. <i>Asteraceae</i> Dumort.			
74	<i>Acroptilon repens</i> (L.) DC.	+	+	+
75	<i>Amberboa turanica</i> Iljin.	+	+	+
76	<i>Artemisia schrenkiana</i> Ledeb.	+	+	+
77	<i>Artemisia sublessingiana</i> Krasch. ex Poljak.	+	+	+
78	<i>Artemisia terrae-albae</i> L.	+	+	+
79	<i>Centaurea ruthenica</i> Lam.	-	+	+
80	<i>Galatella fastigiiformis</i> Novopokr.	+	+	+
81	<i>Handelia trichophylla</i> (Schrenk) Heimerl	+	+	+
82	<i>Hyalea pulchella</i> (Ledeb.) K. Koch	-	+	+
83	<i>Jurinea semenowii</i> (Herd.) C.Winkl.	-	+	+
84	<i>Lactuca undulata</i> Ledeb.	+	+	+
85	<i>Microcephala subglobosa</i> (Krasch.) Pobed.	+	-	+
86	<i>Scorzonera pusilla</i> Pall.	+	+	+
87	<i>Scorzonera sericeolanata</i> (Bunge) Krasch. & Lipsch.	+	-	+
88	<i>Senecio dubius</i> Ledeb.	+	+	-
89	<i>Senecio noeanus</i> Rupr.	+	+	+
90	<i>Tragopogon karelinii</i> S. Nikit.	+	+	+
91	<i>Taraxacum officinale</i> F.H. Wigg.	+	+	+

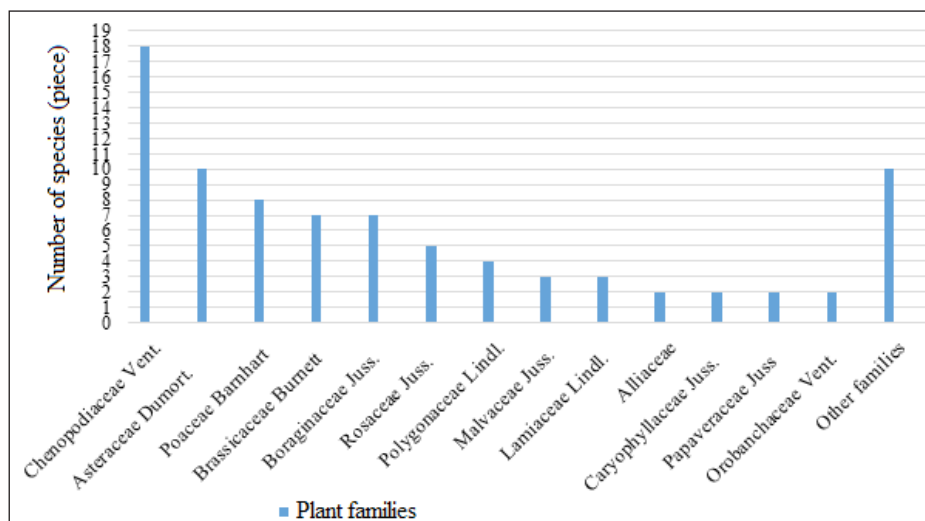


Figure 1 – Community floristic composition of families of the population *Ferula iliensis*

Out of the total 91 plant species identified, 38 species (41.7%) were therophytes (grasses), 30 species (33%) were hemicryptophytes, 9 species (9.9%) were shrubs and semi-shrubs, 1 species were macro shrubs – *Haloxylon aphylla*.

Of the total species, 5 (5.5%) species *Ferula iliensis*, *Heliotropium parvulum* M.Pop., *Tragopogon karelinii* S. Nikit., *Microcephala subglobosa* (Krasch.) Pobed., *Artrophytum iliensis* are endemic to Park Altyn Emel. Out of this, 4 species have been registered in the red data list of Kazakhstan qualifying for vulnerable category.

From a total of 91 plants reported for Park Altyn Emel, 52 plants are consumed as food (animal food) these plants include trees, terrestrial herbs, shrubs. Out of this 45 plants are environmental uses (erosion control) species, 15 species weeds, 6 species medicines (folklore), 5 species fuels (biomass for energy generation), 4 species harmful organism host (poisonous plants). 20 plants had been complex value.

## Conclusions

The population of *Ferula iliensis* is one of the National Park Altyn-Emel in region Almaty and is a home for diverse groups of plant species. It consists of 91 species of vascular plants belonging to 72 genera and 24 families. *Chenopodiaceae* Vent. and *Asteraceae* Dumort were found to be the most dominant family followed by *Poaceae* Barnhart, *Brassicaceae* Burnett and *Boraginaceae* Juss. Of the total species, 5 species are endemic to community.

Three plant communities were identified and described with varying degree of species richness, evenness and diversity. Analysis of population structure of the most common species showed that most of species exhibit normal population structure. The reason for this population *Ferula iliensis* of plants can be found up to exit from immature to youth generative [14]. The characteristics of the full life cycle of *F. iliensis* relate it to the monocarps, i.e., plants flowering once at the very end of their life cycle and die after fruiting. *F. iliensis* is in flower and fruit in the 7-9th year of life [15]. The state of the substances abused by members of an underground accumulated a great established, play an important role in the sprouting plants. After this period of 1.5-2 months to plant flowering fruit. Seeds are fully ripe and matured with the fund discharges of nutrients, the plant dries. The next year, the new family of new shoots will appear. Here's how *Ferula iliensis* plant will continue its development cycle.

Population of *Ferula iliensis* now there is no direct threats. The only gathering of this plant as a raw a medicinal plant roots ferule before fruiting uncontrolled population excavated area and range of the species decline, so what is the territory of the national park can not be allowed to collect medicinal raw materials in the case, because the building As we speak *Ferula iliensis* vegetation endemic and loss of the species included in the Red Book. The data compiled in this study highlights the necessity to better understand the role of anthropogenic ecosystems in providing wild medical plant resources. Further research needs to be carried out on the seasonal quantification of their environmental



availability, as well as the location of actual gathering events. Finally, research on transplanting and other management practices would allow us to better comprehend the distribution of the plant in the different ecosystems.

Based on the results of the study, the following recommendations were suggested:

- And this is the basis of medicinal raw materials plant roots. Due to the above reasons, the preparation of raw materials only in the case of artificial plantation. This is based on the scientific work in accordance with the proposal of the grounds agricultural *Ferula iliensis* requires the growth of plants. Because of the limitations and diffusivity of its distribution, its small population and its monocarp characteristics, this valuable species needs increased protection, and work needs to be carried out on its cultivation.

- Further research on regeneration status and soil characteristics of the population.

- Detailed ethno botanical studies are also required to explore the wealth of indigenous knowledge on the diverse uses of plants and their implication in conservation.

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