IRSTI: 34.29.35 https://doi.org/10.26577/eb.2023.v94.i1.04

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DISTRIBUTION AND GEOBOTANICAL STUDIES OF THE MEDICINAL PLANT *CAPPARIS HERBACEA* WILLD. IN THE SOUTHERN REGIONS OF KAZAKHSTAN

Conservation of biodiversity has now become one of the most important issues in the world. Among them, the conservation of medicinal plants requires special protection. Today, medicinal plants are widely used in scientific medicine. Its main purpose is to prepare medicinal preparations on the basis of medicinal plants. Huge territories of Kazakhstan are provided with rich natural diversity. Our country has unique plants, adapted to life in the desert. In addition, the flora is rich in forest and steppe species. In recent years, the country's environmental problems have become more complex. The issue of conservation of medicinal plants is a pressing environmental concern. The pharmaceutical industry in Kazakhstan is still in need of development. Therefore, the development of the pharmaceutical industry has become an urgent issue in the country. Intensive integrated use (highland pastures, hayfields, developed cattle breeding, as well as use as a recreation area) of mountain and foothill territories, has caused significant anthropogenic changes in flora and vegetation in recent years. The relevance of the study, is the study of the medicinal plant Capparis heerbacea Willd. which grows mainly in the deserts, semi-deserts and steppes of Central Asia and Kazakhstan. This species is well adapted to different abiotic conditions and was therefore selected for the present study. The research work was carried out in 2020-2022. Classical botanical methods were used in the work. These include: route surveys, ecological systematics, ecological geography, methods of studying cenopopopulations. As a result of research work communities are characterized by the following data: Populations which are in Turkestan region and grow in disturbed areas, gradually increase the number of their individuals and thereby restore the local flora or form the conditions for the formation of new communities and populations of other species. And in the Kyrgyz Alatau population, the ecological condition is stable, which is shown by the mosaic distribution of the study species. The study showed that C. herbacea can be one of the main dominant species for a particular area or locality and an edificator for some ephemeral or ephemeroid species.

Key words: Capparis herbacea, medicinal plant, biodiversity, seeds, population, ecology, current situation.

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Қазақстанның оңтүстік облыстарында *Capparis herbacea* willd. дәрілік өсімдігінің таралуы және геоботаникалық зерттеулері

қазіргі уақытта биоалуантүрлілікті сақтау әлемдегі ең маңызды мәселелердің біріне айналды. Олардың ішінде дәрілік өсімдіктерді сақтау ерекше қорғауды қажет етеді. Бүгінгі таңда дәрілік өсімдіктер ғылыми медицинада кеңінен қолданылады. Оның негізгі мақсаты дәрілік өсімдіктер негізінде дәрілік препараттарды дайындау болып табылады. Қазақстанның орасан зор аумақтары бай табиғи әртүрлілікпен қамтамасыз етілген. Біздің елде шөлді өмірге бейімделген ерекше өсімдіктер бар. Сонымен қатар, флора орман және дала түрлеріне бай. Соңғы жылдары елдің экологиялық проблемалары күрделене түсті. Дәрілік өсімдіктерді сақтау мәселесі қоршаған ортаны қорғау саласында өзекті болып табылады. Қазақстандағы фармацевтика өнеркәсібі әлі де дамуды қажет етеді. Сондықтан фармацевтика өнеркәсібін дамыту елдегі өзекті мәселеге айналды. Таулы және тау бөктеріндегі аумақтарды қарқынды кешенді пайдалану (биік таулы жайылымдар, шабындық жерлер, дамыған мал шаруашылығы, сондай-ақ демалыс аймағы ретінде пайдалану) соңғы жылдары флора мен өсімдіктердің айтарлықтай антропогендік өзгерістерін тудырды. Зерттеудің өзектілігі негізінен Орта Азия мен Қазақстанның шөлдерінде, жартылай шөлдерінде және далаларында өсетін Capparis herbacea Willd. дәрілік өсімдігін

зерттеу болып табылады. Бұл түр әртүрлі абиотикалық жағдайларға жақсы бейімделген, сондықтан нақты зерттеу нысаны ретінде таңдалды. Зерттеу жұмыстары 2020-2022 жылдары жүргізілді. Жұмыста классикалық ботаникалық әдістер қолданылды. Оларға мыналар жатады: маршруттық зерттеулер, экологиялық систематика, экологиялық география, ценопопуляцияны зерттеу әдістері. Зерттеу жұмыстарының нәтижесінде қауымдастықтар келесі мәліметтермен сипатталады: Түркістан облысында орналасқан және бұзылған аумақтарда өсетін популяциялар біртіндеп өз дараларының санын көбейтіп, сол арқылы жергілікті флораны қалпына келтіреді немесе жаңа қауымдастықтар мен басқа түрлердің популяциясын қалыптастыру үшін жағдай жасайды. Ал Қырғыз Алатауында орналасқан популяцияда зерттелетін түрдің мозаикалық таралуымен көрсетілген экологиялық жағдайы тұрақты. Зерттеу көрсеткендей, C. herbacea белгілі бір аумақ немесе аймақ үшін негізгі доминанттардың бірі және кейбір эфемерлік немесе эфемероидты түрлер үшін эдификатор болуы мүмкін.

Түйін сөздер: Capparis herbacea, дәрілік өсімдік, биоалуантүрлілік, тұқымдар, популяция, экология, қазіргі жағдай.

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Распространение и геоботанические исследования лекарственного растения *Capparis herbacea* willd. в южных областях Казахстана

В настоящее время сохранение биоразнообразия стало одной из самых важных проблем в мире. Среди них особой охраны требует сохранение лекарственных растений. Сегодня лекарственные растения широко используются в научной медицине. Ее основной целью является приготовление лекарственных препаратов на основе лекарственных растений. Огромные территории Казахстана обеспечены богатым природным разнообразием. В нашей стране есть уникальные растения, приспособленные к жизни в пустыне. Кроме того, флора богата лесными и степными видами. В последние годы экологические проблемы страны усложнились. Вопрос сохранения лекарственных растений является актуальным в области охраны окружающей среды. Фармацевтическая промышленность в Казахстане все еще нуждается в развитии. Поэтому развитие фармацевтической промышленности стало актуальным вопросом в стране. Интенсивное комплексное использование (высокогорные пастбища, сенокосные угодья, развитое животноводство, а также использование в качестве зоны отдыха) горных и предгорных территории, обусловило за последние годы значительные антропогенные изменения флоры и растительности. Актуальностью исследования, является изучение лекарственного растения Capparis herbacea Willd., который произрастает главным образом в пустынях, полупустынях и степях Средней Азии и Казахстана. Этот вид хорошо адаптирован к различным абиотическим условиям и поэтому был выбран объектом настоящего исследования. Исследовательская работа проводилась в 2020-2022 годах. В работе использовались классические ботанические методы. К ним относятся: маршрутные исследования, экологическая систематика, экологическая география, методы изучения ценопопуляций. В результате исследовательской работы сообществ характеризуется следующими данными: Популяции которые находится в Туркестанской области и произрастают на нарушенных территориях, постепенно увеличивают число своих особей и тем самым востанавливают местную флору или образуют условия для обрзования новых сообществ и популяции других видов. А в популяции расположенной в Киргизском Алатау, экологическое состояние стабильное, которое показана мазаичным расприделением исследуемого вида. Исследование показало, что C. herbacea может быть одним из основных доминантов для определенной территории или местности и эдификатором для некоторых эфемерных или эфемероидных видов.

Ключевые слова: Capparis herbacea, лекарственное растение, биоразнообразие, семена, популяция, экология, текущая ситуация.

Introduction

Currently, the conservation of biodiversity has become one of the most important problems in the world. Among them, the preservation of medicinal plants requires special protection. Today medicinal plants are widely used in scientific medicine. Its main purpose is the preparation of medicinal products based on medicinal plants. The subject of medical practice research is the experience of traditional medicine. That is, medicinal plants that are popular with the people are in demand.

Vast territories of Kazakhstan are provided with rich natural diversity. In our country there are unique plants adapted to life in the desert. In addition, the flora is rich in forest and steppe species. In recent years, the country's environmental problems have become more complicated. The issue of preserving medicinal plants is relevant in the field of environmental protection. The effective use of flora for the needs of socio-economic development of society is a requirement of the market situation [1].

The pharmaceutical industry in Kazakhstan still needs to be developed. The availability of medicines does not exceed 10 percent. Therefore, the development of the pharmaceutical industry has become an urgent issue in the country.

Intensive integrated use (high-altitude pastures, hayfields, developed animal husbandry, as well as use as a recreation area) of mountainous and foothill territories has caused significant anthropogenic changes in flora and vegetation in recent years.

The main types of anthropogenic disturbance of many territories are: man-made mechanical disturbances, pollution by various construction wastes, pasture degradation, road digression, soil erosion and diflation, flooding or, conversely, drainage of soils, as well as unregulated use as a recreation area.

Anthropogenic impact on the vegetation cover inevitably leads to a violation of the stability of indigenous communities, a change in floral composition, the formation of derivative communities.

Currently, there is an intensification of anthropogenic pressure on the territory (development of natural territories, operation of industrial facilities, deforestation, development of new lands for farms, increasing residential and recreational loads, the use of chemicals and pollution by industrial emissions and transport) [2; 3].

The foothill plains of the surveyed territories have long been used for irrigation agriculture and horticulture. With a shortage of water resources, rain-fed cultivation of grain crops is used here. As a result, large oases have emerged with a predominance in the area of vegetable gardens, grain crops, orchards and vineyards. There is practically no natural indigenous vegetation left [4; 5].

The original appearance of the vegetation cover on the cultivated areas of the foothill plains cannot be established even theoretically. At best, we have here only fragments of natural vegetation in the form of steppe areas, remnants of desert vegetation, thickets of shrubs and riverine tugai communities. In place of abandoned agricultural lands, secondary vegetation of deposits and wastelands has formed, which consists of groupings of weeds, mainly segetal and ruderal species. Among the weeds of crops , we will name the following types: *Acroptilon repens, A. australe, Sonchus arvensis, Cirsium setosum, Lactuca tatarica, L. serriola, Malva pusilla, Dodartia orientalis, Artemisia annua, Echinochloa crusgalli, виды Brassica, Sinapis arvensis* et al. In addition, some representatives of the natural flora are able to increase their abundance on the site of destroyed natural vegetation [3].

A striking example of digressive succession with unregulated use on high-altitude pastures can be the formation of rear areas (parking areas) – small (approximately 500 m2) territories covered with a layer of manure up to 10-15 cm. Vegetation in these areas is completely absent not only as a result of prolonged and repeated presence of a large mass of livestock in a relatively small area, but also due to poisoning of the soil surface with animal waste products, mainly nitrates. It is impossible to grow higher vascular plants on thyrls for several years until partial weathering and flushing of substances harmful to life occur.

The relative restoration of natural vegetation at the site of livestock camps occurs over a number of years as a result of the successive stages of ecological succession. Various stages of overgrowth of thyrl can be observed throughout the study area – from pioneer groups of weeds to natural phytocenoses with traces of overgrazing. Depending on the specific ecological and geographical conditions, the set of pioneers of the overgrowth of tyrl may be different [4-6].

The depletion of natural resources has led to environmental problems, such as the depletion of valuable wild plants. The growing areas of medicinal plants have decreased. Monitoring, research and evaluation of medicinal plant populations is an urgent task. In 1992, the Convention on Biological Diversity was adopted in Rio de Janeiro. Today, several levels of organization of living organisms

have been identified, each of which has a special biodiversity [2].

The history of the medicinal properties of medicinal plants goes back to ancient times. In the past, various decoctions and ointments were prepared from plants, which were used for various types of treatment. Hippocrates, who is considered the father of medicine, also used medicinal plants for treatment. Hippocrates gave a scientific description of 230 medicinal plants. In addition, Chinese medicine is based on medicinal plants. Today medicinal plants form the scientific basis of modern official medicine [3].

Kazakhstan's treatment policy is based on the principle of providing citizens with high-quality, effective, safe and affordable medicines. To date, more than 7,000 medicines have been registered in the Register of the Republic of Kazakhstan. Among them, 30% are domestic drugs, the rest are imported. Since the pharmaceutical market depends on imports, at the moment the release of new domestic drugs is a very urgent issue. The study of medicinal plants in our country is a prospect for the development of the pharmaceutical industry.

Currently, the State pays special attention to the conservation of plant biodiversity. The problem of plant protection as an important component of biodiversity is given great attention at different levels. The conceptual directions of solving the problem are set out in international documents:

- Creation of a system of criteria for the inventory of rare species, their identification and determination of the level of protection;
- Population and monitoring studies, as well as the use of generally accepted methods of working with rare and endangered plant species during in vitro cultivation;
- Study of biological features of rare species and mechanisms of influence of limiting factors on them;
- Development of biological principles and methods of conservation of rare species;
- organization of monitoring;
- Creation of a single database [4].

Research at the population level plays a special role in the protection of rare and endangered plant species. Coenopopulation is a special life form of plant species with a known functional structure and complex composition [5]. Currently, the threat to the gene pool of rare endemic and endangered species is primarily posed by anthropogenic environmental changes and habitat fragmentation, population decline and isolation [6].

Relevance of the study: The medicinal plant Sarragis herbacea Wild., capers, family Sarragaceae) grows mainly in deserts, semi-deserts and steppes of Central Asia. This species is well adapted to various abiotic conditions (drought, salinization, temperature changes and other environmental factors) and therefore was chosen as the object of this study.

The growing conditions of this plant are unique in nature, such as drought resistance, resistance to high temperatures and the ability to grow even in rocky places. Among many promising medicinal plants, we chose Capparis herbacea, a plant rich in biologically active substances. *Capparis herbacea* has not been systematically studied in Kazakhstan. Therefore, the purpose of our work is to study the phytochemical composition and biological activity of the plant, as well as the study of new medicines, the biological activity of phytopreparations or herbal medicines. This species grows and blooms in arid regions during the summer. It does not compete with other species for water in the Mediterranean basin. The plant does not compete with other species for water in the Mediterranean basin. This requires a semi-arid climate with an average annual temperature above 14 °C and an average annual precipitation of at least 200 mm [7]. It is adapted to arid regions, therefore, it tolerates water shocks without any symptoms and withstands strong winds and temperatures above 40 ° C in the dry Mediterranean summer [8; 9]. In addition, the stems of capers are well stored in winter; but during the growing season, frost can destroy them. It is usually grown at low altitudes, but some plants are found even at an altitude of 1000 meters above sea level [10]. This plant has a powerful root system associated with nitrogen-fixing bacteria, which allows it to grow in poor soil [11; 12].

Materials and methods of research

The object of our research is the medicinal plant *Capparis herbacea*. *C. herbacea* is the only species of the Capparidaceae family native to Kazakhstan. It is a deciduous perennial herbaceous aromatic plant that grows wild in arid areas. It is sometimes called "wild watermelon" and "wild onion". It grows in groups in rocky, desert areas. In addition, the branches are curved or straight, with simple spikes. And the leaves are rounded or oval, oblong, elliptical, with a blunt base. The structure of the leaves is bare, very dense, the length can reach 30-50 mm. The stem is hollow or whole, its height reaches 4-6 meters. One of the

characteristic features of *C. herbacea* is the presence of thorns. Therefore, it is popularly called "prickly caper". Its leaves are arranged alternately. And the flowers bloom from May to the end of August. The roots are thick, hard, up to 12 m long. The flower has many stamens. Stamens are numerous, with filaments up to 5 cm long. The length of the gynophore is 3-6 mm. The fruits are elliptical, oval or oblong, fragrant. The seeds are large, also brown in color (figure 1). Unlike other plants, they can regulate water metabolism, so they remain active during a prolonged drought. This group of plants is heterogeneous in terms of resistance to extreme growing conditions. For example, some xerophytes shed their leaves and stop growing, some tolerate drought due to a short growing season, etc. [14; 15].

Figure 1 – Flowers, fruits, seeds of the medicinal plant *Capparis herbacea* Willd

The research work was carried out in 2020-2022. Classical botanical methods were used in the work. These include: route studies, ecological systematics, ecological geography, methods of studying cenopopulations.

In the course of the study, herbariums were collected to clearly define the floral community. In total, about 80 herbarium sheets were collected and processed. In addition, the herbarium material of the collection funds of the Institute of Botany and Phytointroduction (AA) was studied during the work. Herbarium collection was carried out according to the method of A.K. Skvortsov (1977). To determine the collected material, the main conclusions were used: "Flora of Kazakhstan" (1960), "Illustrated Handbook of Plants of Kazakhstan" (1969), "Handbook of Plants of Central Asia" (1972), etc. The plant species were listed according to the reports of Cherepanov (1995). The study of plants was carried out by traditional methods of field geobotanical research. The area of the standard plot: in the steppes and deserts is 15x15 sq. m and every 1 sq. m. Species determination was carried out on the basis of primary data. The study determined the timing of the development of the phenological period, as well as the appearance of leaves, flowering time, fruit appearance, leaf fall and the duration of the growing season of the studied plant Capparis herbacea [13-18].

The expedition took place on the territory of Zhambyl region and Turkestan region. The research was carried out using maps of the territory, as well as using a GPS navigator (GPS ETREX 20, Garmin). All identified plant growth points were recorded and thoroughly studied, geobotanical test areas were laid. All identified plant growth points were recorded and thoroughly studied, as well as geobotanical test areas were laid.

Results and discussion

Analysis of the geographical distribution of *C. herbacea*

Sarragis spinosa grows naturally from the Atlantic coast of the Canary Islands and Morocco to the Black Sea, in Crimea and Armenia, and to

the eastern side of the Caspian Sea and Iran. It is common in North Africa, Europe, West Asia, Afghanistan and Australia. The plant may have originated in the tropics and then spread to the Mediterranean basin and Central Asia. Different subspecies and varieties have specific geographical distributions. *C. herbacea* is widespread in Southern Europe, North Africa, including the Sahara, the Arabian Peninsula and the Middle East to China. Rupestris is widely distributed in France, Italy, Spain, Slovenia, Malta, Croatia and Albania, as well as in Turkey, Greece, Algeria, Libya and Tunisia. The Mediterranean regions may be seriously affected by global warming, which will lead to extensive consequences for agroecosystems and crop production. Particular attention should be paid to plants adapted to arid conditions for use in agricultural systems under the current climate change scenario [19].

Mediterranean regions could be severely affected by global warming, with extensive consequences for agro-ecosystems and crop production. Special attention should be given to plants adapted to drought conditions for use in agricultural systems under the current climate change scenario.

Despite the fact that *C. herbacea* is quite widespread, according to many researchers, this species does not spread evenly across the territory of Kazakhstan. It is found in 6. Caspian; 9. Turgay; 10a. Ulytau; 13. Northern Ust-Tark; 16. Betpakdalinsky; 17. Muyunkumsky; 18. Balkhash-Alakolsky; 19. Yuzhno Ust-Tursky; 21. Turkestan; 24. Dzungarian Alatau; 25. Trans-Ili Kungei Alatau; 27. Kirghiz Alatau; 28. Karatau; 29. Western Tien Shan floristic districts (figure 2) [15;16].

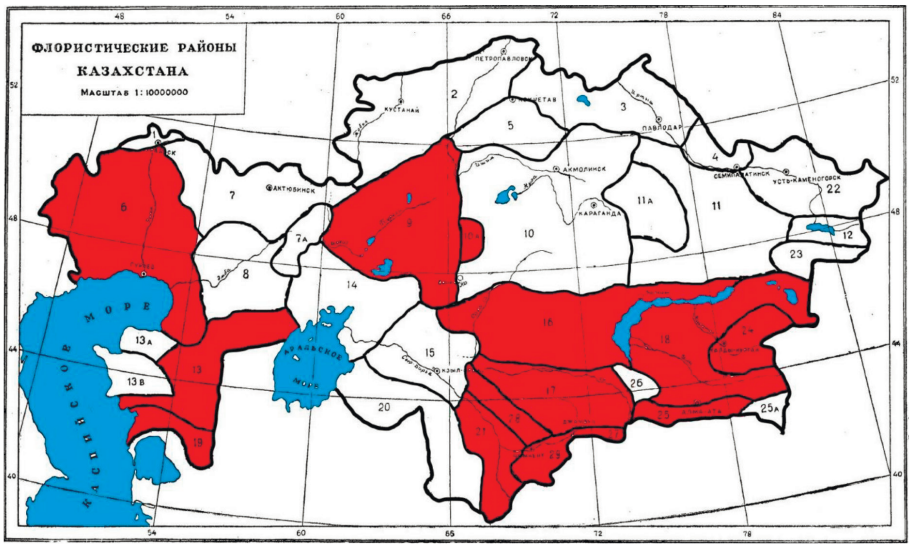

Figure 2 – Distribution *C. herbacea* within Kazakhstan

As we can see from the illustrations shown above, *C. herbacea* is distributed unevenly across the floristic regions of Kazakhstan, and is scattered in the steppe and desert zones, and extends into zones with a high-altitude belt. But the fact that we see in the previous figure is confusing, as no species has been noted in the Chu-Ili Mountains, and this species is found all around it. There are also a lot of questions about the distribution of this species, but it requires a lot of time and resources to perform work on a worldwide scale.

Analysis of expedition work

As a result of the expedition work in the territory of the Turkestan region, 5 points of growth and dominance of the species *Capparis herbacea* were noted. Descriptions of communities are given for all points, some communities have practically no species composition and are limited to several species. This is due to the fact that the studied species is well adapted to growing even in disturbed habitats, as after a rush of land, on deposits.

A B

Figure 3 – Points of communities described in the Turkestan region

A – general map; B – map of points 1-4
Description No. 1
The name of the association: grass-cornflower with the participation of capers
Geographical location: Turkestan region, Tulkibas district, Mashat rural district.
Coordinates: N42º 29’35.00” E69º 56’54.50” h-658 m.
The general nature of the relief: foothill counters, slope (slope 10-15°).
The position of the association site in relief: south-eastern slope, near the highway, between cultivated crops.
Microrelief: undulating plain.
Other features: moderate anthropogenic impact, near the road, the herbal composition is moderately slightly disturbed. The soil is clay. Weeds.
The size of the trial area: 15x15 m
Canopy closeness: 0
Structure of the tier: – *C. herbacea*

Table 1 – Characteristics of the rocks that make up the shrub layer

№	Name of breeds	Abundance	Height, m		Phenophase	Life form
			Average	Max.		
1	*C. herbacea*	Sp	0,5	0,7	C	Shrub

Characteristics of the grass tier
Sample area size: 15x15
Total projective coverage: 50-60% (70)
Aspect (appearance, physiognomy of the association): Mixed

Table 2 – Characteristics of the plants that make up the herbaceous tier

№	Name of plants	Abundance	Height, cm	Coverage, %	Phenophase
1	2	3	4	5	6
	Centaurea pseudosquarrosa Mikheev ex Gabrieljan et Mikheev	cop1	50	20	C
	Artemisia terrae-albae Krasch.	sp.	50	4	⊃
	Convolvulus arvensis L.	sp.	30	4	O
	Trifolium pratense L.	Un	35	0,5	O

1	2	3	4	5	6
	Cichorium intybus L.	Rr	90	1	O
	Astragalus rytilobus Bunge	sol.	30	2	□
	Polygonum patulum M. Bieb.	Sp	20	1	O
	Lactuca tatarica (L.) C.A. Mey.	Un	30	2	O
	Tragopogon sp.	Un	50	0,5	+
	Echium vulgare L.	sol.	60	3	O
	Asteraceae	Rr	80	1	+
	Poa pratensis L.	cop1	70	20	#
	Beckmannia eruciformis (L.) Host	sp.	20	4	#
	Calamagrostis pseudophragmites (Haller f.) Koeler	sp.	20	4	#

Description No. 2

Association name: mixed-herb-caper

Geographical location: Turkestan region, Tulkibas district, Mashat rural district.

Coordinates: N42º 29’19.10” E69º 56’22.60” h-689 м.

The general nature of the relief: the foothill counters.

The position of the association site in relief: the top of a small hillock or counter, near the highway, near a forest belt of elm.

Microrelief: undulating plain.

Other features: moderate anthropogenic impact, near the road, the herbal composition is moderately slightly disturbed. Dirt road. The soil is clay. Weeds.

The size of the trial area: 15x15 m

Canopy closeness: 0

Structure of the tier: – *C. herbacea*

Table 3 – Characteristics of the rocks that make up the shrub layer

№	Name of breeds	Abundance	Height, m		Phenophase	Life form
			Average	Max.		
1	*C. herbacea*	cop2	0,3	0,5	C	Shrub

Characteristics of the grass tier

Sample area size: 15x15

Total projective coverage: 50-60%

Aspect (appearance, physiognomy of the association): Mixed

Table 4 – Characteristics of the plants that make up the herbaceous tier

№	Name of plants	Abundance	Height, cm	Coverage, %	Phenophase
	Centaurea pseudosquarrosa Mikheev ex Gabrieljan et Mikheev	sp.	40	4	C
	Artemisia terrae-albae Krasch.	sp.	50	4	⊃
	Convolvulus arvensis L.	sp.	20	4	O
	Trifolium pratense L.	Un	35	0,5	O
	Cichorium intybus L.	Rr	90	1	O
	Polygonum patulum M. Bieb.	Un	20	0,5	O
	Lactuca tatarica (L.) C.A. Mey.	Un	30	2	O
	Tragopogon sp.	Un	50	0,5	+
	Echium vulgare L.	sol.	60	3	O
	Asteraceae	Rr	80	1	+

	Calamagrostis pseudophragmites (Haller f.) Koeler	sp.	70	20	#
	Echium biebersteinii (Lacaita) Dobrocz.	Rr	30	1	+
	Pseudosophora alopecuroides (L.) Sweet	sp.	90	5	+
	Rumex sp.	Un	60	0,5	+

Description No. 3

The name of the association: grass-cornflower with the participation of capers

Geographical location: Turkestan region, Tulkibas district, Mashat rural district.

Coordinates: N42º 28’36.10” E69º 54’27.00” h-652 m.

The general nature of the relief: the foothill counters.

The position of the site of the association in relief: the lowering of a small hillock or counter, near the highway, near a forest belt of elm.

Microrelief: undulating plain.

Other features: moderate anthropogenic impact, near the road, the herbal composition is moderately slightly disturbed. The soil is clay. Weeds.

The size of the trial area: 15x15 m

Canopy closeness: 0

Structure of the tier: – *C. herbacea*

Table 5 – Characteristics of the rocks that make up the shrub layer

№	Name of breeds	Abundance	Height, m		Phenophase	Life form
			Average	Max.		
1	*C. herbacea*	cop1	0,5	0,5	C	Shrub

Characteristics of the grass tier

Sample area size: 15x15

Total projective coverage: 60%

Aspect (appearance, physiognomy of the association): Mixed

Table 6 – Characteristics of the plants that make up the herbaceous tier

№	Name of plants	Abundance	Height, cm	Coverage, %	Phenophase
	Centaurea pseudosquarrosa Mikheev ex Gabrieljan et Mikheev	cop2	45	30	C
	Artemisia terrae-albae Krasch.	sp.	50	4	⊃
	Convolvulus arvensis L.	sp.	20	4	O
	Trifolium pratense L.	Un	35	0,5	O
	Cichorium intybus L.	Rr	90	1	O
	Polygonum patulum M. Bieb.	Un	20	0,5	O
	Lactuca tatarica (L.) C.A. Mey.	Un	30	2	O
	Tragopogon sp.	Un	50	0,5	+
	Echium vulgare L.	sol.	60	3	O
	Asteraceae	Rr	80	1	+
	Calamagrostis pseudophragmites (Haller f.) Koeler	sp.	70	20	#
	Echium biebersteinii (Lacaita) Dobrocz.	Rr	30	1	+
	Pseudosophora alopecuroides (L.) Sweet	sp.	90	5	+

	Rumex sp.	Un	60	0,5	+
	Astragalus rytilobus Bunge	sol.	30	2	⊃
	Calamagrostis epigeios (L.) Roth	sp.	20	4	#
	Agrostis gigantea Roth	sp.	20	4	#
	Descurainia sophia (L.) Webb ex Prantl	Un	50	0,5	+
	Malva sp.	Rr	90	1	O

In the two following points, the species composition is limited to 2-3 species, since they are located on deposits.

Description No. 4
Association name: bluegrass-caper
Geographical location: Turkestan region
Coordinates: N42º 29.553’ E69º 56.931’ h-765 m.
The general nature of the relief: the foothill counters.
The position of the association site in relief:
Microrelief: undulating plain.
Other features: weak anthropogenic impact, the herbal composition is slightly disturbed. The soil is clay.
The size of the trial area: 15x15 m
Canopy closeness: 0
Structure of the tier: – *C. herbacea*

Table 7 – Characteristics of the rocks that make up the shrub layer

№	Name of breeds	Abundance	Height, m		Phenophase	Life form
			Average	Max.		
1	*C. herbacea*	cop2	0,5	0,7	C	Shrub

Characteristics of the grass tier
Sample area size: 15x15
Total projective coverage: 70%
Aspect (appearance, physiognomy of association): bluegrass

Table 8 – Characteristics of the plants that make up the herbaceous tier

№	Name of plants	Abundance	Height, cm	Coverage, %	Phenophase
	Poa pratensis L.	cop2	40	30	#

Description No. 5
Association name: Caper
Geographical location: Turkestan region
Coordinates: N42º 02.762’ E69º 28.624’ h-682 m.
The general nature of the relief: the foothill counters.
The position of the association site in relief:
Microrelief: undulating plain.
Other features: moderate anthropogenic impact, near the road, the herbal composition is moderately slightly disturbed. The soil is clay. Weeds.
The size of the trial area: 15x15 m
Canopy closeness: 0
Structure of the tier: – *C. herbacea*

Table 9 – Characteristics of the rocks that make up the shrub layer

№	Name of breeds	Abundance	Height, m		Phenophase	Life form
			Average	Max.		
1	*C. herbacea*	cop2	0,6	1	C	Shrub

Characteristics of the grass tier
Sample area size: 15x15
Total projective coverage: 40%
Aspect (appearance, physiognomy of the association): Alhagi-bluegrass

Table 10 – Characteristics of the plants that make up the herbaceous tier

№	Name of plants	Abundance	Height, cm	Coverage, %	Phenophase
	Poa pratensis L.	cop1	30	20	#
	Alhagi pseudalhagi (M. Bieb.) Fisch.	sp.	50	5	C

Taking into account the data obtained on communities in disturbed territories, we can assume that the studied species feels good in such conditions. This is an indicator that it is not for nothing that this species is medicinal and is also shrubby, and it is learned that the species under study was not oppressed and gave offspring well, that is, there were also overgrowths that show that the community is still developing and at the stage of restoration.

A more thorough study was also conducted in the Kyrgyz Alatau, where only in the Oiranda gorge (Zhambyl region), a place of growth of this species was found, and in the gorge. as a Measure or other, this species was not marked (Figure 4; 5) (Table 11).

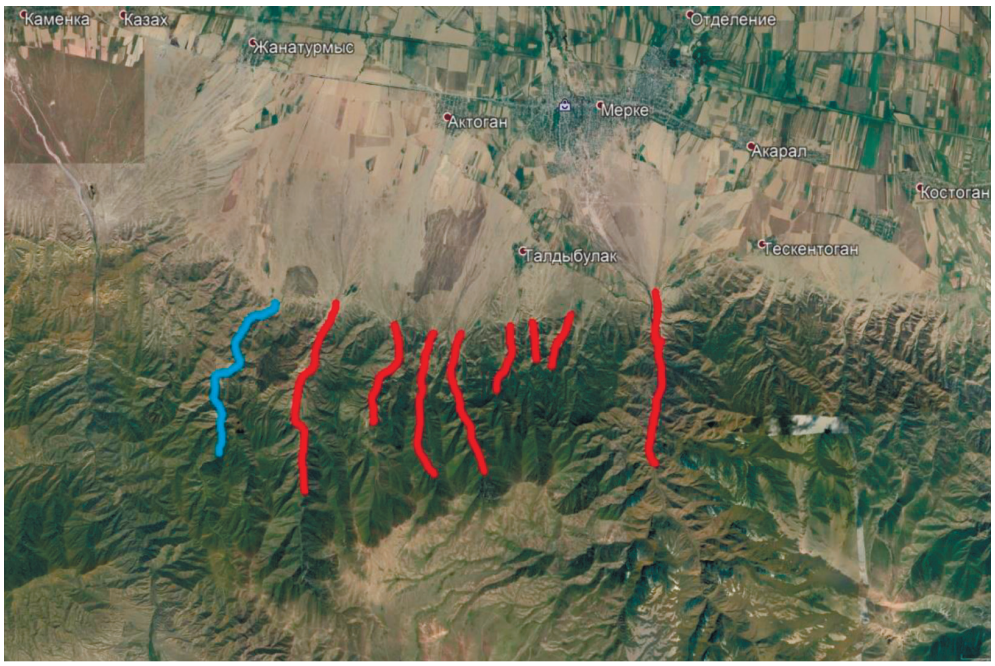

Figure 4 – A drawing map with the marks of the gorge where the species under study grows and does not grow (blue stripe Oiranda gorge)

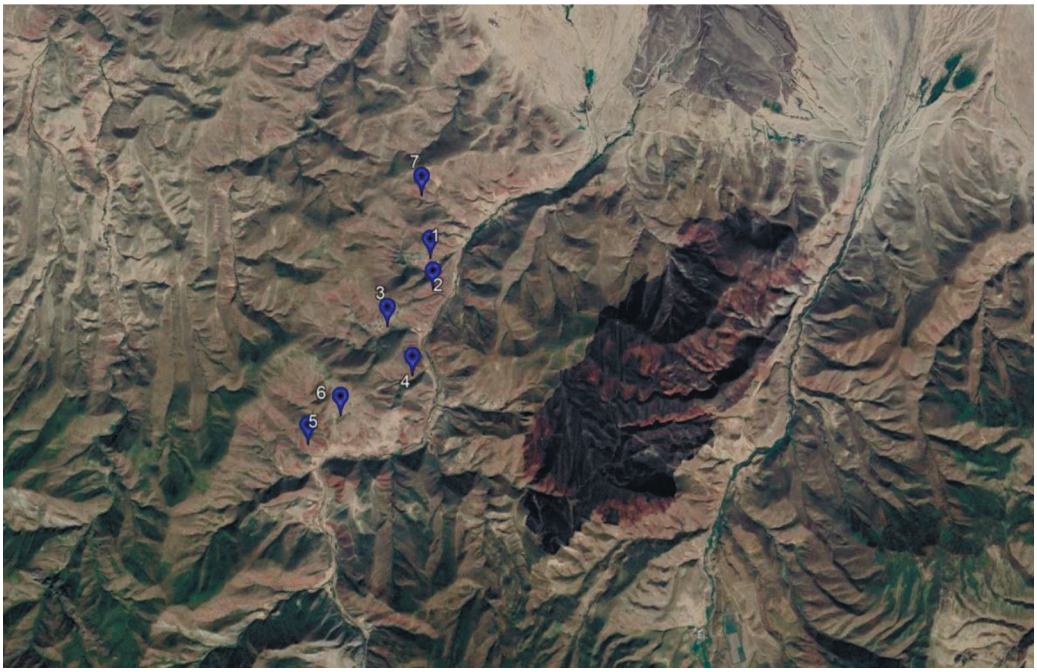

Figure 5 – Oiranda gorge with the indication of the points of the place of growth of *C. herbacea*

Таблица 11 – Floristic diversity of communities with the participation of *C. herbacea* Oiranda Gorge (Kyrgyz Alatau)

Type name	Abundance	Placement by B.A. Bykov	Height, m	Phenophase	
1	2	3	4	5	6
Crataegus chlorocarpa Lenne & K. Koch	Sol	Single	5	Fruits	
Zabelia corymbosa (Regel & Schmalh.) Makino	cop3	Diffuse	4	Fruits	
Spiraea hypericifolia L.	cop 1	Single, unevenly	1-1.5	Vegetation	
Cotoneaster melanocarpus Fisch. ex Blytt	Sp	Single, unevenly	1	Fruits	
Berberis integerrima Bunge	Sp	Single, unevenly	1	Fruits	
Rosa platyacantha Schrenk	Sp	Diffuse	1,5	Fruits	
Juniperus semiglobosa Regel	Sol	Single, unevenly	3-5	Vegetation	
Euonymus semenovii Regel & Herder	Sol	Single, unevenly	1	Seeds	
Lonicera tatarica L.	Sol	Single, unevenly	1,5	Vegetation	
Rhamnus cathartica L.	Sol	in groups, unevenly	6	Fruits	
Ephedra distachya L.	Sol	spots are uneven	0,3	Vegetation	
Ribes meyeri Maxim.	Sol	Single, unevenly	2	Fruits	
Festuca valesiaca Gaudin	cop1	Diffuse	0,6	Seeds	
Capparis herbacea Willd. (*Capparis spinose* L.)	sp -cop1	Diffuse, mazaic	0,8	Fruits	
Rubus caesius L.	sp -cop1	Diffuse	0,8	Fruits	
Origanum tyttanthum Gontsch.	Sp	in groups, unevenly	0,5	Seeds	
Leymus angustus (Trin.) Pilg.	Sp	Single, unevenly.	0,7	Seeds	
Galium verum L.	Sp	spots are uneven	0,5	Seeds	
Phleum phleoides (L.) H. Karst.	Sp	Diffuse	0,5	Seeds	
Descurainia sophia (L.) Webb ex Prantl	Sp	in groups, unevenly	0,6	withering away	
Ajania fastigiata (C. Winkl.) Poljakov	sp	Single, unevenly	0,8	Blooms	
Poa transbaicalica Roshev.	Sp	uneven everywhere	0,8	Seeds	

1	2	3	4	5	6
Viola rupestris F.W. Schmidt	sol-sp	Single, unevenly	0,2	Vegetation	
Bothriochloa ischaemum (L.) Keng	sol-sp	in groups, unevenly.	0,3	Blooms	
Calamagrostis epigeios (L.) Roth	Sol	spots are uneven	1,3	Vegetation	
Veronica spuria L.	Sol	Single, unevenly	0,8	Blooms	
Dictamnus angustifolius G. Don ex Sweet	Sol	Single, unevenly	1	Seeds	
Artemisia dracunculus L.	Sol	Single, unevenly	1	Blooms	
Potentilla asiatica (Th. Wolf) Juz.	Sol	in groups, unevenly	0,5	Blooms	
Geranium collinum Stephan ex Willd.	Sol	Single, unevenly	0,6	Blooms	
Hypericum perforatum L.	Sol	Single, unevenly	0,8	Seeds	
Ziziphora clinopodioides Lam.	Sol	Single, unevenly	0,2	Blooms	
Achillea asiatica Serg.	Sol	Single, unevenly	0,2	Blooms	
Urtica dioica L.	Sol	in groups, unevenly.	1	Vegetation	
Vicia tenuifolia Roth	Sol	Single, unevenly	0,5	Blooms	
Thymus marschallianus Willd.	Sol	in groups, unevenly.	0,1	Seeds	
Sisymbrium loeselii L.	Sol	Single, unevenly	1	Blooms	
Astragalus sp.	Sol	Single, unevenly	0,4	Vegetation	
Verbascum blattaria L.	Sol	Single, unevenly	0,7	blooms	

Based on the above results, we can say that in more stable communities, where there is very little influence of an external factor, in which many species disappear, the species under study also feels good, but is not the main dominant in the community, the bushes are mostly scattered around about 10-15 meters from each other (there are large shrubs). And this shows, in turn, that this species contributes to the preservation of the community and is one of the main components of such a population. In addition, it can be assumed that in the disturbed territories that were previously described from the Turkestan region, communities may also move from dominant to subdominant over time, or be as an edifier species.

General data that can reinforce and supplement the literature data on this species. The plant is adapted to arid regions, so it can withstand hydraulic shocks, strong winds and temperatures above 40 ° C during the dry Mediterranean summer without visible damage. The root system of the plant is well developed. It tolerates sandy or rocky soil [19; 20]. It also prefers saline and halophytic habitats. It also grows wild at the junctions of walls and ancient monuments. Capparis herbacea has a low combustibility, so it is often used to fight forest fires in the Mediterranean climate [21].

In addition, the plant *Capparis herbacea* plays a very important role in agriculture. It is used to beautify the landscape, as well as to reduce erosion on steep rocky slopes, highways, sand dunes or in fragile semi-arid ecosystems. *Capparis herbacea* is very useful for protecting the soil from drought [22]. It plays a special role in soil protection. Capers have also been used as a condiment since ancient times. The plant is rich in biologically active substances and has a wide range of properties of interest to people of culture and the food industry [23]. Its phytochemical value is due to the abundance of bioactive components in various organs, and its cultivation is of great economic importance. In folk medicine, the kidneys, fruits, seeds and roots of this plant are used as a diuretic, rheumatic, expectorant, antidiabetic decoction [24]. This plant also contains phenolic compounds, flavonoids, carotenoids and tocopherols and facilitates cardiovascular diseases, liver damage and nephropathy in animals with diabetes associated with antioxidant phytochemicals [25]. Fruits contain up to 12% sugar, up to 18% protein, essential oils, rutin 0.32%, 150 mg ascorbic acid, about 25-36% edible oil, and the root is the glucoside kapparidin. Medicinal use of the root of *Capparis herbacea* spread from early Arabic medicine to medicine in Central Asia [26]. The root of this plant is used for brucellosis, rheumatism, to calm the nervous system, for toothache and injuries [27]. The root of the plant is a cure for liver diseases and jaundice. The leaves and branches are used to treat diabetes, and the seeds are used to treat headaches [28]. The fruits of the plant treat food diseases, and the decoction – hemorrhoids and

toothache. Well-planned clinical studies are needed to determine the benefits and harms of capers.

It also contains many other useful compounds, such as polyphenols, alkaloids, lipids, vitamins and minerals. Our goal is to identify the main biologically active substances contained in various parts of wild and cultivated plants (leaves, stems, fruits and flowers). If you look at the results of many studies, the morphological characteristics of all ordinary capers are revealed. Such results are of great importance when growing capers in agriculture. In addition, the results of this study indicate the health benefits and chronic diseases of eating capers with antioxidants and their biological properties. The fruits of the medicinal plant *C. herbacea* are also useful. In addition, capers have a pleasant taste, and also contain a large amount of vitamins and trace elements. *C. herbacea* is a very common plant on earth. The plant is found in mountain gorges, and is also heat-resistant. Even his voice has healing properties and is used in folk medicine [23; 24].

For many years, mankind has used herbs to fight various diseases. Of course, they are used to varying degrees in different countries. Many countries have extensive experience in the use of medicinal plants. In 2017, Hamid Wahid, Hassan Rahshande, Ahmad Gorbani found that prickly capers alleviate cardiovascular diseases, liver damage and nephropathy in diabetic animal models associated with antioxidant phytochemicals such as phenolic compounds, flavonoids, carotenoids [25]. In our further research, we will determine the medicinal properties of the phytochemical composition of the aboveground and underground parts, as well as study the medicinal properties of the *C. herbacea*.

Conclusion

As a result of the research work, communities are characterized by the following data: Populations that are located in the Turkestan region and grow in disturbed territories, gradually increase the number of their individuals and thereby restore the local flora or create conditions for the formation of new communities and populations of other species. And in the population located in the Kyrgyz Alatau, the ecological state is stable, which is shown by the mosaic distribution of the studied species.

Capparis herbacea is well studied abroad, it is also known for its medicinal properties. In our country, this species has been poorly studied. Therefore, based on foreign data, it is important for us to study the distribution and composition of the medicinal plant *C. herbacea* in Kazakhstan. All vegetation growth points were identified and geobotanical test areas were laid.

In addition, the study showed that *C. herbacea* can be one of the main dominants for a certain territory or locality and an edifier for some ephemeral or ephemeroid species, as well as the main landscape species. The growth of this species on plains and between mountains indicates its high adaptability to various environmental factors and the factor of anthropogenic impact.

Conflict of interest: All authors are familiar with the content of the article and have no conflict of interest.

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