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B.Winterholler[1], A.Winterholler[1], A.K.Auelbekova[2]

[1]*Georg-August University of Goettingen, Hannover, Deutschland;*
[2]*Ye.A.Buketov Karaganda State University*
(E-mail: a-auelbekova@mail.ru)

Incarvillea semiretschenskia (B. Fedtsch) *Grierson* as object of Kazakhstan flora biodiversity saving

The article discusses the issue of the protection of rare populations of *Incarvillea semiretschenskia* in Chu-Ili mountains, which are left unattended. The authors of this article studied the relic plants, which primarily due to human activities is now threatened with destruction. *Incarvillea Juss.* — the only genus of herbaceous plants in the family of *Bignoniaceae*. According to I.D.Illarionova 9 species of inkarvillea grow in Central Asia, one of species — I.Potaninii Maxim. It is endemic of southern Mongolia. Endemic of Kazakhstan Inc. semiretschenskia goes beyond the East Asian type of habitat and is found in the eastern part of the ancient, heavily destroyed Chu-Ili mountains. Saving the rare species of flora in Kazakhstan will help in achieving the main goal — deciphering the phylogeny and development of the concept of the final race. Now especially relevant issues of unique populations are inkarvillei semirechensk in Chu-Ili mountains and generic complex of Incarvillea in Asia.

Key words: population, vegetation, security, community, individual, layering, abundance, area.

In the XXI century threats of the conservation of individual species and their ecosystems increased significantly. The increasing population growth and large-scale economic activity leads to irreversible changes in the nature of our planet. According to the experts of the International Convention on Biological Diversity up to 2/3 of the 300 000 species of plants that live in the present time in the world may be lost in the coming decades. Priority attention is drawn to the species susceptible to total destruction. A specific task of the inclusion or providing up to 90 % of species in the public collections of ex situ is given.

In Europe, the GSPC is carried out through the European Strategy for Plant Conservation.

Kazakhstan, due to its geographical position in the center of the Eurasian continent and the unique combination of natural complexes of steppes, deserts, mountains, large inland waters flowing into them from rivers and vast delta has a great diversity of ecosystems and the corresponding types of vegetation. In Kazakhstan, there is a full range of options of subzonal vegetation of steppes, deserts and mountain belts, specific to Central Asia.

Ecological situation in Kazakhstan is characterized by a great extent the degradation of natural systems, leading to the destabilization of the biosphere, the loss of its ability to maintain the quality of the operating system required for the life of society. There is an acute problem of desertification. The critical state of biodiversity related to human activities, environmental pollution and natural disasters, as well as a small area of protected ecosystems. It is noted the depletion of biodiversity and the degradation of ecosystems in the 66 % area of the country, especially in the deserts and steppes, with plowing and overgrazing.

Difficult situation remains on ensuring the protection of forests from fires and illegal logging in the territory of the State Forest Fund [1].

In the Republic of Kazakhstan pursued a national program of conservation of plants. According to current estimates, there are about 6,000 species of higher plants belonging to 150 families and 1100 genera on the territory of Kazakhstan. Now really in some degree of danger are at least 500 species of vascular plants,

about 9 % of the Kazakh flora. However, this number is necessary to allocate half a dozen species, the most interesting and at the same time inspiring the greatest fear. In our studies, there is a monotype race of Niedzwedzkia B.Fedtsch., now combined with native Incarvillea Juss. As a new subgenus Niedzwedzkia (B.Fedtsch.) Grierson, with its only species, tops the list.

Objects and Methods

Object of research is the wild relic, narrow endemic, endangered species of plants the western slopes of the Chu-Ili mountains, on a hill of Anarhan (upstream Kopalysay) in the hole, Ayderke and Ashchisu is lying on the east of Anarchy (South Kazakhstan) (Fig. 1).

Figure 1. Varieties of Niedzwedzkia in Chu-Ili mountains of Almaty region

Field studies conducted over the years 2005–2007. The studies were conducted route-reconnaissance and semi-stationary method.

The flora and vegetation have been studied with the use of traditional methods of geobotanical field studies [2, 3]. For each plant community established a full floristic composition, was determined phenological stages of individual species, their living condition, the abundance (on a scale Drude), accommodation (on a scale B.A.Bykova) [4], morphometric parameters (height, habit), life forms (trees, grass, bushes, etc.) [5]. Description of vegetation produced in the following sections:

The name of the community. Gives a visual relation of dominant, dominant species of plants and other components. The projected coverage of the soil by plants. Defined as the percentage of the area occupied by the projections of above-ground parts of plants of phytocenosis in general. The floristic composition of the community. Led the Latin names of plants found in the community. For each species it was observed layering, abundance, life condition, location, phonological phase. Based on collected herbarium material and descriptions were made by a list of plants that make up the community. Systematic accessory of set is defined by special determinants of plants [5].

The abundance. This is a visual estimate of the number of individuals of each species in the community. It is determined on a scale of Drude.

Results and Discussion

Incarvillea semiretschenskia (B.Fedtsch.) Grierson is the only representative of the tropical family of Bignoniaceae in the flora of Kazakhstan (Fig. 2). As rarity it can be compared with the South African Welwitschia mirabilis Hook. in the Namibian desert. From the first discovery Niedzwiecki in 1909 in the Chu-Ili mountains (Northern Tien Shan) to the present day, this plant surprises botanists around the world their amazing beauty, and abundant fruiting many-especially remarkable survival and life expectancy in extreme conditions of existence.

Figure 2. *Niedzwiecki semiretschenskia*, *Incarvillea semiretschenskia*, (*Niedzwedzkia semiretshenskia* B.Fedtsch)

Niedzwiecki grew on Earth millions of years ago and has not changed much since ancient times. Fossil ancestral forms Niedzwiecki or inkrvillei in the world still do not found.

Incarvillea Juss. — the only genus of herbaceous plants in the family of Bignoniaceae. The genus name is given in honor of the French missionary Jesuit P.N.Inkarvillya, collected plants in Asia. According to J.B.Lamarck in 1789 the first species of the genus incarvillea Chinese — Inc. sinensis Lam. was described.

The genus of Incarvillea concentrated in Southeast Asia, in the southern regions of China and Nepal, mainly in the mountainous part of the Tibetan Plateau and the Himalayas. One kind Inc. Olga — Inc. olgae Regel grows in Pamir Alai with the transition in Afghanistan and Pakistan.

According to I.D.Illarionova [6] 9 species of inkarvilley grows in Central Asia, one of these species is I.Potaninii Maxim. It is endemic of the southern Mongolia. Endemic of Kazakhstan Inc. semiretschenskia goes beyond the East Asian type of habitat and is found in the eastern part of the ancient, heavily destroyed Chu-Ili mountains. A total of 10 items united in the three major populations in the area of about 7 hectares, the total number of 28–32 thousand bushes of different ages [7–13]. We found (GBS Academy of Sciences of the Kazakh SSR) new natural populations of inkarvillei tracts in Ayderke and Ashchisu in 1976–1987 years, regularly visited in the summer and autumn and serves as a constant object of study biomorphological and environmental characteristics, intraspecific variation of fruits. There were also selected sample plots to map and study the distribution of vegetation in them bushes inkarvillei. A series of experiments on the reintroduction of rare species and repatriation were held.

Under natural conditions, Inc. Semirechenskaya is a vegetatively fixed species. Older shrubs often have a longitudinal splitting at the root collar, the so-called particulation. Vegetative reproduction of inkarvillei experimented only in the culture. In natural populations the species are reproduced by seeds. Unlike all other species of the genus Semirechensk inkarvillei has large fruit, very peculiar box, with different forms of ruptures.

Incarvillea Semirechenskaya as the southern heat-loving plant in a culture more testing in Asian botanical gardens than in a botanical garden of Tashkent (1960) and Almaty (1963) showed that during the autumn sowing in the first year, you can get flowering and fruiting plant, whereas in nature porch grow comparatively slowly. Incarvillea recommended as a valuable ornamental plant for landscaping.

In Central Kazakhstan (Karaganda, Zhezkazgan) incarvillea tested since 1986, experience in mass reproduction should be continued. In the European part of Russia, it was tested in Moscow, Kiev, Minsk, Stavropol. Now, Inc. Semirechenskaya of our recommendations is being tested in several botanical gardens in Germany (Berlin, Gottingen, Hamburger, Dresden, Mainz). Part of inkarvillei seeds passed for testing to known seed company «Jelitto Staudensamen» (Germany). Now rare Inc. Kazakh desert. Semirechenskaya

for the first time crossed the Eurasian continent and has appeared in the open ground of American continent (Missouri Botanical Garden).

Figure 3. Niedzwedzkia semiretshenskia Chu-Ili mountains, Almaty region

It is under the new name «Central Asian garden gloxinia» began to attract more European growers and collectors. Incarvillea Semirechenskaya is a great subject for an interesting experience with its south-eastern representatives. It seems that if the representatives of the western line will meet with the east might happen genetic mixing. Through DNA-analyzes may try to restore (reconstruct) the history of the settlement. Some attempts in this direction now taken by the Chinese and Japanese, in conjunction with American botanist. Semirechenskaya incarvillea — the pearl of the flora of Kazakhstan, miraculously preserved to this day. To see it in its original form in nature, only a few lucky ones managed. Almost two decades Patriarch enrolled in the category of extinct. Only in 1974, a group of employees of the Academy of Sciences of the Kazakh SSR GBS was able to open the Paleogene secondary relic.

In connection with the departure in 1991 in Germany, we were not able to organize the protection of natural populations of inkarvillei. Offered by us years of scientific justification for the organization of the protection of rare populations incarvillea Semirechensk in Chu-Ili mountains left unattended. The plant further was denigrated extinction. We propose for the first time to organize a demonstration Anarhaysky State botanical reserve in the Chu-Ili mountains, the occasion of the 100th anniversary of the birth of the outstanding Soviet botanist, researcher of flora and vegetation of Kazakhstan, Academician Nikolai Vasilevich Palov, calling this place in honor of the scientist Niedzwiecki, incarvillea Semirechenskaya — the brainchild of scientist.

Thus, the plant is now threatened with total destruction, and, first of all, because of human activities. Saving rare species of flora in Kazakhstan will help in achieving the main goal — deciphering the phylogeny and development of the concept of the final race. For this is now there are especially relevant issues of unique populations inkarvillei Semirechensk Chu — Ili mountains and generic Incarvillea complex in Asia.

The data obtained can be used to organize the ecological network for the development of environmental protection measures, as well as mountain areas.

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Б.Винтерголлер, А.Винтерголлер, А.К.Ауельбекова

Incarvillea semiretschenskia (B. Fedtsch*) Grierson* Қазақстан флорасының биоалуандылығын сақтаушы объекті ретінде

Мақалада Шу-Іле тауларындағы қараусыз қалған жетісу инкарвиллеяның сирек популяцияларын қорғау мәселесі талқыланған. Авторлар негізінен адам іс-әрекеттерінің әсерінен қазіргі кезде жойылу қауіпі бар реликті өсімдіктерді зерттеген. *Incarvillea* Juss. — *Bignoniaceae* тұқымдасында жалғыз ғана шөптесін өсімдік. И.Д.Илларионованың айтуынша, Орталық Азияда инкарвиллеяның 9 түрі өседі, оның бірі түрі — *I.Potaninii* Maxim. Ол Оңтүстік Монғолияның эндемигі болып табылады. Қазақстанның эндемигі *Inc. semiretschenskia* туыстың Шығыс Азия ареалынан тыс жерлеріне шығып кетеді және ежелгі өте бұзылған Шу-Іле тауларының шығыс бөлігінде кездеседі. Қазақстанның флорасындағы сирек кездесетін түрді сақтау филогенезді түсінудегі және туыстың соңғы тұжырымдамасын жасаудағы — басты мақсатқа қол жеткізуге көмектеседі. Бұл үшін қазіргі кезде Шу-Іле тауларындағы жетісу инкарвиллеяның сирек популяцияларын қорғау туралы мәселелері мен Азияданы қоса алғанда *Incarvillea* туыстық кешені ерекше өзекті мәселелер болып табылады.

Б.Винтерголлер, А.Винтерголлер, А.К.Ауельбекова

Incarvillea semiretschenskia (B. Fedtsch) *Grierson* как объект сохранения биоразнообразия флоры Казахстана

В статье обсуждается вопрос об охране редчайших популяций инкарвиллеи семиреченской в Чу-Илийских горах, которые остались без внимания. Авторы данной статьи изучили реликтовое растение, которому, в первую очередь из-за хозяйственной деятельности человека, ныне грозит полное уничтожение. *Incarvillea* Juss. — единственный род травянистых растений в семействе Бигнониевых. По данным И.Д.Илларионовой, в Центральной Азии произрастает 9 видов инкарвиллей, из них один вид — *I.Potaninii* Maxim. является эндемиком Южной Монголии. Эндемик Казахстана Inc. *semiretschenskia* выходит за пределы восточноазиатского ареала рода и встречается в восточной части древних, сильно разрушенных Чу-Илийских гор. Сохранение редчайшего вида флоры Казахстана поможет в достижении главной цели — расшифровке филогении и разработке окончательной концепции системы рода. Для этого сейчас особо актуальны вопросы охраны уникальных популяций инкарвиллеи семиреченской в Чу-Илийских горах и родового комплекса *Incarvillea* в Азии в целом.

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