

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Karl Linnaeus Contribution To The Development Of The Russian Far East Flora Systematics.

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ABSTRACT

The article contains the data on species of plants growing on the territory of the Russian Far East, generic and species names of which were established by the science reformer, Karl Linnaeus. The famous Swedish botanist and naturalist Carl Linnaeus (Linnaeus Carolus) brought numerous, scattered knowledge about plants into a single harmonious system - the systematics, the basic rules of which are still used by the scientists of all countries. The eight-volume "Vascular Plants of the Soviet Far East" (1985-1996) was analyzed and they determined the number of plants described by Karl Linnaeus.

Keywords: Carl Linnaeus, systematics of plants, binary nomenclature, vegetation of the Far East of Russia.

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INTRODUCTION

Carl Linnaeus spent more than 20 years of dedicated work to write the famous book "Species Plantarum" ("The types of plants"), which was published in 1753. He used the following as the basis for the differentiation and the description of species:

1. The descriptions and the images of plants of the previous authors;
2. Linnaeus own publications (on the flora of Sweden, Lapland, Ceylon), and the descriptions of species that grow in the gardens of Clifford in Holland and Uppsala in Sweden;
3. The samples of Linnaeus' own herbarium and the herbariums of other botanists sent to him;
4. The descriptions of plants grown by Linnaeus from seeds, which he received from different countries;
5. The publications and the herbarium specimens of contemporary authors, for example, "Flora of Siberia" by I.G. Gmelin; Kamchatka herbarium specimens and seeds from G.V. Steller and other researchers. There is still the correspondence that Linnaeus conducted with E. Laxmann, Amman, Sigezbek, S.P. Krashenninikov and other botanists.

As is known, Linnaeus built his system of plants according to gender principle and thereby finally cemented the recognition of the sexual process among flowering plants. Introducing the binary nomenclature for all plants known to him (generic and species names), Linnaeus collected the genera into detachments, and the detachments into classes. The classes were distinguished on the basis of the genital organs of plants characteristics, depending on number, size and location of stamens and pistils. The Linnaeus gender system of plants was artificial, because it was based on a small number of arbitrarily taken characteristics and did not reflect the actual relationship between different forms. Despite this drawback, this system was very convenient for that time. Sigizbek tried to refute these statements from Linnaeus in his work, on the sole ground that this teaching is supposedly immoral ... "Who will believe that God could bring ... such shameless debauchery in the matter of plant reproduction. It would be scandalous to teach young students this immoral system" [5]. Linnaeus was very offended by Sigezbek's speech, especially since shortly before this Linnaeus gave the newly discovered plant species the name *Siegesbeckia*. Later, sending the seeds of this plant - *Siegesbeckia* eastern - to Petersburg, an outstanding systematist wrote the following name on one of the sacs - *Cuculus ingratus* - an ungrateful cuckoo. Sigizbek sowed the seeds with this strange name in the Botanical Garden and was very offended when he saw that the grown up plant bore his own name. Named after the name of Sigezbek, the genus of plants is represented on the territory of our country by two species - *Siegesbeckia* eastern (Linnean epithet) and *Siegesbeckia* fluffy. Both species are weeds. *Siegesbeckia* fluffy (*Siegesbeckia pubescens* Makino) is widespread in the gardens of the Primorsky and Khabarovsk territories.

The aim of the research is to analyze K. Linnaeus contribution to the development of the systematics of plants of the Far East. At the present time botanical science accepts the Linnean concept of the species and the genus of plants in the sense that the species is a universal and a basic unit of systematics, and a complex system at the same time. The following intraspecific categories are recorded in the International Botanical Codes: a species, a variety, a subspecies, a form. In its turn, plant species are combined into genera, subfamilies, families, orders, subclasses, classes, sub-departments, divisions, i.e. artificial plant associations in classes and detachments are not applied by Linnaeus in taxonomy.

Carl Linnaeus has never been in Russia, and in the Russian Far East, but his name is often found in the names of the Far East plants. Many botanists and travelers in the Far East of Russia sent herbaria, seeds and living plants for Linnaeus to determine the species and generic name, and Linnaeus fulfilled all the requests of travelers with pleasure. The number of plant species on the territory of the Russian Far East is increased almost every year due to extraneous, mostly weed plants, the sowing or the planting of foreign cultural plants, which have various decorative, food, medicinal, technical or other properties. Some of these plants are developed well in the new territory, they go beyond the trial plots (for example, Sosnovsky's giant hogweed), and become the part of the Far East flora. Systematic botanists also discover new, native species of plants, which are mostly endemic to the northern regions of the Far East [1].

RESEARCH RESULTS

According to the eight-volume flora "Vascular Plants of the Soviet Far East" (1985-1996) and expert estimates, 4113 species of native flora (indigenous and adventitious plants) naturally grow in the Russian Far

East. These species are of 939 genera and 158 families, and 65 most widespread species are of cultural flora from 23 genera. In 2006, i.e. 20 years later, they published a new capital work "Flora of the Russian Far East. Additions and changes to the publication "Vascular Plants of the Soviet Far East". V. 1-8 (1985-1996)." 516 genera were supplemented with new information, 26 of them are described in the Far Eastern region for the first time. Additional and new information is available for 1352 species, also 219 are provided to the region for the first time, and 30 are described as new species for science [2,3].

Thus, by the present time the flora of the Russian Far East has 4,322 species of plants belonging to 965 genera and 180 families. The given data on plant species are not permanent, they can be changed in one direction or another due to the death or the destruction of some valuable relic or endemic species; and most often they can be replenished mostly by the importation of weeds or wild crops, as well as through the discovery of new species for science in the Far East. The name of Karl Linnaeus, preserved in the species and generic names of the Russian Far East plants, is given in Table 1.

Table 1 - The number of species and genera of plants in the Russian Far East, the names of which were given by Carl Linnaeus

Volume number of «Vascular plants ...», year of publication	Number of genera	Number of species	Imported, weed	Cultures (becoming wild)
1 - 1985	31	66	30	17
2 - 1987	86	58	17	1
3 - 1988	46	90	49	10
4 - 1989	34	55	42	16
5 - 1991	71	91	23	10
6- 1992	68	75	24	9
7 - 1995	54	66	23	13
8 - 1996	50	102	29	1
Total:	440	603	237	77

The data presented in the table allow us to draw the following conclusions:

- Out of 965 genera of plants growing in the Russian Far East, Karl Linnaeus gave the name to 440 plant genera, which is 45.6%, i.e. almost every second genus of plants in our region was well known and described by the famous Swedish botanist.
- Linnaeus named 603 species among 4362 species of plants in the Russian Far East, which is 13.8% of the total number of species. Such a modest number of Linnaeus species is associated with many reasons: the peculiarities of geographic and climatic conditions, a vast territory that is rich and diverse in flora, and a weak botanical study of the Far Eastern region during the days of Linnaeus (the middle of the 18th century). Only in the last 20 years (1996-2006) Far Eastern botanists discovered and described 30 new species of plants in this region.
- Among 693 species of plants included in the flora of the Russian Far East and described by Carl Linnaeus, 314 of them are attributed to imported, weeds, or wild crops, which is generally 52% of all plant species described by C. Linnaeus. This is a rather alarming signal due to the fact that our original, distinctive Far Eastern flora is clogged quickly with weeds and other undesirable imported plants that are constantly expanding the occupied areas and displacing native species from grasses, shrubs and even certain species of trees.

The world-famous botanist Carl Linnaeus was an extremely modest scientist. Having discovered and described more than 1500 plant species, having named dozens of species and genera of plants in honor of many people familiar to him, he did not think about his glory. However, one of the most common plants was named Linnea northern (*Linnea borealis* Gron.) in honor of Linnaeus during his lifetime. This species with

pretty pink flowers typical of mossy spruce forests of Sweden, was discovered by Linnaeus himself, but he incorrectly carried it to the bluebell, calling it a bluebell with thyme (*Campanula serpyllifolia* L.). In fact, its structure is different than that of a bluebell, and the botanist J.F. Gronovius (Gronovius) who noticed this, changed its name to *Linnea Gronov. Ex L.* This genus is famous for the fact that it is monotypic, i.e. consists of only one species - *Linnea northern (Linnea boreales L.)*. Although sometimes some botanists allocate another 1-2 North American species, but the majority of expert systematists believe that it is inadvisable to distinguish them in this monotypic genus and in the appearance of any intraspecific taxa. What is the northern Linnaeus? This is a low shrub with creeping rooting branches. Its leaves are small, oval, up to 2 cm long and 1.5 cm wide. The flowers are white or pink, with a pleasant scent. This low shrub with a famous name and beautiful fragrant flowers has a huge range and is found in many countries of Europe and Asia, as well as in China, Korea, Mongolia, Japan and others. *Linnea northern (Linnea boreales L.)* is widespread in Russia, also in all areas of the Far East. It can be found in various climatic zones - in the upper areas of coniferous-broadleaf forests, in the alpine belts, in the north, in mountainous and lowland tundra. As a northern species, this shrub is especially abundant in Kamchatka, where they studied and widely use the variety of medicinal properties. All parts of the plant - stems, leaves, flowers - have medicinal properties. Infusions have anesthetic, expectorant, antipyretic, diuretic, blood-curative effects, they help with joint diseases (polyarthritis, etc.) and male sexual impotence.



Figure 1 – *Linnea northern (Linnea boreales L.)*.

The drugs are very effective for the treatment of female diseases, including infertility, blood diseases, as an additional remedy for cancer. People drink infusions from the aboveground parts of the bush, during epilepsy, skin diseases, for the removal of age spots and papillomas. The collection of *Linnea* is best of all during flowering, drying in the shade, the storage in a paper or a cloth container [4].

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