



UDC 58

## **SOME BIOLOGICAL FEATURES AND SEED PRODUCTIVITY OF CATALPA SCOPOLI SPECIES UNDER VARIOUS SOIL SALINITY CONDITIONS IN KARAKALPAKSTAN**

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### **ANNOTATION**

*The article discusses some biological features and seed productivity of *Catalpa scopoli* species in various salinity conditions of the soil of Karakalpakstan.*

**KEY WORDS:** *Aral Sea, flora, introduction, salt, region, landscaping.*

The Republic of Karakalpakstan is located in the southwestern Aral Sea region and is part of the extra-arid zone of Central Asia. The climate is sharply continental, the soils are saline [5].

According to experts, as a result of the drying of the Aral Sea, from 12 to 75 million tons of various salts rise into the air every year [1]. As a result, the region has developed extremely difficult environmental conditions for the population. One of the most effective means of improving the environmental situation is planting greenery in settlements with tall, salinity-resistant, drought-resistant tree species with high sanitary and hygienic properties.

About 98 species of woody plants grow wild on the territory of Karakalpakstan, which is about 10% of the entire flora [10], according to the latest data, 118 species [7].

Most of the woody plants in this region are shrubs and shrubs. For the purpose of landscaping the flora of Karakalpakstan, introduced species of plants are used.

Such promising woody plants include species of the genus *Catalpa* - *catalpa* of the Bignoniaceae family. Of particular value to these plants give their beautiful flowers, collected in large inflorescences. On the territory of Karakalpakstan, it is necessary to use in landscaping plant species resistant to salinity, which include species of the genus *catalpa*.

*Catalpa* entered Central Asia in the 70-80s. 19th century In the Tashkent oasis, the biology and ecology of *catalpa* species was studied by N.F. Rusanov [9].

In Karakalpakstan in 1959 The Botanical Garden was organized. During the existence of the garden, more than 402 species, varieties and forms of tree, shrub and fruit crops belonging to 105 genera and 44 families have been introduced and tested [8].

*Catalpa bignonioides* was introduced into the Nukus Botanical Garden of the KO AS RU in the 1960s [6].

In the south of Karakalpakstan (Buston) in the Botanical Garden. A. Temur there are 3 types of *catalpa*: *C. bignonioides* Walt., *C. speciosa* Ward. and *C. ovata* G. Don., [3].

### **OBJECT AND SUBJECT OF RESEARCH**

The object of study is species of the genus *Catalpa*: *C. bignonioides* Walt., *C. speciosa* Ward., and *C. ovata* G. Don.



## RESEARCH METHODS

The morphogenesis of the studied objects was studied according to the method of I.G. Serebryakova (1952) [11], seed productivity was studied according to the method of O.A. Ashurmetov, H.K. Karshibaev (2002) [2].

Bignonium or common catalpa - *Catalpa bignonioides* Walt. Homeland - southeastern North America. Deciduous tree. On the streets of the city of Nukus, at the age of 8, it reached 6 m in height and a trunk diameter of 35 cm. rounded, curved or spherical crown. Its large leaves are remarkable, resembling lilac leaves in shape, but large (20 x 15 cm), shortly pointed at the top, the base of the leaf is heart-shaped or wedge-shaped, the edge is solid, sometimes there is one large tooth. Inflorescences are broad-pyramidal, many-flowered panicles or large loose racemes, up to 20-25 cm in length. The flowers are collected in panicles - up to 50 flowers in each. The fruit is a bivalve box up to 35 cm long and a box diameter of 2.5-2.9 cm, with a placenta in the center. Seeds elliptical or oblong-linear, narrow up to 2 cm long and 0.5-0.6 cm wide, with narrow beards of hairs at both ends and immature seed coats are white, mature gray-brown. In each box, an average of up to 104 seeds. Weight of 1000 seeds 35.7 g.

**Catalpa is magnificent or beautiful - *Catalpa speciosa* Warder ex Engelm.** A beautiful deciduous tree, on the streets of the city of Nukus at the age of 13-15 years, reached 11-12 m in height and 89 cm in diameter, in the Botanical Garden of the KCO AS RUz (Nukus) 15 cm in trunk diameter at a height of 2.5 m, and in the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan (Buston) 29 cm in diameter of the trunk at a height of 5 m. Tree up to 20-30 m in height, up to 1.5 m in diameter (according to N.F. Rusanov). It has straight trunks with a pyramidal crown. The bark is grey-brown, scaly and the young shoots are green and covered with short hairs. The leaf arrangement in the first year of life is opposite, then whorled. It has very large leaves (20 x 15 cm) on long petioles. Inflorescence almost bare panicle, relatively few-flowered, containing about 14, rarely up to 35 flowers. The fruit is a capsule, up to 30-35 cm long, 2.5-3 cm wide, long, cylindrical, cracking lengthwise into 2 valves. Seeds elliptical, up to 2.8 cm long and 0.7 cm wide, with broad barbules of hairs at both ends. Each box has up to 33-168 seeds. The weight of 1000 seeds is 36 g. In youth, it grows rapidly, giving an increase of up to one meter per year. More frost-resistant than other types of catalpas used in landscape gardening. Relatively drought tolerant. Катальпа яйцевидная — *Catalpa ovata* G. Don.

Native to Central China. Deciduous tree. The height in nature of this tree reaches up to 10-15 m in height. In the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan (Buston), at the age of 6, it reached 4 m in height and a trunk diameter of 28 cm. In the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan (Tashkent), at the age of 12, it reached 5-6, less often 8 N.F. Rusanova). In the second year of life, it reached 47 cm in height with moderately saline (Karauzyak) soil and with highly saline (Nukus) soil it reached up to 17 cm in height. It has curved trunks with a broadly branched crown. The bark is dark gray, smooth scaly and the young shoots are green and pubescent with short glandular hairs.

The arrangement of the leaves in the first year of life is opposite, then whorled. It has very large leaves up to 18 cm long and 16 cm wide on long petioles. In the second year of life, the length of the leaves reached 14.5 cm, with moderate salinity (Karauzyak) and with strong salinity (Nukus), the length of the leaves reached 4.7 cm. The apex of the leaves is sharp, with a heart-shaped base; This one is different from the leaves of *C. speciosa* and *C. bignonioides*. The shape of the leaves is broadly oval, on an adult plant often with two petals on the sides. From above, the leaves are almost naked, from below, densely pubescent with simple hairs. Inflorescence - panicle, many-flowered, containing about 70-90 flowers. The fruit is a thin spindle-shaped box up to 30, sometimes 40 cm long and about 1.5 cm wide. They are much shorter than in previous species of this genus, with thin walls. Seeds elliptical, greyish-brown, up to 1.3 cm long and 0.3 cm wide, with broad barbules of hairs at both ends. Each box contains up to 72-106 seeds. Weight of 1000 seeds 15 g.



The study of *C. bignonioides* was carried out in Tashkent (control, non-saline soils), Buston (Karakalpakstan, moderately saline soils, the content of water-soluble salts in the soil is Cl-0.040% of the dry soil weight of 0-30 cm layer) and in Nukus (Karakalpakstan, highly saline soils, Cl- 0.058%, SO<sub>4</sub> -0.058% in 25-50 cm layer).

The sizes of fruits and seeds were studied. It was established that under conditions of average, compared with the control, *C. bignonioides* fruit length significantly increases ( $41.5 \pm 1.69$  cm and  $50.0 \pm 1.68$  cm, respectively), but their width decreases ( $2.6 \pm 0.05$  cm and  $2.1 \pm 0.03$  cm), the dimensions are reduced ( $2.7 \pm 0.11$  cm x  $0.5 \pm 0.02$  cm and  $2.2 \pm 0.07$  x  $0.2 \pm 0.02$  cm ). In conditions of strong soil salinity, the fruits are shorter than the control ( $31.4 \pm 1.74$  cm), but do not differ significantly in width ( $2.8 \pm 0.09$  cm). The seeds are shorter than in the control ( $2.1 \pm 0.15$  cm), but in width ( $0.5 \pm 0.03$  cm), fullness ( $94.3 \pm 0.68$  cm) and absolute weight ( $35.7$  g ), no significant differences were found. Thus, the studied parameters are influenced not only by the degree of soil salinity, but also by the type of soil, for example, chloride in Buston and chloride-sulfate in Nukus.

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