

**BREEDING OF COMMON CRANBERRY TREE (VIBURNUM OPULUS) IN  
UZBEKISTAN**

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**ABSTRACT**

The article presents the results of studies on the results of the introduction of common cranberry in the conditions of the Botanical Garden of the Academy of Sciences of Uzbekistan. The results of studies on the morphological and decorative features of leaves, flowers and fruits of Viburnum under introduction conditions are presented. The possibilities of seed and vegetative propagation are studied. Seeds after extraction from berries immediately undergo stratification within 90-100 days. Sowing is carried out in late November or early December. The seeding rate of 20 g/m<sup>2</sup> or 400 seeds per square meter. Seeding depth is 2-3 cm. Seed germination and emergence are observed in April. The best result of soil germination of seeds (68%) was noted in the variant of collecting seeds on September 10 and their sowing after 85 days stratified. In this version of the experiment, 272 seedlings appeared in each square meter. The worst result was shown by seeds harvested on October 25 and sown after 43 days of stratification - 7%. Lignified stem cuttings of Viburnum harvested 11.03 rooted at 68%, the safety of seedlings at the end of the growing season was 95.4%. The output of seedlings from 1 square meter was 64 pieces, from 1 hectare of the nursery 448 thousand pieces. The second year, seedlings grow more intensively; they have a height of 90-130 cm at the end of the growing season.

**Keywords:** Biologically stable species, fast-growing shrub, three-lobed leaves, bisexual flowers, fruits, seeds, seedlings, rooted seedlings, decorative viburnum (cranberry tree).

**1. INTRODUCTION**

Introduction of broadleaf trees and shrub species to Central Asia has been going on since ancient times. In the history of the introduction of tree-shrub plants to Central Asia, two stages are distinguished: before and after the arrival of Russians in Turkestan. The first stage was a long one, numbering thousands of years; the Great Silk Road undoubtedly played a big role in this. Obviously, it was along the Great Silk Road that the introduction of foreign plants from neighboring countries began, mainly from China, India, the Caucasus and Russia to Central Asia. According to archives, the beginning of the mass introduction of tree and shrub plants should be considered the end of the 19th century, when the Turkestan administration from abroad of different new species of tree and shrub species. At the same time, the first forest tree breeding centers were laid and mountain forest restoration began.

In the flora of Uzbekistan, viburnum naturally does not occur. The introduction of viburnum species in the Tashkent Botanical Garden began in the 60s of the last century. The Botanical

Garden of the Academy of Sciences of the Republic introduced 6 species of viburnum into the soil and climatic conditions of Tashkent. The results of the introduction showed that only one species is common cranberry tree (*Viburnum opulus* L.) is a biologically stable species, it acclimatized well in hot and arid climates and was subsequently recommended for planting. *Viburnum vulgare* has great prospects for using it as a medicinal and forest-reclamation bush. Vitamin C in the amount of 16538.65 mg/kg, vitamin B - 163.856 mg/kg, vitamin B<sub>6</sub> -0.854 mg/kg were found in cranberries ordinary growing in the conditions of introduction B<sub>6</sub> -3.965 mg/kg, vitamin PP - 16.254 mg/kg, vitamin B<sub>9</sub> -1.885 mg/kg. The highest Ca content was found in leaves (213333.56 mg/kg), K - in the bark of stems (5366.93 mg/kg), P in berries (368,96 mg/kg). In official medicine, fruits (*Fructus viburni*) and shoot bark (*Cortex viburni*) are used as medicinal raw materials [1].

## 2. MATERIALS AND METHODS

In order to clarify the possibility of seed propagation and rooting of lignified stem cuttings of *Viburnum vulgare* (*Viburnum opulus* L.) in the conditions of the Tashkent oasis, we have laid down various experiments. The experiments were carried out in a greenhouse with sprinkler irrigation in the laboratory "Introduction of medicinal plants" of the Botanical Garden of the Academy of Sciences of Uzbekistan.

The verifying good quality of *Viburnum opulus* seeds was made according to the requirements of GOST 13056.8-68 "Seeds of broadleaf trees and shrubs. Testing methods for evaluating quality"

Lignified shoots for obtaining stems were harvested during the period of natural dormancy, in early spring from high-yielding and highly decorative bushes. Shoots were cut garden hooks. Harvested shoots are cut into 20 cm long stems using hooks. Ready stems before planting for 12-14 hours were kept in water.

When planting, the stems are placed upright, leaving 2-3 buds above the soil surface. In each experiment, 100 cuttings were used. To study the dynamics of growth every 15<sup>th</sup> day of the month, heights of seedlings were measured. Growth in diameter was measured only at the end of the growing season. The rooting of stems was taken into account as of June 1, the safety of seedlings - as of October 1. Assessment of the quality of *Viburnum* seedlings was carried out in accordance with the requirements of GOST 3317-90 - "Seedlings of trees and shrubs". Assessment of the quality of viburnum seedlings was carried out according to the requirements of GOST 26869-86 - "Seedlings of ornamental shrubs".

## 3. RESULTS AND DISCUSSION

Based on the biological and ecological study of the species of viburnum introduced into the Botanical Garden of the Academy of Sciences of Uzbekistan from various geographical zones, it can be concluded that most of them can grow and develop in the arid zone of the Tashkent oasis under irrigation conditions. *Viburnum* (*Viburnum opulus* L.) has a significant adaptation. *Viburnum* (*Viburnum opulus* L.) - the most common fast-growing deciduous shrub in the CIS. Annual growth even in lateral shoots reaches 30-40 cm. It survives to 50 years of age. The root system usually consists of a long rod root and numerous lateral ones. Young shoots are green,

branches are bare, ribbed or smooth, with a grayish-green bark, which in some individuals has a faint reddish tint. On old branches and on trunks, the bark is grayish-brown, cracking towards old age [2].

The leaf arrangement in the shoots is opposite. The base of the leaf blade is often rounded, sometimes wedge-shaped or truncated; Leaves with a shallow heart-shaped base are less common. Petioles of leaves are short, 1-2 cm long, furrowed, with 2–4 disc-shaped glands and 2 grown threadlike stipules. Autumn color of leaves is very diverse: from orange-red to purple. The beginning of autumn coloring is the second or third decades of November, the beginning of leaf decay is the end of November – mid-December.

Inflorescences in viburnum are especially amazing. Having a quick look at them, it seems that in most of the flowers the petals have already fallen, or have not yet blossomed. Having a closer look, you can see that real flowers with stamens and pestles are located only in the center of the inflorescence. Beautiful marginal flowers are sterile.

*Viburnum opulus* in the conditions of the Tashkent oasis does not reach a great height, its flowers are invisible and bloom late. Therefore, pollination of *V. opulus* occurs with the help of insects. To attract bugs, butterflies and bees, bright white sterile (asexual) flowers formed on the edges of viburnum inflorescences. In *V. opulus*, sterile flowers are white, flat, 1-2.5 cm across, with five uneven obovate lobes of the corolla, sitting on pedicels 1-2 cm long and located only on the periphery of the inflorescence.

The flowers are collected in a loose umbrella-shaped panicle, consisting of 6-8 rays and reaching 5-10 cm in diameter. Peduncle length from 2.5 to 5 cm. All parts of the inflorescence are usually covered with small glands, sometimes bare. The fruit is almost spherical or widely ellipsoidal (syncarpous drupes), bright red, with yellowish flesh, up to 8-10 mm across. The stone is round or broadly egg-shaped, pinkish-brown, with a pointed apex and an uneven lateral surface, 7–9 mm long [2]-[3].

*V. opulus* blooms in Tashkent in April - May, and the fruits ripen in September and hang on the bushes until the end of November, and sometimes much longer. The fruits of common viburnum are edible, rich in vitamins.

Viburnum propagated by seeds and vegetatively. The seeds ripen physiologically and have a high germination rate in late August and early September. It is during this period that seed collection is necessary. As the berries ripen in September-October, the seed coat will gradually lignify and their germination capacity will decrease. “Dead crops” are formed by sowing these seeds in the spring. Seeds after extraction from berries immediately undergo stratification within 90-100 days. The quality of the seeds was 82-92.5%. Sowing was carried out in late November and early December. The seeding rate of 20 g/m<sup>2</sup> or 400 seeds per square meter. Seeding depth is 2-3 cm. Seed germination and sprouting of seedlings is observed in April. The best result of soil germination of seeds (68%) was noted in the variant of collecting seeds on September 10 and their sowing after 85 days stratified. In this version of the experiment, 272 seedlings appeared in

each square meter. The worst result was shown by seeds harvested on October 25 and sown after 43 days of stratification - 7%.



**Fig. 1.** The annual propagula of *Viburnum opulus*



**Fig. 2.** Root system of the annual propagula of viburnum

Propagation of viburnum with lignified cuttings was carried out on sandy substrates (sand, with a mixture of turf land, humus in equal parts) in a greenhouse with sprinkler irrigation. Early spring harvesting of shoots gives better results on rooting and development of seedlings than late-balanced harvesting (54.0-68.0%). April terms of harvesting and planting of cuttings of viburnum ensured rooting below 5%.

Thus, the best time for harvesting and planting lignified *Viburnum* cuttings for rooting is early spring, during the period of bud swelling of shoots, but at the same time the soil at a depth of 15-

20 cm should warm up to +5 C. Before root formation, the cuttings were watered 2 times a week growth with 4-5 nodes from the upper buds means that the cuttings began to take root, and in this phase the irrigation rate was reduced.

Studies have shown that cuttings of *V. opulus* inherent high regenerative ability when they root in a greenhouse with sprinkler irrigation. The formation of subordinate roots on viburnum cuttings is associated with callus. As a rule, the roots are laid in the cambium of the stem of the stem and make their way through the bark near the leaf pillow or between callus and bark. Starting in May, the aerial growths of cuttings began to dry out, as they had a weak root system, or the roots were absent [4].



**Fig. 3.** The annual propagula of viburnum, grown by rooting of stem cuttings

Thus, by the state of the cuttings, by June 1, we took into account the degree of rooting. The best result of rooting of cuttings was recorded in the variant of harvesting cuttings at 11.03. - 68%. The rooting rate of cuttings harvested in early March and mid-March was 46% and 54%, respectively. The resulting growth in the cuttings increases rapidly in the second half of summer. Shoots develop unevenly, usually from the upper 2-3 buds. One of them becomes the leader, others gradually stop growing. On the leading shoot in the second half of the growing season, summer lateral shoots often develop.

The growth of rooted cuttings during the growing season was uniform, but seedlings from early spring cuttings differed in the best development, at the end of the growing season they had a height of the aerial part of  $16.2 \pm 0.3$ - $16.4 \pm 0.3$  cm (seedlings from April cuttings had a height of  $8.9 \pm 0.2$  cm ). The safety of seedlings at the end of the growing season in all cases is above 90%. Cuttings harvested 11.03. rooted at 68%, the safety of seedlings at the end of the growing season was 95.4%. The output of seedlings from 1 square meter was 64 pieces, from 1 hectare

448 thousand pieces. The second year, seedlings grow more intensively; they have a height of 90-130 cm at the end of the growing season.

According to GOST 26869-86 "Seedlings of ornamental shrubs," the available seedlings are considered to be the standard height of the aboveground part over 60 cm, therefore, seedlings in the forest tree breeding centre are grown for 2 years. The output of seedlings in the March variants of the experiment amounted to 308-448 thousand pcs/ha [4].

Cranberry tree quite successfully grows in the landscaping of parks and boulevards in Tashkent. In open areas, viburnum bushes bear more abundantly and almost annually. Guelder-rose is rather exacting to richness and especially moistening of the soil. Cranberry tree satisfactorily tolerates soil salinization.

#### **4. CONCLUSIONS**

In the landscaping of the city of Tashkent, *Viburnum vulgare* has established itself as a highly ornamental plant, and the sterile form of *Viburnum vulgare* (*Viburnum opulus* f. *sterile*) is most often used.

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Cuttings harvested on 11 March rooted at 68%, the safety of seedlings at the end of the growing season was 95.4%. The output of seedlings from 1 square meter was 64 pieces, from 1 hectare 448 thousand pieces. The second year, seedlings grow more intensively; they have a height of 90-130 cm at the end of the growing season.

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