VEGETATIVE REPRODUCTION OF SYMPHORICARPOS DUHAM (CAPRIFOLIACEAE) SPECIES BY LIGNIFIED CUTTINGS

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Annotation. The ability for vegetative reproduction by lignified cuttings in open ground was studied. This method has a number of advantages over green cuttings - there is no need for expensive fog plants and, in addition, early spring and a long growing season in Uzbekistan make it possible to obtain planting material for shrubs in 1-2 years.
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Introduction

Shrubs are an integral part of landscaping. A special place is occupied by species with decorative fruits that retain their decorative effect from autumn until the winter. Among them, Symphoricarpos Duham species (Caprifoliaceae family) with ornamental fruits of white, pink, red, and greenish color are very perspective [1, 2].

In order to accelerate the production of planting material of perspective types and forms of ornamental shrubs and their introduction into the practice of green building, it is necessary to develop techniques and methods for their reproduction.

Reproduction of woody plants by stem cuttings is the simplest and most accessible method of vegetative reproduction in wide industrial practice. Cuttings make it relatively easy to obtain in mass quantities own-root planting material, which fully reproduces the characteristics and properties of mother plants.

The data available in the literature are mainly devoted to the green cuttings of Symphoricarpos albus. The rooting rate of cuttings ranges from 22.5-40% [3] to 70 [4] and 97% [5] At the same time, in order to obtain satisfactory results with green cuttings, it is necessary to take into account a number of factors, the main of which are the selection of the optimal cutting time and the decay of rooted cuttings in the winter.

The aim of the work is to study the ability for vegetative propagation by lignified cuttings of Symphoricarpos Duham species in the collection of the Botanical Garden.

Material and research methods

Currently, there are 4 species of Symphoricarpos in the collection of the Botanical Garden.

S. albus Blake. Deciduous ornamental shrub up to 1.2 m with a rounded crown and long thin shoots. The leaves are simple, ovate or almost rounded, 1.5-6 cm long, 0.5-1.5 cm wide, green above and gray below. Ripe fruits are berry-shaped, spherical, up to 1 cm in diameter, white, retain their decorative effect after the leaves fall.

S. orbiculatus Moenche. Deciduous ornamental shrub up to 0.8-1 m in height, with thin vertical shoots. Fruits are almost spherical, up to 4-6 mm in diameter, purple-red.

S. microphyllus Kunth. Deciduous ornamental shrub, up to 1.5 m in height, erect, strongly branched. The leaves are ovate, sharp at the apex, with a wedge-shaped base, 1-2.5 cm long, 0.7-1.8 cm wide, entire, dark green above, glabrous or finely pubescent, pale green below and shortly hairy. Fruits are spherical, white or with a pink tinge, translucent, 6-8 mm in diameter.

S. x doorenbosii. Shrub 1.5-2m tall, erect, with thin shoots. Leaves elliptical to lanceolate, 2.0-6.0 cm long, 1-2.5 cm wide, dark green above, pubescent, lighter below, almost glabrous. Fruits are ellipsoidal, pink, 0.7-0.9 cm in diameter.

There a lot of researches about the ability for vegetative propagation by lignified cuttings in open ground. This method has a number of advantages over green cuttings - there is no need for expensive fog plants and, in addition, early spring and a long growing season in Uzbekistan make it possible to obtain planting material for shrubs in 1-2 years.

Well-developed annual shoots were harvested in early December. After removing the upper unripened part, the shoots were tied into bunches and dropped in a standing position into the sand in a trench. At the end of January, cuttings with 2-3 knots were cut, they were placed in a 0.05% solution of the stimulant "Kornevin" or "Heteroauxin" for 14-16 hours. The cuttings were planted in deepened wide burns according to the scheme 5x7 cm. The substrate was coarse-grained washed sand with a layer of 4 cm. Plantings were watered from a watering can as needed, avoiding waterlogging.

When planting rooted plants in the nursery at the end of May, the number of roots and the length of the most developed root, the number of lateral shoots and the length of the most developed of them were determined.

Statistical processing of the actual material was carried out using generally accepted criteria [6].

Results and discussion

The results of observations are presented in table#1

Table 1.

Peculiarities of Vegetative Propagation of Symphoricarpos Species by Lignified Cuttings

Research options	n	Rooting, %	Indicators when landing in the nursery			
			Roots		shoots	
			Number	Max length, cm	Number	Max length, cm
S. albus						
Monitoring	18	55,6±11,71	4,5±0,56	4,2±0,33	1,7±0,15	8,6±0,95
Heteroauxin	18	72,2±10,56	3,9±0,43	6,1±0,37	1,8±0,17	10,5±0,87
Roots	18	83,3±8,78	4,1±0,23	6,3±0,41	2,1±0,15	13,5±0,90
S. orbiculatus						
Monitoring	25	68,0±9,33	2,8±0,30	3,8±,034	1,5±0,13	9,7±1,03
Heteroauxin	25	84,0±7,33	5,1±0,45	5,1±,033	2,0±0,14	13,8±1,55
Roots	23	91,3±5,88	3,7±0,41	5,3±0,50	2,1±0,20	19,7±1,95
S. microphýllus						
Monitoring	25	64,0±9,60	3,1±0,18	3,8±0,34	1,8±0,14	10,8±1,07
Heteroauxin	20	80,0±8,94	3,9±0,27	4,6±0,24	2,4±0,13	15,2±0,93
Roots	20	90,0±6,71	4,4±0,38	4,7±0,35	2,3±0,12	20,4±1,42
S. x doorenbosii						
Monitoring	26	61,5±9,54	3,0±0,24	3,5±0,31	1,8±0,11	9,9±0,76
Heteroauxin	22	86,4±7,32	3,9±0,27	4,6±0,24	2,4±0,13	16,9±1,20
Roots	22	95,5±4,44	4,5±0,35	5,1±0,32	2,3±0,12	22,9±1,54

Note: underlined values are significantly different from control values (P<0.05).

As can be seen from the presented data, in the control variant, the rooting rate of lignified cuttings ranged from 55.6±11.71 (S. albus) to 68.0±9.33% (S. orbiculatus). The use of stimulants significantly increases the yield of rooted cuttings, from 83.3±8.78% in S. albus to 95.5±4.44% in S. x doorenbosii. At the same time, the growth and development of plants

occurs much faster - the number and length of roots, the number and length of shoots increase. The best results in most cases are obtained with the use of root.

By autumn, about 40% of the plants were ready for planting in a permanent place.

On the example of S. albus, it is explored that the influence of the position of the cutting on the shoot on the features of vegetative reproduction. Rootin was used as a stimulant (Table 2).

Table 2.

Features of vegetative reproduction of S. albus depending on the position of the cuttings on the shoot

The position of the cuttings	n	Rooting, %	Indicators when landing in the nursery			
			Roots		Shoots	
			Number	Max length, cm	Number	Max length, cm
Upper	10	40,0±15,49	2,0±0,58	3,0±1,08	1,0±0,00	13,0±2,65
Middle	12	66,7±13,40	3,0±0,50	3,8±0,56	1,4±0,18	22,8±3,38
Lower	15	60,0±12,65	3,1±0,31	4,4±0,58	1,6±0,18	38,9±4,36

Note: underlined values are significantly different from those of the upper cuttings ($P<0.05$).

From the data in Table. 2 shows that the best results in terms of rooting and further growth and development of plants were obtained using lignified cuttings from the lower part of the shoots.

Thus, the obtained results indicate that:

- the studied species are successfully propagated by woody cuttings;
- the best results were obtained when using rootstock and cuttings from the bottom of the shoots;
- the studied method of grafting makes it possible to obtain up to 40% of planting material ready for planting in a permanent place in the first year of growing.

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