

## THE INFLUENCE OF THE SUBSTRATUM ON ACCA SELLOVIANA CUTTINGS ROOTING

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### **Abstract**

*The Acca selloviana is cultivated as a fruit shrub and as an ornamental shrub. It has big flowers and eatable fruits, the size of a lemon. In present the acca selloviana is cultivated in open air and, in regions with unfavourable climate conditions, is cultivated in vegetable vases. These remain outdoor in the warm season and indoor in protected spaces, in the cold season. As a room-plant, the acca selloviana is very attractive by the many small cultivars.*

*In Romania Acca selloviana is less widespread as ornamental or economic utility plant. The reason is the lack of multiplication material as a consequence of low efficiency in multiplication.*

**Keywords:** Acca selloviana, sand, beech sawdust, roots

### **INTRODUCTION**

Experiences on the substrate influence on the rooting of Acca selloviana seedlings were performed between 2017-2019 in the dendrological nursery Santandrei, Bihor County.

Working hypothesis was that through the use of valuable cultivars in terms of providing an inexpensive and easily procured substrate, a favorable microclimate with a uniform tint, can be obtained production performance and economic efficiency.

The seedlings rooting is made in the sand, sand + peat in proportion of 1:1, garden soil + sand, sand + pearl stone. (John Broockes, 2004).

In Romania was recommended to us mixing peat and perl in proportion of 2:1 (Zaharia, Dumitru, 1992), beech sawdust and sand in proportion of 1:1 (Vlad, 2012).

In Germany is used with good results substrate composed of sand grains with mean of 1-2 mm, in proportion of 80% and Pine needles 20% (John Brookes 1999). Must be mentioned that both peat and peat are very expensive materials and replacing them with cheaper materials would reduce the cost of saplings.

### **MATERIAL AND METHOD**

There were used semi-lignificated, top seedlings of 10-12 cm length. Experience has included 3 variants: V1 - rooted cuttings in sand, V2 - rooted cuttings in sand + sawdust beech, 25% / 75% and V3 - rooted cuttings in sand + sawdust beech, 50% / 50%, with 600 seedlings per variant.

The seedlings for rooting were planted in 15 May 2017, 2 June 2018 and 3 June 2019, at a distance of 6x6 cm and depth of 4-6 cm, with good settling of the substrate to remove air spaces of the rooting area.

Light was directed by covering seedlings with green plastic net with mesh 0.5/0.2 cm. In very warm periods were used 2-3 nets.

After rooting the cuttings were planted in pots with a diameter of 12 cm in garden soil 55% black soil 15%, peat 15% and 15% sand.

To differentiate the variants have been made observations and determinations regarding the duration of the rooting, the proportion of rooted cuttings, the number, size and form of the roots.

The calusation process on the base of seedlings begun at close intervals of time with an easy advance to Variant 2. (Table 1)

In 2017 cuttings the calusation duration was 35 days at Variant 1 (rooting in sand), 32 days at Variant 2 (rooting in sand 25% + beech sawdust 75%) and 34 days to Variant 3 (rooting in sand 50 % + beech sawdust 50%) (Table 1).

The period of cuttings rooting expanded during the three years from 118-137 days to Variant 2 (rooting in sand 25% + beech sawdust 75%) at 118-129 days in Variant 3 (rooting in sand 50 % + beech sawdust 50%) and 112-134 days at Variant 1 (rooting in sand).

Substrate composed of sand 50% + beech sawdust 50% leaded in rooting the cuttings in 6-10 days earlier than in the sand.

The number of rooted cuttings from that 600 cuttings put on rooting, had average values of 390 cuttings from Variant 1 (rooting in sand), 535 cuttings from Variant 2 (rooting in sand 25% + beech sawdust 75%) and 420 cuttings in Variant 3 (rooting in sand 50 % + beech sawdust 50%) (Table 2).

Table 1

Experimental data regarding on calusation and rooting period of *Acca selloviana* cuttings, Santandrei, 2017-2019

Nr. crt.	Rooting substrate	2017					2018					2019				
		Data in which the cuttings were rooted in	Data of calu-sation	The days number until calu-sation	Date of rooting	The days number until rooting	Data in which the cuttings were rooted in	Data of calu-sation	The days number until calu-sation	Date of rooting	The days number until rooting	Data in which the cuttings were rooted in	Data of calu-sation	The days number until calu-sation	Date of rooting	The days number until rooting
1	Sand	15 V	20VI	35	2 X	137	2VI	30VI	28	5 X	123	3 VI	30VI	25	30IX	118
2	Sand 25% + beech sawdust 75%	15 V	17VI	32	24IX	129	2VI	27VI	25	30IX	118	3VI	25VI	20	20IX	108
3	Sand 50% + beech sawdust 50%	15 V	19VI	34	29IX	134	2VI	29VI	27	2 X	120	3 VI	27VI	22	24IX	112

Table 2

Experimental average data obtained in rooting of *Acca selloviana* cuttings, Santandrei, 2017-2019

Variants	Rooted cuttings		+ - D	Significance of difference
	Number	%		
V <sub>1</sub> – rooting in sand	390	100	-	-
V <sub>2</sub> - rooting in sand 25% + beech sawdust 75%	535	137	145	***
V <sub>3</sub> - rooting in sand 50 % + beech sawdust 50%	420	108	30	*

LSD 5% - 25.9  
LSD 1% - 44.1  
LSD 0.1 % - 74.8

Number of rooted cuttings of all those rooted in oscillates between 65% and 89.1%.

The differences are statistically analyzed provided positive very significant in Variant 2 (- rooting in sand 50% + beech sawdust 50%) and significant in Variant 3 (rooting in sand 75 % + beech sawdust 25%).

The rooting terms of quality is the average number of roots per slip (Table 3).

Table 3

Average number of roots per cutting, Santandrei, 2017-2019

Variants	Roots per cutting		+ - D	Significance of difference
	Number	%		
V <sub>1</sub> – rooting in sand	6.5	100	-	-
V <sub>2</sub> - rooting in sand 50% + beech sawdust 50%	11,7	180	5.2	***
V <sub>3</sub> - rooting in sand 75 % + beech sawdust 25%	8,2	126	1,7	*

LSD 5% - 1.41  
LSD 1% - 2.11  
LSD 0.1 % - 3.16

It is noted that between Variant 1 (rooting in sand) and Variant 2 (rooting in sand 50% + beech sawdust 50%) are large differences from 6,5 roots per cutting to 11,7. Values, expressed in percentage are equivalent of an overrun of 80% in Variant 2 and of 26% in Variant 3, compared to variant 1 (witness).

Differences are statistically considered, provided positive very significant on variant of the substrate composed of sand + 50% beech sawdust 50% and significantly on variant with a substrate composed of sand 75% + beech sawdust 25%

Increasing the rooting ability of the cuttings comes out from root length and thickness of the newly formed plants. Table 4 shows that the length and thickness of roots vary with relative wide limits with favorability for cuttings rooted in substrate composed of 50% sand + 50% beech sawdust.

Table 4

Length and thickness of the roots of *Acca selloviana* plants, Santandrei, 2017-2019

Variants	Length of roots (cm)	Grouping the roots by thickness		Total
		Roots number < 1 mm	Roots number > 1.1 mm	
V <sub>1</sub> – rooting in sand	1,2-8.3	5,1	3.1	8,2
V <sub>2</sub> - rooting in sand 50% + beech sawdust 50%	2,2-14.9	9,2	5.8	15,0
V <sub>3</sub> - rooting in sand 75 % + beech sawdust 25%	1.9-11.7	6,1	4.0	10,1

Length of roots varies between 1,2-8,3 cm in Variant 1, witness, cuttings rooted in the sand and between 2,2-14,9 cm in Variant 2, cuttings rooted in the sand 50% + beech sawdust 50%. By thickness, up to 1 mm in diameter roots category, had values ranging 5,1 pcs. per cutting on the Variant 1 (rooting in sand) and 9,2 pcs. per cutting on Variant 2 (rooting in sand 50% + beech sawdust 50%), while those with thickness greater than 1.1 mm in diameter was between 3.1 pcs. per cutting in Variant 1 and 5.8 pcs. per cutting in Variant 2.

## CONCLUSIONS

The *Acca selloviana* is an ornamental plant, particularly valuable, least common to us, which is due on the lack of material, as a result of decreased efficiency in multiplication

The rooting period of the cuttings was 108-137 days.

The best option both in terms of the number of rooted cuttings and the number of roots per cutting and the roots length and thickness, was that in which the substrate was composed of sand 50% + 50% sawdust beech.

Decreasing the content of the rooting substrate in sawdust beech up to 25% causes a decrease in rooting yield to 78.5% but higher as variant witness (sand).

Increasing the rate of multiplication by cuttings of *Acca selloviana* can be stimulated by using appropriate substrates.

The method developed in the Santandrei nursery (Oradea) may contribute to expansion of *Acca selloviana* in our country.

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