

SELECTION AND PROPAGATION OF SWEET CHERRY PROMISING CLONES IN CLIMATIC CONDITIONS IN LATVIA

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ABSTRACT

The research data have been summarized on sweet cherry (*Prunus avium* L. syn. *Cerasus avium* (L.) Moench) promising clone selection and propagation for the growing of high-quality trunks and wood stock obtaining in Latvia climatic conditions. In this study, Latvian State Forest Research Institute "Silava" Plant physiology laboratory and Institute of Horticulture Units of Genetics and Breeding has established the first collection of sweet cherry clones important for selection from different regions of Latvia, which currently has 45 accessions.

The method for successful microclonal propagation of selected clones has been fully developed including sample collection, explant preparation, sterilization, medium composition for the culture establishment, propagation and rooting, and further monitoring of explants until transplantation into a suitable substrate. The method for the propagation by leafy cuttings has been developed. The treatments with IBA (indole-3-butyric acid) and lignosilicon were used for rooting stimulation and the treatment with IBA resulted in a higher proportion of cuttings which formed the callus than treatment with lignosilicon - 98% and 68% respectively. We also tested the mycorrhizal preparation "Symbivit".

Keywords: wild cherry, local clones, microclonal propagation, in vitro, leaf cuttings.

INTRODUCTION

Sweet cherry (*Prunus avium* L. syn. *Cerasus avium* (L.) Moench) is one of the fast-growing hardwood species which has attracted the attention recently, but historically has been investigated in Europe since the 1980ties. Sweet cherry characteristics as positive contributions to the conservation of biodiversity, the development of the bioeconomy and the social sphere of the cherries has attracted the attention of scientists. Approbation of sweet cherry taxa and selection of promising clones for their further propagation is performed in many European countries (Latvia, Sweden, Denmark, Netherland, Poland, Germany, Czech Republic, France, Slovakia, Slovenia, Romania, Hungary, Portugal etc.).

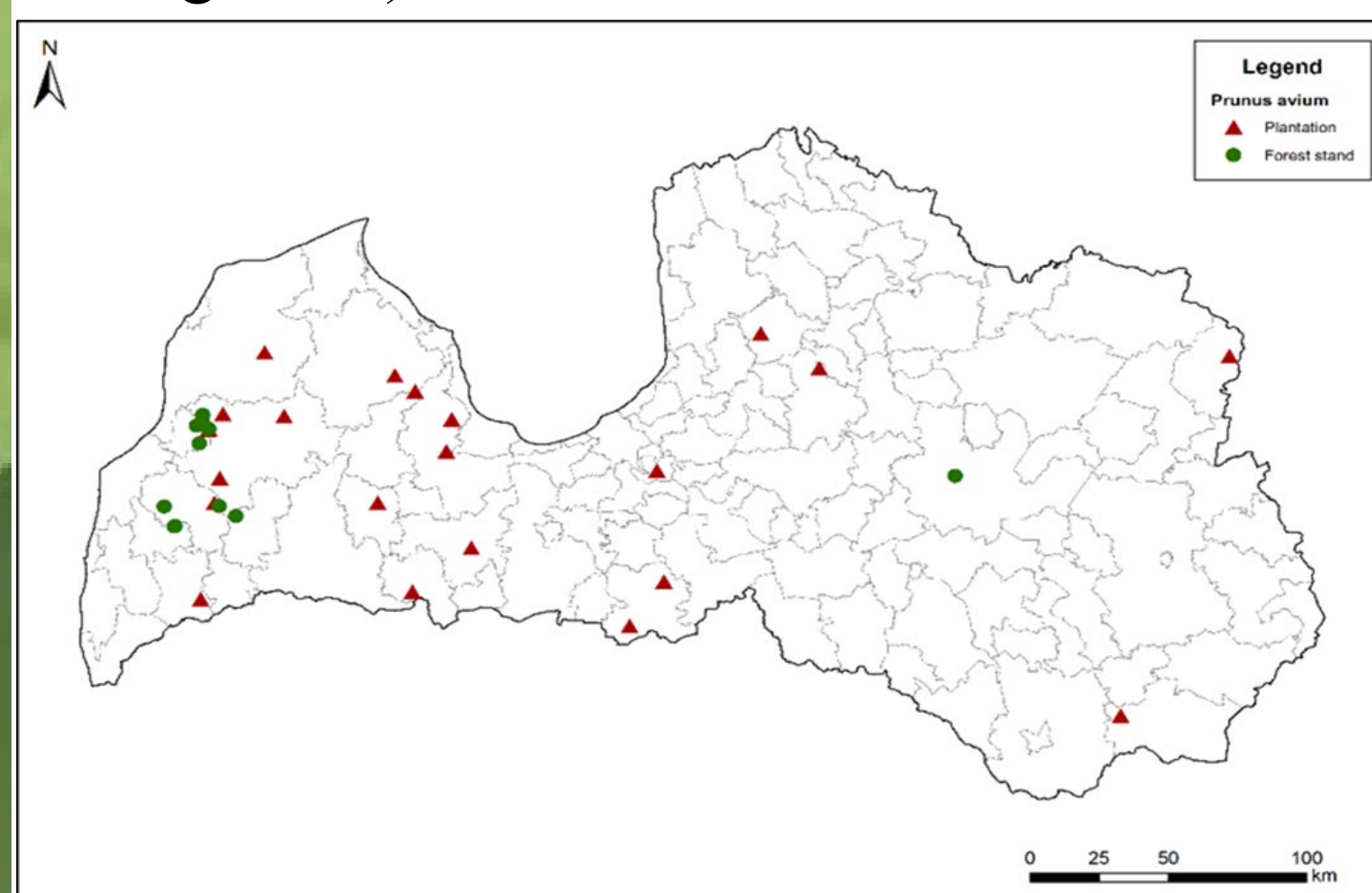


Fig. 1. The occurrence of sweet cherry in forest resource monitoring plots (forest stands) and plantations.

In this study we propagated sweet cherry clones from different sites of Latvia: 12 plantation in Western, five plantation in Central and four plantations in Eastern Latvia (Fig.1). Besides it, promising introduced clones has been investigated – the clone from 'Denmark Trust 791' as well as the clones from Sweden (nr. 9., 10. and 13.).

The aim of study:

- Selection of superior sweet cherry genotypes from local cherry provenances found in various regions for timber production and agroforestry systems.
- Method approbation of perspective clone microclonal propagation and leaf cutting rooting initiation.

METHODOLOGY

Two methods were used to propagate the prospective sweet cherry clones: microclonal propagation and rooting of the leaf cuttings. For microclonal propagation, optimal sampling time has been chosen before buds burst in the beginning of April, as well as in the beginning of June, when the lignification in new shoots have started. For the preparation of spring explants, 15-20 cm long shoots of the previous year shoot with vegetative buds have been taken. For further sampling rooting, the explants have been prepared by cutting into 3-5 cm segments, sterilised in 0.1% HgCl₂ solution and placed on medium MS1.

Samples of leaf cuttings were collected during the June and July, choosing new shoots (for trees with a slow growth rate of 20-30 cm cuttings, for trees with a fast growth rate of up to 50 cm cuttings). The shoots have been cut to 10-12 cm segments with 2-3 half leaves for which segment. To promote rooting, growth stimulants was used - lignosilivium, butyric acid and the mycoriza preparation "Sibivit".

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RESULTS AND DISCUSSION

'Research Institute SILAVA' together with 'Institute of Horticulture Units of Genetics and Breeding' has established the first collection of sweet cherry clones important for selection from different regions of Latvia, and successfully propagated 2760 plants (Tab. 1, Fig. 2).

Table 1
Perspective clones of sweet cherry propagation with microclonal method.

No.	Clone	Propagation beginning date	Number of plants 01.07.21.	Number of planted in pots 28.04.21.	Number of planted in pots 19.05.21.	Survivance % 22.09.21.
1.	Ēdole Z10/2020	2020.	150			
2.	Ēdole 10/2020	2020.	710	600	210	94
3.	Ēdole 6/2010	2010.	100			
4.	Liede 2/2020	2020	100	30	15	100
5.	Botanical garden	2016.	100			
6.	Dobele D4/2010	2010.	500	135	105	94
5.	Ziediņi/Truust F791 DK/2010	07.04.2020.	1100	75	15	98

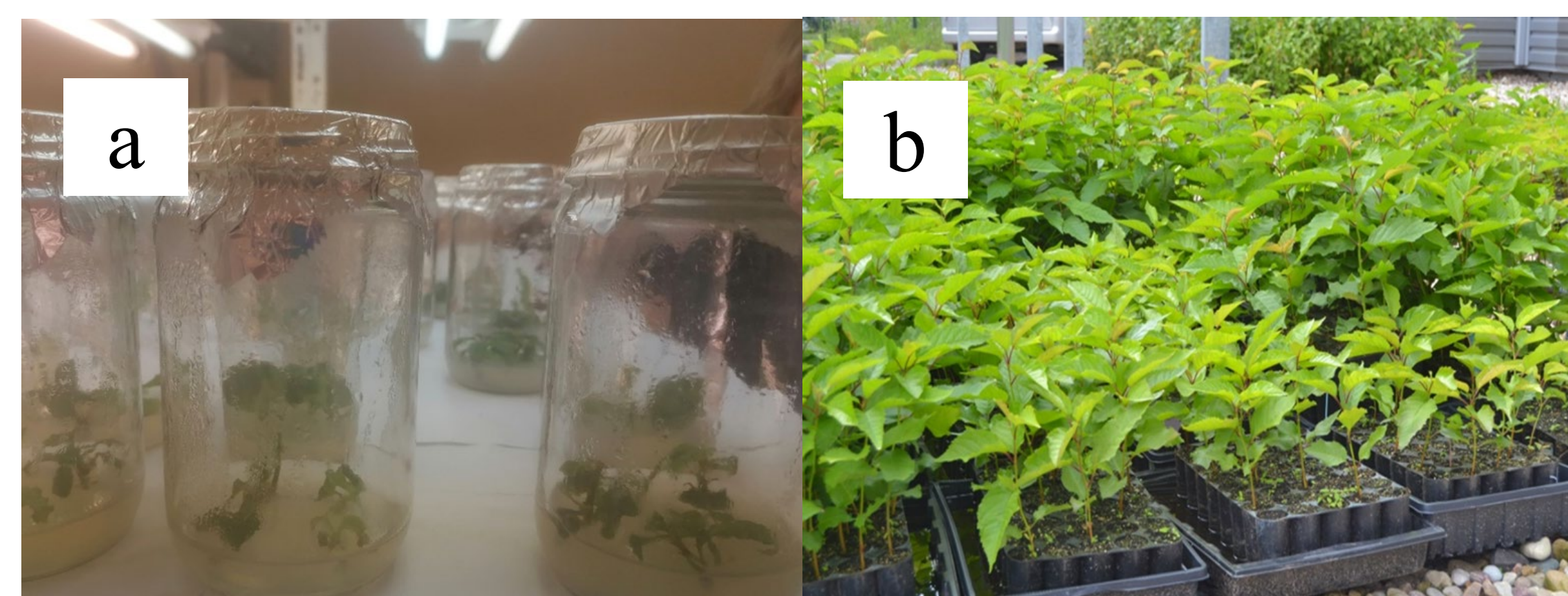


Fig. 2. Sweet cherry propagation in vitro a) in laboratory; b) after one season.

The treatment with IBA resulted in a higher proportion of cuttings which formed the callus than treatment with lignosilicon - 98% and 68% respectively. The mycorrhizal preparation "Symbivit" has been tested (Tab. 2, Fig. 3).

Table 2
Clones chosen for leaf cutting during research.

Genotype	Group	Cuttings with callus, %
Agrais Hedelfingens	Control	89
Agrais Hedelfingens	Mycorrhiza	77
Brjanskaja Rozovaja	Mycorrhiza	90
Šķēdes Jānis	Control	80
Šķēdes Jānis	Mycorrhiza	86
Pūres Jānis	Mycorrhiza	83
Kalniņa Sējenis	Control	91
Briežu Vēlais	Control	29
PU 14498	Control	77
Smiltenes 9	Control	63
Smiltenes 9	Mycorrhiza	77
Aizkraukles Saldais	Control	94
Karzdabas 2	Control	71
Karzdabas 4	Control	81
Karzdabas 4	Mycorrhiza	80
Muižas 1	Control	71
Muižas 1	Mycorrhiza	97
Muižas 2	Mycorrhiza	94
Muižas 4	Control	78
Muižas 4	Mycorrhiza	76
Together	Control	76
	Mycorrhiza	83

CONCLUSIONS

1. Mycorrhizal preparation 'Sibivit' improved callus formation, but further work should proceed to develop efficient techniques for rooting of cuttings.
2. Research ensure the development of the first collection of sweet cherry clones important for selection from different regions of Latvia.