

NORWAY SPRUCE (*PICEA ABIES* (L.) KARST) SEEDLINGS

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Introduction

Norway Spruce forests occupy 21.1% of all Lithuanian stands (PMSA, 2020). In order to extract high-quality spruce wood, it is important to take into account its growth principles and biology. In forestry in Lithuania, spruce stands have both spontaneous and naturally regenerating origins.

In the face of changing climate, which affects the various conditions required for the growth of spruce, it is important to carry out observations during growth in order to grow a valuable stand. It is observed that as the climate warms, there is a more frequent growth of secondary shoots in spruce trees. Secondary growth (sileptic and proleptic) is a genetically decisive trait for specific genotypes, which manifests itself in the growth of apical bud bursts and shoots twice during the vegetation period without reaching rest (Danusevičius, 2008). These changes can affect the quality of the stem and later even the wood.

The aim of study it was to determinate the differences in the secondary growth of Norway spruce (*Picea abies*) seedlings.

Main tasks:

- 1.To determine the basic biometric parameters of spruce.
- 2.To compare the change of secondary growth of second-year, third and fourth year spruce seedlings.

Methodology

The research was started in the spring of 2019 in the nursery of the Dubrava regional branch of the State Forest Enterprise. The study was aimed at seedlings of 4-year-old spruce (*Picea abies* (L.) Karst), which already in 2018, the types of secondary growth were determined for seedlings, i.e. proleptic, sileptic and simple growth.

Biometric parameters of spruce were also determined after determining the types of secondary growth. During the study, 135 seedlings were measured, which were divided according to their growth types: proleptic, sileptic and normal growth. Later, each individual was marked with a special marker and re-transplanted in the nursery of the Dubrava regional branch of the State Forest Enterprise.

Results

Research shows that many seedlings of Norway spruce did not survive. 19 units of syleptic growth type seedlings remained, 28 units of proleptic type and 7 units of ordinary growth type. Most advantageous seedlings are syleptic growth type. Average height of syleptic growth type in 2019 was – 37,9 cm., proleptic – 50,7 cm. Average height of proleptic growth type seedlings in 2019 – 29,2 cm., 2020 – 39,9 cm. Average height of ordinary growth type in 2019 was – 18 cm., 2020 – 28,5 cm. Average diameter of syleptic growth type in seedling root neck in 2019 was 8 mm., in 2020 – 15 mm. Proleptic growth type avg. diameter in 2019 was 7,1 mm., 2020 – 13 mm. Average diameter of ordinary growth type in 2019 was – 4,9 mm., 2020 – 9 mm.. It appears that most of the seedlings in a fourth year had lost signs of secondary growth. The last year of the research they had grown in ordinary way. The percentage of the change in syleptic growth type – 63%, proleptic – 54%, ordinary - 71%. Ordinary growth type Norway spruce seedlings in a fourth year has shown signs of proleptic growth.

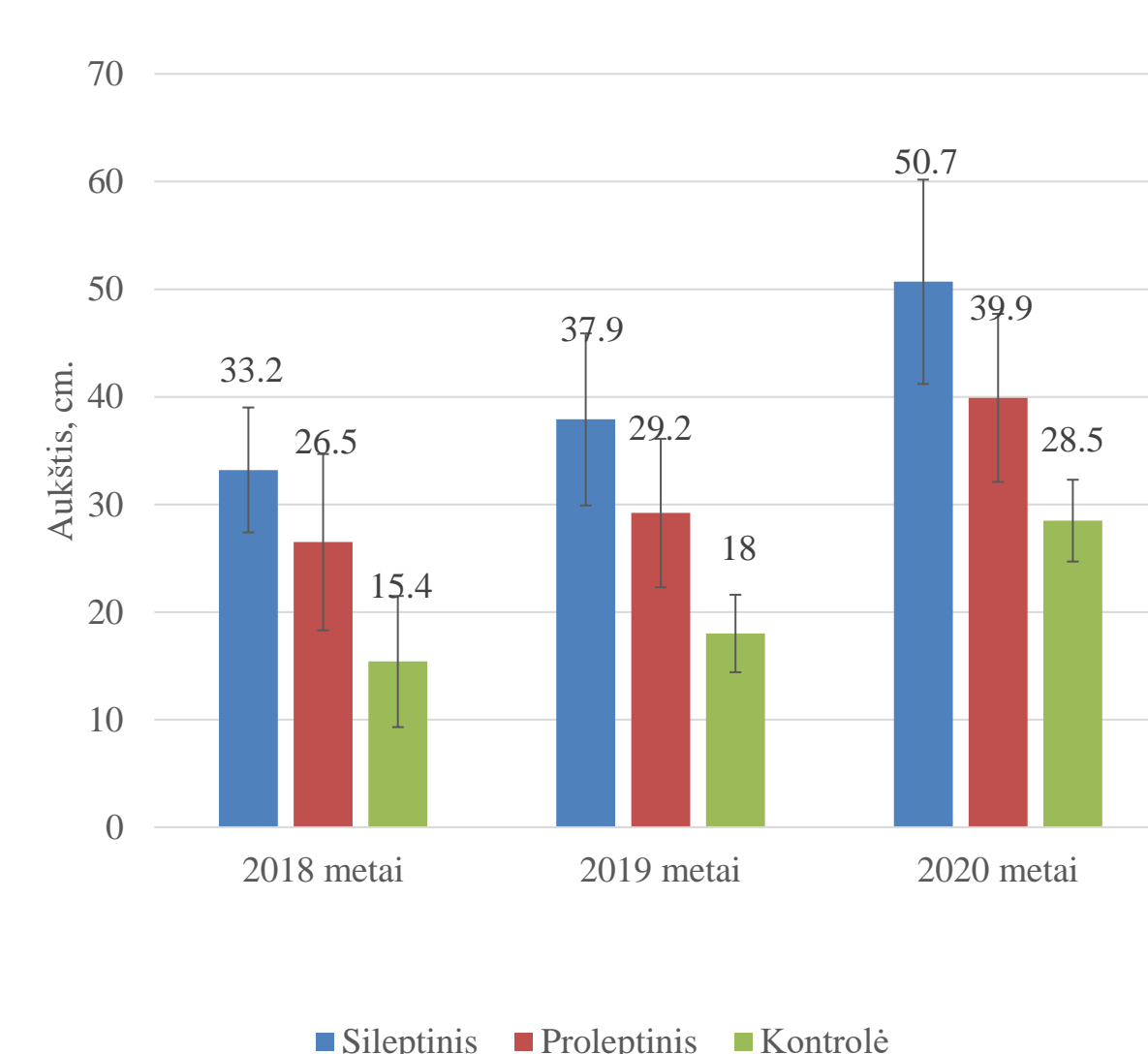


Fig. 1. Distribution of average height of spruce seedlings by growth, mean error ± 6.9 cm, ($p < 0.05$)

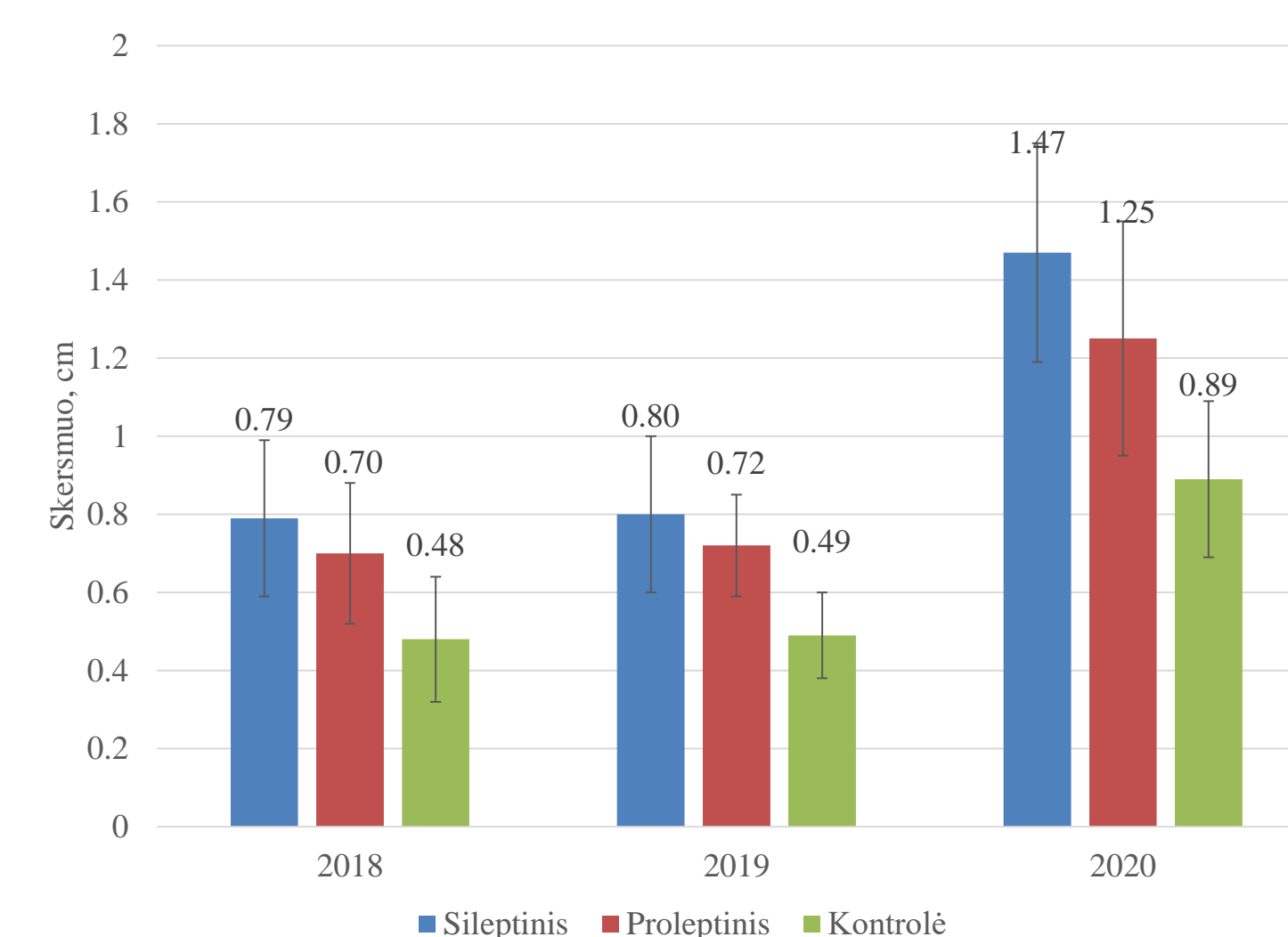


Fig. 2. Distribution of the average diameter of spruce seedlings at root collar height by growth, mean error ± 0.19 cm, ($p < 0.05$)



Main conclusions

In the fourth year of growth, the type of seedling growth changed. Most seedlings showed no signs of secondary growth, they grew in simple growth. Percent change in sileptic growth - 63%, proleptic - 54%, control - 71%. In the fourth year of growth, the Norway spruce acquired signs of proleptic growth.