

Original article

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## Influence of the Frost Heaving on the Growth of Siberian Spruce Seedlings in the Forest Nursery

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**Abstract.** The consequences of the 1-years-old Siberian spruce seedlings frost heaving in the nursery of the Middle Urals grown from seeds treated with biological preparations (verva and verva-spruce) before sowing are described. Frost heaving led primarily to the death of a significant number of seedlings. The surviving seedlings showed a decrease in growth parameters and an increase in the proportion of plants with morphological abnormalities. This resulted in a decrease of standard seedlings production suitable for reforestation. Pre-sowing seed treatment with biological preparations verva and verva-spruce allowed partially mitigating the negative impact of the frost heaving effects, however, their action is primarily aimed at increasing the values of biometric indicators. The proportion of Siberian spruce seedlings that reached the standard size in height and trunk diameter was higher in the variants with the use of biological preparations, except for the variant – verva-el at a dose of 0.1. Statistically proven effect of biological preparations on the surviving of seedlings has not been established.

**Key words:** siberian spruce, frost heaving of seedlings, safety, biometric indicators, forest nursery, biopreparation verva and verva-spruce.

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