

Abstract

Soil fertility rather reduces potential productivity of silver birch at the early stage of natural regeneration of post-agricultural lands [†]

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Abstract: The study aimed to investigate the effect of soil fertility on the growth potential of naturally regenerated silver birch (*Betula pendula* Roth.) stands growing on the post-agricultural lands in Mazowieckie region (central Poland). We selected 10 locations with birch renewals of age ranging from 2 to 17 years. At each place we established a 4-plot chronosequence and determined the following features in the upper 50-cm-thick soil layer: soil texture, pH, total carbon and nitrogen level, and base cations content. These characteristics were later on used for soil fertility index calculation. Based on the height measurements, we determined the site index (height at the base age of 25 years) for the analysed stands using previously developed formula. Trees height as well as chemical properties of soils under silver birch regeneration varied with regard to the age, whereas soil physical attributes turned to be rather stable. We found out that both soil fertility index and site index values were not significantly correlated with stand age ($r = -0.043$, $p = 0.919$ and $r = -0.053$, $p = 0.748$, respectively) indicating that site productivity potential during the initial phase of secondary succession is rather stable. However, the soil fertility turned to have the negative and significant impact on the site index of birch renewals ($r = -0.372$, $p = 0.018$). This might have probably resulted from the similar type of relationship we observed between site index and base cations content ($r = -0.317$, $p = 0.046$).

Keywords: soil fertility, site index, secondary succession

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