

—抄録 (Abstract) —

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トドマツ精英樹次代検定林における年輪構造の遺伝的変異と環境との交互作用

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Genetic Variation and Genotype-environment Interaction in Annual Ring Structure in Progeny Test of Plus Trees of Sakhalin Fir (*Abies sachalinensis*)

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For improving the wood properties of Sakhalin fir (*Abies sachalinensis*) variation in annual ring structure and genetic variation in different environments were examined by X-ray densitometry. The specimens were sampled from 32- to 41-year-old open-pollinated families in progeny test stands, which were 74 families totaling 444 trees in Bibai and 24 families totaling 96 trees in Akkeshi. Six components were analyzed as growth ring components—ring width (RW), earlywood width (EW), latewood width (LW), ring density (RD), earlywood density (ED), and latewood density (LD). The values of LW and LD in Akkeshi were smaller than those in Bibai under the influence of low temperature and short sunlight hours in summer. Narrow sense heritability of ring components was 0.17-0.27 for width and 0.26-0.34 for density in Bibai and 0.47-0.79 for width and 0.26-0.66 for density in Akkeshi. The value of heritability of LW and LD in Akkeshi was different for other traits, probably because of the summer weather. The

analysis using 23 common families in two stands indicated that interaction between families within provenance and stands was significant in LW, RD, ED, and LD. Therefore, seed zones are as necessary for wood density as resistance to weather damages and disease, or growth.

Key words: annual ring structure, genotype-environment interaction, heritability, x-ray densitometry

年輪構造, 遺伝と環境との交互作用, 遺伝率, X線デンシトメトリ

トドマツの材質改良のため, 異なる環境における年輪構造と遺伝的変異をX線デンシトメトリ法で検討した。供試木は美唄と厚岸の精英樹準次代検定林より採取した林齢32～40年生のトドマツ精英樹家系で, 美唄で74家系444個体, 厚岸で24家系96個体であった。解析の項目は年輪幅(RW), 早材幅(EW), 晩材幅(LW), 年輪密度(RD), 早材密度(ED), 晩材密度(LD)の6形質であった。夏季の低温と日照時間の不足の影響で厚岸のLDとLWの値は美唄よりも小さかった。狭義の遺伝率は美唄では幅が0.17～0.27で, 密度が0.26～0.34, 厚岸では幅が0.47～0.79で密度が0.26～0.66であった。厚岸の晩材幅と晩材密度の狭義の遺伝率は他の形質と異なった結果となり, 夏期の天候が影響していると考えられた。検定林で共通の23家系を用いた解析で地域内家系と検定林間の交互作用はLWとRDとEDとLDで認められ, 成長や気象害・病害抵抗性と同様に, 材密度においてもトドマツの需給区分の必要性が確認された。

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