

# Radial Growth Changeability in Horizontal Roots of *Pinus sylvestris* L.

Rimvydas K. Kriukelis

Institute of Botany, Zaliuju ezeru 49, LT-2021 Vilnius, Lithuania

## ABSTRACT

*Pinus sylvestris* has a very plastic root system that can change depending on the environmental conditions. The main quantities of root system elements sometimes vary individually, however, usually they change together under effect of biological, edaphic and biocenotic factors.

*Pinus sylvestris* L. trees growing near the self-contained 53 ha lake Baltys were sampled. The lake has 25-27 yr period water level fluctuations (amplitude – about 1.5 m) that effect the lakeside pine stands. The investigation objects were studied in 90 yr old and 120-150 yr old *Vaccinio-myrtillosum* Pinetum. The root systems of trees were uncovered by the classical washing method. Cross-section of roots were taken from the root base and at a distance of 20 cm from it. Maximum width of every annual ring was measured and the angle of maximum growth direction due to the pith established using original author's method. A total of 54 cross-sections from 18 stems and 267 from roots were measured.

This study includes an analysis of tree-ring growth different parts of trees (stem and roots) as well as different site locations (different height from lake level). Due to unfavourable environmental conditions or mechanical damages the slower growth in one part of the root system caused a more intensive growth in another part or compensating growth. The cross-sections of young Scots pine roots are rounded. However, the older the xylem, the more uneven its distribution around the root axis and it is incomparably more eccentric than in the stem. The horizontal roots are more eccentric than vertical and a very high variety of annual tree-ring formations in different roots of the same tree were observed. Tree-ring radial growth reaction to lake water level fluctuations of two kinds was established due to our investigations: positive (mostly) or negative – in horizontal roots and negative - in stems. *Pinus sylvestris* horizontal roots react to the changes of environment more sensitive, diverse and not always synchronously. Variability in all frequency ranges (high-frequency and low high-frequency variations) in horizontal root radial growth dynamics of Scots pine is significantly higher than in stems. The investigations on root radial growth, as a constituent part of complex research, may increase information on forest ecosystems to a considerable extent.

Key words: *Pinus sylvestris*, horizontal roots, radial growth, changeability, dendroecology,

Address of the author:

Dr. Rimvydas K. Kriukelis  
Institute of Botany, Laboratory of Landscape Ecology  
Zaliuju ezeru 49, LT-2021 Vilnius, Lithuania

Tel.: +370-2 736 909  
Fax: +370-2 729 950  
E-mail: rimvis@ktl.mii.lt