GENERAL INFORMATION

author(s)	Willems S
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English title	Impact of the biotic and abiotic soil characteristics on the water balance of a mixed broadleaved forest (experimental forest Aelmoeseneie)
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project	
supervisor	Lemeur R
institution	Laboratory of Plant Ecology
document	pdf_short, hardcopy at the Laboratory of Plant Ecology
data	Appendices: vegetation near root sample points, root length distribution, root mass, soil moisture profiles, soil density, input data WAVE

MATERIALS & METHODS

study area	5n (scientific zone)
time period	July-August 1997 + November 1997
goal	Investigation of the soil variables that affect the soil water balance of a forest. - Determination of the root distribution. - Determination of the abiotic soil characteristics. - Simulation of the soil water balance with the WAVE model.
set-up	oak-beech vs. ash stand
data collection	roots - location 12 'at random' sample points on p 50 - 0-15, 15-30, 30-45, 45-60, 60-75 cm - root auger: 729 ml samples (d 8 cm, l 14.5 cm) - July-August 1997 (litter layer in November 1997) - roots (d < 1 mm, 1-2 mm, 2-5 mm; dead vs. living), OM, soil separated - root mass and length abiotic soil conditions - soil water potential: 6 tensiometers per stand (10, 25, 50, 75, 100, 150 cm) - precipitation (platform 4 and 5, 1 hour data), stem flow (5 trees per species, 14 day data), throughfall (1 hour data) - soil density, total pore volume (near the root sample points)
remarks	soil profile from Hubrechts_etal_1997_rep on p 49

RESULTS

The root length and biomass showed a high spatial variability, both horizontally and vertically. More samples are required to determine the horizontal root density patterns. The root length was significantly higher in the top soil layer of the ash stand, whereas the differences were not significant for the oak-beech stand. About 50 % of the roots occurred in the top 15 cm of the ash stand and in the top 30 cm in the oak-beech stand. 90 % of the overall root length were roots with d 0–1 mm. The specific root length was highly variable: root length cannot be calculated based on root biomass.

The water availability in the soil was seldom below the optimal conditions for plants. The moisture content (17.5–100 cm soil depth) was higher in the ash stand than in the oak-beech stand. In the oak-beech stand, the overall water movement was downward. In the ash stand, the water movement was downward in wet periods, but upward in dry periods. The differences in soil density with soil depth were the result of the differences in soil texture. No correlation with root density was observed. Yet, small root density (d 0-1 mm) was correlated with soil moisture content.

The model simulations did not yield reliable results. Some parameters have to be determined more accurately: root length distribution (higher number of sample points, sampling till -2 m), soil water conductivity curves, soil water level, daily measures of stem flow.