

GENERAL INFORMATION

author(s)	Rottiers I
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English title	Comparison of the soil respiration in an oak-beech stand and an ash stand in the experimental forest Aelmoeseeneie
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ecosystem service	regulating - C
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project	
supervisor	Lemeur R
institution	Laboratory of Plant Ecology
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data	Appendix 1: pH, N, C for each sample point

MATERIALS & METHODS

study area	5n (scientific zone)
time period	February 1997 – January 1998
goal	Determine which environmental variables cause spatiotemporal variation in soil respiration, and comparison of two measuring methods.
set-up	ash (mull) vs. oak-beech stand (moder)
data collection	<p>respiration</p> <ul style="list-style-type: none"> - closed dynamic method: 3 x 3 sample points in each of the stands, August–October 1997 - static method: 21 sample points per stand, cylinder with d 20 cm, measuring period of 24 hours each two weeks, 11 February 1997–26 January 1998 <p>soil & litter</p> <ul style="list-style-type: none"> - 21 samples: mix of 3 samples around each respiration sample point - L, F, H, 0–5 cm, 5–15 cm, 15–30 cm - pH-KCl, N (Kjeldahl), C (Walkley & Black) <p>measuring tower (5 height levels)</p> <ul style="list-style-type: none"> - temperature (30 min data): 0 m, 21.6 m, 36 m, - 6 cm, - 30 cm - precipitation at 36 m, troughfall at 0 m - soil water potential (1 h data): - 10, 25, 50, 75, 100, 150 cm <p>root respiration</p> <ul style="list-style-type: none"> - around an ash (0–15, 15–30, 30–45, 45–60 cm) & oak tree (0–15, 15–30 cm): soil samples with root auger - total mass, mass dead/living roots, 29 April 1997
remarks	map with sample points p 36

RESULTS

The changes in temperature, soil respiration, and soil water potential in the oak-beech and ash stand are shown for the different sample days and for the sampled year. Both the daily and the yearly pattern in soil respiration were affected by temperature; the soil respiration curve was fitted with a cubic relationship. Soil respiration showed a maximum value in the afternoon and a minimum value early in the morning. The

hourly mean respiration was correlated best with the soil temperature at -6 cm. The effect of temperature was strengthened or weakened by mean temperature, soil moisture or root respiration: the correlation between soil temperature and respiration was lower for dry and hot days. The effect of temperature was stronger in soils with a high root density.

The estimated soil respiration was larger in the ash stand (3689 g CO₂ /m²/year) than in the oak-beech stand (2841). The difference in respiration was caused by differences in stock capacity, root respiration and litter input. The soil of the ash stand was a better C sink (594 g C/m²/year) than the soil of the oak-beech stand (160). The ash stand has a better humus quality, higher pH, and a lower C/N ratio.