

GENERAL INFORMATION

author(s)	Janssen K
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taxa	<i>Fagus sylvatica</i> , <i>Fraxinus excelsior</i> , <i>Acer pseudoplatanus</i> , <i>Corylus avellana</i> , <i>Sorbus aucuparia</i>
project	BELFOR
supervisor	Lemur R, Vande Walle I
institution	Faculty of Agricultural and Applied Biological Sciences, Laboratory of Plant Ecology
document	hardcopy
data	Table III.1 – Table III.4 (Appendix III)

MATERIALS & METHODS

study area	5 n (measuring tower)
time period	May-October 1999
goal	Do the maximum carboxylation rate (V_{cmax}) and the maximum electron transport rate (J_{max}) differ between tree species, for different canopy layers, for different moments in the growing season and for different temperature values
set-up	<ul style="list-style-type: none"> - light and CO₂ response curves estimated for 5 broadleaved species: calculation of V_{cmax} and J_{max} - test for relationships between V_{cmax} and J_{max} on the one hand, and the chemical and physical leaf characteristics (water content, chlorophyll content, specific leaf area, LAI) or the atmospheric conditions (temperature, short-wave incident radiation, PAR, absorbed short-wave radiation, precipitation)
data collection	<p>meteorological data: measuring tower</p> <p>LAI data: Mussche_1997_th</p> <p>5 measuring weeks in May, July, August, September, October: 11 branches per sampling</p> <ul style="list-style-type: none"> - beech (7, 14, 21 m), ash (21 m), sycamore, hazel, rowan (ground level) - beech at 21 m: different temperatures (10, 15, 20, 25, 30°C) <p>measurements in controlled lab conditions</p> <ul style="list-style-type: none"> - gas exchange (Li-6400) - light and CO₂ response curves of four leaves per branch <p>leaf characteristics of the sampled leaves</p> <ul style="list-style-type: none"> - fresh biomass, leaf area (Li-COR portable area meter), dry biomass, SLA - N content (Kjeldahl) - chlorophyll content
remarks	<p>poster PhD symposium September 1999 in appendix 4: “Vande Walle I, Janssen K, Lemur R (1999) Photosynthetic characteristics of some deciduous tree species: the Farquhar approach”</p> <p>BELFOR: study of the pools and fluxes of the C, water, and nutrient cycle in forest ecosystems (the 2 level II plots in the Aelmoeseneie forest and 5 other forests in Belgium) and estimation of the changes in these cycles due to climate change</p>

RESULTS

The studied species in the Aelmoeseneie forest could be classified into 3 layers: shrubs (sycamore, hazel, rowan), low tree layer (beech at 7 and 14 m), high tree layer (beech and ash at 21 m).

The proposed values were

	$V_{c_{max}}$	J_{max}
shrubs	18.81	33.17
lower tree layer	30.70	47.43
high tree layer	36.76	72.27

The values of $V_{c_{max}}$ and J_{max} showed significant differences between the species, the vertical layers, and during the growing season. No significant differences were found for different temperatures. The ratio $J_{c_{max}}/V_{max}$ was rather constant, i.e., 1.81. Regressions were made for $V_{c_{max}}$ (dependent variable), chlorophyll content, mean and max daily temperature, incident short-wave and PAR radiation, the absorbed short-wave radiation, and the precipitation (independent variables). The chlorophyll b content was correlated with time.