GENERAL INFORMATION

author(s)	Muys B, Lust N, Granval P
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project	PhD_Muys
supervisor	Lust N
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MATERIALS & METHODS

study area	3b, 5h, 5k, 5m, 5n
time period	apr&nov 1988 (earthworms), jul 1988-jun 1989 (litter), mei-sep 1989 (biomass herb layer), sep 1989 (description and biomass Ao layer), nov 1987-nov 1989 (litter decomposition rate)
goal	Comparison of the physical and chemical soil properties, earthworm communities, production/decomposition of litter between (1) pasture land afforestations with different tree species, (2) a meadow, and (3) 'ancient' forest with two species
set-up	- 8 sample sites - 5 pasture land afforestations: *Quercus palustris*, *Tilia platyphyllos*, *Prunus avium*, *Alnus glutinosa*, *Fraxinus excelsior* (planted in 1970) - 2 'ancient' forest stands: *Quercus robur*, *Fraxinus excelsior* (planted in 1920) - 1 meadow - 5 permanent plots per site (established in 1987)
data collection	- earthworms: see Muys (1989) - litter production: litter traps: dry mass per fraction - biomass herb layer: sum aboveground biomass - Ao layer: - Litter decompositon rates: litter bags (mesh 1.5 mm and 8 mm) with litter of the studied stand and 6 reference litters: mass loss after 1, 2.5, 6, 12, 24 months - Chemical analysis of soil, litter, herb layer, Ao layer
remarks	

RESULTS

Striking differences in earthworm biomass and community structure, thickness and quality of the holorganic layer, soil pH between the different tree species, 20 years after the afforestation. The stands were classified into a chemically and biologically rich group with mull humus (*Fraxinus, Alnus, Prunus, Tilia*) and a slow-cycling group with moder or developing moder humus (*Quercus*). In the mull group, there were two subgroups: sandier and dry soils with anecic earthworms (*Tilia*, *Prunus*) and an anecic-poor group (*Fraxinus, Alnus*).

Topsoil is fairly rich in the young forests, degraded in the old forest stands (higher organic matter, high amounts of Fe and Al. Litter palatability is higher for *Fraxinus, Tilia, Prunus, Alnus* than for the two *Quercus* species. Consequently, the litter layer is thin and discontinuous in *Fraxinus, Prunus, Alnus* and *Tilia* stands (dry mass < 2000 kg/ha in summer). In the young *Quercus palustris*, an F layer occurs between the L layer and the mineral soil (7300 kg/ha). The moder humus in the mature *Quercus robur* stand was 70 000 kg/ha.

Earthworm biomass is higher in the young stands and comparable to the meadow (1020 kg/ha), except for *Quercus palustris* (340 kg/ha). In the old stands the biomass is 390 kg/ha (*Fraxinus*) and 25 kg/ha (*Quercus*). In the *Prunus* and *Tilia* stands, the litter, even unpalatable litter, decomposes very fast, mainly due to anecic earthworms. If all litter is palatable, active mull humus can be maintained by fairly small anecic populations (*Alnus,* old *Fraxinus*). In the *Quercus palustris* stand, 40 % of poor litter (C/N > 32) lead towards the formation of moder humus and litter accumulation.