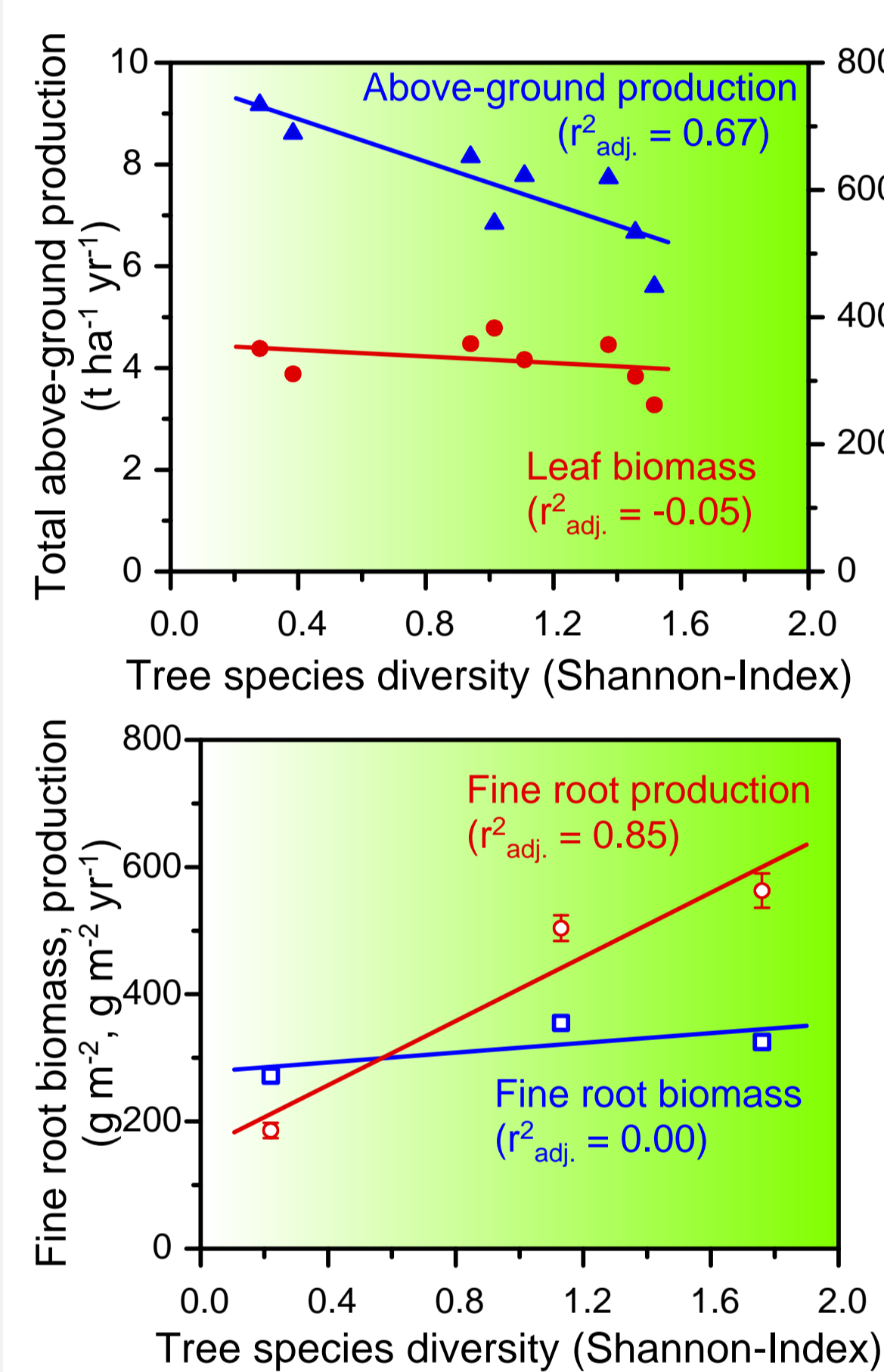




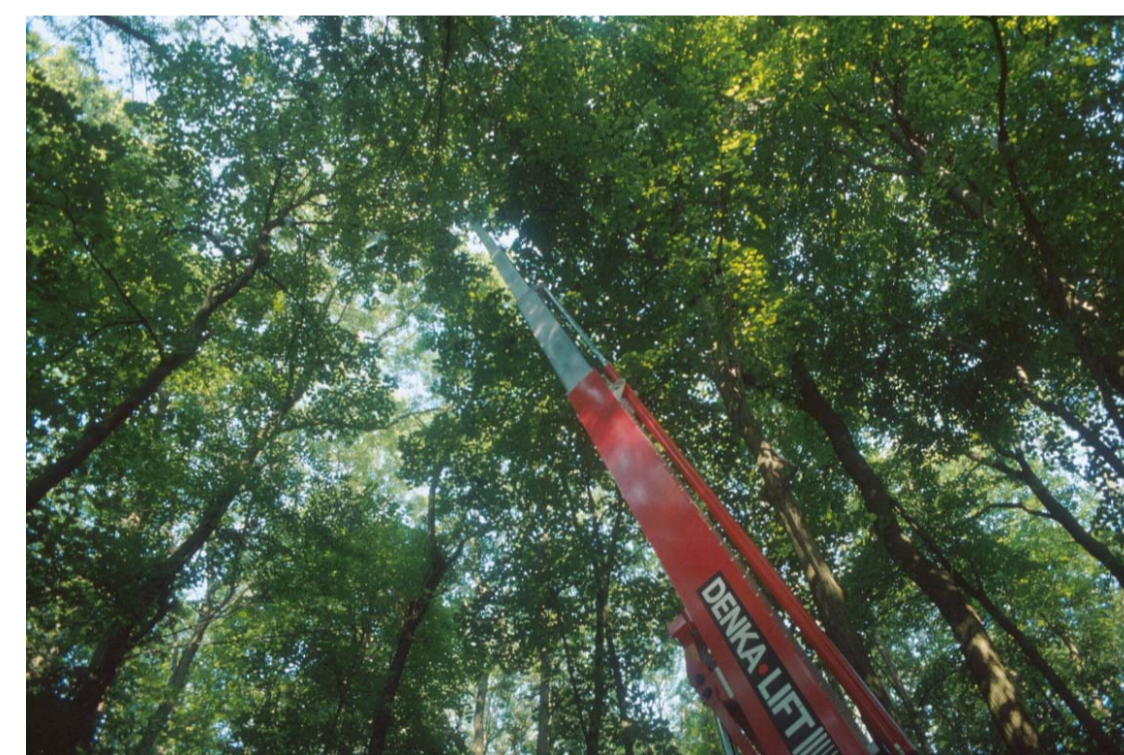
Background

Studies on biodiversity have gained high attention in the past years due to the dramatically increased extinction of plant and animal species. Essential ecosystem functions, such as productivity, water and nutrient cycles, are largely influenced by the species' functional traits. Hence, decreasing biodiversity may strongly impair ecosystem functioning and services. Our current knowledge on the relationships between biodiversity and ecosystem functioning is however rather incomplete. This does not only hold true for ecosystems in global biodiversity hotspots (such as tropical moist rainforests), but also for the relatively species-poor vegetation types of central Europe (grasslands or forests). Moreover, the importance of intra-specific (i.e. genetic) diversity for ecosystem processes has been so far widely ignored in ecological studies.

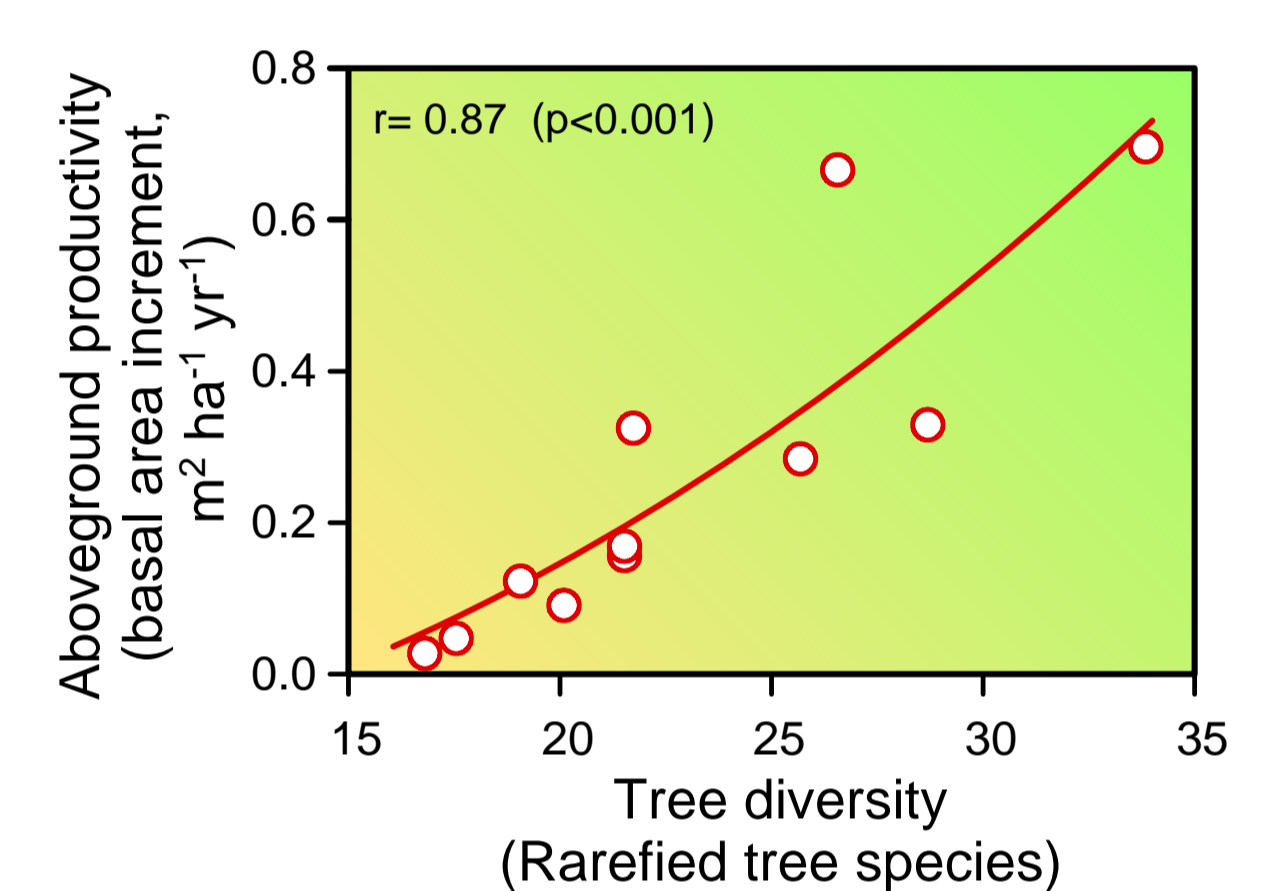
Research



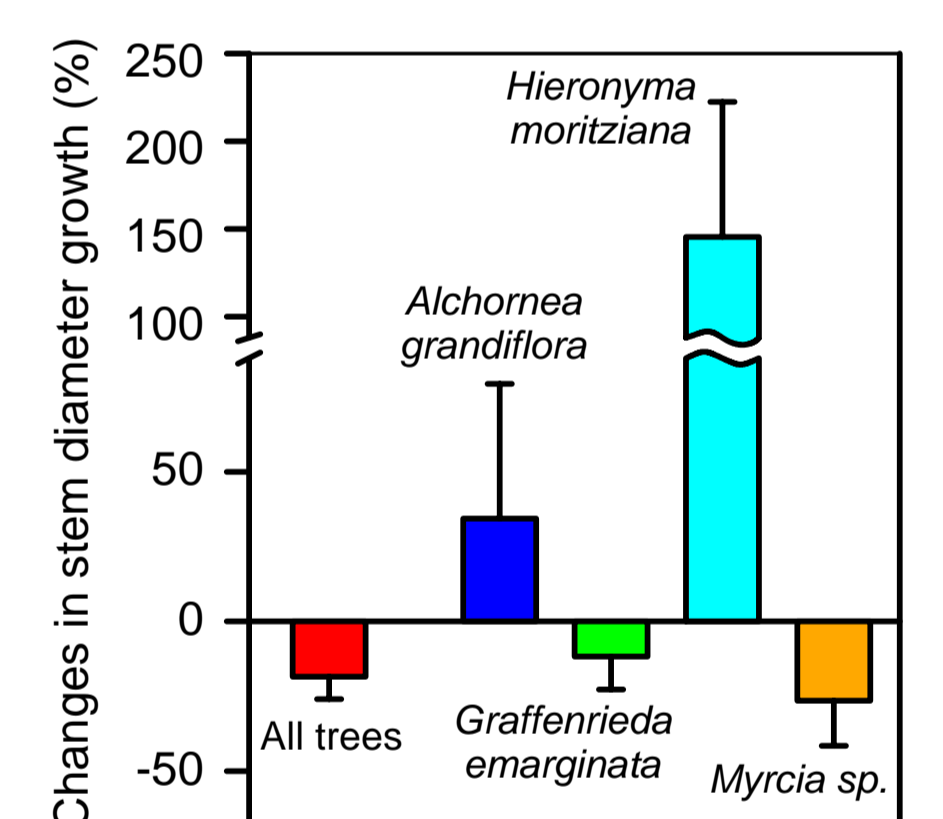
Above- and below-ground production of stands in the Hainich forest is more affected by altered species diversity than is leaf or fine root biomass.



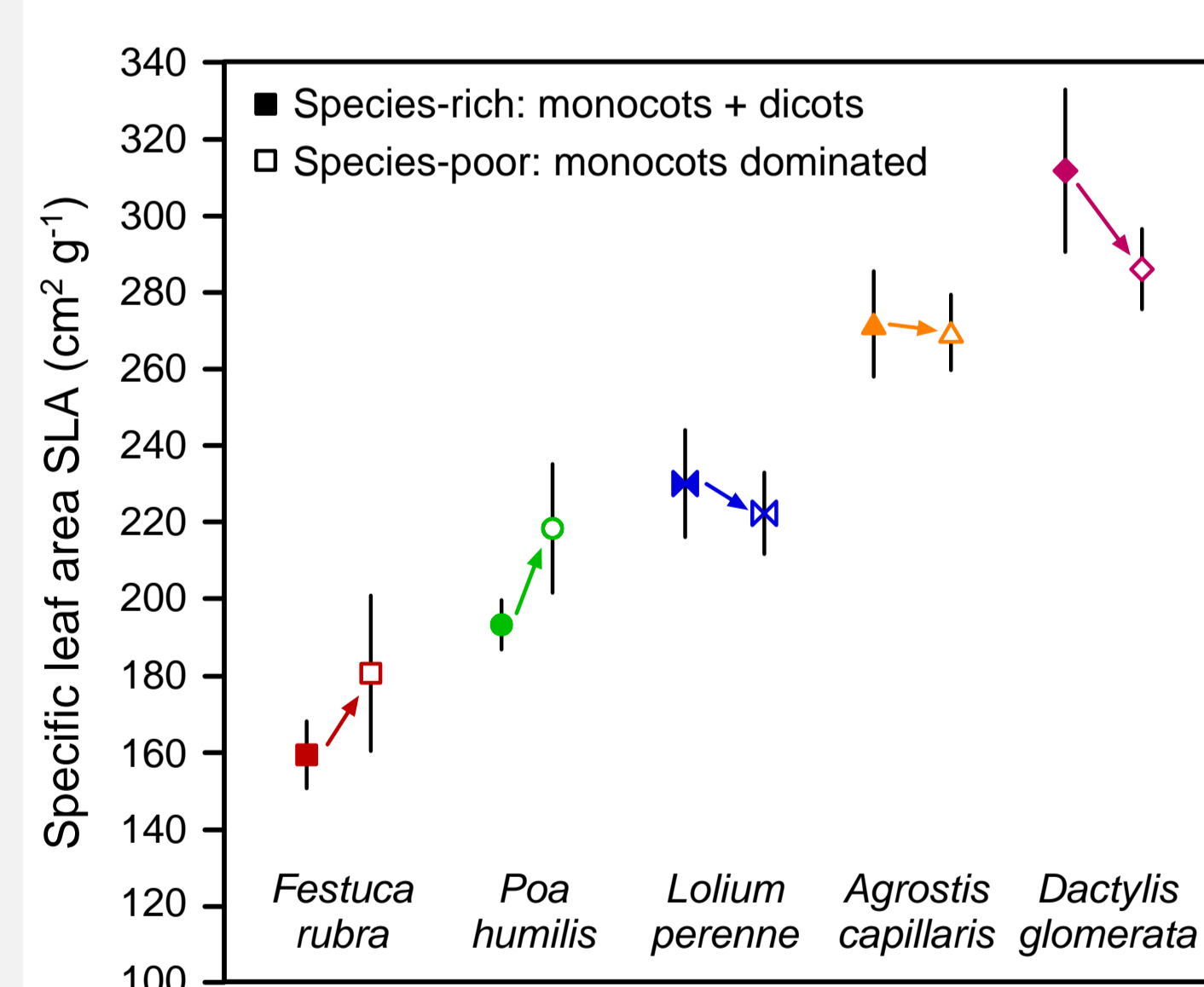
Access to the upper tree crown for eco-physiological investigations is enabled by the use of a large skyjack.



Tropical montane rainforests in Ecuador show a clear positive relationship between species diversity and aboveground productivity. These forests are assumed to be limited by nutrient availability. However, experimental addition of e.g. nitrogen induces highly contrasting growth responses by the present tree species.



The 'POPDIV' experiment at Neuhaus (Solling) aims at investigating the importance of intra-specific (i.e. genetic) diversity for ecological functions (growth, canopy and root interactions) of aspen (*Populus tremula*). This study is based on a large experimental plantation approach comprising 8 different poplar progenies planted in pure and mixed culture (e.g. from Austria, Poland, and U.S.A.; see small pictures).



In the grassland management experiment 'GRASSMAN', we investigate effects of altered species composition and diversity on functional traits of herba-ceous plant species in 72 plots. One result is that the SLA of important grassland species is affected by the competition and species richness of the community.

Major projects: Cluster of excellence "Functional Biodiversity Research" (subprojects GRASSMAN" and "POPDIV")

DFG Research Training Group 1086 "The Role of Biodiversity für Biogeochemical Cycles and Biotic Interactions in Temperate Deciduous Forests"

"Nutrient limitation in tropical mountain forests" - DFG Research Unit 816 "A Mountain Ecosystem in South Ecuador"

Key results

- Species identity plays an important role in the functioning of forest ecosystems differing in tree species diversity. Above- and belowground compartments may show differing functional responses.
- Species identity is in most cases more influential on ecosystem functioning than species number *per se*. The relationship between diversity and productivity may differ largely between different environments (e.g. temperate vs. tropical forests).
- Species richness and species composition can influence the functional traits of target species, probably through altered