

sDiv working group meeting summary

“sMonodominance”

This year we started with a slightly changed working group since we had identified the importance of plant soil feed backs, but had no experts in the working team familiar with plant-soil feedbacks in the context of monodominance. Therefore, we have invited Krista McGuire (University of Oregon) and Francis Brearley (Manchester Metropolitan University) to the working group. Both of them gave introductory presentations about their research on mycorrhiza and monodominance in the tropics on the first days. In addition, we had two early career scientists new on board Sophie Fauset (University of Leeds) and Lukas Moerler (TU Dresden).

We had two main aims at the workshop: 1) to work on a review on monodominance and 2) to discuss and plan future modelling and simulation work. Apart from the work on these two core goals, we had one presentation on the application of percolation theory and fragmentation in the tropics by an early career researcher Franziska Taubert (Helmholtz Center for Environmental Research UFZ). Below we briefly outline what we have achieved in regards to the two main objectives.

1) Review: We have discussed the structure and content of the review especially its function relatively to the existing literature (e.g. Peh et al. 2011, *Journal of Ecology*). Particularly the following themes have been identified to be important and to be a novel and important contribution to the literature: a) To briefly summarize and operationalize the term monodominance in relation to other phenomena such as zonation, succession and edaphically driven monodominance. We had an intense discussion whether monodominance is not always determined by edaphic conditions. In the case of classical monodominance (e.g. *Gilbertiodendron dewevrei* in the Congo Basin) the edaphic differences between monodominant clusters and species rich matrix may be more subtle or have been more pronounced at the time of the formation of the monodominant clusters. b) Brief overview of the description of cluster formation in monodominance and other ecological systems (e.g. tree clusters in savannas). c) Soil-plant feedback and plant microbial feedbacks. Here we summarized what is known on the role of ectomycorrhizal association with trees in the tropics and its potential part in the explanation of monodominance. d) Presentation of traits shared by monodominant species. Here we also discussed the importance of the composition of the regional seed pool. We also came up with a species list of monodominant trees and their known traits which may be supplementary to the existing compilations (e.g. Peh et al. 2011, *Journal of Ecology* and Torti et al. 2001, *The American Naturalist*). e) Impact of humans or/and animals: It is known that for small

areas insects can maintain monodominant stands. Also, it is believed that humans have had a substantial impact in the Amazonian forests and may have created dominant stands of trees they have exploited for various reasons. f) We also discussed how different data sources can potentially be utilized for validation (e.g. identification of monodominant stands using remote sensing data). g) Relevant analysis methods (e.g. tools from statistical physics to detect phase transitions).

Most of the time, the participants have worked in small groups on the different themes and wrote text fragments that we then merged on a shared drive. Juergen Groeneveld and Pia Backmann will compile a joined text from these text pieces and share this in a next round among the workshop participants.

We devoted one afternoon to give the participants a hands-on presentation of the Monodominance simulation model in more detail. The aim was that everybody familiarizes her- or himself with the kind of modelling approach that the Leipzig/Dresden group is applying. The group had been split up in three subgroups where always at least one experienced NetLogo modeler was around to present the monodominance model and the environment. Each subgroup also added a procedure to the model and performed simulation experiments. One aim of this session has been to ease the communication between simulation modelers and the other experts covering the broad spectrum from mathematical modelling to mycorrhiza ecology.

Overall, we spent less than 33% with formal presentations and used the rest of the time with hands on writing or modelling. As a result, we established an international network on monodominance. We plan to submit a review paper with the working group as the author team. One post doc (Pia Backmann) will work for the next two years at the TU Dresden on monodominance models funded by a DFG project. The team has agreed to organize a symposium on the next annual meeting of the GTOE. We are pretty confident that the newly established network will remain highly active.

Finally, we want to mention that the organisation and support from the iDiv team has been great. It was a great relief for the applicants not to be involved in the organisation and to be able to focus on the scientific aspects of the meeting. Also the social activities (we did a guided tour about the composers of Leipzig) and the restaurants were well chosen. Everybody enjoyed the social activities in the evenings.