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sDiv working group meeting summary

"sROOT" - Root Trait functionality in a Whole-Plant Context

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The main aim of sROOT is to study the relationships among different facets of root traits, between root and leaf traits, and to improve our understanding of how traits explain turnover in community composition along environmental gradients. In our first of three sROOT workshops which was held in October 2018 we assembled the largest global database of root traits including measurements of four key functional traits (specific root length, root diameter, root tisse density, and root nitrogen concentration) on > 1700 species. Using this database we developed and tested a framework of root trait space.

The second sROOT workshop was held in May 2019 with 19 participants. The main goals of this second workshop were (1) in depth discussions of our hypotheses on how community weighted root traits change along environmental gradients, (2) to perform first analyses of community weighted root trait changes combining sROOT with sPLOT data, (3) to finalize discussions on the root trait spectrum and comment on the paper draft, (4) to reduce the final number of root traits to be presented in the sROOT database and comment on the paper draft.

We approached our first goal with small group discussions on selected relevant papers on the relationship between traits and environmental gradients. In addition, Daniel Laughlin, the lead author of this third sROOT paper presented detailed ideas on how we should compute whether species occurrence in a given environment depend on their root traits. This introduction was followed by group discussions throughout the week to clarify our expected relationships and the underlying mechanisms. We ended up with a table of detailed trait-environmental factor relationships along with mechanistic justifications for each of those relationship. In parallel, a second group already started coding the envisioned analyses in R in which we want to link sROOT to sPLOT data. The primary aim of the "datachruncher" group was to test different algorithms of coding and solve anticipated problems in the analysis. They were able to present preliminary results on smaller subsets of data which greatly helped to identify challenges that needed further discussion such as the categorization of sPLOT information or additional abiotic soil variables. After the workshop, our top priority would be to secure these datasets and perform the analysis with the complete dataset. Daniel Laughlin was optimistic to be able to present the outcome of this analysis by autumn 2019 and start writing on the draft of the third paper.

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Pictures of sROOTies: top left: Liesje Mommer and Alex Weigelt in front of the sROOT skills board. Top right: Excursion Botanical Garden of Leipzig University lead by Dr. Martin Freiberg. Lower row: sROOTies depicting trait-environment relationships with Lego (left: Catherine Roumet and Alfons van der Plas, right: Thom Kuyper and Daniel Laughlin).

During the second workshop, we also spent some time finalizing the paper on the root trait spectrum lead by Joana Bergmann. We discussed specific figures and part of the manuscript and drafted a letter to the editor. Submission of the paper was envisioned well before the workshop sROOT 3. The key issue for the data paper which is lead by Nathaly Guerrero-Ramirez was the necessary reduction and selection of traits as well as some details on trait calculation and naming. At the end of the workshop we had a final list of traits and a commented draft of the data paper ready. The idea is to submit this paper in parallel with the paper on the root trait space.

Overall, it was again a very productive workshop and a very open and positive working atmosphere which was perfectly supported by sDiv staff and the overall setting. Before, during and after the workshop we increasingly felt the sROOTies spirit. sROOTies were extremely supportive in sharing tasks of e.g. data mining or participating in email discussions on critical issues.