

(Newsletter of the project The Future Okavango, covering the period October and November 2014)

What is coming up? TFO activities and deadlines, events of interest

- The Annual Conference of the Society for Tropical Ecology (gtö), focusing on "**Resilience of Tropical Ecosystems: Future challenges and opportunities**" will run from 7 - 10 April, 2015 in Zurich, Switzerland. Tropical ecosystems are global biodiversity hotspots increasingly under pressure from a growing population. The complexity and unpredictability of these systems present considerable challenges for ecologists, conservation biologists and natural resource managers. The global demand for food, energy and recreation, large scale industrial land use change and anthropogenic climate change present scientific and social challenges. The annual conference of the Society for Tropical Ecology will provide an interdisciplinary platform for discussing these major challenges and future opportunities in tropical Ecology including understanding tropical biodiversity, defining resilient tropical ecosystems and novel approaches to understand and manage tropical ecosystems. You are cordially invited to submit an abstract for your planned contribution to the conference in the form of a poster or an oral presentation by December 31st, 2014 at the latest. For further information, please refer to http://www.gtoe-conference.de/index.php?cat=show_start.
- The 58th Annual Symposium of the **International Association for Vegetation Science (IAVS)** will take place from 19-24 July, 2015 in Brno, Czech Republic. The IAVS is the world's leading scientific society of plant community ecologists and promotes research in all aspects of vegetation science and its application. It holds meetings and excursions, publishes scientific journals (Journal of Vegetation Science and Applied Vegetation Science) and provides other mechanisms to facilitate communication among vegetation scientists worldwide. The purpose of this symposium is to increase awareness of the concepts, methods, data and results used and produced in various sub-disciplines of current broad-scale vegetation research, and to promote synergy by bringing together research efforts that have been disparate to date. The deadline for special session proposals is January 15th, 2015, the deadline for abstract submission is March 15th, 2015. For further information, please refer to http://www.iavs2015.cz/en_welcome.html.

For more upcoming events, please have a look at our TFO website under the category "Events".

Inside TFO: What has been done recently?

- A “Forestry Research Day” was held on September, 23rd at the Polytechnic of Namibia in Windhoek. Miya Kabajani, Rennie Hilukwa, Robert Schulz, Vera De Cauwer as well as other researchers from the Polytechnic of Namibia, the University of Ghent, Belgium, the University of Göttingen, Germany, and the University of Stellenbosch, South Africa, presented their research and inventory work in the woodlands of the Kavango region. The aim of the “Forestry Research Day” was to share the preliminary results obtained under the TFO and SASSCAL projects with stakeholders.



Impressions from the Forestry Research Day (Photos: Robert Schulz)

- Prior to the “Forestry Research Day” a group of forestry students and their lecturers from the Universities of Göttingen, Germany, and Stellenbosch, South Africa, visited the School of Natural Resources and Spatial Sciences (Vera De Cauwer) of the Polytechnic of Namibia in Windhoek. From August, 27th until September, 19th, they performed measurements for the TFO project in Hamoye State Forest and in Ncaute community forest as part of their **forestry training**. Otto Pienaar (Stellenbosch), Mats Mahnken, Robert Schulz, Sinje Ingwersen and Tarek Neubert (Göttingen) joined a Belgian MSc student (Sam Van Holsbeeck) and a Namibian MSc student (Miya Kabajani) who were already working there. The initiative was taken by Prof. Christoph Kleinn (University of Göttingen) and Cori Ham (University of Stellenbosch) and worked out in cooperation with Vera De Cauwer (Polytechnic of Namibia). Guidance during the field measurements and data analysis was given by Dr César Pérez, Dr Paul Magdon, Cori Ham and Vera De Cauwer. Financial assistance was given by the Hans Merensky foundation and TFO, logistic support by the Namibian Directorate of Forestry.



Impressions from the joint field measurements (Photos: Vera de Cauwer)

- On October 17th, 2014, Alexander Gröngröft gave a talk at the Namibian Scientific Society, Windhoek, on **"Soils and climate controlling land use options in communal areas of the Okavango basin"**. In the talk an analysis of the current situation was given and possibilities to improve yields e.g. by conservation agriculture proposed. Later that day, Alexander Gröngröft gave an interview at the German radio station.



Dr. Alexander Gröngröft at the Namibian Scientific Society and the German Radio
(Photos: Armin Jagdhuber and Bertchen Kohrs)

Inside TFO: News, communication & other information

(Topics: New TFO members, new uploads or features in MyTFO, OBIS or website, information by PT/BMBF/GLUES)

- The **final presentation** given by Norbert Jürgens and Thomas Falk at the **"Mid-Term Seminar and 3rd Advisory Board Meeting"** on October 8th, 2014 in Bonn, Germany, is now available for download at the TFO website. As an outcome of the Mid-Term Seminar TFO received a letter of recommendations by the German project manager (PT-DLR) how to further improve the performance of the project towards the end of the running time. SPC will consider these recommendations wherever feasible.

- At the TFO website you will also find the minutes of the **TFO-workshop on Integration and Output** (September 2, 2014, in Hamburg), which aimed at the preparation of the presentation as well as at stakeholder products and the final presentation of TFO results.
- TFO **online calendar** available on OBIS: Please be so kind to take the time to **always add all events, deadlines, field-trips, conference dates** etc. that are of relevance for the TFO community and make use of the calendar as much as possible. You will need an OBIS account to get access to the calendar which is accessible for TFO members only. You can register on the OBIS website, in case you don't have an account yet. Link to the calendar (link can also be found at the upper right corner on the TFO website):

<http://leutra.geogr.uni-jena.de/obis/metadata/login.php?url=%2Fobis%2Fmetadata%2Fcalendar.php>
- Please make use of the TFO webpages internal area called **MyTFO** which allows you to update your participant details, generate mailing lists and download internal documents such as reports, minutes, presentations etc. You will find the MyTFO link in the upper right corner. You can receive your personal MyTFO - login from the TFO - webmaster at webmaster@future-okavango.org
- All SPs and Institutions please spend a minute to **update your participant details on the TFO Webpage in the MyTFO area** (see above) so that we get a clear picture who is participating at this stage. Please also provide information on your function and thematic and regional expertise within TFO. If you identify colleagues of your SP who have left the project please send an email to the TFO - webmaster at webmaster@future-okavango.org

Outside TFO: Reports from stakeholders' activities

(Topics: Feedback from stakeholder meetings TFO attended, TFO members on stakeholders contacts, stakeholder activities....)

New Publications by us and/or others

(Topics: new publications by TFO members or other publication be of interest; interesting websites, data etc.)

- Grönemeyer, J.L., Kulkarni, A., Berkelmann, D., Hurek, T. and Reinhold-Hurek, B. (2014) Rhizobia Indigenous to the Okavango Region in Sub-Saharan Africa: Diversity, Adaptations, and Host Specificity. Appl. Environ. Microbiol. December 2014 vol. 80 (23): 7244-7257
<http://aem.asm.org/content/80/23/7244.abstract>
- Helmschrot, J., Kralisch, S., Quintino, M., Masamba, W., Steudel, T., Göhmann, H., Zander, F., Ambrosio, N., Baumberg, V., Mosimanyana, E., Homolka, A., Mwewa, L., Mashauri, D.-A. & Flügel, W.-A. (2014): Environmental Information Management and Hydrological System

Modelling for the Assessment of Hydrological Ecosystem Functions and Services (ESF/ESS) in the Okavango River Basin. Zentralblatt für Geologie und Paläontologie; Teil I, 2014, Heft 1: 305-337. DOI: 10.1127/zgpl/2014/0305-0337

- Huber, K.J., Wüst, P.K., Rohde, M., Overmann, J. and Foesel, B.U. (2014): *Aridibacter famidurans* gen. nov., sp. nov. and *Aridibacter kavangonensis* sp. nov., two novel members of subdivision 4 of the Acidobacteria isolated from semiarid savannah soil. *Int. J. Syst. Evol. Microbiol.* 2014 Jun; 64(6):1866-75. Epub 2014 Feb 26.
<http://www.ncbi.nlm.nih.gov/pubmed/24573163>
- Röder, A., M. Pröpper, M. Stellmes, A. Schneibel, and J. Hill (2015) Assessing urban growth and rural land use transformations in a cross-border situation in Northern Namibia and Southern Angola. *Land Use Policy* 42:340–354.
<http://www.sciencedirect.com/science/article/pii/S0264837714001847>
- Pröpper, M., and F. Hapts (2014) The culturality of ecosystem services. Emphasizing process and transformation. *Ecological Economics* 108:27-35.
<http://www.sciencedirect.com/science/article/pii/S0921800914002936>
- Schnegg, M., R. Rieprich, and M. Pröpper. 2014. Culture, Nature, and the Valuation of Ecosystem Services in Northern Namibia. *Ecology and Society* 19(4): 26.
<http://dx.doi.org/10.5751/ES-06896-190426>
<http://www.ecologyandsociety.org/vol19/iss4/art26/>
- Vushe, A., Haimene, E.P. & Mashauri, D. (2014) Namibian Land Use Changes and Nutrient Water Quality of the Okavango River. *Journal of Agriculture and Environmental Sciences* 3 (2):219-239.
- Weber, T., Helmschrot, J., Berndt, R. & Jacob, D. (2014): Assessment of climate dynamics in the Okavango region using high-resolution ERA-40 reanalysis data. *Zentralblatt für Geologie und Paläontologie; Teil I*, 2014, Heft 1: 171-187. doi: 10.1127/zgpl/2014/0171-0187.
- Katharina Huber finalized her PhD-Thesis on **“The role of microorganisms in the nutrient cycling of subtropical savannah soils”** in September and will defend it on December 8, 2014:

Soil provides complex habitat for the microbial community which effect nutrient cycling and soil fertility. The identification of environmental factors controlling and influencing the soil microbial community and hence the nutrient cycling were investigated in the present study.

The breakdown of soil organic matter is initialized by exoenzymes. The activities of the β glucosidase, β xylosidase, phosphatase and aminopeptidase determined in 77 Namibian and Angolan soils varied with the soil type, the land use type and the water availability. Moreover, the land use type and the water availability influenced the liberation of nitrogen from complex amino compounds by ammonification and nitrification as well. In sandy Subsaharan savannah soils the decreased nutrient and water availability, the lower aggregate stability reduced total bacterial cell numbers and therefore activity values. But the soil microbial community benefit from stable soil aggregates, nutrients and water provided by soil organic matter in nutrient rich dark loamy pristine soils of Kavango, pristine woodland and bushveld savannah soils of

Mashare and in the peatland soils of Cusseque. Anthropogenic impact on the soils and water stress after the dry season reduced total cell numbers of the soil microbial community and thereby activity values. Human activity disturbs microbial habitats by destroying of soil aggregates, the condensing of bulk soil and poisoning of bacteria by fertilizers addition.

Both land use type and water availability effected the active microbial community composition as well. Predominantly bacterial phyla and species adapted to the nutrient limitation, water stress and heat survived the conditions in the sandy soils. Illumina high throughput sequencing detected similar abundance patterns of Proteobacteria (Rhizobiales) and Actinobacteria (Arthrobacter and Rubrobacter) as typical soil phyla in the riparian woodland and bushveld savannah soils after the rainy season. In contrast, Firmicutes and some Actinobacteria benefit from the drought in the bushveld soils and from the conditions in the agriculturally used soils. Anthropogenic impact as the addition of fertilizers i. e. Zn, Cu, Borax decreased microbial abundances of the Proteobacteria and Actinobacteria and provided growth advantage of the Firmicutes. After the prolonged dry season and rewetting of the soils fast growing Gammaproteobacteria probably originating from the cattle and the local fauna dominated the active microbial community in the riparian woodland and bushveld savannah soils. Subdivision 6 Acidobacteria showed similar activity patterns. Acidobacteria subdivision 4 and 6 reached equal activity patterns in the woodland and bushveld savannah soils, while subdivision 3 and 16 showed slightly increased abundances in the irrigation agriculture soils. High abundances of nitrogen fixing microorganisms like different Arthrobacter species and Paenibacillus and microorganisms performing nitrate ammonification (Arthrobacter) confirmed nitrogen limitation in the subtropical savannah soils. Additionally, Arthrobacter is well adapted to phosphorus limitation. Moreover, the soils supplemented with different phosphorus sources predominantly grouped together. This clustering indicates phosphorus limitation in the Sub-Saharan savannah soils.

Although very little is known about subdivision 4 Acidobacteria these bacteria are detected in many different habitats like soils. In the present study two new representatives were isolated from Namibian soil samples and characterized. Due to morphological, physiological and molecular characteristics and a 16S rRNA gene identity of about 93% with their next relative *Blastocatella fastidiosa*, the new isolates A22_HD_4HT and Ac_23_E3T were proposed as the new genus *Aridibacter* with the new species *A. famidurans* and *A. kavangonensis*, respectively. This study confirms that the activity and the composition of the active microbial community in nutrient limited Sub-Saharan savannah soils are affected by the soil type, land type and water availability.

- Fien Vander Heyden, who worked on germination of Namibian Kiaat, finalised and defended her Master thesis at the University of Ghent, Belgium. The original thesis was written in Dutch, but she translated the most important parts in English:

"Germination experiments with the southern African tree species *Pterocarpus angolensis*: in-vivo and in-vitro."

Pterocarpus angolensis (Kiaat) is a tree species that occurs in the Miombo Woodlands of southern Africa and is considered to be the most important hardwood species of its range. The tree belongs to the family of the *Fabaceae* and has been overexploited since halfway last century. Due to anthropogenic changes during the last few decades, its biotope has systematically been reduced and the forest fire frequency has risen sharply. The tree is resistant to fire but is no match for the current fire frequencies. *P. angolensis* regenerates

difficultly, due to low numbers of seed germination, a long suffrutex-stage, and slow growth. Attempts to cultivate the species encounter restrictions in each stage of growth. This work seeks to determine the best in-vivo germination conditions for *P. angolensis* and examine whether in-vitro propagation is possible. The parameters that were examined are: origin of mother tree, harvesting place (pods harvested from the ground or in the tree) and quality of pods and seeds. As pretreatment, the pods were burned and the seeds were soaked. A floating-test was performed as well. Pods harvested in the tree with healthy seeds, heavier than water and soaked in water appear to have the best chance at germination. The germination percentage achieved in the in-vivo experiment was 8.7 %. while it reached 47.2 % in the in-vitro experiment. During the in-vitro propagation, three mineral mixtures were tested to determine which one was best for shoot growth, with M&S and Q&L giving the best results. The rooting hormone concentration which was best for root growth was tested and resulted in a concentration of 3,2 µg/L IBA. After both germination experiments, a tetrazoliumtest was conducted to determine if the seeds that did not germinate, were still viable. It shows that seeds, once placed in the proper germination conditions, remain viable up to a year after planting."

All TFO participants who have completed MA, BA, PhD theses or other publications, please contact us if you would like to use the opportunity to have your work advertised here and please use the opportunity to contribute your work to the TFO publication-database on our webpage.

News from the Okavango region

(Topics: new policies, happenings etc. relevant for resource management in the Okavango Basin)

Anything else...

(Here we offer space for all other information, which might be of interest for the TFO community)

***** Do you have any information for the TFO-community? *****

Upcoming events, new SP-members, publications, research results, news from the basin or interesting events to share – please let us know:

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