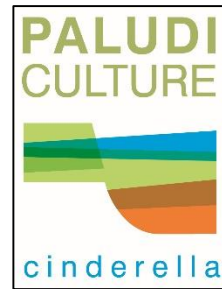


CINDERELLA - Update XIII

July 2017, W. Wichtmann

“Comparative analysis, integration and exemplary implementation of climate smart land use practices on organic soils: progressing paludicultures after centuries of peatland destruction and neglect”



By irregular updates the CINDERELLA community and colleagues are informed about dates, news and other interesting issues within the scope of the CINDERELLA project, ref. paludiculture. All partners are kindly asked to provide current information, which can be inserted here. The idea is to keep all project partners informed on the same level, to exchange information, to ask project related current questions, to arrange meetings and to make appointments as well as to prepare common activities (publications, new projects, etc.).

Excursion to Zegveld during the CINDERELLA partners meeting in Nijmegen (11th of May) (Wendelin Wichtmann, Sabine Wichmann)

The annual project meeting of the Cinderella consortium brought together all project partners at Radboud University in Nijmegen. After the presentation and constructive discussion of the progress of the project several Dutch peatland sites were visited. One of these excursions led to the Zegveld experimental farm located in the “Green Heart” south of Amsterdam. The “Peatland meadow innovation center” focuses on the predominant dairy farming (Fig. 2), including adaptation strategies as underfloor drainage and irrigation, but also investigates new cultures as cranberries.



Fig. 1: *Typha* plantation at Zegveld (Tobias Dahms)

Currently, several approaches to paludiculture are tested on field scale. Colleagues from Radboud University established small field trials with *Typha*, *Phragmites*, *Salix*, *Miscanthus* in cooperation with the Louis Bolk institute (Jereon Pijlman). Several nutrition treatments are realised on *Typha* plots (Fig. 3). Additionally, a 0.5 ha field experiment with *Typha latifolia* plantation was established in June 2016 (Fig. 1). Besides reducing GHG emissions by inundation of the sites, *Typha* cultivation aims at producing fodder for dry milk cows, as the feeding value (especially protein content) of the silage from drained and fertilized grasslands is too high for them.

High protein contents cannot be avoided as very high N-rates are mineralized in the drained grassland soils. *Typha* contains about 15 % of protein, which seems to be much better in this case. In feeding trials, cows ate silage from *Typha*, but preferred grass silage if they had the choice. In total, 16 dairy farmers are currently testing to feed *Typha* to their cows. Their lease contracts with Staatsbosbeheer will expire after 30 years in near future. New contracts will only allow paludiculture on these sites. The utilisation of *Typha* biomass for biorefinery processing is tested, too.



Fig. 2: Common type of silage production in drained peatlands in Zegveld (Tobias Dahms)



Fig. 3: Christian Fritz explaining a series of *Typha* plots for plant nutrition experiments (Tobias Dahms)

News from other projects and activities

CLEARANCE: kick-off Meeting in Greifswald (18th to 19th May 2017)

(Claudia Oehmke)

Participants: University of Warsaw – Wiktor Kotowski (Coordination), Marta Wiśniewska, Ewa Jablonska (Poland); University of Aarhus – Carl Christian Hoffmann (Denmark), IGB – Dominik Zak (Germany), University of Greifswald - Wendelin Wichtmann, Claudia Oehmke, Rafael Ziegler (Germany), University of Nijmegen – Christian Fritz via Skype (Netherlands), Warsaw University of Life Science – Sviataslau Valasiuk, Mateuzy Grygoruk (Poland), Warsaw Ecological Economics Centre of UW - Tomasz Żylicz and Marek Giergiczny (Poland), Green Management Group – Hanna Marliere (Poland), Grüne Liga – Michael Bender (Germany).

From 18th to 19th of May 2017 the kick-off meeting of CLEARANCE was held in Greifswald. After an introductory session with a short overview of the project and the outcomes of the CLEARANCE workshop in Nijmegen (March 2017) and WaterWorks2015 kick-off Meeting (6th of April) by the Coordinator Wiktor Kotowski, project administration matters as well as work packages were presented by the project members. The three case catchments are located in the project countries (Poland, Denmark and Germany) and will be used to evaluate cost and benefits of WBZ for the case catchments under different scenarios including market and non-market values. We discussed about the definition of Wetland Buffer Zones (WBZ), the selection of project case catchment areas in the three countries and methods for estimating recreational aesthetic values related to WBZ and existence values related to biodiversity.



Fig. 4: Clearance project kick off meeting in the “chapel” of Greifswald University with partners from Poland, Denmark and Germany (from left to right: Michael Bender, Søren Erik Larsen, Rafael Ziegler, Wiktor Kotowski, Majka Wiśniewska, Hanna Marliere, Carl Christian Hoffmann, Claudia Oehmke, Dominik Zak, Sviataslau Valasiuk)

WBZ (Wetland buffer zones) are wetlands located between the agricultural land and aquatic ecosystems, capturing nutrient-rich runoff water before it reaches rivers and lakes to reduce nutrient loads in surface waters at water-land interface. CLEARANCE aims to develop an integrated landscape-ecological, socio-economic and policy framework for using WBZ in circular economies of water

purification and nutrient re-use in agriculturally used catchments. It includes the assessment of synergies and constraints between nutrient removal in WBZ and biomass utilisation, analysis of market and non-market values of rivers and river ecosystem services (as co-benefits of WBZ), quantification and upscaling of costs and benefits of WBZ at catchment scale, policy and social network analysis concerning implementation feasibility of using WBZ in circular economies as solutions to agricultural nutrients pollution and market assessment of commodification options of WBZ-related ecosystem services, including nutrients removal and biomass production. Further, CLEARANCE intends to deliver knowledge base for implementing multifunctional WBZ and raise awareness concerning wetland-solutions to solve water and nutrient management problems.

Is paludiculture an option for implementation in the Chautagne peatlands in France?

(W. Wichtmann)

Also in France there are some mires and peatlands! A full overview is given in the France chapter of the new book from H. Joosten, F. Tanneberger & A. Moen on Mires and peatlands in Europe (<https://www.schweizerbart.de/publications/detail/isbn/9783510653836/>). Regional, more detailed information is available through the “Conservatoires d’ Espaces Naturel”, e.g. for the peatlands in the mountains and for the alluvial valleys (<http://www.oieau.org/eaudoc/notice/Guide-de-gestion-des-tourbieres-et-marais-alcalins-des-vallees-alluviales-de-France>). The Conservatoire d’espaces naturels Savoie interested in a vast restoration project initiated a conference on finding incitements for restoration, re-wetting and sustainable use of peatlands in the “Marais de Chautagne” (15th/16th of May, Fig. 5), with the support of the director of Pôle-relais tourbières, Francis Muller.



Fig. 5: The “Marais de Chautagne”, located at the lake de Bourget in Savoie. In the background on the left the sites ready for restoration are visible (open land with brownish colour). Source: <http://censavoie.wixsite.com/marais-chautagne>. The river Rhone can be seen on the horizon at the left side.

The peatlands of interest are situated near the Lac de Bourget in proximity to Aix les Bains, Savoie, half way between Geneve and Lyon. The event was organized by Jérôme Porteret (scientific referent) and Aurélie Charbonnel (project manager) from Conservatoire d’espaces naturels Savoie. The conference

took place in a multifunctional hall in the village of Ruffieux, at the side of the valley. Large fen peatlands can be found between the lake and the river Rhône, north from the lake (Fig. 5).

The precipitation in this area is about 1,000 to 1,400 mm. The peat (pH 5.7 in the topsoil, pH 7 in deeper layers) has been formed e.g. by *Carex spec.*, the thickness is up to 4.8 m. These peatlands are strongly degraded by drainage for agriculture and forestry (Fig. 7, Fig. 9). Poplars have been planted in the 1960ies on sites drained with ditches every 40 m. For allowing maize cultivation, in the 1980ies a drainage system with drains width of 20 m has been installed. Currently, about 900 ha are meadows and pastures (prairies humides) and 368 ha arable land (maize, cereals). An area of 180 ha is managed under agro-environmental schemes and another 160 ha are unused wet conservation area (Fig. 6). Forests on peatlands are 1,700 ha (of which 760 ha are poplar plantations).

Recently, some sites within the entire area have been made available for restoration (80 ha forest, 80 ha arable land, Fig. 7, 8, 9). Wetland functions shall be restored. The main aim is the protection of water resources and their quality, which is considered as a public task. The intended measures enjoy a high acceptance of the local population. Development of wetland biodiversity, GHG emissions reduction and sustainable use are other goals of hydrological measures that partly have been implemented already, further measures are planned. For getting some input of ideas several peatland scientists from different countries had been invited to the conference as a basis for further discussion of potential measures.



Fig.6: Near-natural peatlands nearby the Lac de Bourget, Savoie, France. View into southern direction.



Fig. 7: Blocked ditch in a peatland, which was used for maize production last time two years ago. On some test sites (right side of the picture), hay had been spread that was harvested on wet meadows with diverse vegetation. The intended transfer of diaspores seems not to be very successful due to a high competition of weeds remaining from arable cultivation and an insufficient water table elevation.



Fig. 8: “Rewetting” measures in the forested part of the Marais de Chautagne. Raising water table for another 80 cm would be necessary for the development of wetland biodiversity and the reduction of greenhouse gas emissions.



Fig. 9: Clear cutting was the first measure that was realized in the forested area. Maples, black poplar and willows were planted in “rewetted peatland”. 2nd order ditches have been filled with bush material and branches of trees and were blocked at the end for some meters by peat dams.

Field visits show the value of a deeper understanding of the hydrology of the site to design restoration measures. In any way, water tables must be risen much higher than could be realized until now (Fig. 8). Topsoil removal was considered to be a feasible solution, if it will not be possible to rise water tables technically and if diverse wetland vegetation shall be reintroduced by dispersion of diaspores. Experiments are carried out to evaluate the costs of such an operation. A significant decrease of greenhouse gas emissions as well as the introduction of paludiculture would also require much higher water tables. Paludiculture for both, the open (e.g. Typha plantation or Common reed establishment) or forested sites (Black Alder plantation) would need water tables near soil surface around the whole year." More information: <http://censavoie.wixsite.com/marais-chautagne/single-post/2017/06/06/R%C3%A9sum%C3%A9-des-communications-sur-la-tourbi%C3%A8re-de-Chautagne-et-les-enjeux-de-la-restauration-Colloque-du-15-16-Mai-2017>

REPEAT - REStoration and prognosis of PEAT formation in fens - linking diversity in plant functional traits to soil biological and biogeochemical processes

REPEAT is a joint project of the universities of Warsaw, Greifswald, Antwerp, the Norwegian Institute of Bioeconomy Research and the Danube Delta National Institute for Research and Development in Romania as well as Wetlands International. The project duration is February 2017 to February 2020. REPEAT is funded from ERA-NET Cofunds BiodivERsA3.

REPEAT aims to clarify the mechanisms of peat formation in fens by linking biogeochemical processes to soil community structure and biodiversity, as well as to plant belowground traits. The central research question is: What are the differences in below-ground production and decomposition, and

eventually peat formation, between near-natural, drained and rewetted percolation fens along a climate gradient? Our study sites extent from UK (Wales) via Belgium, the Netherlands and Germany to Eastern Poland. In addition, we study the effect of trophy in near-natural fens in Eastern Poland and Romania, and assess the influence of machine mowing in near-natural and rewetted sites.

REPEAT is the first project to systematically address fen peat formation, the predominant mechanism of the temperate zone, in several European countries. The interdisciplinary project investigates both the least disturbed and the most disturbed percolation fens of Europe with a broad array of methods and assesses the restorability of the latter ones. To compare undrained, drained and rewetted fens, we analyse ecosystem processes in-situ in four countries, supplemented by ex-situ mesocosm and laboratory experiments.

The project also prepares recommendations regarding ecosystem services and resilience in fen rewetting. A particular focus is on restoration and paludiculture. Stakeholders in participating countries are addressed through workshops, side events, and field days. A key stakeholder (Wetlands International) is involved as a consortium member.

REPEAT closely cooperates with the WETSCAPES project (www.wetscapes.uni-rostock.de/en/), addressing fen peat formation in Northeast-Germany. At Greifswald University, the working groups „Peatland Studies and Paleoecology“ (<https://botanik.uni-greifswald.de/en/peatland-studies-and-palaeoecology/>) and „Experimental Plant Ecology“ contribute to REPEAT (<https://botanik.uni-greifswald.de/en/experimental-plant-ecology/>).



Fig. 10: Fieldwork and sampling of Antwerp and Greifswald REPEAT team members in Peene Valley (Germany).

Contact: Dr. Franziska Tanneberger (tanne@uni-greifswald.de)

Current state of the upcoming: 2nd reed conference (rrr2017) in Greifswald

We are getting closer to the rrr2017 conference in Greifswald, which will be held in September 2017 (paludiculture.uni-greifswald.de/en/projekte/rrr2017/index.php). Until now 57 people registered for the national conference, 80 persons subscribed for one of the six excursions and ~125 persons

registered for the international conference. If not already done, please register as soon as possible that the organisers get an overview.

IMCG bulletin May 2017

The latest bulletin by IMCG recently has been published. Again it provides several information on project related relevant issues and gives an overview on recently published papers on peatland protection: <http://www.imcg.net/> . Here you also find a current overview on newest publications on peatland related stuff.

Mires and Peat

Take a look at the latest volume (Vol. 20) of Mires and Peat: <http://mires-and-peat.net> dealing with "Growing Sphagnum", and use this online magazine to publish your newest results!

Further new publications (see dropbox: Cinderella-Partners: paludiculture literature)

Jasmin G. Packer, Laura A. Meyerson, Hana Skalova, Petr Pysek and Christoph Kueffer 2017:
Biological Flora of the British Isles - Phragmites australis. Journal of Ecology 105, 1123 – 1162
Claudia Ciotira, Jessica Szaboa, Joanna Freeland 2017: Genetic characterization of cattail species and hybrids (Typha spp.) in Europe: Aquatic Botany 141, 51–59 (see dropbox: Cinderella-Partners)
Dominik Zak, Tobias Goldhammer, Alavaro Cabezas, Jörg Gelbrecht, Robert Gurke, Carola Wagner, Hendrik Reuter, Jürgen Augustin, Agata Klimkowska & Robert McInnes 2017: Top soil removal reduces water pollution from phosphorus and dissolved organic matter and lowers methane emissions from rewetted peatlands. doi: 10.1111/1365-2664.12931

Upcoming workshops and conferences (provided by G. Gaudig and F. Tannebrger, GMC)

- 11./12.07.2017 International Conference "Conservation and Management of Wetland Habitats", Riga, registration <https://goo.gl/DWi2hv>
- 22.07.-04.08.2017 IMCG Field Symposium "Mires of the Northern Part of European Russia" http://www.imcg.net/media/2016/imcg_bulletin_1610.pdf
- 24.-26.08.2017 Jahrestagung Arbeitsgemeinschaft Grünland und Futterbau (AGGF), Berlin und Paulinenaue, „Nachhaltige Futterproduktion auf Niedermoorgrünland“
- -28.8.-5.9.2017 Pollenmonitoring-Workshop in Torun/Bialowieza
- 02.-07.09.2017 Jahrestagung Deutsche Bodenkundliche Gesellschaft, Göttingen <https://www.dbges.de/wb/pages/jahrestagung-goettingen-2017.php>,
- 14.-16.09.2017 Flora Pomeranica III (Szczecin) <http://florapomeranica.pl>, deadline 31.05.2017
- 21.-23.09.2017 DGMT Jahrestagung in Allenbach (Hunsrück)
- 21.-23.09.2017 IUCN UK Peatland Programme Conference, Edale
- 21.-23.09.2017 2. Auentagung NLP Unteres Odertal "Moore und Böden in Flusslandschaften: Retention und Biotopverbund", Criewen, abstract deadline 31.05
- 12.-14.10.2017 DGMT-Tagung „Erfahrungen mit der Vernässung von Hochmooren in der Eider-Treene-Sorge Niederung / Schleswig-Holstein“
- -26.-28.09.2017 Jahrestagung der Gesellschaft für Pflanzenbauwissenschaften in Witzenhausen
- -29.09.-01.10.2017 27. Jahrestreffen des AK Vegetationsgeschichte, Institut für Pflanzenwissenschaften in Göttingen, Anmeldefrist 30.06.2017

- -12.-14.10.2017 DGMT-Tagung „Erfahrungen mit der Vernässung von Hochmooren in der Eider-Treene-Sorge Niederung / Schleswig-Holstein“
- -23.11.2017 Deutscher Torf- und Humustag in Bad Zwischenahn



Fig 11. The Cinderella team at the test fields Lingezege constructed wetland, nearby Arnhem (Tobias Dahms)