

## Paludiculture Newsletter

The Paludiculture Newsletter of the Greifswald Mire Centre (GMC) aims to inform a growing community about current peatland topics and the latest developments for wet peatland management, i.e. paludiculture. You will find news from science, practice, politics as well as event announcements and literature references. The newsletter is published at irregular intervals and can be forwarded to interested parties, who can register for it by sending an email to [communication@greifswaldmoor.de](mailto:communication@greifswaldmoor.de). The newsletter is currently provided by the BOnaMoor project, supported by the Federal Ministry of Food and Agriculture (BMEL) via the Agency for Renewable Resources (FNR).

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## 1. General information and news on peatlands and paludiculture

### 1.1. Significant improvements for natural carbon stores in the EU needed

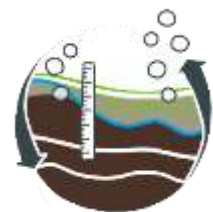
Twenty environmental organisations under the umbrella of Deutscher Naturschutzring (DNR) demand better protection of natural carbon reservoirs and sinks – i.e. also peatlands – in a [position paper](#) from the Parliament and Council of the European Union. The NGOs also want to see them developed in harmony with nature conservation. So far, the draft of the new Land Use, Land-Use Change and Forestry (LULUCF) Regulation must be tightened. Otherwise, climate neutrality at EU level by 2050 and at national level by 2045 at the latest cannot not be achieved, the organisations stress.

They propose, among other things, to decrease climate-damaging greenhouse gas emissions by promotion of natural sinks. Since sinks must sequester more carbon than sources release by 2035, reducing emissions from land use must also be an equivalent target, e.g. stopping peatland drainage and peatland rewetting. The LULUCF Regulation must include reporting requirements for categories such as forest land, cropland, grassland and wetland so that measures can be assessed and adjusted.

The EU Commission had presented its proposals for the amended LULUCF Regulation in mid-July last year as part of the "Fit for 55" climate package. This is intended to adapt the existing legislation to the new climate targets for 2030 and 2050. Now the EU Parliament and Council have to find and negotiate their positions in order to then bring about a legally binding decision. The Succow Foundation as a partner in the Greifswald Mire Centre, together with many other organisations, will continue to campaign for ambitious and comprehensive targets.

## 2. A project presented: Establishment of a Germany-wide peatland soil monitoring for climate protection - open land"

With emissions of 53 million tonnes of CO<sub>2</sub> equivalents per year, organic soils (peatlands and other carbon-rich soils) represent a significant source of greenhouse gases (GHG) in Germany. Accordingly, these mostly agriculturally used soils are of particular importance for climate protection, as they are still characterised by a large but vulnerable stock of soil carbon despite many years of drainage. For the assessment of the status quo as well as the evaluation of GHG mitigation measures, a uniform peatland soil monitoring is necessary. Its aim is to follow the development of the condition of peatland soils at representative sites over the long term and to improve the data basis for emissions reporting.



*Diversity of soil types considered in peat soil monitoring (Photos: B. Schemschot & S. Heller)*

Therefore, the Thünen Institute for Agroclimate Protection (Braunschweig) has been establishing a network designed for long-term monitoring with approx. 200 open land sites since 2020. Simultaneously the Thünen Institute for Forest Ecosystems (Eberswalde) is responsible for approx. 50 additional forested sites. The sites are to cover all important peatland soil and land use types. Wet land use types such as experimental areas for cropping and wet grassland paludiculture will also be considered in the site selection. In addition, synergies with existing and future sites with direct measurements of GHG exchange will be sought. The central element of the peatland soil monitoring is the long-term determination of ground level elevation changes on different spatial and temporal scale levels and, based on this, the derivation of CO<sub>2</sub> emissions. In addition, hydrological and pedological parameters as well as information on vegetation and management are used to collect important control variables for the GHG exchange of organic soils. In addition to the field work, another important component is the updating and improvement of the data and models on which the emission reporting is based, such as the regionalisation of peatland water levels.

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### 3. News from other paludiculture projects

*This section compiles news from current projects and initiatives on paludiculture from various regions and countries.*

#### 3.1. Projects international

##### 3.1.1. The Source of the Nile? - Conference on peatlands in the Nile catchment area

The Nile Basin Initiative organized a 3-day conference on peatlands in the Nile catchment area from January 19th - 21st January in Kampala with the support of the Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Succow Foundation. The conference drew attention to the fact that the Nile



*Presenting products from paludiculture plants  
(Photo: J. Peters)*

and its outflow are strongly influenced by the water regulation of tropical peatlands in the upper catchment area on the Great Lakes in East Africa. It also made aware of these areas as vast carbon stores.

In an [study](#) on local peatland distribution in 2019 the Greifswald Mire Centre could show how much carbon these peatlands potentially store and could thus arouse the interest of the countries bordering the river. Thereupon, government and civil society representatives from Tanzania, Burundi, Rwanda, Uganda and South Sudan attended the conference. They now have a better understanding of where to find peatlands and how they work. The topics included a climate-friendly management of peatlands and value chains for products from wet peatlands. Papyrus, a widespread peatland plant, is traditionally harvested along the Nile and its high-quality fibres are processed. Given the growing population, this form of paludiculture is not sufficient for a livelihood of many. To ensure no further areas are drained, use in paludiculture must be further developed. With the conference closing, the

governments of the region widely agreed on this. The Succow Foundation is already working with partners and entrepreneurs in the [DIAPOL-CE](#) project on creative ideas for this.

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### 3.1.2. Guide "Peatlands across Europe: innovation and inspiration"



Cover "Peatlands across Europe"

CANAPE, [CARE-PEAT](#), [Carbon-Connects](#), [DESIRE](#) and [Life Peat Restore](#) all approach the same fundamental challenge. Rewetting peatlands is a very necessary, but also complicated task, with many technical, financial, and policy issues to overcome. The projects held a series of workshops at the end of 2021, taking advantage of the pandemic enforced remote working to bring stakeholders and experts together virtually from across Europe to share experience, knowledge, and learning, and from them produced the guide "Peatlands across Europe: Innovation and inspiration".

[The guide](#) brings together shared experience across 5 peatland projects stretching from Ireland to the Baltic, all working on the various challenges for peatlands, and to maximise benefits of these incredible landscapes for the climate, biodiversity and the economy. The guide sets out the practical and policy steps that need to be taken

to reduce greenhouse gas emissions from peatlands, including promoting paludiculture and more sustainable use of other agricultural peatlands. This is vital as in some European countries the emissions from drained peatlands outweigh the sequestration by all other ecosystems. [To download or read the guide, please click here!](#) If you would like a printable version of the guide to distribute, please contact [harry.mach@broads-authority.gov.uk](mailto:harry.mach@broads-authority.gov.uk).

*Author: Harry Mach, CANAPE Project Manager*

## 3.2. Projects in Germany

### 3.2.1. Conference "Peatland Protection is Climate Protection"

Wet peatlands are natural climate protection! This is what the scientists of the Greifswald Mire Center demonstrated together with practitioners and partners at the conference ["Peatland protection is climate protection"](#) on 28th March in

front of 200 participants in Berlin and just as many viewers in the [livestream](#).

Up to seven percent of Germany's greenhouse gas emissions can be saved by rewetting drained peatlands. This thus represents one of the most effective measures for the "Natural Climate Protection" action program announced one day later by Steffi Lemke, the German Federal Minister for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection.



*Federal Minister Steffi Lemke answering questions on peatland protection by Jan Peters, CEO of Succow Foundation (Photo: St. Busse)*

*"We must not allow more crises to accumulate. Wet moors are natural climate protection and rewetting in Germany one of the most effective measures. That's why they play an important role in the new action program, which is estimated at 4 billion Euros,"* said Lemke.

The expertise already exists. Scientists from the Greifswald Mire Center and partners have done research on the climate impact of wet areas and tested paludicultures together with farmers. Innovative entrepreneurs have developed regional and ecological products from it. Individual federal states have issued carbon certificates from rewetting. Now it is a question of implementing climate protection through peatland protection on a large scale, as the conference showed. Political, administrative and financial framework conditions still have to be designed for this, according to representatives from nature conservation, agriculture and companies.

Prof. Dr. Kai Niebert, President of the German Nature Conservation Association, described the rewetting of the peatlands as a task for society as a whole with a similar dimension to the coal phase-out. Niebert estimated, that it was already too late for the conserving biodiversity. As far as peatlands were concerned, the clock was now showing five to twelve. If we still wanted to ensure food security, we'd have to think differently now and had no choice but protecting peatlands.

Bernhard Krüsken, General Secretary of the German Farmers' Association, assessed the rewetting of the peatlands as a generational project, just as drainage was. It was important to take everyone with you, to communicate honestly about the scope of the measures and to promote them accordingly in the long term, he said. Alternatives had to be offered to land users. Paludi-PV, i.e. photovoltaics on rewetted peatland, could be a 'collateral benefit'.

### 3.2.2. Paludiculture and Industrial Design

Re:wet is a conceptual design by product and service designer Milan Bergheim for a service that accompanies and records the rewetting of agricultural peatlands with relevant data measurement in order to stop up to 5% of Germany's total CO<sub>2</sub> emissions which are released from drained peatlands.

The necessary land use changes on the scale of at least 50,000 ha/a require an integral organisation of processes and raw material flows. To organise this transformation efficiently, Re:wet works in clusters at the landscape level. Within a cluster, all involved stakeholders work together. The Re:wet platform, which maps the landscape as a digital twin, serves as an interface. For this twin, farmers provide data as citizen scientists. They measure their peatlands with the Peat:lab, an easy-to-use measuring device. The device records four values: terrain height, peat thickness, ditch water levels and - via smartphone - vegetation composition. Coupled with geo-tags, these values are uploaded to the platform.



Presenting Re:wet (Illustration: M. Bergheim)

The digital twin has several functions. It expands the basis for planning rewetting. It enables long-term monitoring, modulates the greenhouse gas balance and generates CO<sub>2</sub> certificates. Rewetting is divided into three phases, evaluation, rewetting and finally paludiculture operation. In the first phase, Re:wet coordinates the planning of the rewetting measures with the help of local planning offices.

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Upcoming construction work is put out to tender via the platform. At the same time, the raw material flows within a cluster are evaluated, growing paludiculture biomass is prospected and the establishment of suitable utilisation chains is initiated. The second phase describes the land conversion. Re:wet provides support and mediates on technical issues. In the third phase, Re:wet accompanies the implementation of paludiculture. The Peat:labs are now in regular use. Long-term monitoring makes it possible to observe further peat sacking or overgrowth. If problems occur, the platform serves as a supporting element. It can also be used to disperse biomass. This makes it possible, among other things, to give preference to certain harvesting times and processes depending on the intended use and to keep transport routes short through intelligent allocations. Through the geo-specific collection of vegetation, reliable and secure CO<sub>2</sub> certificates can be generated using the greenhouse gas emission site types (GEST) approach, which the farmers can market via the Re:wet platform.

The Re:wet platform with the Peat:lab was designed by product and service designer Milan Bergheim as part of his master's thesis at the Weißensee Kunsthochschule Berlin. More information: <https://youtu.be/tro-ooLSu6w?t=1591>.

*Author: Milan Bergheim, Weißensee Academy of Art Berlin*

### 3.2.3. PRIMA - First harvest in cattail plantation near Neukalen/Germany

The Paludi-PRIMA project was able to harvest for the first time on the 10 ha experimental cattail plot in December 2021.

Due to the heterogeneous development within the plot, two subplots were designated, one cattail dominated and another one with a mix from cattail-cattail and reed canary grass which have been harvested in separate batches. Wellink Equipment from Groenlo (Netherlands) was the company commissioned with harvesting. They had already successfully harvested cattail stands on smaller trial areas in the Netherlands. Their special technology used was the track-based Softrak 120 from the British company Loglogic, which is equipped with a Finnish chopper (ELHO double chopper) and a semi-mounted bunker (volume: 11 m<sup>3</sup>) at the front. However, the bunker can not be completely filled when the soil has a very low load-bearing capacity. The harvesting crawler transported the biomass out of the area to the transfer point, which had been set up in a slightly elevated area at the transition to the mineral soil. There, the caterpillar unloaded the biomass onto tarps. A tractor equipped with a forestry crane loaded the biomass onto agricultural trailers for transport to trials for drying and later material processing. Detailed working time measurements and biomass analyses (yield, water content, bulk density, etc.) accompanied harvesting and logistics.

Beginning snowfall revealed the disadvantages of a long-term fixed harvest date - the trial harvest had to be stopped on the second day. Suitable special technology must be available regionally in order to be able to react flexibly to weather conditions when harvesting paludiculture, as is also the case in other agriculture.





*Impressions from first harvesting the Prima project pilot site in Neukalen (Photos: Sabine Wichmann)*

Another challenge was the high proportion of cigars in the 2021 harvest. There are ways of processing both the seed wool and the leaf mass of cattails, but separate mechanical harvesting is not (yet) possible. It still needs to be investigated to extend a high proportion of seed wool in the volume of harvested material affects the preparation and processing.

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#### 3.2.4. „Erzähl mal!“: Oral history of Barver Moor

For two years, the Sphagnum Farm Barver in the district of Diepholz has been testing the climate-friendly productive use of wet peatlands (paludiculture). The project sees itself as part of a decades-long tradition of agricultural peatland use in the heart of the Diepholzer Moorniederung. Therefore, the project's management, the Foundation for Nature Conservation in the District of Diepholz, also turned to the region's "oral history". A three-part documentary now shows the personal everyday life and memory stories of



*In front of the camera, contemporary witnesses tell their personal stories of the moor in Barver (Photo: J.-U. Holthuis)*

seven contemporary witnesses - residents, farmers and nature conservationists of the Barver Moor - after the Second World War.

Under the title "Tell me!", twelve students of the Media Management and Journalism course at the Jade University of Applied Sciences Wilhelmshaven developed it in cooperation with the Interreg project CANAPE. The episodes tell of the former use, the importance of the peatland as a livelihood through peat cutting and industrial peat extraction, as a neighbourly home and living space. The films

also take up today's use, the disappearance of typical peatland plants and animals and the efforts of nature and climate conservationists.

The three-part documentary "Tell me about it" can be seen at <https://www.stiftung-naturschutz-diepholz.de/projekte/nrsp-canape>.

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## 4. Events on peatlands and paludiculture

**03.04. - 08.04.22**

Vienna, Austria and online

[EGU European Geosciences Union General Assembly](#) with various peatland-related sessions

**14.06. to 16.06.22**

Arles, France

[17th Society of Wetland Scientists Europe Chapter](#)

## 5. Publications/ Literature Recommendations

Anadon-Rosell, A., Scharnweber, T., von Arx, G., Peters, R. L., Smiljanić, M., Weddell, S., Wilmking, M. (2022) Growth and Wood Trait Relationships of *Alnus glutinosa* in Peatland Forest Stands With Contrasting Water Regimes. *Frontiers in Plant Science* 12. <https://doi.org/10.3389/fpls.2021.788106>

Czubaszek, R., Wysocka-Czubaszek, A., Wichtmann, W., Banaszuk, P. (2021) Specific Methane Yield of Wetland Biomass in Dry and Wet Fermentation Technologies. *Energies*, 14(24), 8373. <https://doi.org/10.3390/en14248373>

de Jong, M., van Hal, O., Pijlman, J., van Eekeren, N., Junginger, M. (2021) Paludiculture as paludifuture on Dutch peatlands: An environmental and economic analysis of *Typha* cultivation and insulation production. *Science of The Total Environment*. <https://doi.org/10.1016/j.scitotenv.2021.148161>

Finlayson, R. (2021) Managing peatlands in Indonesia's South Sumatra for multiple benefits. *Forest-News*. [Managing peatlands in Indonesia's South Sumatra for multiple benefits - CIFOR Forests News](#)

Freeman, B. Evans, C., Musarika, S., Morrison, R., Newman, Th., Page, S., Wiggs, G., Bell, N., Styles, D., Wen, Y. Chadwick, D., Jones D. (2022) Responsible agriculture must adapt to the wetland character of mid-latitude peatlands. *Global change Biology*. <https://doi.org/10.1111/gcb.16152>

Lane, A. (2021) Peatlands in peril: The race to save the bogs that slow climate change. *ENVIRONMENT* 29/12. [Peatlands in peril: The race to save the bogs that slow climate change | New Scientist](#)



O'Neill, E. A., Morse, A. P., Rowana, N. J. (2022) Effects of climate and environmental variance on the performance of a novel peatland-based integrated multi-trophic aquaculture (IMTA) system: Implications and opportunities for advancing research and disruptive innovation post COVID-19 era. *Science of the Total Environment* 819 <http://dx.doi.org/10.1016/j.scitotenv.2022.153073>

Rahman, M., Cicek, N., Chakma, K. (2021) The optimum parameters for fibre yield (%) and characterization of *Typha latifolia* L. fibres for textile applications. *Fibers and Polymers*, p. 1543–1555 <https://doi.org/10.1007/s12221-021-0194-8>

Rodriguez-Dominguez M.A., Bonefeld, B. E., Ambye-Jensen, M., Brix, H., Arias, C.A. (2021) The use of treatment wetlands plants for protein and cellulose valorization in biorefinery platform. *Science of The Total Environment*, Vol. 810. <https://doi.org/10.1016/j.scitotenv.2021.152376>

Silvianingsih, Y.A., Hairiah, K., Suprayogo, D., van Noordwijk, M. (2021) Kaleka Agroforest in Central Kalimantan (Indonesia): Soil Quality, Hydrological Protection of Adjacent Peatlands, and Sustainability. *Land* 10, 856. <https://doi.org/10.3390/land10080856>

Vroom, R.J.E., Geurts, J.J.M., Nouta, R. et al. (2022) Paludiculture crops and nitrogen kick-start ecosystem service provisioning in rewetted peat soils. *Plant Soil*. <https://doi.org/10.1007/s11104-022-05339-y>

Further new publications on peatlands, rewetting and nature conservation on peatlands can be found in the IMCG Bulletin, which is regularly published on the IMCG homepage.

The compilation of this newsletter was funded by the BOnaMoor project and supported by the Greifswald Mire Centre. The BOnaMoor project is conducted by the University of Greifswald, partner in the Greifswald Mire Centre, in cooperation with HTW, University of Applied Sciences, Berlin and financed by the Federal Ministry of Food and Agriculture (BMEL) through the Agency for Renewable Resources (FNR).

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