Paludiculture Newsletter

With this newsletter the Greifswald Mire Centre (GMC) aims to keep a growing community informed on peatlands and paludiculture. You will find news from research, practice, politics, as well as announcements of conferences and other events and recommended publications. Sign up per e-mail to communication@greifswald-moor.de for upcoming issues! The newsletter is currently provided by the TyphaSubstrat project coordinated by the Greifswald Mire Centre and financed by the German Federal Ministry of Food and Agriculture through the Agency for Renewable Resources (FNR).

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1. General information and news on peatlands and paludiculture

1.1. The Venice Agreement

Peatland and art are combined in an installation at this year's Venice Biennale. Artists and peatland scientists, including some of the Greifswald Mire Centre, have joined forces in a worldwide network. With an art installation and happening they want to achieve more for peatlands also politically. Representatives from art, science, nature conservation, climate policy and indigenous peoples announced the Venice Agreement at the 59th Art Biennale in the lagoon city on World Peatland Day, 2nd June 2022. Following the term “Paris Agreement on climate protection”, the Venice Agreement shall point out, that the preservation and restoration of peatlands is crucial for climate and people on our planet. It was signed, among others, by the Greifswald peatland scientist Prof. Hans Joosten, winner of the German Environmental Award 2021.

The agreement is part of the art initiative Turba Tol Hol-Hol Tol and its peat moss installation in the Chilean Pavilion at this year's Biennale. There, the international artist collective Ensayos has set up a peat moss lawn and a video installation for this purpose in one of the historic Venetian warehouse buildings. A fair share of support was given by the Greifswald Mire Centre and the peat company Torfwerk Moorkultur Ramsloh, which harvested the peat mosses on their *Sphagnum* paludiculture sites in Northwest-Germany, and organised delivery to Venice. The pavillon’s visitors at the Biennale can now discover the peat mosses and the moist oscillating surface they form with all senses. The video sequences convey the fascination of the peatlands in sound and vision. Turba Tol Hol-Hol Tol is primarily dedicated to the peatlands of Patagonia and the indigenous population there. At the same time, it shows that the preservation of nature, including the peatlands, is in the interest of all present and future societies and that the destruction of nature to date can only be reversed globally through the joint efforts of many local initiatives.

The Venice Agreement, a poetical declaration for the protection of peatlands (Doc ny Turba Tol Hol-Hol Tol)

1.2. EU Nature Restoration Law with binding peatland target finally published

On the 22nd of July, after several postponements, the European Commission published the long-awaited draft of the EU Restoration Law. As an essential component of the EU Green Deal, it sets binding targets for the restoration of ecosystems, for example peatlands. The outstanding opportunity of nature-based measures as peatland action to counter the currently unchecked climate and biodiversity crisis is strongly recognised by the European Commission.

The draft law sets as goals for peatland protection that at least 30% of the agricultural peatland area must be restored by 2030, at least 50% by 2040 and at least 70% by 2050. In this context, the restoration of peat extraction areas can be counted towards the targets. Now it is important to maintain these goals in the further negotiations and to anchor them in law in the end. However, according to Jan Peters, CEO of the Succow Foundation, a transformation pathway for full rewetting of all peatlands in the EU should lead to net zero CO_2 emissions by 2050 in order to achieve the climate protection targets of the Paris Agreement and the EU FtiFor55 climate package. The EU should take the lead in the UN Decade for Ecosystem Restoration and achieve ambitious biodiversity targets at the next Biodiversity Convention conference in Canada in December 2022.

More than 50% of peatlands in the EU are still in poor condition, they release large amounts of greenhouse gases as well as nitrates due to drainage, and we are losing more and more animal and plant species typical for peatlands due to habitat destruction. This can be massively improved by rewetting peatlands. With paludiculture, i.e. "wet agriculture and forestry", which has recently also become part of the European Agricultural Policy, value creation, and circular bio-economy can be developed in peatland-rich rural areas.

At the beginning of June, a network of more than 60 organisations from environmental protection, nature conservation, science and agriculture called for ambitious goals for peatland protection in an open letter to the Commission, which was coordinated by the International Mire Conservation Group (IMCG).

1.3 New publications with contribution about peatlands: Book "3 degrees more" and journal "Political Ecology”

On 07.07.2022, the book "3 degrees more - A look at the impending hot spell and how nature can help us prevent it" was published by oekom-Verlag (in German). Prominent authors such as Hans J. Schellnhuber, Stefan Rahmstorf, Jutta Allmendinger describe what threatens nature and society as we head for such high global warming despite the agreements of the Paris Climate Agreement, but also how we can prevent the worst. The chapter by Prof. Hans Joosten explains how the rewetting of peatlands works against the climate crisis.

At the same time as “Peatlands – trump cards in the climate crisis”, oekom-Verlag is dedicating an entire issue of the journal Politische Ökologie, co-published by the Succow Foundation, partner in the Greifswald Mire Centre, to the topic. It offers numerous contributions by authors of the Greifswald Mire Centre on the climate impact of peatlands, paludiculture, the political and legal framework or the financing of peatland protection measures.

2. A paludiculture project presented: Typha Substrat

Peat is still the most important raw material for substrates in professional horticulture, especially in vegetable growing. However, peat extraction and use is associated with greenhouse gas emissions, in total approx. 24 million tonnes of CO_2 equivalents per year across Europe.

The project TyphaSubstrat at the University of Greifswald and partners wants to show an alternative. Over a period of three years, it is investigating the sustainable production and potential of cattail biomass as an alternative raw material for substrates.

Currently, about 6.5 million m³ of growing media are produced annually in Germany, which consist of about 80 % peat (IVG 2000). The German government's Climate Protection Plan 2050 sees considerable potential in reducing the use of peat in horticulture in order to avoid greenhouse gas emissions (BMU 2016). However, clear government regulations do not yet exist. However, German substrate industry have committed themselves to reduce the use of peat. It remains a major challenge to further increase the share of peat-free substrates for all sectors. Bans on peat extraction in western countries have not solved the problem so far, but have shifted peat extraction to other regions, e.g. the Baltic States.

For this reason, the (further) development and production of alternative substrate raw materials is a key funding objective of the Federal Ministry of Agriculture in the course of the peat reduction strategy. This strategy provides for the extensive replacement of peat in professional horticulture by 2030. In the hobby market as well as in gardening and landscaping, the use of peat is to be completely eliminated by 2026. So far, wood fibres, coconut products and various composts have been used as peat substitutes, but they are difficult to obtain and expensive. Transport routes are sometimes long and production is resource-intensive. Paludiculture feedstocks - such as peat moss biomass or cattail - also remain a challenge. Substrate industry and professional horticulture will only switch over once these novel raw materials have been extensively and successfully tested and the availability of raw materials in sufficient quantities is assured.

Since vegetable cultivation consumes more than half of the peat used in professional horticulture, especially through the cultivation of young plants, TyphaSubstrat aims to develop a substrate for press pots that is at least 50 % peat-free.

Test area for cultivating Typha (Photo: T. Dahms); right: Taking samples for studies on nutrient pollution in a natural cattail stand near Kamp in MV (Photo: J. Hanbo Liang)

In the project, Forschungsring e.V. (Darmstadt) is producing alternative substrate mixtures and investigating their suitability for the production of press pots. Currently, pre-treatments such as fibres, fermentation, composting and hygienisation of the different raw materials are being tested. Since only

cattail biomass that complies with limit values for critical ingredients is suitable for substrate, the Institute of Pharmacy at the University of Greifswald is investigating cattail biomass from various locations for herbicide and heavy metal contamination. To provide suitable harvesting technology, the company Wellink GmbH is developing a machine based on a caterpillar-based LogLogic vehicle. It is to enable the harvesting of cattails in chaff and bunches with extremely low ground pressure.

The project results should contribute to a transformation towards wet peatland use and sustainable substrate industry and help to secure the competitiveness of horticulture. The project is funded by the Federal Ministry of Food and Agriculture (BMEL) within the framework of the funding guideline "Promotion of innovations to reduce peat content in cultivated substrates - peat substitutes" in the funding programme "Renewable Resources", the project executing agency is the FNR.

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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.

3.1.1. Peatland Agriculture in Ireland

The Initiatives For Sustainable Farming Of Peatlands - Farm Carbon E.I.P. has assembled some information on paludiculture and its potential in Ireland. Farm Carbon E.I.P. aims at reducing the level of greenhouse gas emissions (carbon dioxide CO_2) released from agriculturally used peatlands and thereby addressing the climate crisis while also enhancing biodiversity and improving water quality.

3.1.2. DESIRE project finished

The project DESIRE, which was funded within the Interreg Baltic Sea Region Programme 2014 -2020 and awarded with a flagship status by the EU Strategy for the Baltic Sea Region, was finalized after three years in December 2021. DESIRE aimed at improving the management of drained peatlands in the Neman river catchment to reduce their nutrient and greenhouse gas emissions. The Neman is the forth-largest river flowing into the Baltic Sea. Extensive drainage of peatlands in its whole basin in Belarus, Lithuania, Poland, and Russia leads to degradation of the sites and contributes to eutrophication of the river waters, the Curonian lagoon and the Baltic Sea. Peatland restoration by rewetting and implementation of paludiculture can largely reduce these negative processes and delivers manifold environmental benefits of strong transnational relevance. DESIRE has identified drained peatlands and established demonstration sites for and rewetting sustainable land use (paludiculture) to exemplarily reduce greenhouse gas and nutrient emissions. Cooperation with regional and national authorities in the Neman catchment, NGOs, agricultural consultants and other stakeholders was a basis for adoption of the developed policies' components that incentivise peatland management into wet condition for nutrient retention, e.g. river basin management

Rewetted fen peatland in Zuvintas Biosphere Reserve, Lithuania (photo: Jurate Sendzikaite)

plans and agri-environmental schemes. Beside scientific interest of investigations on pilot sites, awareness raising and demonstration of practices were promoted. Finally, a general strategy and economic assessment for peatlands rewetting and implementation of paludiculture in the Neman basin were elaborated. Please look at the project website for a list of results and publications of DESIRE. The project was coordinated by the Greifswald University and Succow Foundation and was implemented together with partners from Poland, Lithuania and Kaliningrad. The project was supported by the scientifists at the Greifswald Mire Centre (GMC) and the Interdisciplinary Centre for Baltic Sea Region Research (IFZO) at Greifswald University.

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3.2. Projects in Germany

3.2.1. The BonaMoor project

The BonaMoor project aimed at optimising energy biomass production on rewetted fen peatland sites. In addition to the development of sustainable and economically viable cultivation systems and value chains for biomass from wet fen sites, the goals of the project were to optimise the production of renewable raw materials in paludiculture and their thermal utilisation. The project, financed by the Federal Ministry of Food and Agriculture (BMEL) with FNR as executing agency, was finalized in March 2022.

BonaMoor field day in October 2021 with technology demonstration on wet meadows at Lake Kummerow (Photos: N. Körner)

To achieve these goals, field studies were carried out on rewetted fens on productivity and yields, biomass quality and vegetation composition. In addition, economic analyses and life cycle assessments were done. The scientific investigations were brought closer to the public through various activities to disseminate the results (publications, field days, workshops).

Within the BonaMoor project, various possibilities were used to inform the public (Youtube, Twitter, lectures at scientific events, field days and online workshop).

Elemental and fuel analyses were used to identify time periods for harverting for maximising nutrient removal via the biomass, optimal harvesting dates and improved elemental fuel properties. Important parameters such as ash melting behaviour or the ratio of corrosive substances are directly related to the susceptibility to failure and thus the economic efficiency of small and medium-sized combustion plants. The influence of water levels or other conditions on the fen peatland site and on the contents of critical constituents could also be demonstrated. On the basis of various practical combustion tests with accompanying measurement campaigns, suggestions for optimising combustion could be worked out (Hochschule für Technik und Wirtschaft, Berlin).

In the project, primary data were collected and evaluated for different harvesting methods of biomass from wet peatlands for combustion. In each case, methods were developed or adapted for this purpose. In addition, data for the economic assessment of heat supply costs in practical operation were collected and evaluated, and the environmental impacts of the various fuel supply chains investigated in the project were carried out using the OpenLCA software (GreenDelta GmbH) based on the Ecovinvent 3.6 APOS database. The results were presented at various events, integrated into publications and manuscripts and served as a basis for the elaboration of recommendations. You will find a summary in the brochure Bioenergie aus nassen Mooren -Thermische Verwertung von halmgutartiger Biomasse aus Paludikultur.

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3.2.2. The Buffalo project

As part of the Plant[3] alliance, the joint project Integration of the water buffalo into the value chains of paludiculture and the plant-based bioeconomy started in February 2022 and is funded by the Federal Ministry of Education and Research. The working group "Grassland and Forage Sciences" of the University of Rostock is developing a certified model for the utilisation of plant growths on wet peatlands by water buffaloes together with the working group "Landscape Economics" at the University of Greifswald.

Water buffalo (Photo: B. Herold)

The complex interactions between animal and environment are documented and evaluated through scientific monitoring of water buffalo husbandry on the farms Gut Darß GmbH and Saaler Bodden Biorind GbR. In addition, the project supports the Inselmühle Agrar GmbH farm on Usedom island in setting up a water buffalo husbandry. Real costs and benefits of animal production are determined and used for the development of sustainable bioeconomy. The project is cooperating with other renowned scientific and applied institutions in the state. The aim is to jointly maintain peatlands as locations for meat production in paludiculture after rewetting through adapted business models in the fields of agriculture, landscape management and tourism. The three year project thus contributes to strengthening regional innovative capacity and value creation.

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3.2.3. MoKli sends open letter to the federal ministers

In an open letter to the Federal Ministers Robert Habeck, Steffi Lemke and Cem Özdemir, the Greifswald Mire Centre and the German Association for Landscape Conservation as well as practice partners recommend concrete support for an accelerated implementation of climate protection through peatland conservation. The rewetting of agriculturally used peatlands and a subsequent wet use are effective and cost-efficient measures of natural climate protection. Many farmers have recognised this and want to make their contribution. But the lack of certainty in planning, investments and subsidies makes them hesitate. The opportunity to save up to 7% of Germany's greenhouse gas emissions through peatland protection is thus missed.

It is stated in the "Immediate Climate Protection Programme" and also in the "Natural Climate Protection Action Programme": the protection and rewetting of peatlands is essential for achieving the climate and biodiversity goals.

Subsequent wet use of peatland soils (paludiculture) has many advantages: Emissions from the land are effectively reduced. Farming can be continued in an innovative way, the resulting products can fix carbon and also replace fossil raw materials. Converting to paludiculture after centuries of drainage-based agriculture is a social task. Risks and costs cannot be borne by individuals. The knowledge and willingness for such a "peatland transformation" are there.

The Peatland and Climate Protection (MoKli) project of the National Climate Initiative funded by the Federal Ministry for Environment, Nature Conservation, Nuclear Safety and Consumer Protection has developed solutions for the concrete implementation of peatland climate protection in five model regions in peatland-rich federal states in Germany over the last three years, together with farmers, water and soil associations, authorities and other local actors. It sees willing farmers who are, however, slowed down and frustrated by lengthy planning procedures, uncertain framework conditions for investments and a lack of financial support. As a result, we run the risk of missing out on the potential of serious climate protection on peatland soils.

4. Events on peatlands and paludiculture

12.-13.07.2022 online Webinar on “Wetlands and Agriculture: Transformative actions for sustainable agricultural practices and the wise use of wetland”

14.07.2022 Wagenfeld "Klimaschutz.Moore.LändlicherRaum" - 6. Niedersächsischer Tag der Landentwicklung und Tag der Landwirtschaft in Mooren

15.-19.08.22 Isle of Vilm/Germany Aktuelle Biodiversitätsforschung zur Umsetzung des Übereinkommens über die biologische Vielfalt (CBD)

01./02.09.2022 Rabenberg in the Erzgebirge/Germany Bundesfachtagung „Wiedervernässung von Waldmooren -Politische Rahmenbedingungen –Revitalisierungspraxis –Ökosystemdienstleistungen“

05.-09.09.2022 Allicante/Spain SER Europe 2022 Conference

08.09.2022 Warsaw/Polen GDOS conference „Technical possibilities to increase the profitability of sustainable use of wetlands”

15.09.2022 Rostock/Germany Symposium: Sustainable urban-rural partnerships in Mecklenburg-Vorpommern

20.10.2022 online Rostocker Bodenschutzsymposium

8./9.11.2022 Berlin/Germany Strategische Forum 2022 der Deutschen Agrarforschungsallianz (DAFA) „Landnutzung in Zeiten des Klimawandels“

5. Literature

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Weitere neue Publikationen zu Mooren, Wiedervernässung und Naturschutz auf Mooren finden sich im IMCG Bulletin, das regelmäßig auf der IMCG-Homepage veröffentlicht wird.

Dieser Newsletter wurde im Rahmen des Projektes Typha Substrat erstellt und durch das Greifswald Moor Centrum unterstützt. Typha Substrat wird von der Universität Greifswald, Partner im Greifswald Moor Centrum, durchgeführt. Gefördert wird es durch das Bundesministerium für Ernährung und Landwirtschaft (BMEL) durch die Fachagentur für Nachwachsende Rohstoffe.

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