TyphaSubstrat

Harvesting and use of cattail biomass as an alternative raw material in growing media for vegetable cultivation.

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Cattail as an alternative raw material in growing media

Peat remains the most important substrate in horticulture. Peat extraction is not sustainable, however, as the use of peat causes greenhouse gas emissions and peat cannot grow back quickly (only 1 mm per year in natural peatlands). The German government's Climate Protection Plan 2050 sees considerable potential in reducing the use of peat in horticulture to avoid greenhouse gas emissions (BMU 2016). In Ireland, peat extraction has already been stopped in 2020, England will follow by 2030. In Germany, an average of 4 mill. t of peat is still extracted annually (IVG 2022). In the future, the demand will be covered by peat from Eastern Europe.

The German substrate industry plans to increase the share of peat substitutes in substrates for the hobby market to 50% by 2025 and 70% by 2030; and in growing media for professional horticulture to 20% by 2025 and 30% by 2030. So it is quite a great challenge to further increase the proportions to peat-free substrates in growing media for all sectors.

The TyphaSubstrat project aims to investigate the sustainable production and potential of cattail biomass as an alternative substrate (Fig. 1). Since the vegetable growing sector consumes more than half of the peat used in professional horticulture (approx. 2.5 million m^3), the project aims to develop a substrate for press-pots that is at least 50% peat-reduced.

The intended project results are to contribute to the transformation towards climate-neutral peatland use (Paludiculture) and substrate management as well as to securing the competitiveness of horticulture (Wichtmann et al. 2016).

Cattail (Typha L.) is a native, highly productive marsh plant (Fig. 3). Its cultivation as a climate-friendly management of peatland soils (paludiculture) also offers an alternative to conventional, drainage-based agricultural peatland use, which is also associated with high greenhouse gas emissions. If the cattail biomass is suitable as a substrate feedstock, the substrate industry will gain a new renewable raw material that can be produced regionally and can contribute to the long-term supply of raw materials for the substrate industry. Previous substrate tests with cattail biomass have shown that a proportion of 20-30 % cattail biomass in growing media appears to be practicable. The properties of fiberized biomass harvested in winter are comparable to those of wood fiber. Among the positive properties of both feedstocks are e.g. a low volume weight and a high air capacity. A challenge is the reduction of nitrogen immobilization.

BMU (2016) Klimaschutzplan2050. Klimapolitische Grundsätze und Ziele der Bundesregierung. 91 p.., IVG (2022) Kultursubstrate und Hobbyerden – die wichtigsten Fragen und Antworten. Düsseldorf. Wichtmann, W., Schröder, C., Joosten, H. (2016) Paludiculture – Productive Use of Wet Peatlands. Schweizerbart Science Publishers, Stuttgart, 272 p.

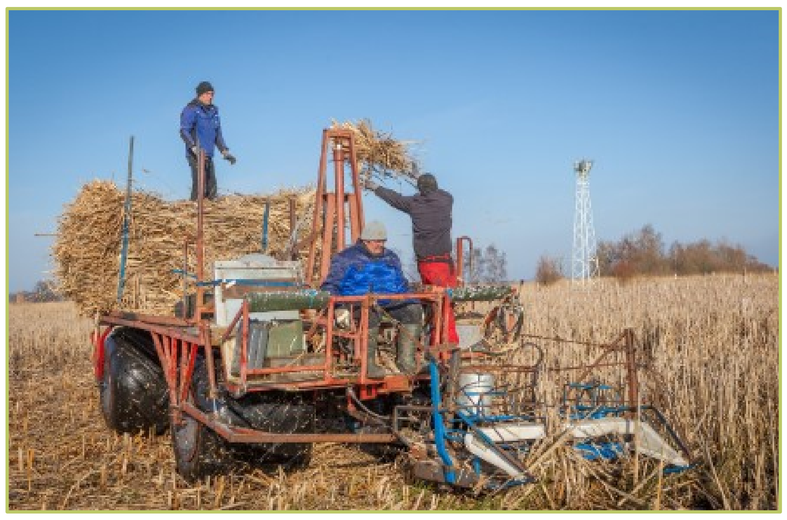

Figure 2 Cattail mowing test with a Saiga, a reed harvest machine adapted to harvest of reed bundles (photo: T. Dahms)

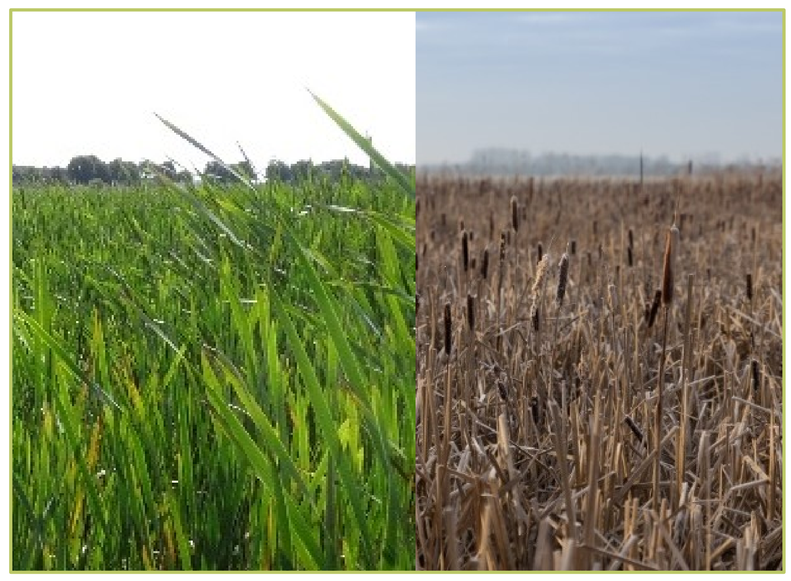

Figure 3 Broadleaf cattail in summer and winter (photo: C. Oehmke)

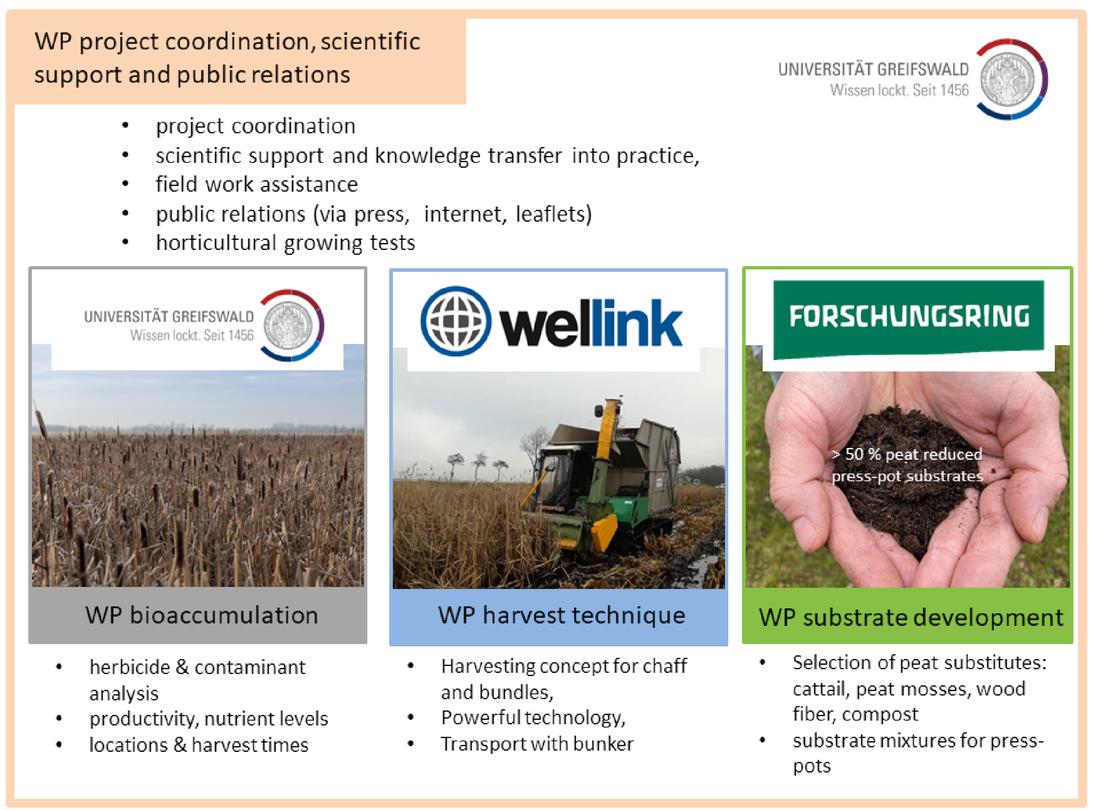

Figure 1 TyphaSubstrat - partners, workpackages (WP) and project goals (photos: left and right - C. Oehmke, in the centre - A. v. Weeren)

TyphaSubstrat - project goals

- quantity and quality analysis of cattail biomass as a function of the production site and harvest time, and derivation of the nutrient retention potential for the site (bioaccumulation)
- characterization of cattail biomass as a substrate feedstock: physical, chemical, and biological properties
- development of suitable technology for cattail harvesting
- development of a suitable pre-processing technique for cattail biomass as substrate for press-pots for horticultural uses
- development of substrate mixtures with cattail biomass and other peat substitutes such as wood fiber, peat moss biomass, etc. for press pots, reduced by at least 50% peat
- horticultural practical tests: young plant growth, durability of the young plants, adaptation of cultivation management during young plant development, establishment and growth in field cultivation
- knowledge transfer ↔ from sience into practice

Learn more about peatland conservation and paludiculture on https://www.moorwissen.de/en/index.php

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