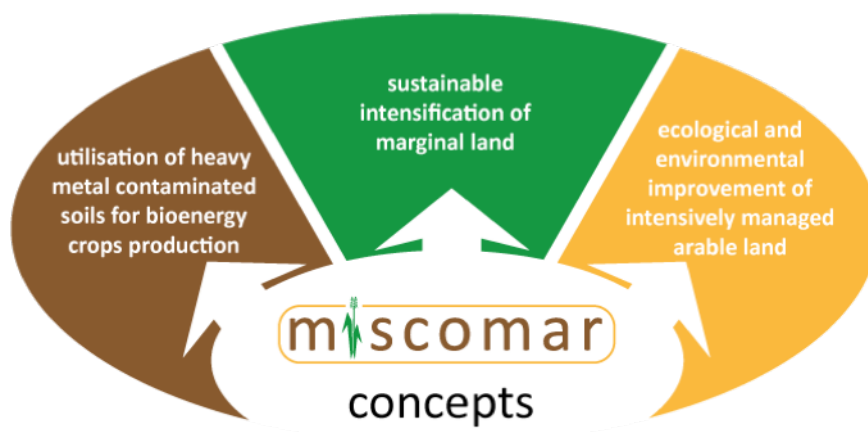


MISCOMAR

MISCANTHUS BIOMASS OPTIONS FOR CONTAMINATED AND MARGINAL LAND: QUALITY, QUANTITY AND SOIL INTERACTIONS



1° Call: 2015

Project period: 06/2016 - 05/2019

Topic: Bioenergy research, Soil management/functionality

Keywords: Miscanthus seed-based hybrids, marginal and contaminated soils, biomass production, anaerobic digestion, combustion

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Total funding: 575.000 €

Website: www.facceturplus.org/research-projects-1st-call/miscomar/
www.miscomar.eu.

BACKGROUND

Bioenergy is a key element of the EU renewable strategy and exists at the interface of policies on agriculture/land use and energy generation. Currently the majority of biofuels are produced from annual food crops grown on agricultural land, whereas the majority of solid biomass used for heat and power is woody and comes from forests. To avoid tension between food and fuel production, changes to the current approach are proposed by the European Commission to grow perennial energy crops on medium or low quality agricultural land wherever possible.

OBJECTIVE

- investigate the field performance of novel, stress tolerant miscanthus seed-based hybrids in comparison to the standard genotype *Miscanthus x giganteus* on economically marginal and heavy metal contaminated (HMC) soils;
- quantify the impacts of miscanthus production on soil parameters;
- identify utilisation options for biomass and study the impact of varying environmental conditions on potential miscanthus end uses;
- develop concepts for the integration of miscanthus into existing crop rotations and farming systems.

METHODOLOGY

- Investigation of the production potential (quantity and quality) of promising near-to-market *Miscanthus* seed-based hybrids on marginal land;
- The hybrids originate from IBERS' breeding program and are grown on HM contaminated land (Poland), marginal arable land (Germany) and as reference on arable land in the UK;
- Comparison of biomass from seed-based hybrids at each location to standard *M. x giganteus* commercial clone.

RESULTS AND KEY FINDINGS

- Optimal systems for "Miscanthus genotype x site x crop management" combinations for biomass production under marginal conditions;
- Utilisation options for biomass from novel *Miscanthus* hybrids including anaerobic digestion (as an alternative for HMC biomass), combustion as well as other uses e.g. for building materials;
- Concepts for integrating miscanthus into agricultural practice on farm level, which was analysed by the economic outcome for the three utilization options 'combustion', 'anaerobic digestion' and 'animal bedding';
- Policy-relevant data on the balance between food/fuel production, with a particular focus on the scope for optimisation of land-use in contaminated and marginal areas.



Green harvest ULI



Brown harvest ULI

KEY PUBLICATIONS

- Krzyżak J., Pogrzeba M., Rusinowski S., Clifton-Brown J., McCalmont J.P., Kiesel A., Mangold A., Mos M., (2017) Heavy metal uptake by novel miscanthus seed-based hybrids cultivated in heavy metal contaminated soil. *Civil and Environmental Engineering Reports*, 26, 121-132.
- Mangold A., Lewandowski I., Möhring J., Clifton-Brown J., Krzyżak J., Mos M., Pogrzeba M., Kiesel A., (2018): Harvest date and leaf:Stem ratio determine methane hectare yield of miscanthus biomass. In: *GCB Bioenergy* 117, S. 851. DOI: 10.1111/gcbb.12549.