BMBF Programm Bioenergie 2021
„Nachhaltige PROduktion von BIOmasse mit Kurzumtriebsplantagen der PAppel auf Mariginalstandorten“

Bundesministerium für Bildung und Forschung

Sustainable production of biomass from poplar short rotation coppice on marginal land (PRO-BIOPA) – A project overview

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PRO-BIOPA is part of the BMBF program “Bioenergie2021” and aims (i) to optimize biomass production with short rotation coppice (plantations) of poplar on marginal sites with limited water and nutrient availability and to implement a comprehensive and integrative evaluation of this form of biomass production with respect to (ii) ecologic and (iii) economic aspects. Furthermore, with regard to environmental sustainability we will amend water and nutrient utilization as well as the emission of reactive trace gases by means of biotechnological approaches.
Therefore, the project includes system biological analyses of Arabidopsis and poplar, laboratory studies with transgenic plants in controlled conditions as well as field trials with conventional poplar species/clones in short rotation plantations on marginal sites.
The different scientific questions will be addressed in an interdisciplinary approach by scientists from the Karlsruhe Institute of Technology, the University of Freiburg, the ‘Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg’, and the industrial partner Netafim GmbH.

Biological Tasks

- Identification of genetic factors determining root architecture in Arabidopsis and poplar with respect to an optimization of water uptake
- Production of transgenic poplar mutants with optimized water and nitrogen use efficiency (WUE, NUE)
- Analysis of biomass production in transgenic mutants with focus on (i) resource use efficiency (RUE) and volatile organic compound (VOC) emissions and (ii) changes in C- and N-allocation

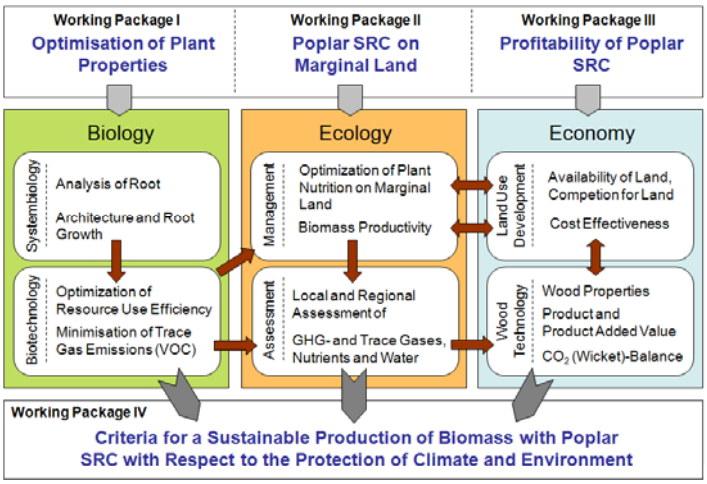
Ecological Tasks

- Compilation of GHG balance of poplar short rotation coppice (SRC) with nutrition and water management considering (i) GHG emission / deposition and (ii) Management induced energy consumption
- Quantification of emission and leaching of environmental incriminating compounds (i) VOC as precursors of tropospheric ozone and (ii) nitrate leaching in ground and surface water bodies

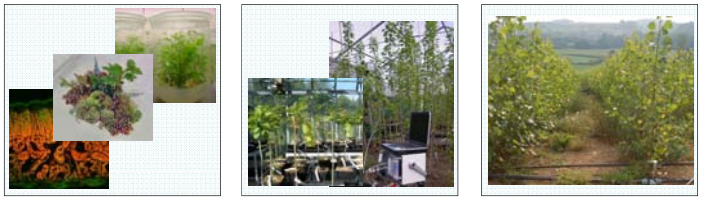
Economical Tasks

- Determination of availability of appropriate marginal land on a national basis (Germany)
- Determination of the competition for cultivable land in Germany (‘food versus fuel‘ discussion)
- Elucidations to meet requirements of the irrigation technique for SRC as well as harvest and transportation logistics
- Determination of net energy balance (NEB) of poplar-SRC and its cost effectiveness in relation to other land use types

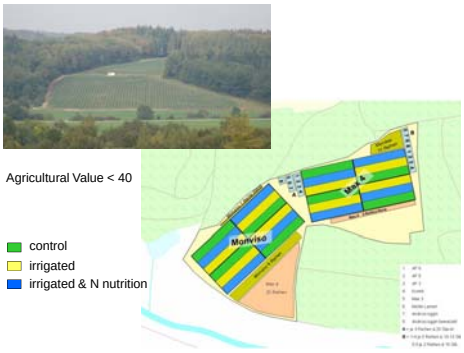
Structure of Probiopa



From the lab into the field



Probiopa-poplar-SRC at Bingen-Hornstein (Sigmaringen, Germany)



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