

Energy Crop Research at Wageningen University and Research Centre

www.biomassandbioenergy.nl

Introduction

Energy crops are grown specifically for the production of electricity, heat or transportation fuels. For these purposes a wide variety of crops is available, but they usually do not meet the requirements of good energy crops. Therefore research is needed to develop biomass crops that better meet the demands of growers as well as industry exist depending on the type of biomass needed. As energy applications often demand different crops and quality traits, compared to traditional food crops, new crops and varieties are needed that fit this demand. Examples of these new demands are; low energy output/input ratio; low ash content; high ash melting point; low N, Cl, and K content; low cost; adaptation to poor soils, etc. With the introduction of the EU Biofuels directive a large demand for biodiesel crops such as oil rape and sunflower and ethanol crops such as sugarbeet, wheat, sweet sorghum, etc. Examples of research conducted in this area at Wageningen-UR are given below.

Annual energy crops

- Hemp for thermal conversion
- Oil rape for biodiesel or PPO (Pure Plant Oil) production

Perennial Crops

- Development of multifunctional biomass production systems where biomass production is combined with erosion control, recreation, bioremediation of contaminated soils
- Development of crop management systems for Miscanthus and switchgrass
- Development of crops growth models (Miscanthus, Switchgrass, Short Rotation Coppice, etc)

Breeding

- Enabling economic production of Miscanthus biomass by reducing its production costs
 - Genetic resources, genetic analyses, and development of criteria for selection
 - Development of novel tools for selection and testing novel varietal concepts
 - Genetic improvement for biomass yield and combustion-related properties

Harvest and logistics

- Modelling of harvest window for perennial grasses
- Modelling of logistical systems
- Development of safe and cost effective biomass storage and drying systems

Other aspects of energy crop production

- Economic analysis of energy crop production
- Assessment of the effects on biodiversity
- Development of integrated regional energy crop production and conversion systems



Oil rape for biodiesel production



Miscanthus giganteus for thermal conversion or ethanol production