

Optimized growth and preservation of energy crop

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In order to identify crop species and to establish crop rotation systems for sustainable energy farming it is necessary to determine the significance of genetic, environmental and growing-technical factors. Therefore, in 2005 a comprehensive joint project “Development and comparison of site-specific cropping systems for energy crops“ was initiated in the Federal Republic of Germany by the Agency of Renewable Resources (FNR). In this network field experiments were established at seven sites under different soil and climate conditions to investigate plant species suitable for biogas production. Crops are grown within 5 rotation systems at each site and the measuring programme considers effects of varying tillage, fertilisation, plant protection and irrigation regimes, respectively. The project also focuses on the double cropping system and the appropriateness of species mixtures like forage plant mixtures for sustainable energy farming.

This opens the question which crops are suitable as energy crops and what determines suitability? The usefulness of a crop as feedstock for anaerobic digestion depends on its yield capacity compared to the effort for cultivation and on the quantity and the quality of the biogas produced, such as the methane content achievable. Furthermore, crops shall be easy to store to make them available for digestion all year round. Hence, the optimum harvest time as well as preservation and storage methods are of particular interest and thus investigated in a co-project at the ATB.

First results obtained confirm that maize (*Zea mays*) is the preferred biogas crop with highest methane yield per hectare and reasonable substrate cost if cultivated at advantageous sites like Ascha, Ettlingen and Gülzow. Data determined at moderate sites (Dornburg, Werlte and Trossin) give evidence for significant advantages of whole crop winter triticale (*X Triticosecale*) regarding substrate cost. In Güterfelde characterised by marginal soil cultivated forage sorghum (*sorghum sudanense*) shows a relatively excellence in comparison to other crops investigated.

In general, results of field experiments confirm the possibility of site-specific, economical and ecological production of various energy plants and give evidence for significant advantages of crop species mixtures.

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