

Plenary Session II Abstracts

Expanded Deployment Options for Short Rotation Woody Cropping Systems

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Under the Renewable Fuels Standard (RFS2) detailed in the Energy Security and Independence Act (EISA 2007), the US economy is mandated to use 36 billion gallons (bg) of renewable transportation fuel per year in its transportation fuel supply by 2022. Of that 36 bgy⁻¹, 20 bgy⁻¹ is mandated to consist of cellulosic ethanol and other advanced biofuels. It is expected that in some regions, short rotation woody crops will be a critically important feedstock supply in meeting those goals. Potential models for integrating short rotation woody crops into regional supply chains and associated policy implications will be discussed. Options for, and constraints on, expanding deployment of short rotation woody cropping systems in the current policy context will be explored.

Keywords: landscape; supply options;

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Subject Area: 5. Commercializing SRWC: Linking Feedstock Production with End Use and Policy Considerations

Plenary Session II Abstracts

Poplar Clones for SRWC

Results of Field Trials in Germany and Austria

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Results of 16 field trials established since 1976 in Germany and Austria were evaluated with respect to the performance and survival of altogether 73 clones in 3 and 6 year-rotation periods on former arable lands. Depending on site factors and the growth performance of the different clones, the variation found is very large reaching from a total loss of some clones to a high performance of over 30 dry t per ha and year. No clone was found to be best performing at all sites, indicating a high genotype by environment interaction. Only seven clones were found to be suitable because they proved to be more resistant against fungi attack than other clones and showed a relatively higher biomass production. They all belong to the *Tacamahaca* section or have one crossing parent of this section. Among the available clones, further testing may bring forth suitable ones. The high clonal variation found lets expect that higher biomass yields seem possible by intensified tree improvement. Also, by better adapted and more intensive plantation management the yields may still be raised considerably, e.g. by implementing irrigation. The high demand for sustainable sources of renewable energy and an estimated million ha arable land available only in Germany requires for intensive development and testing of newly selected clones before this form of biomass production has reached a sufficient degree of development and proves to be competitive to other crops.

Keywords: hybrid poplar, short rotation woody culture, *Populus*, tree improvement,

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Roadmap To Developing Willow Biomass Plantations In Saskatchewan: The First Three Years

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The Government of Saskatchewan has stated that is interested in using biomass to meet some of the future energy needs in an affordable, reliable and environmentally-friendly manner. Saskatchewan has over two million ha of marginal agricultural land that could be used for biomass crops; however, the types of biomass crops that could be grown and provide adequate yields are unknown. Therefore, the objective of this study was to determine how willow, as a short rotation woody crop, would grow along an environmental gradient across Saskatchewan. Six willow clones (Allegany, Canastota, Fish Creek, Sherburne, SX61 and SX64) were obtained from SUNY-ESF and planted in 2007 at four sites: Estevan, Saskatoon, Birch Hills and Prince Albert and another 24 clones were planted in Saskatoon. This north-south gradient of approximately 500 km covers a range of soil and climatic conditions from the SE corner of the province to the central part of the province, just south of the boreal forest. Soils and environmental data were collected from each site and biomass yields were estimated from measured diameters (30 cm aboveground) of each stem and an allometric relationship between diameter and biomass. Clones were coppiced after the first year and have grown for two years since coppicing. The second year yields of biomass (oven dry) for the clones ranged from 8.1 to 13.6 Mg ha⁻¹ for the Canastota and Sherburne clones, respectively when averaged across all sites. Mean biomass yields for all six clones ranged from 5.0 to 16.3 Mg ha⁻¹ for the Saskatoon and Estevan sites, respectively. The greatest biomass yields were observed for Allegany, Sherburne, SX61 and SX64 at the Estevan site and averaged 9.7 Mg ha⁻¹ yr⁻¹. The addition of irrigation also increased yields over the control on clay soils. Predictive yield models were also developed for willow with the 3PG model to predict biomass yields and carbon sequestration. Pest and diseases have not been an issue although willow sawfly has been observed in some plantations and winter kill did damage several clones in 2009.

Keywords: willow, biomass production, growth modelling

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