

Bioenergy

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Enhancing Yields and Environmental Sustainability of Biomass Production Systems by Capitalizing on the Extended Growing Periods

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Abstract

In Canada, fossil fuel use can be reduced by growing biomass crops on lands that are not used for agricultural production, and enhance the capture of solar energy via photosynthetic pathways even beyond the conventional agricultural crops growing period. Biomass crops grown are perennials and once they are established the production systems can remain undisturbed for the next 15 to 21 years contributing to numerous environmental and socio-economic benefits.

Two major types of biomass crops are being promoted by BioFuelNet Canada and by the Canadian Wood Fibre Centre, NRCan. They are: herbaceous [switchgrass (*Panicum virgatum* L), miscanthus (*Miscanthus giganteus*)], and woody [poplar hybrids (*Populus* spp.), willow hybrids (*Salix* spp.)] biomass crops. Continuous and uninterrupted supply of biomass is important for all types of end-users including the emerging bio-auto products, heat energy for the northern First Nations, biofuels and biochemical industries. In this context, the University of Guelph, in collaboration with BioFuelNet Canada and the Canadian Wood Fibre Centre, NRCan has set-up long-term biomass crops research sites in the provinces of Alberta, Ontario and Nova Scotia. Sites were established in 2009 and in 2014 to study the yield responses of above indicated biomass crops in Canada with an aim to identify the best regions to grow these biomass crops.

Results, to-date, suggest that yields are significantly influenced by eco-climatic conditions in conjunction with nutrient cycling and soil carbon sequestration. The latter two are vital ecosystem processes contributing to sustainable biomass yields.



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