Pathfinding the Agronomics of Agricultural Biomass in Ontario

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Harnessing Biomass II
11/22/11 | North Bay, Ontario

Canada AAC agricultural adaptation council Ontario OFA OSCIA Grassroots Innovation Since 1939

Role of Partners

Agronomic – Field-scale – *Farmer Experience*

Agronomic – Research – *Qualify & Quantify*

Processing, Aggregations & Logistics

Steering Committee Chairs

Funding Partner

Agenda

- Object of the Project
- Locations of Research Sites
- Crops and General Agronomics
- Establishment Practices and Approx. Costs
- End-Uses

Project Review

Objective

To explore the economic and agronomic feasibility of purpose-grown biomass as a potential new commercial crop in Ontario.

Process

1. Field-scale Agricultural Study and Assessment
2. Aggregator Pilot and Organizational Study
3. Economic and Nutrient Modeling

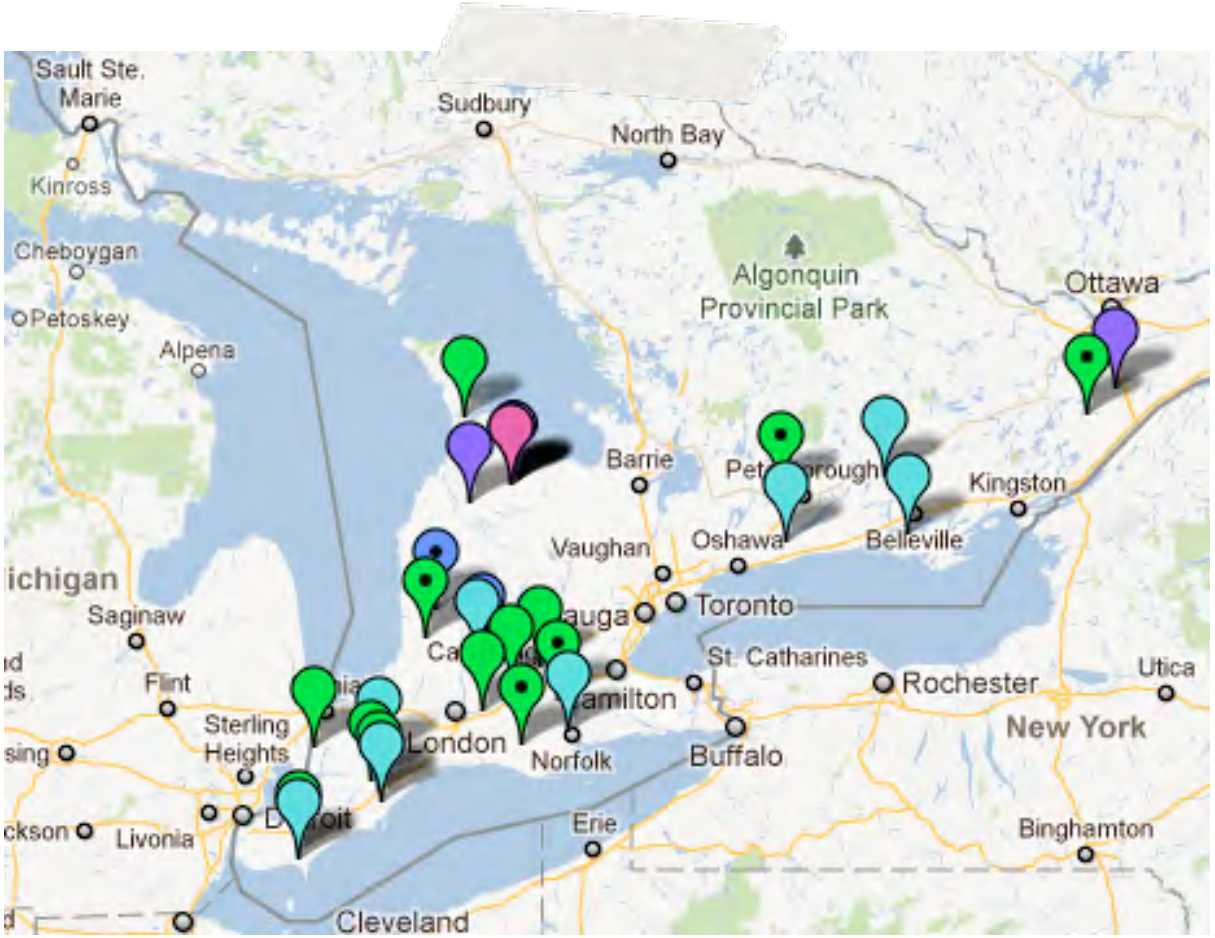
Data Collection

- Costs (establishment and maintenance)
- Moisture in the fall and spring
- Yield (starting in 2012)
- Miscanthus winter survival
- Seeded grass fall establishment
- Seeded grass winter survival

Research Sites

27 Cooperators Across Ontario

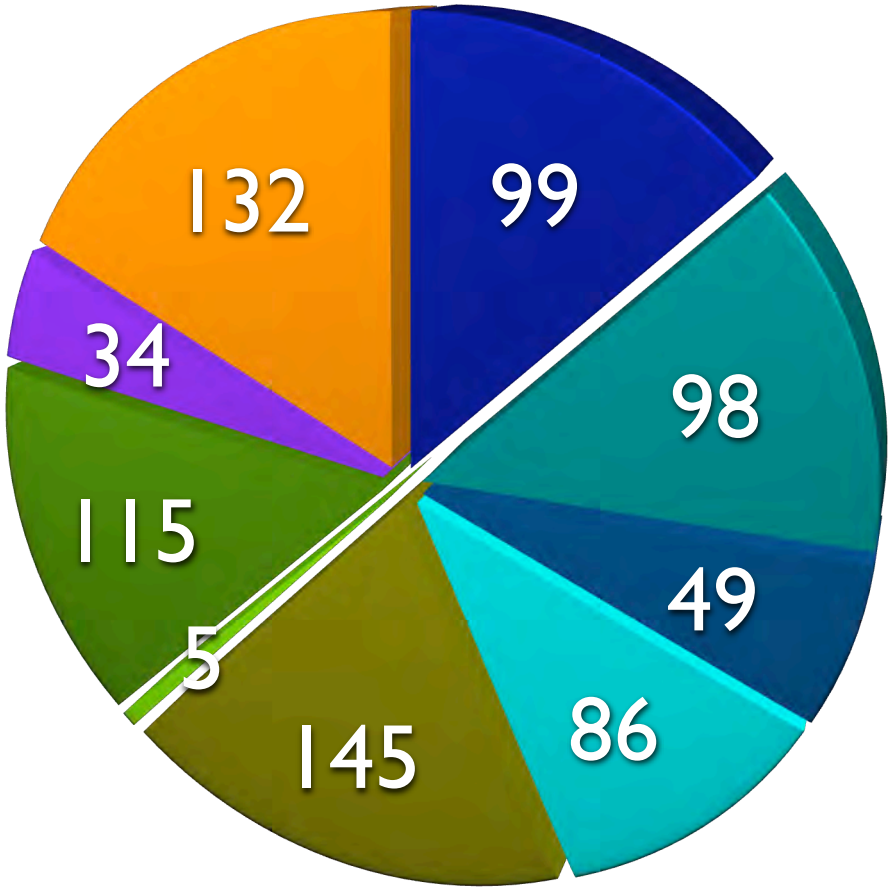
Blue/Purple = 2010 cooperators
Green/Pink = 2011 cooperators



Crops

Crop	Acres
Miscanthus	
Giganteus	99
Nagara	98
Illinois	49
Other	86
Switchgrass	
Cave-in-Rock	145
Blackwell	5
Other	115
Big Bluestem	34
Tall Grass Mix	132

Acres Planted



Giganteus
Nagara
Illinois
Other Miscanthus
Cave-in-Rock
Blackwell
Other Switch
Big Bluestem
Tall Grass Mix

Miscanthus

Miscanthus comprises a group of **more than ten grass species**

Giant Miscanthus is a sterile hybrid, C_4, perennial warm-season grass believed to have *M. sinensis* (a diploid species) and M. *sacchariflorus* (a tetraploid species) as its parents.

Other Observations

Fall harvest moisture contents are too high for dry storage: 25-60%

Spring harvest moisture contents typically 3-8%

Spring harvest yield reductions of 25- 67%

Growth after second winter much more vigorous

Switchgrass

Native prairie tall grass with two classes: upland, lowland.

Native seed with many varieties adapted to Ontario.

Widely researched in the US.

Produces viable seed

Can re-seed itself, resulting in a field that can be productive for decades.

Native Polyculture

Switchgrass

Big Bluestem

Prairie Cordgrass

No evidence of species or variety effects

Spatial occurrence of “spring kill” within a location

Costs

Miscanthus (/ac)	Establishment Item	Switchgrass (/ac)
$100-$400	Land Rent	$50-$200
$70	Labour	$20
$600-$800	Plant Material/Seed	$150
$70	Planting Equipment	$20
$80-$100	Herbicides	$50-60
$920 - $1,440	**YEAR ONE TOTAL** **ESTIMATES ONLY**	**$290 - $450**

Mature Stand Yields: Miscanthus 6-12 dT/a Switchgrass 3-8 dT/a

Combustion End-Uses

- home/district heating
  - ave. family home will heat for 10T/yr (1-3 acres of crop)
- CoGen development: 20% replacement = 70% decrease in emissions
- pelleted = std model ($40/T)
- bale possible = specialized burner

Feedstock End-Uses

Organic, "dust-free", 2+x absorbency of wood chips.

Utilize 3 screen sizes of one cut/year: fine, medium, coarse, or pelleted.

- horse bedding (pellet)
- calving/fowling (coarse)
- small animal (fine)

Alternative End-Uses

- Bioplastics

  switchgrass bale - bioplastic resin pellet - injection mould

  ex. Home Hardware Biobins, maple syrup buckets, chair seats, car parts

- Fiberboard

  In development as "green" alternative/add-in for plywood

Dr. Amaar Mohanty,
University of Guelph

COMING SOON

Agricultural Biomass Knowledge Exchange

Forum to bring together biomass producers from across the province to share challenges, advice, and methods for success

2012 Ontario Regional Biomass Tours

Sept 17-25, 2012 | biomass.cloverpad.org

Similar in design to 2011 Regional Tours, 2012 tours will be targeted to farmers and general public with more handouts and end-use information

Preliminary Project Report

Preliminary project information will be available after harvest (March-April 2012) on yields, economics of establishment, BMPs for planting/managing in establishment

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Since 1939

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