The IBSS Partnership: Advancing Energy Crop Supply Systems In the Southeastern United States

T.G. Rials, Professor & Director
The University of Tennessee
Knoxville, Tennessee
Advanced Lignocellulosic Biofuels

10B gallons
150 plants
$40B capital
12M acres

Projections are that the SE will provide about 50% of the 21 billion gallon requirement of the EISA.
The Answer is in the Wood

1. Supply Chain
   Demonstrate real world solutions to barriers limiting deployment of advanced biofuels in the southeastern United States.

2. Sustainability
   Create, validate, and use new metrics for improved decision-making for regional biorefinery systems.

3. Outreach
   Provide credible and relevant programs to dispense new knowledge for stakeholders.
The SE Region’s Biomass Profile

Billion Ton Update
The Partnership’s Approach

Collaborators

Southern Pine  SRWC  Switchgrass

Hybrid Poplar  Eucalyptus
Assessment of Biomass Quality

- Established in May, 2011
- 12 deltoides clones
- 3 replicates (2 reps for a few)
- 3 planting spacings
  - 3’ x 7’
  - 4’ x 7’
  - 8’ x 7’
- Survival at the site has been very high, with the exception of one clone – 450.
Assessment of Biomass Quality

- Sugars content a key metric for biochemical platform
- Developing multivariate models to monitor chemical composition from near infrared spectra.
- Challenge is identifying specimens to cover the complete range
  - Robust lignin model despite data gap
  - Limited cellulose range doesn’t allow for model development...yet
Biomass Quality – Inorganic Makeup

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Wood Ash</th>
<th>Bark Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID-185</td>
<td>0.8%</td>
<td>4.3%</td>
</tr>
<tr>
<td>ID-230</td>
<td>0.8%</td>
<td>4.7%</td>
</tr>
<tr>
<td>ID-303</td>
<td>0.8%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

- **K**
- **Ca**
- **Mg**
- **P**
- **S**
Assessment of Biomass Quality

- Smaller diameter is comparable to herbaceous crops.
- Important consideration for identifying management approach, i.e. single-stem or coppice.
• SRWC systems have a vital role to play in meeting feedstock demands.
• Newer varieties showing increased yields.
• New quality measures need to be considered in breeding.
• Composition is key in determining suitability.
The IBSS Partnership is supported by Agriculture and Food Research Initiative Competitive Grant no. 2011-68005-30410 from the USDA National Institute of Food and Agriculture.

This research was supported by funding from the North Central Regional Sun Grant Center at South Dakota State University through a grant provided by the US Dept. of Energy, Bioenergy Technologies Office under award number DE-FC36-05GO8504.

Jeff Wright
Bijay Tamang
Jessica McCord
Nicole Labbe
Chris Helton
Steve Taylor
Christian Brodbeck
James Johnson
Choo Hamilton
And, many others I’m sure…