What Cultivars and Management Techniques Produce the Most Consistent and Highest Quality Pawpaw Fruit?

Sarah Francino
Contact: francino.1@osu.edu
G. Matt Davies
Joe Scheerens
Brad Bergefurld

SCHOOL OF ENVIRONMENT & NATURAL RESOURCES

THE OHIO STATE UNIVERSITY
Thank you!

Collaborating Farmers

- Ron Powell
- Gary Gottenbush
- Richard Glaser
- Russ Benz
- Marc Stadler
- Ted Beedy
- Lance Sinkowski

Funders

- The Ohio Department of Agriculture
Background

- What is a pawpaw?
- Yield differences across Ohio
- What effects fruit quality in ten pawpaw cultivars from across Ohio?
- Conclusions
Pawpaw Trees

Pawpaw fruit

Patch of pawpaw trees
Natural range of pawpaw in North America
Methods - Site Selection
Methods - Field Monitoring
Which Cultivars Produce Most Fruit

• Objectives
  – Field Estimation of Yield
  – Cultivar vs. Genetic Group
  – Best yielding trees
Estimating Yield

1. Tallied fruit by size class for each tree
2. Equation based on size
   - Total weight
   - Pulp weight
3. Estimated yield of each tree
Total number produced by 20 cultivars
### Different types of Yield models

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Group</th>
<th>DBH (cm)</th>
<th>Flower Count</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Fruit</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>5</td>
</tr>
</tbody>
</table>

Within a row darker colors are larger effect sizes and asterisk in block indicates significant
Conclusions

• Number of fruit affected by tree size
• Trees last about 20 years
• Lots of fruit v. bigger fruit
• Know your market
Objectives

- What effects the measurable attributes of pawpaw fruit
  - Site
  - Cultivar
  - Ripeness
What is a Pawpaw?

- Best Fruit
- Biggest Fruit
- Sweetest Fruit
- Differs for each specific market
- Quality vs. Homogeneity
Methods - Ripeness

• OPGA ripeness chart developed by Terry Powell
• Score 1 least ripe
• Score 5 most ripe
Methods - Laboratory Assessments
<table>
<thead>
<tr>
<th>Quality Metric</th>
<th>Description</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Moisture</td>
<td>% of water in pulp</td>
<td>Oven Drying</td>
</tr>
<tr>
<td>Length to Width ratio</td>
<td>Measurement of size (%)</td>
<td>Measured</td>
</tr>
<tr>
<td>Weight of Pulp</td>
<td>Pulp weighed after skin and seeds removed</td>
<td>Measured</td>
</tr>
<tr>
<td>Seed to Pulp ratio</td>
<td>Weight of seed to weight of pulp (%)</td>
<td>Measured</td>
</tr>
<tr>
<td>Fruit Phyllostica Abundance</td>
<td>% of skin covered</td>
<td>Photographic</td>
</tr>
<tr>
<td>Skin Hardness</td>
<td>Force to break skin (N)</td>
<td>Force gauge</td>
</tr>
<tr>
<td>Flesh Hardness</td>
<td>Resistance to flesh puncture (N)</td>
<td>Force gauge</td>
</tr>
<tr>
<td>Brix</td>
<td>Sugar Content (°)</td>
<td>Refractometer</td>
</tr>
<tr>
<td>L Average Flesh</td>
<td>Light to dark for flesh</td>
<td>Colorimeter</td>
</tr>
<tr>
<td>L Average Skin</td>
<td>Light to dark for skin</td>
<td>Colorimeter</td>
</tr>
<tr>
<td>pH</td>
<td>Acidity level</td>
<td>Meter</td>
</tr>
<tr>
<td>DeltaE</td>
<td>Browning potential</td>
<td>Colorimeter</td>
</tr>
</tbody>
</table>
Pawpaw Quality

- Heavier and lighter colored flesh fruit
- Lots of Phyllostica and More Seeds

Harder Fruit

Sweetest Fruits
Pawpaw Quality

Harder Fruit

Lots of Phyllostica and More Seeds

Sweetest Fruits

Heavier and lighter fruit

1

3

5
Pawpaw Quality

- Sweetest Fruits
- Harder Fruit and lighter fruit
- Lots of Phyllostica and More Seeds
- Susquehanna, Shenandoah, Shawnee, and Potomac Trails

Harder Fruit vs. Heavier and lighter fruit
Sweetest Fruits
Pawpaw Quality

Heavier and lighter fruit

Lots of Phyllostica and More Seeds

Harder Fruit

Sweetest Fruits

NC-1

Overleese
Pawpaw Quality

Harder Fruit

Sweetest Fruits

Heavier and lighter fruit

Lots of Phyllostica and More Seeds

5

4
What is most important
Conclusions

• Ripening Chart Works!
• Site and Cultivar
• Cultivar dependent on market
• Quality v. Homogenous