Improving Harvesting Effectiveness for Peanut Diggers

Dr. Gary Roberson, North Carolina State University
Department of Biological and Agricultural Engineering

How to improve it...

Digger Modifications
- Establish performance monitoring for peanut diggers
- Improve known sources of harvesting digging losses
- Bring digger performance in-line with combine improvements

Shaker chain speed control
- Adapted a sprayer/spreader control to regulate shaker chain speed
- Ensures chain speed synchronization regardless of ground speed

Alternative standard designs
- Standard A: Flat sweep angle and sharp blade angle
- Standard B: Sharp sweep angle and flat blade angle

Digger Performance
- Procedure
  - Compare performance of modified digger to conventional digger
  - Evaluate test plots for digger losses
- Field Testing
  - Two farmers in Martin County volunteered to try automatic chain control digger
  - Estimated combined total of 100 acres plowed by digger.

Current problems...
- Digger blades to cut tap root and fracture soil
- Shaking mechanism to remove dirt from around pods
- Inverter section to invert vines and form windrow

What to improve...
- Digger blades
  - Dull blades create drag
- Shaker chain
  - Incorrect chain speed results in mishandling as peanuts are lifted onto chain
- Inverter
  - Misadjusted inverter action can strip peanuts from the vines.

Alternative Design Modifications
- New designs under study
  - Shaker arm separator
  - Eliminate the conveyor chain
  - Continued development of shaker mechanism

Implement

By adapting a common agricultural rate controller to the shaker chain drive the advantages would be creating opportunities for automatic control and better monitoring of rates used.

Sweep angle and the blade action are important factors.

Above Ground Losses
Below Ground Losses

<table>
<thead>
<tr>
<th>Farm</th>
<th>ACS Digger</th>
<th>Farm A PTO Digger</th>
<th>Farm B PTO Digger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm A ACS Digger</td>
<td>120.5 LB/AC</td>
<td>116.3 LB/AC</td>
<td>81 LB/AC</td>
</tr>
<tr>
<td>Farm B ACS Digger</td>
<td>35.6 LB/AC</td>
<td>35.6 LB/AC</td>
<td>61.2 LB/AC</td>
</tr>
</tbody>
</table>

ACS = Automatic Control System
PTO = Conventional Digger

Kastler Bar Digger

Digger- Shaker- Inverter

Farm Above Ground Losses
Below Ground Losses

Standard A
FSFB 169 LB/AC 127 LB/AC

Standard B
SWFB 81 LB/AC 47 LB/AC