Introduction

Plant and Soil Sciences
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Systems and Agricultural Engineering
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Measuring Peanut Yield

Cotton Yield Monitor for Application of an AGLeeper®
Figure 1. Mounting location of the Agleader Pro sensor.

Materials and Methods

Sensor calibration was done for various conditions. For peanut production, a field was selected to compare yield monitors with the Ateleader sensor. The sensor was mounted on the crop by Rains et al. (2005) to determine crop calibration procedures for use of the Ateleader monitor in peanuts and to expand the work completed by Rains et al. (2005).
The Peanut Wagon

Figure 4. Truck scales used for weighing peanuts during the harvest.

Figure 3. Opticaal sensor after harvesting for three days.

Williams Peanut Company

Individual grade sheets from the C.H.

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Figure 2. Top and side views of the dust detectors.
Results and Discussion

Procedures used for all data analysis and calibration, the weight of the peanut was measured and then dry weight was measured and then dry weight was measured and then dry weight was measured. The samples were dried at 65°F for 72 hours. The net weight for all loads exceeded 3,500 lbs. The loads in the table are for each load of certified weight. The net weight was determined for each load of certified weight for each load. The second load was recorded for each load. The sample was collected from each of the loads. The first load weight was recorded since a single wagon held two bins.
<table>
<thead>
<tr>
<th>Wagon Label/Field</th>
<th>Type</th>
<th>Moisture Content (%)</th>
<th>Net Weight (kg)</th>
<th>Error (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LK1 / Blood</td>
<td>Spanish</td>
<td>18.2</td>
<td>4.1045</td>
<td>-1.8</td>
</tr>
<tr>
<td>SKK1 / Blood</td>
<td>Spanish</td>
<td>20.5</td>
<td>4.3127</td>
<td>-0.9</td>
</tr>
<tr>
<td>LK5 / Blood</td>
<td>Spanish</td>
<td>15.1</td>
<td>4.3327</td>
<td>3.0</td>
</tr>
<tr>
<td>LK7 / Blood</td>
<td>Spanish</td>
<td>16.3</td>
<td>4.1305</td>
<td>0.2</td>
</tr>
<tr>
<td>LK5 / Blood</td>
<td>Spanish</td>
<td>14.8</td>
<td>4.1564</td>
<td>-0.5</td>
</tr>
<tr>
<td>LK4 / S. Harvey</td>
<td>Spanish</td>
<td>14.5</td>
<td>3.6686</td>
<td>-5.4</td>
</tr>
<tr>
<td>LK4 / Deckboat</td>
<td>Runner</td>
<td>14.2</td>
<td>3.6823</td>
<td>-0.6</td>
</tr>
<tr>
<td>LK1 / Deckboat</td>
<td>Runner</td>
<td>25.3</td>
<td>4.2800</td>
<td>16.3</td>
</tr>
<tr>
<td>LK1 / Deckboat</td>
<td>Runner</td>
<td>21.1</td>
<td>4.1727</td>
<td>-16.3</td>
</tr>
<tr>
<td>LK1 / Deckboat</td>
<td>Runner</td>
<td>25.0</td>
<td>4.5042</td>
<td>-19.6</td>
</tr>
<tr>
<td>LK1 / Deckboat</td>
<td>Runner</td>
<td>23.6</td>
<td>4.6824</td>
<td>-23.2</td>
</tr>
</tbody>
</table>

Table 2. Summary data for the 12 loads collected in 2012. The yield monitor weights were based on a calibration number of 3,500 using net weight from the first five loads in the table. Error is calculated from the net weights obtained at the selling point.

<table>
<thead>
<tr>
<th>Wagon Label/Field</th>
<th>Type</th>
<th>Moisture Content (%)</th>
<th>Net Weight (kg)</th>
<th>Error (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKK14 / LK1 / Huckabees</td>
<td>Spanish</td>
<td>15.8</td>
<td>9.0818</td>
<td>3.46</td>
</tr>
<tr>
<td>SKK6 / N. Barger</td>
<td>Spanish</td>
<td>15.2</td>
<td>9.0830</td>
<td>3.46</td>
</tr>
<tr>
<td>SKK13 / N. Barger</td>
<td>Spanish</td>
<td>15.8</td>
<td>4.5040</td>
<td>3.46</td>
</tr>
<tr>
<td>SKK4 / S. Suter</td>
<td>Spanish</td>
<td>15.2</td>
<td>4.5040</td>
<td>3.46</td>
</tr>
<tr>
<td>SKK9 / S. Suter</td>
<td>Spanish</td>
<td>15.2</td>
<td>4.5040</td>
<td>3.46</td>
</tr>
<tr>
<td>LK5 / Deckboat</td>
<td>Runner</td>
<td>15.2</td>
<td>4.5040</td>
<td>3.46</td>
</tr>
<tr>
<td>LK1 / Deckboat</td>
<td>Runner</td>
<td>15.2</td>
<td>4.5040</td>
<td>3.46</td>
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<tr>
<td>LK1 / Deckboat</td>
<td>Runner</td>
<td>15.2</td>
<td>4.5040</td>
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</tbody>
</table>
few days earlier than necessary. Figure 5 shows the error as a function of moisture content. The data are separated in Figure 5 by type. The relationship that appears between moisture content and error is more likely due to the type of peanut and the limited data. It should be noted the Spanish type has a load with moisture exceeding 20 percent similar to that for the runners, but the error for this load is small. Unfortunately, similar trends with moisture content are not represented in Figure 6 from the 2012 harvest season. More data analysis will hopefully discover the cause of the errors from this harvest season.

However, since the yield monitor does not include a moisture sensor like grain yield monitors, there is some cause for concern. Further studies across a wider range of moisture content are needed for the three main types of peanuts before conclusions can be drawn.

Figure 7 represents the error based on the number of calibration loads used. This data is for the five loads of runner type peanuts. The error is for an individual load and all possible combinations of loads were used for calibration. As expected, error was reduced as the number of loads used for calibration increased. The number of calibration loads may be based on the individual user’s preference. However, this data indicates at least four loads are required to reduce errors to the ±5 percent range.

Figure 7. Number of loads used for calibration and the overall error for the runner type.

Conclusions
This study supports previous research demonstrating the feasibility of using an optical cotton yield monitor to accurately measure peanut yield. Similar to other crops, calibration is very important when using this type of monitor with a peanut crop. Results show at least four calibration loads should be used to minimize error. Furthermore, the yield monitor should be recalibrated for different peanut types. Preliminary data supports the need for calibration by type and moisture content does not play a large role in the error incurred within types but could still be a concern. A producer can accurately post calibrate peanut yield to the net weight.
Acknowledgements

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References
