Soybean Quality

- Some small beans; 1 and 2 bean pods. Fewer than expected. Timing of rain.
- Protein low but oil high
  - 33-34% protein; 19.5%+ oil
  - Estimate meal to be 46.5 – 47.5 % protein (12%M)
- Shrinkled

- Extraction poor; may counteract higher oil
- Residual oil higher: 1.5%  Fiber higher: 4%

Iowa State University
Extension and Outreach
Healthy People. Environments. Economies.
# Soybean Quality Trends - Example

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield bu/ac</th>
<th>Moisture %</th>
<th>Protein 13%M</th>
<th>Oil 13%M</th>
<th>Fiber 13%M</th>
<th>Sum 13%M</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>58.7</td>
<td>13.7</td>
<td>34.7</td>
<td>18.5</td>
<td>4.9</td>
<td>53.2</td>
</tr>
<tr>
<td>2010</td>
<td>58.7</td>
<td>10.5</td>
<td>35.5</td>
<td>18.5</td>
<td>4.8</td>
<td>54.0</td>
</tr>
<tr>
<td>2011</td>
<td>65.9</td>
<td>10.5</td>
<td>34.2</td>
<td>18.4</td>
<td>4.9</td>
<td>52.6</td>
</tr>
<tr>
<td>2012</td>
<td>52.5</td>
<td>8.7</td>
<td>33.9</td>
<td>19.9</td>
<td>4.8</td>
<td>53.8</td>
</tr>
</tbody>
</table>

*4 strip trial tests, 20-40 varieties/location*  
*Adair, Black Hawk, Bremer, Palo Alto counties in Iowa*
## Corn Quality Trends - Example

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield bu/a</th>
<th>Test Weight lb/bu</th>
<th>Moisture %</th>
<th>Protein %</th>
<th>Oil %</th>
<th>Starch %</th>
<th>Density gm/cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>194.1</td>
<td>54.0</td>
<td>25.6</td>
<td>7.6</td>
<td>3.6</td>
<td>61.1</td>
<td>1.244</td>
</tr>
<tr>
<td>2010</td>
<td>184.9</td>
<td>57.6</td>
<td>14.3</td>
<td>6.7</td>
<td>3.5</td>
<td>61.6</td>
<td>1.255</td>
</tr>
<tr>
<td>2011</td>
<td>207.6</td>
<td>58.7</td>
<td>16.8</td>
<td>7.2</td>
<td>3.6</td>
<td>61.2</td>
<td>1.271</td>
</tr>
<tr>
<td>2012</td>
<td>152.0</td>
<td>60.1</td>
<td>16.5</td>
<td>8.2</td>
<td>3.4</td>
<td>60.6</td>
<td>1.287</td>
</tr>
</tbody>
</table>

4 strip trial tests, 20-40 hybrids/location
Adair, Black Hawk, Bremer, Palo Alto counties in Iowa
What is *Aspergillus* ear rot?

- Olive-green powdery ear rot of corn
- Caused by *Aspergillus flavus*
- Most prevalent in drought conditions

Dr. Alison Robertson; September 2012
Favorable conditions for *A. flavus* growth and aflatoxin production

**Temperature**

- 45°F to 52°F: *Aspergillus* growth
- 104°F to 120°F: Aflatoxin production

**Moisture**

- 16% to 17%
- 30%

So, the fungus can grow at higher and lower temperatures & moistures and not produce aflatoxin.

Dr. Alison Robertson; September 2012
FDA Guidance Levels

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn for lactating cows</td>
<td>20 ppb</td>
</tr>
<tr>
<td>Milk</td>
<td>.5 ppb</td>
</tr>
<tr>
<td>Corn for breeding beef/swine/poultry</td>
<td>100 ppb</td>
</tr>
<tr>
<td>Corn for finishing swine &gt;100 lb.</td>
<td>200 ppb</td>
</tr>
<tr>
<td>Corn for finishing cattle</td>
<td>300 ppb</td>
</tr>
</tbody>
</table>

**General tolerance:** 20 ppb.
Some buyers are screening at 10 ppb

There have been milk cases in Iowa.
Rations with high percentages of corn, and grazing fields with high AF corn.
Aflatoxin Years

• 1983

Average of all Iowa samples
21 ppb

• 1988  About the same as 1983;
  – 21 ppb statewide average; 62 ppb average of counties showing positive
• 2005 SE IA 5-10 counties; less in IL even though drier. A little rain after black layer is not so good.
## Aflatoxin Survey Data - Iowa

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average</strong></td>
<td><strong>3.2 ppb</strong></td>
<td><strong>5.3 ppb</strong></td>
</tr>
<tr>
<td><strong>High</strong></td>
<td><strong>14.7 ppb</strong></td>
<td><strong>180 ppb</strong></td>
</tr>
<tr>
<td><strong>% over 20ppb</strong></td>
<td><strong>0.0</strong></td>
<td><strong>6.1% (18.5% IL)</strong></td>
</tr>
<tr>
<td><strong>Samples</strong></td>
<td><strong>98</strong></td>
<td><strong>396</strong></td>
</tr>
<tr>
<td><strong>Counties</strong></td>
<td><strong>50</strong></td>
<td><strong>99</strong></td>
</tr>
<tr>
<td><strong>DDGS</strong></td>
<td><strong>10.6 ppb</strong></td>
<td></td>
</tr>
</tbody>
</table>
Corn Aflatoxin 2012; GIPSA Submitted Samples Iowa (n=10,458), Iowa Survey (n=396), Illinois Survey (n=400) vs 1988, 1983 ISU Surveys

2012 Crop

As of 12/02/2012

2012 Iowa Aflatoxin Survey – IDALS
Percent of detectable samples (over 3 ppb) average, and distribution, by Crop Reporting District

- >3.1-20ppb
- 20.1-50ppb
- 50.1-100ppb
- 100.1-200ppb

- 20.8% 3.3 ppb
- 29.5% 2.3 ppb
- 38.6% 3.0 ppb
- 15.4% 0.8 ppb

- 31.3% 2.8 ppb
- 33.3% 2.5 ppb
- 33.3% 4.4 ppb

- 8.6 ppb
- 63.6%
Aflatoxin Testing

• Black (Ultraviolet) light (BGYF)
  – Not positive proof of aflatoxin
  – Requires a color standard, dark cabinet
  – 1 glower/lb = higher risk of +20 ppb

• Test Kits (immunoassay strips or wells)
  – USDA GIPSA approved list
    www.iowagrain.org
    Yes-no strips or quantitative strips/wells

• Laboratory analysis for level
  – List: www.iowagrain.org
  – HPLC.
Aflatoxin Sampling

• Sampling = largest source of error
  – 25-40% sampling error (or more)
  – Includes handling of subsamples

• 1 lb/500 bu (5 lb min)
  – Black light whole sample
  – Grind ENTIRE sample for strips, lab test

• Bin sample
  – 1 lb cut per load, take in middle
  – Combine, submit entire sample to lab
  – Never divide whole corn sample below 10 lbs
Testing Scenarios

1. Composites much below 20 ➔ normal handling may handle the problem. 2005 case – Except Dairy, Pet Food, Buyers w/ <20 specs

2. Avg near 20 ➔ may have to separate. Black light loads + composites. 1983, 1988 cases

3. Avg much over 20 ➔ Separate for sure; manage harvest flow. Probably strip test, but maybe black light.
AF Blending Policy for IA, NE, KS, IL

• Signed agreement with IDALS (FDA agent)
• Can blend 21 - 500 ppb corn down to feed levels.
  – Blended lots tested with GIPSA approved kits
  – Blended lots documented; buyer gets test results
  – Blended lot for feed only (according to level); buyer provide written assurance.
• Currently good until June 30, 2013

http://www.iowaagriculture.gov/
U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period
Valid for February 7 - April 30, 2013
Released February 7, 2013

KEY:
- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events — such as individual storms — cannot be accurately forecast more than a few days in advance. Use caution for applications — such as crops — that can be affected by such events. “Ongoing” drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.
## Food Safety Checklist Example
### Part 1: Food Safety Program

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Documents, filenames</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A documented food safety program that incorporates Quality Management Program has been implemented</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The operation has designated someone to implement and oversee the food safety program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name ____________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. All food safety documentation is located in one central location.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where: __________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Records are kept for two years in an orderly manner.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. A map of the facility and grounds is available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Where To Find Us...

Iowa Grain Quality Initiative

Grain Quality Laboratory

www.iowagrain.org

Supporting Services and Technologies for BioProcess Industries

Analytical Programs
Quality Management Systems

IOWA STATE UNIVERSITY
Extension and Outreach
Healthy People. Environments. Economies.