What’s New for Corn

- Balance Flex
- Corvus
- Capreno
- Prequel
- Kixor Technology
  - Sharpen
  - Integrity
- Optimum GAT Corn
- DHT Corn
**Balance Flexx in corn** (Bayer Crop Science)

- 2.0 lbs / gallon Isoxaflutol *(Balance)* + cyprosulfamamide (Safener) for broadleaf and grass control

- **Timing of application**
  - Preplant surface or incorporated up to 30 days prior to planting (with COC or MSO)
  - Preemergence (with COC or MSO)
  - Early post – up through 2-If (collars) corn – can be mixed with atrazine only, adjuvants or other herbicides may increase the risk of crop injury.

- **Use rates depended upon soil type & OM**
## Balance Flexx – Application rate

<table>
<thead>
<tr>
<th>Applic. Timing</th>
<th>Fluid oz /acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coarse Sand, Loamy sand, Sandy loam</td>
</tr>
<tr>
<td></td>
<td>1.5% OM or less</td>
</tr>
<tr>
<td>Early Preplant Surf or Inc 8 to 30 days preplt</td>
<td>4.0</td>
</tr>
<tr>
<td>Preplant Surf or Inc 0 to 7 days preplant OR Preemergence OR Early postemergence</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Balance Flexx (Cautions and Restrictions)

• Do not use on fields when the water table is less than 25 feet below the ground surface.
• Do not use on sandy loam, loamy sand, or sand surface soils and sub soils when the organic matter in the top 12 inches is less and 2%
• Do not apply in the following 11 Kansas counties, SG, HV, MP, RN, RC, PR, SF, BA, KW, ED, PN
• Crop rotation restrictions: wheat 4 months, soybean, sweet corn, popcorn, grain sorghum, and sunflower 6 months, alfalfa 10 months, drybeans 18 months
Restricted soil types if depth to water table is unknown~!

- Albion, Aline, Anselmo, Attica, Bankard, Bayard, Boel
- Canadian, Carr, Cass, Cleora, Crisfield, Darr, Dillwyn
- Dix, Dorrance, Dune Land, Dwyer, Els, Elsmere, Eva,
- Gerlane, Glenberg, Goltry, Goodnight, Gracemont,
- Gracemore, Happyditch, Haxtun, inavale, Kanza,
- Kingsdown, Krier, Las Animas, Likes, Lincoln, Manter,
- Meadin, Optima, Ortello, Otero, Platte, Plevna, Pratt,
- Sarpy, Schamber, Simeon, Thurman, Tivoli, Valent
- Valentine, Vona, Waldeck, Wann, Yahola
**Corvus in corn, (Bayer Crop Science)**

- Isoxaflutol (1.88 lb/gal)+thiencarbazone-methyl (0.75 lb/gal) (ALS inhibitor grass product)+Cyprosulfamide (Safener)
- Use rate 3.33 to 5.6 fl oz/a (check label)
  - Sand, Loamy sand, Sandy Loams 2% OM or less use 3.33 oz
  - Sand, Loamy sand, Sandy loams greater than 2%OM or medium and fine textured soils use up to 5.6 oz
- Best tank mixed with atrazine
Corvus for Corn

• Timing of application
  – Early Preplant up to 30 days prior to planting
  – Pre-emergence
  – Early post – up through 2-If (collars) corn
    • Mix with atrazine only, no adjuvants or other herbs.
  – USE COC or MSO for burndown of weeds before corn emergence

• Broadleaf and improved grass control over Balance Flexx

• Same area restrictions as Balance Flexx
Corvus restrictions

• Do not use in the same season as Lorsban 15G, Counter 15G, or Counter 20 G
• Do not graze or harvest for forage within 45 days after application
• Can rotate to wheat in 4 months, soybean, and sorghum (if Corvus used at the 2.25 oz rate) in 9 months, and alfalfa, sorghum, sunflower, oats, canola, and all other crops in 17 months (30 inches of precip required during the 17 month period)
Capreno (Bayer Crop Science) postemergence on all types of corn

- Tembotrione 2.88 lb/gal of (Laudis) + thiencarbazone-methyl 0.57 lb/gal (ALS inhibitor grass product)
- Use rate - 3.0 fl oz/a with COC 1% v/v and a nitrogen fertilizer source to corn 1 through 6 collar, best mixed with atrazine
- Broadleaf and grass control
  - Improved control of fall panicum compared to Laudis
- Can be tank mixed with glyphosate, atrazine, or Ignite.
**Capreno restrictions**

- Do not use in the same season as Lorsban 15G, Counter 15G, or Counter 20 G
- Do not apply using liquid fertilizer as the carrier
- Do not graze or harvest for forage within 45 days after application
- Can rotate to wheat in 4 months, cotton soybean, and sorghum in 10 months, and alfalfa and sunflower in 18 months
Weed control in corn with HPPD inhibitors—single pass, Manhattan, Thompson / Peterson, 0903corn

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Appli.</th>
<th>Rate</th>
<th>Yield</th>
<th>PAAM</th>
<th>VELE</th>
<th>IVOH</th>
<th>Sunf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corvus+atrazine</td>
<td>PRE</td>
<td>5.6 + 32</td>
<td>209</td>
<td>97</td>
<td>99</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>Balance Flexx+atra</td>
<td>PRE</td>
<td>6 + 32</td>
<td>209</td>
<td>95</td>
<td>100</td>
<td>92</td>
<td>37</td>
</tr>
<tr>
<td>Bicep II Magnum</td>
<td>PRE</td>
<td>2.6 qt</td>
<td>221</td>
<td>96</td>
<td>83</td>
<td>87</td>
<td>53</td>
</tr>
<tr>
<td>Corvus+atrazine</td>
<td>EPOS</td>
<td>5.6+32</td>
<td>235</td>
<td>99</td>
<td>98</td>
<td>96</td>
<td>100</td>
</tr>
<tr>
<td>Balance</td>
<td>EPOS</td>
<td>6+32</td>
<td>203</td>
<td>99</td>
<td>100</td>
<td>94</td>
<td>97</td>
</tr>
<tr>
<td>Capreno+atra¹</td>
<td>EPOS</td>
<td>3+32</td>
<td>217</td>
<td>99</td>
<td>100</td>
<td>96</td>
<td>92</td>
</tr>
<tr>
<td>Halex GT+atra²</td>
<td>EPOS</td>
<td>3.6 pt+32</td>
<td>241</td>
<td>100</td>
<td>100</td>
<td>97</td>
<td>100</td>
</tr>
<tr>
<td>Capreno+atra¹</td>
<td>MPOS</td>
<td>3+32</td>
<td>228</td>
<td>100</td>
<td>99</td>
<td>97</td>
<td>99</td>
</tr>
<tr>
<td>Halex GT+atra²</td>
<td>MPOS</td>
<td>3.6 pt+32</td>
<td>227</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>Untreated</td>
<td></td>
<td></td>
<td>117</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td></td>
<td></td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

1 = applied with COC and AMS; 2 = applied with NIS and AMS
**Weed control in corn with HPPD inhibitors – pre/post, Manhattan, Thompson / Peterson, 0903corn**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Appli.</th>
<th>Rate</th>
<th>Yield</th>
<th>PAAM</th>
<th>VELE</th>
<th>IVMO</th>
<th>Sunf</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>oz prod /a</td>
<td>Bu/a</td>
<td>6/5</td>
<td>6/5</td>
<td>6/5</td>
<td>6/5</td>
</tr>
<tr>
<td>Corvus+atrazine Laudis+atrazine</td>
<td>PRE Mpost</td>
<td>3 + 32</td>
<td>218</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Balance Flexx+atra Laudis+atra</td>
<td>PRE Mpost</td>
<td>3+ 32</td>
<td>223</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Corvus+atrazine Laudis+Ignite</td>
<td>PRE Mpost</td>
<td>3 + 32</td>
<td>224</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>Balance Flexx+atra Laudis+atra</td>
<td>PRE Mpost</td>
<td>3 + 32</td>
<td>223</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Corvus+atrazine Capreno+atra</td>
<td>PRE Mpost</td>
<td>3+32</td>
<td>230</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>99</td>
</tr>
<tr>
<td>Balance Flexx+atra Capreno+atra</td>
<td>PRE Mpost</td>
<td>3+32</td>
<td>238</td>
<td>100</td>
<td>99</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td></td>
<td></td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

Laudis applied with MSO and AMS; Capreno applied with COC and AMS
Prequel (DuPont) for Field Corn

- *Prequel* contains: 15% rimsulfuron (*Resolve*) + 30% isoxaflutol (*Balance*)
- Use rate is 1.66 oz/a
  - 1 oz *Resolve* + 1 fl oz *Balance* Pro
  - Use MSO or COC 1% v/v for emerged weeds
- Rotational Restrictions: 4 mo – wheat, 6 mo – STS beans, 10 mo – alfalfa, sorghum, soybean, sunflower, sweet corn, popcorn, 18 mo – other crops
- DO NOT apply postemergence to corn
- Area/water table restrictions same as Balance
BASF Products for Corn

- *Kixor Technology*
  - Saflufenacil
  - New class of chemistry, pyrimidinedione
  - PPO inhibitor
  - Broadleaf burndown and residual control (rate dependant)
Sharpen (BASF) for Corn

- Saflufenacil @ 2.85 lb/gal
- For burndown activity use 1 fl oz Sharpen + MSO or COC at 1% v/v and ammonium sulfate 8.5 to 17 lb/100 gal or liquid nitrogen at 1.25 to 2.5 gallon/100 gal
- Use rates for residual control:
  - 2 fl oz on coarse texture soils
  - 2.5 fl oz on medium texture soils
  - 3.0 fl oz on fine texture soils
- Can be tank mixed with other corn Herbicides
- Sharpen controls broadleaf weeds only
**Sharpen for Corn**

- Rotational restrictions

<table>
<thead>
<tr>
<th>Crop</th>
<th>Rotational Crop Interval (months of non-frozen soil after application)</th>
<th>Sharpen Rate (fl oz/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Corn</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sorghum</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wheat</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Soybean</td>
<td>0 to 1</td>
<td>1 to 2</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Sunflower</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Cotton</td>
<td>1.5</td>
<td>3</td>
</tr>
</tbody>
</table>

Use the longer interval in listed range when on coarse soils with less than 2% OM
**Integrity** for Corn, grain, silage, popcorn

- Saflufenacil @ 0.57 lb/gal + dimethenamid-P (Outlook) @ 1.0 lb/gal.
- Broadleaf and grass control
- Use rates: 10 to 16 fl oz
  - 10 fl oz on coarse texture soils
  - 13 fl oz on medium texture soils
  - 16 fl oz on fine texture soils
  - 16 fl oz = 3.1 oz Sharpen and 13.4 oz Outlook
- This is a low rate of Outlook. The Sharpen may give you 3+ weeks residual broadleaf control. These rates are lower than what was used in experiments conducted the past two years
DuPont’s Optimum® GAT® Trait

• GAT = Glyphosate ALS Tolerance Corn & Soybean, Different glyphosate tolerant event
  – Will have a pre-pack mixture of herbicides which include ALS inhibitors not used on Non-ALS tolerant corn or soybean
  – Looking for deregulation in corn soon and introduction into the market in 2011?? Has received approval in Canada
  – Excellent Crop Safety
Optimum® GAT® Corn
Optimum® GAT® Corn

- DuPont MIX + Atrazine PRE
- Chloracetamide + Atrazine
-Glyphosate one pass
- Chloracet.+Atra PRE
- DuPont MIX + ATRA PRE
- Glyphosate POST
- Untreated
Dow AgroSciences DHT Corn

• DHT = Dow AgroSciences Herbicide Tolerant
• GMO trait –
  – Gene provides resistance to 2,4-D
  – Same gene provides resistance to aryloxfenoxy proprionic acids (FOPS)
  – Would allow 1 lb ae rates of 2,4-D, PRE and post not to exceed 3 lbs / growing season
  – Would allow a grass herbicide to control grassy weeds
  – Could be combined with a glyphosate tolerant gene
• Also developing DHT soybean and cotton. Gene is different than the gene in corn. Corn – 2012-13??
What’s New for Sorghum

- Lexar
- Degree Xtra
- Sharpen
- Integrity
- Huskie??
- ALS sorghum??
- ACCase sorghum??
**Lexar (Syngenta) for Use in Sorghum**

- **Use rate:** 3.0 qt Lexar/acre
  - (1.4 pts Dual II Mag+5.3 oz Callisto+1.3 qt atrazine)
  - must use *Concept* treated seed
- **Timing:** From 21 day preplant through preemergence
- **Preplant/preemergence split application** can be made. Apply 1.5 to 1.75 qt 7 to 21 DBP and 1.25 to 1.5 qt/a post-plant preemergence
- **Do NOT use** on Sand, sandy loam, or loamy sand soil
- **Do NOT use** on forage sorghum, sweet sorghum, sudangrass, or any dual purpose sorghum
Sorghum plant showing about 15% injury
**Degree Xtra (Monsanto)**

- Acetochlor 2.7 lb + Atrazine 1.34 lb / gallon
- Grass and broadleaf weed control
- Use rates: Dependent on soil characteristics
- 2 qts = 1.35 lbs acetochlor (2.8 pts Degree) + 0.67 lb atrazine

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Degree Xtra rate in quarts /acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 1.5% OM</td>
</tr>
<tr>
<td>Coarse soil</td>
<td>2.0 to 2.5</td>
</tr>
<tr>
<td>Medium</td>
<td>2.0 to 2.5</td>
</tr>
<tr>
<td>Fine</td>
<td>2.0 to 2.9</td>
</tr>
</tbody>
</table>
Degree Xtra (Monsanto)

• Application timing
  – Preplant surface or incorporated
  – Preemergence
  – Postemergence up to 11 inch sorghum
**Sharpen (BASF) for Sorghum**

- **Sharpen** contains saflufenacil 2.85 lb/gal
- Use 1 to 2 fl oz on all soil types
- For burndown activity add MSO or COC at 1% v/v and ammonium sulfate 8.5 to 17 lb/100 gal or liquid nitrogen at 1.25 to 2.5 gallon/100 gal to kill emerged weeds
- Controls broadleaf weeds only
- Sorghum forage can be harvested, fed, or grazed 70 days or more after application
- Do NOT apply to emerged sorghum
- These rates are lower than experimental work!
**Integrity (BASF) for grain sorghum**

- **WAITING FOR A REGISTRATION**
- *Integrity* contains saflufenacil 0.57 lb/gal + dimethenamid-P (Outlook) 1.0 lb/gal.
- Broadleaf and grass control
- Use rates: ????
  - Expecting a label soon (rates not provided at this time)
Preemergence sorghum weed control

Untreated
Lumax 2.5 qts
Integrity 20 oz
Bicep II Magnum 2.1 qts
Sharpen + Guardsman Max 3 oz + 3 pints
Huskie (Bayer) in Sorghum NOT REGISTERED

- Huskie will be the first post-emergence HPPD inhibitor in grain sorghum
- Huskie will control ALS and Triazine resistant pigweed, kochia, and other broadleaf weeds
- Huskie should be applied with
  - Atrazine
  - Ammonium sulfate
  - 2,4-D (still exploring rates and formulation)
- Expect to see some crop injury, 3 – 14 day
Weed control in sorghum with late salvage herbicides, Manhattan, Thompson / Peterson, 0903corn

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
<th>Yield</th>
<th>injury</th>
<th>PAAM</th>
<th>VELE</th>
<th>Sunf</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prod/a Bu/a</td>
<td>7/14</td>
<td>14DAT</td>
<td>14DAT</td>
<td>14DAT</td>
<td></td>
</tr>
<tr>
<td>Atrazine+COC</td>
<td>1.5+1%v/v</td>
<td>72</td>
<td>0/0</td>
<td>73</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>Aim EC+ NIS</td>
<td>.5oz+.25%</td>
<td>55</td>
<td>23/7</td>
<td>40</td>
<td>100</td>
<td>57</td>
</tr>
<tr>
<td>Aim+Atra+NIS</td>
<td>.5oz+1.5+.25</td>
<td>65</td>
<td>28/10</td>
<td>60</td>
<td>96</td>
<td>87</td>
</tr>
<tr>
<td>Rage D-Tech+NIS</td>
<td>.5pt+0.25%</td>
<td>68</td>
<td>38/18</td>
<td>80</td>
<td>100</td>
<td>93</td>
</tr>
<tr>
<td>2,4-D ester</td>
<td>16 oz</td>
<td>109</td>
<td>13/5</td>
<td>77</td>
<td>95</td>
<td>92</td>
</tr>
<tr>
<td>2,4-D ester+atra</td>
<td>8oz+.56lb</td>
<td>98</td>
<td>17/7</td>
<td>82</td>
<td>98</td>
<td>96</td>
</tr>
<tr>
<td>Ally + 2,4-D amine</td>
<td>.05oz+8oz</td>
<td>82</td>
<td>12/10</td>
<td>79</td>
<td>75</td>
<td>88</td>
</tr>
<tr>
<td>Permit+Atra+COC</td>
<td>.67oz+1lb+1%</td>
<td>76</td>
<td>2/0</td>
<td>82</td>
<td>68</td>
<td>94</td>
</tr>
<tr>
<td>Yukon+atra+COC</td>
<td>6 oz+1lb+1%</td>
<td>112</td>
<td>7/5</td>
<td>82</td>
<td>77</td>
<td>95</td>
</tr>
<tr>
<td>Marksman</td>
<td>2 pt</td>
<td>99</td>
<td>10/5</td>
<td>88</td>
<td>88</td>
<td>95</td>
</tr>
<tr>
<td>Untreated</td>
<td></td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td></td>
<td>30</td>
<td>9</td>
<td>10</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
Introducing a New Weed Control Technology for Grain Sorghum to Kansas Growers
Development

• ALS and ACCase resistant sorghum lines were developed at KSU
• ALS resistant shattercane was crossed with grain sorghum lines (Tuinstra and Al-Khatib)
• ACCase resistance sudangrass genes were moved into grain sorghum (Tuinstra and Al-Khatib)
• ACCase and ALS resistant lines were distributed by K-State to sorghum breeding programs
• This is a cooperative project with Dupont and all programs breeding these sorghum have signed agreements with Dupont
ALS & ACCase sorghum

• Management
  – Management
  • Management

• Weed control
  – Target annual grass problems postemergence
  – Herbicides being developed by Dupont and could include Accent, Resolve, Steadfast products for ALS sorghum and Assure II for ACCase sorghum
Summary

- ALS and ACCase sorghum are tools in the weed control strategy tool chess for grain sorghum in coming years.
- ALS and ACCase sorghum will provide growers means to control some grass weeds post-emergence.
- All tools have their limitations:
  - ALS resistant weeds.
  - ACCase expense, performance in tough conditions, and inability to mix with growth regulator herbicides.
Questions?

Curtis Thompson

Cthompso@ksu.edu

785-532-3444