Forage Corn Management
Pesticide Applicator Training

Tuesday, January 12, 2016
Lauchlin Titus, CPAg
AgMatters LLC
Topics I have in mind....

- New corn herbicides
- Some tips about corn herbicide decisions
- Cover crops after corn herbicides
- What about fungicides?
- Hay/Forage herbicides
What Do You Want to Talk About?
Be mindful of plant stress

- Crop has to manage the herbicide dose too.
  - Herbicides generally stress crop plants
  - Hopefully not as much as weeds, moisture and fertility competition
- Stress factors
  - Too wet
  - Too hot
  - Too cold
  - Ozone
- bmr varieties are most sensitive
- Stressed weed plants may not take in herbicide well enough to provide good control.
Tips about herbicide decisions

- Will chosen herbicide program kill weeds known or expected to be present?
- Use enough water/carrier to provide adequate coverage
- Do you need adjuvants, nitrogen additive?
- Think about recent weather, predicted weather—is plant stress likely?
- Does herbicide need moisture, or time to dry?
What about Cover Crops

- Big help in weed management.
- Important for soil health considerations
- Important aspect of No-till farming
Cover crops after corn herbicides

- Label MUST allow cover crop species if it is to be harvested for forage (grazed, chopped, etc.)
- Label MUST allow cover crop species for any use....but we are working on that.
  - Some states have a different opinion.
What About Fungicides

- Northern corn leaf blight and other corn diseases used to be uncommon.
- Changes in weather (prolonged periods of whatever---wet, hot, etc.) favor many of the corn foliar diseases.
Fungicides

- Useful if have had or expect weather conducive to disease
- Useful if you have susceptible varieties
  - Why didn’t you shop for less susceptible varieties?
- Can you get application when needed?
Weed Problems

- Ragweed
- Yellow Nutsedge
- Crabgrass
- Green Foxtail
- Lambsquarter
- Bindweed
- Some new ones (for us)
Jimsonweed
Biennial Wormwood
Info from some of the manufacturers

- Bayer
- BASF
- Syngenta
- Gowan
- Dow Agrosciences
Capreno® Herbicide
Man Vs. Weed

• With the longest-lasting residual of any post, Capreno delivers season-long control of the toughest weeds for an amazing end-of-season clean.
  • Excellent burndown of grass and broadleaf weeds
  • Controls more than 65 broadleaf and grass weeds, including glyphosate-, PPO-, ALS-, auxin- and triazine-resistant weeds
  • Consistent performance regardless of weather conditions
  • Bayer’s proprietary safener found in Capreno enables plants to better withstand herbicidal activity and allows for better crop safety compared to Halex GT and Realm Q.
  • Ultra low use rate of just 3 fl oz/A
  • Flexible use
Resistance Management Tool

- **Dual modes of action** help manage and prevent the development of resistance:
  - HPPD Inhibitor (bleacher)
    - Inhibits the 4-hydroxyphenylpyruvate dioxygenase (HPPD) enzyme in plants
    - HPPD is key to the production of a plant's protective pigments
  - By preventing pigment production, plant chlorophyll is destroyed by the sun’s ultraviolet rays
  - ALS Inhibitor
    - Inhibits acetolactate synthase enzyme
    - Prevents weeds from producing three essential branch-chain amino acids
    - These amino acids are building blocks for normal growth and development
Respect the Rotation™

- Rotating herbicide mode of action is essential to improving weed resistance management and helps you
- Respect the Rotation
  - Rotate mode of action (MOA) and/or use multiple MOAs to reduce the selection pressure caused by overusing a single MOA
    - Rotate herbicide-tolerant traits
    - Rotate crops
Flexibility

• Available for use on field corn, seed corn and corn grown for silage

• Use in a wide variety of tillage programs:
  • Conventional
  • Conservation tillage
  • No-till crop management systems
  • Post-harvest non crop
  • Pre plant

• **Tankmix with Stratego® YLD fungicide** for excellent early-season disease control, contributing to late-season crop health, higher yield potential and improved stalk quality
Cover Crops

- Use of cover crops as a means of soil improvement, erosion control, weed and/or insect suppression, etc., following harvest of corn in the fall is increasing. Planting of cover crops in fields treated with CAPRENO Herbicide is allowed as long as these cover crops are not grazed by livestock nor harvested for food. Cover crops are to be tilled under or chemically controlled with burndown herbicides in the spring. Cover crops can be planted within 90-120 days after application of CAPRENO Herbicide. However, all potential cover crops have not been evaluated for tolerance to CAPRENO Herbicide and significant injury may occur. Prior to seeding a cover crop, complete a successful field/ small scale bioassay to provide an indication of the level of tolerance to the prior CAPRENO Herbicide application. Refer to the “Field/ Small Scale Bioassay” section. If used in tank mixtures with other herbicides, always follow the most restrictive label.
DiFlexx™ Herbicide

Science For A Better Life
Flexible and Safe Broadleaf Weed Control in Corn

**DiFlexx provides corn growers an ideal combination: dicamba and CSI™ Safener technology**

- Extremely fast and effective control of broadleaf weeds with residual.
- **Controls more than 100 annual and perennial weeds**, including those resistant to glyphosate-, PPO-, ALS- and triazine-based herbicides.
- Liquid formulation vs. dry.
- **DiFlexx may be used pre-emergence as well as postemergence.**
- **Next innovation in crop safeners**, which allows for improved crop safety during wider application period.
- **Safens tankmix partners**, both pre and post, by enabling corn plants to better withstand herbicidal activity.
Superior Crop Safety

- DiFlexx includes highly active Crop Safety Innovation™ (CSI) Safener technology that has both soil and foliar uptake. Because the safener is active in both pre- and post applications, DiFlexx can be used on any soil for greater crop compatibility and can be applied from pre-plant burndown to V10.

- A great fit in areas of traditional high use of dicamba and in areas where dicamba use has been restricted due to soil texture.

- Because of the safener, DiFlexx can also be used on field corn, field corn grown for silage, white corn, seed corn and popcorn.

- CSI Safener enables corn plants to better withstand herbicidal activity, which can lead to increased root growth and plant health.
Flexibility

- A wide window of application timing for exceptional flexibility
  - Pre-plant burndown
  - Pre-emergence
  - Post-emergence
- A great tool for control of broadleaf weeds in fallow croplands
- The ability to safely combine DiFlexx with MSO or COC for improved weed control as compared to non-safened dicamba
- The ability to be used in tank mixtures or sequentially with additional herbicides for broader spectrum weed control
What is Laudis?

- **Postemergence** corn herbicide that delivers cutting-edge control of weeds
- Combines extremely strong herbicide with a highly effective **safener** which enables plants to better withstand herbicidal activity to deliver powerful weed control that is tender on corn
- Residual in-season weed control
- Control of the toughest broadleaf weeds and key grasses, including many glyphosate-, PPO-, ALS-, triazine- and auxin-resistant weeds
- Rapid control without compromising crop safety
- Convenience in crop rotation
- The safener in Laudis **will safen tankmix combinations with any dicamba product.**
Laudis Delivers

- Laudis has no hybrid restrictions*, and no interactions with any insecticides, fungicides or seed treatments
- Perfect fit in traditional herbicide programs or as a tankmix partner with Liberty® herbicide in LibertyLink® hybrids, and with glyphosate in Roundup Ready® corn
- The safener in Laudis will safen tankmix combinations with any dicamba product

*Except fresh market hybrids, Merit® and Shogun®
Power

- Laudis easily controls ragweeds, velvetleaf, pigweeds, lambsquarters and waterhemp, as well as woolly cupgrass, giant and yellow foxtail, shattercane, large and smooth crabgrass
- Valuable tool in managing glyphosate-, PPO-, ALS-, triazine- and auxin-resistant weed populations
- Maintains the viability of other herbicide programs

Based on victories in corn and broadleaf programs with...
General Use Patterns

- For use on field corn, seed corn, sweet corn, popcorn and white corn
- Flexible to fit your needs
  - Pre-emergence followed by postemergence application program
  - Total postemergence program
  - LibertyLink® or Roundup Ready® programs
Use Rate

Rate
Use Laudis at 3 fl oz/A

- Combine with atrazine at 0.5 lb AI/A to increase speed of control, weed spectrum and consistency
- 3 fl oz/A when mixed with 22 fl oz/A Liberty
- Laudis – formulated as a suspension concentrate (SC)
  - 42 acres treated per gallon

Water
- Minimum 10 gal/A;
  - 15 gal/A if using Liberty
Timing

- Wide Application Window
  - Application VE up to V9 in field, seed inbreds or popcorn
    - Maximum two applications per season on field, seed and popcorn; Seven days apart
  - Application VE up to V7 in sweet corn
    - One application per season in sweet corn

Laudis 3 fl oz/A + 1 lb AI/A atrazine
+ 1 qt/A Methylated Seed Oil + 8.5 lbs AMS/100

West Central, OH popcorn field
Laudis Summary

- **Postemergence** corn herbicide with broad-spectrum control of both grass and broadleaf weeds
- Unsurpassed crop **safety** in field corn, seed corn, sweet corn, white corn and popcorn with no restrictions* on hybrid selection or insecticide use, and few crop rotation limitations in key crops
- In-season residual control
- Performs **quickly** and consistently even when challenged with quick rainfall and dry conditions
- Allows growers to **break the weed-resistance cycle** by introducing a powerful chemistry and HPPD mode-of-action to their fields
- **Flexibility to rotate** to many crops next season, including soybeans in as little as 8 months

*Except fresh market hybrids, Merit and Shogun
Flexible and Safe Broadleaf Weed Control in Corn

**DiFlexx DUO** - an ideal combination of HPPD herbicide + dicamba + CSI™ Safener technology brings corn growers:

- Fast and effective control of more than 100 broadleaf weeds and grasses with residual
- Two effective modes of action for foliar and residual control of tough broadleaf weeds such as Palmer amaranth, waterhemp, kochia, marestail and giant ragweed - including those resistant to glyphosate-, PPO - and ALS-based herbicides
- A superior safener compared to other dicamba or HPPD products
- Application flexibility - PRE to late POST (up to V10 corn growth stage)
- Flexible use rates from 24-40 fluid ounces/acre (core rate 32 fl oz/ac)
- Liquid formulation
- **Registration expected 2016**

For educational purpose only. This product is not yet registered with the EPA and is not available for sale.
Liberty Herbicide

- Liberty smokes weeds, including glyphosate-resistant ones.
- Liberty has a unique mode of action that offers a nonselective choice for Integrated Weed Management plans.
- Liberty is a fast-acting contact herbicide that kills weeds in days, not weeks. Visual effects and control occur within two to four days after application under good growing conditions.
Respect the Rotation

“Respect the Rotation” is an industry-wide initiative to:

- Elevate the importance of herbicide mode of action rotation.
- Improve on-farm adoption of herbicide diversity.
- Promote IWM by highlighting an essential action to improve weed resistance management.

Working together, Respect the Rotation can:

- Motivate proactive management to prevent the spread of weed resistance.
- Steward current and future weed management technology.
- Promote sustainable and profitable row crop production.
- Preserve conservation tillage opportunities.
LibertyLink Corn

- The LibertyLink trait is widely available in trusted hybrids from virtually all seed corn companies, including hybrids with the following *Bt* insect protection traits:
  - All Herculex hybrids.
  - All *SmartStax* hybrids.
  - All Agrisure hybrids with corn borer protection.
- Remember to follow refuge requirements, and purchase non-*Bt* LibertyLink hybrids to ensure maximum weed control flexibility across all your corn acres.
Supplemental Label:
- Liberty may be utilized on Liberty Link sweet corn varieties
- Use rate: 20 oz/a
- Through V7 growth stage or 24”
- 40 oz/a maximum per season
- 50 day PHI
BASF

Armezon Pro

- Used as a POST emergence 1 pass or 2 pass option.
- Key Points: Tough on broadleaf weeds and grasses to protect yield potential
- **Two Modes of Action** for Weed Resistance Management
  - Group 27 (Armezon)
  - Group 15 (Outlook)
- **Flexible Use** –
  - Wide window of application (spike to 30”)
  - Low Use Rate (16-20 oz.)
  - Rain fast in 1 hour
  - Does not contain Glyphosate so can be used on non RUR corn
- **Consistent Performance**
  - Low rainfall required for effective weed control
  - Postemergence and Soil residual control
  - Safe for all types of corn
BASF

Sharpen Herbicide: Broadleaf weed control in Perennial Forage Grasses

Key Points:
- For control of 70+ broadleaf weeds in grass crop.
- Selective Broadleaf burndown herbicide to control the toughest broadleaf weeds
- Fast and Effective
  - Three to five times faster than 2,4-D
- Broad Spectrum of broadleaf weed control
- Flexible
  - Application in cool and warm season grasses
  - Dormant season and in season use
  - Zero day grazing restriction.
  - Minimal rotation restrictions – any crop/cover crop can be planted less than or equal to 4 months after use
(Received EPA registration last week) labeled for use in established pasture/hay fields. Will be used in preemergence applications to reduce emergence of grass weed species (crabgrass, foxtail, barnyardgrass, goosegrass, and invasive grasses Japanese siltgrass or joint-head grass) and small seeded broadleaves – like lambsquarters, velvetleaf, pigweeds.
A step change in weed management

• **Accuron**
  - Four active ingredients including bicyclopyrone
  - Three complementary modes of action
  - Residual control of 70+ weeds including giant ragweed, waterhemp, Palmer amaranth
Additional Accuron benefits

- Best chance at a one-pass system.
- Hardest-working residual
- Registered in field corn, seed corn, silage corn, sweet corn and yellow popcorn.
- Can be applied 28 days pre-plant up to 12-inch corn.
  - Built in resistance management.
WORKS TEN TIMES HARDER FOR A WHOLE LOT LONGER.
Step Change in Disease Control

- Contains blockbuster SDHI, Solatenol fungicide
- Three potent active ingredients for complete disease control
- Demonstrated excellent activity on rusts, leaf spots, and other key diseases
- Contains three complementary and non-cross-resistant modes of action
Protection Against Costly Diseases

- Gray leaf spot
- Leaf blight
- Northern corn leaf blight
- Northern corn leaf spot
- Rust
- Eye spot
- Yellow leaf blight

FSF001A3, 2014, Giesler, NE—Gray Leaf Spot

Untreated  Aproach® + NIS  Stratego® YLD + NIS  Trivapro™ + NIS

Public: For Presentation Only; Not for Distribution
Helps Plants Better Reach Full Yield Potential

- Trivapro helps corn,
  - stay greener longer for improved grain fill
  - develop stronger stalks for less lodging, volunteer corn and dry down costs
  - optimize water use for better heat/drought endurance

Syngenta, V5 fungicide trial, August 26 - September 5, 2014, Owatonna, MN
The hardest-working, longest-lasting fungicide on the market.
www.syngentaus.com/Trivapro
Gowan PermitPLUS

- Two active ingredients
- Can be used pre or post emergence
- Very effective on:
  - Yellow Nutsedge
  - Many broadleaf weeds
- Low use rate of $\frac{3}{4}$ oz. per acre
Gowan Yukon

- Two active ingredients
  - Dicamba
  - Halosulfuron (Permit)
- Post Emergence use
  - Use rate is 4-8 oz. per acre
- Very effective on:
  - Yellow nutsedge
  - Field Bindweed (what many of us call morning glory)
  - Most broadleaf weeds
- New label use for pastures and grass hay/forage acreage
NEW CROP PROTECTION SOLUTIONS

- FullTime® NXT: Herbicide
- Keystone® LA NXT: Herbicide
- Keystone® NXT: Herbicide
- Surpass® NXT: Herbicide
- Instinct® II: Nitrogen Stabilizer
- Transform® WG: Insecticide
- SureStart® II: Herbicide
- Surveill™ Co-Pack: Herbicide
### Solutions FOR THE CORN ACRE

<table>
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<tr>
<th>SEED</th>
<th>TRAITS</th>
<th>POST HERBICIDES</th>
<th>RESIDUALS</th>
<th>INSECTS</th>
<th>Nitrogen Management</th>
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<tbody>
<tr>
<td>Mycogen Seeds</td>
<td>Enlist</td>
<td>Enlist Duo</td>
<td>SureStart II</td>
<td>Cobalt Advanced</td>
<td>Instinct II</td>
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<tr>
<td>Codex weed control</td>
<td>SmartStax</td>
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<td>Keystone NXT</td>
<td>Lorsban Advanced</td>
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<td></td>
<td>Refuge Advanced</td>
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**WIDE-ranging**, effective product offering | Supported by **strong investment** in research and development

Cobalt Advanced and Lorsban Advanced are federally Restricted Use Pesticides,

*Anticipated Launch 2015

Enlist E3 soybeans are being jointly developed by Dow AgroSciences and MS Technologies.

Regulatory approvals are pending for the Enlist herbicide solution and crops containing Enlist herbicide tolerance traits.

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A Market Leader in Corn Herbicides

FLEXIBLE DEPENDABLE weed control
Solutions FOR THE CORN ACRE

1 inch of rain for activation

Group 15
Seedling shoot inhibitor

Group 5
Photosynthesis inhibitor

Modes of Action

Keystone® LA NXT
Hornet® WDG

One-pass solution

Flexible application: from preplant to postemergence

Atrazine restricted areas

Low Atrazine perfect for Atrazine restricted areas

©2014 Dow AgroSciences LLC
Hornet®
WDG
HERBICIDE
**Tank-Mix** compatible with Glyphosate

**Extended application window**

**Hornet WDG**

** Keystone NXT**

**One-pass solution**

**Up to 20 in Tall**

**Large Seeded**

broadleaf weeds

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INTRODUCING

The power to control tough weeds with trusted residual activity deep into the growing season.
NEW herbicide with 3 modes of action

SUPERIOR CONTROL of herbicide resistant GRASSES AND BROADLEAF weeds

trusted RESIDUAL ACTIVITY DEEP into the growing SEASON

Novel formulation of 3 leading actives

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Resicore™ herbicide by Design

- Trusted Residual
- Resistance Management
- Resounding Yield Potential
- The Core of a Grower’s Weed Control Program

Federal Registration expected in 1st half of 2016

Ideal for Growers who invest in resistance management and want a premium brand that delivers extended residual control

Resicore is not yet registered with the U.S. EPA. Federal registration is pending. This presentation is intended to provide technical information only and is not an offer for sale of product. Always read and follow label directions. ©2015 Dow AgroSciences LLC
Resicore™ herbicide contains three effective modes of action aimed at control of many of today's toughest herbicide-resistant weeds

The three active ingredients in Resicore do not include atrazine or glyphosate

Resicore will be tank-mix compatible with other herbicides such as atrazine and glyphosate, providing flexibility to include additional modes of action in a single application

### Technical Information

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Mode of Action</th>
<th>Site of Action</th>
<th>Lb/gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetochlor</td>
<td>Seedling Shoot Growth Inhibitor</td>
<td>Group 15</td>
<td>2.8</td>
</tr>
<tr>
<td>Mesotrione</td>
<td>Pigment Inhibitor</td>
<td>Group 27</td>
<td>0.3</td>
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<tr>
<td>Clopyralid</td>
<td>Growth Regulator</td>
<td>Group 4</td>
<td>0.19</td>
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</tbody>
</table>

**Active Ingredients**

- Acetochlor, 2-chloro – N – ethoxymethyl – N – (2- ethyl6 methylphenyl)acetamide…31.0%
- Mesotrione. 2-(4-(methylsulfonyl)-1, 3-cyclohexanedione………………3.3%
- Clopyralid. 3,6-dichloropyridinecarboxylic acid, monoethanolamine salt………………2.7%
- Other ingredients……………………………63%
- Total…………………………………………100%
Technical Information

<table>
<thead>
<tr>
<th>Proposed Labeled Crops</th>
<th>Rotational crop</th>
<th>Rotational Interval</th>
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<tbody>
<tr>
<td>Field Corn</td>
<td>Field corn</td>
<td>Anytime</td>
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<tr>
<td></td>
<td>Field seed corn</td>
<td></td>
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<tr>
<td></td>
<td>Field silage corn</td>
<td></td>
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<tr>
<td></td>
<td>Sweet corn</td>
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<tr>
<td></td>
<td>Yellow popcorn</td>
<td></td>
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<tr>
<td>Field Seed Corn</td>
<td>Wheat</td>
<td>4 months</td>
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<tr>
<td>Field Silage Corn</td>
<td>Alfalfa</td>
<td>10.5 months</td>
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<tr>
<td></td>
<td>Barley</td>
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<td></td>
<td>Millet (pearl and proso)</td>
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<td>Oats</td>
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<td></td>
<td>Rye</td>
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<td></td>
<td>Sorghum</td>
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<td></td>
<td>Soybean</td>
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<td></td>
<td>Sunflower</td>
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<tr>
<td>Sweet Corn</td>
<td>All other rotational crops</td>
<td>18 months</td>
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<tr>
<td>Yellow Popcorn</td>
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*Other restrictions may apply, product label is pending registration.

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Resicore™ herbicide proposed use rates by soil texture and organic matter content.

<table>
<thead>
<tr>
<th>Soil Texture</th>
<th>Rate per acre (Quarts)*</th>
<th>Soil organic matter content</th>
<th>Greater than 3%</th>
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<tbody>
<tr>
<td></td>
<td>Less than 3%</td>
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</tr>
<tr>
<td>Coarse</td>
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<td>2.50</td>
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<tr>
<td>Medium</td>
<td>2.50</td>
<td></td>
<td>2.75</td>
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<tr>
<td>Fine</td>
<td>2.75</td>
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<td>3.00</td>
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</tbody>
</table>

*An additional 0.25 qts/Acre may be used in areas of heavy weed infestation. Do not exceed 3.25 qts/Acre of Resicore™ herbicide per season

**PROPOSED APPLICATION TIMING:**
Timing to weeds:
- Make soil applications prior to weed emergence
- Make post-emergence applications before broadleaf weeds reach 3” tall

Timing to crop:
- Make soil applications prior to crop emergence
- Make post-emergence applications before corn reaches 11” tall

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Resicore is not yet registered with the U.S. EPA. Federal registration is pending. This presentation is intended to provide technical information only and is not an offer for sale of product. Always read and follow label directions.
Will deliver the residual activity growers need for long-lasting weed control with excellent crop safety, to maximize yield

Is a powerful tool to fit into various weed management programs, including the Enlist™ Weed Control system

Produced excellent results in University and Diamond showcase trials in 2015
And so, The End