Forage Corn Management Pesticide Applicator Training

Tuesday, January 12, 2016

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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

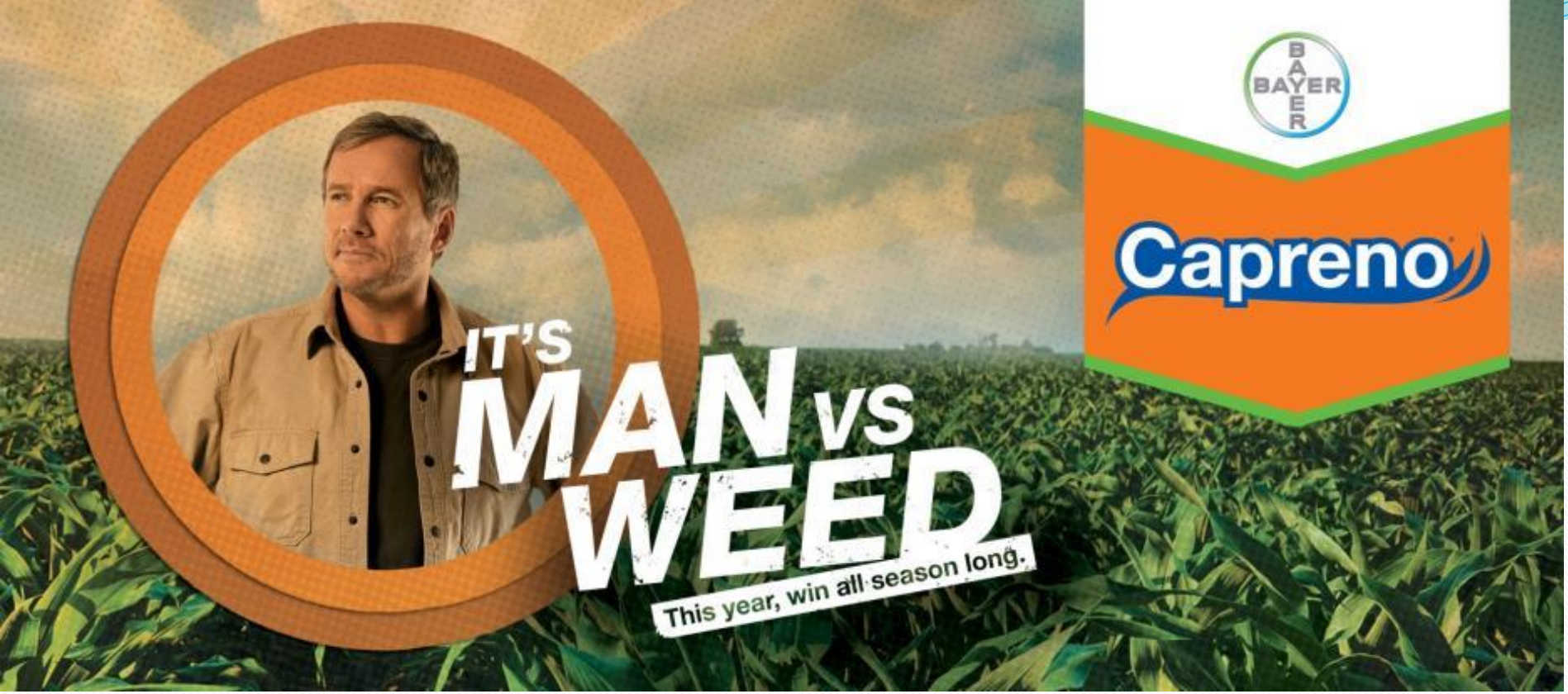
- Ragweed
- Yellow Nutsedge
- Crabgrass
- Green Foxtail
- Lambsquarter
- Bindweed
- Some new ones (for us)

Jimsonweed

Biennial Wormwood

Info from some of the manufacturers

- Bayer
- BASF
- Syngenta
- Gowan
- Dow Agrosciences



BAYER

Science For A Better Life

- Capreno® Herbicide

Capreno

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

Capreno

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 plants 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

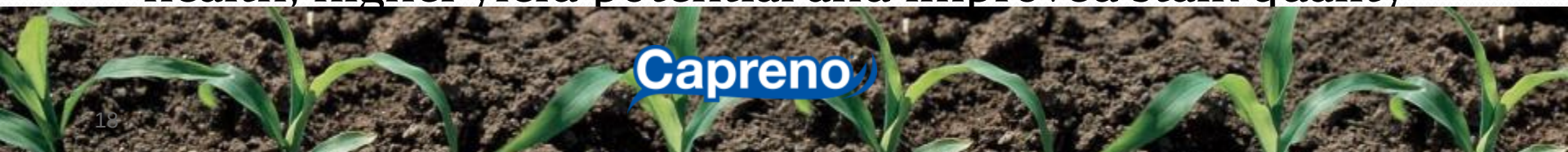
Respect the Rotation™

- 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

Capreno

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



Providing Season-Long Control of Even the Toughest Weeds

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.

BAYER

Science For A Better Life

• DiFlexx™ Herbicide

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.

DiFlexx™

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.

CSI SAFENER

DiFlexx™

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

BAYER

Science For A Better Life

Laudis® Herbicide

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

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®

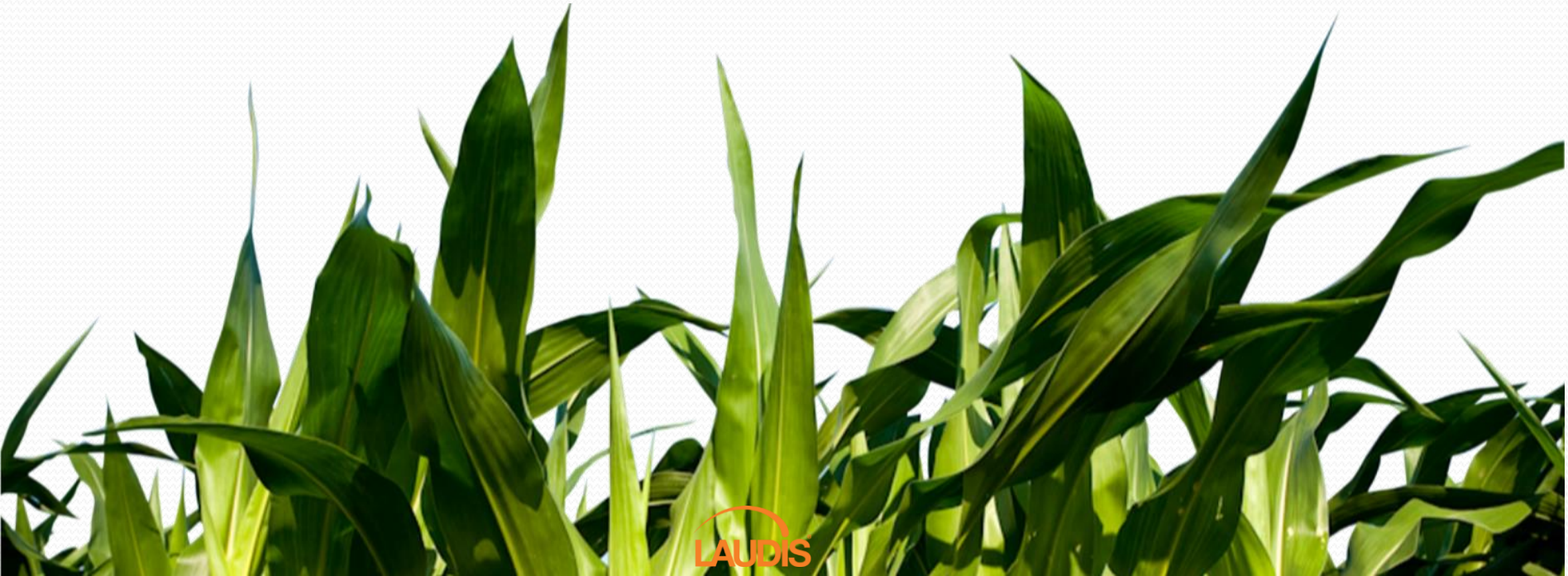
LAUDIS®

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

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

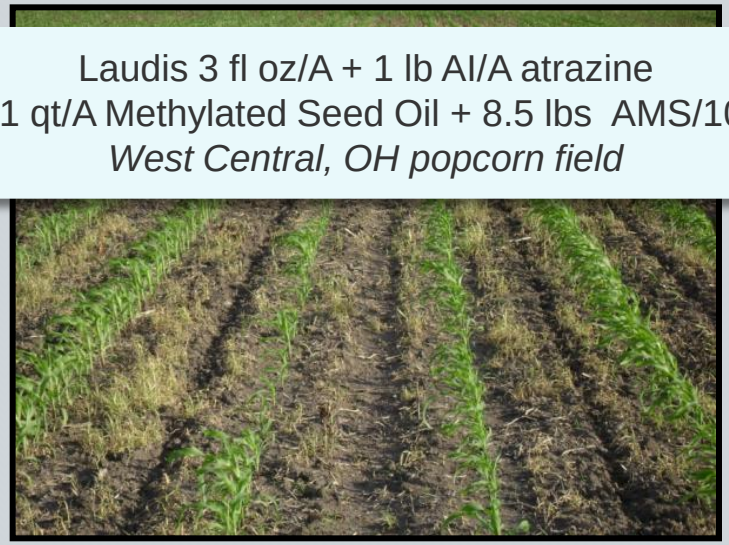
- Minimum 10 gal/A;
  - 15 gal/A if using Liberty

LAUDIS®

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®

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.

Liberty 280 SL Herbicide For Use On Sweet Corn

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

BASF
Prowl H20

- (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)
- small seeded broadleaves – like lambsquarters, velvetleaf, pigweeds.

Syngenta
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

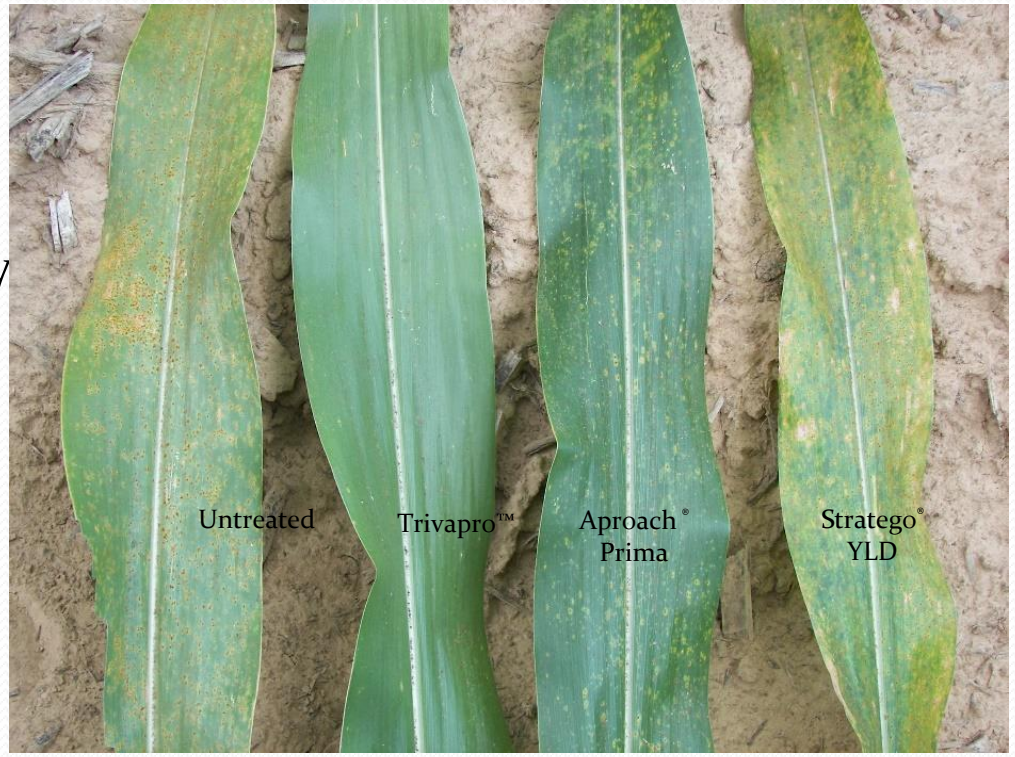
- Best chance at a one-pass system.
- Hardest-working residual
- Registered in field corn, seed corn, silage corn, sweet corn and yellow popcorn.
- Can be applied 28 days pre-plant up to 12-inch corn.
- Built in resistance management.

Trivapro™

syngenta®

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



Public: For Presentation Only; Not for Distribution

Protection Against Costly Diseases

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

Untreated

Aproach® + NIS

Stratego® YLD + NIS

Trivapro™ + NIS

FSF001A3, 2014, Giesler, NE—Gray Leaf Spot

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

Gowan PermitPLUS

- Two active ingredients
- Can be used pre or post emergence
- Very effective on:
  - Yellow Nutsedge
  - Many broadleaf weeds
- Low use rate of ¾ 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

DOW®

Dow AgroSciences

Solutions for the Growing World

NEW CROP PROTECTION SOLUTIONS

FulTime® NXT
HERBICIDE

Keystone® LA NXT
HERBICIDE

Keystone® NXT
HERBICIDE

Surpass® NXT
HERBICIDE

Instinct® II
NITROGEN STABILIZER

Transform® WG
INSECTICIDE

SureStart® II
HERBICIDE

Surveil™ Co-Pack
HERBICIDE

Solutions FOR THE CORN ACRE

SEED	TRAITS	POST HERBICIDES	RESIDUALS	INSECTS	Nitrogen Management
Mycogen SEEDS	Enlist Corn	Enlist Duo Herbicide	SureStart II HERBICIDE	Cobalt Advanced INSECTICIDE	Instinct II NITROGEN STABILIZER
Brodbeck Seeds	SmartStax	SureStart II HERBICIDE	Keystone NXT HERBICIDE	Lorsban Advanced INSECTICIDE	N-Serve NITROGEN STABILIZER
DAIRYLAND SEED	REFUGE ADVANCED powered by SmartStax	Hornet WDG HERBICIDE	Keystone LA NXT HERBICIDE		
pfister		Durango DMA HERBICIDE	FulTime NXT HERBICIDE		
Prairie Brand			Surpass NXT HERBICIDE		

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.

DOW Dow AgroSciences Solutions for the Growing World

A Market Leader in Corn Herbicides

FulTime® NXT
HERBICIDE

SureStart® II
HERBICIDE

Hornet® WDG
HERBICIDE

FLEXIBLE DEPENDABLE
weed control

Keystone® NXT
HERBICIDE

Keystone® LA NXT
HERBICIDE

Surpass® NXT
HERBICIDE

1/4 inch of **rain for activation**

2 Modes of Action

Group 15
Seedling shoot inhibitor

Group 5
Photosythesis inhibitor

Keystone® LA NXT HERBICIDE + Hornet® WDG HERBICIDE

One-pass solution

Flexible application: *from preplant to postemergence*

Atrazine restricted areas

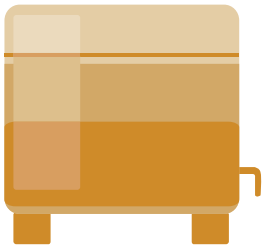
Low Atrazine perfect for Atrazine restricted areas

Hornet® WDG

HERBICIDE

Dow AgroSciences

Solutions for the Growing World



Tank-Mix compatible with Glyphosate

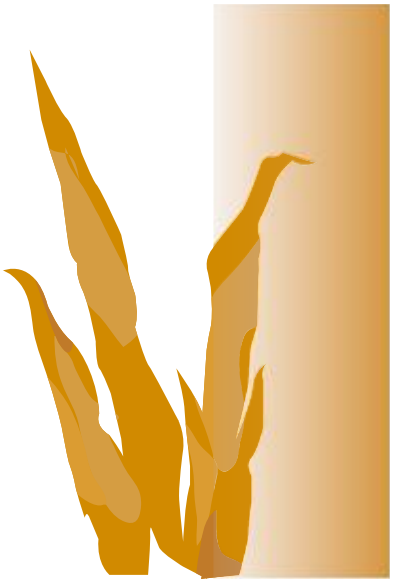
Extended application window

Hornet® WDG HERBICIDE

Keystone® NXT HERBICIDE

One-pass solution

Large Seeded
broadleaf weeds



Up to
20 in
Tall

INTRODUCING

Resicore™
HERBICIDE

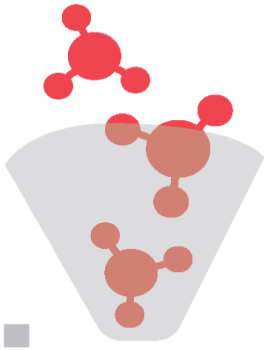
The power to control tough weeds with trusted residual activity deep into the growing season.

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



DOW Dow AgroSciences

Resicore™
HERBICIDE

Resicore™ herbicide by Design

Resicore HERBICIDE

- Trusted **Res**idual
- **Res**istance Management
- **Res**ounding 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

Dow AgroSciences

Technical Information

Resicore™ HERBICIDE

Active Ingredient	Mode of Action	Site of Action	Lb/gal
Acetochlor	Seedling Shoot Growth Inhibitor	Group 15	2.8
Mesotrione	Pigment Inhibitor	Group 27	0.3
Clopyralid	Growth Regulator	Group 4	0.19

- 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

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, monoethanoilamine salt……...2.7%

Other ingredients……63%

Total……..100%

Dow AgroSciences

Technical Information

Resicore™ HERBICIDE

Proposed Labeled Crops
Field Corn
Field Seed Corn
Field Silage Corn
Sweet Corn
Yellow Popcorn

Rotational crop	Rotational Interval
Field corn Field seed corn Field silage corn Sweet corn Yellow popcorn	Anytime
Wheat	4 months
Alfalfa Barley Millet (pearl and proso) Oats Rice Rye Sorghum Soybean Sunflower	10.5 months
All other rotational crops	18 months

*Other restrictions may apply, product label is pending registration

Dow AgroSciences

Technical Information

Resicore™ HERBICIDE

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

Soil Texture	Rate per acre (Quarts)* Soil organic matter content	
	Less than 3%	Greater than 3%
Coarse	2.25	2.50
Medium	2.50	2.75
Fine	2.75	3.00

*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

Dow AgroSciences

Resicore™
HERBICIDE

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