

What's New for Agronomic Weed Control: 2011

CORN

Corvus 2.63SC (Bayer CropScience) is a newer corn herbicide premix that includes a novel corn safener to reduce the potential of crop injury. Corvus contains two active ingredients: isoxaflutole (HPPD-inhibitor in Balance Flexx) and thiencazzone (ALS-inhibitor) plus the corn safener. This safener called cyprosulfamide safens corn both pre and post and is reported by Bayer to increase corn metabolism of isoxaflutole. Corvus is a pre or early post herbicide that has a broader weed control spectrum than Balance Flexx since it also contains thiencazzone which controls several grass and broadleaf weeds. Corvus can be applied either pre or early post (up to the V2 growth stage) at the typical rate of 5.6 fl oz/A. It will likely not provide adequate control of severe problem annual grasses (foxtails and panicum, etc.), so it is recommended that these herbicides be used in a planned pre followed by post program that include additional grass control. The addition of atrazine will also improve the weed control spectrum. Corvus can also be used to help with no-till burndown and provide some residual control of weeds including triazine-resistant species. Penn State research has looked at Corvus over the past few years and noted limited crop injury and good weed control. Corvus contains herbicides in WSSA groups 2 and 27 (see discussion below about WSSA herbicide groups).

Prequel 45WG (DuPont) contains two herbicide modes of action, isoxaflutole (Balance, HPPD-inhibitor) plus rimsulfuron (Resolve, ALS-inhibitor). This is a similar product to Corvus, but Prequel does not contain a safener and must be applied before corn emergence. It provides some burndown and residual control of common broadleaves and some grasses when applied at the labeled rate of 1.66 to 2.5 oz/A. At labeled rates, it will either need to be mixed with other herbicides to provide better grass control or requires a post herbicide program to control escaped weeds. It is primarily designed for use in two-pass programs in GMO corn. Prequel contains herbicides in WSSA groups 2 and 27.

TripleFlex 4.25L (Monsanto) is a premix identical to SureStart (Dow AgroSciences) for control of annual weeds and contains acetochlor (TopNotch), flumetsulam (Python), clopyralid (Stinger), and a corn safener. It can be applied from pre to the early post stage (11-inch tall corn) and is intended to be used with Roundup Ready or Liberty Link field or silage corn hybrids. When applied pre, it is designed to provide early season control of common annual grasses and broadleaf weeds to allow better timing of the in-crop application of glyphosate or glufosinate. The use rate on medium-texture soils ranges from 1.5 – 1.75 pints/A.

TripleFlex does not contain atrazine, so it provides a non-atrazine alternative for atrazine-sensitive areas. However, atrazine, glyphosate, 2,4-D, and other herbicides can be tank-mixed with TripleFlex to broaden the weed control spectrum. Make sure to plant corn 1 ½ inches deep and be cautious of interactions with certain OP insecticides that may cause crop injury. Wheat may be planted 4 months after application; alfalfa, soybeans, barley, oats, and rye can be planted the following spring; sorghum after 12 months. TripleFlex contains herbicides in WSSA groups 2, 4, and 15.

CORN and SOYBEAN

Kixor (BASF) is a new active ingredient called, saflufenacil, a PPO-inhibitor herbicide similar to Valor and Authority herbicides. Much of the interest in Kixor in our region has been focused on the potential burndown activity of saflufenacil for glyphosate resistant horseweed or marehail in no-till soybean and the opportunity to use a new mode of action (PPO) preemergence in corn. Relative to summer annual weeds, Kixor-powered products will provide burndown and residual activity on several broadleaf weeds including pigweed, lambsquarters, and nightshade. Kixor will not control grasses and the current labeled rates target small seeded broadleaves and shorter residual control. Additional herbicides may need to be tank-mixed with saflufenacil or applied post to control escaped weeds or to increase the control spectrum. BASF has developed prepackaged herbicide mixtures to supplement this need. These products will primarily be used as pre, "setup" herbicides since they typically will be used in a planned pre followed by post herbicide program. Although Kixor is a BASF trademark, saflufenacil products will include:

- **Sharpen** (saflufenacil alone) can be used in field corn, soybeans or small grains. The use rate in corn is 2 to 3 fl oz/A and in soybean it is 1 fl oz/A. Sharpen is a WSSA group 14 herbicide.
- **Verdict** (formerly Integrity) [saflufenacil + dimethenamid-P (Outlook)] can be used in corn and soybeans as a burndown/pre and this premix provides some annual broadleaf and grass residual activity but at the labeled rate, post herbicides will likely be necessary to control escapes. The typical medium-soil use rate is 13 fl oz/A for corn and 5 fl oz/A for soybean. The lower use rate in soybeans results in less residual activity. Verdict contains herbicides in WSSA groups 14 and 15.
- **Optill** [saflufenacil + imazethapyr (Pursuit)] is designed as a "setup" herbicide for use in soybeans but it will likely need to be followed by glyphosate or other post herbicides. The targeted use rate is 2 oz/A. Optill contains herbicides in WSSA groups 2 and 14.

Warrant 3CS (Monsanto) contains encapsulated acetochlor and is designed to be used postemergence in soybeans and corn to provide residual control of later-emerging annual weeds. It provides residual control of foxtails, panicum, crabgrass, lambsquarters, pigweed, smartweed, and black nightshade. Warrant does NOT control emerged weeds so it must be tank-mixed with glyphosate (RR soybeans or corn) or Ignite (LL soybeans or corn) to control existing weeds. The typical use rate is 1.5 qt/A. Warrant is a WSSA group 15 herbicide.

SOYBEAN

Authority XL 70WG (FMC) is a premix of sulfentrazone (Authority, PPO inhibitor) and chlorimuron (Classic, ALS-inhibitor) and is similar to the old Canopy XL. Authority XL contains a higher rate of sulfentrazone than Canopy XL, so it should provide improved residual control of horseweed and eastern black nightshade while also controlling lambsquarters, pigweed, mustards, velvetleaf, and ragweed. In a two-pass system, apply 3.2 oz/A (typical medium soil rate) followed by glyphosate (RR soybeans) or Ignite (LL soybeans) as an in-crop application. The typical medium soil rate for full season control is 6.5 oz/A. Authority XL can be applied in the fall or at soybean planting time as a preplant or preemergence treatment. Be cautious of crop rotation restrictions: in general, wheat- 4 months, field corn- 10 months, and alfalfa-12 months. Higher soil pH greatly increases recropping intervals. Authority XL contains herbicides in WSSA groups 2 and 14.

Ignite 280 2.34SL (Bayer CropScience), formerly known as Liberty, is a newer higher-load formulation of glufosinate. Ignite is a post, broadspectrum herbicide that controls many annual broadleaf and grassy weeds and provides some suppression to biennials and perennials. The typical use rate for Ignite is 22 to 29 fl oz/A; include ammonium sulfate (AMS) at 3 lb/A to the spray solution (use only 1.5 lb/A if temperatures are expected to exceed 85°F). Do not apply more than 44 fl oz total/A/season.

Keys to success with the LibertyLink soybean program include:

- **Start clean.** In no-till settings, a burndown program that kills all weeds before planting is essential. A pre application or a post application with a residual product may be required for broader spectrum and extended control in problematic fields. The use of soil residual herbicides before crop emergence can reduce the number of post applications required or provide a larger window for later season control.
- **Include residual herbicides.** Include an effective residual herbicide with the burndown followed by a timely post application of Ignite about 4 weeks after planting. Ignite can be slightly less effective on grasses than glyphosate such as yellow foxtail, shattercane, and

barnyardgrass, but is more effective on some of the broadleaf weeds such as annual morningglory, eastern black nightshade, and smartweed. In the program, is best to include residual herbicides such as, Authority MTZ, Boundary, Valor, Sonic, Prefix, Pursuit, Envive, Prowl, Outlook, Optill, Intro, among others. Dual Magnum, Reflex, and Warrant can be tank-mixed with Ignite and applied postemergence.

- **Use in glufosinate resistant soybeans.** Ignite can be used on all LibertyLink soybean varieties from emergence up to bloom stage and has some limited utility for burndown situations (i.e. horseweed). If Ignite is used in the burndown program, no in-crop application of Ignite is allowed.
- **Size matters.** Although weed size is important with glyphosate, is it more critical with Ignite and spray applications should be made when weeds are no more than 4 to 6 inches tall.
- **Uniform coverage necessary.** Since it is a contact herbicide, it is weaker than glyphosate on perennials and requires uniform spray coverage to achieve consistent weed control. Use a minimum spray volume of 15 gallons/A and nozzles that provide a uniform distribution of medium sized spray droplets.
- **Weather and timing impact effectiveness.** Warm temperatures, high humidity, and bright sunlight improve the performance of Ignite. Do not apply when heavy dew or mist/rain are evident. For more consistent lambsquarters and velvetleaf control apply between dawn and 2 hours before sunset (9 am to 6 pm is best).
- **No extended control.** Ignite does not have residual activity and will not control weeds not yet emerged.

In studies at Penn State and other universities, some occasional temporary crop injury was observed to soybean, however no yield reductions were observed. Currently, there are no soybean varieties that have stacked gene traits of glyphosate and Ignite. This will likely be a benefit when it does occur. Ignite and the LL system are marketed as an alternative to a Roundup Ready (glyphosate resistant) system. It allows rotating herbicide modes of action to reduce the potential of developing glyphosate resistance biotypes of weeds. Unfortunately for Bayer and glyphosate resistance management, current low cost glyphosate will likely limit the utility of Ignite and Liberty Link crops. Ignite is a WSSA group 10 herbicide.

SMALL GRAINS

Huskie 29.6L (Bayer CropScience) contains pyrasulfotole (an HPPD-inhibitor) plus bromoxynil (Buctril) and controls broadleaf weeds in wheat, barley, and triticale. Huskie controls common chickweed, wild buckwheat, mustards, prickly lettuce, lambsquarters, pigweed, smartweed, ragweed, and velvetleaf. Apply 11 oz/A (plus AMS or UAN) to the small grains between 1 leaf and up to flag leaf

emergence and to actively growing weed that have 1-4 leaves. Do not apply to crops undersown with legumes. Huskie can be tank-mixed with certain herbicides, insecticides and fungicides. In wheat, liquid nitrogen may be used as the carrier. Soybeans can be planted 4 months after application; alfalfa, corn, and potatoes after 9 months. Penn State researchers plan to test this product in wheat next spring. Huskie contains herbicides in WSSA groups 6 and 27.

PowerFlex 7.5WDG (Dow AgroSciences) is a new ALS-inhibitor herbicide that contains pyroxsulam. It controls annual ryegrass, downy brome and cheat plus a few annual broadleaves such as chickweed (non-ALS resistant), mustards, henbit, wild buckwheat, and hairy vetch. When targeting grassy weeds, fall applications seem to provide the best control. Apply 3.5 oz/A once wheat reaches the 3-leaf stage. PowerFlex has a favorable crop rotation timeframe. Soybeans can be planted after 3 months while other crops can be planted after 9 months. Penn State researchers have limited experience with this herbicide on weed control and crop injury potential in wheat. PowerFlex is a WSSA group 2 herbicide.

GRASS FORAGE

Paramount 75WG (BASF) contains quinclorac and can be applied in cool-season grass pastures or hay. Paramount is currently the only herbicide labeled that controls some annual grasses in grass forages. According to the label it has activity on foxtails, large crabgrass, and barnyardgrass as well as broadleaves such as lambsquarters, ragweed, velvetleaf, annual morningglory, dandelion, and field/hedge bindweed. Paramount can be applied in bromegrass, tall fescue, Kentucky bluegrass, orchardgrass, and ryegrass. It is also labeled for use on several warm-season grasses. The typical use rate is 3 to 8 oz/A plus necessary adjuvants. A waiting period of 7 days is required before cutting. Paramount will severely injure or kill clovers, alfalfa, and other legumes. Be cautious of crop rotation restrictions. Paramount is a WSSA group 4 herbicide.

PENDING PRODUCTS

Pyroxasulfone is an experimental herbicide (formerly coded as KIH-485) that is expected to be labeled in corn (all types), soybeans and wheat. It has annual grass activity similar to metolachlor (Dual) and acetochlor (Harness) but also provides good control of several annual broadleaves. The use rates are up to 8 times lower than Dual or Harness with comparable weed control. BASF will sell pyroxasulfone as **Zidua 85WG**, but will likely premix it with other active ingredients. Valent and FMC will also have some premixes. **Fierce 76WG** (Valent) contains pyroxasulfone plus flumioxazin (Valor SX) and will initially be labeled for burndown/residual use in field corn and soybeans.

Anticipate EPA approval by early to mid 2011 with full scale marketing of products by 2012. Penn State has evaluated pyroxasulfone for the past several years in corn and has noted very good weed control performance and crop safety.

Realm Q (DuPont) contains rimsulfuron (Resolve, ALS-inhibitor), mesotrione (Callisto, HPPD-inhibitor) and the corn safener (isoxadifen). DuPont claims this safener allows more flexibility to apply the herbicides across a diversity of application conditions. The safener does not totally eliminate potential crop injury, just lessens the impact. Realm Q will likely be applied at 4 oz/A and can be tank-mixed and applied post with glyphosate, Ignite, or included in other post herbicide programs to improve weed control spectrum. Realm Q contains herbicides in WSSA groups 2 and 27.

GENERICIS

More and more generic products are being sold due to patent expiration and licensing agreements. Some of the more commonly used generic products are those that strive to mimic Bicep and Harness products, Prowl, Cimarron, and Harmony. In most cases, generic herbicides cost less than name-brands. When looking to purchase generic alternatives, ask or search for the herbicide by its chemical name or active ingredient, for example, glyphosate, metolachlor, dicamba. Not all generics are equal to the original. Always read the label and be cautious of how it is formulated since it may not have equivalent amounts of active ingredients and therefore the quality and application rates may be different. Relative to quality, generic products may or may not be as sound as the original and there could be problems with mixing and compatibility with other pesticides. Some of the generics are not labeled for use on the same crops or allowed to be applied in certain situations. Watch out for offers that sound too good to be true or promise too much. In addition, most generics herbicides will not include product service or guarantees if weeds are not controlled or crop injury occurs. It is best to consider all factors such as product quality, rebates, warranties and not just price before purchasing a generic herbicide.

WSSA Herbicide Groups

As more weed species become resistant to herbicides, certain precautions such as tank-mixing, crop rotations, and a combination of weed management techniques, must be implemented to prevent resistance. Understanding herbicide modes of action is a key factor in this process. The Weed Science Society of America (WSSA) developed a grouping system to help with this process. Herbicides that are classified as the same group number kill weeds using the same mode of action. *Thus, it is best to select or combine herbicides that provide at least two different modes of action*

against the same weed. Group numbers can be found on many herbicide product labels and can be used as a tool to choose herbicides in different mode of action groups so mixtures or rotations of active ingredients can be planned to better manage weeds and reduce the potential for resistant weed species. A useful chart can be found at: <http://www.glyphosateweeds crops.org/Pubs.html>

Weeds in the news

In the Lancaster and Lebanon area it is reported that **common chickweed** is not being control by Harmony SG or Harmony Extra applications. Penn State is currently conducting studies to evaluate these populations and their surrounding circumstances to determine for certain if they are technically resistant. This was not totally unexpected since in some parts of Virginia and Maryland, populations of common chickweed have already developed resistance due to the long history of using Harmony products and other ALS herbicides in wheat; and we typically rely on these same products for weed control in wheat in our state. The populations in Virginia and Maryland are resistant to at least a 32X application rate of Harmony Extra and they are also cross resistant to herbicides like Pursuit and Raptor. We typically have observed that Harmony Extra (thifensulfuron + tribenuron) provides better control of common chickweed than Harmony (thifensulfuron). If resistant populations are indeed evident, alternatives are quite limited. Herbicides like 2,4-D and Banvel/Clarity have never been that effective on common chickweed and generally only provide about 60 to 70% control. The same is true for other herbicides typically used in small grains. Starane Ultra (Dow AgroSciences) has been suggested as an option. This product is being recommended and used in the Mid-Atlantic area for control of ALS-resistant chickweed and appears to have good crop safety. Also, Huskie (Bayer CropScience) lists control of common chickweed (including ALS-biotypes) but data are limited. Other control options such as Prowl H2O, Sencor, Valor, Axiom, and Sharpen have been examined but application timing and other restrictions are critical with these products. Other reasons for poor weed control also need to be considered such adequate spray volume, inclusion of proper spray additives, weed size at application time, and temperature and other environmental conditions. Be alert to the development of new resistant weed problems on your farm and adjust your herbicide programs accordingly.

Other News – Incoming Herbicide Resistant Crops

DHT is the acronym for Dow AgroSciences Herbicide Tolerance traits that will provide overall tolerance in corn and soybeans to 2,4-D and some of the post-grass herbicides like Assure and Fusilade. These traits also will be

stacked with glyphosate tolerant traits. Dow AgroSciences estimates launch timing for this technology at 2013 for corn and 2015 for soybeans.

Dicamba resistant soybeans are being developed by Monsanto and BASF to allow pre or post applications of dicamba (active ingredient in Clarity, Banvel, etc.) on soybeans. These varieties will likely be stacked with the Roundup Ready trait. Marketing of these soybean varieties is not expected until 2014 or later.

In general, there are some benefits and risks associated with DHT and dicamba-resistant technologies. Overall, we can expect to see better annual and perennial broadleaf weed control in soybeans. Also these traits will offer some protection from drift and spray tank contamination. However, off-site movement of 2,4-D and dicamba to sensitive non-target plants is of great concern. In a diverse landscape like Pennsylvania, this will be more of a concern than perhaps for our neighbors to the west. Over the next few years, we will see how these companies and universities devise ways to handle these issues.

Optimum GAT corn and soybean debut has been delayed. Optimum GAT confers resistance to glyphosate and ALS-inhibitor herbicides. DuPont and Pioneer have been working on this technology for the past several years, but no revised release date has been set.

Roundup Ready alfalfa is still under investigation. Despite the U.S. Supreme Court stopping the restriction that barred farmers from planting Roundup Ready alfalfa, the USDA still must complete an Environmental Impact Statement. Until all of these regulatory obstacles have been dealt with, RR alfalfa can not be sold or planted.

Prepared by:
Dwight Lingenfelter and William Curran
Department of Crop and Soil Sciences
Penn State University



Websites:

www.weeds.psu.edu

<http://cmeg.psu.edu/>

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