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2003 Weed Control Guidelines for Indiana: <http://www.btny.purdue.edu/Pubs/WS/WS-16/>

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### New Herbicides for Corn

*Guardsman Max* (dimethenamid-p 1.7 lb/gal + atrazine 3.3 lb/gal) from BASF will eventually replace Guardsman in the market. This product can be used EPP, PPI, PRE and POST on corn up to 8 inches tall. Guardsman Max contains the resolved isomer dimethenamid also found in Outlook. Use rate is 4 pt/A which provides 0.85 lb/A of dimethenamid-p and 1.65 lb/A of atrazine. Labeled in 2002.

*Guardsman Max Lite* (dimethenamid-p 2.25 lb/gal + atrazine 2.75 lb/gal) from BASF also contains the resolved isomer of dimethenamid and is loaded with less atrazine. This product can be used EPP, PPI, PRE and POST on corn up to 8 inches tall. This product is designed for use on sandy soils in N. Indiana and in the northern cornbelt states (MI, WI, MN). Labeled in 2002.

*Option* (foramsulfuron + safener) 35% WG from Bayer is a postemergence herbicide for control of grass weeds in field corn. It is not recommended for use on seed corn and not labeled for use on sweet or popcorn. It is an ALS inhibitor designed for use on grass weeds up to 3 inches tall (crabgrass up to 2 inches tall) and corn up to 16 inches or V5. Drop nozzles can be used on corn 16 to 35 inches tall. Use with MSO or ESO + UAN or AMS adjuvants. It can be used after the following soil insecticides: Regent, Aztec, Force, Lorsban 15G and tankmixed with Ambush, Asana, Pounce, and Warrior. Labeled in 2002.

*Equip* (foramsulfuron + iodosulfuron) from Bayer is another postemergence herbicide for corn. Equip is a premix of the grass control component of Option (foramsulfuron) plus iodosulfuron which provides some activity on broadleaf weeds. Use rates will range from 1.25 to 1.5 oz/A on corn up to 20 inches tall. Adjuvants required include MSO and AMS. Label expected 1<sup>st</sup> quarter of 2003.

*Keystone* (acetochlor 3 lb/gal + atrazine 2.25 lb/gal) from DowAgroSciences is another atrazine + grass herbicide premix. Labeled for use on field and seed corn EPP, PPI, PRE and POST up to 11 inch tall corn. Use rates are 2.4 to 3.4 qt/A which will provide 1.8 to 2.6 lb/A of acetochlor and 1.35 to 1.9 lb/A of atrazine.

*Keystone LA* (acetochlor + atrazine) from DowAgroSciences is a product similar to Keystone with a lower atrazine load. This product is designed for use on sandy soils in N. Indiana and in the northern cornbelt states (MI, WI, MN). Label expected in 2003.

There are now at least four products available that contain acetochlor + atrazine from basic chemical manufacturers. There is at least one product (Confidence, from Agrilience) available from a distributor. The following table shows the amount of acetochlor and atrazine present in each commercially available product available from basic chemical manufacturers.

Table 1. Acetochlor + atrazine products from basic chemical manufacturers labeled for use in corn.

Herbicide	Product Rate/A	Acetochlor	Atrazine
Keystone	2.67 qt	2 lb	1.5 lb ai
Fultime	3.75 qt	2.25 lb	1.5 lb ai
Degree Xtra	3.7 qt	2.5 lb	1.24 lb ai
Harness Xtra 5.6	2.4 qt	1.9 lb	1.5 lb ai

*Cinch*, *Cinch ATZ* and *Cinch ATZ Lite* are products Dupont has obtained from Syngenta and will be marketing under their trademark. *Cinch* is Dual II Magnum, *Cinch ATZ* is Bicep II Magnum, and *Cinch ATZ Lite* is Bicep II Magnum Lite

Yukon (halosulfuron + dicamba) from Monsanto is a postemergence herbicide for use on corn up to 36 inches tall. Use rates are 4 to 8 oz/A with 4 oz/A providing 2/3 oz/A of Permit and 4 oz/A of Banvel. Adjuvants required include either NIS or COC. Label granted in 2002.

*Lumax* (s-metolachlor 2.68 lb/gal + atrazine 1 lb/gal + mesotrione (0.27 lb/gal) from Syngenta is a product that can be used PPI, PRE, or POST on field, seed, or silage corn up to 5 inches tall. Use rates are 2.5 qt/A on soils with less than 3% organic matter and 3 qt/A on soils with greater than 3% organic matter. The 3 qt/A rate provides 2 pt/A of Dual II Magnum, 0.75 lb/A of atrazine and 6.4 oz/A of Callisto – 3 different modes of action. If the product is applied POST the use of NIS is recommended, but do not use COC, MSO or nitrogen solutions because of risk of crop injury. Warrior is the only insecticide mentioned as a tankmix partner on the label. Labeled in 2002.

*Camix* (s-metolachlor 2.68 lb/gal + mesotrione (0.27 lb/gal) from Syngenta is a product that can be used PPI, PRE, or POST on field or seed corn up to 5 inches tall. Use rates are 2.4 qt/A which provides 1.75 pt/A of Dual II Magnum and 6.3 oz/A of Callisto. This product will be available in limited quantities in MI, MN, PA, and WI. If the product is applied POST the use of NIS is recommended, but do not use COC, MSO or nitrogen solutions because of risk of crop injury. Do not use after Counter or Lorsban insecticide.

## **New Herbicides for Soybean**

*Phoenix* (lactofen) from Valent is a new formulation of Cobra with an adjuvant system designed for less crop response. Labeled in 2002.

*Valor* (flumioxazin) 51% WDG was labeled in 2002 for fall, EPP, and PRE applications in soybean. This product is a PPO inhibitor, similar to Authority/Spartan with good activity on small seeded broadleaf weeds such as pigweeds/waterhemp, lambsquarter, and annual nightshade species. Use rates are 2 to 3 oz/A. The label does not allow this product to be tankmixed with chloroacetamide herbicides (Lasso, Dual II Mag, Frontier, Define, Boundary) because the risk of crop response is enhanced. Labeled in 2002.

*Gangster* is a co-pack of Valor (flumioxazin) + FirstRate (cloransulam) co-marketed by Valent and DowAgroSciences. The addition of FirstRate adds activity on ragweeds, marestail, morningglories, velvetleaf and cocklebur to the activity of Valor. Registration expected 2<sup>nd</sup> quarter of 2003.

Glyphosate formulations. There are now over 30 formulations of glyphosate labeled for use in Roundup Ready crops in Indiana. Monsanto will introduce a product called Roundup Original II, which is a 3 lb ae/gal isopropylamine salt that does not contain the Transorb adjuvant package. Label allows the use of additional adjuvants. Monsanto will also be phasing out Roundup Ultramax and replacing it with Roundup Weathermax as their primary glyphosate product for Roundup Ready Soybeans. Roundup Weathermax is a potassium salt of glyphosate with 4.5 lb of acid equivalent (ae)/gal. Use rates of Roundup Weathermax will be 22 oz/A.

In Table 2, we have listed four of the major glyphosate brands available for use in Roundup Ready crops and their equivalent rates to obtain 0.38 or 0.75 lb ae/A. Most of the generic glyphosates are formulated as the isopropylamine salt with 3 lb of ae/gallon, similar to the Glyphomax products shown on the first line. It is important to keep in mind that each product may have unique adjuvant requirements. Here are examples of statements from labels of a few Monsanto glyphosate products:

- Roundup Weathermax – do not add additional surfactants
- Roundup Original II – additional surfactant optional
- Roundup Original – additional surfactant recommended
- Honcho Plus – additional surfactant optional
- Honcho – additional surfactant recommended

Table 2. Glyphosate salt and formulations of four major brands available for use on Roundup Ready soybean and corn.

Herbicide	Concentration	0.38 lb ae/A	0.75 lb ae/A
Glyphomax, etc (isopropylamine salt)	3 lb ae/gal	16 oz	32 oz
Touchdown IQ (diammonium salt)	3 lb ae/gal	16 oz	32 oz
Rup Ultramax (isopropylamine salt)	3.75 lb ae/gal	13 oz	26 oz
Rup Wmax	4.5 lb ae/gal	11 oz	21 oz

(potassium salt)

A great deal of time and effort is devoted to marketing the various glyphosate products. Many claims are made in reference to one product being superior to others. When used according to label directions we have observed very few differences in the activity of the various formulations on target weed species. Shown in Table 3 is the result of this years experiment at the Purdue University Agronomy Farm. Essentially no differences were observed between the six products evaluated in this trial.

Table 3. Weed control in soybean with various glyphosate formulations in Purdue University research in 2002.

Herbicide	Rate (oz/A)	Giant foxtail	Ivyleaf morningglory	Velvetleaf
Roundup WeatherMax	21 oz	96	84	96
Roundup UltraMax	26 oz	96	84	99
Touchdown IQ	32 oz	95	88	95
Glyphomax Plus	32 oz	96	84	98
Clearout 41 Plus	32 oz	96	83	92
LSD = 0.05		ns	ns	ns

### **New Herbicide for Alfalfa**

*Raptor* (imazamox) 1S has received federal approval for use on established alfalfa (2 trifoliate or more) in the fall, winter, or spring to dormant or semi dormant alfalfa or between cuttings (less than 3 inches of regrowth) in non-dormant alfalfa and in-season use on other edible legumes. The formulation of imazamox labeled for alfalfa will be called Raptor. Raptor controls a similar spectrum of weeds compared to Pursuit, with better activity on grasses and lambsquarter, but less soil residual activity. Pursuit will provide better soil residual activity. Use rates are 4 to 6 oz/A with COC (1% v/v) or NIS (0.25% v/v) + AMS (12-15 lbs/100 gallons).

### **New Herbicide for Wheat**

*Beyond* (also imazamox) 1S will be labeled for use on Clearfield (imidazolinone resistant) wheat. Beyond can be applied at 4 to 6 oz/A in the fall or spring from the 3<sup>rd</sup> leaf stage of wheat up until before jointing. NIS and AMS or UAN are the required spray additives. Beyond will control ryegrass, bromegrass and many winter annual weeds. Seed supply will be limited in 2003.

### **New Herbicide for Grass Pastures**

Dupont will introduce a product called *Cimmaron* 60 DF (metsulfuron) for broadleaf weed control in grass pastures. It is essentially the same product as Ally with no haying or grazing restrictions.

## **New Herbicide-Resistant Weeds**

Glyphosate-resistant marestail (horseweed) has been identified at two sites in Jackson county in southern Indiana. Glyphosate resistant marestail has also been identified in Ohio and Kentucky. A number of additional sites in Indiana have also reported difficulty in controlling this weed with glyphosate this past year. We will be doing some more work in the greenhouse to determine how well other herbicides control these suspect populations.