

## New Wheat Herbicides

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The winter wheat market has seen the introduction of several new herbicides in the last couple of years. Many of them are mixtures of two or more herbicides, often with two or more different modes of action. As herbicide resistance in weeds continues to expand, combining different modes of action can be an effective strategy to stave off further problems. The following are brief descriptions of these new winter wheat herbicides. Always be sure to read and follow label directions when using any of these products.

### BASF

#### *Clearmax™*

Clearmax herbicide is a co-pack of imazamox (Beyond® herbicide) and MCPA ester. Imazamox is an ALS inhibitor (Group 2) and MCPA is a synthetic auxin (Group 4). Clearmax herbicide should only be used with Clearfield wheat cultivars such as Above, Infinity CL, or Bond CL. These cultivars contain the gene or genes for tolerance to imazamox. Other wheat cultivars treated with Clearmax herbicide will be seriously injured or killed.

Due to the expense of Clearmax (\$17.80-\$22.25/A), it is primarily used to control troublesome winter annual grass weeds such as jointed goatgrass, downy brome, and feral rye. Control of these weeds is generally best with fall application. Tillering should be initiated in the wheat before applying the herbicide. Early spring applications can also be effective, if somewhat more inconsistent than fall applications; with the possible exception of feral rye, which is more difficult to control. Spring applications should be made prior to stem elongation (jointing) in the wheat. Clearmax will also provide very good control of most winter annual broadleaf weeds that may be present at the time of application, but most warm season weeds will not be present at the optimum application timing and will probably not be satisfactorily controlled with Clearmax.

In field studies conducted in the Nebraska Panhandle on feral rye, Clearmax provided similar to slightly better control of feral rye than Beyond herbicide. Clearmax also provided slightly better control of tumble mustard in one year when it was present with the rye (data not shown). In a 2006/2007 study conducted near Sidney, liquid fertilizer (32-0-0) was used at three rates (2.5, 25, and 50% v/v) with Beyond and Clearmax herbicides applied in the fall and spring. Herbicide treatments were applied in 10.9 gallons/acre of spray solution. The higher rates of fertilizer reduced feral rye control with Beyond, particularly the spring applications (Table 1). However, feral rye control with Clearmax was not reduced with increasing fertilizer rates. Crop injury was slightly greater with Clearmax than with Beyond.

In western Nebraska, Clearfield wheat, Clearfield sunflower, Clearfield canola, edible legumes or soybeans may be planted anytime after an application of Clearmax herbicide. Minimum recrop intervals for other common crops include: 3 months to alfalfa and non-Clearfield wheat; 4 months to rye; 8.5 months to corn (Clearfield or non-Clearfield); 9 months to barley, grain sorghum, millets, oats, and sunflowers; 18 months to barley and turnips; and 28 months to canola and sugarbeets.

Table 1. Effect of liquid fertilizer rate on the efficacy of Beyond and Clearmax herbicides for feral rye control.

Herbicide <sup>a</sup>	32-0-0	Timing	Crop injury	Feral rye control	Foreign material	Wheat yield <sup>b</sup>
	% v/v			%		bu/acre
Beyond	2.5	Fall	0	90	0.2	51
Clearmax	2.5	Fall	7	94	0.2	46
Beyond	25	Fall	0	83	0.8	50
Clearmax	25	Fall	3	92	0.1	53
Beyond	50	Fall	0	22	4.0	61
Clearmax	50	Fall	0	93	0.2	54
Beyond	2.5	Spring	0	73	3.4	55
Clearmax	2.5	Spring	2	88	0.8	60
Beyond	25	Spring	0	8	9.3	50
Clearmax	25	Spring	0	77	2.0	62
Beyond	50	Spring	0	0	9.6	48
Clearmax	50	Spring	0	77	2.4	58
Check	--		0	0	30.4	27
LSD (5%) <sup>c</sup>			2.4	8.6	6.4	15

<sup>a</sup> All herbicide treatments contained the equivalent of 5 oz/A of Beyond herbicide + 0.5% v/v of NIS.

<sup>b</sup> Wheat yield does not contain rye grain.

<sup>c</sup> We are 95% certain that treatment means in the same column that differ by at least the given amount are indeed due to treatment effects and not the result of random or uncontrolled variation.

## Bayer CropScience

### *Huskie*

Huskie herbicide is a premix containing pyrasulfotole and bromoxynil (Buctril) plus a crop safener. Pyrasulfotole is the first wheat herbicide that is an HPPD inhibitor (Group 27). Balance and Callisto are two corn herbicides with this site of action. Bromoxynil inhibits photosynthesis at photosystem II, site B (Group 6).

Huskie may be applied at rates ranging from 11 to 15 oz/A; however, effective control of many of the common broadleaf weeds found in winter wheat can be achieved with 11 to 13 oz/A of

Huskie plus 2,4-D or MCPA ester. The cost of Huskie herbicide (\$7.50-\$10.20/A) will probably limit its use to situations where ALS-resistant weeds are a concern. Good coverage is essential to good control, so apply Huskie in at least 10 gallons of water/A. Add ammonium sulfate at 0.5 to 1.0 lb/A and NIS at 0.25 to 0.5% v/v.

In a 2007 study conducted near Sidney, Huskie herbicide alone at the 15 oz/A rate, or at the 11 oz/A rate with MCPA, provided good to excellent control of kochia and Russian thistle (Table 2). Both weed species contained a significant population of ALS-resistant plants, as evidenced by the poor control provided by the Ally + 2,4-D ester treatment.

Table 2. Kochia and Russian thistle control with Huskie herbicide.

Treatment	Rate	Weed control	
		Kochia	Russian thistle
	oz product/A	%	
Huskie	11	72	95
NIS	0.5% v/v		
AMS	8		
Huskie	15	83	97
NIS	0.5% v/v		
AMS	8		
Huskie	11	92	97
MCPA ester	12		
NIS	0.5% v/v		
32-0-0	??		
Ally	0.1	43	67
2,4-D ester (6 lb)	5.3		
NIS	0.5% v/v		
Check		0	0
LSD (5%) <sup>a</sup>		16	23

<sup>a</sup> We are 95% certain that treatment means in the same column that differ by at least the given amount are indeed due to treatment effects and not the result of random or uncontrolled variation.

Recrop intervals include: 7 days to wheat, barley, oats, rye, and triticale; 4 months to grain sorghum, millet, and soybean; and 9 months to alfalfa, canola, chickpeas, corn, dry beans, field peas, lentils, potatoes, safflower, sunflowers, and sugarbeets.

## **Dow**

### *Cleanwave™*

Cleanwave herbicide is a premix of aminopyralid (Milestone™) and fluroxypyr (Starane™). Aminopyralid and fluroxypyr are both synthetic auxins (Group 4). Apply Cleanwave at the rate of 14 oz/A. For best control, apply in at least 10 gallons of water/A.

Although fluroxypyr is very safe to wheat, aminopyralid can cause injury similar to dicamba or 2,4-D if applied after wheat stem elongation (jointing) or under adverse climate conditions. The aminopyralid in Cleanwave broadens the range of weeds controlled by fluroxypyr alone. In field studies conducted in 2006 near Sidney, Cleanwave provided very good control of wild buckwheat. Cleanwave may be best suited for fields where kochia and/or wild buckwheat are the main weeds of concern. Cleanwave is very effective on ALS- and dicamba-resistant kochia. Cleanwave is weak on mustard species, pigweed species, and Russian thistle and should be tank mixed with 2,4-D or a sulfonyleurea herbicide such as Ally or Express to help with the control of these weeds.

Recrop intervals include: anytime to grasses and wheat; 4 months to barley, corn, millet, oats, rye, or triticale; 9 months to canola (rapeseed); and 18 months to alfalfa, chickpea, dry bean, field pea, lentil, potato, safflower, soybean, sugarbeet, or sunflower.

### *PowerFlex*

PowerFlex herbicide had not received EPA registration at the time of this writing (1/16/08). Registration was expected in time for sales in fall of 2008. PowerFlex contains pyroxsulam and a crop safener. Pyroxsulam is a new sulfonamide herbicide that inhibits the ALS enzyme (Group 2) and will be used to control common grass and broadleaf weeds in winter wheat. Other herbicides in this class include Maverick®, Olympus™, and Olympus Flex™. In studies conducted in Colorado and Kansas, PowerFlex has provided good control of *Bromus* species (downy brome, Japanese brome, and cheat) as well as many of the common winter annual broadleaf weeds. PowerFlex has a shorter soil residual than Maverick, Olympus, or Olympus Flex, which will allow greater rotational flexibility. Expected rotational intervals are nine months or less to most crops of interest to Nebraska growers.

### *Starane® NXT*

Starane NXT herbicide is a premix of fluroxypyr (Starane) plus bromoxynil (Buctril®). Fluroxypyr is a synthetic auxin (Group 4) and bromoxynil inhibits photosynthesis at photosystem II, site B (Group 6).

Starane NXT poses little risk for crop injury and the window of application extends from three-leaf wheat to flag leaf emergence. Starane NXT provides excellent control of kochia, including ALS- and dicamba-resistant kochia. It also works very well on puncturevine and common purslane. Good plant coverage is essential for best control, so use with at least 10 gallons of water/A. Best control is achieved with small weeds up to 4" tall or a 2" rosette. Apply Starane NXT at a rate of 14 to 21 oz/A. Recrop intervals include: 30 days to wheat, barley, and oats; all other crops can be planted 120 days after application.

### *WideMatch™*

WideMatch herbicide is a premix of clopyralid (Stinger®) and fluroxypyr (Starane). Both

herbicides are synthetic auxins (Group 4). The primary use of WideMatch in winter wheat is the control of Canada thistle. The window of application for WideMatch is greater than the window of application for Curtail<sup>®</sup> (clopyralid plus 2,4-D amine). WideMatch can be applied to winter wheat from three-leaf wheat to flag leaf emergence, while Curtail should be applied from the time of wheat tillering up to wheat stem elongation (jointing). Canada thistle plants may not all be emerged by the time wheat starts to joint. Therefore, WideMatch may have a better fit for Canada thistle control in winter wheat grown in western Nebraska. Curtail will control a wider range of broadleaf weeds than WideMatch, but if Canada thistle is the main weed of interest, WideMatch is often the better choice of the two herbicides. Apply WideMatch herbicide at the rate of 1.33 pt/A.

Recrop intervals include: anytime to barley, grasses, field corn, oats, sweet corn, and wheat; 120 days for canola, sugarbeets, and turnips; 10.5 months for alfalfa, dry beans, field peas, grain sorghum, safflower, sunflower, and soybeans; and 18 months to chickpeas, lentils, and potatoes.

## **DuPont**

### *Affinity<sup>™</sup> BroadSpec*

Affinity BroadSpec herbicide is a premix of thifensulfuron (Harmony<sup>®</sup>) and tribenuron (Express<sup>®</sup>). Both are inhibitors of the ALS enzyme (Group 2). Affinity BroadSpec has equal parts of both chemicals, while Harmony Extra<sup>®</sup> has twice as much thifensulfuron as tribenuron. Like Harmony Extra and Express, Affinity BroadSpec will primarily be used for situations where a grower wants to leave their crop rotation options open, for example, irrigated production. Recrop intervals include: anytime to wheat and barley; 45 days to any other crop other than sugarbeets, winter rape, or canola. These more sensitive crops can be planted after 60 days.

Apply Affinity BroadSpec to wheat from the two-leaf stage to before flag leaf emergence at the rate of 0.4 to 1.0 oz/A. Add another labeled herbicide, such as 2,4-D, if using between 0.4 and 0.6 oz/A. Add NIS at a rate of 0.06 to 0.5% v/v.

### *Agility<sup>™</sup> SG*

Agility SG herbicide is a premix of three sulfonylurea herbicides [thifensulfuron (Harmony), tribenuron (Express), and metsulfuron (Ally<sup>®</sup>)] plus dicamba (Banvel<sup>®</sup>). The sulfonylurea herbicides are all inhibitors of the ALS enzyme (Group 2) and dicamba is a synthetic auxin (Group 4). Apply Agility SG herbicide at a rate of 2.4 to 3.2 oz/A from the two-leaf stage of wheat to before wheat stem elongation (jointing). Add 2,4-D to broaden the range of weeds controlled including mustards, kochia, and Russian thistle. Add NIS at a rate of 0.125 to 0.5% v/v. The metsulfuron in Agility SG herbicide provides up to five weeks of residual control of susceptible weeds and the dicamba provides control of sulfonylurea-resistant weeds such as kochia, prickly lettuce, and Russian thistle.

Recrop intervals include: 1 month to wheat and triticale; 4 months to STS soybeans, IR corn, proso millet, and grain sorghum; 10 months to barley or oats; 12 months to corn east of the Panhandle; and 22 months to soybeans.

### *Ally<sup>®</sup> Extra*

Ally Extra herbicide is a premix of thifensulfuron (Harmony), tribenuron (Express), and metsulfuron (Ally XP). All three are inhibitors of the ALS enzyme (Group 2). Apply Ally Extra at a rate of 0.2 to 0.4 oz/A. Ally Extra provides weed control similar to Ally XP, but it has a shorter soil residual, which allows for shorter recrop intervals. This is most relevant for proso millet and grain sorghum, which can be planted four months after application of Ally Extra vs. 10 months after Ally XP. Ally Extra fits the niche for those who want a little more soil residual than Express or Affinity BroadSpec can provide, but not as much as Ally provides. Ally Extra can be applied from the 2-leaf stage of wheat until the flag leaf appears. Add NIS at a rate of 0.125 to 0.5% v/v.

Recrop intervals include: 1 month to wheat and triticale; 4 months to STS soybean, IR corn, proso millet, and grain sorghum; 10 months to barley and oats; 12 months to corn grown east of the Panhandle; and 22 months to soybean grown east of the Panhandle and safflower.

## **FMC**

### *Aim*<sup>®</sup>

The active ingredient in Aim herbicide is carfentrazone. Carfentrazone is a protox inhibitor (Group 14). It is the only wheat herbicide with this mode of action. Aim herbicide may be applied to wheat from prior to planting up to leaf stem elongation (jointing). It can be applied at rates from 0.5 to 2.0 oz/A. It is best used at rates from 0.5 to 1.0 oz/A with 2,4-D. Aim herbicide will cause leaf spotting on emerged leaves, but the plants quickly outgrow the injury. Adding Aim herbicide to 2,4-D improves control of weeds like lambsquarters, mustards, kochia, Russian thistle, and wild buckwheat. Aim is a contact herbicide so good plant coverage is essential to good weed control. Apply in at least 10 gallons of water/A. There are no crop rotation restrictions following the use of Aim herbicide.