

# TIMING OF FALL-APPLIED TREATMENTS FOR ITALIAN RYEGRASS CONTROL IN CONVENTIONAL AND CLEARFIELD WHEAT VARIETIES (UKREC 2002-2003)

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## INTRODUCTION:

The size of plants and emergence patterns are two critical factors affecting season - long control of Italian ryegrass in wheat. The importance of application timing may be more important for some herbicides compared with other products.

The objective of this research was to evaluate impact of various herbicides on Italian ryegrass control and wheat yield when applied in the fall prior to and after tiller initiation of ryegrass.

## METHODS:

Studies were conducted at UKREC near Princeton, KY. Pioneer 2552 and an experimental Clearfield wheat variety were planted in separate blocks in a conventional tilled seed bed on October 18, 2002.

Information on the herbicides included in these studies is listed in Table 1.

Achieve, Everest, and Hoelon are currently registered for ryegrass control; whereas, Axiom, Beyond, Discover, Prowl, and Osprey are not approved for use in wheat in Kentucky.

The timings of treatments were as follows:

- Early Post (EP) on 11/13/02
  - Wheat 3 leaves and 3 inches
  - Ryegrass 2 leaves and 2 inches
- Mid Post (MP) on 12/14/02
  - Wheat 2 tillers and 3 inches
  - Ryegrass 1 tiller and 2 inches

Additional information on methods used in these studies is included with data tables 2 and 3.

Table 1. Grass Herbicides Used in These Studies		
Product	Active Ingredient	Mode of Action
Achieve 40 DG	tralkoxydim	Accase inhibitor
Axiom 68 DF	flufenacet + metribuzin	Accase inhibitor + Photosynthesis inhibitor
Beyond 1S	imazamox	ALS inhibitor
Discover 2 EC	clodinafop-propargyl	Accase inhibitor
Everest 70 DG	flucarbazone	ALS inhibitor
Hoelon 3 EC	diclofop-methyl	Accase inhibitor
Osprey*	mesosulfuron	ALS inhibitor
Prowl	pendimethalin	Cell division inhibitor
* The formulation of Osprey in this study was AEF-13006000 75WG. The safener AEF 10789200 (mefenpyr-diethyl) was included with all Osprey treatments.		

## RESULTS: Pioneer 2552 Study (Table 2)

Herbicide treatments in this study included Achieve at 9.5 oz/A, Discover at 4 oz/A, Hoelon at 2 pt/A, Osprey at 0.29 oz/A applied alone and Everest at 0.61 oz/A applied as a tank mix partner or as a sequential spray with Axiom at 10 oz/A.

Italian ryegrass control on 3/23 ranged from 87 to 100% for all treatments in this study. Regardless of timing of application, Italian ryegrass control with most herbicides tended to decline between visual ratings made on 3/23 and 5/29. The cool conditions were favorable for regrowth of ryegrass. By late May control ranged from 77 to 98%.

The sequential treatment of Axiom followed by Everest at EP or MP provided at least 96% ryegrass control throughout the spring and had fewer seedheads compared with most other herbicide treatments.

Achieve was the only herbicide where ryegrass control was reduced by delaying application from EP to MP. Achieve provided 87% ryegrass control when applied as an EP treatment compared with 77% when applied as a MP treatment. Ryegrass control with the other herbicide treatments ranged from 80 to 98%.

The yields for the herbicide treatments were not statistically different but were variable and ranged from 79.8 to 102.7 bu/A. Due to the heavy ryegrass pressure the yield of the non-treated check was only 23.9 bu/A.

### **RESULTS: Clearfield Wheat Study (Table3)**

The main herbicide in this study was Beyond. It is an imidazolinone herbicide that can injure conventional wheat varieties. In order to insure crop safety, Beyond must be applied only to wheat varieties having the Clearfield or imidazolinone tolerant trait.

Herbicide treatments in this study included Beyond applied alone at 4 or 5 oz/A or Beyond applied at 4 oz/A rate in tank mix combination with either Clarity at 4 oz/A or Harmony Extra at 0.3 oz/A. Prowl was applied alone at 2.4 pt/A or at 2.4 pt/A or 4.8 pt/A in combination with Beyond at 4 oz/A.

Timing of application did not affect on ryegrass control with Beyond. Ryegrass control ranged from 70 to 80% where Beyond applied alone at either 4 or 5 oz/A. Clarity tended to reduce ryegrass control with Beyond, especially at the EP treatment. There was a slight decrease (i.e. 3 to 7%) in ryegrass control by including Harmony Extra with Beyond compared with Beyond alone; however, the difference was not statistically different.

Ryegrass control was at least 92% where Prowl was included with Beyond and applied as an EP treatment. Prowl applied alone provided only 57% ryegrass control.

The timing of application of Beyond applied alone did not affect the yield of the experimental Clearfield wheat variety but was but was variable and ranged from 51.5 to 72.9 bu/A. Wheat yield was greatest where Beyond was applied in combination with Prowl.

### **SUMMARY:**

Based on results in these experiments, application timing in the fall generally did not affect ryegrass control or wheat yield. However there were a few exceptions.

The impact of timing on ryegrass control was more critical with Achieve than with Beyond, Discover, Hoelon, or Osprey. Achieve was more effective in controlling ryegrass when it was applied to 2-leaf plants than plants in the 1-tiller stage.

There were mixed results by using tank- mix combinations. The tank mixture of Clarity plus Beyond had less ryegrass control when applied to 2 - leaf ryegrass compared with Beyond alone. The treatments of Everest plus Axiom or Beyond plus Prowl applied to 2 - leaf ryegrass provided superior season-long ryegrass control relative to most other herbicides applied alone.

Wheat yield was generally not affected by application timing where herbicides were applied alone in the fall. However it is worth noting that wheat yield with Beyond applied to 1- tillered ryegrass was greater where the herbicide rate was 5 oz/A compared with the 4 oz/A rate. A substantial increase in wheat yield occurred where Prowl was included with Beyond and applied to 2- leaf ryegrass.

The low wheat yield in the ryegrass infested plots confirmed the importance of controlling this problem weed.

**TABLE 2. EFFECT OF TIMING OF APPLICATION ON ITALIAN RYEGRASS CONTROL IN PIONEER 2552 WHEAT**

Chemicals	Rate	Timing	Ryegrass				Wheat Yield Bu/A
			Control %			Seedheads/Ft <sup>2</sup> 5/29/2003	
			3/23/2003	4/19/2003	5/29/2003		
Achieve Supercharge	9.5 oz/A 0.005	EP EP	95	93	87	5	86.0
Achieve Supercharge	9.5 oz/A 0.50%	MP MP	87	83	77	6	79.8
Discover DSV Adjuvant	4 oz/A 12.8 oz/A	EP EP	98	96	87	4	92.7
Discover DSV Adjuvant	4 oz/A 12.8 oz/A	MP MP	98	98	88	3	96.8
Osprey Destiny Liquid N 28%	0.29 oz/A 1.5 pt/A 2 qt/A	EP EP EP	92	90	80	8	83.7
Osprey Destiny Liquid N 28%	0.29 oz/A 1.5 pt/A 2 qt/A	MP MP MP	87	90	83	5	89.4
Hoelon	2 pt/A	EP	96	93	86	4	95.1
Hoelon	2 pt/A	MP	99	99	92	3	92.3
Axiom Everest Activator 90	10 oz/A 0.61 oz/A 0.25%	EP EP EP	100	98	96	1	98.0
Axiom Everest Activator 90	10 oz/A 0.61 oz/A 0.25%	EP MP MP	98	98	98	1	102.7
Non-treated Check			0	0	0	17	23.9
LSD (0.05)			6	8	10	4	23.9

Wheat planted: 10-18-02      Wheat variety: Pioneer 2552      Stand = 34 plants/Sq Ft

Italian ryegrass density on 11-13-02: 100 tillers/Sq Ft      100 Tillers/Sq Ft

<u>Application Timing</u>	<u>Date</u>	<u>Wheat</u>	<u>Ryegrass</u>
Early Post (EP) Inches	11/13/2002	3 Leaf    3 Inches	2 Leaf    2

Oct 18, 2002      Overseeded area with ryegrass (40 lb/A) to insure uniform ryegrass pressure  
 Oct 18, 2002      Applied glyphosate to kill any emerged ryegrass that was not completely killed with tillage  
 Oct 18, 2002      Planted Pioneer 2552 Wheat (Conventional Tillage with 33 viable seed per square foot)  
 Nov 21, 2002      Applied Warrior (3.5 oz/A)  
 Mar 3, 2003      Applied Nitrogen (35 units/A)  
 Mar 12, 2003      Applied Warrior (3.5 oz/A)  
 Mar 24, 2003      Applied Nitrogen (60 units/A)  
 May 3, 2003      Applied Headline (9 oz/A)  
 June 20, 2003      Harvested wheat with plot combine

**TABLE 3. EFFECT OF TIMING OF APPLICATION ON ITALIAN RYEGRASS CONTROL IN CLEARFIELD WHEAT (UKREC 2003)**

Chemicals	Rate	Timing	Ryegrass				Wheat Yield (Bu/A) (6/20/2003)
			Control (%)			Density (Seedheads/Ft <sup>2</sup> )	
			(3/23/2003)	(4/19/2003)	(5/29/2003)	(5/29/2003)	
Beyond Crop Oil Conc.	4 oz/A 1% v/v	EP	77	80	80	7	59.3
Beyond Crop Oil Conc.	5 oz/A 1% v/v	EP	80	80	70	11	65.8
Beyond Clarity Crop Oil Conc.	4 oz/A 4 oz/A 1% v/v	EP	53	60	57	13	44.8
Beyond Harmony Extra Crop Oil Conc.	4 oz/A 0.3 oz/A 1% v/v	EP	77	73	77	8	66.8
Beyond Crop Oil Conc.	4 oz/A 1% v/v	MP	77	72	73	11	51.5
Beyond Crop Oil Conc.	5 oz/A 1% v/v	MP	85	80	80	6	72.9
Beyond Clarity Crop Oil Conc.	4 oz/A 4 oz/A 1% v/v	MP	63	60	67	11	54.6
Beyond Harmony Extra Crop Oil Conc.	4 oz/A 0.3 oz/A 1% v/v	MP	70	67	73	9	54.6
Beyond Prowl Crop Oil Conc.	4 oz/A 2.4 pt/A 1% v/v	EP	100	95	92	4	84.2
Beyond Prowl Crop Oil Conc.	4 oz/A 4.8 pt/A 1% v/v	EP	97	98	95	1	86.3
Prowl	2.4 pt/A	EP	60	37	57	13	43
Nontreated Check			0	0	0	19	20.9
LSD (0.05)			17	21	14	7	16.2

Wheat planted 10-18-02      Wheat stand 31 plants / ft<sup>2</sup>

Italian ryegrass density 98 tillers / ft<sup>2</sup>

<u>Application Timing</u>	<u>Date</u>	<u>Wheat</u>		<u>Italian</u>	
<u>Ryegrass</u>					
Early Post (EP)	11/13/2003	3 Leaves	3 Inches	2 Leaves	2

Oct 18, 2002 Overseeded area with ryegrass (40 lb/A) to insure uniform ryegrass pressure  
 Oct 18, 2002 Applied glyphosate to kill any emerged ryegrass that was not completely killed with tillage  
 Oct 18, 2002 Planted Pioneer: Clearfield wheat (conventional tillage)  
 Nov 21, 2002 Applied Warrior (3.5 oz/A)  
 Mar 3, 2003 Applied Nitrogen (35 units/A)  
 Mar 12, 2003 Applied Warrior (3.5 oz/A)  
 Mar 24, 2003 Applied Nitrogen (60 units/A)  
 May 3, 2003 Applied Headline (9 oz/A)  
 June 20, 2003 Harvested wheat with plot combine