APPLICATION TIMING FOR ITALIAN RYEGRASS CONTROL IN CONVENTIONAL AND NO-TILL WHEAT

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Introduction:

Plant size and emergence pattern of Italian ryegrass are major factors that influence control of this problem weed in wheat. Ideally ryegrass should be small and most plants emerged before applying a postemergence herbicide.

Because of the increased interest in using no-tillage practices in wheat, research was conducted to determine if tillage system impacts ryegrass growth and control when a postemergence herbicide is applied in the fall or spring.

Research methods and materials are summarized in Table 1.

Results:

Table 2 shows the percentage of ryegrass plants ranging from one leaf to two tillers compared with plants that exceeded two tillers at the time of application. Data were grouped in these two categories because the maximum stage of growth of ryegrass is two tillers for such herbicides as Axial, Finesse Grass & Broadleaf, Hoelon, and Osprey.

All ryegrass plants in both tillage systems were within the label growth stage when Osprey was applied in mid November. Delaying applications until mid December resulted in 94 and 83% of plants being within the label stage for conventional and no-tilled systems, respectively. Applying Osprey in mid March resulted in 60 and 73% of ryegrass being within the label for conventional and no-tillage systems, respectively.

Based on statistical analysis, density of ryegrass did not vary due to tillage system or application timing. However, ryegrass density tended to be greatest for the November timing and least for the mid December timing. Data from last year's study indicated that ryegrass density peaked in late December and declined by mid April (data not shown).

The percent ground cover occupied by ryegrass was not affected by tillage system, but nearly doubled between mid November and mid March application times (Table 2).

Ryegrass control at the end of the season exceeded 90% for all treatments regardless of tillage system or application timing (Table 3). Control was not affected by tillage system except for a small difference in the late season ratings where control was 91% in conventional tillage and 96% in no-tillage. The control ratings during the first six weeks after application indicated herbicide activity was slower for the mid December timing than the mid November or mid March timings (Table 3). The cooler temperatures during and after mid December slowed Osprey's activity but did

not limit the final control at the end of the season.

Only a few scattered ryegrass seedheads were observed in any of the Osprey treated plots and ranged from 0.1 to 0.9 heads/ft^2. Neither tillage system nor application timing affected the number of escapes of seedheads.

Significant wheat injury in the form of stunted and chlorotic plants was observed only with the mid March timing. Wheat injury was observed soon after the March treatment and remained up through maturity. This injury was attributed to topdressing liquid nitrogen near the mid March application timing of Osprey. The label cautions against topdressing nitrogen within 14 days of Osprey applications.

Wheat yields in treated plots exceeded 100 bu/A and were not impacted by tillage system (Table 3). However, the yield for the spring application timing tended to be less compared with the mid November and December timings. The Osprey injury associated with the spring application timing may have contributed to the lower yields.

Summary

Results of this year's research indicated ryegrass plants were within the label growth stage when treatments were made mid November. However 6 to 17 percent of ryegrass plants exceeded the label growth stage when treatments were delayed until mid December, compared to 27 to 40 percent for applications made in mid March. Ryegrass growth was essentially the same regardless of tillage system for both fall application timings; however, when application was delayed until mid March, the conventional tillage system had a larger portion of the population that exceeded the label growth stage than the no-till system. Tillage system generally did not influence late-season ryegrass control, except where no-till had slightly better control than conventional tillage for the mid November application.

Wheat yields were not affected by tillage system. However, the trend for lower yield for the mid March application timing was believed to be attributed to the Osprey injury when nitrogen was topdressed a day before the herbicide.

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Table 1. Research Methods and Materials
Field History: No-till corn that was infested with ryegrass in 2007. Ryegrass was also overseeded with drill prior to planting to ensure uniform infestation.
Experimental Design: Randomized Complete Block with 4 reps. Plot size 10' by 28'
Application Equipment: CO_2 Back pack; 8003 flat fan tips; 20 GPA spray volume
Osprey 4.75 oz/A + NIS 0.5% + Liquid N 28% 2 qt/A Application timing: Mid Nov: 11-16-07 Wheat 3-4 leaves Mid Dec: 12-13-07 Wheat 2-3 tillers Mid Mar: 3-11-08 Wheat 3 tillers
Tillage Treatments: CT = Conventional Tillage: Two passes with disc on 10-15-07 NT = No-Tillage: Touchdown 2.2 pt/A 10-15-07
Planted wheat 10-15-07 Variety: Pioneer 25R54 Seed rate: 35 viable seed/ft^2.
Visual control ratings and percent ground cover ratings were made at 2, 4, and 6 weeks after treatment and late season on 6-05-07.
Ryegrass plants were sampled with a 2-inch core at four random sites in check plots for both tillage systems and were used for staging plants and estimating density at each application timing.
[4] Ryegrass seedheads counted at two random locations per plot on 06-11-08.
Nitrogen and Pest Management Nitrogen: 41 units/A on 3-10-08 and 80 units /A on 4-2-08. *(Because of wet weather, the initial split of nitrogen had to be delayed until the day prior to Osprey. This delay resulted in significant crop injury from the interaction of nitrogen and Osprey.)* Warrior 3 oz/A: 11-16-07 and 3-24-08 Tilt 4 oz/A: 4-3-08

Table 2. Italian Ryegrass Growth Stage, Density, and Ground Cover At The Time of Osprey Application Nov 16, Dec 13, and Mar 11 in Tilled and No-Tilled Wheat (UKREC 2007-2008)

Osprey Timing	Tillage System [1]	Growth Stage [2]		Density [3] (Plants/Ft$^{2)}$	Ground Cover [4] (%)
		≤ 2 Tillers (% of Population)	>2Tillers (% of Population)		
Mid Nov	CT	100	0	204	43
	NT	100	0	234	35
Mid Dec	CT	94	6	95	56
	NT	83	17	89	65
Mid Mar	CT	60	40	109	77
	NT	73	27	123	76
LSD (0.05)		13	13	NS	20

[1] CT – Conventional tillage, NT = No-tillage
[2] Ryegrass plants collected at random in four 2" cores and grouped in two growth stage categories (up through 2 tillers and greater than 2 tillers)
[3] Density based on plants collected at random in four 2" cores.
[4] Ground cover estimated visually and based on percent ground cover occupied by ryegrass in row middles.

Table 3. Effect of Timing of Osprey and Wheat Tillage System on Italian Ryegrass Control, & Head Counts, and Wheat Injury & Yield (UKREC 2007-2008)

Osprey Timing	Tillage System [1]	Ryegrass					Wheat	
		Control (%) [2]				Head Count (Heads/Ft^2)[3]		
		2 WAT	4 WAT	6 WAT	Late Season		Injury [4] (%)	Yield (Bu/A)
Mid Nov	CT	13	55	90	91	0.9	0	117.4
	NT	15	53	88	96	0.3	0	123.0
Mid Dec	CT	13	23	70	96	0.1	0	111.1
	NT	10	20	73	96	0.9	0	118.1
Mid Mar	CT	23	70	95	98	0.3	15	104.4
	NT	23	68	98	99	0.3	15	100.6
Non-treated Check	CT	0	0	0	0	19.6	0	41.9
	NT	0	0	0	0	17.6	0	50.5
LSD (0.05)		6	11	9	3	4	4	14.2

[1] CT – Conventional Tillage, NT = No-Tillage
[2] Control evaluated at 2, 4, 6, Weeks After Treatment (WAT) and late season on June 7, 2008.
[3] Head Counts made June 11, 2008.
[4] Wheat injury evaluated May 8, 2008.