# APPLICATION TIMING FOR ITALIAN RYEGRASS CONTROL IN CONVENTIONAL AND NO-TILL WHEAT (2008-2009)

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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 over a three-year period to determine if tillage system impacts ryegrass growth and control when a postemergence herbicide is applied in the fall or spring. Data for the first two years of research are included in the Wheat Science Research Reports for 2006-2007 and 2007-2008. The third study was conducted during the 2008-2009 growing season and its results are discussed in this report.

Research methods and materials for the third study are summarized in Table 1.

## RESULTS

Table 2 shows the percentage of ryegrass plants that exceeded two tillers at the time of application. Data were grouped in this category 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 Axial XL was applied in mid-November. Delaying applications until mid-December resulted in 6.7 and 3.7% of plants exceeding the labeled stage for conventional and no-tilled systems, respectively. Applying Axial XL in mid-March resulted in 30.8 and 13.3% of ryegrass plants exceeding the labeled growth stage for conventional and no-tillage systems, respectively.

Based on statistical analysis, density of ryegrass was greater for no-till than for conventional till systems for the fall timings, but did not vary for the spring application. Delaying treatment until mid-December tended to allow time for additional ryegrass plants to emerge, particularly for the no-tillage system. Ryegrass densities tended to decline during the winter and were 137 plants/$ft^2$ in conventional till and 118 plants/$ft^2$ in no-till on March 16.

The percent ground cover occupied by ryegrass was not affected by tillage system or application timing (Table 2). The maximum ground cover for conventional till was 75% in mid-December and 81% for no-till in mid-March.

Based on visual control ratings at 2 and 4 WAT, ryegrass control was slower with the fall treatments than the spring treatments

(Table 3). There were no differences in ryegrass control due to tillage system. Control at the end of the season was at least 95% for all treatments, except for 88% for treatment made in mid-December in no-till. The cooler temperatures during and after mid-December slowed Axial's activity, but did not limit the final control at the end of the season.

The number of seedheads observed at the end of the season tended to be greater when the treatments were applied in mid-December for no-till (Table 3).

Study 3 had mixed populations of weeds in addition to ryegrass. Henbit, little barley and a Brome species occurred in scattered portions of the study and were not effectively controlled with Axial XL. The competition from scattered populations of these weeds is one reason wheat yields were highly variable. Also, vole damage in portions of the field contributed to the variability of wheat yields in study 3. Wheat yields for the herbicide treated plots ranged from 98.3 to 112.1 bu/A and were statistically similar. There was a slight trend for higher wheat yield in the fall treated plots compared with the spring treated plots, yet these differences were not statistically significant.

**SUMMARY**

Results of this year's research indicated ryegrass plants were within the label growth stage when treatments were made mid-November. However, delaying treatment until mid-December resulted in 6.7 and 3.7 percent of ryegrass plants exceeding the label growth stage for conventional and no-till, respectively. As much as 30.8 percent of ryegrass plants exceeded the labeled growth stage when the postemergence treatment was applied in mid-March for conventional till compared with 13.3 percent for no-till.

A significant portion of the ground cover or biomass of ryegrass was achieved by mid-November and increased only slightly as the season progressed. However, based on plant counts, ryegrass densities tended to decline over the winter.

Although herbicide activity tended to be slower with the fall treatments compared with the spring treatments, control at the end of the season was at least 95% for most treatments except for 88% when the treatment was applied in mid-December in no-till plots.

Wheat yields were statistically equal for all herbicide treatments, regardless of tillage system or application timing, yet yields tended to be lower for both tillage systems when the treatment was delayed until spring. Competition from other weed species and vole damage may have impacted wheat yields.

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| *Table 1.* Research Methods and Materials for 2008-2009 Study |
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| **Field History: No-till corn that was infested with ryegrass in 2008. Ryegrass was also overseeded 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; 80015 flat fan DG tips; 10 GPA spray volume** |
| **Axial XL 16.4 oz/A**<br>**Application timing:**<br>**Mid Nov: 11-13-08 Wheat 2 tillers**<br>**Mid Dec: 12-13-08 Wheat 3 tillers**<br>**Mid Mar: 3-16-09 Wheat 3 tillers** |
| **Tillage Treatments:**<br>**CT = Conventional Tillage: Two passes with disc on 10-9-08**<br>**NT = No-Tillage: Roundup PowerMax 2 pt/A on 10-9-08** |
| **Planted wheat 10-09-08 Variety: Branson Seed rate: 36 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 at maturity on 6-11-09.** |
| **Ryegrass plants were sampled with a core 2-inches in diameter 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 06-10-09.** |
| **Nitrogen and Pest Management**<br>**Nitrogen: 41 units/A on 2-25-09 and 80 units/A on 3-23-09.**<br>**Warrior 3 oz/A: 11-13-08 and 3-23-09**<br>**Proline: 4-29-09** |

*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 2008-2009)**

| Axial XL Timing | Tillage System [1] | Percent of Ryegrass Population that Exceeded 2 Tillers [2] | Density [3] (Plants/Ft$^{2)}$ | Ground Cover [4] (%) |
|---|---|---|---|---|
| Mid-Nov | CT | 0 | 148 | 70 |
| | NT | 0 | 345 | 68 |
| Mid-Dec | CT | 6.7 | 227 | 75 |
| | NT | 3.7 | 445 | 78 |
| Mid-Mar | CT | 30.8 | 137 | 68 |
| | NT | 13.3 | 118 | 81 |
| LSD (0.05) | | 8.5 | 176 | NS |

[1] CT = Conventional tillage, NT = No-tillage

[2] Ryegrass plants collected at random in four cores 2 inches in diameter and grouped in two growth stage categories (up through 2 tillers and greater than 2 tillers). The percentage of plants that exceeded 2 tillers were reported.

[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 2008-2000)**

| Osprey Timing | Tillage System [1] | Ryegrass | | | | | Wheat |
|---|---|---|---|---|---|---|---|
| | | Control (%) [2] | | | | Head Count (Heads/Ft$^2$)[3] | Yield (Bu/A) |
| | | 2 WAT | 4 WAT | 8 WAT | Late Season | | |
| Mid-Nov | CT | 30 | 55 | 90 | 97 | 1.25 | 112.1 |
| | NT | 33 | 53 | 93 | 98 | 1.25 | 103.8 |
| Mid-Dec | CT | 0 | 63 | 86 | 95 | 2.25 | 117.2 |
| | NT | 0 | 63 | 88 | 88 | 4.13 | 120.4 |
| Mid-Mar | CT | 0 | 97 | 100 | 100 | 0.13 | 98.3 |
| | NT | 0 | 97 | 97 | 97 | 1.0 | 98.4 |
| Non-treated Check | CT | 0 | 0 | 0 | 0 | 8.25 | 56.6 |
| | NT | 0 | 0 | 0 | 0 | 9.88 | 49.5 |
| LSD (0.05) | | 3 | 10 | 6 | 7 | 4.9 | 27.2 |

[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 were made on June 11, 2009.