

WHEAT RESPONSE TO TOPDRESSING NITROGEN FERTILIZER AND APPLYING OSPREY (UKREC 2005-2006)

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Introduction:

Osprey is a relatively new foliar-applied herbicide used to manage weedy grasses after wheat emergence. The active ingredient, mesosulfuron methyl, is an Acetolactate Synthase (ALS) inhibitor that can injure wheat; consequently, it is formulated with the safener, mefenpyr diethyl.

There have been isolated cases in Kentucky where Osprey injured wheat, particularly when it was applied near the time of topdressing nitrogen fertilizer. Because of the risk of crop injury, the Osprey label recommends avoiding applications within 14 days of topdressing ammonium nitrogen fertilizer.

The objective of this research was to evaluate crop injury and possible effects on wheat yield relative to using Osprey near the same time as nitrogen fertilizer applications.

Methods:

'Pioneer 25R35' wheat was planted October 12, 2005 using no-tillage practices. A premix of thifensulfuron plus tribenuron was applied January 12, 2006 to keep plots as weed free as possible. In order to help eliminate variability from other pests, Warrior insecticide was applied in the fall and spring and Tilt fungicide was applied in the spring.

Osprey was applied at a rate of 4.75 oz of product/A (0.21 oz ai/A) with a CO₂ back-

pack sprayer on March 10, 2006. A non-ionic surfactant at 0.5% v/v plus 28% liquid nitrogen at 1 qt/A were included in the spray mixture as additives for Osprey. Stream bars were used to apply 28% liquid nitrogen fertilizer at 120 lbs of actual nitrogen /A approximately 2 hours before Osprey. Another treatment involved applying liquid fertilizer as a split treatment, at 40 and 80 lbs/A of nitrogen, at approximately 3 weeks before and 3 weeks after Osprey, respectively. Ammonium nitrate and urea were dry forms of nitrogen fertilizer that were hand applied as a single treatment at 120 lbs of nitrogen/A on the same day as Osprey, but were not evaluated as split treatments. Each nitrogen treatment was compared with, and without Osprey in order to evaluate the effect of the herbicide.

Results:

Wheat injury in the form of yellow or necrotic leaves and stunted plants tended to be greatest where Osprey and 28% liquid nitrogen were applied the same day. Based on Normalized Difference Vegetative Index (NDVI) readings, some discoloration was observed in all treatments where Osprey was applied, however the differences in NDVI readings decreased by five weeks after Osprey was applied (data not shown). Wheat plants that received both Osprey and 28% liquid nitrogen fertilizer the same day were 2.6 inches shorter at one week after treatment than those that were not treated with Osprey but received

liquid nitrogen (see table 1). This stunting was still obvious by four weeks after treatment but diminished by the time plants matured.

Wheat streak mosaic virus was observed in this study and significantly impacted grain yield in a portion of the field. The plots that were not substantially affected by the virus were used for statistical comparisons for yield. Osprey limited yield in nearly every case, except where ammonium nitrate was used (see table 1). The greatest difference was where Osprey was sprayed and 28% liquid nitrogen was applied with stream bars the same day. Applying liquid nitrogen as a split treatment of three weeks before and three weeks after Osprey also reduced wheat yield relative to applying liquid nitrogen as a split treatment without Osprey.

Summary:

In summary, topdressing nitrogen fertilizer on the same day as spraying Osprey has potential to injure wheat and limit grain yield, particularly with 28% liquid nitrogen. Applying 28% liquid nitrogen as split applications seemed to limit injury from Osprey, yet yields were still low where the herbicide was used compared to where it was not applied.

Table 1. Wheat Plant Height and Yield Following Osprey and Topdressed Nitrogen Fertilizer (2005-2006)

TREATMENT ¹	RATE	TIMING	WHEAT PLANT HEIGHT ^{2,3} (INCHES)						WHEAT YIELD ³ (Bu/A)
			1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	Maturity	
Liquid N (split 1) (split 2) Osprey	40 lb/A 80 lb/A 4.75 oz/A	Feb 15 Apr 4 Mar 10	8.7 *	10.8	11.7 *	15.5	22.2	30.1	89.0 *
Liquid N (split 1) (split 2)	40 lb/A 80 lb/A	Feb 15 Apr 4	10.4	12.3	13.2	16.1	23.4	32.0	98.1
Liquid N (single) Osprey	120 lb/A 4.75 oz/A	Mar 10 Mar 10	5.5 *	7.4 *	8.7 *	14.7 *	20.6 *	30.2	86.7 *
Liquid N (single)	120 lb/A	Mar 10	8.1	9.8	11.5	17.7	23.8	31.6	99.3
Ammonia Nitrate (single) Osprey	120 lb/A 4.75 oz/A	Mar 10 Mar 10	6.9 *	7.9 *	9.6 *	16.5 *	22.8	30.7	94.0
Ammonia Nitrate (single)	120 lb/A	Mar 10	8.3	10.9	12.5	18.2	24.2	31.1	99.5
Urea Osprey	120 lb/A 4.75 oz/A	Mar 10 Mar 10	7.1 *	9.0	10.3 *	15.0 *	21.3 *	29.0	83.4 *
Urea	120 lb/A	Mar 10	8.2	10.5	12.3	16.9	23.9	30.7	98.1
LSD (0.05)			1	1.5	1.1	1.3	1.7	NS	5.8

¹ Liquid N applied with stream bars, whereas, ammonia nitrate and urea were hand applied. Osprey applied with a CO₂ back pack sprayer in 20 GPA spray volume. A non-ionic surfactant at 0.5% v/v plus 28% liquid nitrogen at 1 qt/A were included in the spray mixture as additives for Osprey.

² Plant height was based on an average of 5 plants per plot.

³ An asterisk indicates a significant difference due to Osprey for each respective nitrogen treatment.