

# **RESPONSE of WHEAT to AE F130060 and NITROGEN FERTILIZER**

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AE F130060 (proposed common name mesosulfuron methyl) is a foliar-applied herbicide used to manage weedy grasses after wheat emergence. It 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 AE F130060 injured wheat, particularly when it was applied near the time of topdressing nitrogen fertilizer. The herbicide label for AE F130060 cautions against making applications within 14 days of topdressing ammonium nitrogen fertilizer due to the risk of crop injury.

This research was conducted over a two-year period during the 2006-2007 and 2007-2008 growing seasons to evaluate wheat response when nitrogen fertilizer was topdressed at different times relative to spring application of AE F130060. Liquid nitrogen was applied with stream bars at 120 units/A. The commercial formulation of AE F130060 with the safener was applied in mid-March at a rate of 0.21 oz ai/A plus surfactant, plus 28% liquid nitrogen at 1 qt/A in water at spray volume of 20 GPA with 8003 flat fan tips. The timing for topdressing nitrogen in the first study occurred over a period of five weeks at weekly intervals designated as -14, -7, 0, +7, and +14 days relative to timing of AE F130060. The timings for the second study also included -21 and +21 days, consequently topdressing timings occurred over a period of seven weeks. Each nitrogen treatment that was associated with AE F130060, had the same nitrogen fertilizer treatment but without AE F130060.

Wheat injury in the form of yellow or necrotic leaves and stunted plants tended to be greatest where AE F130060 and 28% liquid nitrogen were applied the same day. Wheat plants usually recovered from discoloration within 4 to 5 weeks after the herbicide was applied. Wheat plants were numerically shorter than the non-treated checks within one week after AE F130060 in both studies. The amount of stunting was usually greater when nitrogen fertilizer was topdressed the same day as spraying AE F130060 (i.e. 0-day timing of N fertilizer). AE F130060 tended to cause stunting for all timings through 6 weeks after application. Freezing temperatures during April 6 -10 caused substantial freeze damage to plants that were rapidly growing and not injured from the AE F130060. By the time wheat matured in 2007, the plants that were initially injured from AE F130060 tended to be taller than the plants that did not receive AE F130060. It is likely that the initial injury from the herbicide delayed the development of wheat; consequently these plants were able to tolerate the freezing temperatures that occurred during early April. In the second study the herbicide-treated plants were numerically shorter than the non-treated checks and were statistically significant when nitrogen was topdressed at -14 days, the same day, and +14 days.

## Response of wheat to mesosulfuron and nitrogen fertilizer

The unexpected higher yield in the first study where plants were injured the greatest from AE F130060, compared with plants that did not receive AE F130060, is attributed to the unusual freezing temperatures in early April in the first study. Plants that were injured from the March application of AEF 130060 were delayed in growth and less prone to the freezing temperatures in early April. AE F130060-treated plants were able to recover more quickly from the freeze injury and yielded better than plants that did not receive the herbicide. Herbicide injury in the second study limited wheat yield by 8.3 and 9.6 bu/A when liquid nitrogen was topdressed the same day as AE F130060 and seven days after AE F130060, respectively. In spite of herbicide injury, the best overall wheat yield in the second study occurred for nitrogen topdressed February 21 or 14 days before Osprey.

In summary, AE F130060 caused wheat to be stunted and have yellow or necrotic leaves. The plants recovered from discoloration by 5 weeks after the herbicide was applied; however, stunting occurred up to maturity for some treatments in the second study. The only treatments where AE F130060 limited wheat yield was in the second study when nitrogen was topdressed the same day as AE F130060 and seven days after the herbicide.

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