RESPONSE OF CORN TREATED AT TWO GROWTH STAGES WITH FOLIAR - APPLIED HERBICIDES. James R. Martin and Charles R. Tutt, Extension Professor and Research Specialist, Department of Plant and Soil Sciences, University of Kentucky, Princeton, KY 42445.

Delaying postemergence treatments to allow time for late emerging warm-season weeds to reach optimum stage may cause growers to apply overtop corn that exceeds the V6 growth stage. This practice has sometimes led to crop injury, particularly with certain Acetolactate Synthase (ALS) inhibitor herbicides. The labels of many of the ALS inhibitor herbicides indicate to not apply them as broadcast sprays overtop corn that exceeds the V6 growth stage.

Studies were conducted in 2005 and 2006 to evaluate and compare various postemergence herbicides for their potential to cause crop injury when applied to corn at either V4 or V7 growth stages. Corn was planted on April 11 both years using conventional tillage practices. The 2005 study had isolines with similar base genetics, yet different herbicide tolerant traits. 'Garst 8451 RR' was used for evaluating glyphosate and sulfonylurea herbicides; whereas, 'Garst 8450 IT' was used for evaluating the premix of imazethapyr plus imazethapyr as well as the non-treated check. The imidazolinone herbicides were not included in the 2006 study, consequently the only hybrid used in the second study was 'Dekalb DKC63-74 RR2/YGPL'. Soil - residual herbicides were used to maintain a weed - free environment.

Treatments were applied to V4 corn on May 13, 2005 and May 6, 2006; and to V7 corn on May 31, 2005 and May 26, 2006. Plants were hand harvested from an area of 50 ft^2 within the two center rows to determine grain yield and to evaluate for ear abnormalities.

The postemergence herbicides compared in both years were nicosulfuron at 0.5 oz ai/A, foramsulfuron at 0.53 oz ai/A, premix of nicosulfuron at 0.38 oz ai/A plus rimsulfuron at 0.19 oz ai/A, and glyphosate at 0.75 lb ae/A. The premix of imazethapyr at 0.67 oz ai/A plus imazapyr at 0.22 oz ai/A was evaluated only in 2005 and rimsulfuron at 0.25 oz ai/A was evaluated only in 2006. Adjuvants were included with the herbicides according to label directions.

Corn plants in all treatments in the 2005 study had normal vegetative growth throughout the season. However, in the 2006 study, injury in the form of stunted plants and shortened internodes were observed when the premix of nicosulfuron plus rimsulfuron or rimsulfuron alone were applied to corn in the V7 growth stage. As much as 13% injury was observed at five weeks after applying the premix to corn in the V7 growth stage.

Abnormal ears in the form of twisted rows or pinched areas were observed in all treatments, including the non-treated check, both years. The amount of abnormal ears for the premix of nicosulfuron plus rimsulfuron applied to corn in the V7 growth stage was 40% in 2005 and 20% in 2006. These values exceeded those observed in non-treated checks in both studies. Rimsulfuron applied at the V7 stage was the only other treatment that had a significant percent of abnormal corn ears relative to the non-treated checks in the 2006 study.

Delaying application until V7 growth stage tended to influence corn grain yield of some treatments. The yield reductions in the 2005 study were less obvious than those in the 2006 study and were not statistically different for any of the treatments. However there was a trend for low yield when the premix of nicosulfuron plus rimsulfuron was applied to V7 corn. There were significant yield reductions in the 2006 study. The yield of premix of nicosulfuron plus rimsulfuron was 167.6 bu/A compared with 227 bu /A for the non-treated check. Applying rimsulfuron alone at V7 resulted in 39.3 bu/A less yield than that of the non-treated check in the 2006 study.

The results of this research show that foliar - applied herbicides may differ in their potential to injure corn when applied to plants that exceed the recommended growth stage. The herbicides that had the highest risk to cause abnormal ears when applied at V7 growth stage included the premix of nicosulfuron plus rimsulfuron and rimsulfuron alone.

2006 North Central Weed Science Society Proceedings 61:23.