

PERSISTENCE AND EFFICACY OF FALL-APPLIED SIMAZINE AND ATRAZINE. Andrew T. Lee and William W. Witt, Graduate Research Assistant and Professor, Department of Agronomy, University of Kentucky, Lexington, KY 40546.

Applying triazines to soybean stubble in the fall has become popular among Kentucky herbicide applicators aiming to spread out their workload and control winter annual weeds. Controlling winter annual weeds before planting corn may provide many advantages including warmer spring soil temperatures, less crop drought stress, and less reliance on burn-down herbicides in no-till production systems. Controlling winter annual weeds also provides early spring cosmetic benefits that are of high interest to producers that cash-rent cropland. Field studies were conducted in November 2000 through October 2001 to determine herbicide persistence and efficacy from fall applied atrazine and simazine. A nine-treatment study, comprised of three fall herbicide options followed by three spring herbicide options, was replicated across three locations (Lexington, Princeton, and Bowling Green) in Kentucky. Atrazine at 1.7 kg/ha, simazine at 1.7 kg/ha, and no herbicide application were the fall herbicide options. Spring herbicide options included 1.3 kg/ha metolachlor + 1.7 kg/ha atrazine, 1.3 kg/ha metolachlor + 1.7 kg/ha atrazine + 1.1 kg/ha glyphosate, and no herbicide application. Soil samples were collected at 30 day intervals (January through May) to determine atrazine, simazine, and total triazine concentration. Yield data along with February, March, April, and May visual efficacy ratings for winter and summer annual weed control were used to compare differences among treatments ($P=0.05$). Surface soil temperatures were taken in three hour intervals during March and April.

Atrazine and simazine exhibited up to 95% control of henbit, but neither herbicide controlled or suppressed summer annual weed populations. Wild garlic control in February with atrazine was statistically greater than with simazine at the Princeton location. Wild garlic control ranged from 56% to 59% with atrazine, and 18% to 25% with simazine. No statistical differences of corn emergence, except for a decrease in the weedy check, were observed. The same pattern held true with corn seed yield. Yields ranged from 3,390 kg/ha to 11,200 kg/ha. Surface soil temperatures ranged from 1°C to 29°C. Daily fluctuation of surface soil temperature was higher where simazine was applied compared to where no herbicide was applied. January soil samples from plots treated only with fall-applied atrazine and simazine ranged from 0.6 to 1.0 ppm for atrazine, and 0.7 to 2.7 ppm for simazine. These numbers declined to ~ 0.02 ppm in May. Throughout the sampling period, simazine treatments contained about 2X the herbicide concentration in the soil over atrazine.

In conclusion, both fall applied simazine and atrazine were effective for henbit control. Henbit control translated into warmer surface soil temperature, but more variability during the diurnal cycle. Atrazine may offer better control of early season winter annuals such as wild garlic. Atrazine degraded more quickly than that of simazine under the conditions present from November 2000 to May 2001 in Kentucky.