IN ROW AND BETWEEN ROW ZONE HERBICIDE APPLICATION AT DIFFERENT RATES CONTROLS ANNUAL WEEDS AND REDUCES TOTAL RESIDUAL HERBICIDE USE IN CORN.

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New best management practices are needed to reduce offsite herbicide, nutrient, and sediment movement in runoff from farm fields and minimize herbicide contamination of surface and ground water without compromising soil conservation or economic goals. Zone herbicide application (ZHA) is a practical, generic approach for achieving some of these goals. It uses 1) crop management to enhance crop competitiveness with weeds, 2) soil residual herbicide banded over crop rows at reduced rates and 3) the same herbicide banded between rows at higher rates than over crop rows, so that total herbicide use per unit area is reduced. The goal of this research was to determine the impact of reduced rate zone herbicide application on weed control (chiefly giant foxtail, waterhemp species, common ragweed, common cocklebur, smartweed species and velvetleaf), grain yield, and economic return on herbicide investment in field corn. Preemergence zone herbicide applications of atrazine + metolachlor + clopyralid + flumesulam were made in bands at different rates between and over crop rows at two sites in Missouri. The 1X rate of atrazine + s-metolachlor + clopyralid + flumetsulam equaled 2.24 + 1.75 + 0.211 + 0.067 kg ai/ha, respectively. Treatment effectiveness was measured as reduced between-row and in-row total weed ground cover, increased crop grain yield, and increased economic return on investment. At both sites, zone herbicide application treatments (0.25 X in row rate + 0.75 to 1 X between row rate) outperformed all reduced rate broadcast herbicide treatments (0.25 X, 0.5 and 0.75X), based on these criteria. When compared to the 1X broadcast application, zone herbicide application reduced total herbicide applied per unit area 37 to 50%. In order to adopt ZHA, existing sprayers will require relatively minor, inexpensive modifications. Input cost savings for herbicides over time will dwarf initial costs for modifying sprayers and will drive adoption rather than government regulation or subsidies. ZHA is also scale independent and can be adopted on many farm sizes. ZHA is compatible with no-till farming methods, which can help prevent soil erosion and sediment contamination of surface water. Zone herbicide application may provide farmers with a new option for reducing herbicide rates and input costs while lessening the change of surface water contamination by herbicides.

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