

GRASS AND BROADLEAF WEED DENSITY INTERACTION WITH HERBICIDE DOSE.

Aifheli M. Ndou* and J. Anita Dille, Graduate student, and Associate Professor, Department of Agronomy, Kansas State University, Manhattan, KS 66502.

A field study was conducted near Manhattan, KS in 2006 to determine how weed density interacts with herbicide dose for both grass and broadleaf weeds. Dekalb soybean (DICB 35-52) was sown at 120 000 seed ha⁻¹ in 0.76-m rows. Within each main soybean plot, either of the two grass species [large crabgrass (*Digitaria sanguinalis*) or shattercane (*Sorghum bicolor*)] or the two broadleaf weed species [Palmer amaranth (*Amaranthus palmeri*) or velvetleaf (*Abutilon theophrasti*)] were sown in separate subplots at nine various densities (5, 10, 20, 40, 80, 160, 320, 640 and 1200 seed per 60-cm by 60-cm area). Clethodim or glyphosate were applied to the grass species plots, while lactofen or glyphosate were applied to the broadleaf species plots at 1X, ½, ¼, 1/8, 1/16, and 1/32X using a half-step log sprayer. Untreated controls were included for comparisons. Four weeks after herbicide application, surviving plants were counted and severed at ground level, dried in an oven and biomass measured. The reduction in biomass due to postemergence herbicide applications were described by dose-response curves using non-linear regression analysis. For the grass species, two significant three-way interactions were observed between herbicide, dose, and species; and between dose, species, and density (P < 0.0001). Shattercane was more susceptible than large crabgrass to both herbicides as 1/8X dose of clethodim or glyphosate resulted in no biomass. Among the broadleaf weed species, one significant three-way interaction was observed between herbicide, dose, and species (P=0.001). At lower densities and lower herbicide doses, velvetleaf produced a large amount of biomass, however, as density increased, the biomass decreased, which was attributed to intraspecific competition. Palmer amaranth was not as sensitive to this density effect as was velvetleaf. Before weed control measures are taken, weed species, weed density and herbicide combination should be taken into consideration. The results obtained in this study are of importance in developing decision algorithm for making better site specific weed management decisions.