

C23-P

IDENTIFYING FIELD SPECIFIC CHARACTERISTICS THAT LEAD TO SUCCESSFUL
POSTEMERGENCE WEED MANAGEMENT IN CORN

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Across the United States, the most frequent herbicides used for weed control in corn are soil-applied, preemergence products. Although preemergence herbicides are often considered an important tool in weed management, there are number of concerns associated with them. One possible alternative is to integrate postemergence weed control into weed management systems. In order to evaluate the potential success of single postemergence applications, three different experiments were conducted between 2000 and 2002 across multiple northeastern states. The objectives of these studies were to develop prediction models for weed emergence across geographic locations, examine the impact of postemergence herbicide application timing and program across multiple locations, and to evaluate the impact of both weed density and time of weed removal on corn grain yield. The ability to predict weed emergence across geographic location using a soil degree-day scale varied with weed species with the coefficients of determination for the predictive emergence model ranging from 0.67 to 0.88, depending on species. Most weed species had two distinct peaks of emergence. In terms of periodicity, common ragweed had one of the shortest emergence periods, while redroot and smooth pigweed had one of the longest periods of emergence. In the weed density experiment, at low weed densities, application timings ranging from V2 to V8 corn provided corn yields similar to the weed-free plots. At higher weed densities, however, the V4 application timing provided the most consistent and highest yielding results. In the application timing experiment at multiple locations, the V3/4 timing was more effective than the V2 timing when averaged over treatment. Glyphosate alone was impacted the most by timing, with the V2 treatment having less effect on weed biomass, compared to the other treatments. The glyphosate mixtures and the nicosulfuron-based treatment were equal at the V3/4 timing when averaged across location. Problem weeds with some total post treatment locations included quackgrass and yellow nutsedge in Maine, common cocklebur and horsenettle in Delaware, large crabgrass and yellow foxtail in Massachusetts, and common ragweed and giant foxtail at several locations. Regardless of treatment, the untreated check had at least 5 times more weed biomass than any herbicide treatment regardless of timing. Excluding the weedy check, corn grain yield ranged from less than 56 kg/ha to more than 224 kg/ha depending on location. Yield in the glyphosate alone V2 treatment was less than the other V2 treatments that included residual herbicides. These experiments demonstrate that single postemergence applications can be successful, but are dependent on weed species and density as well as herbicide program.