COMPARISON OF WEED MANAGEMENT STRATEGIES IN GLUFOSINATE, GLYPHOSATE, AND CONVENTIONAL SOYBEAN VARIETIES. Dean M. Grossnickle, James F. Lux, Damian D. Franzenburg, and Micheal D. K. Owen, Ag Research Specialists, and Professor, Agronomy Department, Iowa State University, Ames, IA 50011.

Field experiments were established to compare weed management tactics in glufosinate, glyphosate, and conventional soybean varieties in the spring, 2008. Strategies evaluated included several herbicide application timings and the use of a residual herbicide as part of a weed control program. Experiments were established at the Ames, Lewis, and Nashua Iowa State University research farms. Experiments were randomized complete block design with four replications. Plots measured 3.05 by 7.62 m and studies were established under minimum tillage conditions. Soybean varieties included 'ML2566' (glufosinate resistant), 'AG2802' (glyphosate resistant), and a conventional cultivar 'PB253N'. Soybeans were seeded 3.18 cm deep using a 76.20 cm row cone planter at 370,500 seeds per ha.

Treatments included three application timings; early postemergence (EPOST) at V3, mid-postemergence (MPOST) at V5, and late postemergence (LPOST) at R2. Sequential application timings included preemergence (PRE) followed by (FB) MPOST, EPOST FB LPOST, and PRE FB EPOST and LPOST. One conventional program (PRE FB EPOST) was also included. Herbicides included glufosinate, glyphosate, pendimethalin, acifluorfen, bentazon, and sethoxydim. All PRE treatments were pendimethalin at 1.06 kg ai ha^{-1}. Glufosinate was applied at 0.44 kg ai ha^{-1} with 3.85 kg ammonium sulfate (AMS) per 378 l of carrier volume and applied to the 'ML2566' soybeans. Glyphosate was 0.86 kg ae ha^{-1} with 3.85 kg of AMS per 378 l of carrier volume and applied to the 'AG2802' soybeans. Conventional EPOST treatments included acifluorfen at 0.19 kg ai ha^{-1}, bentazon at 0.83 kg ai ha^{-1}, sethoxydim at 0.21 kg ai ha^{-1}, and crop oil concentrate at 2.32 l ha^{-1}. All herbicide applications were made at 187 l ha^{-1}.

Soybeans were evaluated for herbicide injury 7 days after the EPOST and MPOST applications and percent weed control was evaluated 15 days after EPOST, MPOST, and LPOST applications. Weeds evaluated included foxtail spp., velvetleaf, common waterhemp, and common lambsquarters. Woolly cupgrass was evaluated at Lewis.

Significant soybean injury ranging from 16 to 76% was observed across the three locations for the conventional herbicide program. Across the three locations, glufosinate treatments resulted in 0 to 10% soybean injury, while glyphosate treatments resulted in 0 to 7% injury.

In Ames, control of foxtail spp. ranged 92 to 99% across all herbicide treatments and application timings. Glyphosate controlled foxtail spp. 4 to 7% better than glufosinate at the 15 day evaluation rating for EPOST and MPOST application timings. The conventional program controlled foxtail spp. 4% better than the EPOST glufosinate. Glyphosate had 8% better velvetleaf control than glufosinate and the conventional program for the EPOST application timing and control ranged 90 to 99%. All herbicides and application timings controlled common waterhemp 90 to 98%. Glyphosate applied MPOST controlled common waterhemp 6% better than glufosinate. Glyphosate and the conventional program had 8% better control than glufosinate for common waterhemp EPOST. No differences between glyphosate, glufosinate, and conventional program were seen for the control of common lambsquarters for EPOST application timing. The MPOST timing of glyphosate and glufosinate had similar control of common lambsquarters and ranged from 95 to 99%. No differences in control between LPOST glyphosate and glufosinate regardless of weed species.

At Lewis, woolly cupgrass control ranged from 87 to 99%. Glyphosate and glufosinate EPOST controlled woolly cupgrass 12% better when compared to the conventional program EPOST. Glyphosate and glufosinate were similar for woolly cupgrass control when applied EPOST, MPOST, and LPOST. Glyphosate controlled velvetleaf 5% better than glufosinate at the MPOST timing.

Glufosinate and the conventional program controlled velvetleaf 3% better than glyphosate EPOST. No differences for common waterhemp and common lambsquarters were observed. No differences between glyphosate and glufosinate LPOST were observed and control was 98 to 99%.

At Nashua, glyphosate controlled velvetleaf 9 to 14% better than glufosinate at the EPOST and MPOST timings, respectively. The conventional program controlled velvetleaf 14% better than EPOST glufosinate. Comparing the MPOST application timing, glyphosate controlled common waterhemp and common lambsquarters 7% better than glufosinate. Glyphosate, glufosinate, and the conventional program controlled common lambsquarters and common waterhemp EPOST equally and control ranged from 91 to 99%. No differences for herbicide treatments were observed for foxtail spp. control. Glyphosate and glufosinate LPOST provided 98 to 99% weed control.