COVER CROP ROLLER-CRIMPER CONTRIBUTES TO WEED MANAGEMENT IN NO-TILL SOYBEAN. Adam S. Davis, Ecologist, United States Department of Agriculture/Agricultural Research Service, Invasive Weed Management Unit, Urbana, IL, 61801.

Termination of cover crops prior to no-till planting of soybean is typically accomplished with burndown herbicides. Recent advances in cover crop roller-crimper design offer the possibility of reliable physical termination of cover crops without tillage. A field study within a no-till soybean production system was conducted in Urbana, IL, from 2004-2007 to quantify the effects of cover crop (cereal rye, hairy vetch, or bare soil control), termination method (chemical burndown or roller-crimper) and postemergence glyphosate application rate (0, 1.1 or 2.2 kg a.e. ha^{-1}) on soybean yield components, weed-crop interference, and soil environmental variables. Biomass of residual weed populations within soybean following either vetch or rye was reduced by 26 and 56%, respectively, in the rolled system compared to the burndown system ($P < 0.001$). Soybean yield loss due to weed interference was unaffected by cover crop termination method ($P > 0.35$), but the interaction between cover type and postemergence glyphosate application rate was significant ($P < 0.01$). In soybean following a rye cover crop, regardless of termination method, yield under competition from weeds was unaffected by glyphosate rate, whereas in soybean following a vetch cover crop or bare soil, yield increased with glyphosate rate ($P < 0.001$). Variation in soybean yield among cover crops and cover crop termination treatments was due largely to differences in soybean establishment, rather than differences in the soil environment. Use of a roller-crimper to terminate a cover crop preceding no-till soybean has the potential to achieve similar yields to those obtained in a chemically terminated cover crop while reducing residual weed biomass.

2009 North Central Weed Science Society Proceedings 64:66.