Do winter cover crops suppress weeds in Midwestern corn- and soybean-based systems? A meta-analysis

Session we plan to submit to

Cover crop management 5-min oral and poster

https://scisoc.confex.com/scisoc/2018am/webprogrampreliminary/Session18114.html

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Abstract (300 words max)

The Midwestern U.S. has seen a modest increase in winter cover crop use over the past 10 years. However to reach water quality goals, it is estimated that adoption of cover crops will need to scale from 5% to more than 50% of cropland acres in this region. At the same time, their use may aid in reducing herbicide costs and in providing an alternative strategy for managing herbicide resistant weeds, both important cost savings that improve short-term economics. Presently, the degree to which cover crop type, fall planting date and spring termination method affect weed management is not well understood. Further, the quantity of cover crop biomass needed for a significant reduction in weeds is uncertain. To address these questions, we conducted a meta-analysis to quantify the effects of winter cover crops, and their management, on weeds. We included peer-reviewed studies in our database if they: (1) Were located within one of the major corn producing Midwestern states; (2) Grew a fall seeded cover crop before corn or soybean; and (3) Measured and reported weed biomass or weed density. To date, we have analyzed data from twelve studies representing over 200 paired observations. Sixty-three percent of paired observations reduced weed biomass and 55% reduced weed density with cover crops. We found that large quantities of cover crop biomass (>3000 kg ha-1) are needed to provide at least a 50% reduction in weed biomass. We did not find significant differences in the reductions of weed biomass or density when grouping the dataset by termination method or cover crop type. While this research helps to quantify benefits of winter cover crops with respect to weed management, it also highlights the need for more precise information on how to most effectively manage cover crops to exploit their competitive interactions with weeds.