Title

Weed suppression from winter cover crops in the U.S. Corn Belt: 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

Authors

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Abstract (300 words max)

The Corn Belt region of the U.S. has seen a modest increase in winter cover crop use for the purposes of reducing both soil erosion and nutrient leaching over the past 10 years. However to positively affect water quality, adoption of cover crops will need to scale from 5% to more than 50% of cropland acres. At the same time observational and on-farm research show that weed management is improved with addition of a winter cover crop to a corn and soy-based cropping system. 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 the short-term economics. Presently however, the degree to which cover crop type, fall planting date and spring termination method affect weed management is not well understood. More so, 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 twelve Corn Belt states (2) Grew a fall seeded cover crop before a cash crop of corn or soybean and; (3) Measured and reported either weed biomass or weed density. To date, we have analyzed data from twelve studies representing over 200 paired observations. 63% of paired observations demonstrated a reduction in weed biomass and 55% demonstrated a reduction in 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.