Possible titles:

Quantifying the effect of winter cover crops on weeds in the U.S. Corn Belt: a meta-analysis

Weed suppression from winter cover crops in the U.S. Corn Belt: a meta-analysis

Possible sessions to submit to:

Cover crop management poster

https://scisoc.confex.com/scisoc/2018am/webprogrampreliminary/Session17953.html

Cover crop management oral

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

Cover crop management 5-min oral and poster

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

Authors:

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Abstract:

Controlling weeds is a widely reported benefit of utilizing cover crops, potentially reducing herbicide costs and providing a biological method for managing herbicide resistant weeds. However, it is not well understood how much cover crop growth is needed for effective weed control such that cover crop management costs, often cited as a barrier for their use, are offset. We conducted a meta-analysis to quantify the weed control benefits of winter cover crops and focused on the upper midwestern United States, because the growing season for cover crops is limited by the dominant corn-soybean cropping systems and the relatively colder winter climate. We included experiments in our database if they were published in peer reviewed journals, in English, and fulfilled the following criteria: 1. Grew a fall seeded cover crop before a cash crop of corn or soybean; 2. Measured and reported either weed biomass or weed density; 3. Conducted in one of the top twelve corn producing states in the region considered the “Corn Belt.” We have analyzed data from twelve studies representing over 200 paired observations to date. Overall, 63% of response ratios demonstrated a reduction in weed biomass and 55% of response ratios 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 major differences in weed control when grouping the dataset by termination method or cover crop type. Only 14% of our dataset represented a “win-win” scenario where weeds were decreased and yields of corn or soybean were increased. Quantifying tradeoffs associated with cover crop biomass, weed control and cash crop yields can aid in farmer decision making and management of cover crops.