Corn Yield Response to Winter Cover Crops: A Meta-Analysis Update

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INTRODUCTION

Winter cover crops (WCC) bring benefits to cropping systems although negative impacts have been reported.

- WCC may compete for soil resources and reduce cash crop yields and farm profits

- Information gaps about benefits and tradeoffs prevents WCC adoption.

OBJECTIVES

-Summarize the overall response of corn yields to WCC as reported in peer reviewed research,

-Investigate the influence of management factors in moderating corn yield response to WCC

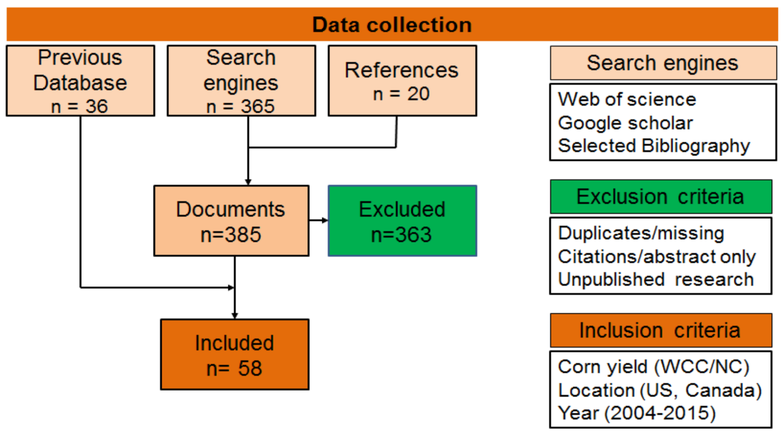
METHODS

Meta-Analysis

Data Collection	Data analysis	Publication
▪Identify studies ▪Yield records ▪Crop management Information ▪Prepare database	▪ Combine results ▪ Analyze data variability ▪ Change in results given changes/management ▪ Detect influential data	▪ Software codes ▪ References List ▪ Peer review process ▪Final manuscript

Progress

Data collection



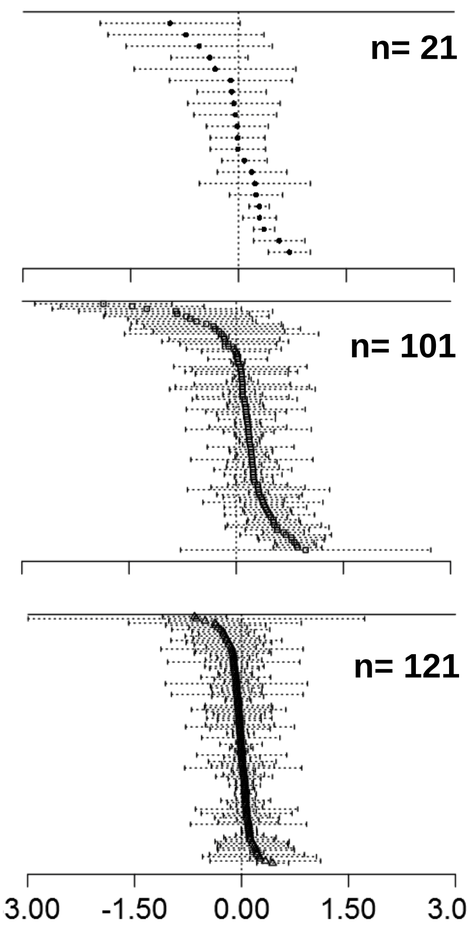
Data Analysis (Model)

$$\text{Yield} = \text{mean effect} + (\text{WCC} + \text{Management}) + \text{uncertainty}$$

PRELIMINARY RESULTS

Summary of Cover crop Effects - 58 independent studies (1967-2015)

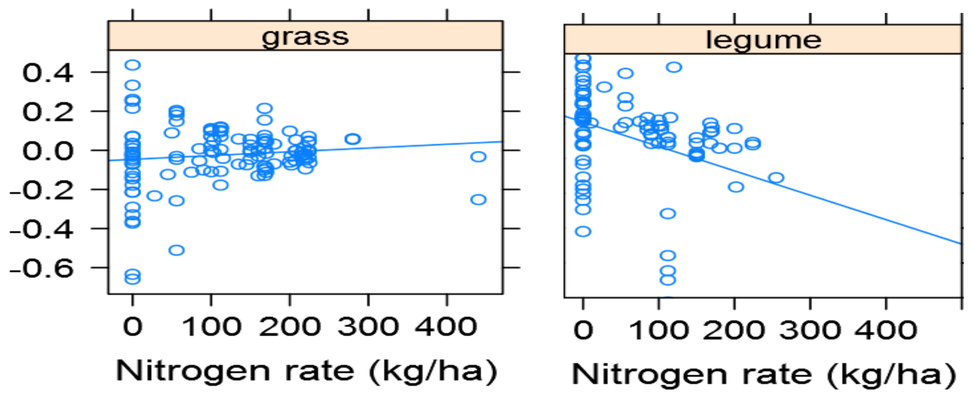
Corn yields following cover crop (WCC) relative to yields after no cover (NC). Points to the right of zero indicate positive effects of WCC and points to the left otherwise. Horizontal bars show yield uncertainty.



Mixture WCC seems to maintain corn yields. Mixtures bring the positive effects of legumes and grasses to corn production.

Legume WCC contributes to higher corn yields. Legumes fix and releases nitrogen for corn in the next season.

Grass WCC shows a neutral effect on corn yields. Grasses do not influence directly corn yields, but capture nutrients in excess, and reduce groundwater pollution.



With increasing Nitrogen fertilizer, yield response to grass WCC increases.

With increasing Nitrogen fertilizer, yield response to legume WCC decreases.

CONCLUSIONS

▪WCC promote, or maintain corn yields.

▪Legumes display positive effects on corn yields; grasses/bicultures showed a neutral effect.

▪Nitrogen fertilization moderates corn yield responses to WCC

RECOMMENDATIONS

▪Continue data collection. Inputs of quality are critical for a successful Meta-analysis.

•Evaluate yield response to changes in management (e.g. How much will yields change in WCC systems if killing/seeding dates are delayed)

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