Recent research uses a meta-analysis to assess the effect of cover crops on weeds and any impact on the main crop.

From an analysis of 46 data sets, researchers determined cover crops can reduce the presence of weeds, minimizing the need for herbicide use.

In addition to providing weed control, cover crops had either no effect or a positive impact on the yield of the main crop.
Research on the effects of cover crops seems to be everywhere these days—from use in organic farming to home gardens and to traditional row crop systems. The studies seek to determine how cover crops influence erosion, soil compaction, microbial communities, weeds, and soil nutrients to name a few. However, like many topics, there is not a clear consensus about the effects of cover crops. Results that are positive, neutral, and negative have been published, making it difficult for those who may be interested in using cover crops to determine if they are an appropriate tool.

This lack of consensus was noticed by weed scientist O. Adewale Osipitan when he attended a workshop where the topic of cover crops to reduce weeds was presented. Coming away from the workshop with more questions than answers, Osipitan, who is currently a post-doctoral researcher at the University of Nebraska–Lincoln, says, “I felt the answers to these questions required collection and analysis of broad-based data from different contradictory findings to arrive at a quantitatively summarized answer.” Because of this, he decided to conduct a meta-analysis. Being new to this approach, he consulted with colleagues who had experience in it and decided to focus on the effect cover crops have on weed biomass and the yield of the main crop grown after the cover crop. An initial search of the literature turned up 894 papers, and based on pre-selected inclusion criteria, 46 were included in the analysis. Osipitan points out the importance of having pre-selected criteria, which makes it easy to determine what papers should be included.

From this analysis, Osipitan and co-authors, Anita Dille, Yared Asefa, and Stevan Knezevic determined that cover crops can provide effective weed suppression. This will come as no surprise to many, but what is more interesting is that in addition to providing weed suppression, this analysis demonstrated that there was either no effect or a positive effect on the yield of the main crop. The main crops, or cash crop that followed the cover crop, were categorized as grains or vegetables. There was a positive yield benefit of cover crops for vegetable crop yields and no impact on grain crop yields.

Although this approach provides evidence that cover crops will have no effect or a positive effect on the cash crops growers depend on, it is important to note the potential for a bias toward positive results in this approach. Osipitan mentions that there is the potential for publication bias to influence the results of a meta-analysis. Researchers often rely on peer-reviewed publications to determine what data to include, and peer-reviewed publications are less likely to include non-significant or negative results. It may be beneficial to include unpublished data from graduate student theses and dissertations, which are often unpublished because the results are non-significant, to strengthen the analysis.

This meta-analysis may aid in giving farmers interested in using cover crops some peace of mind that they will not have to sacrifice yields. “A take home for farmers is that if cover crops are properly selected and properly managed, there would be weed suppression benefits comparable to what tillage or herbicide could provide, particularly during the early part of the main crop’s growing season, after cover crop termination,” Osipitan says. There are additional environmental benefits to reducing herbicide use too as herbicides often run off and impact non-target organisms like aquatic vegetation, amphibians, and fish and can lead to herbicide-resistant weeds.

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