

## Montana Producers' Response to Cover Crop Survey

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### IMPACT STATEMENT

*There is increasing interest by Montana producers in growing cover crops. From a 2015 survey of Montana producers, we learned why and how they grow cover crops, and the real or perceived benefits and challenges to growing cover crops. The survey results will guide future research and outreach activities on cover crop benefits and best management practices, and will hopefully help guide policy decisions that can affect Montana growers.*

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### SUMMARY

Montana producers were surveyed about cover crops to learn what's working, what's not, the benefits they are seeking, reasons they would continue using cover crops or have never tried them, and what information they would like. Roughly 30% of respondents have grown cover crops and about 90% of those say they will continue to use them. Most respondents were relatively unfamiliar with cover crop mixtures, meaning cover crops that contain at least two species. Soil health was consistently cited as the biggest reason to adopt cover crops, whereas water use, effect on next crop, and economics, were cited as the biggest reasons to quit or not grow cover crops. Despite some frustrations, cover crop growers seem to be optimistic about the value of cover crops, though some grower perspectives disagreed with Montana research results. Research, agency and Extension entities need to continue their efforts to provide research-based information leading to cover crop success.

### INTRODUCTION

There is growing interest in the use of cover crops in Montana and surrounding states, yet little is known about why producers grow, or don't grow cover crops. In addition, there is scant information from the region on what specific cover crop management practices producers use, or what research questions they

would like answered. This survey of Montana producers is part of a larger USDA-WSARE grant on soil quality and agronomic responses to cover crop mixtures.

### PROCEDURES

Five hundred randomly selected Montana producers received the survey; 72 surveys were either returned due to an incorrect address or because the producer no longer farmed. Of the remaining surveys, 168 were filled out and returned, for a response rate of approximately 40%. We recognize those growing cover crops were possibly more likely to return the survey, so certain questions may have somewhat biased answers, possibly up to about a factor of 2.

### RESULTS AND DISCUSSION

Roughly 30% of the respondents have grown cover crops and about 90% of those said they will continue to use them. Some appeared to be using cover crops as summer fallow replacement, others as a 'break crop' after a perennial stand was taken out. Soil health was consistently cited as the biggest reason to adopt cover crops, with nearly 50% of respondents stating this as their main reason. Water use, its effect on the next crop, and economics were cited as the biggest reasons to quit or not grow cover crops.

When asked the main reason for planting cover crops, only 17% of those growing cover

crops listed providing nutrients (e.g., nitrogen), yet about 40% of the respondents that grow cover crops reported that at least 50% of their cover crop biomass was legumes. This is encouraging, since MSU research has found nitrogen inputs from legume cover crops has a measurable impact on subsequent small grain production (Burgess et al. 2012; Miller et al. 2008; Miller et al. 2015). Cover crop biomass should be at least 50% legume to provide substantial amounts of plant-available nitrogen for the next crop (Sullivan and Andrews 2012) with termination at or before 1<sup>st</sup> flower (in pulses) to minimize soil moisture use and subsequent yield losses (Miller et al. 2006). Only 20% of growers stated specifically they use 'before maturation' to time termination. Given 47% of cover crops get terminated during or after August, and 70% of cover crops are grown for more than 2 months, it is likely cover crops are using more soil water than optimal for the subsequent crop. Thirty percent of the respondents listed limiting soil moisture as the main reason they have or would quit using cover crops. Terminating cover crops too late to conserve enough water for the next crop may be due to lack of appropriate information, or because management of cover crops takes a back seat to managing cash crops. However, the termination timing responses include producers growing cover crops for reasons other than replacement of dryland fallow, where soil moisture did not appear to be a concern. In some production systems, the benefit of soil cover and stubble to reduce evaporative soil moisture loss, may be very beneficial in dryland systems in Montana (Cutforth, and McConkey 1997).

Increasing crop diversity through rotations has a positive effect on soil organic matter and soil fertility in wetter regions (Tiemann et al. 2015). In the northern Great Plains, crop rotations are limited to one per year. Therefore, mixing several species into a cover crop planting may be needed to provide diversity. Half the respondents felt that cover crop mixtures would likely improve short-term and long-term soil health more than single species cover crops. However, early results from our four-year WSARE-funded study suggest that soil benefits are more related to cover crop

biomass than species diversity (Housman et al. 2015), and cover crop mixes have not consistently provided more biomass than pea when grown at equal seeding rates. But, we have only had two rotations of mixed species cover crops (at four sites), so it may be too early to detect measureable effects of diverse species on soil properties. Research after multiple cover crop-wheat cycles is needed to determine whether mixtures are more beneficial to soil and net return than single species cover crops.

A slight majority (55%) of cover crop growers were willing to invest in cover crops without a return on investment in the year after their cover crop. This suggests desire to increase soil health, possibly for long-term economic benefit. On average, cover crop growers were willing to invest in cover crops for  $2.1 \pm 1.7$  years without a profit. MSU research has generally found no-till wheat and barley yields are similar or lower after one rotation of cover crops than after chemical fallow (O'Dea et al. 2013; Burgess et al. 2014; Miller unpub. data). After 4 cycles of cover crops, grain yields were similar or higher than after fallow, and in the 4<sup>th</sup> and 5<sup>th</sup> cycle, pea cover crop-wheat net returns matched or exceeded fallow-wheat net returns (in a 16" rainfall zone), without Natural Resources Conservation Service (NRCS) payments (Miller et al. 2015). Less than half of the survey respondents were aware that the NRCS provides financial incentives for growing cover crops.

There appears to be significant interest in using cover crops for forage, with about 30% of respondents indicating that they do, or would, consider this as an option. Integrating grazing with cover crops could help with financial return.

There are some misconceptions on the benefits and best management of cover crops. There are also clearly frustrations, ranging from a lack of willingness and cooperation from decision-making family members to lack of familiarity with cover crops and seeing neighbors struggle with them. Yet, most cover crop growers intend to continue growing cover crops. Based on this survey, research, agency and Extension entities need to continue their

efforts to provide information leading to cover crop success.

The most frequently posed questions were on the effects of cover crops on soil water and health, and the subsequent crop. Many respondents would like to learn more about best management practices, economics and cover crop use in forage production systems. The full survey and report are available at:

<http://landresources.montana.edu/soilfertility/covercrops.html>.

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