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Search for Excellence in Sustainable Agriculture
On-Farm Demo to Promote Cover Crops in Clay County
Narrative, 2021

**Educational Objectives**

Cover crops are becoming more popular in Arkansas. They can be used in a row crop setting to improve soil health and help with soil conservation. We have had several inquiries about the use of cover crops because Clay County has over 300,000 acres of corn, cotton, grain sorghum, wheat, rice, and soybeans. A local producer who had previously tried a cereal rye cover crop to prevent sand blows in his cotton, contacted me to ask about conducting a demonstration. At the time, the rest of the state of Arkansas was beginning a round of cover crop demonstrations. We joined in to participate so that most of the demos around Arkansas would have the same layout. Cover crops can potentially provide the following: economic benefits like reducing herbicide applications, reducing irrigation frequency by increasing water infiltration rates that allow for greater utilization of rainwater, and reducing the need to work/till the field. Some of these benefits like increased infiltration may take more than 1 or 2 years to observe. Others like reduced tillage and herbicide use are likely observable in the first year. With that being said, we decided to make this a three-year demonstration. When transitioning from a conventional-till system to a no-till system, with the use of cover crops, the reduced tillage is the biggest economic benefit. Often, the potential benefits of cover crops are lost when heavy tillage is reintroduced into the production system. In order to maximize the potential economic benefit of cover crops, their use should be coupled with long-term no-till, or as close to no-till as possible. Clay County Extension is promoting cover crops because they provide multiple potential benefits to soil health, while also helping maintain cleaner surface and groundwater. They prevent erosion, into compacted soil layers, making it easier for the following crop's roots to more fully improve soil physical and biological properties, supply nutrients to the following crop, suppress weeds, improve soil water availability, and break pest cycles. Some cover crops are able to break develop. The actual benefits from a cover crop depend on the species and productivity of the crop you grow and how long it's left to grow before the soil is prepared for the next crop. We also wanted the cooperator as well as other producers to be able to learn from our demonstration and apply it to their operations. Farmers must utilize all the tools possible to be able to remain in business and become more sustainable.

**Program Activities for 2019**

Terry Pollard split his 73-acre field on the edge of Clay County nearly in two. On November 21st, 2018, 56 pounds of a cereal rye cover crop were broadcasted across the 38-acre half of the field, which was planted into corn the year before. The other half, which was 35 acres that was planted in cotton the year before, did not receive a cover crop. On March 19th Latigo with

RoundUp PowerMax were sprayed on the non-cover side of the field for a burndown. A few days later a do-all was used to knock off the tops of the beds on the side with a cover to make planting easier. On April 23rd the cereal rye was 100% headed. Extension's recommendations were to spray the cover crop at that time because of a possible "green bridge" with insects, but the rain made the producer push that back. Cotton was planted into each field on April 27th at around 49,000 seeds per acre. The cover crop field was checked a little extra due to the fact that insects could have possibly been worse in that field than the field without a cover crop. Moisture sensors were also installed on each field to tell if there was a difference in moisture retention. When installing the sensors, we noticed that there was a hard pan in both fields. The cotton plants came up better and faster on the side with a cover crop than the side without. The stand wasn't near as consistent on the no-cover side, also known as the farmer's standard. On June 5th, after the cereal rye had flowered, Latigo with RoundUp PowerMax were sprayed to burndown the cover crop. Each week, the two fields were scouted separately. Both sides of the field were treated the same in regard to fertilizer and herbicides except for the initial burndown application and a necessary application of Folex to the Non-Cover side. The fields were soil sampled separately so that after the three years we would be able to tell the differences in fertility and organic matter. The side without a cover always seemed to show more herbicide injury than the other. There was also hardly any weed pressure on the cover crop field, with very little on the non-cover. When it rained, there was always more water standing in the furrows on the farmer's standard size, whereas the cover crop side seemed to soak it in. Each week the moisture sensors were checked, but they didn't want to work as they should. After a few weeks of investigating, we think that the problem with the moisture sensors was that there was a hard pan in both fields, making the moisture data skewed. At the end of the growing season when it was time to harvest, each field was measured and picked separately. The round bale modules were numbered and labeled according to which side of the field they came out of, then taken to the gin for ginning.

**Program Activities for 2020**

Last year in 2020, Terry Pollard conducted the same demonstration in the same field he used in 2019. He split the 73-acre field in two. On November 18th, 2019, 56 pounds of a cereal rye cover crop were broadcasted across the 38-acre half of the field. The other 35-acre half did not receive a cover crop just like the year before. A do-all was used to knock off the tops of the beds on the cover crop side to make planting easier. He plowed the furrows to make irrigation easier on the side without a cover. Terry's cereal rye did not have as good of a stand in 2020 as it did the previous year. It didn't take off near as well and had a harder time growing. At the end of April, the cereal rye was 100% headed. Extension's recommendations were to spray the cover crop at that time because of a possible "green bridge" with insects, but the rain made the producer push that back. On May 2nd, 30 ounces of RoundUp PowerMax was sprayed on the cover crop side of the field for a burndown. Cotton was planted into each field on May 2nd at around 49,000 seeds per acre. The cover crop field was checked a little extra due to the fact that insects could have possibly been worse in that field than the field without a cover crop.

Moisture sensors were also installed on each field to tell if there was a difference in moisture retention. When installing the sensors, we noticed that there was a hard pan in both fields. The cotton plants came up better and faster on the side without a cover crop possibly due to heavy rain and storms. Each week, the two fields were scouted separately. Both sides of the field were treated the same regarding fertilizer and pesticides. The fields were soil sampled separately so that after the three years we would be able to tell the differences in fertility and organic matter. The cover crop side was injured 6-8 times with a group 4 or auxin herbicide while the other was only impacted lightly once or twice. There was also hardly any weed pressure on both fields. Each week the moisture sensors were checked, but they continued having technical difficulties. At the end of the growing season when it was time to harvest, each field was measured and picked separately. The round bale modules were numbered and labeled according to which side of the field they came out of, then taken to the gin for ginning.

**Teaching Methods**

Throughout the two growing seasons, Terry spoke with us about how much of each pesticide he used. He explained that all year he would notice that the field with a cover crop looked so much better than the side without. We met with him to see what his scouts were finding in the fields so that we could see if we were getting the same numbers. The scout and I were very consistent during the growing season which makes Terry feel better about the good job his scout does. It is important to have a trustworthy scout that actually takes the time to see if you need to spray or not. They can cost you a lot of money if they tell you to spray when it is unnecessary, or not spray when it is. He learned that there was a possibility for more insects in the cover crop side due to the “green bridge.” In 2019 Terry asked that one of the stops on the East Clay County Field Day tour come to his farm to see what we had been doing with cover crops and to discuss what had been working for him. Although the field day got rained out and had to be moved indoors, there were still nearly 60 producers who attended with questions for us about the cover crop demonstration. Terry was anxious to talk to anyone with questions and even convinced a few other farmers to try a field or two of cover crops. The cover crop demonstration was also discussed at the annual Clay/Greene County Corn/Cotton Production Meeting in January of 2020. There were over 60 producers in attendance who listened to our report of the demo. Several asked questions regarding what we did, wanting to know if it was beneficial. Some of the farmers said that they were thinking about planting a few acres into cover crops next year. The demo field was going to be a stop at the 2020 Field Day, but due to Covid-19, it was cancelled. Fortunately, I was asked to work with our cotton specialist, Dr. Bill Robertson, to participate in the state-wide virtual field day that included a stop at our cover crop demonstration. The Division of Ag put on the virtual event to replace the in-person meetings so that our clientele could still get the information they needed. I was honored to have our Clay County demonstration to be a part of a meeting that was shown to cotton producers and industry personnel across Arkansas. Stewart Runsick, my staff chair, and myself also emailed the results and made copies of our demo book with the results inside to send to

our producers. The results would have been shared at the 2021 Clay County Production Meeting, but since Covid-19 is still hindering face-to-face meetings, that was not possible.

**Results and Evaluation**

After receiving the results from Graves Gin in 2019, it was surprising to us that the side without a cover crop, picked more than the side with a cover crop. All year, it seemed as if the cover crop side was healthier and had more lint. We know that crop rotation alone can benefit yields, which could be a big reason why the side without a cover crop yielded a little less. Cotton has proven to do better behind corn than when you plant cotton behind cotton. We think that might also have made a difference. We are mostly looking for long-term benefits, so we weren't too disappointed with those results. We hoped to see more the second year since both fields were previously planted into cotton.

In 2020, the results were very close. The lint yield between the two sides was just a little more than 4.5 pounds difference. The side without a cover crop yielded slightly higher than the side with a cover crop. The lower than expected yield on the cover side could also be attributed to the injury from the off-target movement of the group 4 or auxin herbicide. The cover crop side had a better turnout than the side without a cover.

The quality of the cotton between the cover and non-cover side were not statistically different in 2019 or 2020. We did not quite receive the results we were looking for in 2019, but with cover crops it usually takes a few years to see any benefits. The cover crop did appear to improve water infiltration. Haney Soil Health Test samples, nematode samples, N-STaR samples, and regular soil tests including organic matter were taken. After this year, which will be the 3$^{rd}$ and final year, we will compare them to see how they have improved. We utilized the Clay County Extension Council, the Clay County Cotton Subcommittee, and local crop consultants to get their feedback and evaluation of this program. They all requested that we continue the test for the final year to see if we can measure the benefits. Based on their opinions, we will continue to do so. Those results were discussed at the Corn/Cotton Production Meeting in 2020 and the 2020 virtual field day. The results were published on social media, on the Clay County Extension website, and in the Clay County Demonstration Book, which was handed out to local leaders and producers. There were 11 social media posts on Facebook and Twitter that dealt with the cover crop demo. These posts reached over 10,000 indirect contacts and nearly 2000 direct contacts in 2019. In 2020, 19 posts were made to Facebook and Twitter that pertained to the cover crop demo with over 13,100 indirect contacts and almost 700 direct contacts.

**Impact Statement**

Terry Pollard only had around 150 of his acres planted with a cover crop year before last. This past year he planted 300 acres with a cover crop, doubling his number from the year before. He has plans to plant another 200 acres this year. It might not sound like many acres to some farmers, but it is quite a few for a small farmer, especially when seed can be so expensive.

Three farmers that attended the field day in 2019, who also talked to Terry Pollard about his cover crop fields, tried cover crops in 2020. I have recently checked with them and they said that they all have their cover crops planted for this year too. Over 60 producers attended the Clay/Greene County Corn/Cotton Production Meeting in 2020. The participants took a survey that said they learned something new during the cover crop talk. Over 115 people attended the statewide Cotton Online Field Day last year in 2020.