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There's a buzz around annual ryegrass in the Midwest- is it right for your farm?

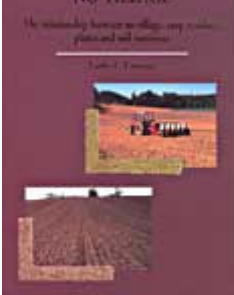
Photo courtesy of Christy Couch Lee.

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Going Deep with Annual Ryegrass

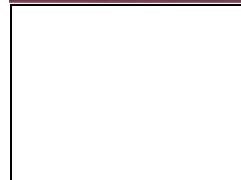
By Kyle Nickel and Christy Couch Lee

Annual ryegrass has been used for forage and cover crop in the southern United States for years, but no-till producers in the Corn Belt are beginning to recognize it as a valuable addition to their operations. Reduced fertilizer costs, higher yields from increased water availability, and improved manure management are just some of the benefits. But it won't happen overnight and it does take management.

“We subsoil our ground once in a while to break up compaction, and I thought with the root structure we have with the annual ryegrass, this would be a way to replace having to take that tractor out there across the field. Save some fuel and time and wear and tear on the equipment,” says Mike Starkey, a producer who no-till farms near Brownsburg, Ind.

Looking across the rows of annual ryegrass on Starkey's farm, one wouldn't recognize it as a significantly different cover crop. That's because the secret to annual ryegrass is below the surface: It has deep, strong roots that don't stop growing, even in tough Midwestern winters.

The deep roots do a number of important things, including speeding up water drainage, increasing soil tilth,



providing paths for crop roots to deeper supplies of water and nutrients, and providing a means for gas exchange in the soil nearest crop roots. All of which can reduce costs and increase yields.

Creating pathways

“The [ryegrass] root structure I’ve seen this winter has been incredible. I dug in January, and I was finding roots that went all the way down to the glacial till area. I’m talking about 17-21 inches deep. And that’s in January. It’s unreal how much the roots penetrate and open up the soil,” says Starkey.

The annual ryegrass roots go deeper than corn roots, but they are actually finer, and create paths of least resistance. “It’s like pre-drilling a hole for a screw,” explains Dan Towery, president of Ag Conservation Solutions.

At an August field day at the Starkey farm, corn roots that had followed the paths left by annual ryegrass went well beyond the top layer of rich Brookston soil to the bottom of the display pit. The visible roots measured approximately 44 inches, two feet below the hardpan.

The same root channels that lead the way for corn roots rush surface water away. “I got 3.5 inches of rain on a Thursday and was out spraying Saturday afternoon without even leaving a mark in the field,” says Starkey.

In years when the levels of precipitation are normal, yields may not increase significantly compared to fields under similar tillage and soil type. However, according to Towery, in dry years the corn will have access to water other plants won’t because of the access provided by the ryegrass roots.

Finer roots for better soil

The deep roots change the structure of the soil in a way that can be seen by the eye, but it alters it on the microscopic level, as well. “Annual Ryegrass can speed up the process of the transition between traditional tillage to no-tillage,” says Towery. “No-till results in an increase in mycorrhizal fungi. However, it is a slow process and takes about five years to see much increase.”

But annual ryegrass can speed up the increased presence of mycorrhizal fungi. These fungi grow rapidly in the presence of fine root hairs, like the ones on annual ryegrass, and enhance nutrient and moisture uptake.

“Annual ryegrass has massive amounts of fine root hairs - this increases the production of mycorrhizal fungi, but it still takes time and results will vary depending on soil type and pest management,” says Towery.

The fungi do more than increase nutrient and moisture uptake; they produce glomulin, which improves aggregate stability over time. Improved aggregate stability improves pore space and makes the soil more resistant to sealing over, increases infiltration and allows for gas exchange. All of this increases the opportunity for corn to absorb water and nutrients and increases the potential for a higher yield.



Corn roots on Starkey's farm go well into the subsoil where annual ryegrass was used as a cover crop.
Photo courtesy of Kyle Nickel.

Nitrogen management

One area where that increased opportunity may be most dramatic is in the realm of nitrogen. By planting the annual ryegrass as a cover crop, excess nitrogen left in the soil after a corn harvest is captured. The ryegrass takes the N into its roots and leaves and stores it there. After the spring burn down, the plant begins to decompose and releases the N back into the soil mid-summer, potentially at a time when corn needs it most. According to Towery, up to 80 pounds of N an acre can be saved each year, reducing fertilizer cost and risk of nutrient runoff.

Jim Hoorman, water quality extension educator at The Ohio State University, and his team are conducting a three-by-three replicated nitrogen experiment using dairy and swine manure applied at zero, 5,000, and 10,000 gallons per acre on bare ground, cereal rye and annual ryegrass.

"In our test plots, we are seeing up to 5.3 percent nitrogen absorbed by annual ryegrass or 400 to 500 pounds per acre. To get the nitrogen benefits the same year, you have to kill annual ryegrass in late March or early April when it is in the vegetative state and before it joints. Otherwise the cover crop turns to straw, which ties up N, and then it slowly releases the N over a long period of time," says Hoorman.

After several years of continuously using cover crops, Hoorman is also finding that P and K nutrient levels in the subsoil are decreasing while levels of the same in the topsoil are increasing. The cover crops, including annual ryegrass, are moving the nutrients to where the crops can use them more efficiently. This could mean a healthier corn crop for farmers who chose to use a cover crop like annual ryegrass, as well as potentially higher yields.

Who should use annual ryegrass?

Higher yields are a tantalizing proposition, and it's simple enough to begin using annual ryegrass. It can be broadcast sown, harrowed in, or drilled. Ron Althoff, an agronomist and annual ryegrass dealer with Saddle Butte Ag, reports that he has a customer so convinced of the benefits of annual ryegrass that he hired a person to follow the combine with a drill.

"When they pull out of that field after harvest, they're done with it until spring and have a cover crop," says Althoff.

But is it for everyone?

"Don't put the whole farm out and expect big results. Put 20 acres out and observe that, and then go from there. Figure out what your issues and problems were, and learn from that," says Starkey.

Towery agrees, "This is for farmers who have already been no-tilling for awhile. It'd be good for someone who has no-tilled for several years and acquired new ground that has been under conventional tillage."

Burn down worries

Althoff makes a point of noting that some producers have a negative misconception of annual ryegrass, "This isn't the stuff that the Australians had trouble with." In 1996, reports indicated that ryegrass in Australia had become glyphosate resistant. "They have *loium rigidum*; this is *loium multiflorum*. Different species."

But the use of glyphosate can be a tricky part of the equation. If producers are going to spray ryegrass with day temperatures of about 40 degrees and night temperatures of 30, it may take four weeks to kill it. A second application may be necessary. According to Towery, two details of glyphosate application are critical. The first is to only spray 10 gallons per acre. Farmers may be used to applying 15-20 gallons an acre, however the herbicide isn't diluted as much and packs a bigger punch. The second detail is that if temperatures are cool, you probably should quit spraying by mid-afternoon and allow a longer time for the chemical to move through the plant.

“It takes management,” says Hoorman, who also warns that it can quickly become an expensive “weed” to control if it gets in wheat. “You have to be careful, especially if you’re broadcast sowing.”

The future of annual ryegrass

The most recent buzz around annual ryegrass is the belief by some researchers that there may be a connection between annual ryegrass and soybean cyst nematode populations. There are no conclusive studies as of yet, but speculative reports suggest that annual ryegrass may bring soybean cyst nematode populations down dramatically in certain soil types.

“It’s too soon to say anything for sure, but we’re optimistic,” says Towery.

Like all new practices, using annual ryegrass will be challenging. The details required in timing and careful management may make it a difficult endeavor for a producer just beginning to no-till, but for those that have practiced no-till for several years and have the challenges associated with that transition worked out, annual ryegrass may be the next step toward reduced fertilizer costs and greater yields.

About the Writer: Kyle Nickel is the CTIC Communications Director.