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Teen's Invention May Save Lives

Mason Gahler of Pierz, Minn., may be in high school, but his credentials already include an invention that could save countless lives, a tool he calls the Grain Gyre.

"My idea for the Grain Gyre started in 7th grade when my ag teacher Mrs. Tax showed us a video of a grain bin incident," says Gahler.

Accidents like this cause over 20 fatalities a year. When grain is unloaded from a bin, it flows downwards from the top center, creating a funnel that sucks it down to the conveyor at the bottom. This flowing grain behaves like quicksand and can bury a full-grown adult in under 30 seconds. Getting out can be almost impossible, which is why Gahler's Grain Gyre focuses on preventing farmers from stepping into their silos in the first place.

The Grain Gyre includes an auger at the bottom of the bin that suctions up the grain and transports it back to the center. This prevents air pockets and eliminates the funnel effect, meaning a farmer who steps in won't get sucked to the bottom. And because the crop continuously moves throughout the bin, it tends to dry faster, minimizing the risk of sticking to the sides.

In November 2022, Gahler worked with his father to build a scale model of his idea. "My design has changed a lot since I was in 7th grade; there's been a lot of trial and error," he says. "The final design focuses mostly on unloading your bin and stirring it during the off-season to get clumps off of the bin's walls. When my dad and I finally flipped the model's switch, it did more than I expected it to!"

Gahler is currently working to get his invention patented. Looking toward the future, he plans to get a model of the Gyre built and installed into a grain bin that's getting built in his yard. This will allow for more testing to ensure it lives up to its promises.

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Mason Gahler developed his Grain Gyre to move grain in the bin making it less likely for grain entrapment.

With relay cropping, the second crop is planted while the first is still growing.

Relay Cropping Boosts Bottom Line

By Jim Ruen, Contributing Editor

Mitchell Hora is a big fan of cover crops, especially when they allow him to harvest rye or wheat and a crop of soybeans from the same field. Unlike double cropping, where one follows the other, with relay cropping the second crop is planted while the first is still growing.

"A lot of our cover crops are harvested, not terminated," says Hora. "Cereal rye is ideal due to its height difference over soybeans when it's harvested."

Hora and his father Brian have been doing relay cropping for about 5 years. They started with a 10-acre plot and are now at 150 acres of their 350-acre soybean fields. Cereal rye is solid seeded in the fall at a 55 to 60-lb. rate with 7 1/2-in. row spacing at a slight negative angle to the corn stubble. In the spring, he decides whether to terminate it or harvest it.

Soybeans are solid-seeded at the same 7 1/2-in. spacing the second week of April when the rye is only 4 to 6 in. tall. It's drilled into the rye at a slightly positive angle. The combination of off (corn) row planting helps break down the stubble.

"At that point, the rye is still short enough that the emerging soybeans aren't shaded out," says Hora.

As with any cover crop, the previous year's nutrients are carried forward. Hora reports 120 credits following cereal rye. This benefits the growing soybeans in two ways. Because the N is sequestered in the rye, the soybeans have to work harder to produce the N they need.

"The soybeans nodulate more, and then the harvested rye releases sequestered nutrients in August and September when the soybeans need it the most," says Hora.

As a result, after taking a 30-bu. per acre rye harvest, he later harvests 70-bu. soybeans. "The rye crop also reduces our need for fertilizer and pesticides," says Hora.

"We harvest the rye in mid-July when it's about 4 ft. tall," says Hora. "We have to manually control the header, as there's only about 15 in. clearance over the soybeans. We follow harvest with a single herbicide pass of Roundup to clean up the field."

Initially, crop insurance was an issue when trying relay planting. "You have to have conversations with crop input providers, crop insurance providers, and your banker," says Hora. "Everyone has to be on the same page, but we've been able to prove it works much better than a conventional single crop system."

The proof comes in the increased income from the sale of rye seed at $15/bu. off the farm. At 30 bu. per acre, it adds $450 per acre income while reducing soybean inputs. While it may limit potential soybean yields, that's not a problem for the Horas.

"Growing 100-bu. soybean yields is not something we want to pursue on our farm," he says.

Combined with long-term no-tilling and heavy use of cover crops, reducing inputs is adding more to the bottom line. Hora credits improved nutrient cycling and availability, as well as increased biological activity. Organic matter has increased by 1.2 percent over 10 years.

"We can infiltrate 4 in. of rain in 6 seconds," says Hora. "The national average is 1/2-in. per hour."

Off-farm input reduction is also paying off. The Horas have reduced nitrogen applications from 230 units to about 155, with a whole farm average yield of 245 bu. Pesticide applications have been reduced by 75 percent.

"Phosphorus has been cut to 50 lbs. every other year from 250 lbs. every year," says Hora. "We completely eliminated potassium applications aside from a little potassium sulfate. We have reduced MAP from 250 lbs. every year to 50 ahead of corn and have done zero lime for the past 11 years."

Carbon credits are another way the no-till, cover crops, and relay cropping will pay off. "The national average for carbon intensity is 29.1 per acre," says Hora. "Our score is a negative 4.4. This will be extremely important for low carbon markets and is a huge opportunity."

Hora continues to farm with his father, exploring and intensifying their regenerative farming practices. At the same time, he heads up Continuum Ag, a soil health data intelligence firm, for others wishing to improve their soil health.

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Relay cropping cereal rye with soybeans.