

**Matt Burkholder in the field with multi-species cover crops, including rye, oats and legumes.**



## He Plants 16 Crops In One Field

Matt Burkholder plants up to 16 different crops in a single field, not for harvest but to build the soils for future crops. His multi-species cover crops are part of an intensive soil-health improvement process. He drills them on behind wheat and often air seeds cover crop seed into pre-harvest soybeans. In the spring, he plants into standing cover crops before terminating the cover crops with herbicides.

“Cover crops and no-till have raised

my soybean yields by 10 to 15 bushels per acre and my wheat by at least 10,” says Burkholder. “I have a clay knob I started farming 12 years ago. Soybean yields on that field have gone from 40 bushels per acre to 55 this year. If it can work on poor quality soils, it works elsewhere too.”

Costs have dropped as well. Burk-

holder is no longer planting GMO soybeans, nor is he using seed treatments and fungicides. “I use no insecticides on either soybeans or wheat because I don’t want to kill beneficials,” he adds. “I apply an inoculant and beneficial microbes. They are very effective.”

Planting covers has been a learning experience for Burkholder. He started with just one cover crop and not much guidance. Even the co-ops who sold him the seed couldn’t help. He credits a couple of friends and the staff of Sustain Seed+Soil for encouragement and counsel.

Gradually he began adding more species, especially following soybeans. The mix of 16 species is the most yet, including grasses, brassicas like radish and turnip, peas, clovers, buckwheat and two types of oats.

“I usually like to have at least three types of cover crops in a mix - grasses, brassicas and legumes,” says Burkholder

Along the way, he has made mistakes, like planting too high a rate of clovers that attracted voles. They dug out corn seed, resulting in a less than desirable stand.

“Now it’s my turn to help other farmers

in my area,” says Burkholder, who is an advocate for conservation with The Nature Conservancy. “Sometimes it seems like I’m one of the few in the county working on regenerative agriculture. I know other farmers drive by and turn their heads to see what I’m doing.”

Sometimes they stop and ask. He recalls a neighbor asking about the field with the clay knob. “He asked what I was doing,” says Burkholder. “He could see the crop was greener and looked better. I’m glad to take time and answer questions.”

Burkholder has seen the impact of the multi-species cover crops. He points to the different root structures and rooting depths of different species. He notes that they sequester different nutrients, and that benefits the following crop.

“Cover crops save me money, build soil health and are good for the environment,” says Burkholder. “I believe in the system and know it is working. Even when I make a mistake, I will keep working on it.”

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## “Made It Myself” Hillbilly 4-Wheeler

Nate Smith’s hillbilly 4-wheeler is a perfect example of his jack-of-all-trades skills, playful creativity, and passion for never wasting anything.

“I was bored and like to mess around with engines. It’s one part snowblower, two parts minibikes and a pony saddle,” he explains, adding he recently swapped out the saddle for a more comfortable tractor seat.

Smith built it while spending time on his mother’s farm, and she said he needed to do something with all his old stuff. Instead of trashing it, he took off the front of a snowblower and the backs off two minibikes and bolted and welded them together. He added a pedal connected to the 11 hp. Briggs and Stratton engine. Lining up the frame to the snowblower body was tricky and he had to add more bracing to beef it up after bending the frame. Smith also tried reverting it up with a bigger pulley to go faster - 40 mph. But after flipping it a couple of times he downsized the pulley.

His hillbilly 4-wheeler goes about 10 mph, and with solid rear tires isn’t the



**Smith built his hillbilly 4-wheeler from a snowblower, two old minibikes, and a pony saddle.**

smoothest ride, Smith notes. But there is some suspension, and he likes to take it out for rides.

“It’s a tight squeeze and I get weird looks,” he says with a laugh, but with the original disc

drive, he has six forward speeds and reverse.

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## Replacing Rubber Tires With Pressurized Wheels

**By Bruce Derksen**

Global Air Cylinder Wheels (GACW), an Arizona startup, says it has reinvented the wheel.

While working for Volkswagen in 2011, principal investor Dr. Zoltan Kemeny - a professor, architect, seismologist and structural dynamic engineer - came to believe that the current design of wheels and tires is not efficient. Based on a napkin drawing, he patented his idea for a new wheel option and shelved it for later review.

Harmen van Kamp joined the company in 2016 and soon after the two men began actively marketing the concept. They located investors and completed testing.

“We have been granted six patents and have 72 international patents pending,” says van Kamp, GACW’s Global Sales SVP. “They cover any wheel on any type of vehicle. That includes wheelchairs, bicycles, cars, airplanes, racers, buses, trucks, OTR applications, ATVs and military equipment.”

Wheels are made of rigid solid steel in the outer drum covered with polyurethane treads around the perimeter. Mounting discs secure the wheel to the existing axle. Multiple nitrogen cylinders inside the wheels provide flexibility.

Van Kamp explains that the cylinders provide the needed suspension to control vibration and deflection like a rubber tire. Operating pressure is 2,300 psi, but the cylinders are rated for 10,000, allowing plenty of room for overloading, even in the harshest conditions.

“The nitrogen compressed cylinders are hugely beneficial as they provide an exponential rather than lineal suspension like rubber tires. They have a dampening and soothing effect on the drivetrain, axle and engine.”

He adds that the wheels are designed to offer up to 87,000 hours of use. Safety is a huge asset as cylinders bring the flexibility and strength of the wheel to the inside rather than having the flexible portion constantly touching the ground as rubber tires do.

“The wheels are 100 percent recyclable,” van Kamp says. “Only the removable treads need to be replaced although we’re working on an idea to use existing unrecycled rubber for treads. We also believe there will be a substantial amount of fuel savings when using the wheels. Conservative numbers say between 8 and 30 percent on hard road conditions with rolling resistance reduced by 60 to 70 percent. We’re in the process of proving these metrics with real data for our



**GACW’s new wheels are made of rigid steel and covered with polyurethane. Nitrogen cylinders inside the wheels provide flexibility.**

customers.”

In the future, GACW hopes to move from retrofits to designing equipment for any rim size, width, diameter, speed rating or payload.

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