Robot fleet in action weeding a field.

Robots Keep Fields Weed-Free

Clint Brauer put his California technology experience to use when he returned to the family farm in south central Kansas. Needing to fight herbicide-resistant weeds and wanting to reduce chemical use on the farm, Brauer came up with a novel solution. Over the past several years, he has been building a fleet of robots. They're designed to travel between rows, cutting any weeds they encounter, day or night. Solar panels power the robots, including the dual motors at the front of the machine with their rotating blades.

This year, Brauer's company, Greenfield Robotics, has its third-generation fleet working on paid acres in Nebraska, northern Oklahoma and south-central Kansas. It's the company's third year of paid acres of weed control.

"We reached our goals for the summer, but I feel we need one more summer of field trials," says Brauer. "Our hardware will be where we want it by November of this year, and we're confident our software will be ready by April next year."

One new piece of hardware to be added in 2025 is a state-of-the-art light sensor for real-time tissue analysis. Rock River Laboratory developed the sensor to identify nutrient deficiencies in crops. It was field-tested on broad-acre crops, like soybeans, in 2024.

"By combining Rock River Laboratory's expertise in plant tissue analysis with our robotics technology, we're working toward providing farmers with a powerful tool to take proactive control of their crops' nutrient health," says Brauer.

The machines are 4 ft. long, 3 ft. tall and sized to fit in 30-in. row spacings. Cameras and guidance system antennae ride on a 5-ft. tall pole. Weights range from 300 to 400 lbs., depending on the version. Suspension, safety features and a chassis designed to support modular attachments (like sprayers) are proprietary designs built from the ground up on Brauer's farm.

"Any part on the robot can be replaced in 15 min. or less," says Brauer. "That was my edict after working on poorly designed equipment growing up on the farm."

In addition to reducing chemical use, Greenfield robots will cause only a fraction of the yield-robbing compaction left behind by even moderate-sized tractors or highboy sprayers.

"We're testing them out for foliar feeding," says Brauer. "We want to see if they can carry enough product to feed the crop while cutting weeds."

"We feel the fewer sensors, the better," says Brauer. "We use field imagery as part of how we navigate and ground-truth as the robots travel the field."

A drone captures a field map, including borders and anomalies, such as irrigation systems and even coyote burrows. Brauer notes that the latter are common in his part of Kansas.

"Our images have to be hyper-precise," he says. "Ours are within 1 to 2 cm."

Using the field map and guidance, the robots travel the field as a swarm, each carrying out the task on its rows. Using machine vision and AI, they talk to each other, deciding where to go, all on their own.

"The farmer doesn't have to be there," says Brauer. "We don't even have to be there."

The number of units in a field will depend on its size and weed density. Advances in software have increased the number that can be operated at once.

"Two years ago, with a communications center needed at the end of the field, we could handle up to 10 units in a field at a time," says Brauer. "We eliminated the need for communications, so now the question is what is the right size fleet for a particular field, and how soon can it get the job done? Most times, we want it done in 1 to 2 days."

Once in the field and operating, the AI-type software system can adapt on the go. If equipped with tracks, Brauer expects the robots will be able to bridge coyote holes, eliminating them as a problem.

He's confident Greenfield Robotics is close to a commercial introduction. Several large investors, including the investment arm of Chipotle Mexican Grill, agree. Greenfield Robotics has raised around $12 million in capital and is seeking more.

Brauer says his next big challenge will be connecting with farmers. Does Greenfield handle delivery and service, or does the secondary market handle that?

"How do we make this smooth for everyone?" questions Brauer.

Contact: FARM SHOW Followup, Greenfield Robotics, 36706 W 39th St. S, Cheney, Kan. 67025 (GFR@Greenfieldrobotics.com; www.greenfieldincorporated.com).

Robot's size minimizes field compaction is are designed to fit between 30-in rows.

Hitches are plumbed into the truck's air system, and one to four airbags are automatically inflated by accessing a factory-set, inline head-leveling valve. This valve allows the proper amount of air to enter depending on the trailer's weight.

Air-Controlled Hitches Are Ideal For RVs And Large Horse Trailers

To address routine motion and stress from standard 5th wheel RV and horse trailer hitches, PopUp Towing Products and sister company Young's Welding created their ET Air Ride 5th Wheel Hitches.

The specially designed "air-controlled" hitches come in various configurations and can handle gross trailer ratings up to 40,000 lbs. Double parallel arm links on either side of the hitch control horizontal and vertical forces, absorbing movement and motion stress to nearly eliminate chucking. This means less wear and tear on the truck, trailer, livestock and passengers.

"Our hitches are perfect for RVs and larger living quarter horse trailers," says Sales and Marketing Representative Brian Fairchild. "It makes a huge difference in fatigue levels when transporting show or performance horses. They're not constantly bracing themselves for bumps and stops and starts."

The hitches are plumbed into the truck's air system, and one to four airbags are automatically inflated by accessing a factory-set, inline head-leveling valve. This valve allows the proper amount of air to enter depending on the trailer's weight.

"The operator doesn't need to do anything, just hook it up," Fairchild says.

Young's Welding builds the ET hitches using quality components, including case-hardened shafts, greaseless composite bearings and thick mounting plates.

Fairchild recommends interested customers contact them directly for costs and installation requirements, as truck frames may need to be extended and modified to accommodate the specially designed units.

Contact: FARM SHOW Followup, PopUp Towing Products & Young's Welding Inc., LLC, 4330 S. Johnson Rd., Chanute, Kan. 66720 (ph 800-837-8578; info@popuphitch.com; www.popuphitch.com).

Sturdy Cattle Gate Wheels

When it comes to farm gates, Tech Team has devised ways to make them convenient to use and last longer. Their newest products make installation even easier.

Ted Werner, owner, understands that because he farms in addition to running Tech Team.

"I've struggled with gates and realized that very few people know how to build a good hinge post, and a good hinge post should be the first step when installing a gate," he says.

His first gate project was adding a 16-in. flat free wheel to make opening gates over rough turf easier.

"Having a wheel to support the end of the gate also prevents the gate from sagging and moving, so the gate and posts last longer," he says. "A good gate wheel simplifies and changes the dynamics."

The newest model, 945, has spring suspension and comes with an 8-in. solid rubber tire with a steel hub and roller bearing. The biggest difference is how it mounts to tube gates with a newly designed mounting bracket using the included U-bolts, making installation quick and easy. For installation on other style gates, the punched square holes accommodate 3/8-in. carriage bolts. The model 946 has a 4-in. wheel that works well with residential gates.

"Everything installs without welding. They're purpose-built and overbuilt to last," Werner says, noting the zinc plating finish passes the 96-hr. salt spray test and is suitable for a marine environment.

Tech Team's newest gate wheel model, 945, has spring suspension and comes with an 8-in. solid rubber tire with a steel hub and roller bearing.

Tech Team also makes slide bolt and cowboy gate latches, and drop rods for double gates and spring-loaded gate casters. Get more information on the business website and shop for products through Amazon and businesses such as TSC.

Contact: FARM SHOW Followup, Tech Team, P.O. Box 983, Middleburgh, N.Y. 12122 (info@techteamproducts.com; www.techteamproducts.com).