

Testing Offers Unique View Into Soil Health

A new approach to soil testing goes beyond N, P and K, and key micronutrients. The Rhize Soil Health Test measures the microscopic life forms and available nutrients that support crop life and predict end-of-season yields.

"The soil's complex is difficult to digest or make sense of," says Joshua Toal, RhizeBio. "We focus on the root system and specialize in DNA sequencing of the soil around it. In our analysis, we screen and pick up on thousands of different species."

The RhizeBio report provides data on biodiversity, including the number of species, community evenness and primary members. It also includes functionality, such as the soil's ability to withstand drought and disease. Disturbance ratings and nutrient cycling potential are also provided.

"We can tell if the field was tilled or no-tilled and if the soils were waterlogged by looking at oxygen levels," says Toal. "The report provides categories, such as the number of nitrogen cycling species and how many phosphorus cycling species we observed."

Once species present in the soil have been identified, connections can be made between organisms in the soil, growth patterns, plant diseases, or problems with nutrient availability. These can lead the way to changes in management. Likewise, a baseline test before a management change and a follow-up test can help evaluate the change's impact.

Toal notes that a good portion of their business is with agronomists and input manufacturers. The test results are especially helpful when evaluating biological stimulants and different seeds in a greenhouse situation.

"Send in a sample of the soil and the seed you were planning to use, and we'll conduct a greenhouse study, looking at different biological inputs to see the best candidate," says Toal. "A farmer can work with us



The study is quicker than running a field trial and more informative, explains Toal.

directly, but the majority work through an agronomist."

Toal explains that the study is quicker than running a field trial and more informative. He recommends pulling soil samples on a per-soil basis, and he adds that timing is also important.

"The soil microbial population is fairly stable through the season," says Toal. "However, we recommend sampling the first week after planting. We find that the first week is the most important for predicting future crop outputs and end-of-season yields."

A soil sample analysis with a pathogen screen is priced at \$255. Toal explains that the Rhize Soil Health Report is different from microbial tests offered by most competitors. "Most DNA sequencing makes predictions from a small number of genes," he says. "RhizeBio technology uses all the microorganisms from a sample."

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Robots Improve Cover Crop Seeding In Corn

EarthSense has developed a method of seeding cover crops in corn fields without using a drone or waiting until the corn stalks are harvested.

The TerraPreta is a small, 18-in. wide seeding robot that features a small hopper that holds up to 90 lbs. of seed, an auger system that pushes it to the dispensing mechanism, and a blower that evenly spreads the seed across five 30-in. spaced corn rows. A single robot can seed approximately 20 acres in 6 to 8 hrs.

"The robots have GPS, but it's notoriously unreliable in corn rows under the heavy canopy, so we operate without it," says Project Lead Antony Silveti-Schmitt. "Our biggest innovation is our front-mounted computer vision camera sensors to recognize row structure, predict the path and navigate."

The units are powered by rechargeable lithium batteries. A full battery charge lasts about 4 to 8 acres or 3 to 4 hrs.

Seeding speed is comparable to drone seeding, but the robots carry more weight and get much better seed-to-soil contact, as the seed doesn't need to find its way down through the heavy canopy.

EarthSense currently operates 20 robots but is manufacturing another 40 this year. In 2024, they seeded around 1,000 acres, but with the added units, they expect to reach approximately 10,000 acres in 2025.

"We'll sell the robots, but for now, we want to become the best full-service provider possible," Silveti-Schmitt says. "We want



A single robot can seed approximately 20 acres in 6 to 8 hrs.

farmers to call us, give us a window of seeding days, and we'll come with people who know how to operate them and the seed required. We'll seed the field and leave without any headache on the farmer's part. Our goal is to make cover cropping easy and inexpensive. We're a robotics company, but we want people to consider us the cover crop kings."

Silveti-Schmitt says the cost to the farmer this year will be around \$5 to \$10 per acre, including robots, staff and seed.

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Rather than coupling the tank's PTO drive to the tractor before each use, the main hose is connected to the rear of the pump. As the tractor completes sharp corners, the hose moves freely as it slides back and forth.

Vacuum Tank PTO Turns On A Dime

Dairy farmers pulling vacuum pump tanks through tight-cornered barns know all about the issues and dangers live PTOs present. Rather than keeping them running, they're often forced to disengage them at every corner to avoid costly damage to drive shafts and universal joints.

APM Manufacturing recently developed its patented Pivot Tank to address these challenges. The machine resembles a standard vacuum tank, but the PTO is mounted on the tractor's 3-pt. hitch instead of the tank's tongue.

"This unique positioning keeps the PTO drive system square to the tractor at the same distance and angle no matter how tight the turning radius," says APM Manufacturing Project Manager Michael Rothe. "The operator doesn't have to disengage the PTO at the corners but can keep the vacuum running without missing anything."

Rather than coupling the tank's PTO drive to the tractor before each use, the main hose is connected to the rear of the pump. As the tractor completes sharp corners, the hose

moves freely as it slides back and forth.

The Pivot Tank maintains all the standard capabilities of earlier vacuums. All controls are mounted in the tractor's cab. Units come equipped with an adjustable discharge spray nozzle on the rear of the tank.

The unique Pivot Tanks are manufactured in Texas and available throughout North America from a network of dealers.

Tank sizes range from 3,000 to 5,000 gal. and come with a single axle or dual axles that feature rear-steering capabilities.

"Since dairy farmers use them daily, they're usually dedicated to a specific tractor to be ready to go," Rothe says. "We gladly talk to farmers and figure out the best tank for their tractor and operation size."

The popular 4,500-gal. Pivot Tank sells at an MSRP of \$129,500 plus S&H. Discounts may apply.

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"GST Denmark and Biostar want an aggressive machine with versatility and uniformity to do multiple jobs. With this equipment, you don't just use it once and put it away. It's valuable in all seasons," says Mahaney.

Retooled Rotary Hoe Contributes To Sustainable Cropping

The Biostar Seeder is manufactured by GST Denmark, and BioCovered of Iowa holds the U.S. market rights.

"We want to revolutionize and modernize the rotary hoe," says BioCovered owner Eric Mahaney. "The Biostar Seeder is focused on crust busting, weed management and seeding, eliminating the need for extra passes by doing more than one thing at a time."

Machines ranging from a few feet to 50 ft. in length are tailored to the farmer's needs. Models feature hoppers with variable compartments for commodities such as seeds, fertilizer, and chemicals for weed control. "We not only sell machines and parts, but if a producer wants custom applications, we'll help them make it happen," Mahaney says.

A hydraulically driven fan runs to a maximum of 3,300 rpm.

"Just turn on the fan, and it blows the product from the tank, dispersing it evenly across the frame in front of the rotary wheels about 12 in. off the ground," he says. "The wheels agitate the ground to provide the

optimal seed-to-soil contact. They're also adjustable on the third link of the 3-pt. hitch for aggressiveness."

Options include variable tank sizes from 850 lbs. to 3 tons of product and cab-mounted computer monitoring systems compatible with apps, iPads and ISOBUS, ensuring precise application and efficient operation.

"It's highly efficient with the accuracy and coverage everyone is looking for, even at speeds up to 20 mph," Mahaney says. "GST Denmark and Biostar want an aggressive machine with versatility and uniformity to do multiple jobs. With this equipment, you don't just use it once and put it away. It's valuable in all seasons."

The Biostar Seeder is available across North America for \$45,000 to \$130,000, depending on size and options.

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