

Advancements In Targeted Pest Management

In agricultural pest management, traditional broad-spectrum pesticides that control fungi, insects and plants often harm beneficial organisms alongside target pests. As pest resistance grows and regulatory pressures mount, the need for more precise, species-specific solutions has never been greater.

Dr. Justin Pahara, an Agriculture and Agri-Food Canada Research Scientist in Lethbridge, Alberta, and his team are committed to advancing targeted pest management by developing new active ingredients that can be delivered to specific pest species.

“Our group focuses on how to get ingredients into target pests,” Dr. Pahara says. “Many studies are working on creating active ingredients, but the limitation, in our opinion, is reliably getting new active ingredients into those targets.”

While traditional pesticides rely on small molecules that aren’t easily designed to be species-specific in broad-spectrum applications, emerging technologies focus on nucleic acids such as DNA and RNA. These molecules can be engineered to target only specific species, thereby reducing collateral damage to non-target organisms.

“They’re a bit bigger and also more susceptible to environmental factors,” Dr. Pahara says. “They can quite easily break down and degrade. Unlike the biomedical realm with controlled environments, in agriculture, we spray the field, and the weather is what it is, plus there are lots of organisms floating around. We need to protect these new ingredients and ensure they reliably meet the targets.”

To overcome these obstacles, the team is conducting research at the Canadian Light Source (CLS) facility at the University of Saskatchewan, using nanoparticles to deliver active ingredients directly to pests. With advanced equipment, including the CLS BioXAS beamline, they’re tracking how nanosystems move, whether they adhere to body surfaces, penetrate, or accumulate within target insects. The findings are guid-



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ing the team in designing nucleic acid-based solutions that target specific tissues or cells within pests, thereby enhancing both efficacy and safety.

The research is ongoing, with experiments currently limited to laboratory settings due to regulatory permits. Specialized spray chambers and a steady supply of pest colonies, including lygus bugs, cutworms and Fusarium fungi, are advancing the work. The research spans a range of species, including kochia, and explores delivery methods for crops such as soybeans, corn and barley.

“Ultimately, our goal is to produce early prototypes and partner with commercial companies to combine these innovations into agricultural products,” Dr. Pahara says. “I believe this research is extremely important and hope others will join in focusing efforts in this area. We must address the growing tolerance of pests and find our way through evolving regulatory barriers.”

Dr. Pahara invites producers to share their concerns and collaborate to shape the future of sustainable agriculture.

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Time Saving AI-Powered Agronomy Solutions

FarmMind, a new player in agricultural technology, is quickly making waves by redefining how farmers and consultants make decisions and automate workloads. Born in 2023 from a collaboration between AI researchers and the LSU Ag Center, FarmMind set out to address a key challenge: traditional AI systems struggle to think like agronomists and don’t grasp the nuances of regulatory labels or agricultural research. After a year and a half of intensive problem-solving and innovation, FarmMind developed an AI engine tailored to the unique needs of agronomy.

Unlike generic AI platforms, FarmMind’s system is designed as a virtual research assistant. It not only understands complex agricultural problems but also navigates more than 16,000 EPA-approved herbicide and pesticide labels. Users can ask label-related questions and receive nearly instant answers, complete with citation links for easy verification.

“Ask a label question, find the information, click on the citation, and it’ll bring you to the page where it’s written,” says Colin Raby, FarmMind CEO. “Our philosophy is we don’t want you to trust it; we want you to verify it. And we make that part easy.”

The platform’s intelligence goes beyond label reading. Farmers can instantly find chemical application rates tailored to specific field sizes, compare crop varieties, or access up-to-date recommendations. Tasks that once took hours now take seconds. An earlier version of FarmMind, released in spring 2025, operated as a chat tool, but feedback showed that embedding AI directly into existing agricultural workflows (mapping, field notes, calendars, documentation and pesticide recommendations) would save even more time and improve usability.

“Our main focus is on consultants and growers, many of whom currently juggle up to five different software tools,” Raby says. “Paying for five isn’t necessary. With us, you don’t need to do that.”

The company’s integrated approach offers



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a single, streamlined platform at a competitive price. Subscriptions are \$99/month or \$999/year, priced at or below the cost of other agricultural software suites, with potential discounts for cooperatives and extension services.

Specialized partnerships with irrigation and drone companies have already begun, expanding FarmMind’s reach and capabilities. Once the central intelligence is built, adapting it to new workflows is relatively fast, making rollouts across sectors straightforward. While 80% of FarmMind’s system is globally applicable, the company is currently focused on optimizing its platform for U.S. users.

Headquartered in Innovation Park, Baton Rouge, FarmMind is committed to keeping technology accessible, independent, and unbiased by large agribusiness interests.

“It’s important that we support the resilience of the U.S. ag sector,” Raby explains. “Margins are abysmal, with farmers going out of business. If we can contribute to reducing costs, improving yields, cutting through documentation, decreasing time spent on gap analysis and compliance issues, which will help growers focus on what matters, then that’s our goal.”

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Computer Generated Photo

GrazeStat is not a diagnostic system. Rather, it’s a decision-support tool for determining when to call an expert.

Tracking Software Shows Equine Health

Sean Fintel of Firth, Neb., aims to transform the future of equine health with GrazeStat, the first equine health-monitoring tool that combines visual data with smart analytics to quantify horse behavior and assess overall health.

“GrazeStat is an equine health and feeding intelligence system built to provide horse owners with earlier, more actionable insight into daily health patterns—before subtle shifts escalate into serious concerns,” says Fintel. “It currently has five pilot prototype systems scheduled for deployment in mid-

2026, with commercial rollout anticipated in late 2026 to early 2027.”

It’s an invention close to his heart. Fintel’s earliest memories are on the family farm, where intervention was necessary in the winter months to prevent newborn calves from freezing. His deep desire to help animals thrive only grew stronger in 2013 after losing a bred mare to late-gestation colic. Today, Fintel and his wife care for horses and other animals on their expansive acreage in Nebraska. Traveling for work leaves the animals unattended, and even when home,

they can’t monitor the horses 24/7.

With GrazeStat, he aims to address this problem. The tracking will leverage continuous, passive monitoring at the resource zone (following additional testing and commercialization) to capture visit frequency and duration, water intake, facial pain cues, gait analysis, and behavioral changes.

Fintel clarifies that GrazeStat is not a diagnostic system. Rather, it’s a decision-support tool for determining when to call in an expert. The technology doesn’t interfere with the animals; it quietly observes and learns from their daily patterns.

Once a horse’s profile is created in the GrazeStat app, the system establishes the horse’s normal baseline over several days. App users will then receive daily health summaries, trend alerts, and shareable reports for veterinarians or caretakers. If behavior deviates from the horse’s baseline, notifications are sent via text or through the GrazeStat app.

GrazeStat pricing has not been finalized, but Fintel predicts that a \$74.95/month subscription will cover up to three horses, at an annual cost of about \$300 per horse.

“Preventing a single colic episode, choke event, or delayed diagnosis could offset multiple years of GrazeStat subscription costs,” Fintel says. “Emergency veterinary services easily reach the thousands. In contrast, GrazeStat can identify subtle changes in feed and water behavior before the issues escalate.”

A patent-pending accessory package will provide continued surveillance options beyond the resource zone, including when the horse is out to pasture, traveling in a trailer, or being ridden or boarded in a stall.

The device pairs well with the EZ Grazer Ultra Hay-Net Feeding system, another Fintel invention. It’s designed to keep forage elevated, contained and protected, improving feeding efficiency and horse health by helping animals follow their natural grazing instincts.

Horses will graze for 14 to 18 hrs. a day, consuming 1.5% to 2.5% of their body weight. When hay remains clean, dry and accessible, horses feed more consistently, which supports better digestive health. The EZ Grazer can slow the eating pace from 3.3 lbs. per hour to 1.9 lbs. per hour, reducing the risk of colic, promoting digestive health, and supporting better weight management.

Likewise, using the EZ Grazer with properly used hay nets can result in hay loss of less than 1%, significantly outperforming many conventional feeding methods. It also protects hay from moisture damage that can trigger mold and bacterial growth and diminish its nutritional value.

Now in the final design stages, Fintel seeks input from customers willing to pilot the GrazeStat software, which will be ready for testing in mid-2026 or early 2027. Interested parties can reach out directly.

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