

Robotic Feeding System Tells All

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Robotic hardware, wireless communication and comprehensive feeding software allow Kansas State University (KSU) swine nutritionist Mike Tokach and his colleagues to double the amount of research they're doing at a large Pipestone, MN, finishing operation.

The system called Feedlogic has helped reduce feed and labor costs and improve feed efficiency for 200,000 pigs that flow through New Horizon Farms.

The time, frequency and speed of feeding are all managed by the Feedlogic system that feeds 4,800 pigs in four research barns at the Minnesota operation. New Horizon has a unique agreement with KSU to conduct research in its finishing units in return for nutritional expertise. What they learn, Tokach says, is quickly applied.

A self-propelled, overhead delivery unit travels by rail, dispensing feed automatically into individual feeders. Weight and time of delivery are recorded and transmitted live via wireless network to a computer. Each system can be monitored and managed remotely via landline connection.

Software included with the system provides users with a simple "virtual barn" view customized to pen layout and feed bin contents. Users can receive instant reports on feed intake, by pen, over set times. It can also create and manage feed budgets and monitor feed bin inventories.

New Horizon Test Barns

One delivery unit is used per barn and can load feed automatically from up to eight different outside bins. Systems have been operating in all four New Horizon barns since November 2003, and already research results have been applied to the rest of the operation.

"We've acquired a lot of answers," Tokach points out. "But the biggest thing this system has done for us is increase the amount of research we've been able to conduct."

Before Feedlogic, a scale cart was used to feed pigs. It took one full-time person all day to feed pigs at two barns per day, so they had to stagger trials. With the automated system, that person was reassigned, and they're getting twice the amount of research. An on-site manager, Corey Jones, manages the day-to-day operation of the system and coordinates collection of pig weights and other data.

All that added data has been put to use at New Horizon. Examples of applied research include:

- **Lysine levels**

After testing each phase of grow-finish, lysine has been increased in late finishing. Graded levels are still used, with the last diet at about 0.71% lysine. They found a better response and reduced risk of poor performance by feeding higher lysine levels. The genetics in this system, (PIC 337 terminal line), have a higher lysine requirement than some other lines, says Tokach.

- **Antibiotic regimen**

Growth-promoting antibiotics were found not to generate a response in their finishing system, so they were removed from the finishing diet.

- **Fat levels**

This area has been confusing because every system they test provides different answers. In some systems, the highest possible energy looks like the best route, but in other systems, no fat looks best, notes Tokach. They don't have the final answers yet.

- **Paylean timing**

By pinpointing where they get the best bang for the buck, they've targeted 21 days in the feeding period.

- **Feed intake and efficiency**

The system allows them to view feed intake patterns. Feed efficiency (FE) in the system keeps improving as they work on genetics and daily feeder adjustments. "It helps show us what feeder adjustment is worth by how good FE can get in these barns," notes Tokach.

An answer to research still to come is the relationship between feeder space and stocking densities. There is conjecture that growth rate and feed intake improve if more feeder space is available. Tokach adds they're looking at amino acid ratios, especially with Paylean.

Commercial Application

Installations have mostly been in research settings, but Feedlogic is also intended for commercial use, notes Drew Ryder, CEO of Feedlogic Systems, Inc. "Commercial application is further down the road. Whenever there is something totally different, it takes time for people to realize its potential. There is a payback with this system, but it will take time."

The system costs about \$30,000 for every 1,200 animals, but price varies with options. Most installations are retrofit, and the unit works well in large-pen finishers, although its forte is in smaller pen arrangements.

Feedlogic's ability to blend feeds "on the fly" is a capability Ryder hopes to market, but Tokach is not sure commercial producers are willing to put in the cost for blended feeding. "Certainly, there would be advantages. Only two diets would have to be delivered — a high protein and low protein, for example, with the system blending those as pigs get older. The system blends and weighs feed very well."

Hubbard Feeds put a Feedlogic system, combined with automatic sorting, in a new research facility near Medford, MN. Labor was a big factor, notes Brad Lawrence, swine nutritionist for the Mankato-based company. Existing feed intake monitoring tools are very labor intensive, he says. "Feedlogic is very labor un-intensive. We're too early into it to say much, but we'll be looking at its blending capabilities."

KSU uses Feedlogic to deliver feed to pigs. "We haven't gotten into all its capabilities," notes Tokach. "If someone wants to analyze intake patterns using daily disappearance, it can do that."

The real-time feed intake data helps spot trends, adds Ryder. "It's a critical piece of information. A drop in intake may indicate that pigs are sick. Managers for big operators could look at feed intake reports (see diagram) by pen on a daily basis and tell employees which pens to check. The potential is there to generate exception reports to preset parameters automatically, so managers are only alerted when they need to be."

The technology could also benefit producers with continuous-flow housing. With centralized feeding systems, diets must be compromised due to the range in age and sex. The Feedlogic system can be targeted to the needs of each pen.

Because the system allows precise, rapid adjustments to diets throughout the growth cycle, overfeeding is avoided, according to Ryder. "Overfeeding in finishing is common with the stepped-feeding approach. When you're only changing the diet three or four times in a five-month finishing cycle, it's impossible to stay close to the pig's ideal feed curve," he says. "The Feedlogic system reduces overfeeding by frequently changing diets over the growing cycle. The patented dispensing technology and software allows weekly or even daily changes to diets with a few simple mouse clicks."

A Place in Sow Housing

There's a lot of interest in feeding sows with Feedlogic, too, says Ryder, who adds that the first system will go into a sow unit this year. "We can feed multiple times a day to help reduce sow stress and improve feed intake and body condition. Every sow is an individual with our software so it is best used in stalls.

"Barn managers would have far more control. With Feedlogic, amounts fed and other information can be recorded automatically and monitored by managers at off-site locations," he explains. Prices would be competitive with volumetric feed drops in gestation barns.

Feedlogic, founded in 2001, has offices in Lynden, WA, and Abbotsford, British Columbia. The company was a recipient of the F. X. Aherne Prize for Innovative Pork Production in 2003. There are currently seven systems running in the U.S. and Canada, all in finishing barns. In addition to New Horizon and Hubbard Feeds, a system has been operating in a commercial facility in British Columbia for over four years, and additional systems are being installed in Alberta this spring.