

Bovine Bling: Dairy Science Goes High Tech

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Photography by Matt Barton



For nearly six decades, David Corbin has been taking care of Holsteins at the family farm in Campbellsville, where he currently milks about 300 cows. It's a challenging, often unforgiving life that requires him to get up hours before the rest of the world. Over the years, Corbin has spent countless hours milking and watching cows to monitor their health and determine when to breed them.

"I have been around dairy cattle since I was five," he said. "Mom and Dad started milking cows before I was born. My mom still comes to the barn every day to help take care of the babies."

He's never shied away from cooperating with Animal and Food Sciences faculty and taking part in technology research. As a result, in recent years, Corbin has been able to spend a little less time watching the cows thanks to several new technologies. He's always learning about something new from UK dairy specialist Jeffrey Bewley, though Bewley will say he's always learning something from Corbin.

"We like to call him Professor Corbin," Bewley said. "He may not have a PhD, but he knows the dairy cattle business inside out. We try to take our dairy students down to his

farm at least once a year, because he has so much experience and knowledge to share."

Bling Research

At UK, Bewley is spearheading many research projects involving precision dairy technology that measures physiological, behavioral, and production indicators to maximize production, detect disease early, and minimize medication use. Most UK dairy cows sport several pieces of bovine "bling" in their ears, on their legs, around their necks, and even on their rumps. Around the clock, each piece is collecting data that translates into information farmers can use to make important production decisions.

"All of these items are helping us monitor something about the cow that can help us learn how to better manage her," Bewley said. "A lot of our technology comes as an offshoot of other industries."

Inside a mobile phone or tablet is something called an accelerometer. It is what makes the screen change orientation from vertical to horizontal depending on how the user holds the device. Bewley is using technologies with accelerometers to determine if the cow is standing or lying.

"The main application of this to the dairy industry is heat detection, and it's taking off with real dairy farmers," Bewley said. "They are using it to detect estrus, when a cow is in heat, so they can breed her at the right time. Farmers are busier now than ever, and they don't have a lot of time to play the sit, watch, and wait game."

The devices that use accelerometers give a farmer an overall picture of the cow's activity. If there's a deviation from her normal activity, if she's more active, it may tell the farmer she's in heat. But that's not the only message it sends.

"Sometimes a decrease or increase in lying, feeding, or rumination time tells us the cow is sick or uncomfortable," he said. "Maybe she has an illness that we need to address."

Bewley is also experimenting with ear tags that monitor temperature and neck and ear tags that measure when a cow is eating or chewing her cud and how long she spends chewing. These tools can tell a farmer a lot about the digestive health of their animals.

Each cow has her own baseline. If she's not chewing her cud, she may be experiencing some stomach discomfort. The device can send the farmer an alert to check the cow and determine why she's deviating from her baseline.

Corbin said the practical applications of the technology have really changed the way he operates his dairy.



David Corbin is able to track the health of his dairy herd with RFID trackers on the cow's legs.

“When you are trying to get a cow bred, you don’t have a wide window,” he said. “If you miss that part of the cycle, you have to wait 21 days before you can try again. The good thing about this technology is that I never wonder what’s going on with my cows, even if I’m gone for a day. I can check the computer reports in the morning and the evening and see what happened while I was gone and then make breeding and health decisions based on what I find there.”

With Daniel Lau, professor in the UK College of Engineering, Bewley is exploring the use of image analysis to evaluate cow body condition and locomotion. Bewley is also collaborating with another engineering professor, Kevin Donohue, and Bruce O’Hara, professor in the UK Department of Biology, to develop a device to monitor sleep in cows.

“Both of these tools could provide us new, invaluable insight into animal well-being and health status,” Bewley said.

Baby Bling

Corbin has greatly benefited from using precision dairy technology to detect heat, but the thing that has helped him the most is the automatic calf feeding technology. Feeding about 350 calves is very time consuming. That was before. Now each calf has an ear tag with a unique sensor. Each time the calf steps up to the feeding area, the computer recognizes that specific calf and makes a milk ration based on its individual requirements.

“They learn really fast where to get fed,” Corbin said. “They go to the machine like it’s their mother. The computer keeps a record

of how much they eat and how long it takes them. You can catch problems really fast. The machine watches closer than you can. That’s the neat thing about technology; it gives you freedom to go and do some other things.”

The feeder automatically begins to wean the calf off milk as it begins to eat more sweet feed and over time actually weans the calf. That results in an easier weaning process with less bawling and stress.

Corbin will be the first, though, to admit technology can’t do it all.

“You still need to know what’s going on with your cows,” he said. “It doesn’t completely take away the human element. You still have to be tied in and understand what’s going on at your farm. It’s only a tool to help us make better decisions.”

David Corbin of the Corbin Dairy showed an automated feeder that ensures calves receive the correct amount of milk.

Bling on a Budget

Surprisingly, most of the technology that the UK cows are testing won’t break the bank. Heat detection technology is more affordable than ever. Health detection technology is not as far along, and so there are more questions about its economic feasibility.

“Affordability is really important to us in research,” Bewley said. “If the technology isn’t economically viable, it won’t be very useful to farmers. Most of the devices do show a payback in just a few years. Health detection may offer a larger benefit down the road. It could help keep cows from getting culled prematurely.”



Karmella Dolecheck, one of Bewley’s graduate students, has developed an online calculator for farmers to figure the costs of using technology.

“We just finished a study comparing a lot of different technologies from several companies,” Bewley said. “They all worked pretty well. The bottom line message here is there are a lot of options out there for farmers, and they can use them successfully and economically.”



Baby calves at the Corbin Dairy are kept together in a barn instead of individual huts.