



# Beef Research Goes High Tech

University of Kentucky researchers develop real-time health monitoring.

Story & photo by Aimee Nielson

Cattle producers try their best to monitor the health of their herds for any sign of sickness and disease. For large producers, that can be a very time-consuming task. But new research at the University of Kentucky (UK) College of Agriculture could give farmers a real-time, inexpensive way of spotting signs of illness earlier, thus making treatment quicker and more effective.

With a hefty grant of nearly \$900,000 from the U.S. Department of Homeland Security, UK Beef Cattle Nutritionist Eric Vanzant and Craig Carter, epidemiologist for the UK College of Agriculture's Livestock Disease Diagnostic Center, are collaborating on a project that includes specialists in UK's biosystems and agricultural engineering department,

Eastern Kentucky University and NetQuest, a corporate partner based in Louisville, Ky.

Vanzant is placing a monitoring device, designed as part of an ear tag by NetQuest, in the ears of some cattle at the UK Animal Research Center in Woodford County. The device will transmit real-time ear-surface temperature data, as well as head position, via antennae to a receiving station. Vanzant and other researchers will then be able to immediately analyze the data and respond to

early signs of sickness within the herd.

"Our real motivation behind this was to come up with devices, not necessarily from a national biosecurity standpoint, but from a standpoint of individual producers, and give them a tool that they can use to detect sick animals in the

herd," Vanzant says. "So we've been working on an ear tag that contains sensors that will give us information about the animal.

"Right now, we're focusing on some very noninvasive types of sensing," he continues. "We're measuring the temperature of the ear, where the ear tag is located. We're measuring activity of the animal. The main activity we're able to pick up is eating and drinking behavior. This will allow us to detect when animals are off feed, which is the first sign of illness."

## Biosecurity role

From the biosecurity standpoint, Vanzant says the research could play an important role in identifying possible disease outbreaks early, so folks like Craig Carter can issue alerts to producers about what may be coming down the pike, ultimately based on data gathered from herds around the state.

"The information we look at is mostly from cases that have been given to us by practicing veterinarians around the state," Carter says. That limits disease monitoring to findings in laboratory testing, from a whole-animal necropsy to a single blood test indicating presence of a disease.

"This project has enabled us to build some computer systems that are going to help us better gather some of that information and then help us to better analyze it and generate alerts in case of a disease outbreak," he says. "At the laboratory, we'd be more apt to generate that on a regional or county level when we see an increased incidence of something that's going on and then mount a response."

Vanzant says the work done up to this point has been conducted inside in a very controlled situation — with "pretty pampered animals."

"We're just at the point right now to be getting sufficient numbers of tags to start doing some of the field work that really has to be done to adequately test feasibility and implementation of this," he says. "Our intent is to do some of the work here at the UK beef research unit, looking at animals on feed."

Vanzant says they'll probably begin with about 100 animals at the research unit, then test the technology on Kentucky farms, tracking animals in transit from Kentucky to feedlots in the High Plains.

Carter says Vanzant is one of very few animal scientists in the country on the leading edge of this type of technology.

"It's really going to change the way farms look at animal health," he says. "You can see we are on the cusp of this wireless society, and a whole brave new world is going to open up so many new applications and increase the capacity of our ability to



►Above: UK researchers are placing a monitoring device, designed as part of an ear tag, in the ears of cattle at the UK Animal Research Center in Woodford County to serve as an early indicator of illness.

monitor animal health in a near real-time, or even in a real-time fashion.

“The neat thing,” he continues, “is this project is helping us develop engines that will analyze this data and, it doesn’t really matter if it’s regional or statewide data or herd-based, the analysis will be just about the same.”

**Endless possibilities**

Vanzant says additional research could be explored in the future, including measuring pulse rate, blood oxygen level and even the

cow’s location on the farm — all via a similar, noninvasive monitoring device.

“Ultimately having a device that’s inexpensive enough that producers will be able to buy it and put it on their animals — that’s the goal,” he says.

The device could be as inexpensive as \$5 per ear tag. Vanzant says there are other one-time costs associated with the monitoring system, such as hardware, software and receivers.

“It’s amazing to me how inexpensive some of this technology is, and to a large

extent the ultimate price is dictated by the quantities we purchase,” Vanzant adds. “But it’s certainly not unreasonable to expect that we can have tags that would pick up temperature, activity and some of the other things we’ve talked about, with the radio transmitter that sends back to a base station for that price per tag.”



**Editor’s Note:** *This article was provided by UK Agricultural Communications News and Information, available at [www.ca.uky.edu/news](http://www.ca.uky.edu/news).*

**L**ots of rain leaves standing water. Standing water attracts mosquitoes. Mosquitoes can carry West Nile Virus, and July is the prime month for cases of the disease to start showing up, a Texas Cooperative Extension specialist says.

Greta Schuster, an Extension integrated pest management (IPM) specialist in Canyon, Texas, started dragging out her carbon dioxide light traps in mid-July to determine how many positive mosquitoes could be found in the area. Schuster, who also is a West Texas A&M University associate professor, is working with James Alexander and the Texas Department of State Health Services.

Alexander reports West Nile Virus is already active in Texas as of the first week of July, with one human case in Willacy County. Positive mosquitoes have been found in Collin, Denton, Jefferson, Montgomery and Willacy counties. West Nile Virus cases in Texas can be found at [www.dshs.state.tx.us/idcu/disease/arboviral/westNile/](http://www.dshs.state.tx.us/idcu/disease/arboviral/westNile/).

In 2006, 33 West Nile human fatalities were reported, and since 2002, 71 fatalities due to the virus have been reported in Texas, Schuster says, quoting state health service figures.

For the past five years, Schuster has been sampling for mosquitoes carrying the West Nile Virus. She started in an effort to help Extension agents and area veterinarians know the severity of the situation and to help get horses vaccinated for the disease.

Each year she watches the reports from other parts of the state to know when to start collecting mosquitoes. When the positive cases start showing up in the south, she knows it won’t be long before the virus moves north.

When Schuster collects the live mosquitoes in her traps, she sends them to the Texas health department in Austin where

# Protect Against West Nile

they are tested to see if they carry the disease. “We’re trying to find out when mosquitoes are becoming active and what species is active at the time,” she says.

With all the recent rain in Texas, a large hatch of mosquitoes can be expected, Schuster says. “If they are showing up in my traps, then there are a lot more out there,” she adds. “That’s when we start alerting the Texas Department of Agriculture and other agencies who can get the word out that it is time to be more vigilant in control and protection.”

**Protection**

To protect against disease-carrying mosquitoes, Schuster advises wearing long sleeves when working outdoors, using a deet product and not going outside from sundown to 10 p.m. if possible. “When we were collecting mosquitoes off the horses, they were covered the heaviest from about 8 to 10 (p.m.),” she says.

Schuster says there is some concern about using products containing the deet chemical, but she advises that if people spray most of the chemical over their clothing and use long sleeves to protect themselves, it is safe.

The deet amounts in products vary, she says. The amount needed depends on how long an individual expects to be outside. The more deet the repellent contains, the longer (not better) it will protect.

The Centers for Disease Control and

Prevention (CDC) advise that products with a low concentration of active ingredient may be appropriate when exposure to insects is minimal, Schuster says. Higher concentrations of active ingredient may be useful in highly infested areas or with insect species that are more difficult to repel.

When trying to limit mosquito populations outside, a combination of treatments is best, Schuster says. “First, we advise sanitation. Empty water from flowerpots, pet food and water dishes, birdbaths, swimming pool covers, buckets, barrels and cans. Remove discarded containers and other items that could collect water.”

Second, use a larvicide chemical to control hatching mosquitoes so they never become adults, Schuster adds. Larvicides, which kill immature mosquitoes, are put in water sources. *Bacillus thuringiensis*, more commonly know as Bt, is a biological larvicide that is safe for animals, she says. It is found in products sold as Mosquito Dunk. Methoprene, a chemical larvicide, is an insect growth regulator that kills larvae by disrupting their development. As with all products, read and follow all labels and directions.

The final step to treatment is the use of adulticides or products used to kill adult mosquitoes, she said. These products can immediately reduce the number of adult mosquitoes around the home. They include fogs, mists or sprays, which are often used by city and county officials to treat large areas, she says.

“There’s no one control that works the best,” Schuster notes. “It’s a combination of all of them. That’s the whole basis to the integrated pest management program.”



**Editor’s note:** *This release is provided by Texas A&M University.*