



Scientists Put Cameras on Pigs 24/7

University of Illinois researchers are embarking on a major new study in which they videotape sows around the clock to find out how elements of their “microenvironment” create stress. Although this may sound like an animal science version of the “Big Brother” reality show, the ultimate goal is to find out how the microenvironment can affect the reproductive health and well-being of sows.

Robert Knox and Janeen Salak-Johnson, associate professors, along with Xinlei Wang and Kaustubh Bhalerao, assistant professors at the U of I, will conduct their research to investigate the effect of variability in gestation-stall microenvironment on sow well-being, physiology, and productivity. Their findings could give an economic advantage to producers, said Wang.

“Reproductive failure is the primary limitation to performance and profitability for producers,” said Wang. “There’s also an overwhelming concern for the well-being of gestating sows in individual stalls in the United States. Once we develop better environmental control methods and automatic monitoring systems that will enhance the well-being of individually housed sows, we can transfer those management technologies to other swine housing systems if we need to.”

Up to this point, the microenvironment of a gestating sow has not been considered as one of the control factors that impact the animal’s welfare or productivity, Wang said. A microenvironment is defined as the immediate surroundings that impinge on a single animal in its individual space; and those surroundings are highly variable among sows within the same building.

“For example,” said Wang, “you and I could be sitting in the same room where the thermostat says 72 degrees; but if I’m next to a cold window, I will feel colder than you. Our microenvironments will be much different.”

Temperature has been the primary environmental factor considered in previous studies, but the U of I study will include humidity, air velocity, and lighting.

“Sows should be protected against heat stress prior to mating, for two to three weeks just after mating, and for two or three weeks just before farrowing,” he said. His objective is to develop a heat-demand sensor that will effectively control all aspects of the thermal environment.

But how do you determine whether changes in the microenvironment really affect the pig’s physiological well-being? “One way we measure a sow’s welfare is by looking at her behavior,” said Salak-Johnson, another member of the research team. “A sow might play with her water to try and cool herself, or she might pull her legs underneath her if she’s cold.”

“Animals also sometimes perform behaviors in particular patterns, so if there’s a change in their environment that causes them to be stressed, they might change that pattern,” she added. “We’ll see if there are certain patterns that occur in animals that are in a positive environment (one that improves well-being), versus those that are in a negative environment.”

In addition, researchers will be looking at social interaction with other pigs because that plays a significant part in the sow’s well-being,



Salak-Johnson said. More than 70 percent of the sows in the United States are housed in individual gestation stalls (as opposed to group pens); but Salak-Johnson said pigs in general have a social ranking, no matter where they’re housed, and that ranking carries a physiological consequence.

“One of the reasons sows are kept in individual stalls during gestation is their aggressive nature. If you let them roam in pens, the dominant sow will eat all her feed and then start moving everybody else out from theirs,” she explained. “But even if they’re in individual stalls, a gilt (a sow pregnant with its first litter) could be right next to a fifth-parity sow (one pregnant with its fifth litter) who is intimidating her. That puts a tremendous amount of psychological stress on the gilt.”

The stress caused by that type of interaction between sows could cause the gilt to give birth to lower-weight pigs or more stillborn pigs.

Salak-Johnson will videotape the sows around the clock to monitor their behavior and eventually hopes to develop an automatic monitoring system that will optimize the animals’ reproductive health and well-being.

This research will be conducted at the U of I’s Swine Research Center. A building is being remodeled to create three control rooms that are similar in size, temperature control, air flow, animal numbers, and housing.

“Each control room will have two different types of lighting, bright and dim,” said Wang, “and we will test each room at three different thermal levels, cold (55 to 64 degrees F), neutral (65 to 80 degrees F), and hot (81 to 95 degrees F). There will be six stalls in each room, so the animals will have social interaction similar to a commercial set-up.”

To carry out this work, the four researchers have received a grant of \$271,000 from the Council on Food and Agricultural Research Sentinal Project.

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