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Using infrared for early detection

Infrared cameras used in a finisher barn setting can help detect fever signs early on and thus reduce mortality and treatment costs

by TREENA HEIN

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In a finishing barn situation, pathogens which lead to mortality can be devastating to a producer. The situation is complicated by the fact that infectious diseases such as Actinobacillus pleuropneumoniae can display few clinical signs before the onset of mortality. As well, it is not economically feasible to inspect individual pigs for early signs of clinical disease in a large finishing operation.

A group-level method for detecting early stages of the disease would therefore be beneficial from both a production and a herd health point of view," says Kevin McIntosh, a third year (Phase III) veterinary student at the University of Guelph. With professors Zvonimir Poljak and Robert Friendship of the Department of Population Medicine, McIntosh carried out a 2008 study to evaluate the use of infrared thermography as an early detection method for mortality-causing disease in a finisher barn setting.

Infrared thermography is a passive sensing technology which provides visual and quantitative information on the body temperature of animals and on the environment. In this situation, it would indicate which pens contain pigs that show a fever, indicating disease presence. Although a handful of studies have been undertaken in cattle to assess presence of disease, the possibilities have been largely unexplored in pigs. "This is the first time that this technology was evaluated for its accuracy in predicting Actinobacillus pleuropneumoniae in a swine herd, at least to our knowledge," says Poljak.

Adds McIntosh: "If farmers can detect fever levels early – and therefore isolate and treat affected animals or pens early – mortality, treatment costs and spread of disease all have the potential to be reduced."

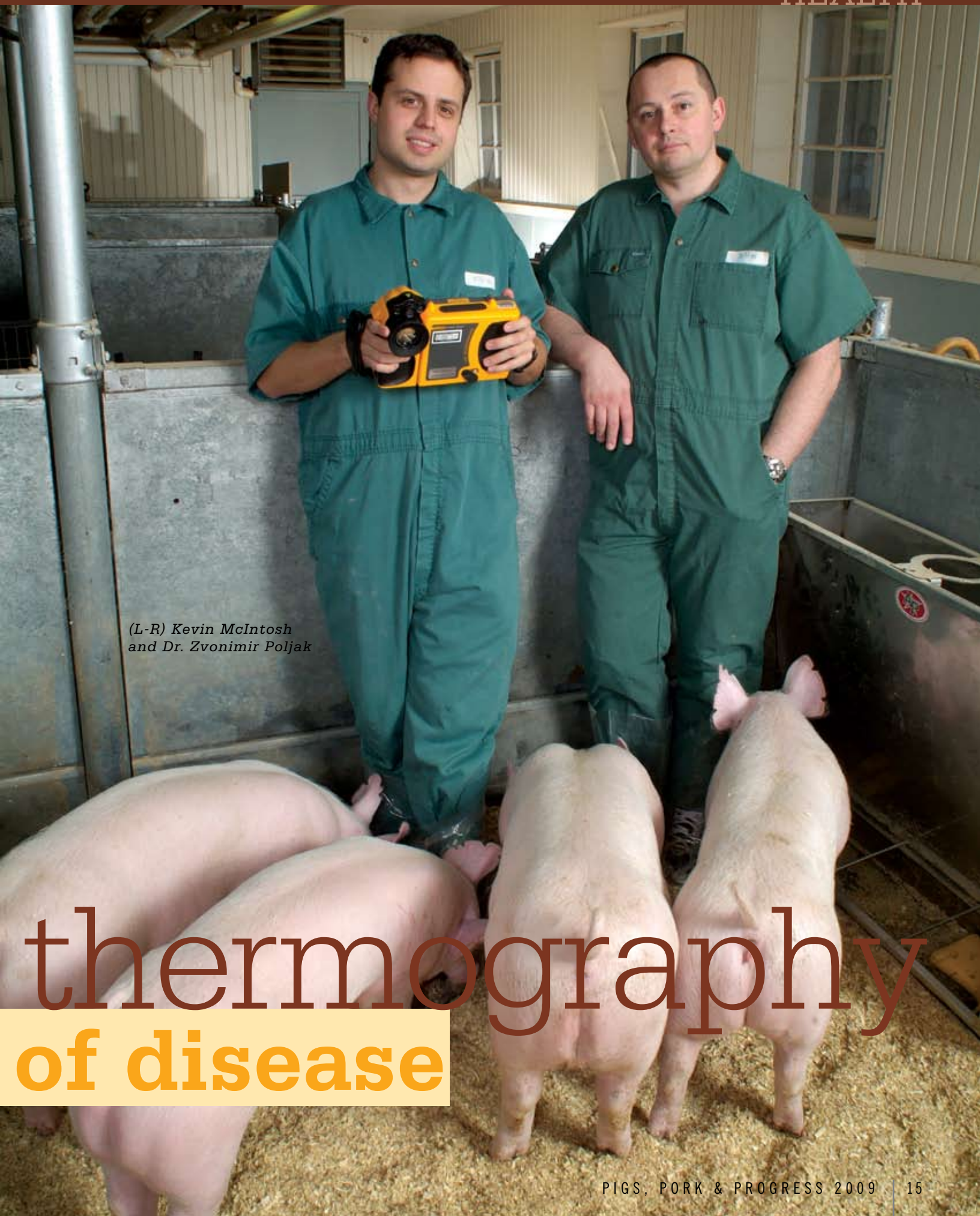
Over a consecutive 19-day period in the summer of 2008, McIntosh used a Fluke Ti45 Infrared Camera to take images of 56 finisher pens in a barn experiencing an outbreak of mortality due to Actinobacillus pleuropneumoniae. "The finisher barn operated as a naturally ventilated, continuous flow operation divided into four rooms with a common airflow, and with each pen housing 20 pigs on average," he notes.

Two thermal images were taken per pen each day. McIntosh recorded humidity, environmental temperature and maximum temperature within the pen, as well as age class, and number of mortalities. "A 'case pen' was defined as a pen that had at least one mortality recorded that day," says McIntosh. "Each case pen was randomly matched with three control pens. Matching was performed with a statistical software package, using day of the study and approximate age category."

Data was analyzed using a conditional logistic regression model. The pen-level temperature data were compared using values for the day of mortality, the day before, and two days before. "Statistical repeatability studies were also performed on the camera to evaluate the precision of the camera on itself," says McIntosh.

Results were as predicted. "Case pens had significantly higher maximum temperature than control pens, not only on the day that the mortality was recorded, but also the day before and two days before mortality," observes McIntosh.

"These findings can, with further development and research, be used by herd-health practitioners with access to commercially available infrared cameras to screen pens at risk of experiencing mortalities due to febrile disease," says McIntosh. "This could potentially decrease the economic loss that occurs with finishing-barn diseases as well as provide a targeted approach to antibiotic use in order to control mortality caused by finisher-barn diseases."



(L-R) Kevin McIntosh and Dr. Zvonimir Poljak

thermography of disease