

PIGS in TRANSIT

Making the ride
more comfortable

PHOTO BY MARTIN SCHWALBE



LEFT:
Tina Widowski and
Luigi Faucitano.

It's known that stressful transportation conditions can add to morbidity and affect meat quality. So researchers are looking at ways to improve temperatures and ventilation on trucks and reduce the energy pigs expend in getting on and off

T

hat pig transport you see wending its way down the highway might look airy but, unless it's

moving, it's not. Even when it is moving, the pigs at the back are getting the most air and the ones at the front are getting less air — and they are getting it last. What's more, there are compartments where even that air flow is limited by the architecture of the trailer.

"The airflow patterns in those trucks are not the way you'd think they would be," says Tina Widowski of the University of Guelph. She is part of a research group looking into the effects of transport on pigs as it applies to equipment. Widowski says all those vents on the side of the trailer only facilitate air flow in a crosswind when the truck is standing still.

"When the truck is travelling down the road, air pressure differences from the vehicle's movement cause the air to enter at the rear of the trailer and head toward the cab," she says.

Air flow, outside temperature, loading and unloading ramps, and the amount of time pigs spend waiting to be unloaded at the packing plant can all affect the well-being of the pigs, add to morbidity and alter the quality of meat.

"Ideally, we'd have artificial ventilation on trucks," says Widowski, noting that it would be very expensive and add weight to the trucks.

So Widowski, a professor in the department of animal and poultry science and director of the Campbell Centre For the Study of Animal Welfare at the University of Guelph, is working with a team of other researchers in Quebec and Western Canada to come up with practical solutions to the difficulties pigs encounter in transport. The problems of distance and outside temperature vary between east and west so the solutions may vary also.

Harold Gonyou, a research scientist at the Prairie Swine Centre and an adjunct professor at the University of Saskatchewan, and Luigi Faucitano, a meat scientist at Agriculture and Agri-Food Canada, are leading the team. Gonyou says research has already shown that stressful conditions decrease meat qual-

BY
MIKE MULHERN

ity. "What we wanted to know is, 'Are there differences within the truck itself?'" It turns out that there are.

"If you load the pigs straight into the truck and they stay on that same level, we have very good pork quality," Gonyou says. "If they have to go down into the pot or if they have to go up onto the top deck, we start seeing a number of things that end up causing problems with pork quality."

To test for conditions in various parts of the truck, they used both trucks with ramps and various levels and trucks with hydraulic lifts that meant pigs never used ramps. One in every six pigs was fitted with heart monitors and one in every six with a core body temperature gauge which they ingested. When pigs have to use ramps, researchers see increased heart rates for extended periods, coupled with increased core body temperature.

"That physical exertion of getting up into the top deck or getting down into the bottom deck and the reverse coming off the truck has an effect on meat quality," Gonyou says.

One of the trucks used in Quebec was divided into two levels, allowing the pigs to enter the truck without ramps. When one level is full, it is raised hydraulically, and the second level is filled. For the pig, this means they never have to go up or down a ramp, something Widowski says pigs don't like to do.

"Pigs do not do well on ramps," she says, "and a lot of the ramps being used are much steeper than recommended."

The trucks used in the West double as cattle trucks and the ramping system they use is even steeper than ramps on similar trucks used for the single purpose of shipping pigs. Gonyou says that the dual-purpose trucks used in the West do pose problems for pigs.

"To get to the front compartment in the middle of the truck," he says, "pigs go up a ramp at the back and down a ramp at the front, so they have two ramps to deal with. That compartment had the worst meat quality of them all because of the ramps." There are other issues, too, including air movement and outside temperature.

During the winter in the West, pigs are exposed

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Harold Gonyou

to cold temperatures for long periods because the ride to the packing plant is about seven hours with outside temperatures of about -35° C. Even with straw bedding and the sides of the trailer boarded up, the temperature inside is about -15° C, a bit of a shock to an animal that has spent its entire life in a barn where the temperature was kept at about 14° C. In Ontario, barn temperatures range from 16 to 19° C.

"What we did see is that these pigs expend a lot of energy. Their heart rate stayed up for the entire seven hours of the trip. Their core body temperature also stayed up indicating they were generating a lot of heat just to keep warm," says Gonyou. That affects meat quality.

"You get a meat quality condition we call dark and dry," he says. "They basically use the energy they have in their muscle. When they die, their metabolism stops very quickly. When you don't have the metabolism going on, you end up with a higher pH in the meat. It's a darker colour and it retains water and downgrades the quality of the meat."

In warm weather, even on short trips, stress causes a high activation of metabolism. "They are really burning up energy, but they still have lots of energy left when they get to the slaughter plant. When they die, the metabolism is still very high, the temperature in the

muscle stays high and the metabolism that goes on creates more lactic acid. That metabolism tends to break down the cell walls of the meat and you end up having a lot of drip loss or water coming out of the muscle that's pale, soft and watery meat," Gonyou says.

The meat then has to be downgraded; it is not as salable and it is not fit for some export markets, especially Japan.

While ramps, temperature, length of journey and air quality are concerns, they can't be solved in the short term with things like hydraulic lifts, because they may not work well in cold temperatures and they limit the load.

"They haven't yet developed hydraulics for use in a potbelly truck," Gonyou says. "The difference is maybe 50 extra pigs you can haul on a truck if you have a potbelly versus a hydraulic lift truck. That means 250 pigs with a pot belly and 200 if you don't, so there are some economies to using the pot belly," Gonyou notes. The longer distances travelled in the West tend to favour the use of the larger trailers.

The researchers will also be looking at ways to improve ventilation, lower temperatures during summer and raise temperatures in winter.

"We feel that we should be ramping up the ventilation within these trucks," Gonyou says, "and making sure they are more open to the air flow. We're doing more studies now to monitor temperatures on trucks and we are doing some modification of penning within the trailers to get more air flow moving through."

While the research continues, there are questions about who will pay. Researchers are working with transport companies in the West to modify some trailers to try for improvements -- things like insulating the roof, adding roof chimneys for summer ventilation, improving the boarding on the sides of trailers in winter and even adding heavier straw to keep pigs warm on the journey.


While morbidity rates vary during transport, producers take the loss when pigs die in transit or are deemed unfit when they get to the packing plant. Once the animals are slaughtered, meat quality problems cost the packers money.

"Eventually," says Gonyou, "it becomes an industry standard, but for a period of time it's a question of who is going to go first and pay for it."

He says it will take another year to evaluate whether modifications made to trailers will make a difference in lowering morbidity and improving meat quality.

The research focuses only on equipment, travel times and environmental influences such as weather conditions. Outcomes are not a reflection

on trucking companies or truckers who abide by transportation acts and regulations and trucker quality assurance standards.

Project researchers also include Stephanie Torrey, Trevor Crowe and Jorge Correa. 

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RESEARCH PROFILE

BY MIKE MULHERN

Tina Widowski

Tina Widowski has been busy. In addition to her research and teaching duties, she has published more than 70 scientific articles and 200 abstracts and technical publications, and she now leads an internationally recognized centre for the study of animal welfare.

A native of Chicago, Widowski came to the University of Guelph in 1990 after earning her PhD in animal sciences at the University of Illinois-Urbana. Before being appointed to her faculty position in 1998, Widowski conducted studies into the behaviour and welfare of poultry.

Currently professor of applied animal behaviour and welfare in the Department of Animal and Poultry Science at the University of Guelph, Widowski has served as associate editor for the *Canadian Journal of Animal Science*, as special editor of *Applied Animal Behaviour Science* and as an individual expert on the Canadian Agri-food Research Council (CARC) Expert Committee on Farm Animal Welfare and Behaviour.

Widowski has also served as a scientific advisor/reviewer for the Canadian Poultry Research Council, the Canadian Pork Council's animal care working group and the advisory committee on the humane destruction of swine for the Canadian Food Inspection Agency.

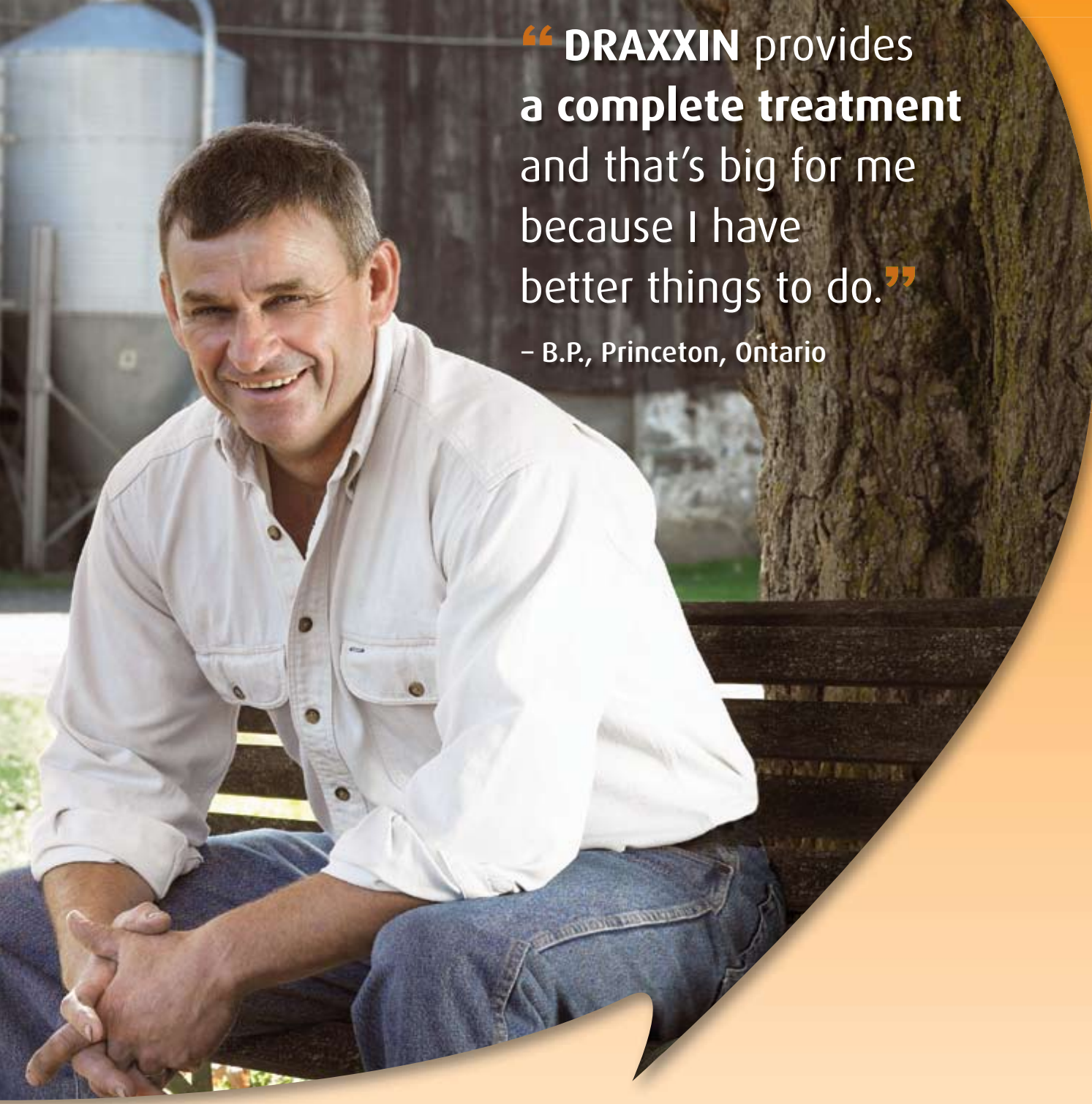
Her current teaching responsibilities include both undergraduate and graduate courses in environmental physiology and applied animal behaviour, as well as supervising a number of undergraduate and graduate students each year. She was awarded the Guelph Faculty Association Distinguished Teaching Award in 2005.

Her research focuses on the behaviour and welfare of both pigs and poultry. Swine research projects include development of feeding behaviour and its relationship to behaviour problems in newly weaned piglets; handling and transport of market hogs; housing systems for gestating sows; assessment of processing and euthanasia techniques for piglets; and tusk trimming in boars.

In 2007, Widowski was appointed director of the Col. K. L. Campbell Centre for the Study of Animal Welfare (CCSAW) at the University of Guelph, currently the largest centre of its kind in North America.

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