

RESEARCHERS LOOK TO NEW TRUCK DESIGNS TO IMPROVE CHICKEN TRANSPORT IN EXTREME TEMPERATURES

Chillin' chickens

By Sarah Van Engelen

Transporting chickens safely in Canada's climate is no easy task. From frigid winters to sweltering summers, extreme temperatures increase chickens' stress levels, affecting their quality of meat and quality of life. That's why researchers at the University of Saskatchewan (U of S) are looking at ways to improve truck design and ventilation – they want to provide the chickens with a more controlled and comfortable environment.

Prof. Hank Classen, Department of Animal and Poultry Science, at the U of S is working with Prof. Trevor Crowe, Department of Agricultural and Bioresource Engineering and Prof. Phyllis Shand, Department of Food and Bioproduct Sciences, to study the effects of cold stress on poultry. They want to know how current truck designs fare in extreme weather, and how they can be improved.

“The industry really does a good job of transporting poultry in extreme weather conditions, with old technology,” says Classen. “But that old technology needs to be updated.”

Some of the common problems include inconsistent temperatures within the transport truck. The U of S scientists have found that although the external temperature in the winter might be -28°C , inside the truck it can be a toasty 30°C in areas because of all the body heat produced by the chickens. But there are also cold pockets, such as at the sides and rear of the truck, where the inside and outside temperatures are similar.

Inside, the inconsistent temperatures are caused in part by poor airflow in common truck and trailer designs. Air pressures around the moving trailer cause air to move from the back to front, carrying heat and moisture from the birds and creating hot pockets in the front. At the same time, small amounts of air enter around rear and bottom edges of the trailer causing these areas to be colder and resulted in discomfort for chickens most winters.

Extremes in heat and cold have stress and physiological consequences for the chickens. High temperatures can cause heat stress if there isn't proper ventilation and airflow in the trailer to remove the produced heat and moisture. Low temperatures can cause cold stress and produce dark meat because the birds use up their glycogen reserves and burn energy stored in their muscles in an attempt to stay warm.



Studying how current truck designs fare in extreme weather

To counteract these inconsistent temperatures and the resulting impact on chickens, engineers in the transportation team have designed an experimental test trailer with heat and ventilation that can warm up the air in the trailer and regulate ventilation so as to maintain more uniform and appropriate temperature and moisture levels. So far, the researchers have found the birds maintain their body temperature the best when the heat and moisture is removed and the trailer is kept at a regulated temperature. With inlets and fans in proper locations throughout the trailer, researchers will be able to increase the quality and uniformity of the poultry, all while creating a more hospitable environment.



One of the techniques being used to assess cold temperature limits is placement of a sensor in the proventriculus (stomach) of the birds. Using this device, the researchers are able to record the inner temperature of the birds in varying environmental temperatures. Although the preferred ambient temperature seems to be in the $0\text{-}20^{\circ}\text{C}$ range, Classen says

colder temperatures are likely acceptable if the birds are dry. At this point they have not established the minimum temperature but have seen conditions where core body temperatures drop and the birds noticeably show signs of slowing down.

“Our final goal is to have a well ventilated vehicle that you can put on the road in Saskatchewan or Ontario,” says Classen, “**and have it acceptable for animal welfare and increase meat quality as well.**”

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