Printed in the January 2013 issue of Canadian Poultry magazine

CPRC Update

TRANSPORTING TO THE FUTURE

Keeping poultry comfortable during transport can be a challenge. Trucks loaded with birds run all year long in a variety of weather conditions and a range of outdoor temperatures. The current strategy to deal with different conditions is to adjust air flows through the loaded truck trailer by opening or closing air inlets and varying the amount of load covered by side tarps – i.e. no tarps when it's warm outside and increasing tarp coverage as ambient temperatures drop. Generally, flaps and tarps are set at the time of loading based on the average ambient temperature expected during the trip.

The problem is that temperature and humidity levels in a given load can vary greatly. Dr. Trever Crowe and his team at the University of Saskatchewan have shown that as ambient temperatures decrease, the range of temperature and humidity in a load of broilers becomes wider. As an illustrative example, a trip made during an average ambient temperature of -22^{o}C ranged from -21 to +22^{o}C in different areas of the load. An estimated 60% of the birds in the load experienced temperatures below 0^{o}C. Roughly the same proportion of the birds likely experienced a build-up of excess moisture during the trip, which is a concern because wet feathers can impair a bird's ability to maintain its body temperature.

A better way?

Dr. Crowe's group wanted to see if supplemental heat and/or active ventilation could improve conditions during transport. They fitted a single commercial trailer with a heater at the front and three fans at the back that draw air through the load. Trips were made to the processor either with no heat and one fan running or with heat and one, two, or three fans running. None of the birds transported under any of the ventilation strategies experienced temperatures below 0^{o}C during the trips, even when ambient temperatures fell well below the freezing mark.

Additional trips were made in the ventilated trailer to measure temperature effects on meat quality. Trips were categorized according to average ambient temperature as Hot (20-30^{o}C), Warm (10-20^{o}C), Cool (0-10^{o}C) and Cold (below 0^{o}C). Breast meat from birds transported under 'Cold' conditions had the highest incidence of a quality defect known as Dark, Firm, Dry (DFD) meat. More precise temperature control and readings were made using an experimental chamber in which birds were loaded into a drawer much like those used on commercial trailers. These studies showed that small birds (1.9 vs. 2.6 kg) had a higher incidence of DFD and that males were more prone to the defect than females. Delaying processing after transporting birds in the cold increased the incidence of meat quality issues, even if they waited at relatively warm ambient temperatures. Live shrink increased when transport conditions dropped below 0^{o}C.

The culmination of these data points to the potential impact of temperature and moisture on bird well-being and meat quality. Mitigating these negative impacts will require strategies that avoid temperature extremes and remove excess moisture. Dr. Crowe's data suggest that supplemental heat may not be required, even on the coldest days. Similar to a broiler barn, effective cold-weather ventilation takes advantage of the fact that warm air can hold more moisture than cold. The strategy is to seal up the load relatively tight with tarps and run exhaust fans. Cool, relatively dry air enters multiple points throughout the load. As the incoming air warms, it is able to hold more moisture and is exhausted by the fans along with excess moisture. The result is a flow of air that evens out temperature extremes and removes excess moisture, all regardless of whether the truck is rolling down the highway or stuck in traffic.

What's next?

This research demonstrates the potential of active ventilation to improve conditions during cold-weather transport. It also provides information on the relationship between loading density and a bird's ability to cope with cold stress. Studies are ongoing to assess the impact of feather wetness during cold exposure and to pinpoint when a drop in body core temperature begins to negatively affect bird welfare. While it remains to be seen if active ventilation is a practical solution, ongoing research continues to provide industry with information that can be applied to continuously improve transport conditions for poultry.

Funding for this research was provided by Alberta Chicken Producers, Alberta Farm Animal Care Association, Chicken Farmers of Saskatchewan, CPRC, Lilydale, Poultry Industry Council, the Natural Sciences and Engineering Research Council/Agriculture and Agri-Food Canada Partnership Program, and Saskatchewan Chicken Industry Development Fund.

For more details on these or any other CPRC activities, please contact The Canadian Poultry Research Council, 350 Sparks Street, Suite 1007, Ottawa, Ontario, K1R 7S8, phone: (613) 566-5916, fax: (613) 241-5999, email: info@cp-rc.ca, or visit us at www.cp-rc.ca.