Lowering In-Transit Losses

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▪ Introduction

The term in-transit losses refers to the market weight pigs that die on the way to the packing plant or while they are in lairage at the packing plant. Although the percent of pigs that die in transit is low, the overall numbers of pigs affected in North America is high. This problem represents a significant welfare concern for the swine industry. The purposes of this study were to describe the losses experienced by pigs in Ontario and to identify factors that were associated with these losses.

▪ Materials and Methods

Ontario Pork provided data on all market pigs that were shipped in Ontario in 2001. Records were itemized by one day's shipment from a single producer. The trucking company (transporter) and packing plant associated with these pigs was also indicated. One record was produced for each Hourly temperature and humidity information was obtained from the nearest weather station to the packing plant. The distance travelled by the load was assigned based on the road distance from transporter address or assembly yard to the packer address. Swine comfort indexes (referred to as pigindex) were calculated according to Hahn *et al.* (2003). The Ontario Pork data was merged with the distance based on the transporter and packer and the weather based on the time of arrival at the packing plant.

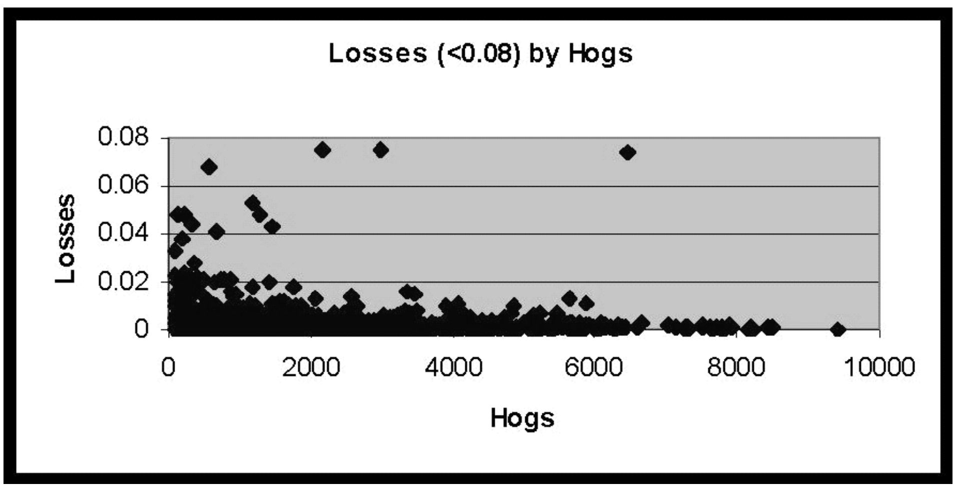
The in-transit loss ratio was calculated as the number of pigs that died in transit divided by the number of pigs marketed by a producer in a day. Subject pigs were those that did not appear completely healthy and could be identified at the farm, assembly point, on the truck or in the packing plant. Only subject pigs that ultimately died were identified. The association between in-transit losses and the following variables was determined: dry temperature, humidity, total shipped by each producer, mileage, and number of subject pigs. The impact of producer, transporter and packer were also measured as random effects.

Results

There were 4159 producers, 33 packers and 117 transport companies in this database. A total of 4,760,213 market weight pigs were shipped on 329 separate days in 2001. Of these pigs, 7969 or 0.17% of the pigs died in transit. There were 1212 pigs (0.025%) classified as subject that died. These represented 15% of the dead pigs.

Producers who ship less than 2,000 pigs have higher losses than those shipping more pigs. Approximately 65% of producers shipped less than 500 pigs. Most producers (75%) who lost a pig in-transit lost fewer than 6 pigs during the year (**Figure 1**).

Figure 1. In-transit deaths by number of pigs marketed per producer per year in Ontario, 2001



Dry temperatures seldom went above 30º C in the summer months of June, July, and August, and the maximum temperature was in June (33º C). Humidity in the winter and fall were generally higher (73.8%) than in the summer months (64.1%). Death and subject classification were greater in the summer months with the highest levels again in August (**Table 1**). Based on the pigindex calculations, August 2001 was the most uncomfortable month (Hahn et. al

2003). In that month, 1,617 pigs died and 195 of those were classified as subject.

Table 1. Average in-transit loss ratio by temperature for Ontario pigs marketed in 2001

Dry Temperature	Number of deaths per 10,000 marketed
14^{o}C or below	14
15 to 19^{o}C	24
20 to 22^{o}C	43
23-25^{o}C	42
26 to 28^{o}C	59
29 to 31^{o}C	76

Approximately 74% of all shipments to packers involved a distance greater than 200 km. Distance alone did have an effect on deaths or subject classification.

The pig indexes are similar to a humidex. It indicates the environmental impact on the pig based on the combination of temperature and humidity.

For the Pig index hierarchical ranges, the incidence rate for pig deaths within that range is approximately the coefficient times the incidence rate for pig deaths in the range below it. For example, for the first range, the incidence rate for pig deaths between indexes of 10 to14 is approximately 1.11 times greater than the incidence rate for pig deaths in below that range when controlling for all other fixed covariates in the model and the average random effects of producer, transporter, and packer. For the continuous variables the interpretation is somewhat different. The in-transit loss ratio was 23 times higher for loads with a subject pig than in loads without a subject pig. A temperature of 27^{o}C at a very low humidity < 15%, will have the same impact as a temperature of 23^{o}C with a humidity of > 75%. Pigs transported under these conditions will have a incidence ratio of in-transit deaths that is 4 times higher than if pigs are transported at low humidity with a temperature of 20-23^{o}C or high humidity with a temperature of 17 - 19^{o}C.

Approximately 56% of pigs that die in-transit are found dead on the truck. This might lead people to believe that the transporter was responsible for a large portion of the in-transit losses. However, by looking at the random variation due to producer, transporter and packer, we can determine which level explains most of the extremes of the in-transit losses. The random error variance was 0.99. The highest level of variance based on the clustering of pigs was at the producer level (estimate= 0.47). This was slightly lower at the packer level (estimate= 0.32) and lower still within the transporting company level (estimate= 0.15).

Take Home Message

- Pigs are affected by both temperature and humidity
- Reductions in density of pigs on trucks must take both heat and humidity into account
- Farm of origin accounts for more variation due to in-transit loss than does transport company or packing plant
- Producers must implement changes in genetics or handling or feeding practices to reduce in-transit losses
- Pigs travelling large distances did not experience higher in-transit losses than those travelling shorter distances

Acknowledgements

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Reference

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