

Weaned piglet mortality during long transport events is affected by season

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SUMMARY

Limited information is available on factors associated with piglet mortality during weaner transport events. This study aimed to identify transport characteristics associated with the occurrence of in-transit mortality or increased rates of mortality (≥ 1 piglet found dead on arrival) using records of weaned piglet transport events voluntarily provided by five Canadian swine companies. A total of 810 long duration (>8h to <28h) weaned piglet (4.2-7.7kg) transport events were analysed to investigate risk factors for the occurrence of in-transit mortality. Season of transport was the only significant independent variable in the final logistic regression model. The odds of a transport event having mortality occur was ~ 2 times greater during winter (December, January, February) compared to spring (March, April, May), summer (June, July, August) and fall (September, October, November). A separate dataset (755 long duration weaned piglet [4.2-7.9kg] transport events) was used to identify risk factors for increased rates of in-transit mortality. In-transit mortality rates ranged from 0.00-6.16%, with an average of 0.15%. Season of transport was again the only significant independent variable in the final model. The rate of piglet death in-transit was increased in all seasons compared to the summer with winter transport having the highest predicted rates of in-transit mortality (5x greater than summer and 3x greater than fall and spring). These results suggest that winter transport in Western Canada is an area of opportunity to reduce in-transit mortality during long duration weaned piglet transport events.

INTRODUCTION

In-transit mortality is an indicator of severe welfare compromise and is typically recorded in documentation accompanying commercial transport events. Despite this, previous investigations of factors associated with weaned piglet mortality during transport are limited. Previous research showed that in-transit mortality rates of weaned piglets (6.5 ± 0.7 kg) were greatest during transport events conducted in average ambient temperatures $>25^\circ\text{C}$, increasing further with farther transport distances. However, the lowest temperature category included in that study was $<15^\circ\text{C}$ and therefore likely does not represent the low temperatures encountered during winter transport in Canada (e.g., -20°C). For young piglets, cold stress is a welfare concern due to their lack of innate warming mechanisms and limited body reserves. Three-week old piglets are most comfortable when exposed to temperatures between 22 and 30°C . In addition to cold weather transport conditions, the association of trip factors including trailer type and multiple loading or unloading stops with weaned piglet mortality in-transit have yet to be evaluated. Studies investigating risk factors for in-transit mortality of piglets transported at three to four weeks of age capturing seasonal conditions experienced in Canada are needed to support the development of specific management recommendations for this unique age group. As such, the objectives of this study were to identify transport characteristics that were associated with the occurrence of in-transit mortality and/or associated with increased rates of in-transit mortality using a retrospective dataset containing records of weaned piglet transport events obtained from multiple Canadian swine companies and years of transport. Based on previous research, factors hypothesized to be associated with both the increased occurrence and rate of trip mortality were extreme temperatures (high or low) and long trip durations.



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EXPERIMENTAL PROCEDURES

Weaned piglet transport records collected between 2013 and 2018 (n = 8891) were voluntarily provided by five Canadian companies conducting weaned piglet transport events. These five companies included three production companies (an integrator, a cooperative, and a stand-alone company) and two livestock transport companies moving piglets for private farms. The existing information provided were used to match additional information to each company's dataset (trip distance, departure and arrival temperature), calculate additional parameters (average piglet weight, estimated trip duration, in-transit mortality) and generate categorical summary variables (multiple origin barns, border crossing, multiple destination barns). As most short transport events did not provide mortality data, the decision was made to analyze data only from transport events between 8 and 28h in duration, resulting in a dataset with 810 long transport events. A mixed logistic regression model was used to look at associations of trip characteristics with a transport event having ≥ 1 piglet found dead on arrival. One company with data available from multiple years and with a range in trip durations greater than 8h was selected to study risk factors for increased rates of in-transit mortality in greater detail, resulting in a dataset with 755 long transport export events that was analysed by negative binomial regression.



RESULTS AND DISCUSSION

In total, 64% of the initial dataset included trips less than one hour in duration with 2% of trips recording a mortality, while 13% of the initial dataset included trips between eight and 28h with 30% recording mortality.

Occurrence of in-transit mortality: Longer trip durations, use of a potbelly trailer, larger load sizes, and winter transport had significantly greater odds of a trip having mortality occur, while average piglet weight and interruptions were not significantly associated. Season of transport was the only significant independent variable in the final logistic regression model. The odds of a transport event having mortality occur was approximately 2 times greater during the winter (December, January, February) compared to the spring (March, April, May), summer (June, July, August) and fall (September, October, November), with no differences observed between the other seasons.

Rates of in-transit mortality: Models of in-transit mortality rates included the factors trip duration, interruptions, season and year. The rate of in-transit mortality was greater for transport events occurring in the winter compared to the other seasons. The greatest difference was observed for trips occurring in the winter compared to those in the summer, and the least for trips occurring in the winter compared to those in the fall, with trips in the winter compared to the spring intermediate. The rate of in-transit mortality for trips conducted in the fall was 1.8 times greater than those conducted in the summer, and the rate of in-transit mortality for trips conducted in the spring was 1.6 times greater than those conducted in the summer. The rate of in-transit mortality was significantly less for transport events occurring in the summer relative to all other seasons. For every 10,000 piglets at risk (transported), the predicted rate of piglet death during transport was 27.1 piglets during winter months, 9.9 during fall months, 8.7 during spring months, and 5.5 during summer months.

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IMPLICATIONS

This research identified winter transport as a potential area of opportunity to reduce the occurrence and rate of in-transit mortality during long duration weaned piglet transport events in Western Canada. Further, these findings suggest that the development of specific transport recommendations for weaned piglets may be beneficial. Investigations of management practices and factors which modulate cold weather conditions such as space allowance and bedding provision would be particularly useful in informing transport recommendations for this young age group.

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