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Weaner transport: Journey duration influences piglet physiology

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The transport of pigs is an integral part of pork production however it can be a stressful event for pigs with consequences on meat quality and animal welfare. Research has identified that many factors affect market pigs during transport, including temperature fluctuations, stocking density, vibrations, noise, the total time off food and water. We also expect these same factors will influence the health and welfare of weaned piglets during transport. However, relatively little is known on how transport influences weaned piglets, and if effects are additive close to weaning. Under the new Health of Animals regulation (Part XII: Transportation of animals, Section 19.0) released in February 2019, you can transport pigs of any age up to 28 hours without feed, water and rest. There is minimal information on how the length of commercial transport may affect piglet health and welfare in the short and long term. Research is currently in progress looking at how piglets respond to transport under commercial conditions.

What we did

This pilot study assessed weaner pigs traveling short (n=3, 200 piglets/load) and long journeys (n=3, average 2183 piglets/load) from two different farms during summer months (Figure 1). Each load consisted of sixty piglets selected as focal pigs for close monitoring, being evenly distributed across specific trailer compartments. Data loggers positioned in focal pig compartments, recorded temperature and humidity continuously throughout the journey. Approximately, two days before transport focal piglets were weighed, scored for lameness, skin,

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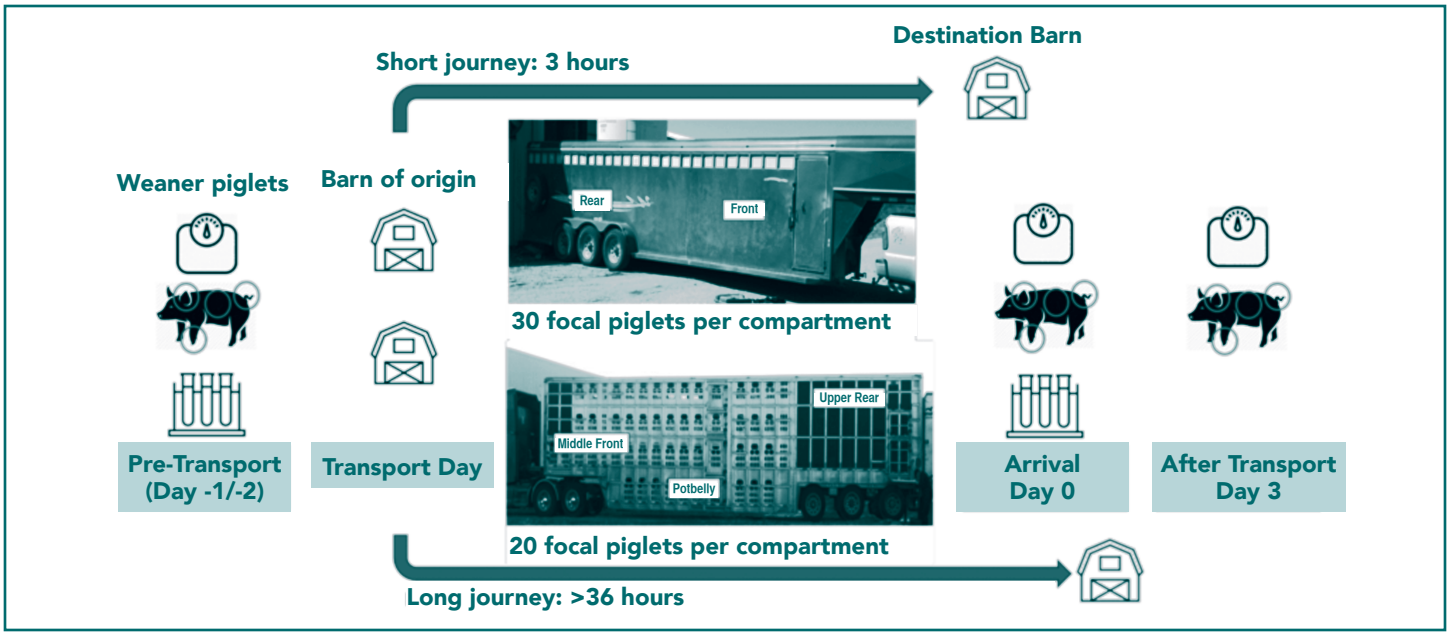

Figure 1. Diagram showing data collected (blood samples, weight, lameness, skin, ear and tail scores) timepoints pre, during and post transport, journey type and trailer type used for short and long haul journeys of weaner piglets.

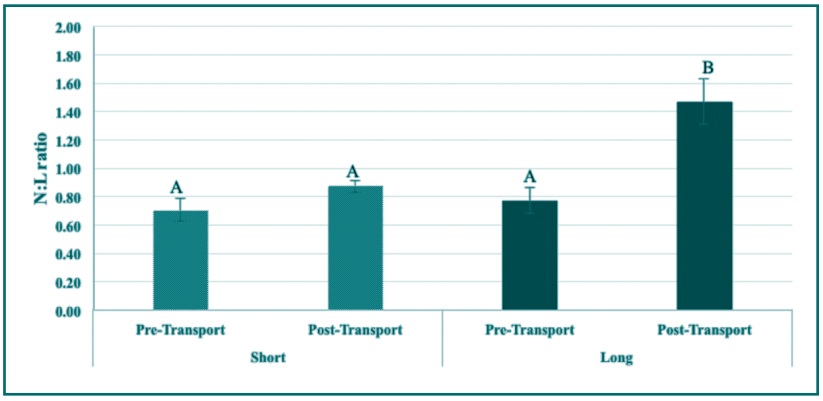

Figure 2. Mean N:L ratio in weaned piglets after short (3h, n = 60) and long (>36h n = 60) trips. Error bars indicate ± SEM. Different superscript letters within and between transport type indicates significant difference at the 5% level.

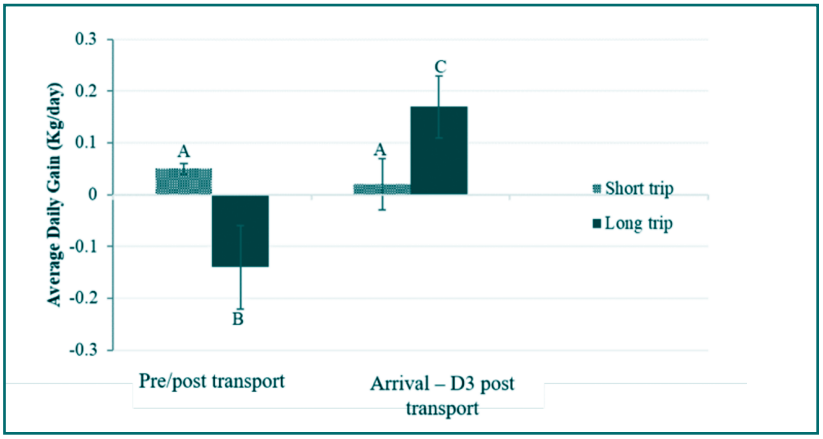

Figure 3. Mean average daily gain (kg) of weaned piglets (N=180/trip type) over the course of short (3h) and long (>36h) transport. Error bars indicate ± SEM. Different superscript letters within and between time points indicate significant difference at the 5% level.

ear and tail lesions and 20 piglets/trip type/load were blood sampled. We repeated these measures upon arrival at the destination barn, along with recording the number of dead piglets (DOA). Piglet behaviour was recorded during (pig postures - standing, sitting, and lying) and for two days after transport. Piglet behaviour and weights were used to evaluate how piglets responded to, and their speed of recovery following transport. Morbidity and mortality to the end of the nursery period was also recorded. A range of tests were run on blood samples including a complete blood count including the neutrophil to lymphocyte ratio (N:L), serum cortisol, haematocrit, lactate and creatine kinase (CK); providing information on how the transport influences the piglets' physiological status.

What we found

Long haul journeys cause greater physiological stress

Piglets transported for long journeys had higher neutrophil to lymphocyte ratios (N:L) than those transported for short journeys (Fig 2). The post-transport N:L ratio of pigs from long journeys is outside of the typical ranges for piglets (0.6-0.8, Saugiharto et al. 2014) , which indicates that the long haul journeys caused physiological stress in the weaned piglets, and is capable of causing immune cell responses. Regardless of trip type, transport increased blood levels of creatine kinase, indicating some muscle degradation, potentially related to unloading activity.

Journey duration influences ADG

Long haul journeys resulted in weight loss during transport (calculated from the weight change from pre transport to arrival), (Fig 3). This weight loss likely results from the prolonged fasting period (>24hrs) arising from a long haul journey, with a continued

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There are additional considerations that producers must take in account when feeding DON-contaminated. In theory, if we could simply purchase DON contaminated grains cheaper we could maintain margin over feed cost, however, it is not that simple in practice and may not be possible. If these savings cannot be achieved, pigs fed DON-contaminated diets will need to be kept in the barn longer due to slower growth, increasing costs and reducing throughput. Adding 5 days to market adds approximately 4.5% to fixed costs, as fewer pigs can be marketed from the barn in a year. In farrow-to-finish operations, many facilities simply cannot afford to keep pigs 5 days longer. Logistics are another important consideration. If farms do not have the ability to separate the DON contaminated ingredients from clean grain, the entire herd would receive the DON ingredient – perhaps creating additional challenges in other parts of the production system. It is also important to note that this economic analysis examines the impact of feeding DON on based on one specific grading grid. As packers have different requirements, the change in margin over feed cost would be packer specific and shipping at lighter weights (associated with higher levels of DON) may be more detrimental in some cases. Finally, the use of DON-mitigating feed additives, while potentially effective, also result in increased feed costs, therefore, producers would need to weight the potential benefits against the costs of these products.

Take home message

1. In finisher pigs, feeding of diets with > 1 ppm DON results in an initial reduction in feed intake and average daily gain. This results in a reduction in body weight which is sustained over time. Growth performance recovers after a period of time, indicating that pigs may be able to adapt to DON intake. The response to DON appears to be reduced and more variable in grower pigs than in finisher pigs.
2. The negative effects of DON intake appear to be due largely to reduced feed intake. This is supported by lack of negative effects of DON intake on nutrient utilization, health status, and carcass quality.
3. Feeding diets containing > 1 ppm DON will result in reduced margin over feed cost. This reduction is greater when DON is first introduced in the finisher period compared to the grower period.
4. Producers may be able to feed DON-contaminated diets, up to 5 ppm, while making adjustments (e.g., reduced ingredient/feed cost, increased days to market, mycotoxin mitigating feed additives) for the negative impact of DON intake on growth performance.

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expenditure of piglets body reserves. Piglets may compensate for this time off feed by increasing their feed intake upon arrival, as indicated by an increased ADG over the three days following arrival (Fig 3). This weight loss likely results from the prolonged fasting period (>24hrs) arising from a long haul journey, with a continued expenditure of piglets body reserves. Piglets may compensate for this time off feed by increasing their feed intake upon arrival, as indicated by an increased ADG over the three days following arrival (Fig 3).

In the present study, journey duration had minimal impact on DOA with 0 and 0.08% DOA for short and long journeys respectively. DOA for the remainder of the nursery period was 1% for short journeys and 0.32% for long journeys, indicating overall, there was a lower mortality in piglets transported for long journeys. This suggests that when transported in the right conditions, mortality does not increase with transport duration. Piglet health at the time of transport and management of the piglets in destination barn also influence these results.

Implications

Although all transportation creates some stress for pigs, long haul journeys in summer had a greater impact on piglets, evidenced by greater physiological stress and a larger reduction in ADG upon arrival. Although piglets may show compensation of ADG following arrival; whether there are longer-term consequences of these findings for piglet health is unknown at present.

Research is ongoing in this area looking at the impact of new trailer designs, and on-board watering on piglet physiology, behaviour, welfare and productivity. This will contribute to identifying best management practices for weaner transport for journeys of varying duration.

Acknowledgements

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