Loading Gantry versus Traditional Chute for the Finisher Pig: Effect on Transportation and Packing Plant Losses

A.S. Leaflet R2339

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Summary and Implications

Pig mortalities from the farm to the harvest facility have been estimated to cost the U.S. swine industry over 55 million dollars annually. Improved understanding of the major factors impacting the behavioral and physiological responses of the finisher pig during transportation is needed.

Introduction

Animal "*movement is accomplished by making the target location, or route to it, more attractive than the starting location.*" Pigs are motivated by several factors including natural curiosity, odors, sounds, conspecifics, food, water and fear. Traditional handling and loading systems have been either poorly planned or not planned in the design and construction of finishing facilities. Therefore, during handling and marketing opportunities the industry is forced to rely heavily on negative motivators or repulsive forces, most notably fear and pain, to move the animal. Therefore, the objective of this study was to determine if loading system affects the incidence of dead, injured or stressed pigs during transportation or at the packing plant.

Materials and Methods

Animals: A total of 551 semi loads of crossbred finisher pigs from a single site were collected on a commercial finishing unit in the Midwest from July 2006 to October 2007.

Treatments: Two loading systems (prototype loading gantry [P] vs. traditional chute [T]) were compared in two different experiments. Experiment one (n=211 semi loads, avg. wt. = 116.6kg) included the comparison of two loading systems on the first pigs marketed from a finishing facility or first pull [FP] pigs. Experiment two (n=340 semi loads, avg. wt. = 118.5kg) included the comparison of two loading systems on the last pigs marketed from a finishing facility or closeout [CO]) pigs.

Measures: Pigs were loaded using an internally-approved Swine Welfare Assurance Program™ (SWAP+) market load assessment, which combines the National Pork Board's SWAP program and the American Meat Institute's Animal Handling Audit. This assessment included facility evaluation (chute angle and cleat spacing), adherence to the integrator market pig loading standard operating procedure and transportation standard operating procedure (density and environmental management). Performance measures evaluated at the completion of unloading were crippled on arrival (COA), stressed on arrival (SOA) and dead on arrival (DOA). Performance measures evaluated in lairage were crippled in plant (CIP), stressed in plant (SIP) and dead in plant (DIP). Crippled (COA and CIP) pigs were defined as "any pig that had received an injury that impeded its movement." Stressed (SOA and SIP) pigs were defined "as having temporarily lost the ability to walk, but had a reasonable expectation to recover full locomotion with rest." Dead (DOA and DIP) pigs were defined as "a pig that had ceased to breathe." Unloading and lairage defects were summed to evaluate total crippled, total stressed, total dead and total losses.

Results and Discussion

Experiment One: In this study loading system influenced the total number of dead pigs ($P < 0.06$) and total losses ($P < 0.03$). However, there were no loading system ($P >$ 0.05) differences in the incidence of all other performance measures collected. Ritter et al. (2006) reported total losses of 1.08%, and these data were similar to results from a number of other field studies (Ellis et al., 2003 and Hambrecht et al., 2004). Our trial is in agreement with previous studies when the T system is used to load pigs (1.61 ± 0.18 pigs/load [0.96%]). However, there were fewer

Table 1. First pull performance measures.

	Chute Type[a]		
Item[b]	T	P	P-value
COA	0.05 ± 0.02	0.02 ± 0.02	0.33
SOA	0.62 ± 0.10	0.48 ± 0.09	0.29
DOA	0.33 ± 0.07	0.21 ± 0.05	0.16
CIP	0.01 ± 0.01	0.00 ± 0.00	0.58
SIP	0.28 ± 0.06	0.24 ± 0.06	0.59
DIP	0.31 ± 0.05	0.19 ± 0.05	0.37
T crippled	0.06 ± 0.06	0.02 ± 0.02	0.27
T stressed	0.93 ± 0.13	0.73 ± 0.11	0.23
T dead	0.64 ± 0.09	0.42 ± 0.07	0.06
T losses	1.61 ± 0.18	1.15 ± 0.15	0.03

[a]T = Traditional chute; P = Prototype loading gantry
[b]COA = Crippled on arrival; SOA = Stressed on arrival; DOA = Dead on arrival; CIP = Crippled in plant; SIP = Stressed in plant; DIP = Dead in plant; T cripple = Total crippled; T stress = Total stressed; T dead = Total dead; T losses = Total losses

total losses reported when pigs were loaded using the P system (1.15 ± 0.15 pigs/load [0.69%]).

Experiment two: Loading system had no (P > 0.05) influence on performance measures evaluated (Table 2.3). However, reported total losses (1.19 ± 0.15 pigs/load, [0.72%], T vs 0.99 ± 0.15 pigs/load, [0.60%], P) in this study were lower compared to a number of other field studies (Ellis et al., 2003 and Hambrecht et al., 2004).

Table 2. Closeout pull performance measures.

	Chute Type[a]		
Item[b]	T	P	P-value
COA	0.02 ± 0.01	0.01 ± 0.01	0.41
SOA	0.62 ± 0.10	0.48 ± 0.09	0.19
DOA	0.18 ± 0.03	0.17 ± 0.04	0.86
CIP	0.03 ± 0.01	0.00 ± 0.00	0.11
SIP	0.19 ± 0.04	0.20 ± 0.05	0.86
DIP	0.17 ± 0.04	0.13 ± 0.04	0.49
T crippled	0.05 ± 0.02	0.01 ± 0.01	0.06
T stressed	0.80 ± 0.11	0.67 ± 0.11	0.29
T dead	0.36 ± 0.06	0.33 ± 0.07	0.74
T losses	1.19 ± 0.15	0.99 ± 0.15	0.21

[a]T = Traditional chute; P = Prototype loading gantry
[b]COA = Crippled on arrival; SOA = Stressed on arrival; DOA = Dead on arrival; CIP = Crippled in plant; SIP = Stressed in plant; DIP = Dead in plant; T cripple = Total crippled; T stress = Total stressed; T dead = Total dead; T losses = Total losses.

In conclusion, transportation of the finisher pig to market is a critical time period in regards to performance (Rademacher and Davies, 2005). In specific situations, performance and thus economic implications can be manipulated by loading system. This investigation has provided insight to changes in facility design that may ultimately lead to the minimization of some stressors that pigs are exposed to at the time of marketing. Results indicate that pigs loaded on the P chute during the FP have fewer total deads and total losses.