

The “What’s” of Fatigued Pigs

Don Down

Elanco Animal Health



Overview

- Science of fatigued pigs
- Elanco's role in Animal Welfare
- Key Learning's

Pig Transportation in the Early 1900s



Fig. 142. Hogs being driven to market. This was a common scene in the early 1900's. Truck transportation of livestock was first started in 1911. (Photo by J. C. Allen and Son, West Lafayette, Indiana; Courtesy, American Feed Manufacturers Association, Inc.).

Pig Transportation in the 1930s

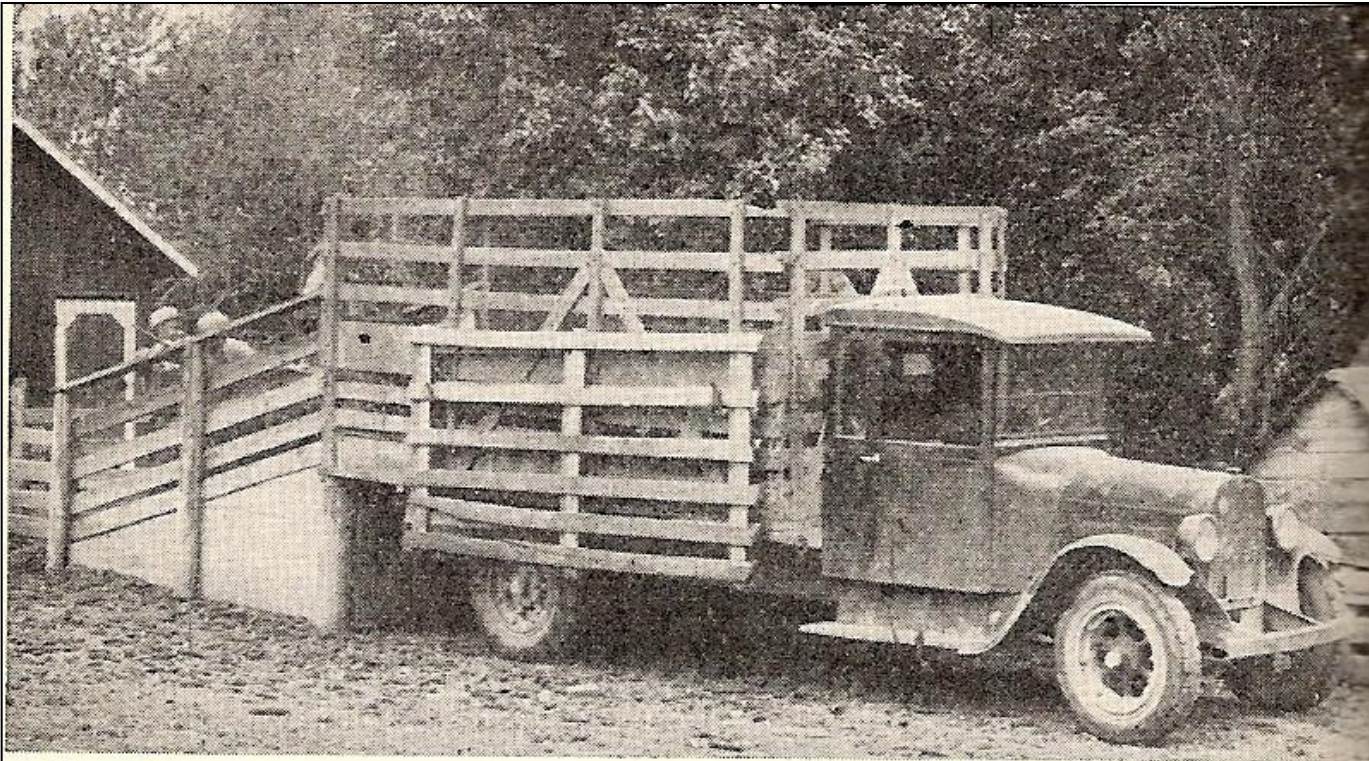


FIG. 60.—Truck service is prompt, dependable, efficient, adapted to short hauls, and provides access to a large number of interior or local markets. (Ind. Exp. Sta., Bul. 337.)

Non-ambulatory Pigs at the Plant



Fig. 144. Badly crippled hogs unable to walk into pens unassisted on arrival at market. Such badly crippled animals are hauled in the "cripple cart," and are generally bought subject to inspection. The National Livestock Loss Prevention Board is authority for the statement that there is an annual loss of \$25,000,000 accruing from bruises, crippling, and death losses in marketing animals. (Courtesy, National Livestock Loss Prevention Board).

Recommendations from the 1930s

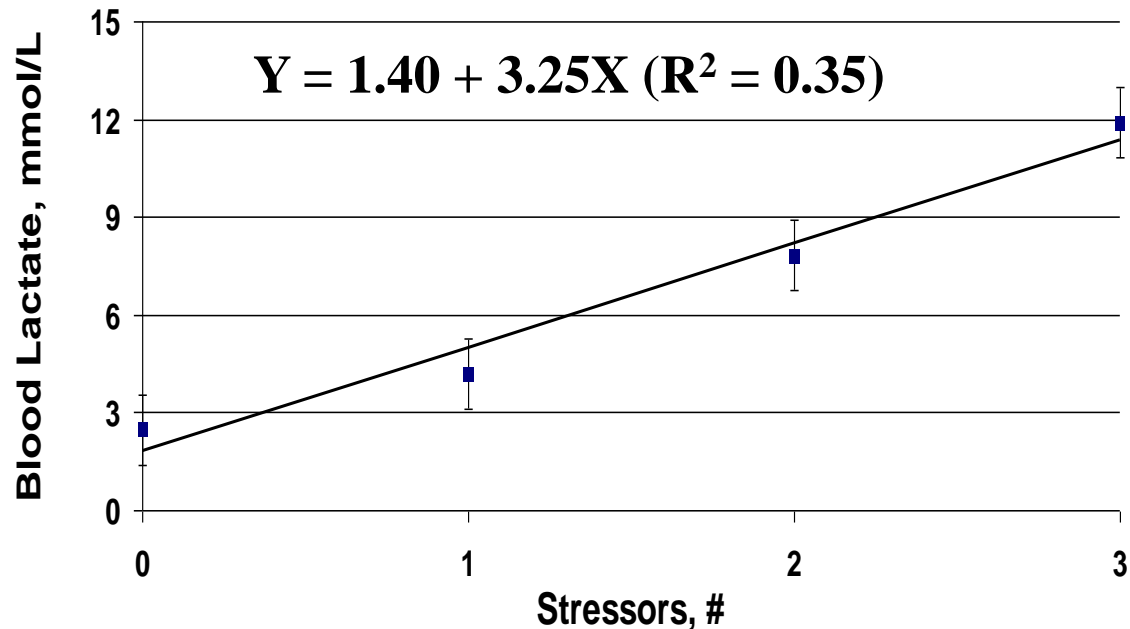
- Trucks should be clean and properly bedded before loading
 - Summer: use sand and shower pigs prior to and during transport
 - Do not pour cold water on the back of a “hot” pig → death
 - Winter: use straw or hay and cover the vents of the truck
- Do not ship pigs on a full stomach (especially in summer)
- Handle pigs quietly and calmly
 - Do not use prods, sticks, clubs, or whips
- Do not mix unfamiliar pigs during transport
- Do not overcrowd pigs on the truck (especially in summer)

STRESS!



Minimize Stress

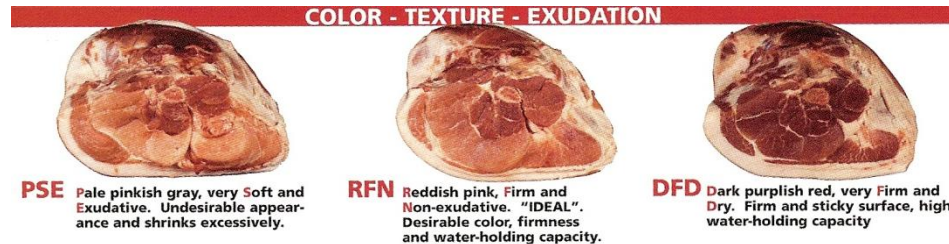
- *Aggressive handling, restricted transport floor space, and long distance moved* treatments had additive effects on rectal temperature, blood acid-base balance, and loin muscle lactate values (Ritter et al., 2007)



Removing just one stressor will improve the pig's well-being!

Potential Pork Quality Defects

- Variation in pork quality?



(Photo courtesy of the National Pork Board's TQA Handbook, 2004)

- The vast majority of fatigued pigs had pork with dark color, high ultimate pH, and low drip loss, but a small percentage had PSE pork (**Carr et al., 2005**)

- Carcass bruising



(Photos courtesy of Lonergan et al., 2006)

National Pork Board. 2004. Trucker Quality Assurance Handbook. C. Stahl, ed. National Pork Board, Des Moines, IA.

Carr, S. N., J. P. Gooding, P. J. Rincker, D. N. Hamilton, M. Ellis, J. Killefer, and F. K. McKeith. 2005. A survey of pork quality of downer pigs. *Journal of Muscle Foods*. 16:298-305.

Lonergan, S., E. Huff-Lonergan, and A. Johnson. 2006. Pork Quality. Proceedings of the Animal Care and Handling Conference, Overland Park, KS.

Stress and Pork Quality

Pre-harvest Stress and Pork Quality

- Long term stress → DFD pork
 - Low muscle glycogen
 - Normal rate of pH decline
 - Meat has high ultimate pH
- Short term stress → PSE pork
 - Elevated body temperature
 - Metabolic acidosis
 - Increased rate of muscle pH decline



Gregory, N. G. 1994. Preslaughter handling, stunning and slaughter. *Meat Sci.* 36:45-56.

Buege, D. 1998. Variation in pork lean quality. National Pork Board. Des Moines, IA. Available: <http://www.meatscience.org/Pubs/factsheets/q-variationinporklean.pdf>
Accessed December 4, 2008.

Pork Quality

Variation in Fresh Pork Quality

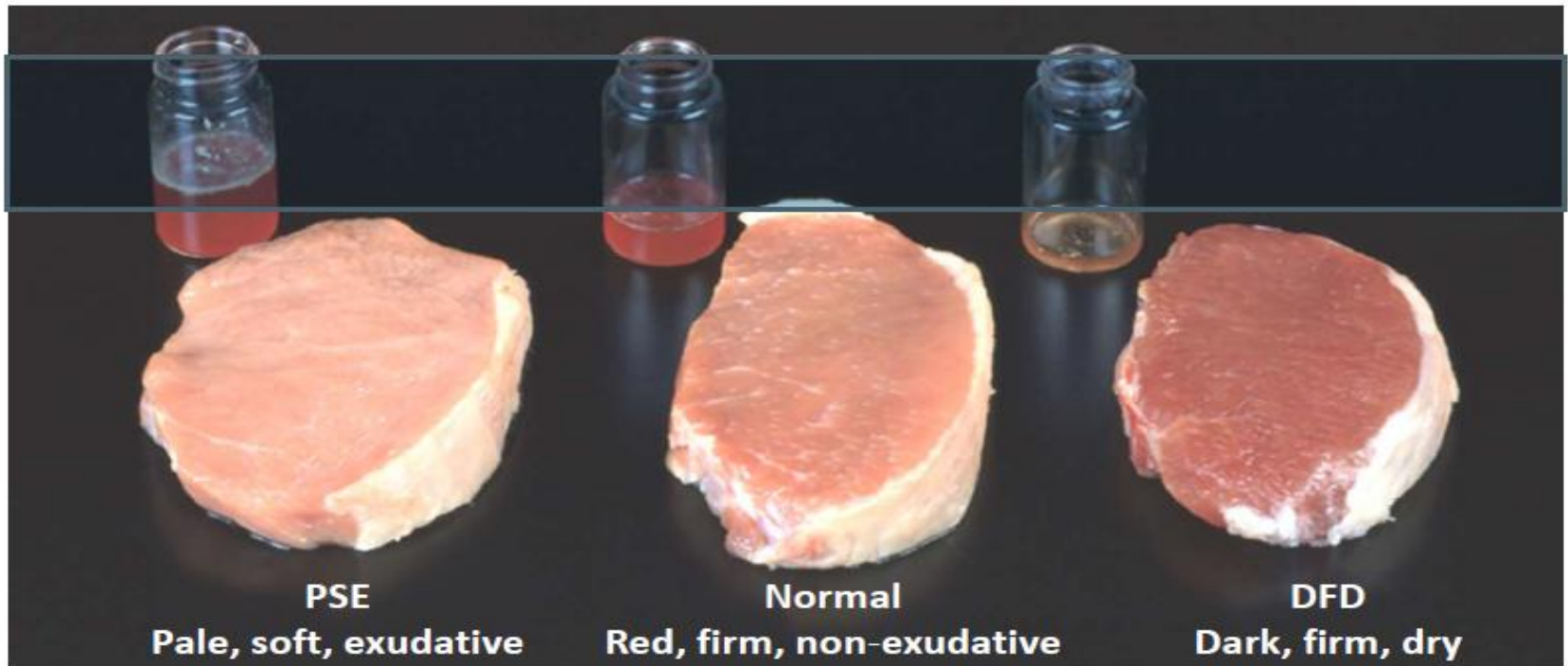
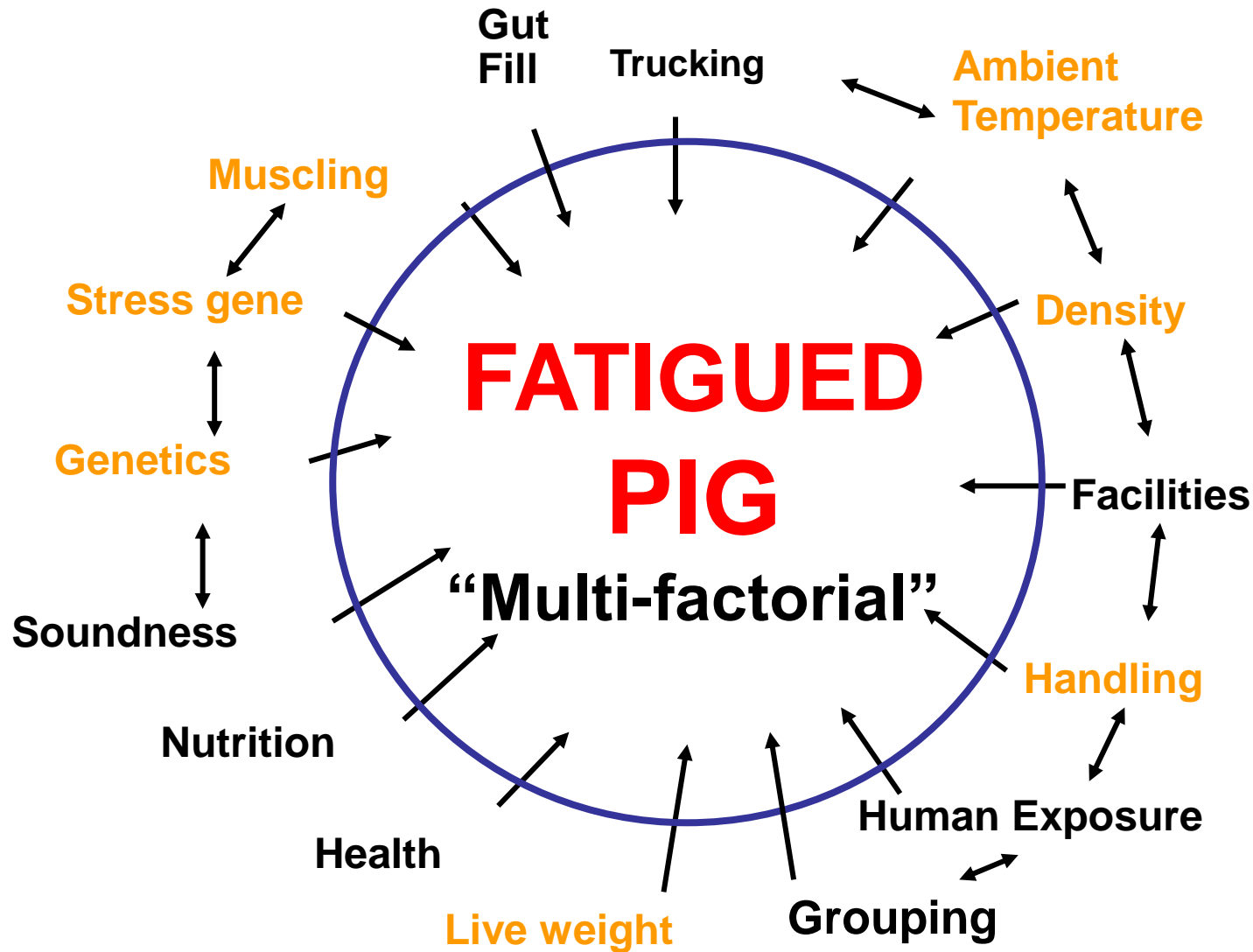


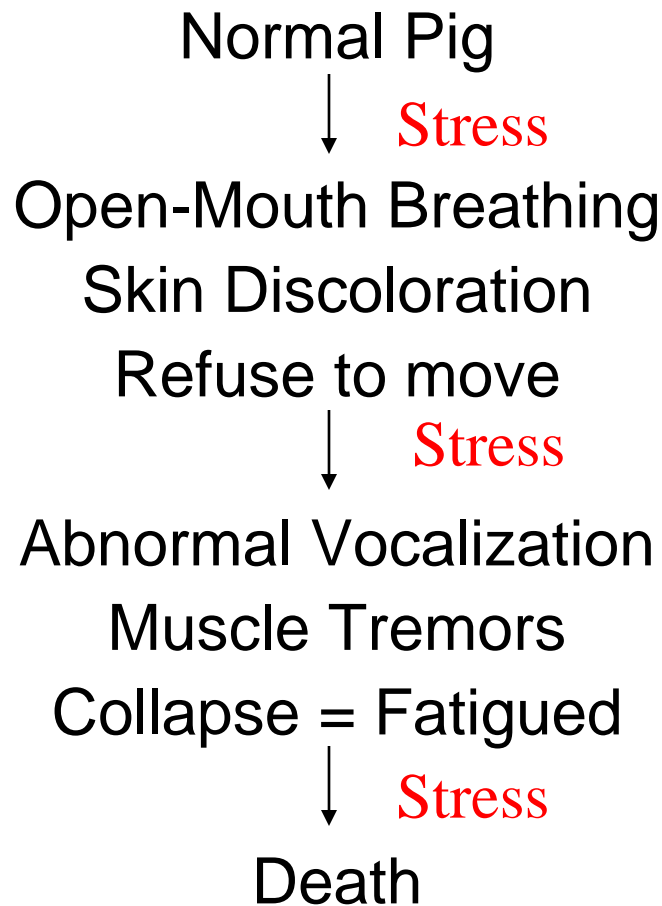
Photo provided by Floyd McKeith



Anderson, D. B., D. J. Ivers, M. E. Benjamin, H. W. Gonyou, D. J. Jones, K. D. Miller, R. K. McGuffey, T. A. Armstrong, D. H. Mowrey, L. F. Richardson, R. Seneriz, J. R. Wagner, L. E. Watkins, and A. G. Zimmermann. 2002. Physiological responses of market hogs to different handling practices. Pages 399-400 in Proceedings of the American Association of Swine Veterinarians, Kansas City, MO.



Fatigued Pig Symptoms



Ritter, M., M. Ellis, M. Benjamin, E. Berg, P. DuBois, J. Marchant-Forde, A. Green, P. Matzat, P. Mormede, T. Moyer, K. Pfalzgraf, M. Siemens, J. Sterle, T. Whiting, B. Wolter, and A. Johnson. 2005. The fatigued pig syndrome. *Journal of Animal Science*. 83(Suppl. 1):258. (Abstr.)

Research Shows Fatigued Pigs Can Recover

- Followed 25 fatigued pigs from the farm to the plant with a 3 h transport time
 - 18 (72%) were normal during unloading

- 2 hours of rest time allows pigs to recover

Ritter, M. and M. Ellis. 2006. Non-Ambulatory Pigs: Reducing incidence, handling properly. Proceedings of the Animal Care and Handling Conference, Overland Park, KS.

Ritter, M. J., M. Ellis, J. Brinkmann, J. M. DeDecker, K. K. Keffaber, M. E. Kocher, B. A. Peterson, J. M. Schlipf, and B. F. Wolter. 2006. Effect of floor space during transport of market-weight pigs on the incidence of transport losses at the packing plant and relationships between transport conditions and losses. *Journal of Animal Science*. 84:2856-2864.

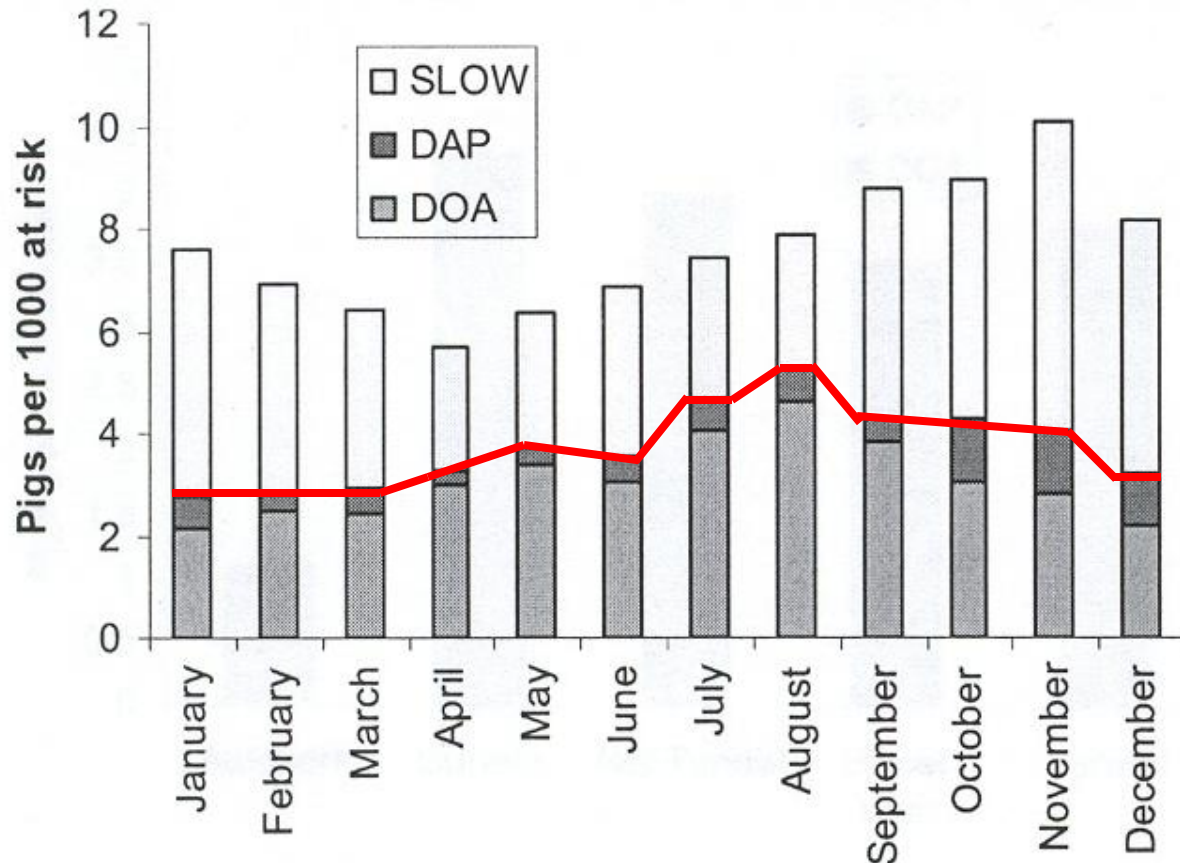
Research Shows Fatigued Pigs Can Recover

- Subjected 96 pigs to an aggressive handling model
 - 11 fatigued pigs were observed
 - Fatigued pigs were placed in recovery pens and allowed to rest
- Results
 - Rectal temperature increased during aggressive handling but after 2 hours nearly returned to normal
 - Blood Ph was reduce after handling but increased after 2 hour rest.
- 2 hours of rest time allows pigs to recover

Ritter, M. and M. Ellis. 2006. Non-Ambulatory Pigs: Reducing incidence, handling properly. Proceedings of the Animal Care and Handling Conference, Overland Park, KS.

Ritter, M. J., M. Ellis, J. Brinkmann, J. M. DeDecker, K. K. Keffaber, M. E. Kocher, B. A. Peterson, J. M. Schlipf, and B. F. Wolter. 2006. Effect of floor space during transport of market-weight pigs on the incidence of transport losses at the packing plant and relationships between transport conditions and losses. Journal of Animal Science. 84:2856-2864.
SBU 2044

Research Shows Seasonal Variation of Fatigued Pigs

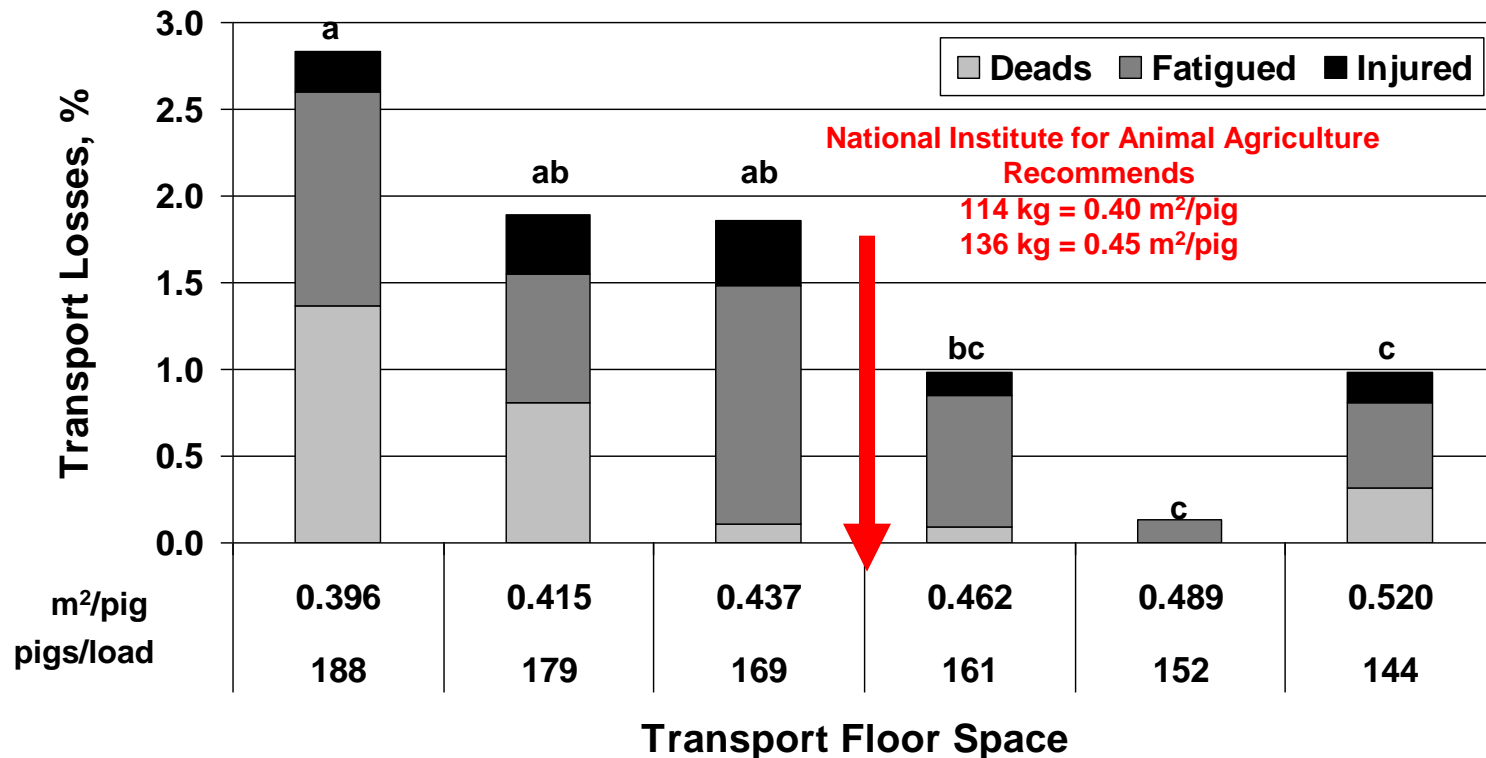


(Based on 1.3 million pigs)

Rademacher, C., and P. Davies. 2005. Factors associated with the incidence of mortality during transport of market hogs. Pages 186-191 in Proceedings of the Allen D. Lemay Swine Conference, St. Paul, MN.

Research Shows Transport Floor Space Makes A Difference in the Number of Fatigued Pigs

- Utilized 42 loads in spring and fall to determine the effects of transport floor space on losses at the plant



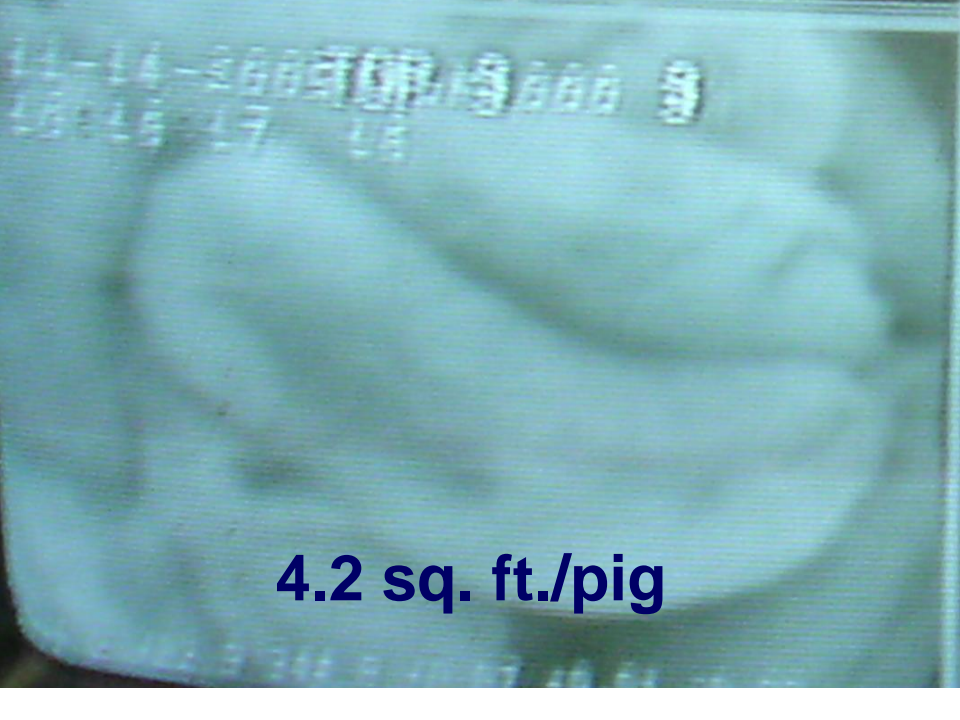
Ritter, M. J., M. Ellis, C. R. Bertelsen, R. Bowman, J. Brinkmann, J. M. DeDecker, K. K. Keffaber, C. M. Murphy, B. A. Peterson, J. M. Schlipf, and B. F. Wolter. 2006. Effects of distance moved during loading and transport floor space of market weight pigs on transport losses at the packing plant. Page 137 in Proceedings of the 2006 Midwest Animal Science Meetings, Des Moines, IA. (Abstr.)



5.8 sq. ft./pig



5.0 sq. ft./pig



4.2 sq. ft./pig



Secure environment

- Remove any unnecessary objects in their path
- Be vigilant and avoid any possible harmful situations like:
 - Sharp edges, or
 - Damaged floor or slats



Trim Loss – not always recognized

Carcass Bruising and Trim Loss



(Photos courtesy of Lonergan et al., 2006)

- Carcass bruising can be caused by:
 - Rough handling
 - Poorly maintained facilities
 - Overcrowding pigs during transport
 - Fighting

Lonergan, S., E. Huff-Lonergan, and A. Johnson. 2006. Pork Quality. Proceedings of the Animal Care and Handling Conference, Overland Park, KS.

Faucitano, L. 2001. Causes of skin damage to pig carcasses. Can. J. Anm. Sci. 81:39-45.

Barton Gade, P. 1997. The effect of pre-slaughter handling on meat quality in pigs. Pages 100-123 in Manipulating Pig Production. P. D. Cranwell, ed. Australasian Pig Science Association, Victoria, Australia.

Load Site Assessments

- Value added service provided by ELANCO
- Assessments conducted by ELANCO
- Evaluate:
 - Pre-loading preparation
 - Handling tools and vocalization
 - Loading crew – loading procedures
 - Truck driver – loading procedures

Load Site Assessment Forms

Load Site Assessment Report				EJANCO	
Site Name:			Date: / /		
Assessor Name:		Crew Leader Name:			
Type of Truck:		Outside Temperature:			
Arrival Time of Truck: <input type="checkbox"/> am <input type="checkbox"/> pm		Departure Time of Truck: <input type="checkbox"/> am <input type="checkbox"/> pm			
Time First Pig Loaded: <input type="checkbox"/> am <input type="checkbox"/> pm		Time Last Pig Loaded: <input type="checkbox"/> am <input type="checkbox"/> pm		Total Time:	
Arrival Time at Plant: <input type="checkbox"/> am <input type="checkbox"/> pm		Unloading Time at Plant: <input type="checkbox"/> am <input type="checkbox"/> pm			
Number of Loads to be Loaded by Crew Today:		This is Load # Today			
Load Out Crew					
Preload Evaluation					
Weight of Pigs:		Lbs.		Timeliness:	Ready? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Why?
Number of Head:		Count			Not Ready? <input type="checkbox"/> <input type="checkbox"/>
This is the ___ cut of the barn		Cut #		Equipment:	Available? <input type="checkbox"/> <input type="checkbox"/> Why?
Number of People in Crew:		Too few? <input type="checkbox"/>			Not Available? <input type="checkbox"/> <input type="checkbox"/>
		Too many? <input type="checkbox"/>		Equipment:	In Good Repair? <input type="checkbox"/> <input type="checkbox"/> Describe:
		Proper? <input type="checkbox"/>			Needs Repair? <input type="checkbox"/> <input type="checkbox"/>
Comments:		Chute:		In Good Repair? <input type="checkbox"/> <input type="checkbox"/> Describe:	
				Needs Repair? <input type="checkbox"/> <input type="checkbox"/>	
				Proper Footing? <input type="checkbox"/> <input type="checkbox"/> Comments:	
				Poor Footing? <input type="checkbox"/> <input type="checkbox"/>	
		Angles:		Steep Incline? <input type="checkbox"/> <input type="checkbox"/>	
				Gradual Incline? <input type="checkbox"/> <input type="checkbox"/>	
Building					
Angles/Sharp Turns:		Yes <input type="checkbox"/>	No <input type="checkbox"/>	Building Equalization:	Curtains Lowered? <input type="checkbox"/> <input type="checkbox"/> Comments:
Describe:					Fans Off? <input type="checkbox"/> <input type="checkbox"/>
				Lighting:	Well Lit? <input type="checkbox"/> <input type="checkbox"/> Comments:
					Poorly Lit? <input type="checkbox"/> <input type="checkbox"/>
Tools and Vocalization					
Hot Shot Evaluation:		Aggressive <input type="checkbox"/>		Vocalization of Pigs/Squealing:	
		Moderate <input type="checkbox"/>		Rarely <input type="checkbox"/> <input type="checkbox"/> Comments:	
		As Needed <input type="checkbox"/>		Sometime <input type="checkbox"/> <input type="checkbox"/>	
		None <input type="checkbox"/>		Often <input type="checkbox"/> <input type="checkbox"/>	
Location In Barn: (Average # shocks/pig)		Pen #		Tools in Use:	
		Aisle #		Sort Boards <input type="checkbox"/> <input type="checkbox"/> Comments:	
		Chute #		Rattle Paddles <input type="checkbox"/> <input type="checkbox"/>	
		Doorway #		Slappers <input type="checkbox"/> <input type="checkbox"/>	
				Other <input type="checkbox"/> <input type="checkbox"/>	
Loading					
Time to Load:		In a Hurry <input type="checkbox"/>		Employee Vocalization:	
		Patient <input type="checkbox"/>		Quiet/Calm <input type="checkbox"/> <input type="checkbox"/> Comments:	
				Loud/Yelling <input type="checkbox"/> <input type="checkbox"/>	
Pig Loading Order:		Employee Attitudes:		Start:	
Pigs Closest to Door:		Top Deck <input type="checkbox"/>		Good <input type="checkbox"/> <input type="checkbox"/> Comments:	
		Bottom Deck <input type="checkbox"/>		Fair <input type="checkbox"/> <input type="checkbox"/>	
Pigs Farthest from Door:		Top Deck <input type="checkbox"/>		Poor <input type="checkbox"/> <input type="checkbox"/>	
		Bottom Deck <input type="checkbox"/>		Finish:	
Number of Head Moved per Group		3 to 5 <input type="checkbox"/>		Good <input type="checkbox"/> <input type="checkbox"/>	
		4 to 6 <input type="checkbox"/>		Fair <input type="checkbox"/> <input type="checkbox"/>	
		7 or more <input type="checkbox"/>		Poor <input type="checkbox"/> <input type="checkbox"/>	
Stressed Pigs:		Left Alone <input type="checkbox"/>		Stressed Pigs:	
		Moved to Holding Area <input type="checkbox"/>		Forced to Move <input type="checkbox"/> <input type="checkbox"/> Comments:	
				Hot Shot Used <input type="checkbox"/> <input type="checkbox"/>	

Driver						EJANCO	
Driver Information							
Driver Name:		Timeliness:		On Time? <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Why?
TQA #:				Late? <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Date: / /		Equipment:		Ready? <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Why?
Site:				Not Ready? <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Truck Cleanliness:		Clean <input type="checkbox"/>		Biosecurity:		Comments:	
		Dirty <input type="checkbox"/>		Trucker entered barn? <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Bedding:		Adequate <input type="checkbox"/>		Trucker had clean boots? <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		Short <input type="checkbox"/>		Trucker had clean clothes? <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Loading of Truck By Trucker							
Loading:		Takes pigs as delivered by load crew <input type="checkbox"/>		Comments:			
		Waits for two groups or more <input type="checkbox"/>					
Position of Trucker:		Does not impair forward movement of pigs <input type="checkbox"/>		Comments:			
		Causes pigs to turn back <input type="checkbox"/>					
Trucker Vocalization:		Quiet/Calm <input type="checkbox"/>		Comments:			
		Loud/Yelling <input type="checkbox"/>					
Trucker Attitude:		Hot Shot Evaluation:					
Start:		Good <input type="checkbox"/>		Usage:		Aggressive <input type="checkbox"/>	Comments:
		Fair <input type="checkbox"/>				Moderate <input type="checkbox"/>	
		Poor <input type="checkbox"/>				As needed <input type="checkbox"/>	
Finish:		Good <input type="checkbox"/>		Trailer Panels:		None <input type="checkbox"/>	Comments:
		Fair <input type="checkbox"/>				Adequate <input type="checkbox"/>	
		Poor <input type="checkbox"/>				Inadequate <input type="checkbox"/>	
Ventilation Plugs:		% in use <input type="checkbox"/>		Season:		None needed <input type="checkbox"/>	Comments:
		Out <input type="checkbox"/>				Spring <input type="checkbox"/>	
						Summer <input type="checkbox"/>	
						Fall <input type="checkbox"/>	
						Winter <input type="checkbox"/>	
Comments:							
Plant Information							
Name of Packer						Comments:	
Location and Distance to Plant							
Scheduled Delivery Time		<input type="checkbox"/> am <input type="checkbox"/> pm					
Number of Loads Trucker has Transported Today							
Site/Loadout Sketch/Additional Comments							

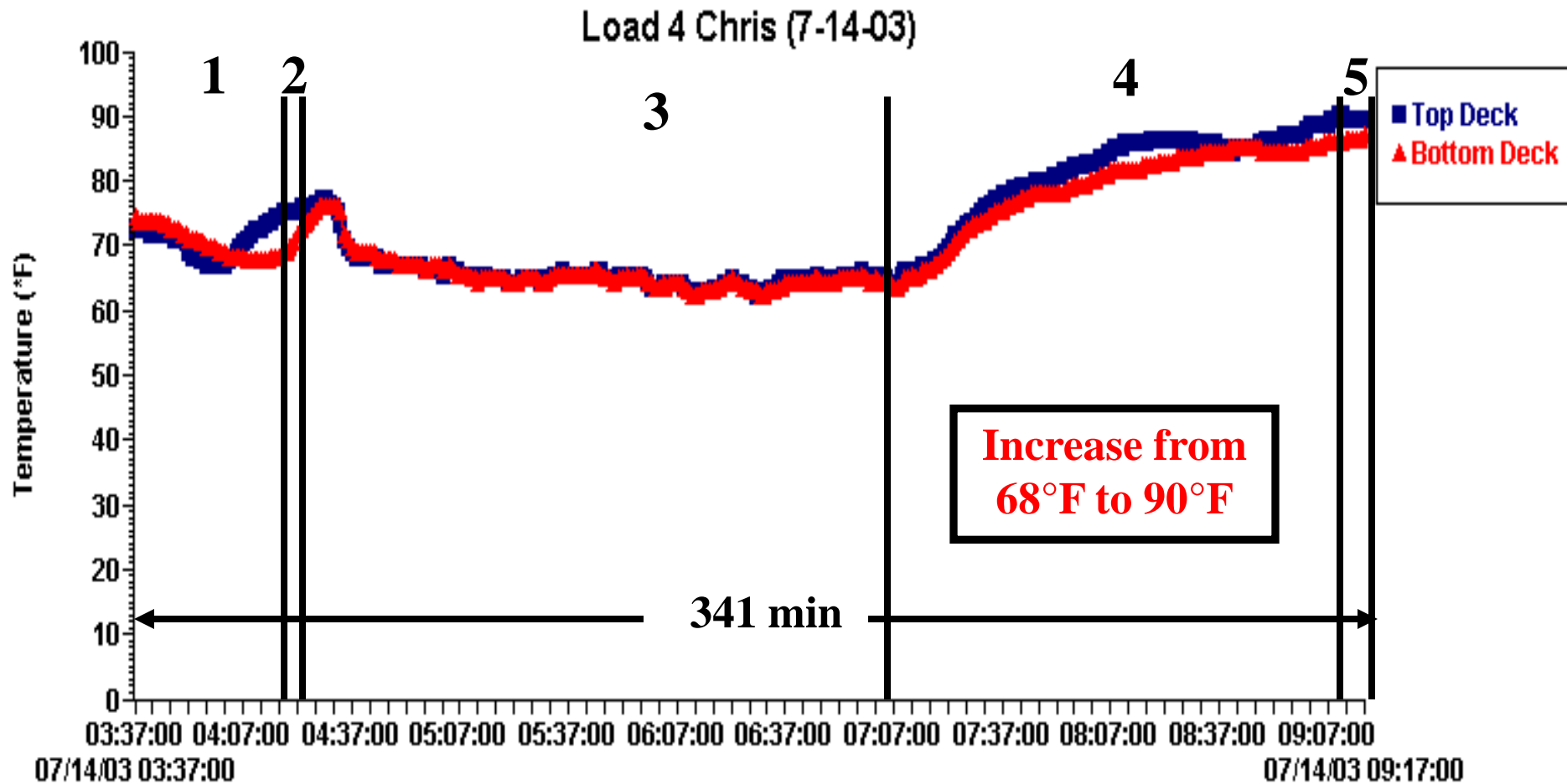
Load Site Assessments

- Close to 90 assessments in W. Canada
 - Each is different
- Most often the issues are easily corrected
- Producers many times do not realize until they are shown
 - Video and pictures are great feed back

Load Site Assessment - Learnings

- Trying to move too many at once
 - Top deck
- Communication with driver – compartment plans
 - Weights
 - Numbers
- Sorting hogs in barn and then shipping a few hours later
 - Fighting has occurred and stress is high
- Loading truck too soon
 - Too early for dock time

Summer Load: No Showering



1: Loading (42 min)

2: Wait at the farm (3 min)

3: Transport (164 min)

4: Wait at Plant (124 min)

5: Unloading (8 min)

Load Site Assessment - Learnings

- Driver interference – scares hogs
 - Trying to help!
- Loading hogs that shouldn't be
 - Injured
 - Stressed
- Hogs with furthest walk on top deck
 - Tired already
- If they are moving – leave them alone
- It is not a race!

Group Size Study

Investigators:

Cargill, Inc.

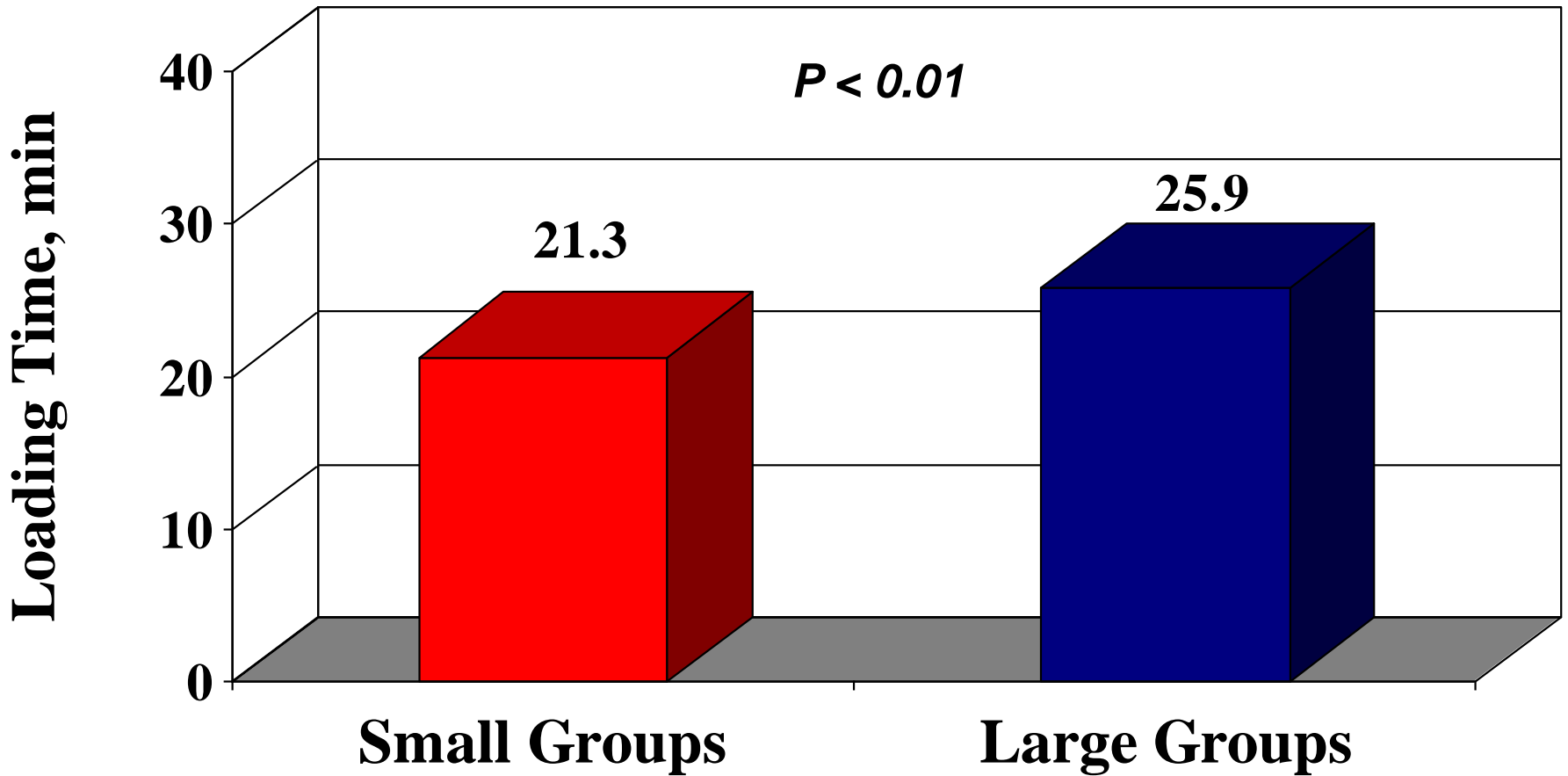
ELANCO Animal Health

Objectives:

To determine the effects of group size during loading on loading time, stress responses (during loading and unloading) and transport losses at the plant in market weight pigs

Berry, N. L., M. Ritter, E. Brunton, W. Stremsterfer, B. Hoag, J. Wolfe, N. Fitzgerald, M. Porth, D. Delaney, and T. Weldon. 2009. Effects of moving market weight pigs in different group sizes during loading on stress responses and transport losses at the packing plant. Page 5 in Proceedings of the Midwest Animal Science Meetings, Des Moines, IA.

Loading Time*



*Time to load a trailer deck (n = 87 pigs)

Handling Summary

- The single most effective handling device is a sorting boarding
- The most effective place to tap or shock a pig is on the back behind the point of balance
- Stress responses are minimized when pigs are:
 - Moved at a slow and calm pace
 - Moved in small groups
 - Moved with paddles or with ≤ 2 shocks/pig from an electric prod

ELANCO Your Partner in Reducing Transport Losses

- “*Hog Handling Update*” – monthly e-newsletter
- “*Load Site Assessments*”
- Facility design evaluations
- Training growers, loading crews, and truck drivers
- Conducting research to identify causes of transport losses and management strategies to reduces these losses

Free Monthly E-Newsletter



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www.hoghandlingupdate.com

Why Be Patient With Pigs?

1. **A lot of time, energy and expense was required to breed, farrow, and raise this pig**
2. **It is the business we are in**
3. **It is the “Right” thing to do**
4. **Animal Welfare/Rights groups-we need to stay on the offensive**
5. **“To Deliver a High Quality, Full Value Pig to Market”**
6. **We are finally getting paid for our efforts!!**

THIS IS THE “PUBLIC FACE” OF OUR INDUSTRY

