Key Findings in Post-Weaning Mortality Research & Pig Livability Project Producer Resources

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https://piglivability.org

The 2.0 Team

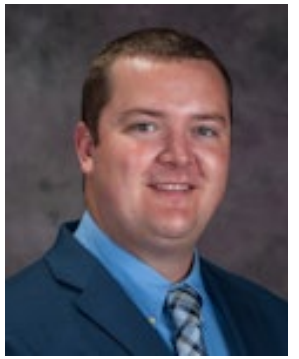

Marcelo Almeida


Jack Dekkers


Joel DeRouchey


Nick Gabler


Katelyn Gaffield


Jordan Gebhardt


Robert Goodband


Laura Greiner


Anna Johnson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Edison Magalhaes


Stacie Matchan


Chris Rademacher


David Rosero


Jason Ross


Stephan Schmitz-Esser


Juan Steibel


Mike Tokach


Jason Woodworth

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A multidisciplinary team from Kansas State University and Iowa State University

Industry Partners - Thank you!

More than $1.6 million of in-kind support!

More than $1.5 million of additional grants.

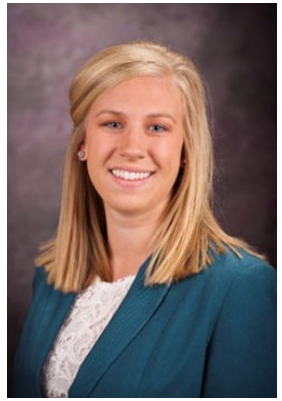
Graduate and Post-Graduate Students Trained

Spenser Becker
Dr. Laura Greiner

Marcie Christianson
Dr. Ken Stalder

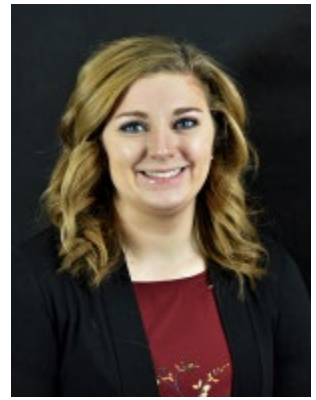
Erin Dolecheck
Dr. Lee Schulz

Megan Nickel
Dr. Chris Rademacher



Kiah Gourley
Dr. Jason Woodworth

Julia Holen
Dr. Jason Woodworth



Zoe Kiefer
Dr. Jason Ross

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Dr. Daniel Linhares

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Dr. Jack Dekkers

Grace Moeller
Dr. Ken Stalder

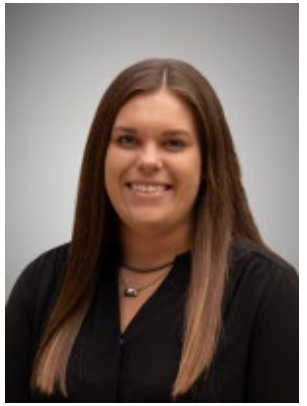
Larissa Shirley
Dr. Kara Stewart

Jamie Studer
Dr. Jason Ross

Emiline Sundman
Dr. Anna Johnson

Blaire Todd
Dr. Nick Gabler

Madie Wensley
Dr. Mike Tokach



Kayla Miller
Dr. Nick Gabler

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24 Graduate students trained

FFAR pork checkoff

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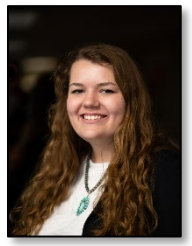
Undergraduate Internship Activities

- Lead or assist in all aspects of research (in-barn and lab work, report writing and professional meeting presentations)
- Create extension activities (fact sheets, videos)
- Interact with faculty graduate students and industry professionals

15

Undergraduate Interns

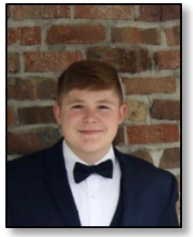

Erika Johnson
2019


Mikayla Spinler
2020


Caitlyn Eickleberry
2020


Ty Kim
2021


Alicia Denton
2021


Alton Holstine
2021


Andrew Boschert
2021


Grace deNeui
2022


Abby Statler
2022


Maeghan Petznick
2023


Ava Bohr
2023


Sierra Collier
2024


Samatha Swanson
2024

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Additional Student Training and Development

Undergraduate Students

- Jameson Bell
- Brooke Bowen
- Alexis Berte
- Dalton Line
- Sydney Smith
- Nicole Walker
- Jaye Schuelke
- Kaitlyn Olson
- Jenna Bromm
- Macie Reeb
- Kelsey Teeple
- Karissa Rulon
- Miranda McGuire
- Courtney Barga
- Macy Erliwein
- Analicia Swanson
- Rafe Royall
- Christina Peterson
- Rosetta Brice
- Drew Wiley
- Haley Schwecke
- Grace Mercer
- Kayla Christiansen
- Phoebe Hartoonian
- Cassandra Frick
- Marissa Phillips
- Sophia Puff
- Hannah Burrows
- Ryan Maurer
- Olivia Harrison
- Hannah Tingler

Graduate Students

- Kayla Mills
- Katharine Sharp
- Ricardo Garcia
- Kelsey Batson
- Wade Hutchens
- Leandro Del Tuffo
- Hayden Williams
- Evandro Cunha
- Johnson Rao
- Jenna Chance
- Andres Tolosa
- Wade Hutchens
- Larissa Becker

Post-Doctoral Veterinarians

- Dr. Justin Brown
- Dr. Meredith Petersen
- Dr. Gabi Doughan

Additional Student Help

50+

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2.0 Advisory Board Members

- Bart Borg, Passel Farms
- Jasmine Bruno, Foundation for Food & Agriculture Research
- Gene Gourley, Gourley Research Group
- Chris Hostetler, National Pork Board
- Clayton Johnson, Carthage System
- Dustin Kendall, Prestage Farms
- Christine Mainquist-Whigham, Pillen Family Farms
- Dwight Mogler, PigHill
- Jeremy Pittman, Smithfield Foods
- Kevin Rasmussen, Rasmussen Farms, Inc
- Stephanie Wetter, National Pork Board
- Noel Williams, Seaboard Foods

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What is next for the Pig Livability Consortium?

- National Pork Board has funded $500,000 for two years (2024-2026)
- NPB and project team working with FFAR for matching funding
- Further develop industry partnerships to conduct pig livability research
- Develop RFP for other entities to submit for project funding
- Build a wider consortium
- Further develop resources and producer tools available at: www.piglivability.org

Mortality cost, $/pig

- 1% change = $0.82 to $1.20

Euken and Schulz, 2021
ISU publication B1-78

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Table 3. Sensitivity analyses of net income per head by carcass price, feed price and feed efficiency

		Carcass price per hundredweight				
Net income per head		$ 66.00	$ 68.00	$ 70.00	$ 72.00	$ 74.00
Mortality %	4.00%	$ 0.39	$ 4.42	$ 8.46	$ 12.50	$ 16.53
	5.00%	$ (0.57)	$ 3.42	$ 7.42	$ 11.41	$ 15.40
	6.00%	$ (1.53)	$ 2.42	$ 6.37	$ 10.32	$ 14.28
	7.00%	$ (2.49)	$ 1.42	$ 5.33	$ 9.24	$ 13.15
	8.00%	$ (3.45)	$ 0.42	$ 4.29	$ 8.15	$ 12.02

		Feed price per pound				
Net income per head		$ 0.07	$ 0.08	$ 0.09	$ 0.10	$ 0.11
Mortality %	4.00%	$ 22.79	$ 15.62	$ 8.46	$ 1.30	$ (5.87)
	5.00%	$ 21.65	$ 14.54	$ 7.42	$ 0.30	$ (6.82)
	6.00%	$ 20.52	$ 13.45	$ 6.37	$ (0.70)	$ (7.77)
	7.00%	$ 19.39	$ 12.36	$ 5.33	$ (1.70)	$ (8.73)
	8.00%	$ 18.26	$ 11.27	$ 4.29	$ (2.70)	$ (9.68)

		Feed efficiency (pound of feed per pound of gain)				
Net income per head		2.60	2.65	2.70	2.75	2.80
Mortality %	4.00%	$ 11.01	$ 9.73	$ 8.46	$ 7.19	$ 5.91
	5.00%	$ 9.95	$ 8.68	$ 7.42	$ 6.15	$ 4.89
	6.00%	$ 8.89	$ 7.63	$ 6.37	$ 5.12	$ 3.86
	7.00%	$ 7.83	$ 6.58	$ 5.33	$ 4.08	$ 2.83
	8.00%	$ 6.77	$ 5.53	$ 4.29	$ 3.05	$ 1.80

Improving Feed Intake Post-wean to Impact Livability

- Low feed consumption immediately after weaning disrupts nutrient intake and results in what is commonly known as a post-weaning growth check.
- Some pigs fail to make the weaning transition, leading to increased morbidity and mortality.
- Several pre- and post-weaning strategies have been suggested to improve post-weaning feed intake.
  - Need to optimize current intervention and management practices

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Improving post-wean feed intake research overview

- Outcomes from 2 literature reviews and 10 experiments using a total of 17,290 pigs.

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Strategies to increase feed intake after weaning

Pre-weaning

Maternal nutrition
Management
Piglet nutrient intake

Post-weaning

Environment
Placement strategies
Nutrient intake
Genetics

Maintaining continuity of nutrient intake after weaning. I. Review of pre-weaning strategies

Madie R. Wensley[†,1], Mike D. Tokach[†], Jason C. Woodworth[†], Robert D. Goodband[†], Jordan T. Gebhardt[‡], Joel M. DeRouchey[†], and Denny McKilligan[‖]

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doi: 10.1093/tas/txa021

Maintaining continuity of nutrient intake after weaning. II. Review of post-weaning strategies

Madie R. Wensley,[†,1] Mike D. Tokach,[†] Jason C. Woodworth,[†] Robert D. Goodband,[†] Jordan T. Gebhardt,[‡] Joel M. DeRouchey,[†] and Denny McKilligan[‖]

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doi: 10.1093/tas/txa022

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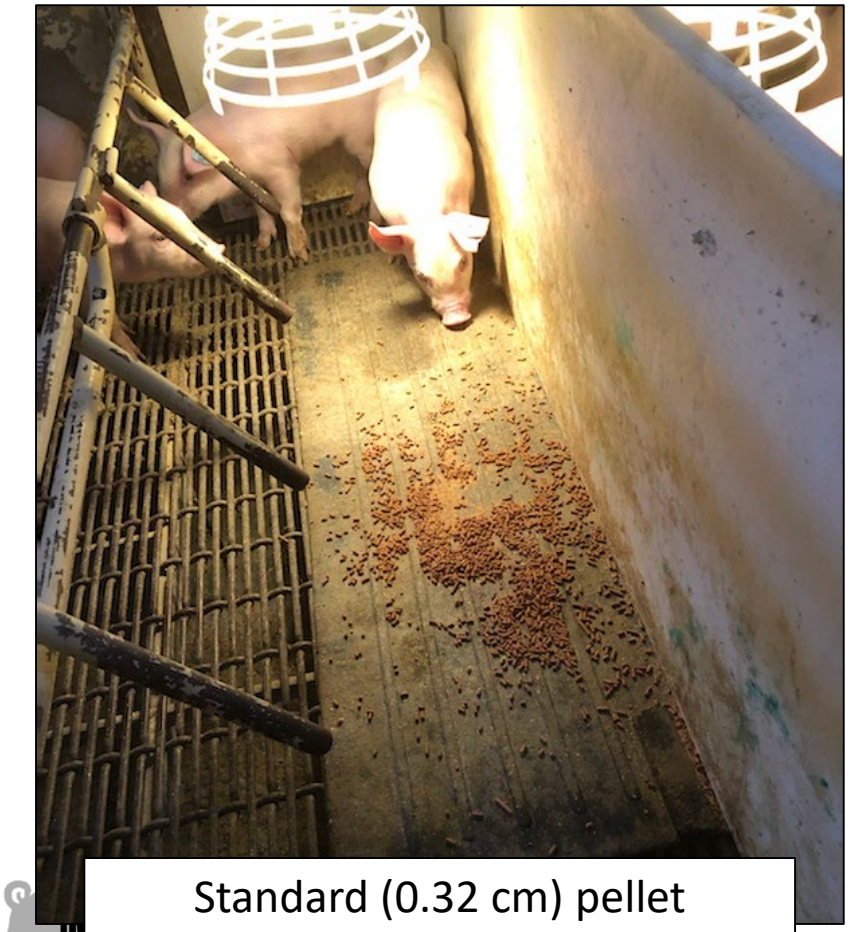
Floor feeding creep feed

264 litters corresponding with 2,497 nursery pigs – no creep or 227 g/d



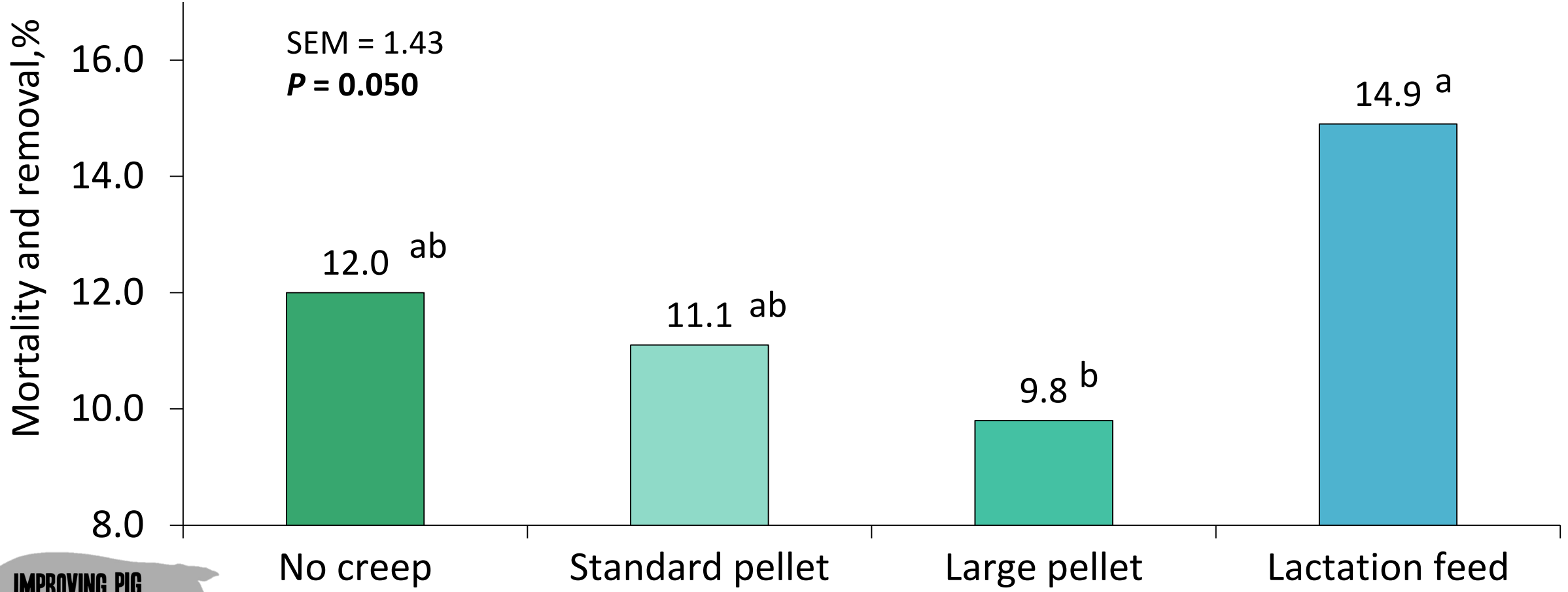
Standard (0.32 cm) pellet

Large (1.27 cm) pellet

Lactation meal feed

Wensley et al., 2022

Influence of creep feed on nursery mortality and removals



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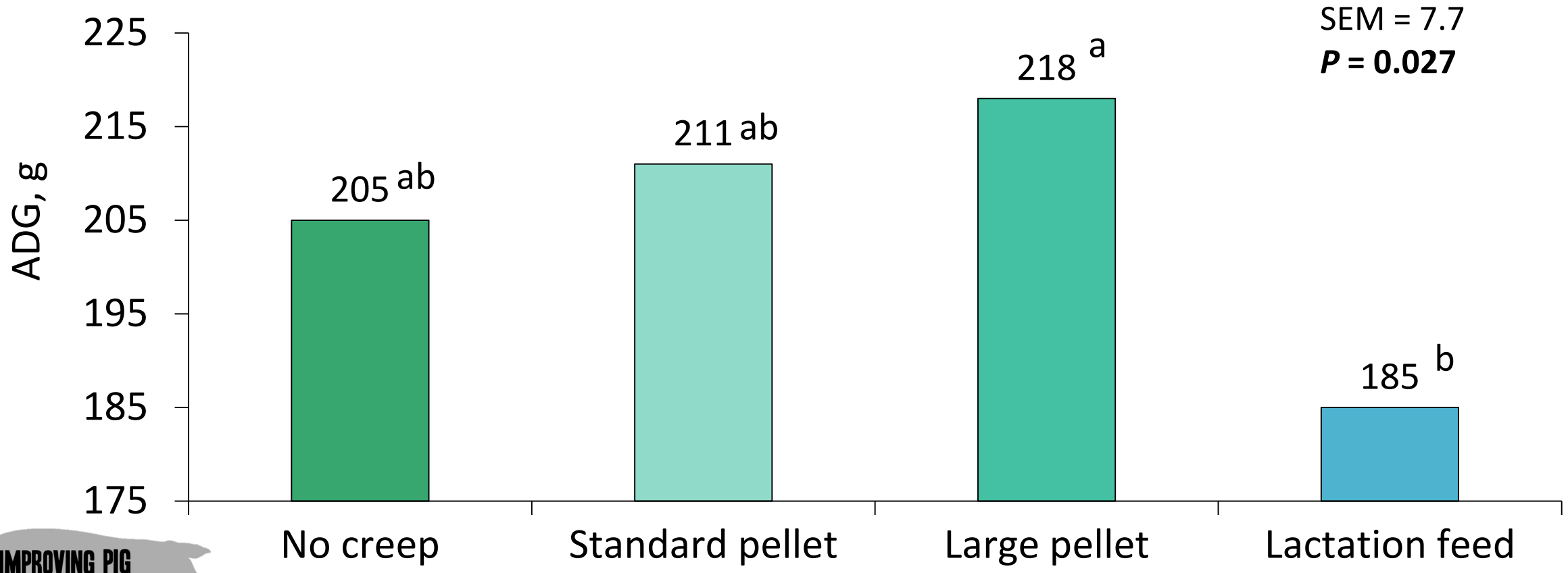
Wensley et al., 2022

Influence of creep feed on ADG d 0 to 36, **per pig placed**



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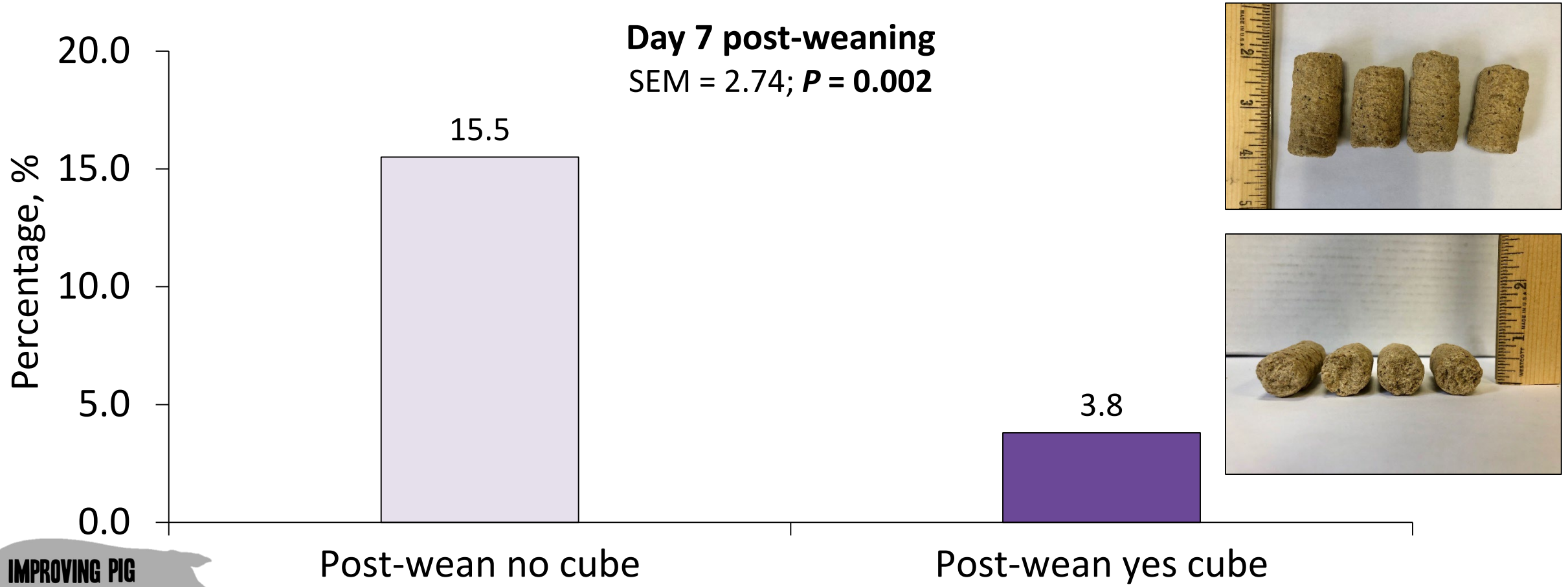
Wensley et al., 2022

Enrichment cubes after weaning on early BW loss

100 g was provided in feed 1X per day



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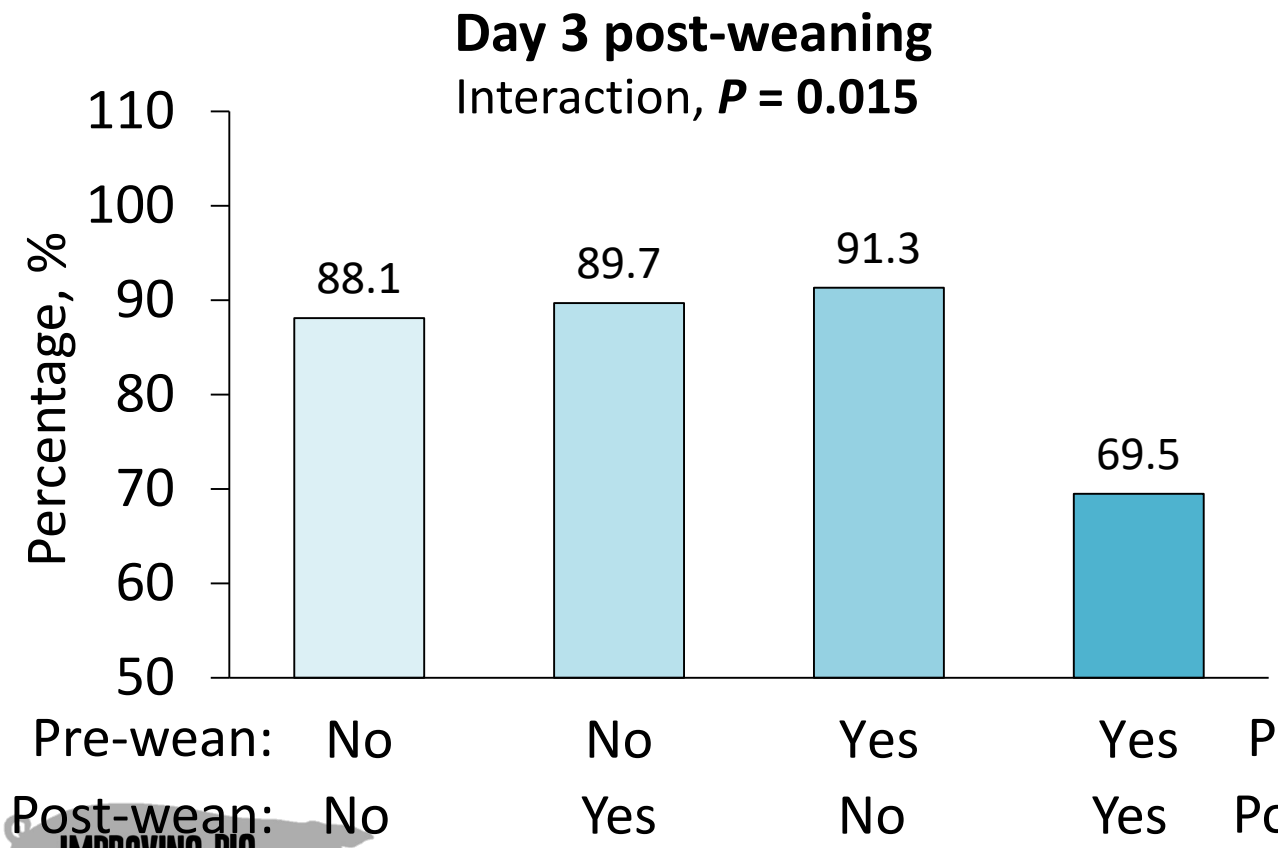
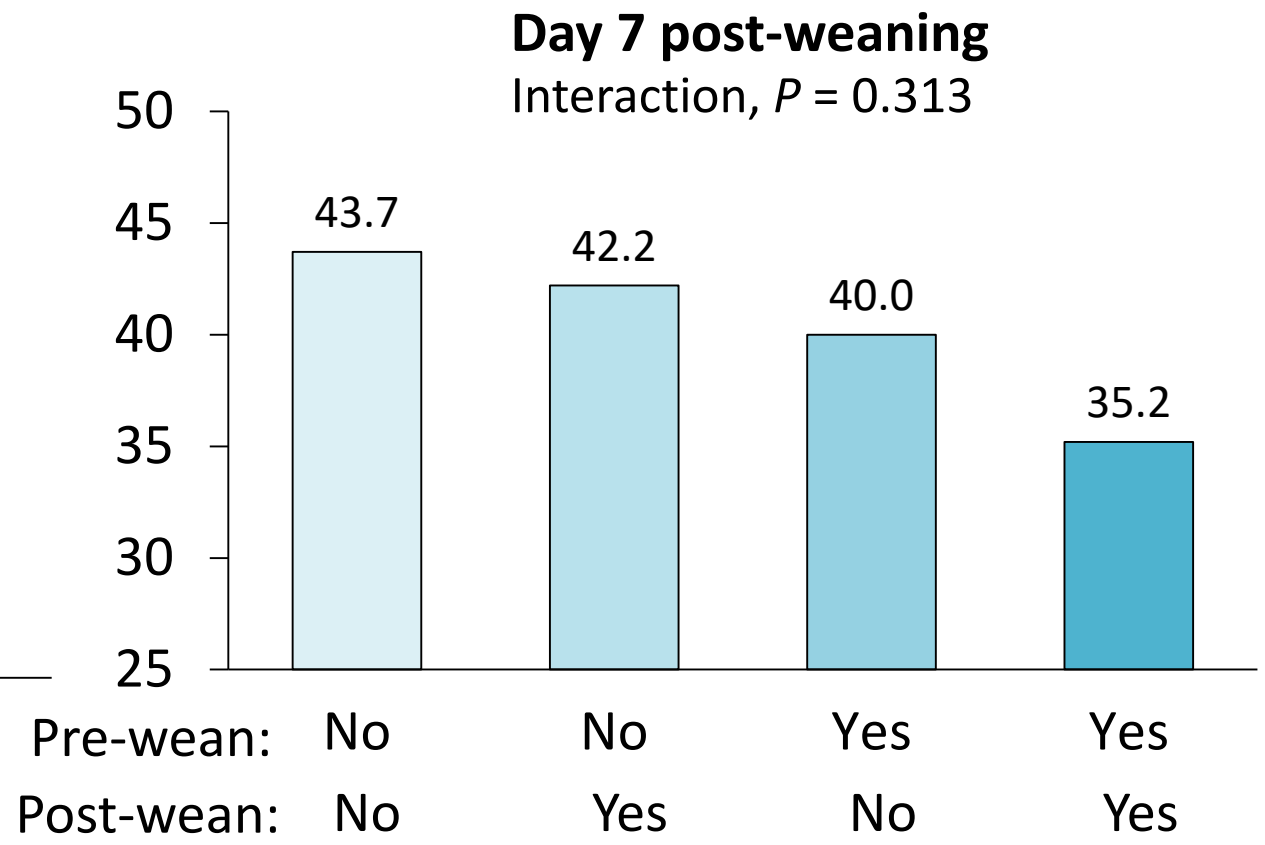
Wensley et al., 2022

Sensory Attractant Restart AFP before and after weaning on body weight loss in early nursery





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Wensley et al., 2022

Mat feeding strategies

- 3 experiments using a total of 9,403 nursery pigs
- 30 to 35 pigs per pen
  - **Exp. 1:** mat v no mat feeding
  - **Exp. 2:** 2×2 factorial with main effects of diet form (pellet or crumble) and mat feeding (without or with)
  - **Exp. 3:** mat feeding small (0.32 cm) or large (1.27 cm) pellets, or no mat feeding

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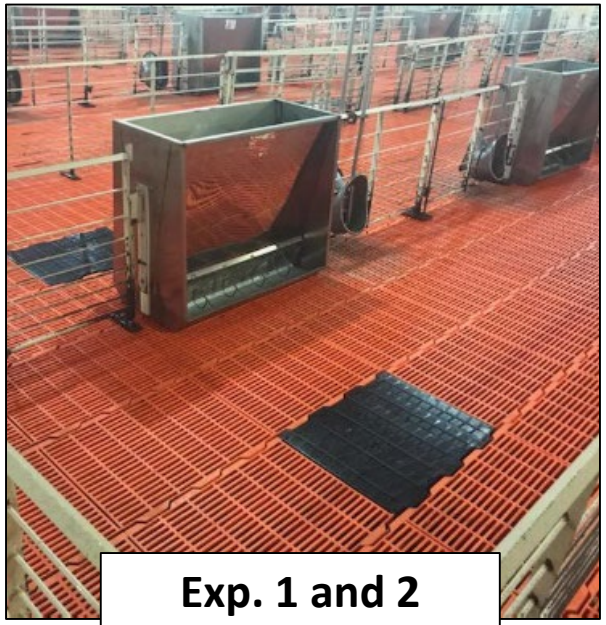
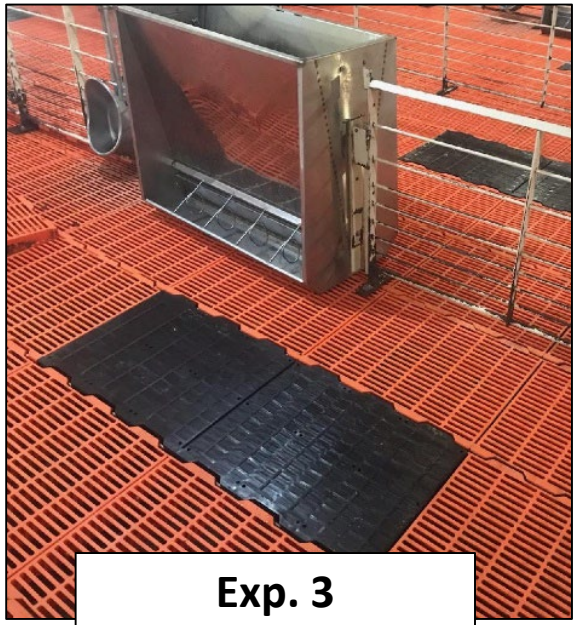
Wensley et al., 2022

Mat feeding strategies

- Feed was provided on 46 cm × 61 cm pieces of DuraTuff solid flooring three times daily for 10 d post-placement.
  - **Exp. 1:** 318 g of pelleted feed
  - **Exp. 2:** 318 g of pelleted or 372 g of crumble feed
  - **Exp. 3**: 726 g of pelleted feed



Exp. 1 and 2



Exp. 3

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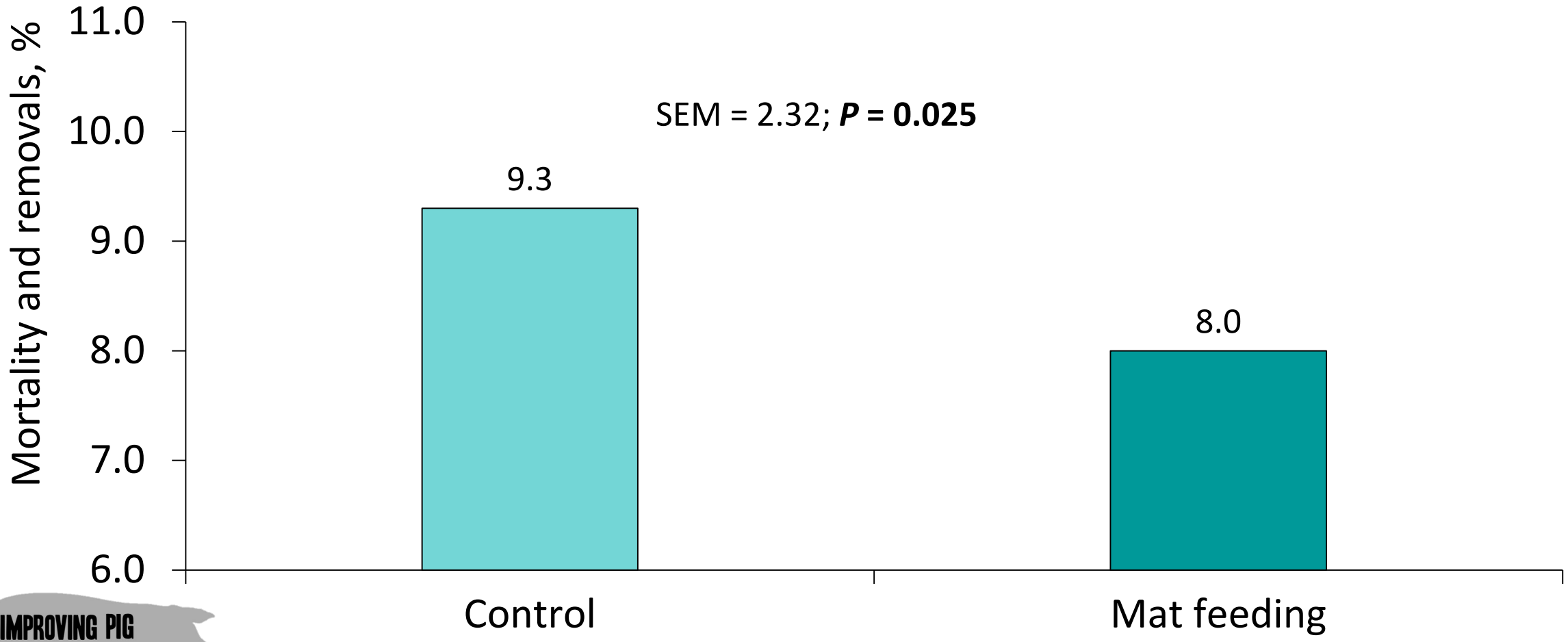
Mortality and Removals

Exp. 1, 2, and 3 combined



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Wensley et al., 2022

Gruel feeding

- 1 experiment using 3,087 nursery pigs in a 14,400 head hotel-style nursery.
  - Pens of small pigs were gruel fed two or four times per day for 14-d post-placement.
  - Approximately 1,134 g of solid feed was added to a round Rotecna bowl.
    - Ratio of water to feed decreased over time
      - d 0 to 5 (3:1), d 6 to 10 (1:1), d 11 to 14 (1:3)

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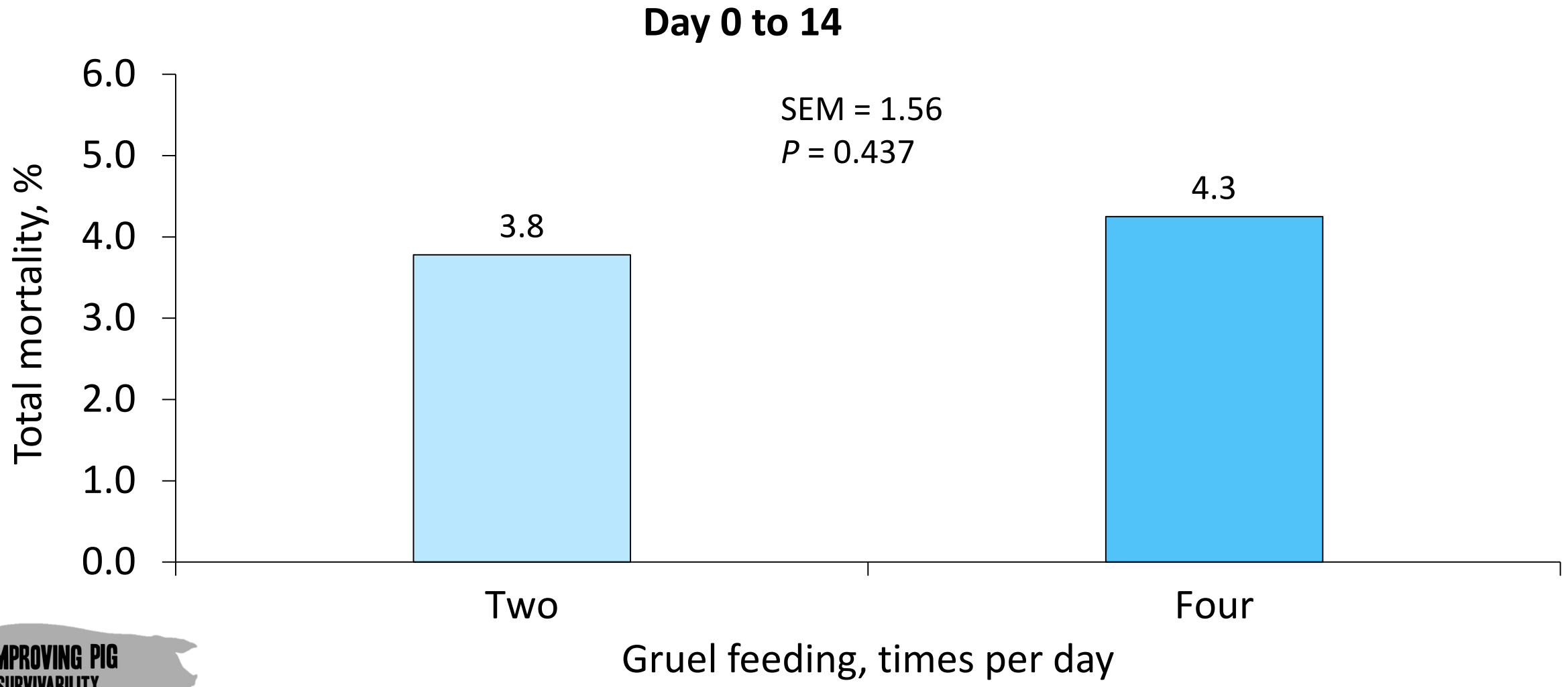
Wensley et al., 2022

Gruel feeding: Total mortalities



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Oral dextrose for pull pigs

1 experiment using 988 nursery pigs from a 14,400 head population

- Every pig removed from the general population for welfare considerations were tagged, weighed, and their body temperature and blood glucose measured.
- Every other pig received 10 mL of oral dextrose.
- Mortalities were tracked until approximately 38 d post-weaning.

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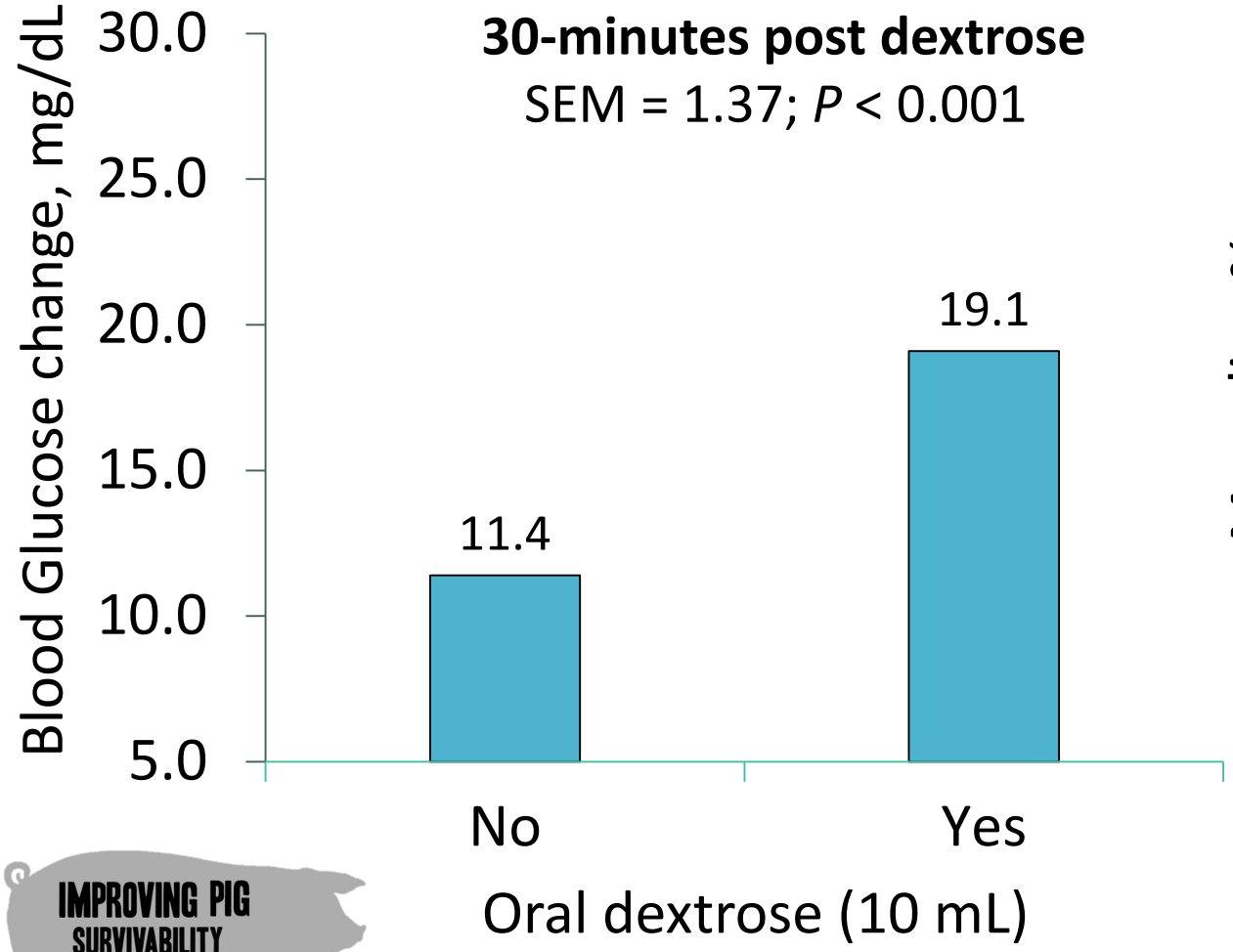
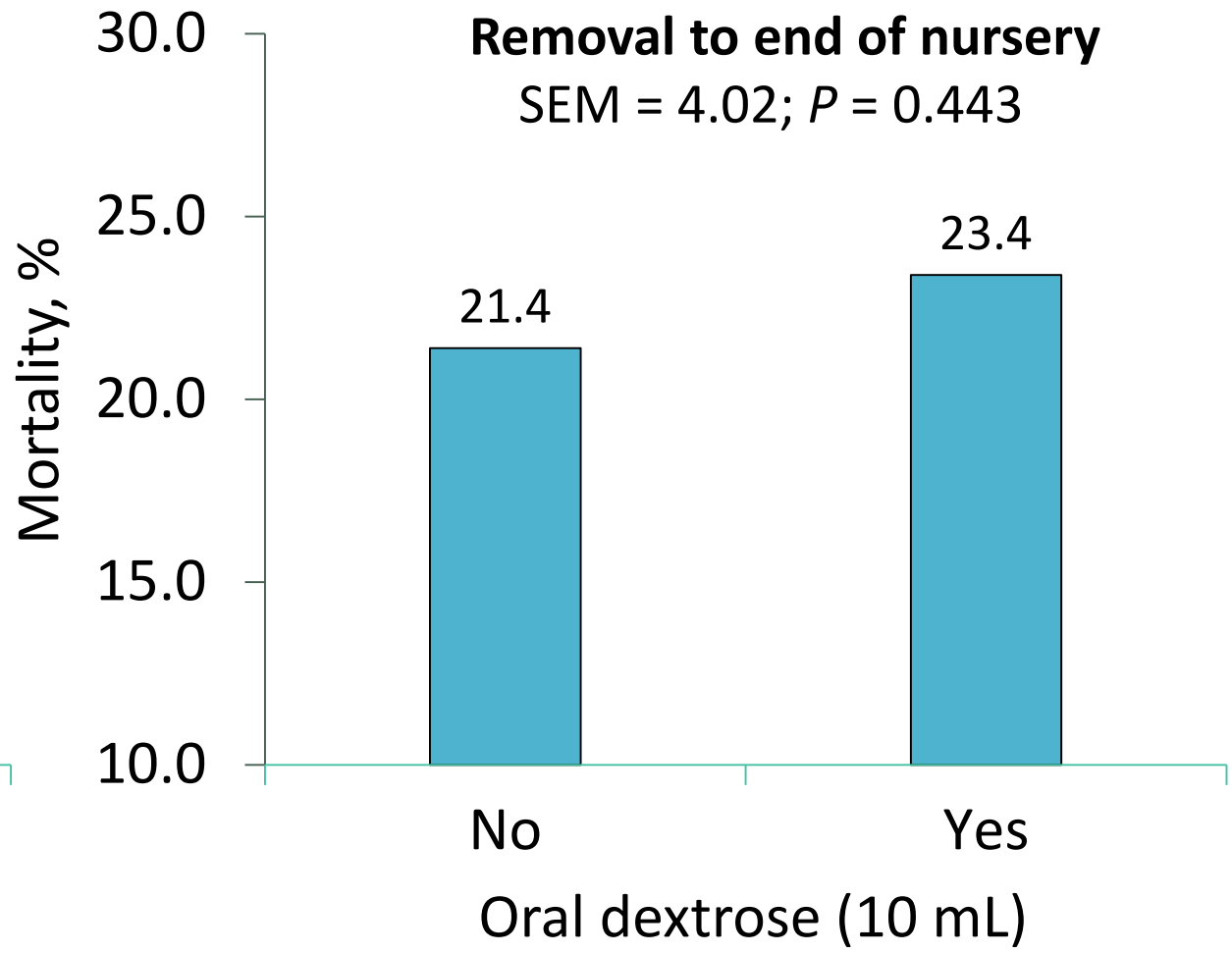
Oral dextrose





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Sire line maturity

- Sows were bred to 1 of 2 Duroc sire lines
  - Early maturing (high growth early)
  - Late maturing (high growth late)
- Pig growth performance was tracked from birth to market
  - Initial feed intake and body weight loss post-weaning
- Sire line stress response was determined at weaning
  - Blood cortisol

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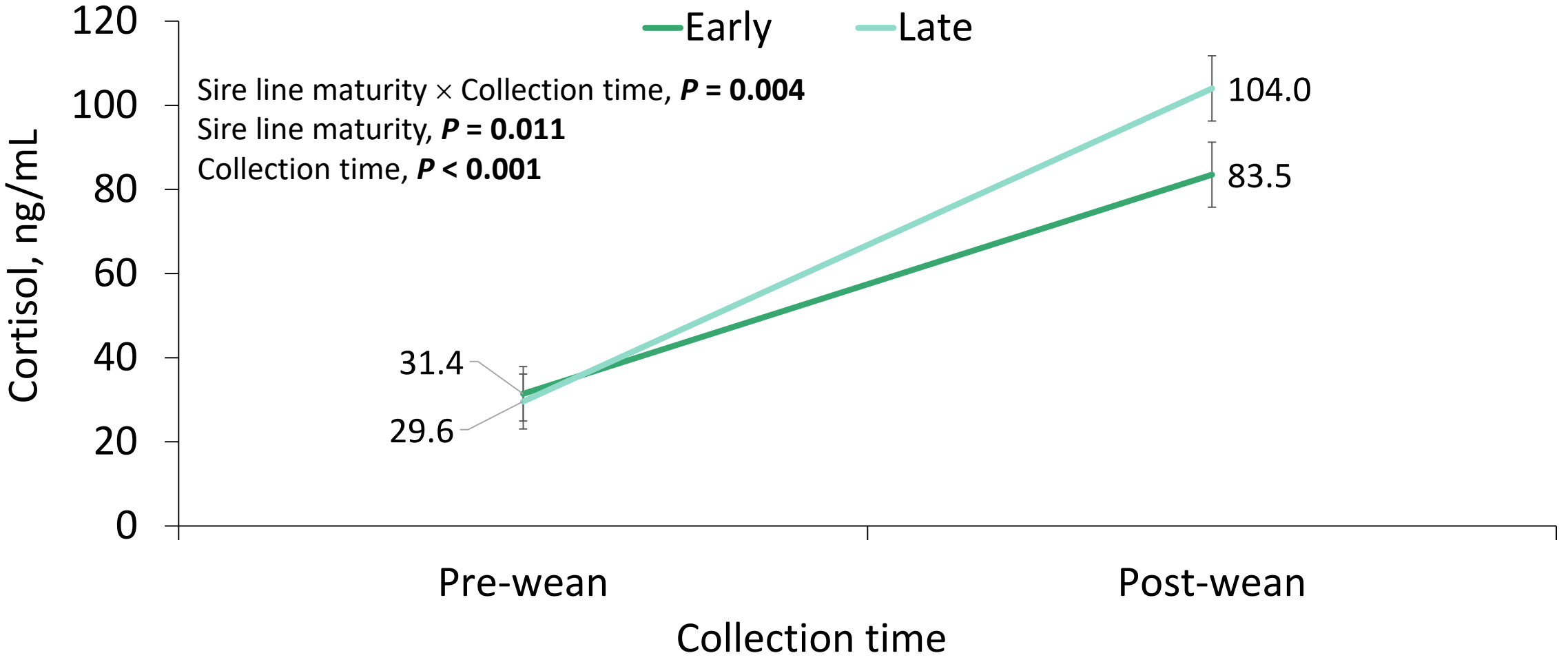
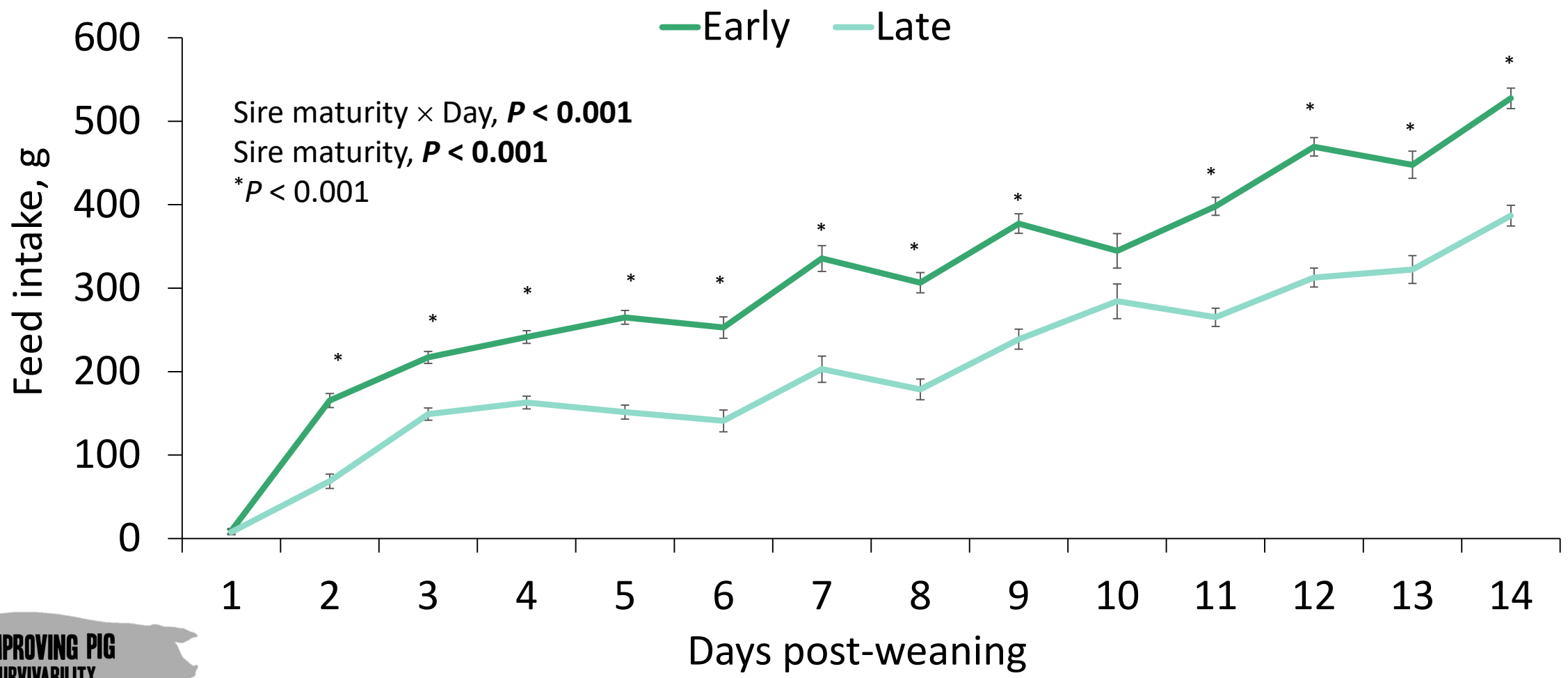
Sire line maturity: Blood cortisol



Daily feed intake post-weaning



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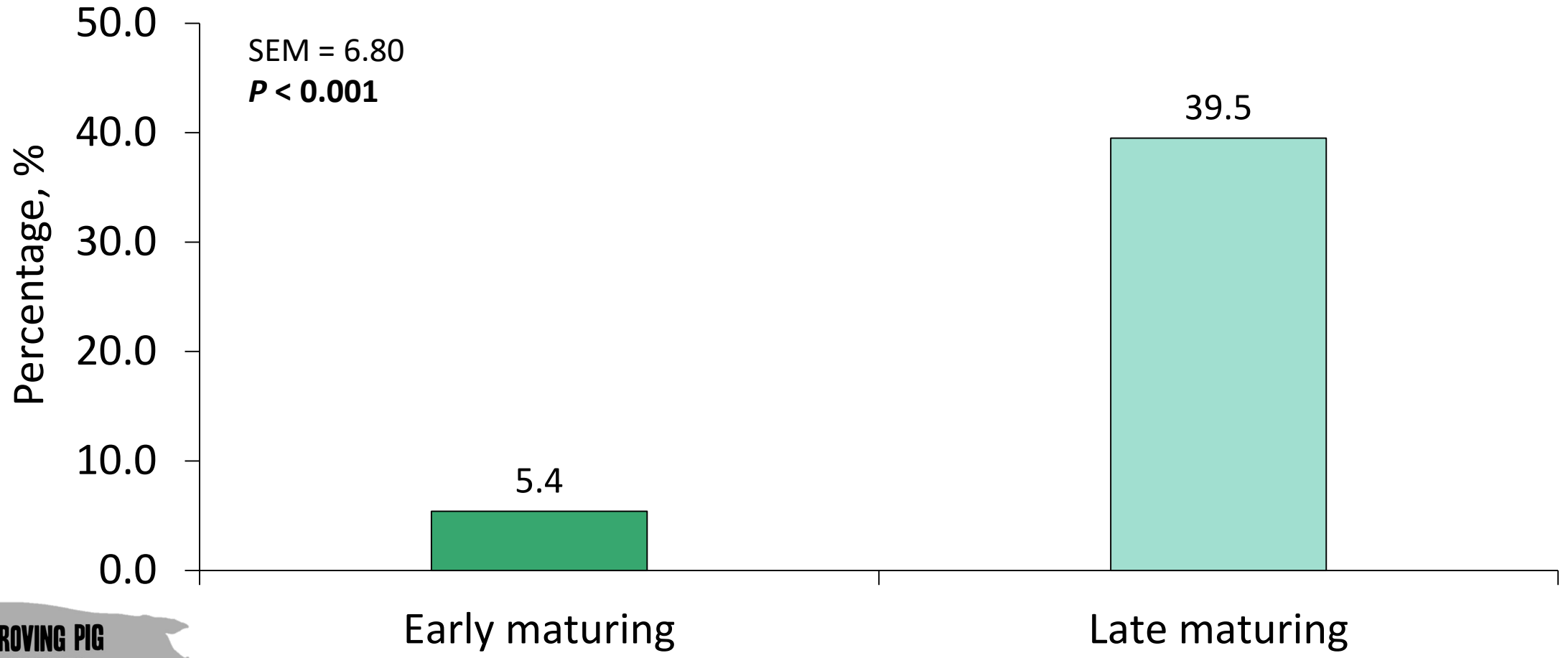
Percentage of pigs that lost weight from d 0 to 3 after weaning



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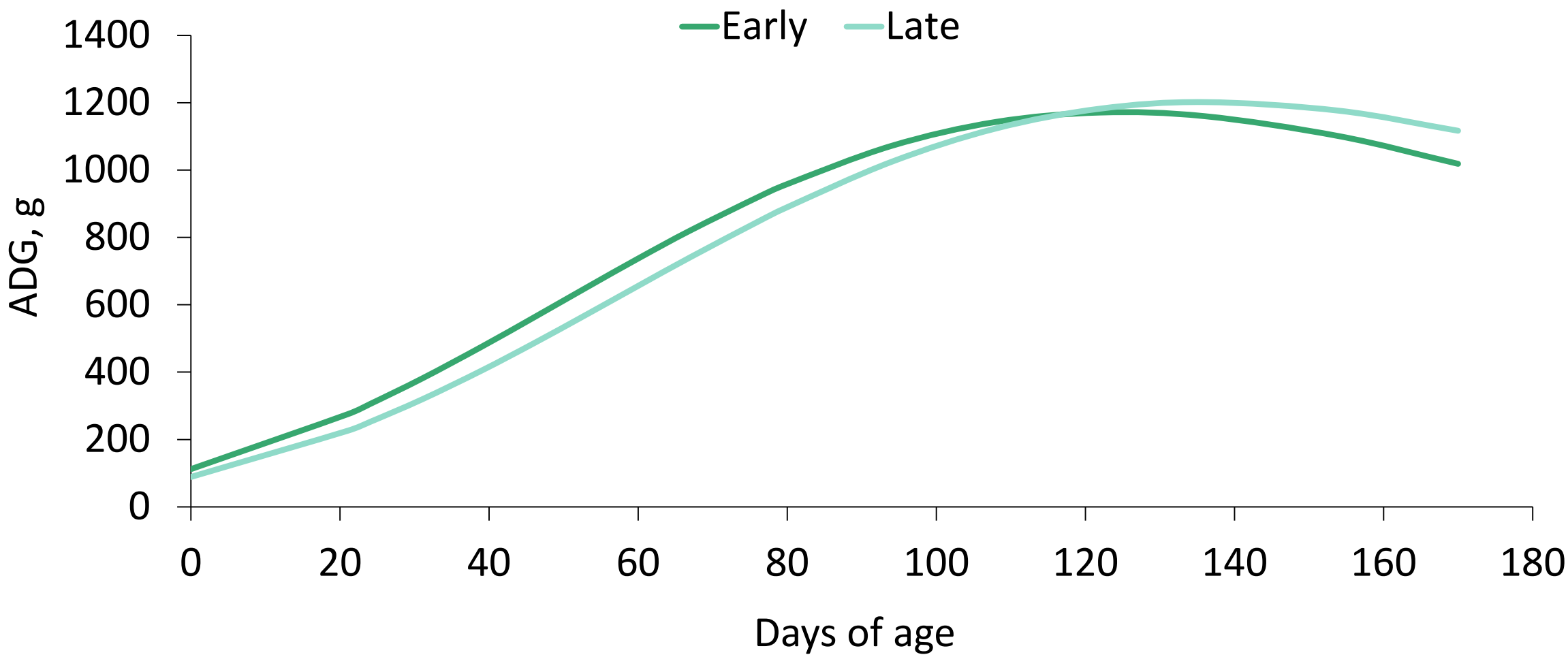
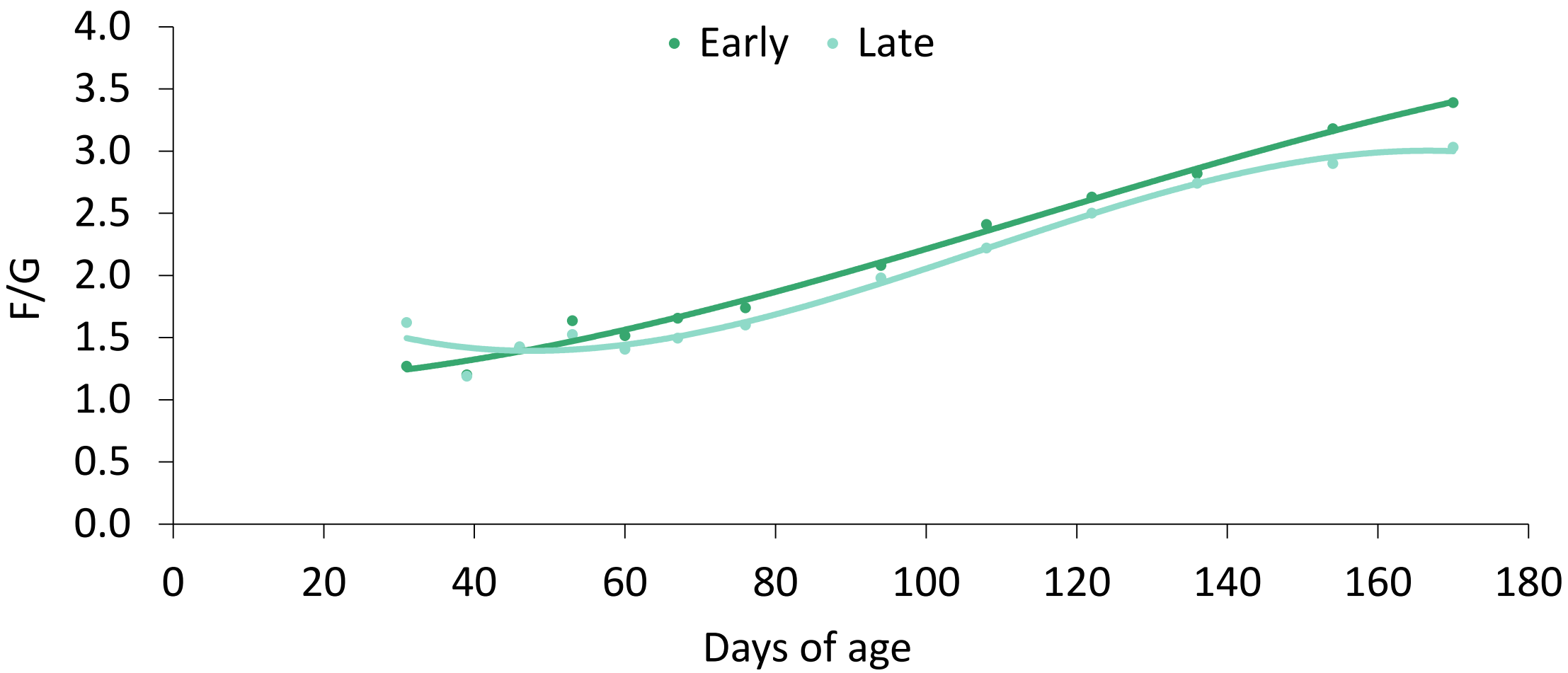
Sire line lifetime average daily gain



Wensley et al., 2022

Sire Line Feed efficiency

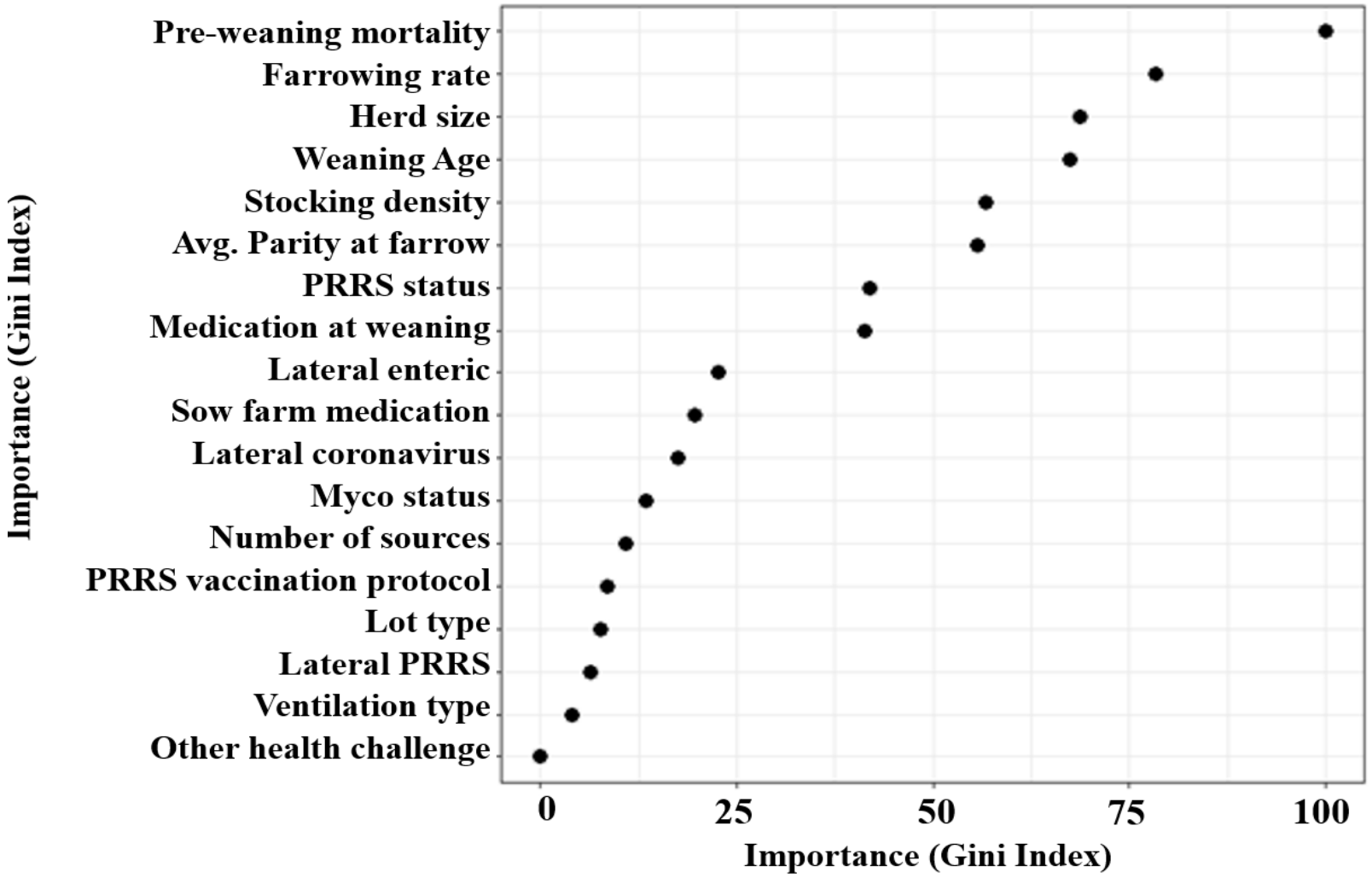


Wensley et al., 2022

PROSPER

Predictors of Swine Performance

- ***Identifying and ranking the drivers*** *of high nursery mortality for pigs raised under field conditions*



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Magalhaes et al., 2023

Works

Pre-weaning mortality

- Adequate consumption of colostrum
  - 300-350 grams per piglet
- Enrichment ropes
  - Piglet mortality was reduced by milky cheese addition during the enrichment period. Semiochemical treatment had the lowest percent mortality at weaning.
- Feeding strategies prior to farrowing
  - Feeding 1.5 lbs four times daily reduced piglet deaths compared to ad libitum feed prior to farrowing.

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Pre-weaning mortality

No benefit observed

- Sow essential fatty acids (EFA) intake during lactation did not influence litter survivability or subsequent reproductive performance.
- Birthing induction did not influence born alive, stillbirths, mummies, assistance required at farrowing, fetal blood oxygen levels.

Works

Wean-finish mortality

- Better sow farm health status and productivity associated with improved livability
- Genetic influence on post-weaning stress and growth
  - Early maturing duroc sired pigs had reduced stress, higher feed intake, lower % losing weight post weaning, and higher gain during the nursey period.
- Biscuit enrichment
  - Providing enrichment cubes to pigs post-weaning reduced the percentage of pigs that lost weight after weaning (3.8% vs 15.5%).
- Pellet size and mat feeding
- Sensory attractants
- Dietary essential fatty acids
  - The linoleic:linolenic acid ratio can impact gilt growth and the use of lower energy diets does appear to reduce joint inflammation.

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Wean-finish mortality

No benefit observed

- Liquid sensory attractant applied pre and post-weaning.
- Increasing gruel frequency from 2 to 4 times per day did not reduce nursery mortality.
- Providing oral dextrose drench to fallback pigs increased blood glucose, but did not reduce mortality.
- Feeding a 4:1 linoleic:linolenic acid ratio does not appear to alter joint inflammation in swine.
- Antibiotic treatment regimens showed no differences between mass injection, spot treatment, mass water medication or mass water medication plus spot treatment on percent mortality in naturally occurring multi-etiologic respiratory challenges in commercial nursery pigs.

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https://piglivability.org

RESOURCE LIBRARY

Gilt Development

Pelvic Organ Prolapse

Managing the Sow

Transitioning to the Nursery

Wean-to-Finish

Biosecurity

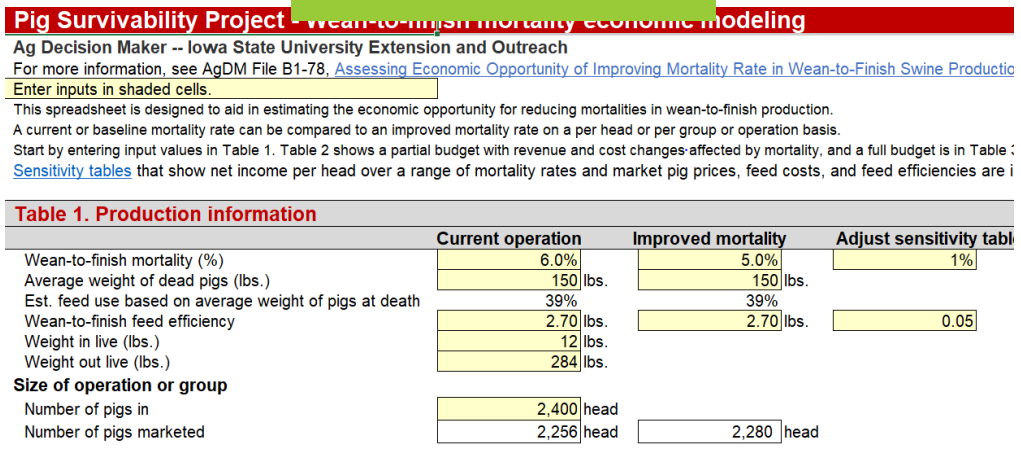
Reaching Stakeholders Through Multiple Channels

55 Podcasts

28 Fact Sheets

All available in Spanish!

Producer Tools


Pig Survivability Project - Wean-to-finish mortality economic modeling

Ag Decision Maker -- Iowa State University Extension and Outreach

For more information, see AgDM File B1-78, Assessing Economic Opportunity of Improving Mortality Rate in Wean-to-Finish Swine Productio

Enter inputs in shaded cells.

This spreadsheet is designed to aid in estimating the economic opportunity for reducing mortalities in wean-to-finish production.
A current or baseline mortality rate can be compared to an improved mortality rate on a per head or per group or operation basis.
Start by entering input values in Table 1. Table 2 shows a partial budget with revenue and cost changes affected by mortality, and a full budget is in Table 3
Sensitivity tables that show net income per head over a range of mortality rates and market pig prices, feed costs, and feed efficiencies are i

Table 1. Production information

	Current operation	Improved mortality	Adjust sensitivity tabl
Wean-to-finish mortality (%)	6.0%	5.0%	1%
Average weight of dead pigs (lbs.)	150 lbs.	150 lbs.	
Est. feed use based on average weight of pigs at death	39%	39%	
Wean-to-finish feed efficiency	2.70 lbs.	2.70 lbs.	0.05
Weight in live (lbs.)	12 lbs.		
Weight out live (lbs.)	284 lbs.		
Size of operation or group			
Number of pigs in	2,400 head		
Number of pigs marketed	2,256 head	2,280 head	

29 Short Videos

Educational Materials

IMPROVING PIG SURVIVABILITY

https://piglivability.org

2021 – International Conference on Pig Survivability
https://piglivability.org/conference-recordings

- 33 talks/recorded presentations available from swine industry leaders in management, genetics, reproduction, diagnostics, health, nutrition bio-security, and economics.

- Registrants – 451
  - US States - 29
  - Countries - 5
  - Companies - 175

IMPROVING PIG SURVIVABILITY

SAVE THE DATE!

International Conference on Pig Livability

November 5 – 6, 2025

Hilton Omaha
Omaha, NE

https://piglivability.org/

IMPROVING PIG SURVIVABILITY

K-STATE Research and Extension

IOWA STATE UNIVERSITY

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Key Findings in Post-Weaning Mortality Research & Pig Livability Project Producer Resources

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