



CARTHAGE

INNOVATIVE SWINE SOLUTIONS

Research update: Advances in gestation, nursery, and finishing feeding programs

Carthage Innovative Swine Solutions
September - 2026

Research work 2025 -2026



Sows

- 8 experiments
 - ✓ Lysine requirements – Lactation
 - ✓ Feed additives – Summer months
 - ✓ Feed management – Gestation
 - ✓ Semen characteristics – Farrowing
 - ✓ medication withdrawal



Nursery

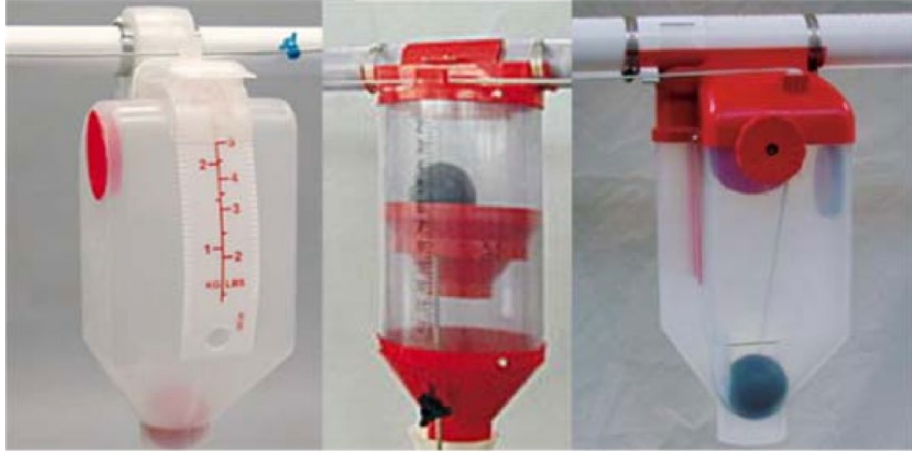
- 3 experiments
 - ✓ Value of the Carthage nutrition program.
 - ✓ Insoluble fiber – Growth performance



Finishing

- 2 Experiments
 - ✓ DDGS and SBM – Summer months.
 - ✓ Feed additives.

Introduction



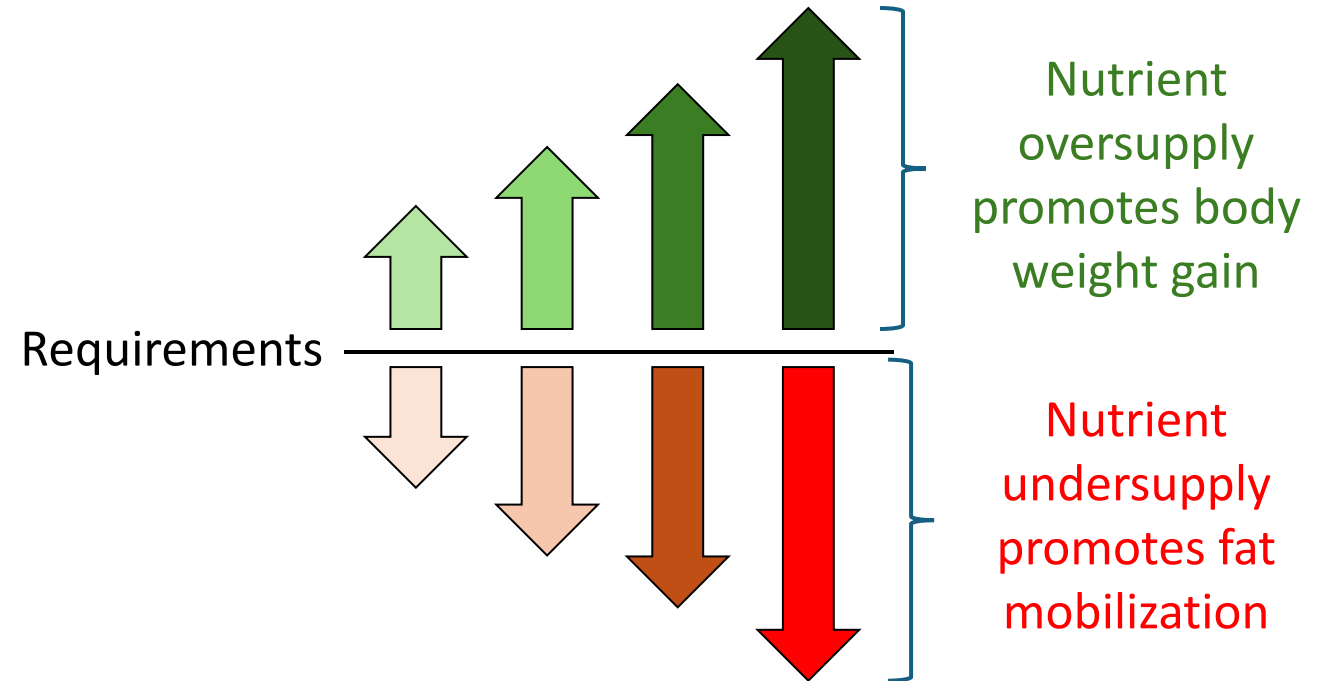
Single
gestation diet



Different feed
allocation



Body condition is
a tool used to
assess sow body
weight status.



- Traditionally, three different feed allocations are used for thin, ideal, or fat sows.
- The response of different animals within the same BCS category may depend on other uncontrolled factors such as parity, body weight, and health status.

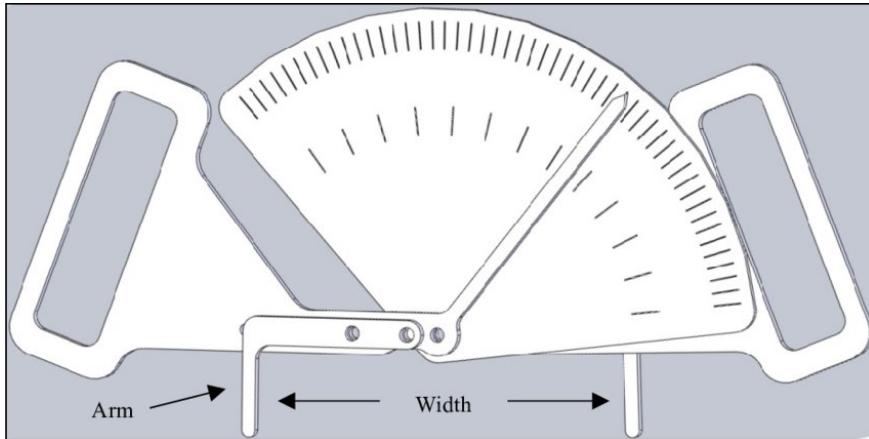
Objective

To evaluate the effect feed allocation during early gestation on sow reproductive performance in young or mature sows.



Materials and Methods

- 3,084 sows (line 1050, PIC)
- March to October 2024
- Sows were classified either as thin or ideal at weaning.



Thin
Caliper score 9 to 12

Ideal
Caliper score 13 to 16

- Randomized incomplete block design
- 2 x 3 factorial (within each BCS)

		Feed allocation		
		Low	Medium	High
Sow parity	Young	P1 and P2		
	Mature	> P3		
		lb/d		
		Low	Medium	High
	Thin	6.0	7.0	8.0
	Ideal	4.3	5.0	5.8

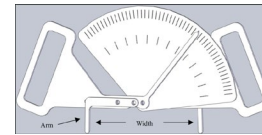
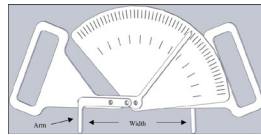
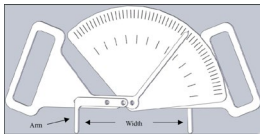
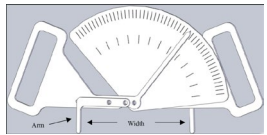
Materials and Methods

d 0 to 50- Experimental period
Allotment



d 50 to transfer

- Groups by parity
- 2 kg/d



- Total born
- Born alive
- Still born
- Mummies
- Weaned

Subsequent
breeding
performance

Day 0

Day 21

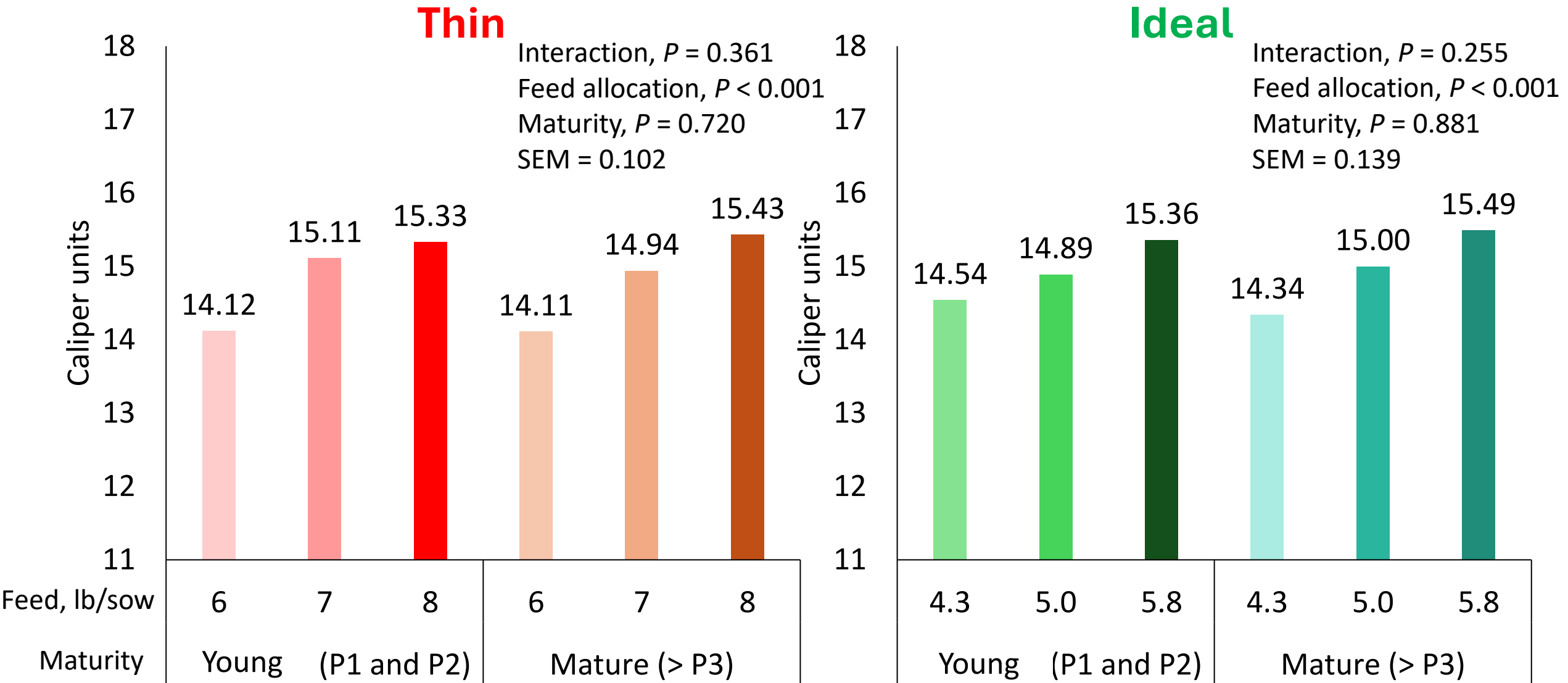
Day 50

Day 112

Farrowing

Breeding

Results- Caliper d 50



Results- Farrowing performance



Farrowing
rate



Weaned
pigs



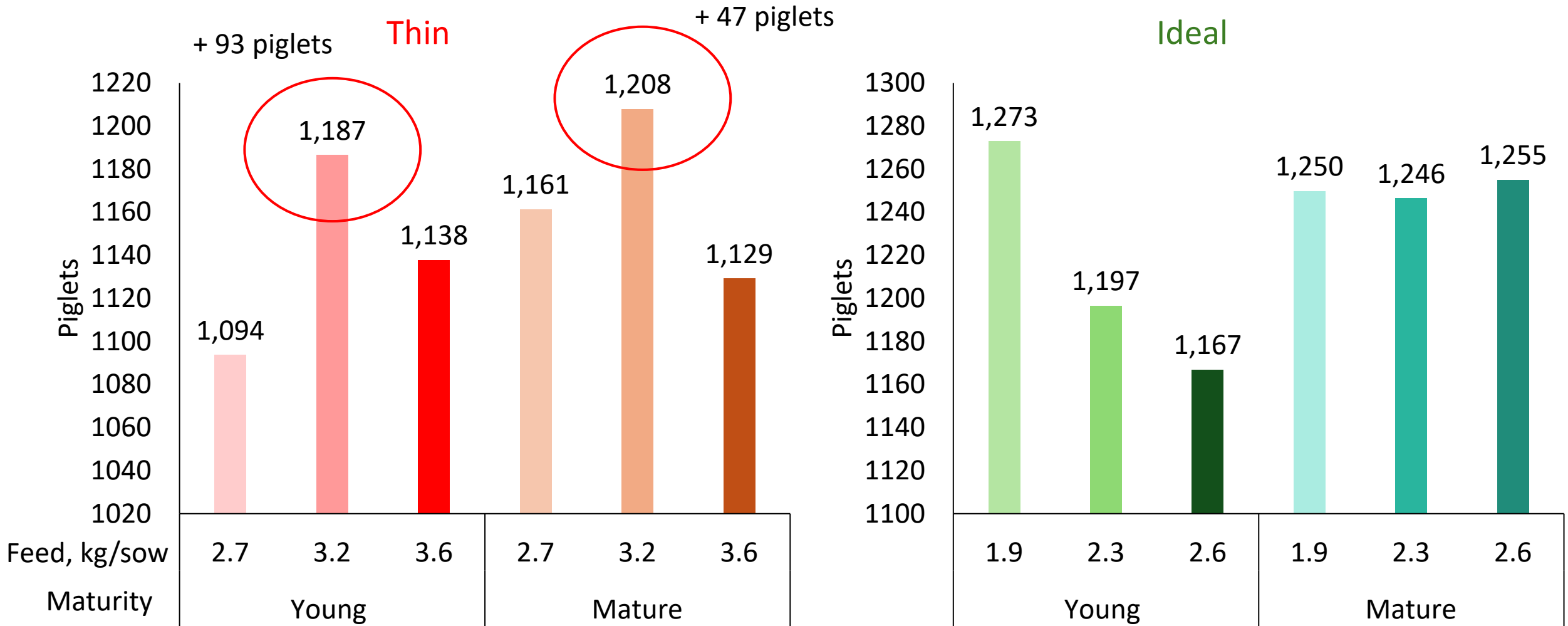
Removed
and not
bred



Wean to
first
service
Interval

Not affected by feed allocation ($P > 0.10$)

Results- Born alive / 100 bred sows





Conclusions

Under the conditions of this study, increasing feed allocation during early gestation may be a strategy to improve BSC; however, further research is needed to better understand the impact in reproductive performance

1.

Increased early-gestation feed allocation improved sow BW and body condition, regardless of initial BCS.

2.

No effect of feed allocation was observed for most of the farrowing performance parameters.

3.

Further research is required to assess the impact of early gestation feed allocation on subsequent reproductive cycles and sow longevity.

Introduction



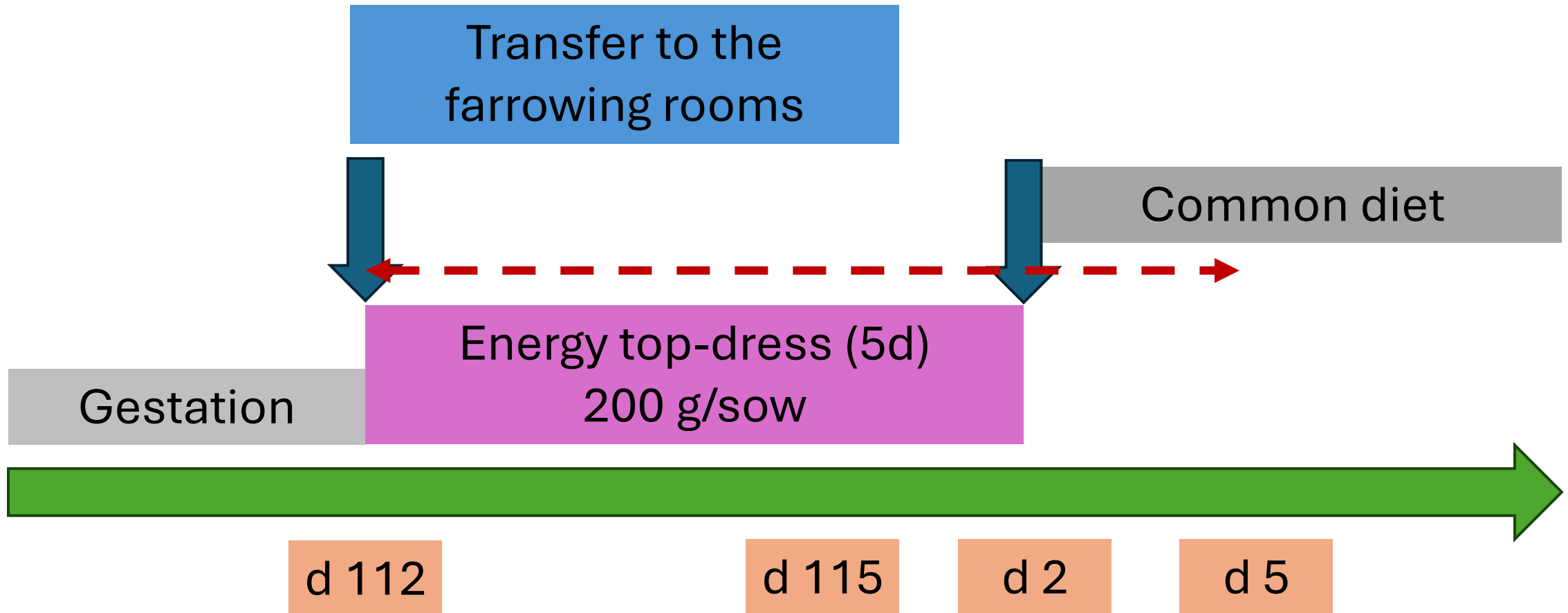
Farrowing is an energy-demanding process that, according to theoretical estimates, requires approximately **3,824 kcal**.



Despite the high variability in the available data, low energy intake during the late gestation period has been associated with reduced muscle contraction capacity and limited oxygen availability, thereby increasing the risk of sow fatigue during farrowing.

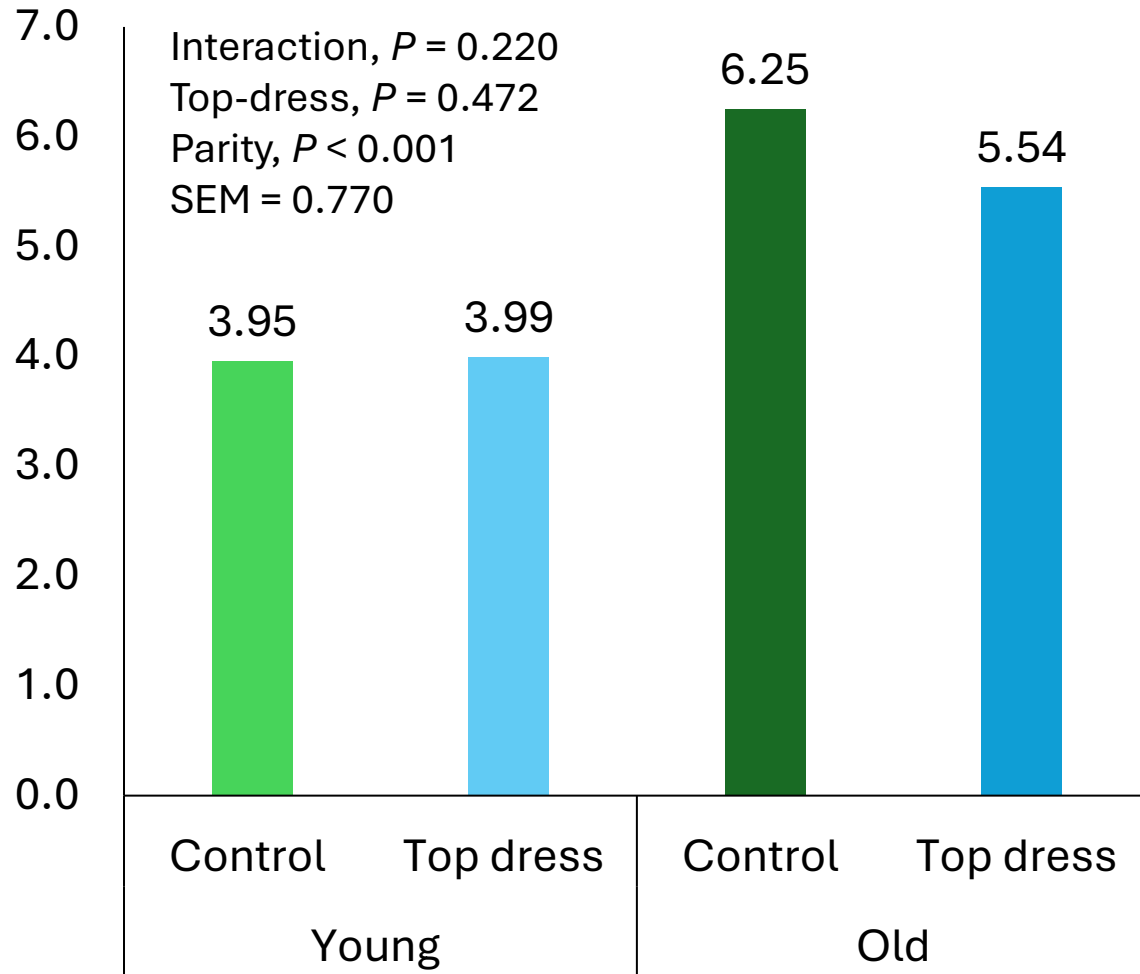
Providing adequate energy levels during the transition period can shorten farrowing duration, which has been linked to a reduced risk of stillborn

Materials and methods

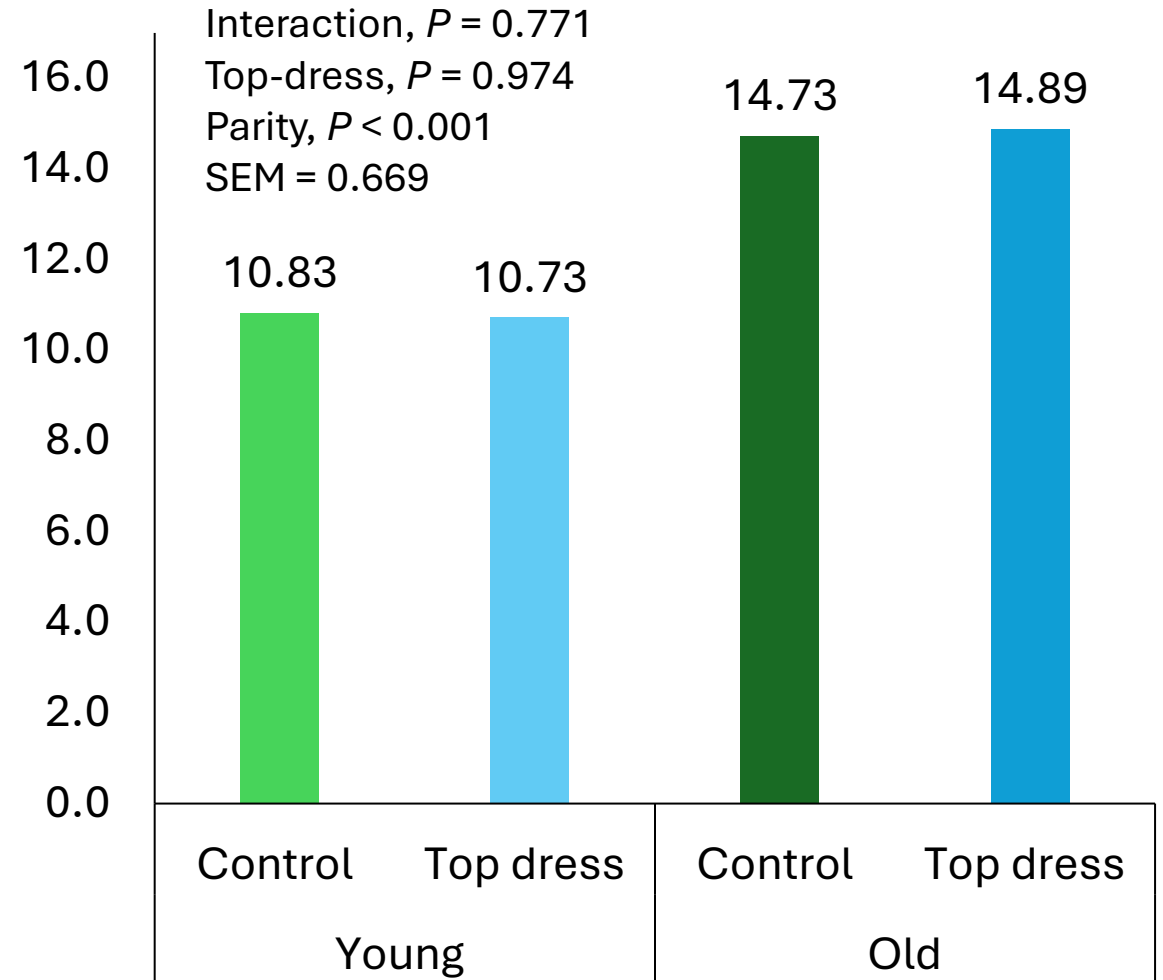


Results

Stillbirths, %



PWM, %



Results

**No significant
impact of the
energy top-dress**

Under the conditions of this study,
increasing energy intake during the
transition period did not have a significant
impact on any performance parameters.

Born
alive

Mummies

Weaned
pigs

WTE
interval

Piglet
BW

Effect of formulation strategy on growth performance and economics.

- Three independent experiments
- Fall 2025 and spring 2026
- Comparisons were made across treatments with the same feed budget.

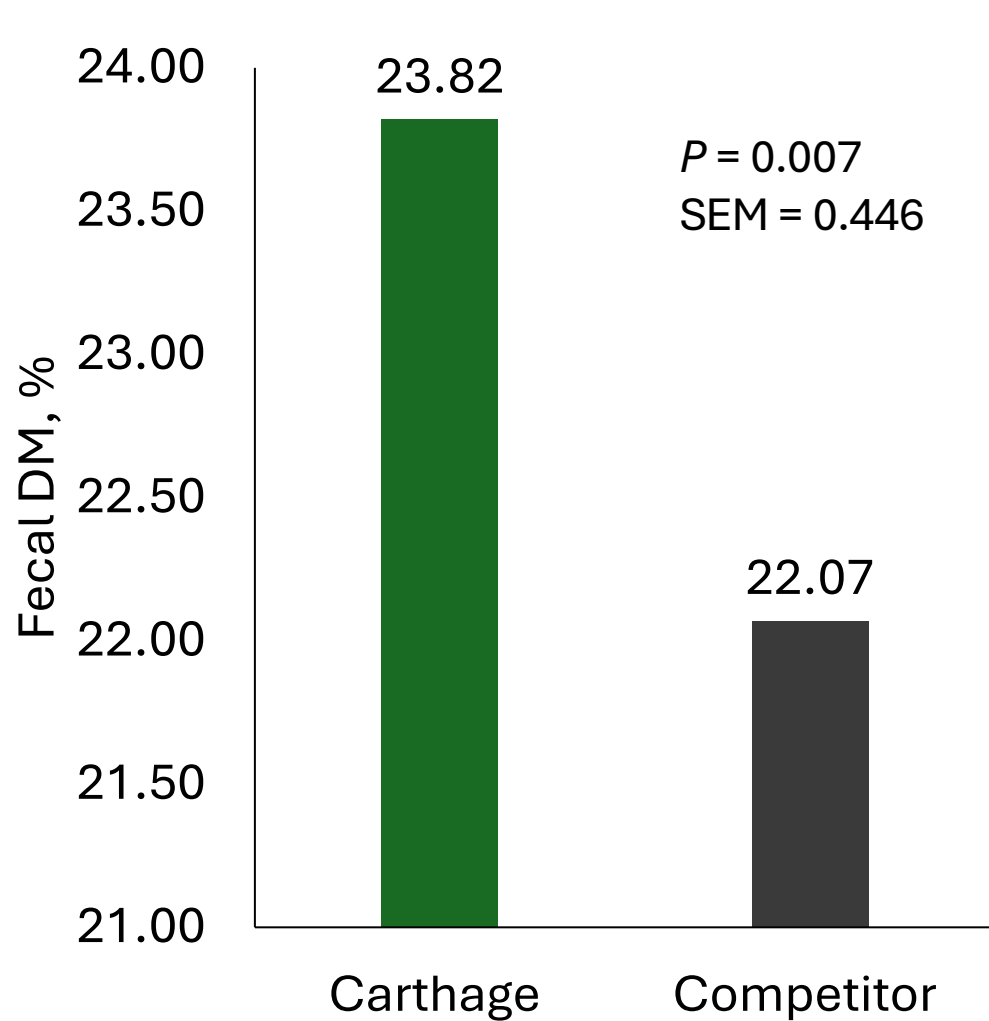
Objective: To compare Carthage nutrition program against competitors.

Results



No statistically significant differences were observed in overall ADG, ADFI, and F/G among the formulation strategies across the three experiments.

Results- Fecal DM



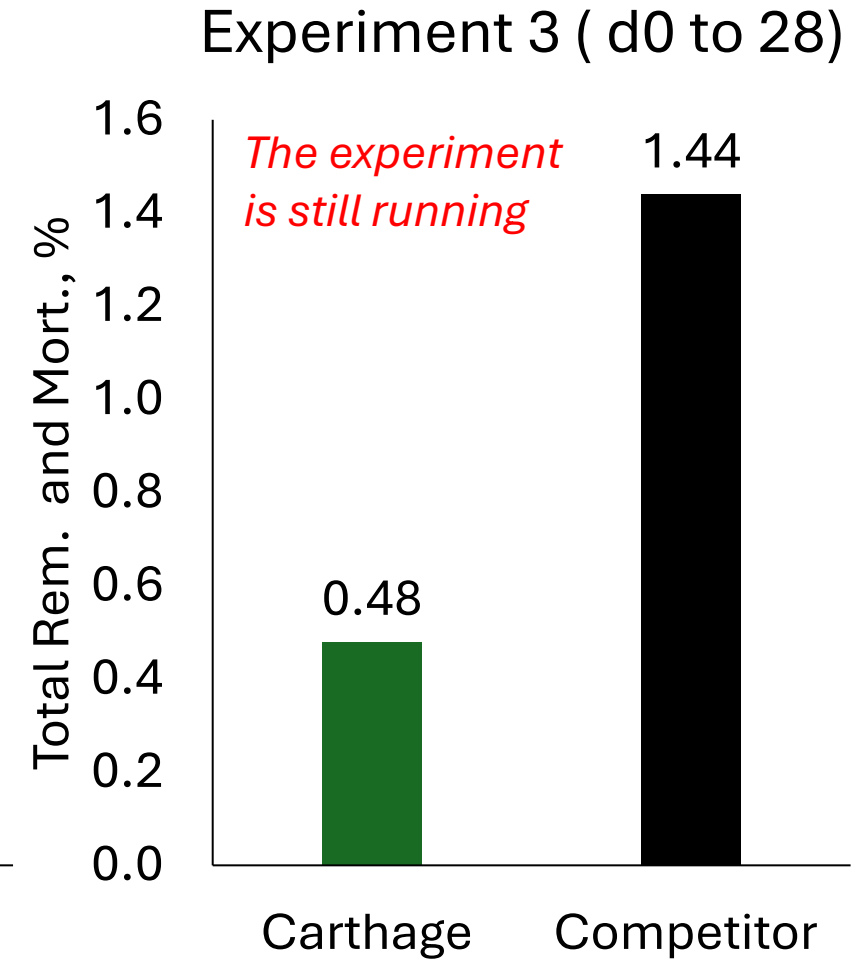
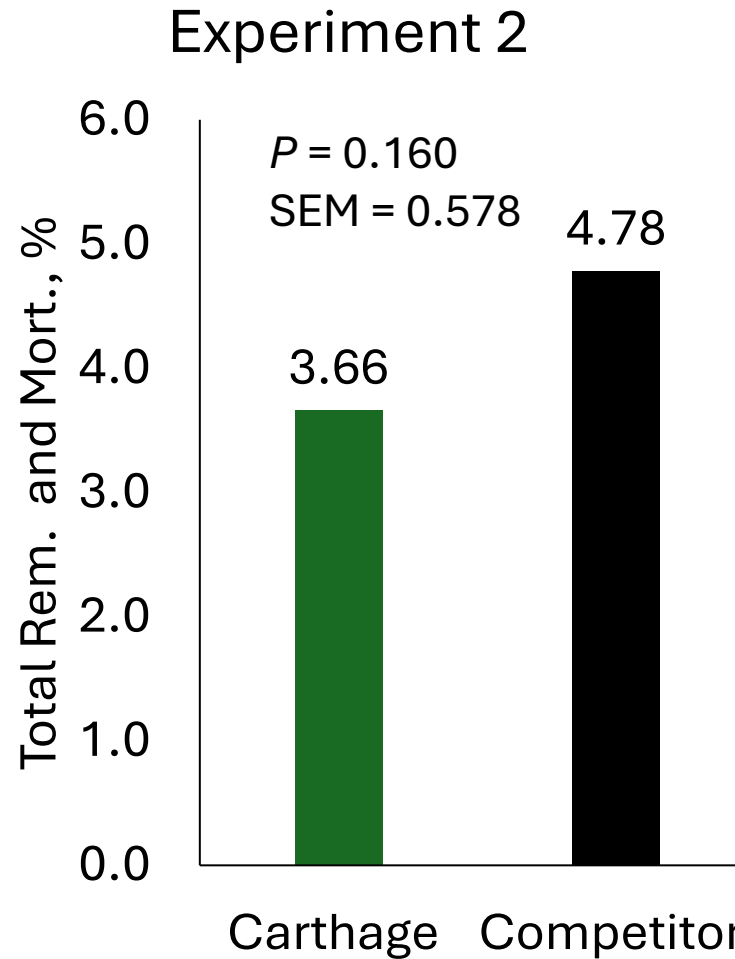
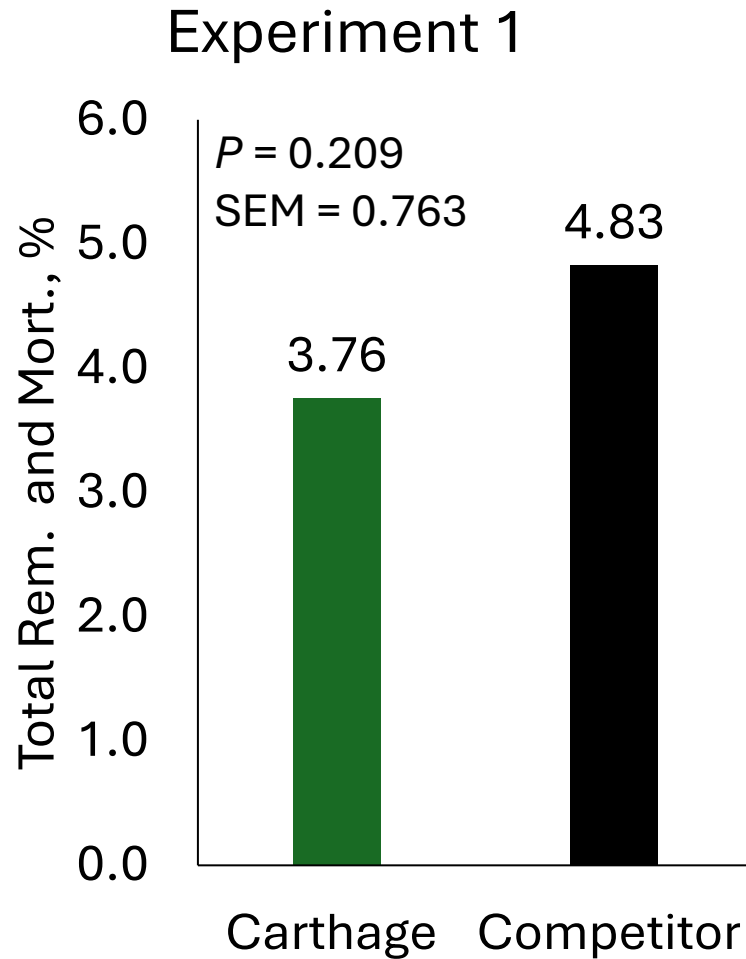
Carthage



Competitor



Results – Mortality and removals

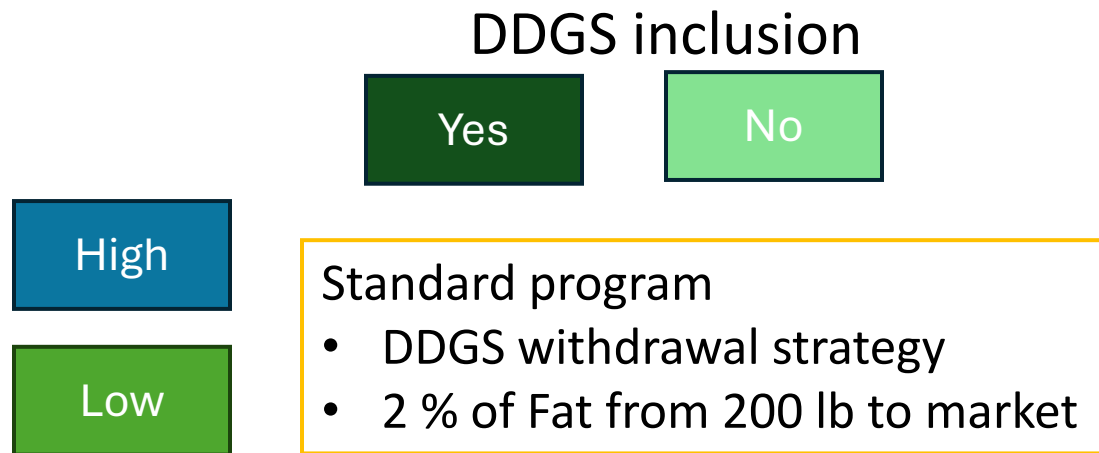


Effects of soybean meal, DDGS, and synthetic amino acid levels on the growth performance of pigs harvested during the summer months.



Materials and Methods

- 2,421 pigs (line 337 x 1050, PIC)
- March and June 2025
- Initial BW of 70.3 lb.
- 2 x 2 + 1 factorial design

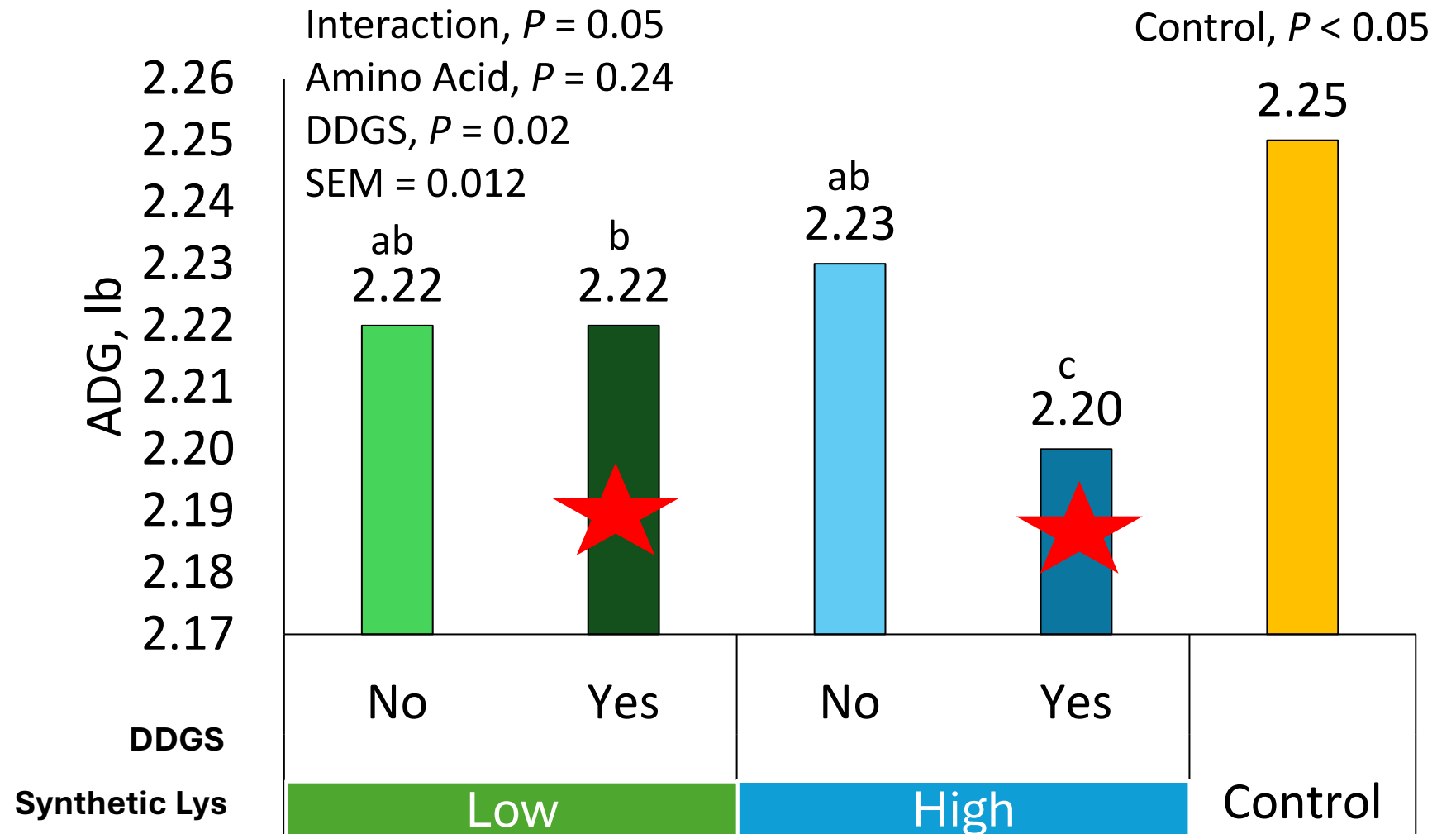
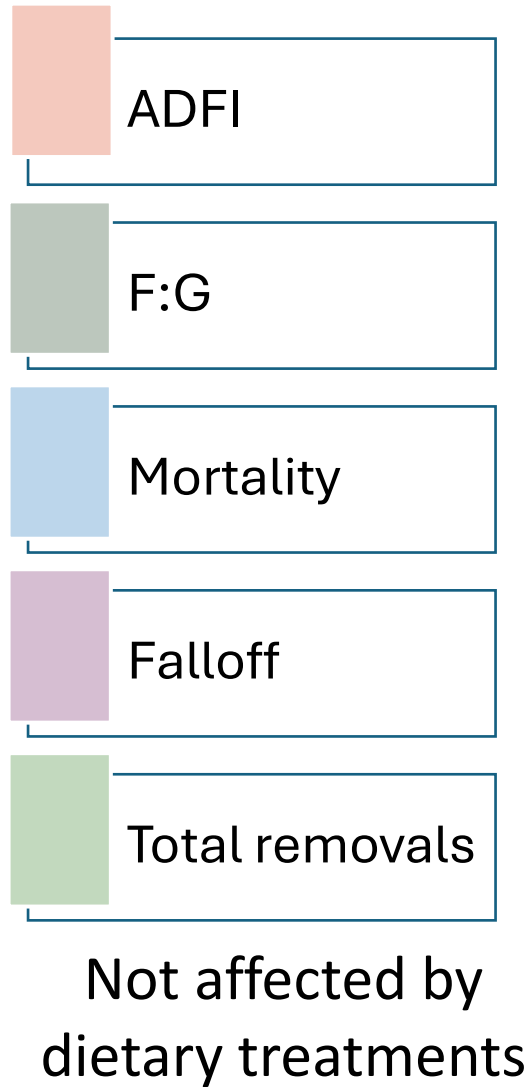


Synthetic Amino Acids

Formulation strategy:

- Five dietary phases
- DDGS inclusion:
 - ✓ Factorial: 20% (400 lb/T) from phases 1 to 5.
 - ✓ Standard program: 20 % from phases 1 to 3 and no DDGS in phases 4 and 5
- Same Lys:Cal ratio, STTDP, and added VTM across treatments within each phase.

Overall (d 0 to 187)



Economic analysis

	Lys DDGS	Low		High		Control
		No	Yes	No	Yes	
BW gain, lb		234.9	236.0	233.5	231.0	237.7
Yield, %		75.0	74.6	75.0	74.6	75.0
Total , \$/pig		72.15	69.27	76.70	70.18	70.58
\$/ lb of gain		0.31	0.29	0.33	0.30	0.30
Revenue, \$/pig		149.40	149.23	148.51	146.06	151.18
IOFC		77.25	79.95	71.80	75.89	80.60

Assuming a carcass yield of 75%, the reduction associated with a 20% DDGS inclusion from P1 to 5 was calculated using the Kansas State University DDGS calculator (-0.58%).

Ingredients price:

Corn: 4.71 \$/Bu

SBM: 360.4 \$/ton

DDGS: 179.6 \$/ton

Lys: 0.96 \$/lb

Lean hog: 0.848 \$/lb

Consistent with the performance results, reducing synthetic lysine inclusion when DDGS are included maximized economic outcomes. However, the use of a standard feeding program resulted in the highest IOFC.

Practical considerations

- Withdrawing corn DDGS during late finishing and adding 2% supplemental fat maximizes overall ADG.
- During the grower period, including 20% corn DDGS with low synthetic lysine does not reduce growth performance while allowing formulation cost savings.
- During the late finishing period, including 20% corn DDGS reduces growth performance, regardless of synthetic lysine inclusion.
- When economically feasible, increasing SBM inclusion without excessively increasing crude protein allows formulation savings while maintaining growth performance.

Effects of manganese source and lysine level on grow/finish pigs under space-restricted conditions



Materials and Methods

- 2,462 pigs (line 337 x 1050, PIC)
- Initial BW of 84.4 ± 2.38 lb
- September to December 2025
- 2 x 4 factorial design

SID Lys level, % of PIC recommendation

95	100	105	110
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Mn source

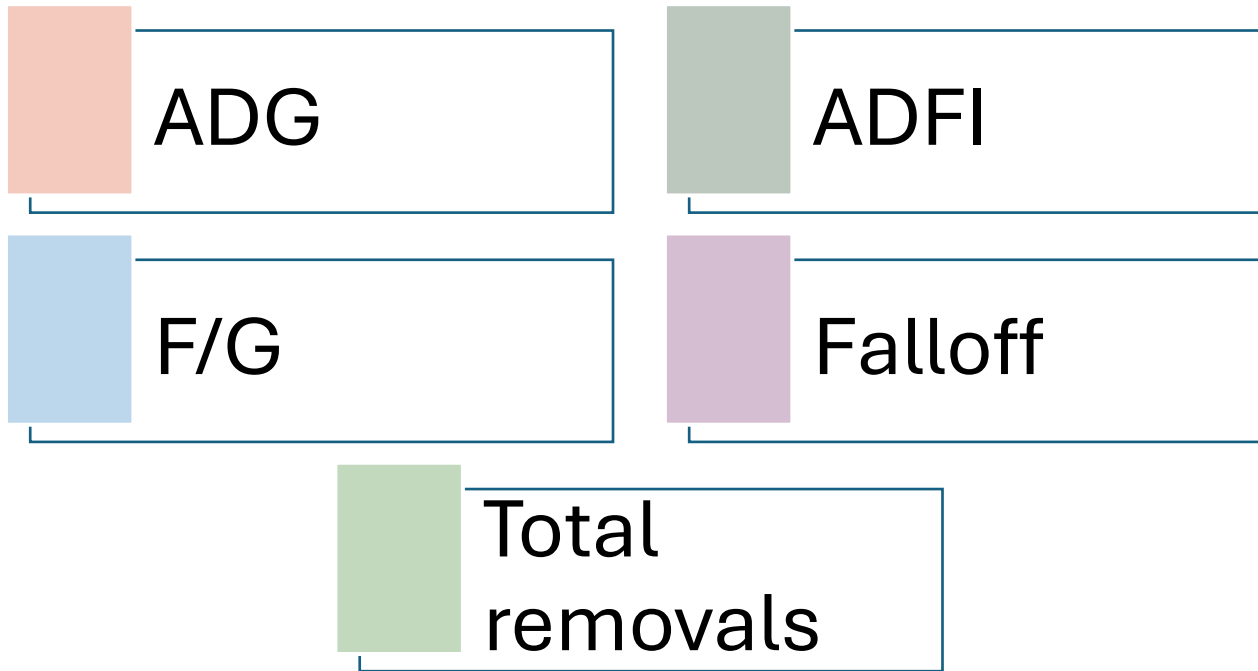
Mn
Hydroxychloride

Mn sulfate

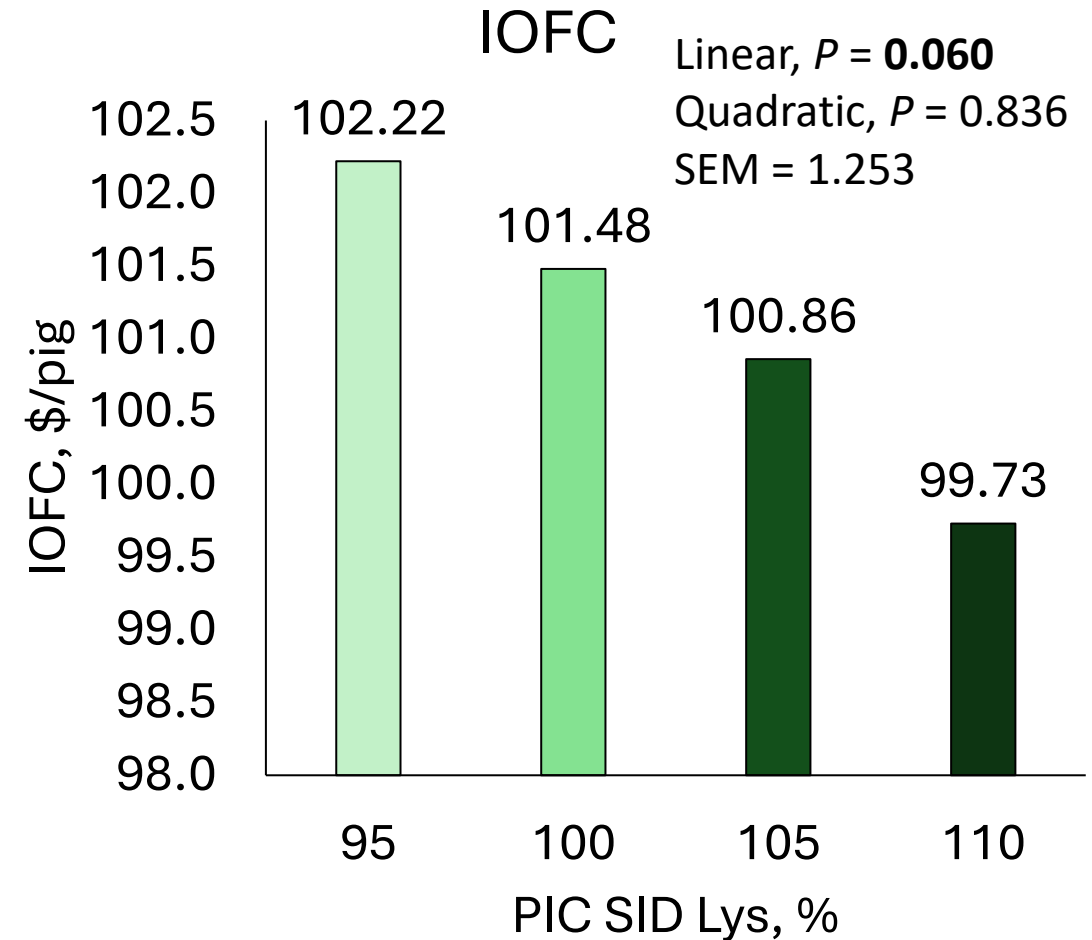
Increasing SBM levels and synthetic Lys

Gate positions were adjusted to maintain the target stocking density of 6.7 ft^2 per pig during the whole experiment.

Results- Overall, d 0 to 91



No significant interactions or main effects were observed for any performance parameter.





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Thank you.

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