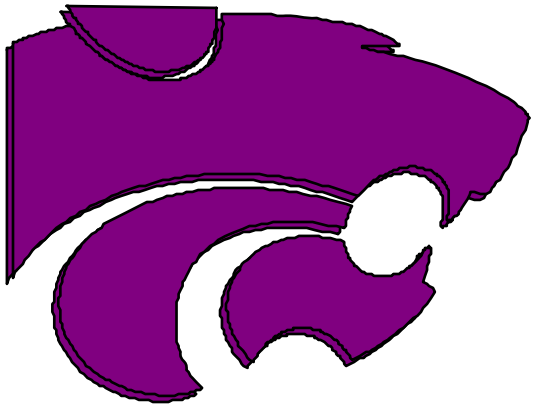
Swine Day 2004



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RESEARCH
and
EXTENSION

Feeding Gestating Sows

- Feeding sows in gestation based on body weight and back fat thickness is more precise and economical than methods of feeding based on visual observation of body condition score.
- Previously, we have used heart girth as a indicator of body weight and back fat thickness
- Recently developed new procedure, using a flank to flank approach to simplify the procedure.

Procedures for comparing heart girth and flank to flank measurements

- Sow girth was measured on all three farms with flank measurements taken on two of the farms.
  - 605 sows from 3 farms were used for the girth measurement
  - 306 sows from 2 farms were used for the flank measurement.
- On all farms, sows were removed from the gestation stall and weighed on a platform scale.

Iwasawa et al., 2004

Heart girth measurement

Flank to Flank measurement

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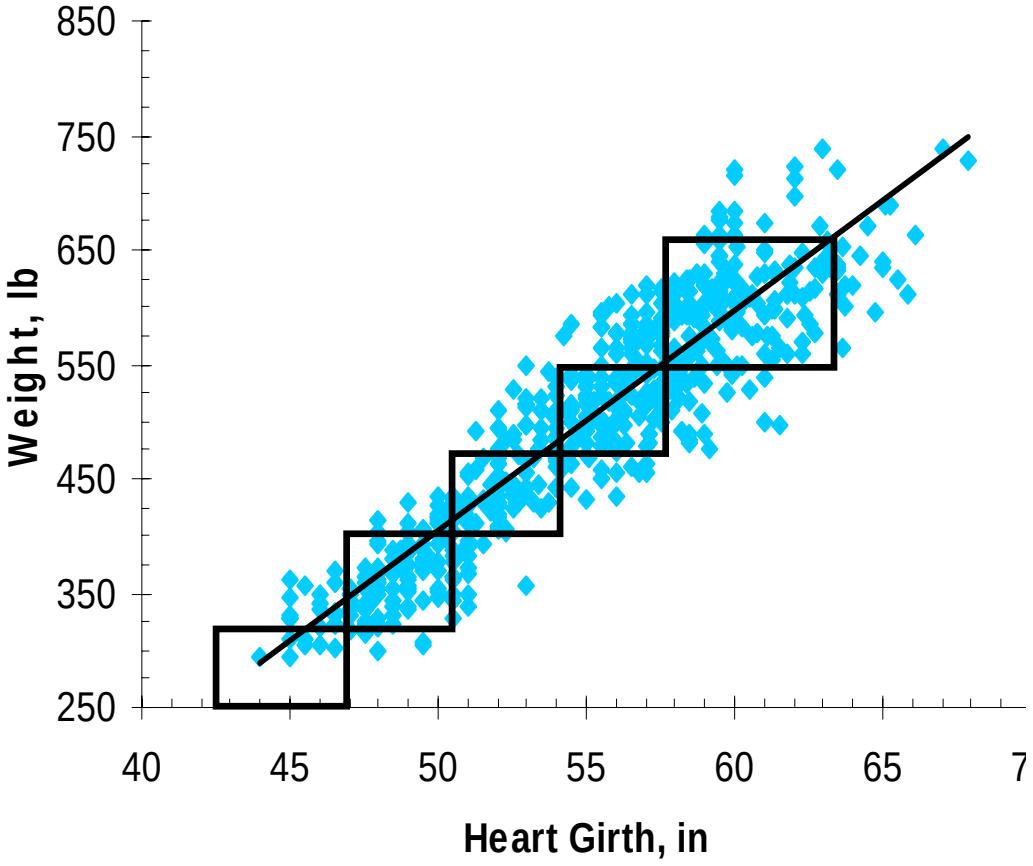
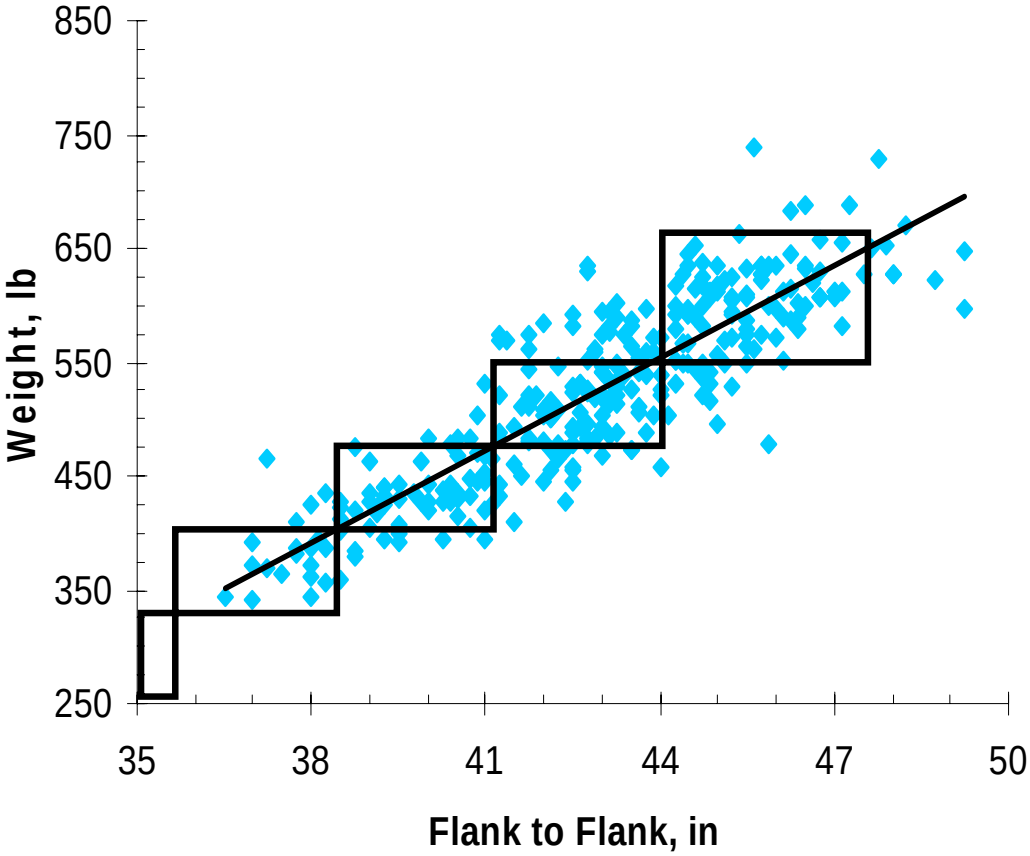
Percentage of Sows that were Accurately Categorized or Under or Overestimated for Weight Category

	Weight category					
	1	2	3	4	5	Total
Girth measurement						
Correct category	1.7%	10.7%	12.4%	13.7%	27.9%	66.4%
Underestimate	- - -	2.3%	3.0%	5.6%	8.9%	19.8%
Overestimate	1.7%	3.5%	2.8%	5.8%	- - -	13.7%
Total	3.3%	16.5%	18.2%	25.1%	36.9%	100.0%
Flank-to-flank measurement						
Correct category	- - -	3.9%	13.7%	21.9%	32.7%	72.2%
Underestimate	- - -	- - -	1.0%	2.3%	10.1%	13.4%
Overestimate	- - -	3.6%	6.5%	4.2%	- - -	14.4%
Total		7.5%	21.2%	28.4%	42.8%	100.0%

Weight Categories for Gestation feeding





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Iwasawa et al., 2004

Heart girth and flank to flank measurements

- The flank-to-flank measurement can be obtained faster with less risk of operator injury and with the same accuracy as compared to girth measurement.
- Either method should provide a more accurate estimation of body weight compared to visual estimation.

Feeding level from day 0 to 101, lb/day

Flank to flank, inches	Estimated weight, lb	Backfat at breeding, mm			
		9 to 11	12 to 14	15 to 17	>18
< 35.5	250 to 325	5.1	4.6	4.0	3.5
35.6 to 38.0	325 to 400	5.7	5.1	4.6	4.0
38.1 to 41.0	400 to 475	6.1	5.6	5.0	4.5
41.1 to 44.0	475 to 550	6.6	6.1	5.5	5.0
> 44.0	550 to 650	7.1	6.6	6.0	5.5

- Assumes diet with 1.5 Mcal ME/lb
- All sows fed additional 2 lb/d from d 101 to 115
- Sows maintained at or above 20°C

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Feeding of group-housed gestating sows

Conceived by: Dr. Steve Henry and innovative Kansas producers

Concept: Divide feed allotment into 5 to 7 feedings per day

Initial response: Producers love it!

They believe there is less fighting and less variation in weight gain

Research plans: We will be testing the concept in the near future.

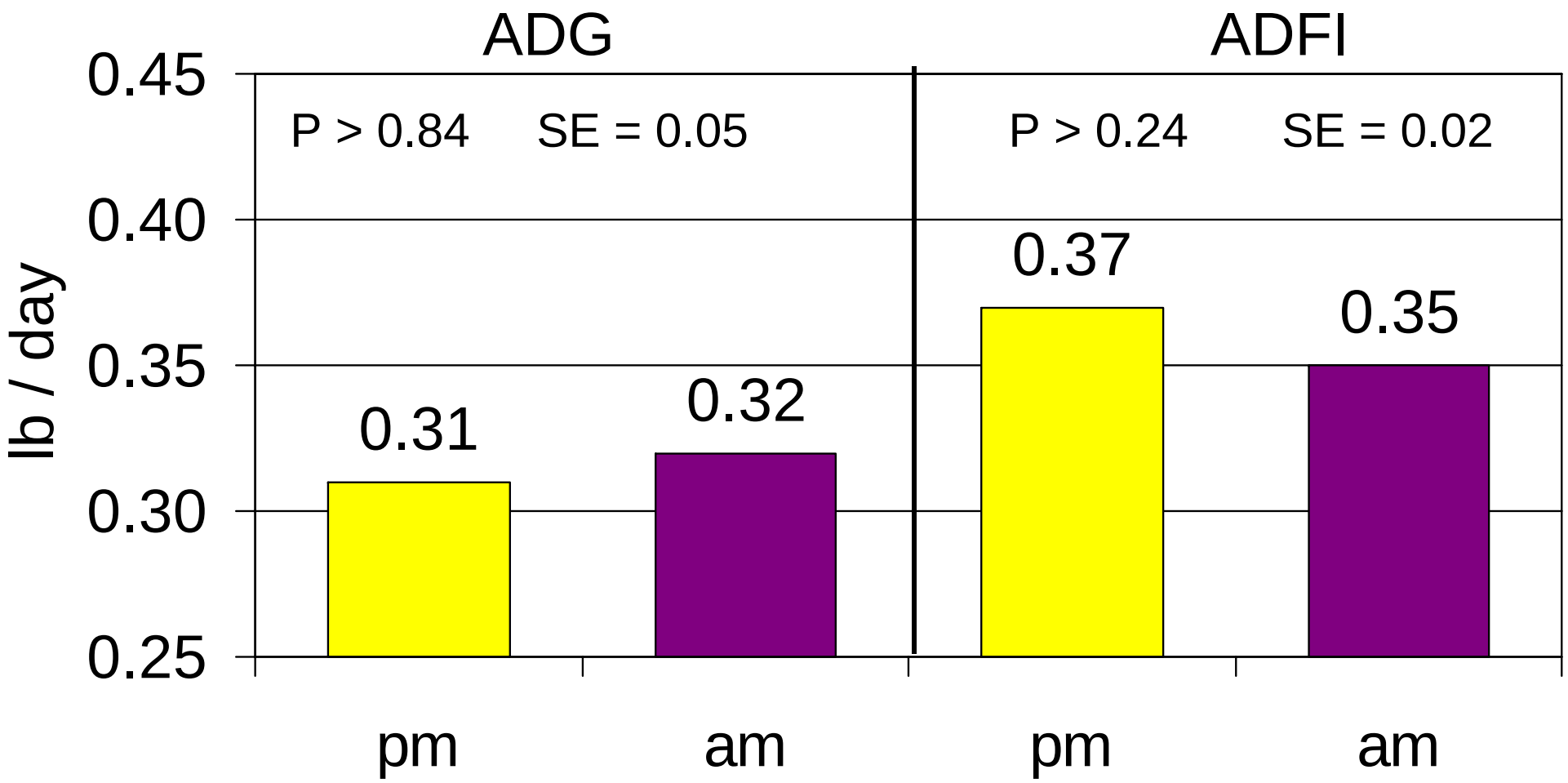
K-STATE

Weaning Time – am or pm???

- **Objective** - to determine whether removing sows from the farrowing crates 12 h before moving pigs to the nursery would influence how weanling pigs adjust to the nursery environment.
- 25 litters had sows removed from crates on Thursday pm and 25 litters had sows removed Friday am (271 pigs per weaning time).
- All weaned pigs moved to nursery pens on Friday am

Neill et al., 2004

Weaning time on performance, d 0 to 7



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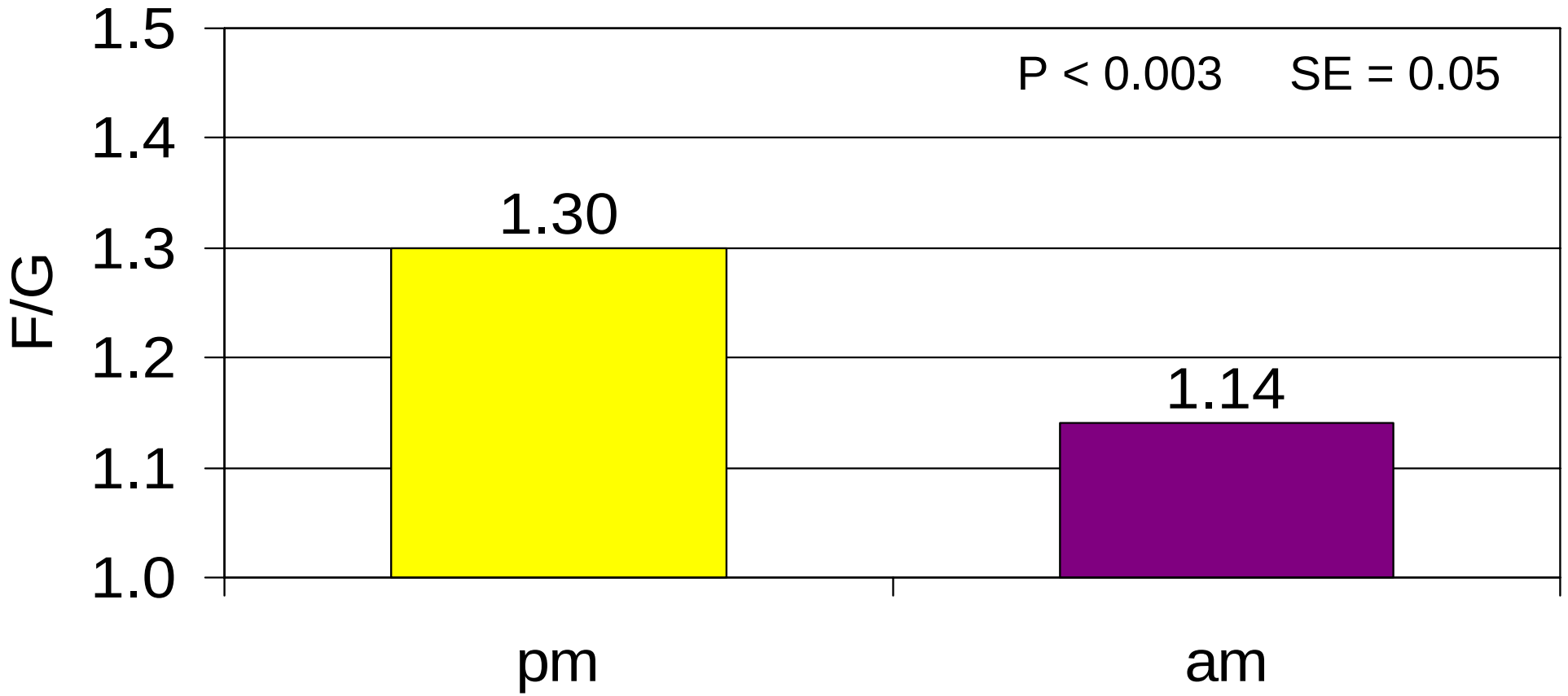
Neill et al., 2004

Weaning time on F/G, d 0 to 7



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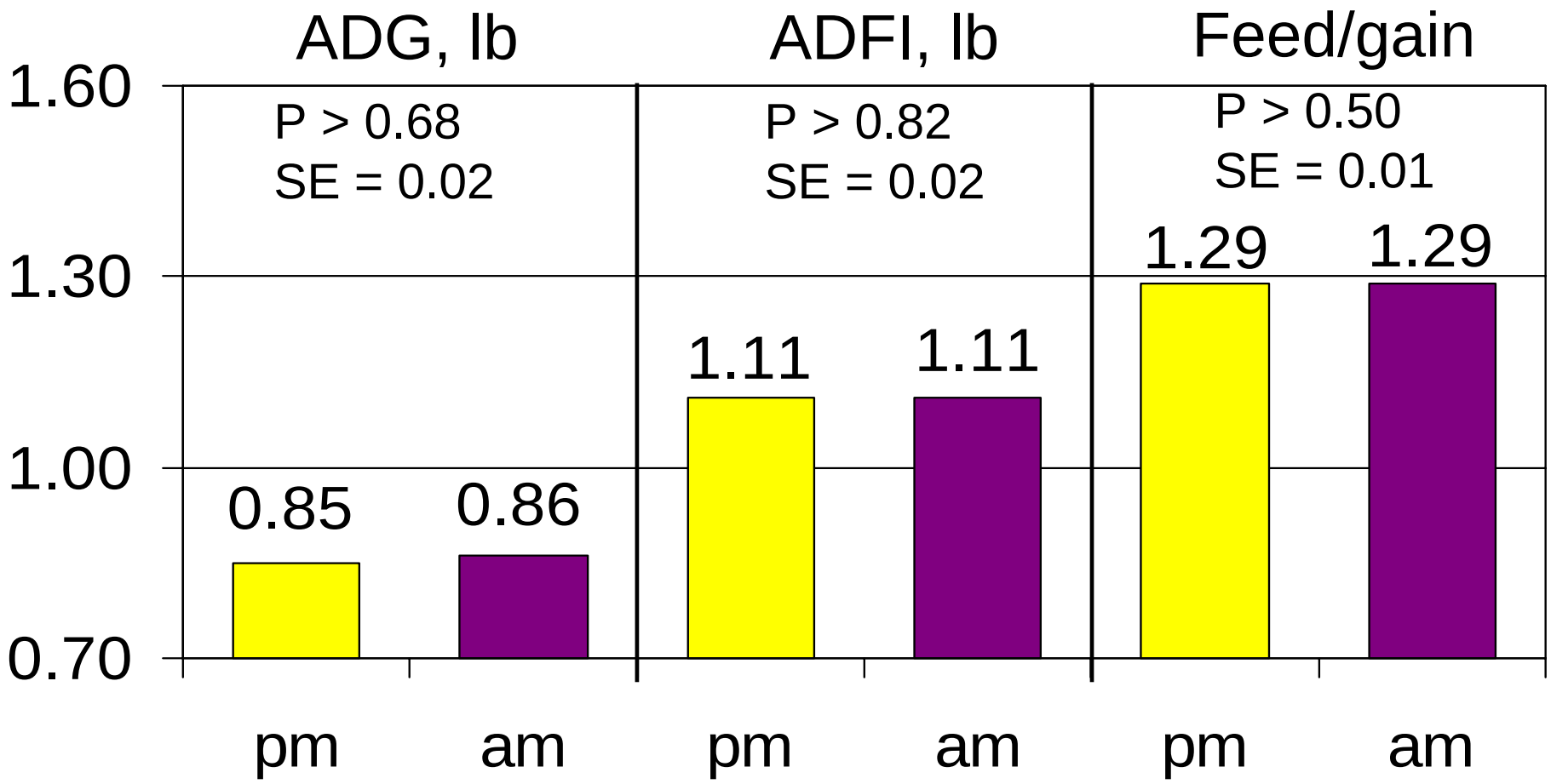
Neill et al., 2004

Weaning time, d 0 to 28



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Neill et al., 2004

Weaning Time – am or pm???

- Overall, no differences in growth performance were observed based on weaning time

- May allow for more flexibility for managers based on labor availably and to ensure sows are not omitted from a traditional weaning day feeding

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- Recent data from Michigan State University evaluated the Berry Feeding System™

- They compared -
  - Ad-libitum, wet/dry feeder with the nipple waterer inside the feeder
  - Hand-fed dry feeder with the nipple-cup combination waterer independent of the feeder

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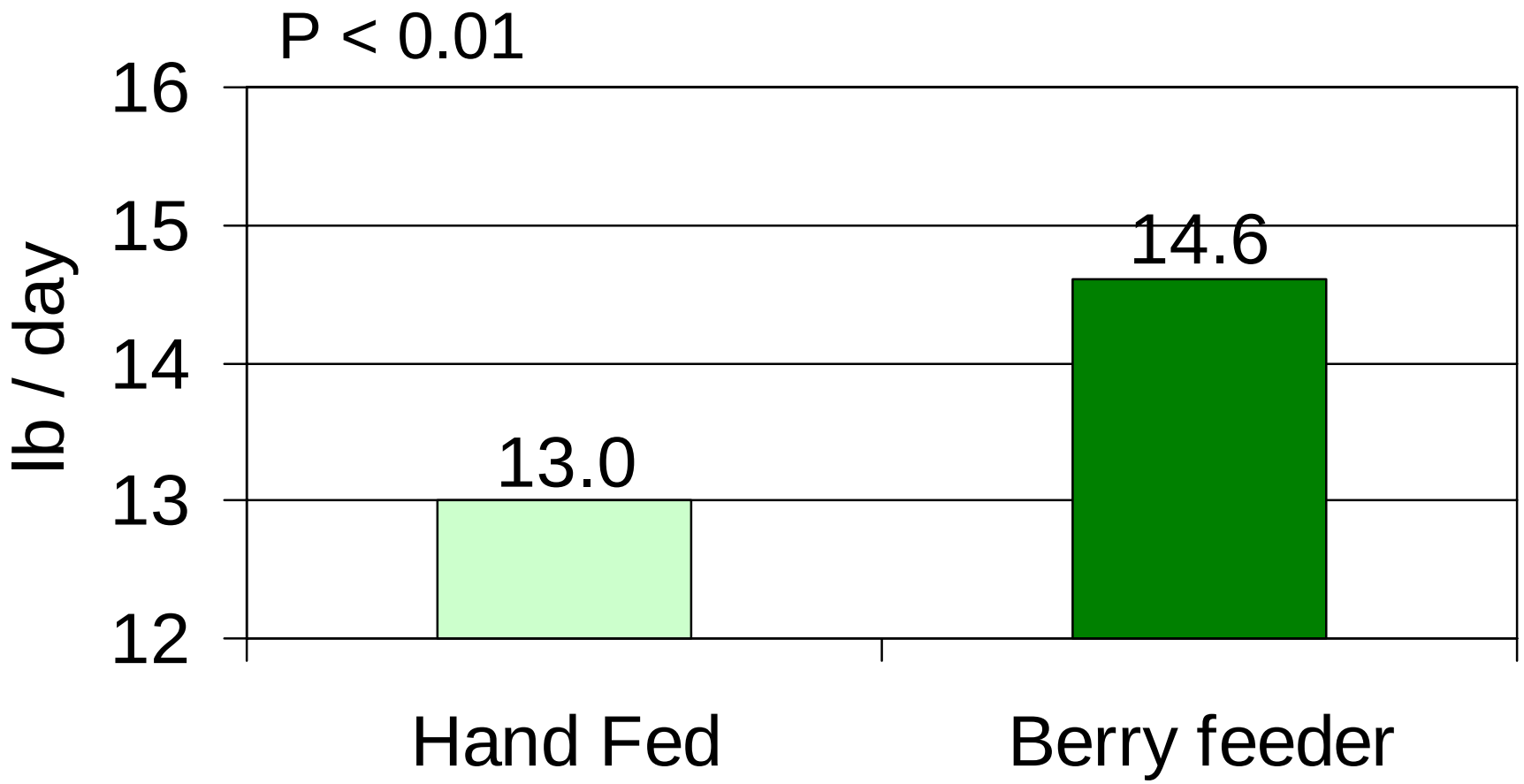
Influence of feeder design on sow average daily feed intake



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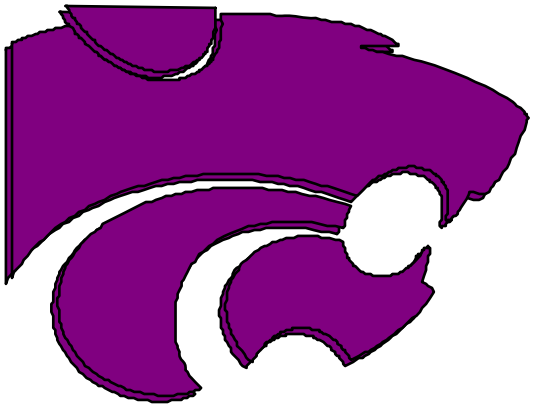
Michigan State University, 2004

Nursery pig update



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Adjust Feed Budgets for Older Weaning Ages and Weights

	Weaning Weight, lb/pig			
Diet, lb/pig	10	12	14	16
SEW	2	1	.5	.5
Transition	5	3	1	--
Phase 2	13 to 15	13 to 15	13 to 15	13 to 15

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Older weaning ages have not eliminated the need for identifying “starve out” pigs

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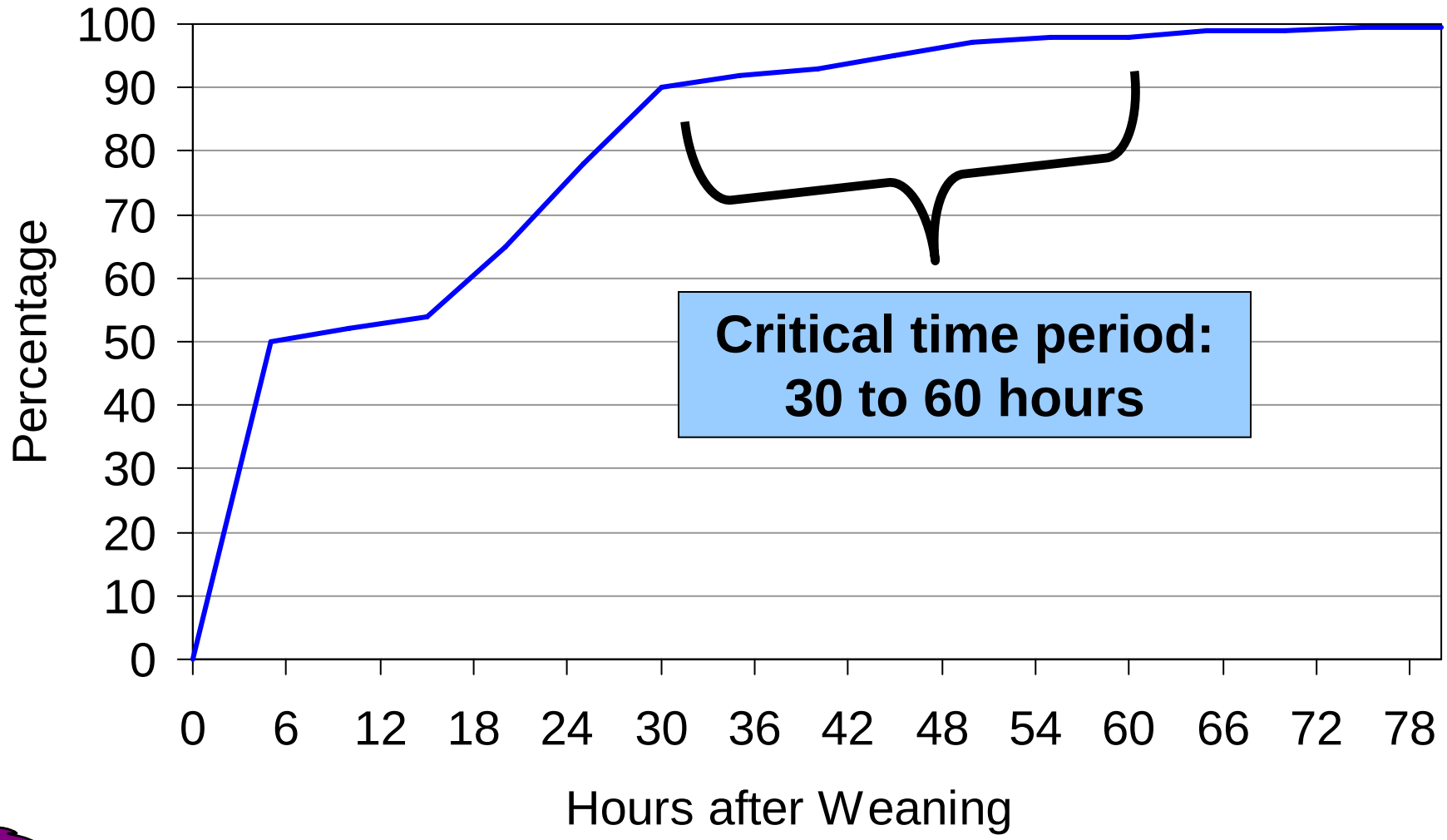
Percentage of Pigs that have Eaten by Hours after Weaning



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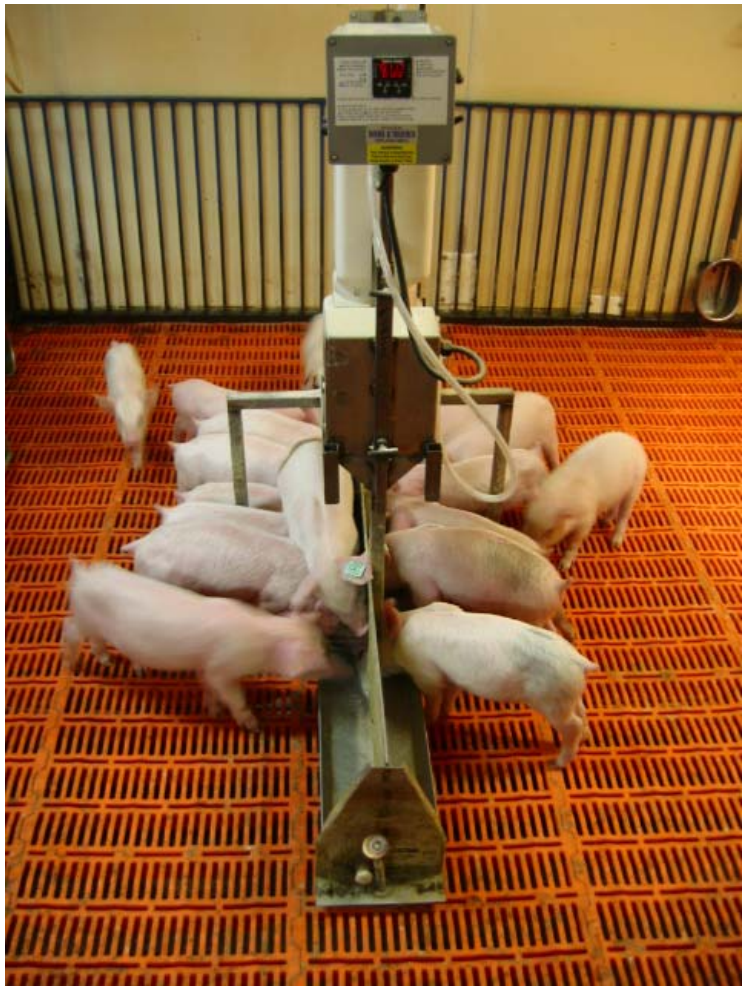
Adapated from Bruinix et al., 2001

Identifying pigs that need to be taught feeding behavior:

- Mental status – alert or depressed
- Body Condition – normal or thin
- Abdominal shape – round or gaunt
- Skin – sleek appearance vs fuzzy
- Appetite –feeding at the feeder or huddled
- Signs of dehydration – normal or sunken eyes

Intensive Care Feeder
“The Cappuccino Feeder”



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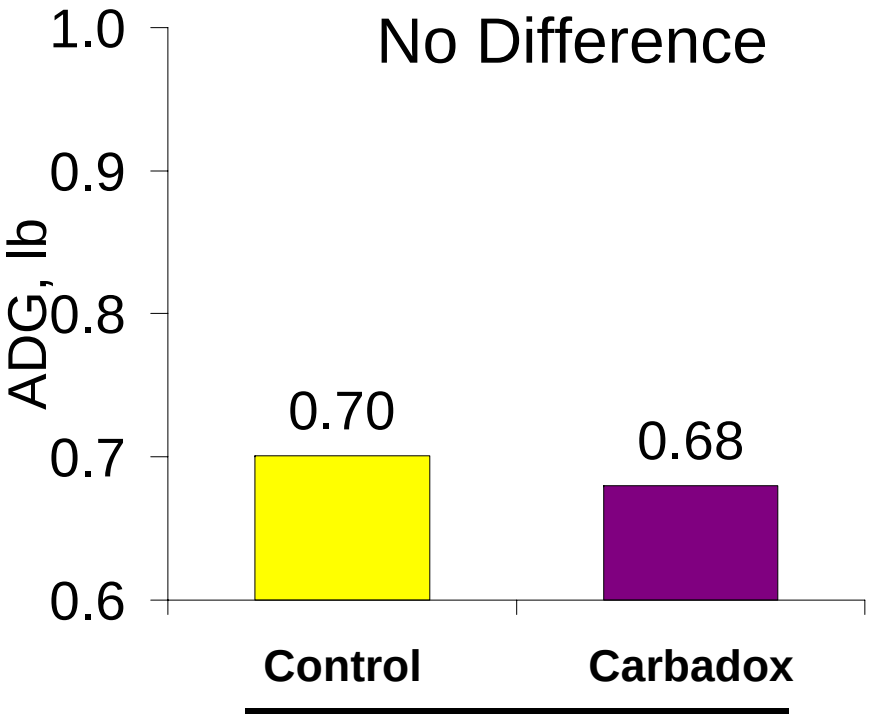
Addresses three needs of pigs that have not begun eating after weaning:

- **Water –** Young pigs are susceptible to dehydration
- **Nutrition –** Automated method of provided frequent meals
- **Behavior –** Cues to learn feeding behavior

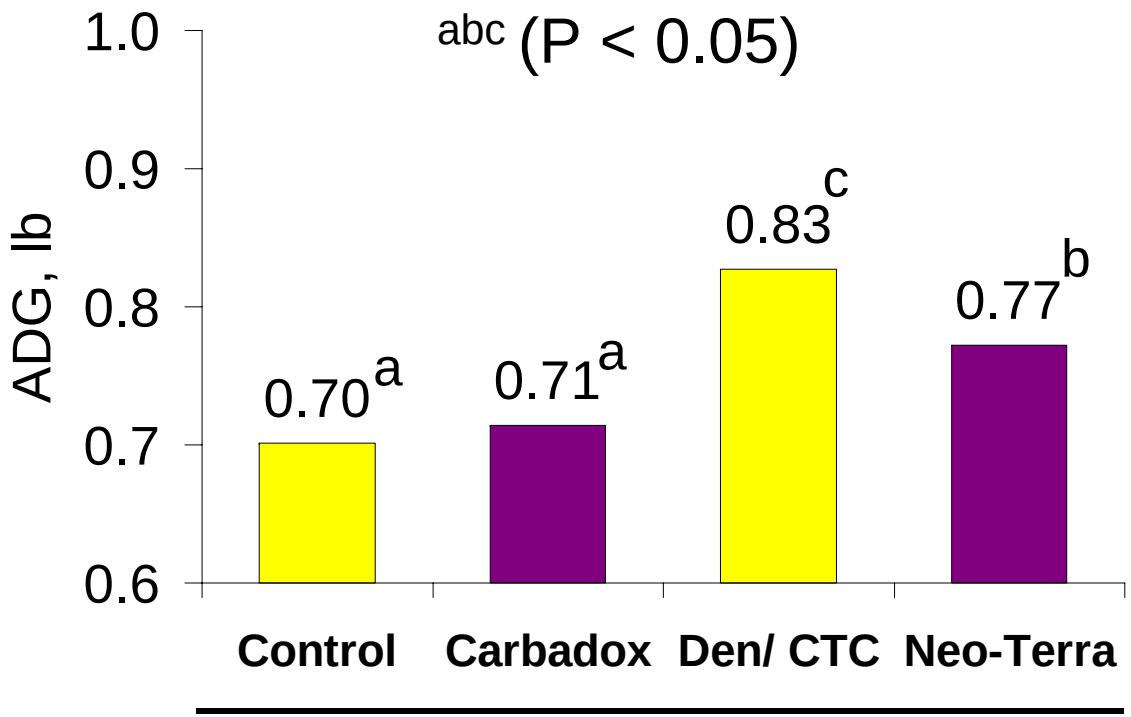
Influence of feed antimicrobials on growth rate

Commercial Farm

(d 0 to 31 after weaning)



Trial 1



Trial 2

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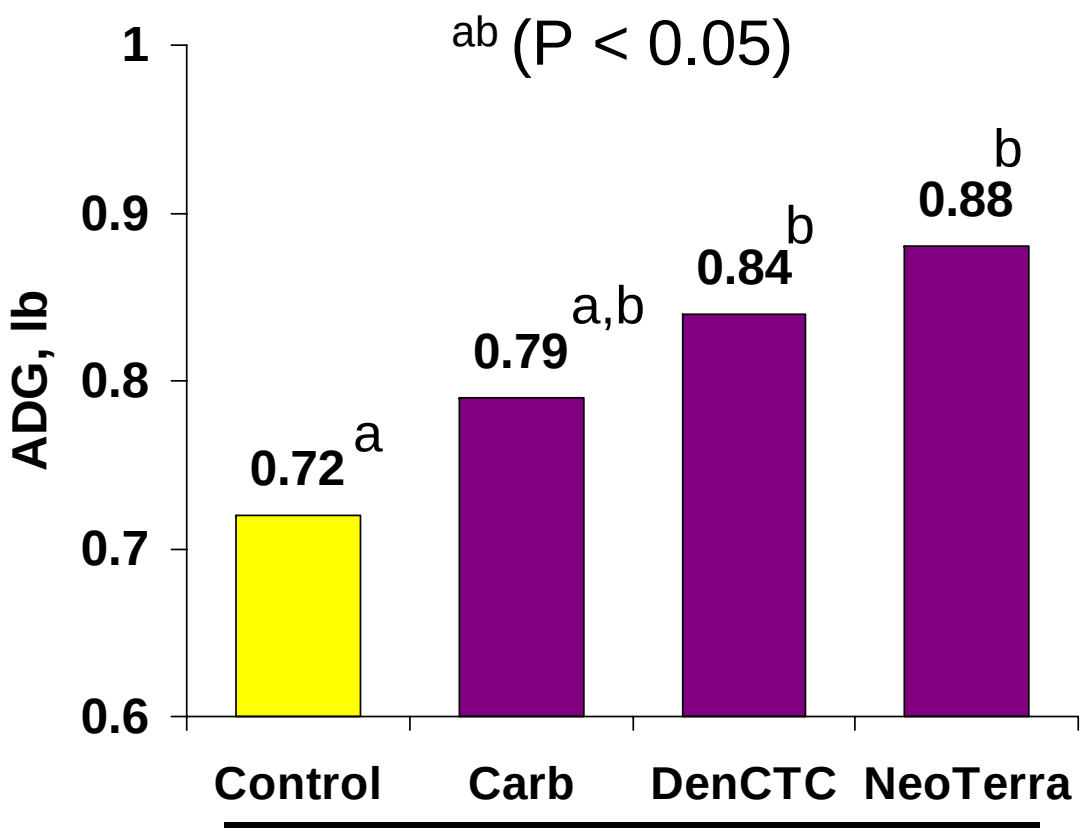
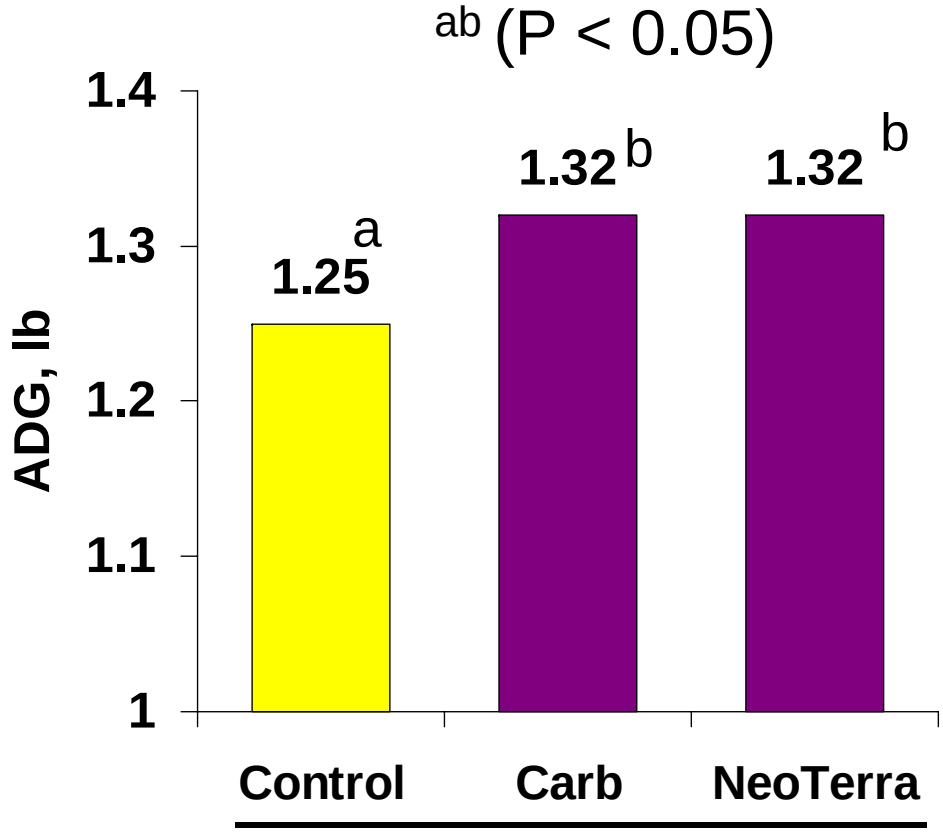
Keegan et al., 2005

Influence of feed antimicrobials on growth rate



KSU Swine Farm

d 0 to 28 after weaning



Commercial Farm 2

d 21 to 42 after weaning

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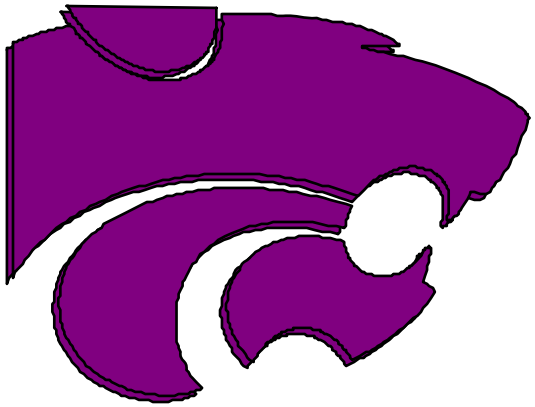
Antimicrobial Alternatives Tested in 2004

- Oregeno – Neill et al Poster
- BioSaf – Hilldabrand Poster
- KE-01 – Swine Day Report

- Little Response

Amino acid update



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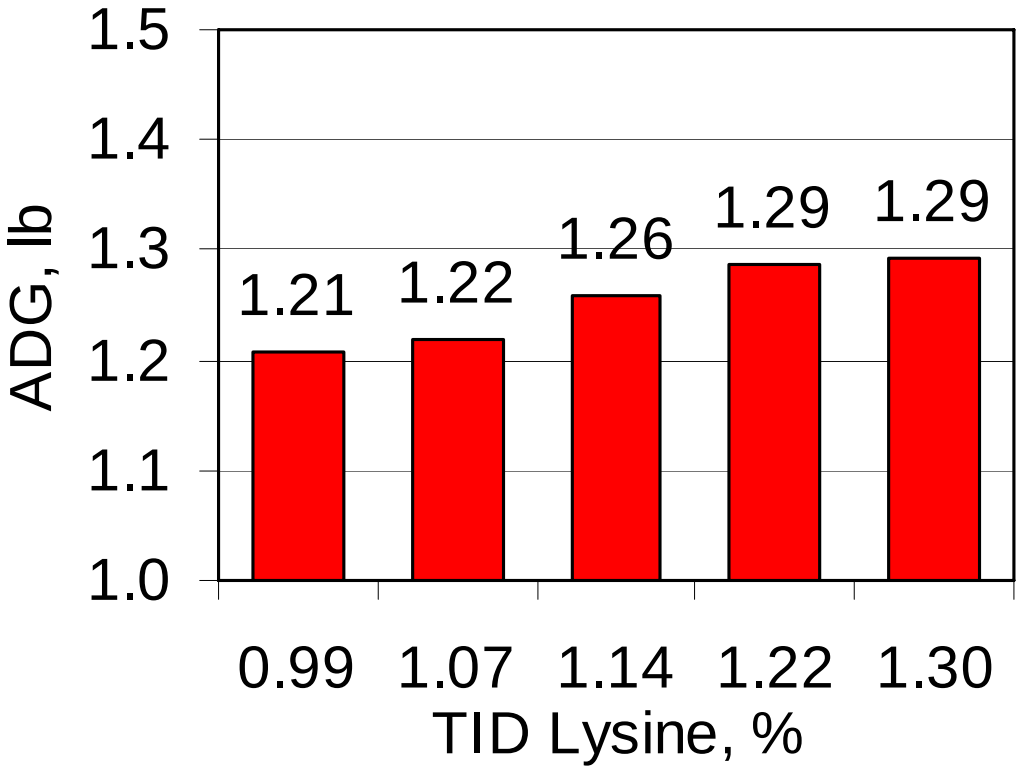
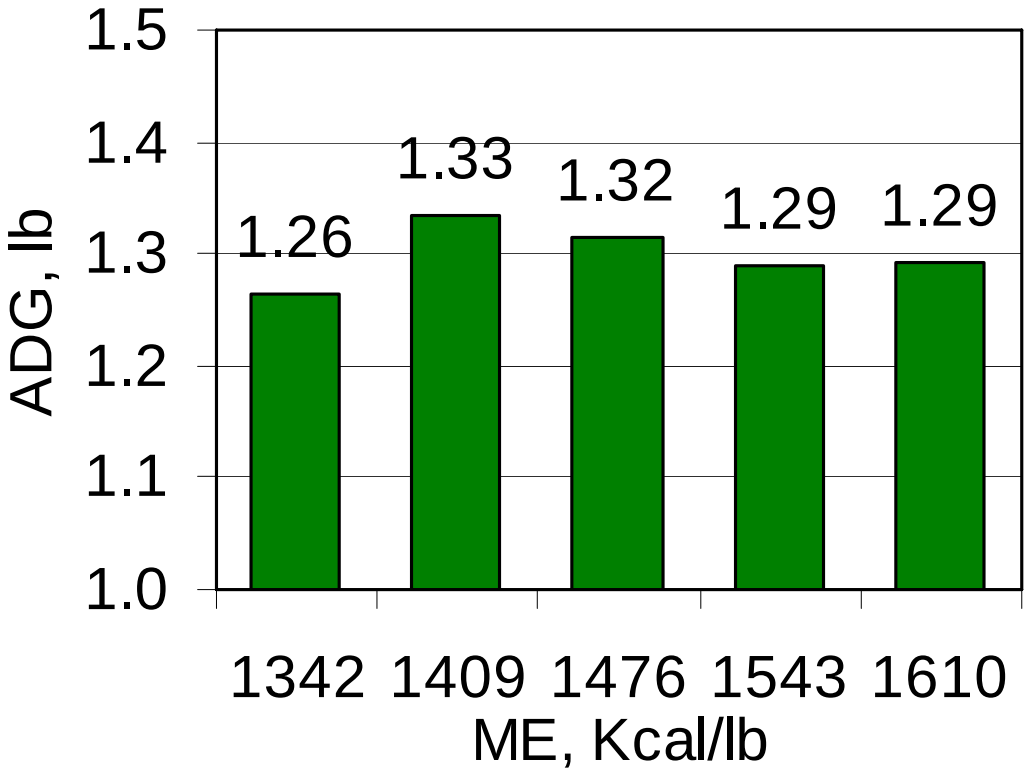
Influence of TID lysine and ME on ADG (Genetiporc pigs from 20 to 50 lb)





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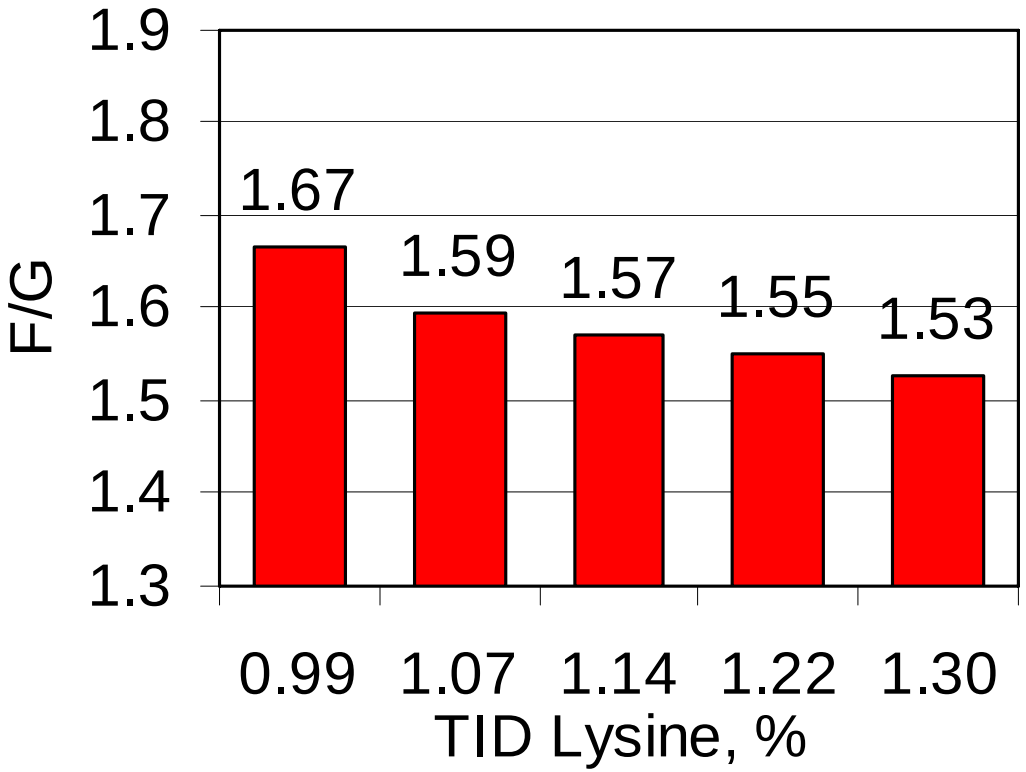
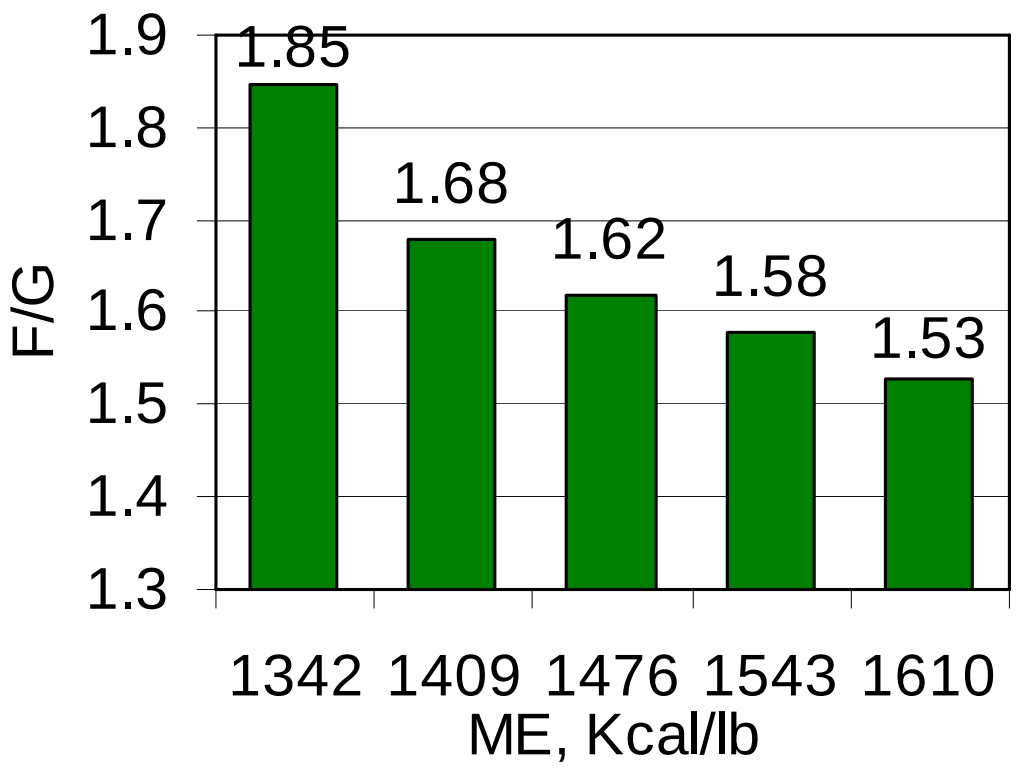
Schneider et al., 2004

Influence of TID lysine and ME on F/G (Genetiporc pigs from 20 to 50 lb)

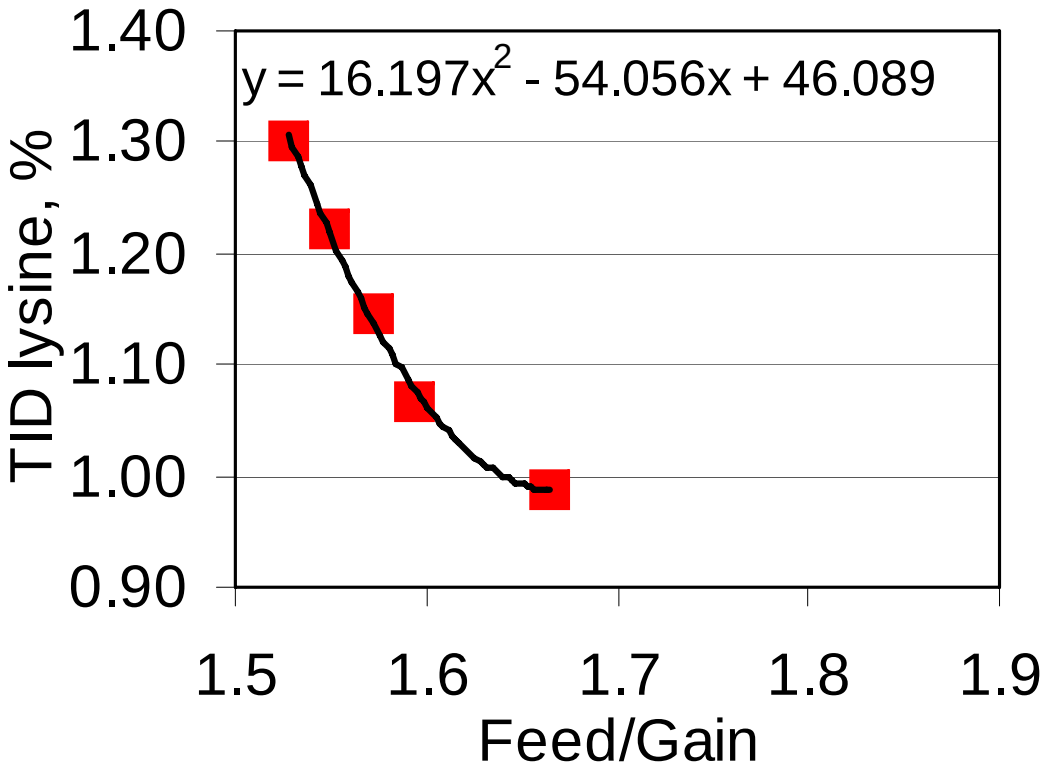


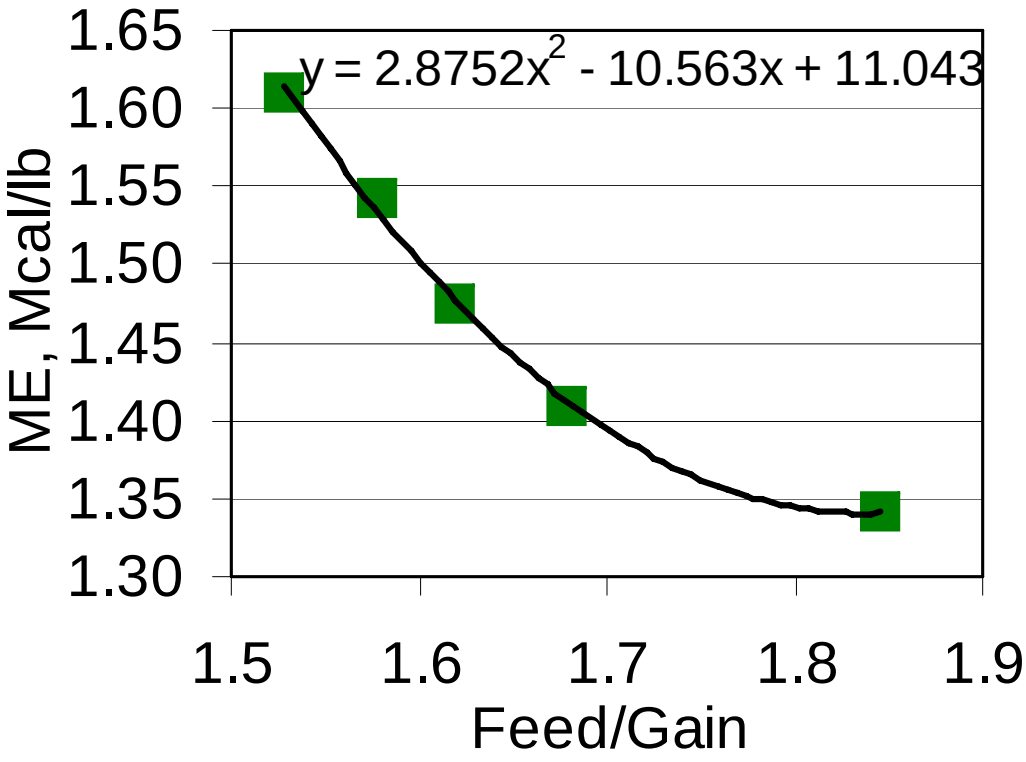


K-STATE

Schneider et al., 2004

Predicting TID lysine and ME from F/G (PIC pigs from 20 to 50 lb)





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Schneider et al., 2004

Predicting Lysine:ME ratio from F/G

Feed/gain	TID lysine, %	ME, Kcal/lb	Lysine:ME ratio
1.67	0.99	1421	3.15
1.63	1.01	1464	3.13
1.59	1.09	1517	3.25
1.55	1.22	1578	3.49
1.53	1.30	1612	3.65

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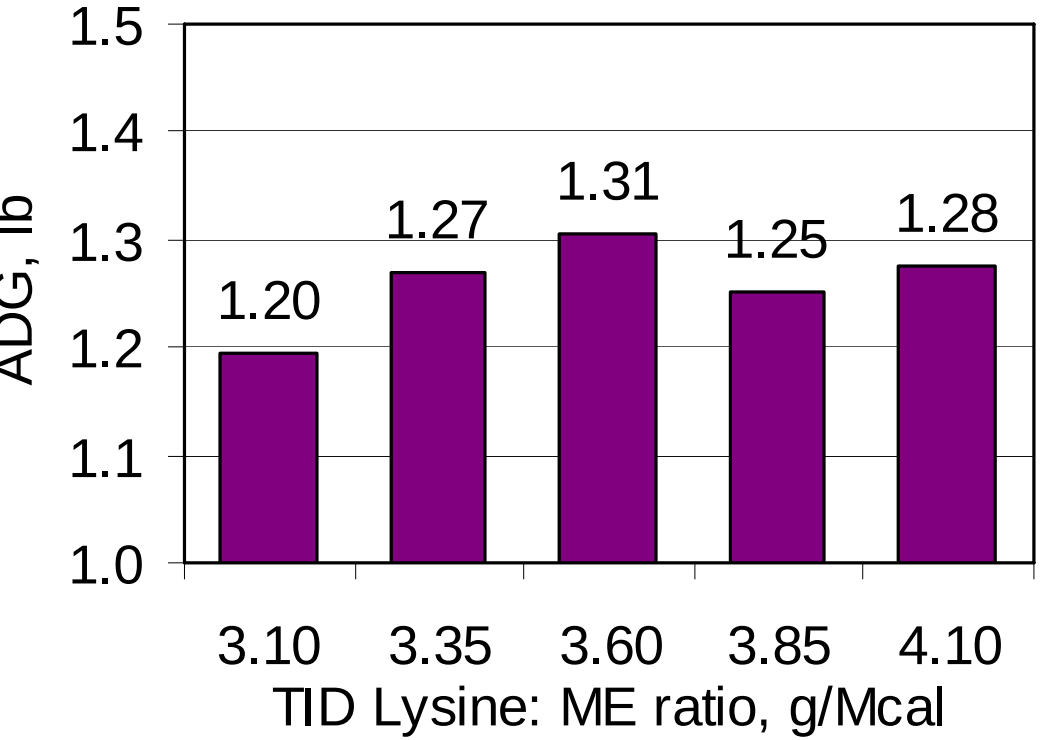
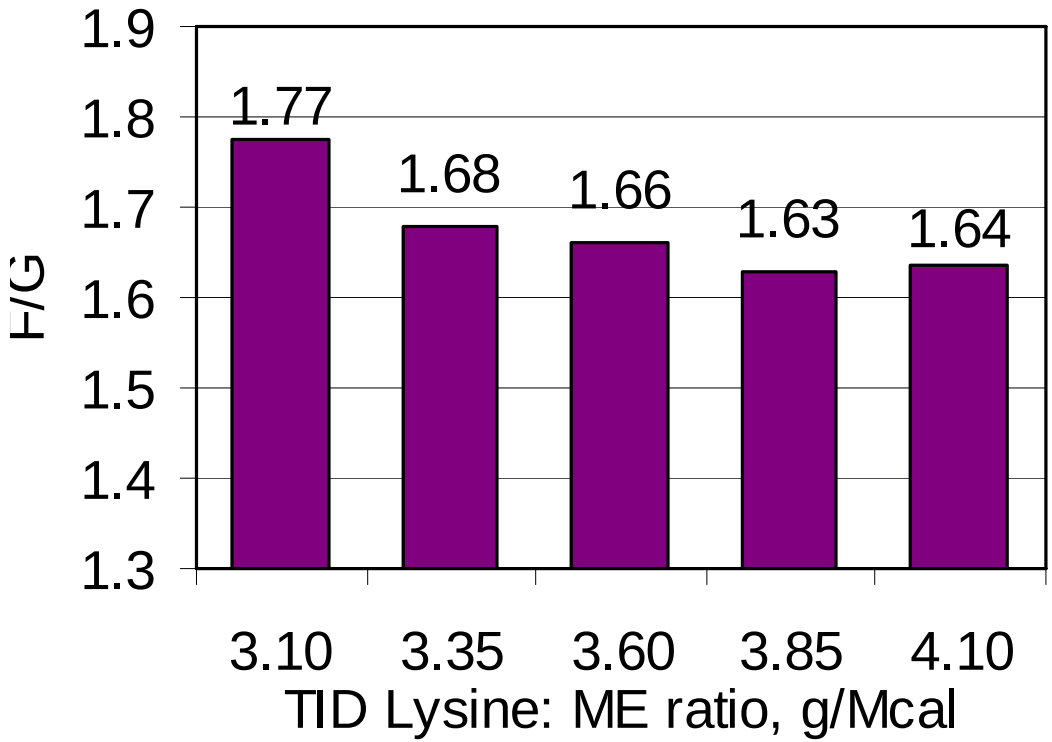
Schneider et al., 2004

Optimal TID Lysine:ME ratio (Genetiporc pigs from 20 to 50 lb)





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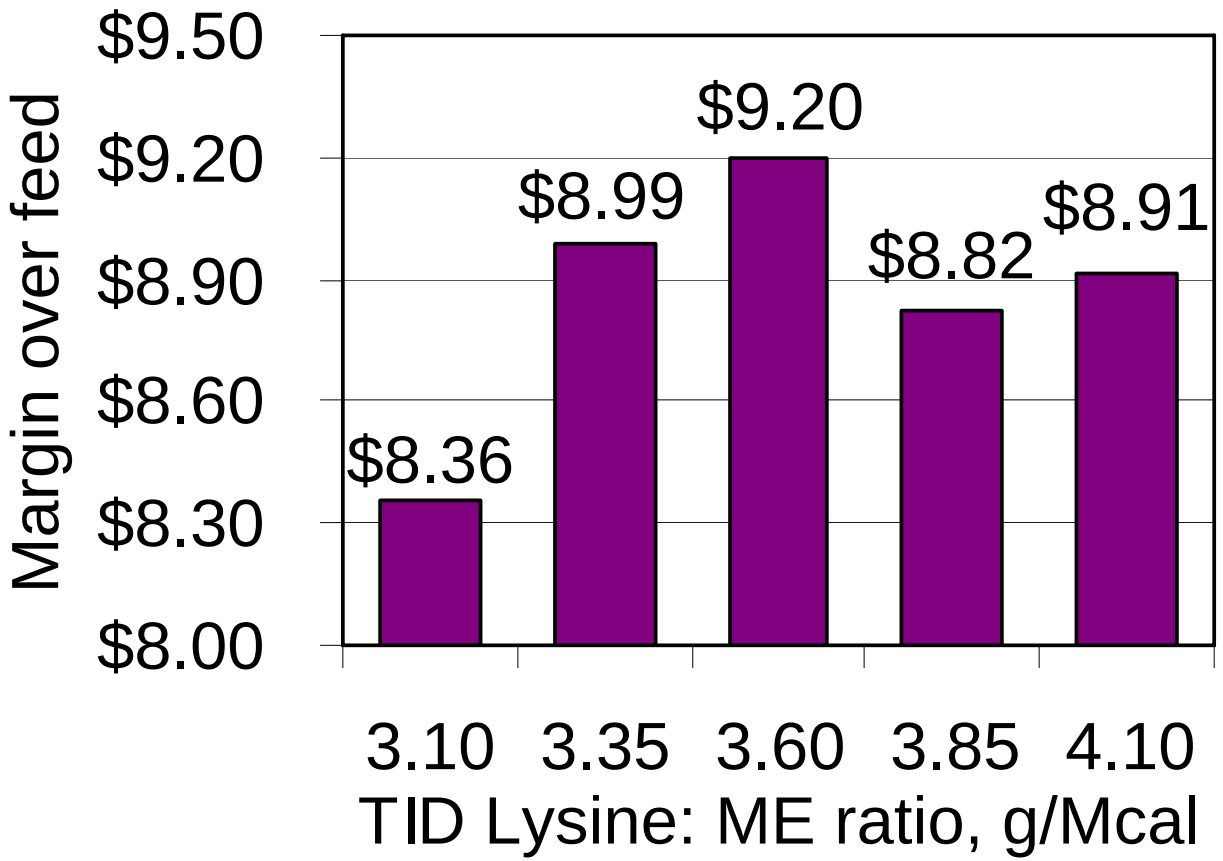
Schneider et al., 2004

Optimal TID Lysine:ME ratio (Genetiporc pigs from 20 to 50 lb)



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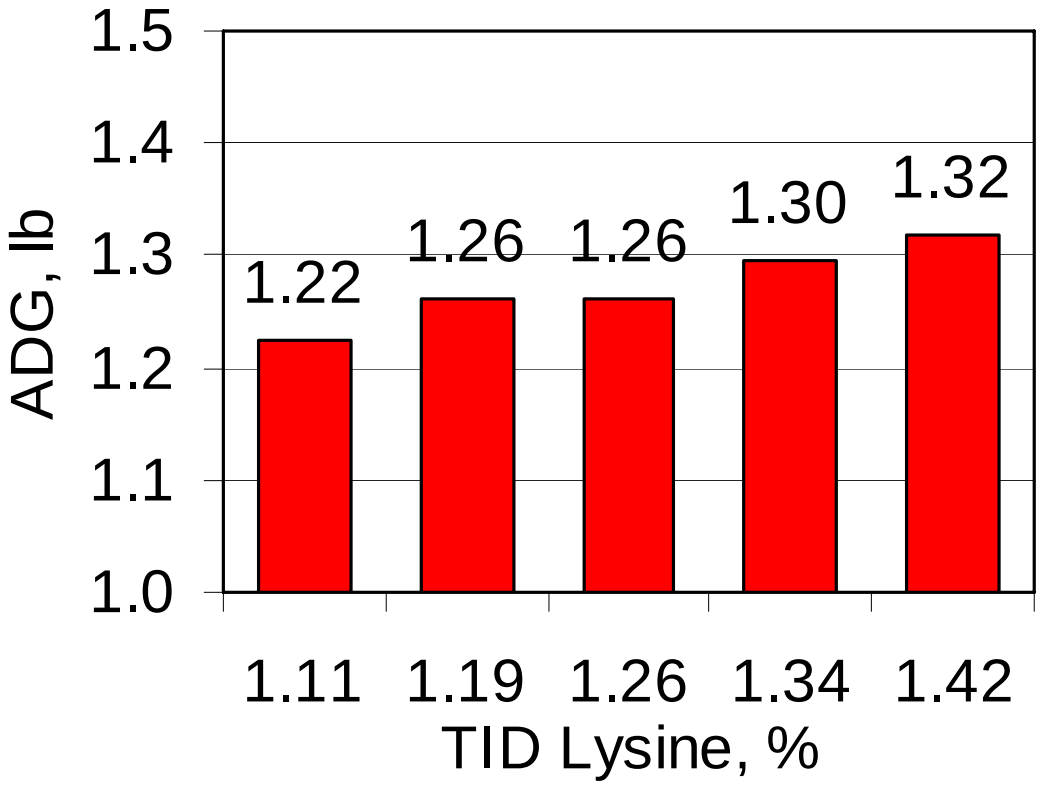
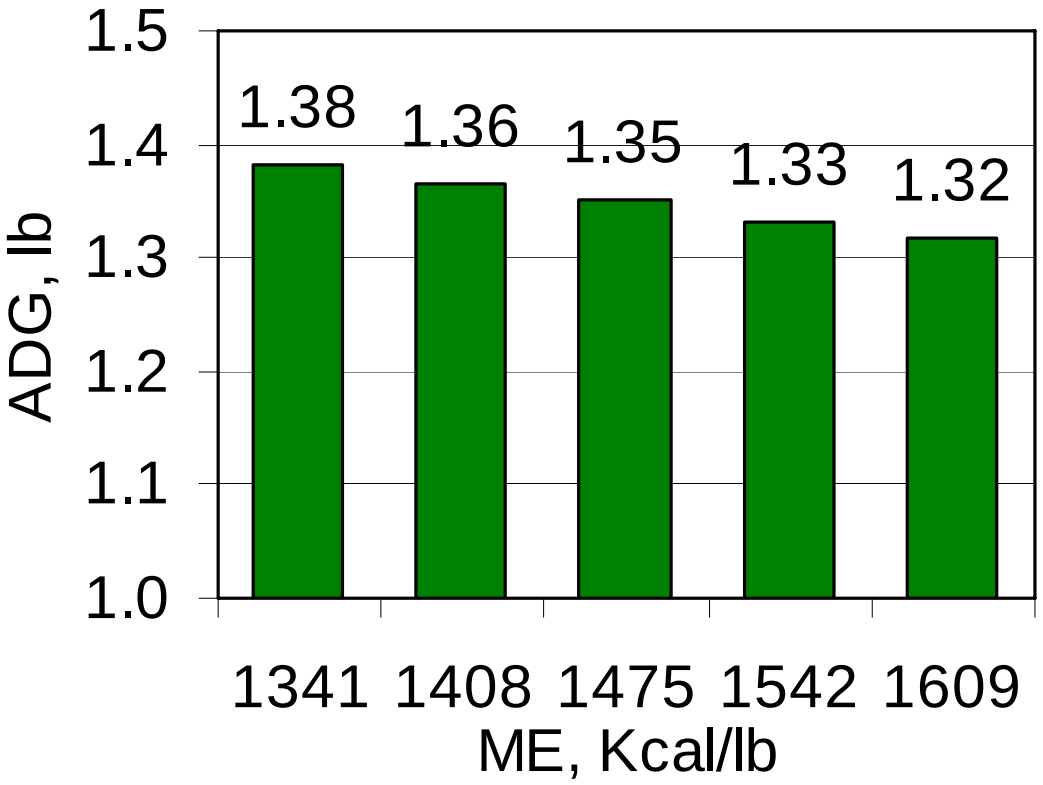
Schneider et al., 2004

Influence of TID lysine and ME on ADG (PIC pigs from 20 to 50 lb)





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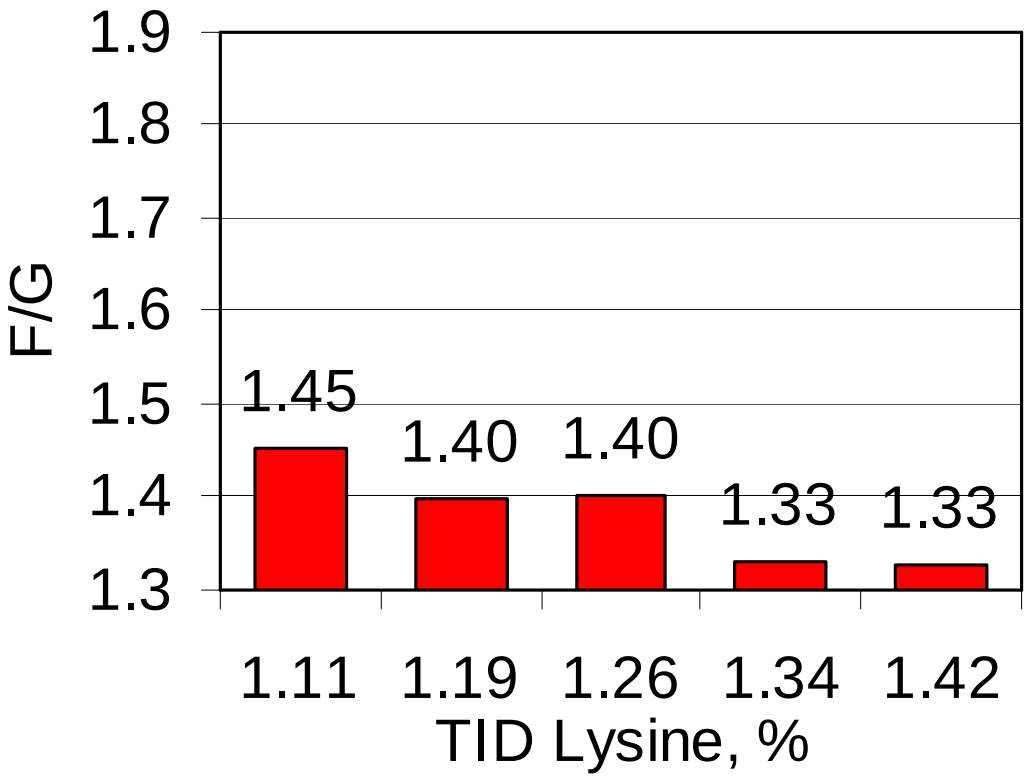
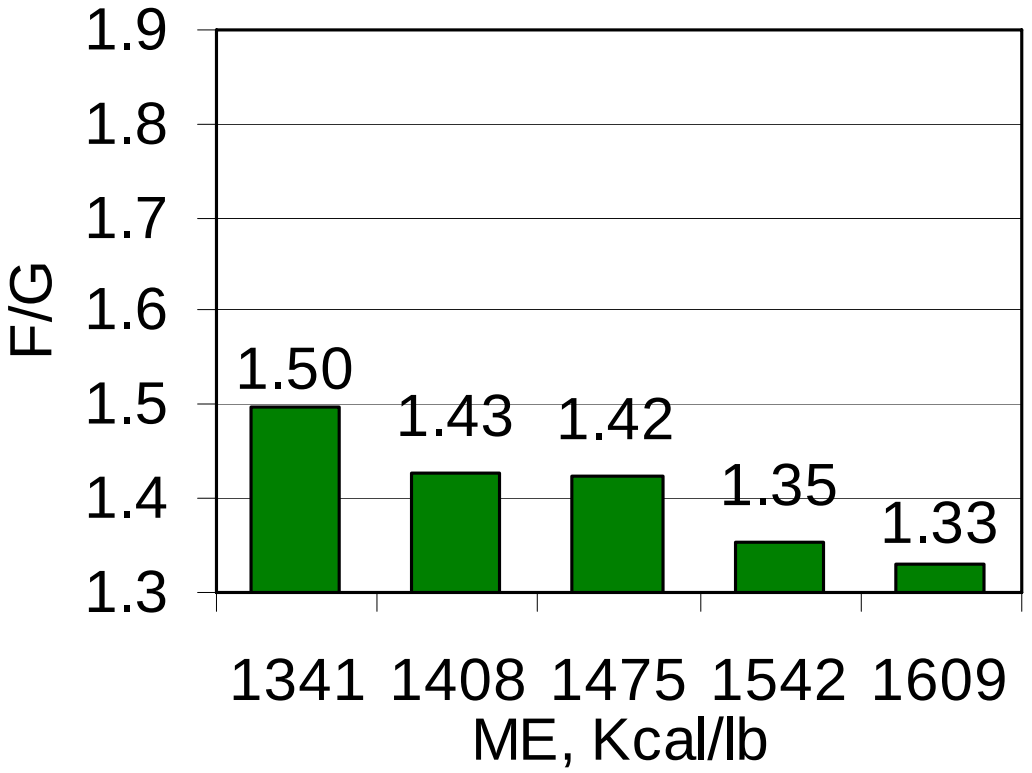
Schneider et al., 2005

Influence of TID lysine and ME on F/G (PIC pigs from 20 to 50 lb)





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Schneider et al., 2005

Predicting Lysine:ME ratio from F/G

Feed/gain	TID lysine, %	ME, Kcal/lb	Lysine:ME ratio
1.45	1.11	1402	3.61
1.41	1.20	1461	3.73
1.37	1.29	1527	3.84
1.33	1.38	1599	3.92

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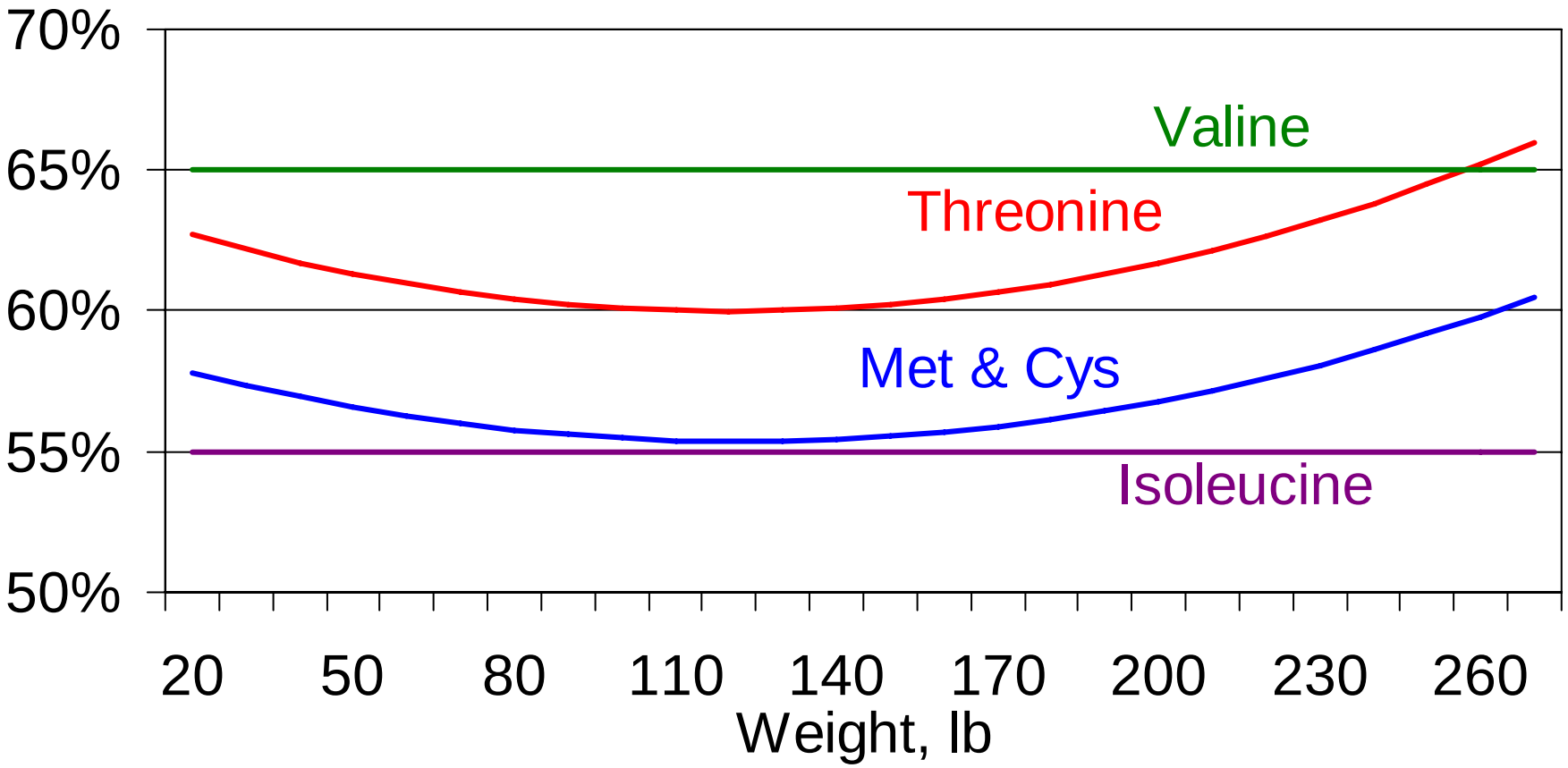
Schneider et al., 2005

Amino acid ratios relative to lysine
- TID basis -



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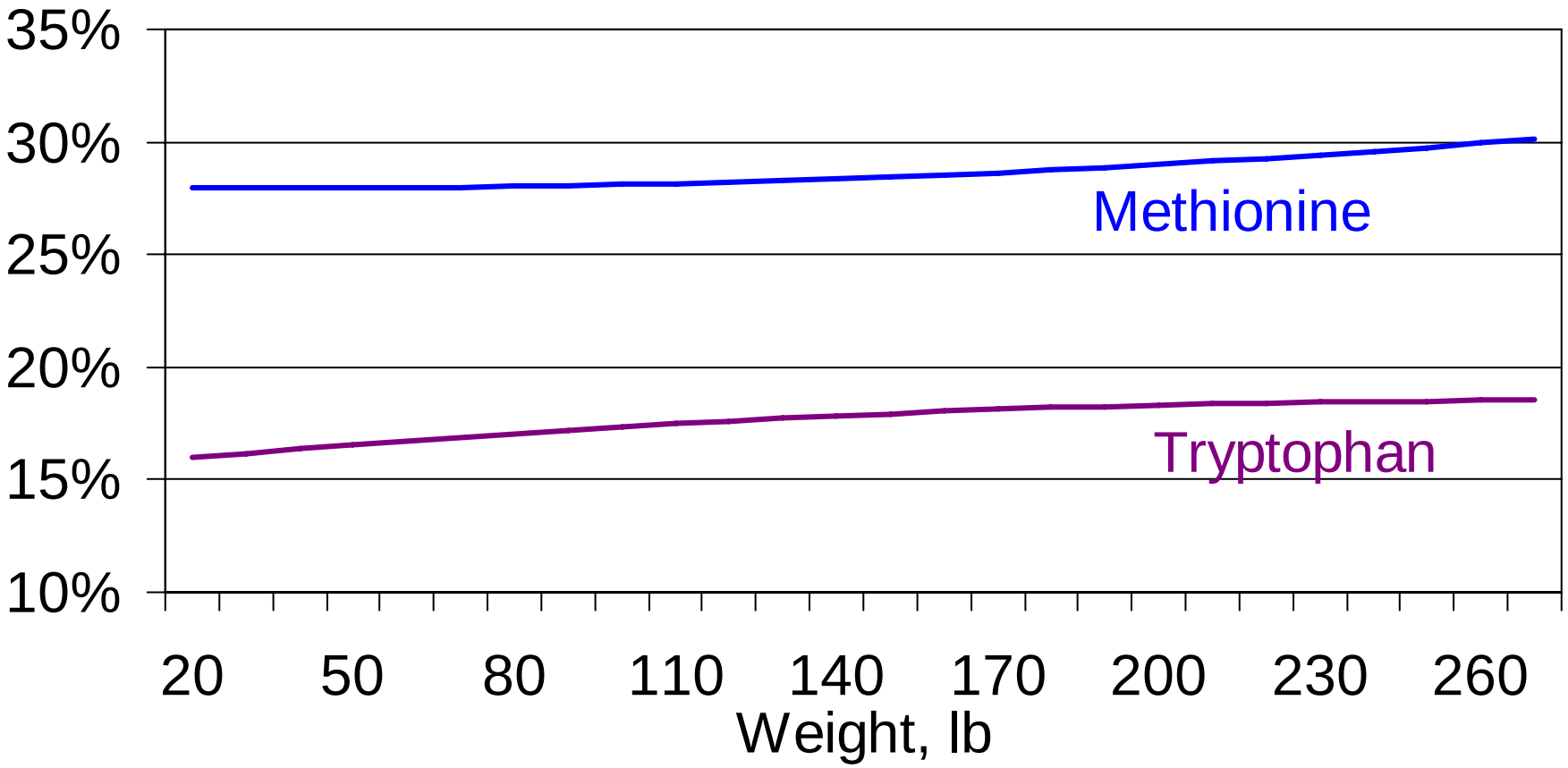
Amino acid ratios relative to lysine
- TID basis -



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Regression equations to predict TID amino acid:lysine ratios

Threonine = 0.00000268*wt^2 - 0.000645*wt + 0.6387

Met & Cys= 0.00000234*wt^2 - 0.000572*wt + 0.5885

Methionine = 0.00000042*wt^2 - 0.000037*wt + 0.2806

Tryptophan = -0.00000041*wt^2 + 0.00022*wt + 0.1556

Valine = 65.0%

Isoleucine = 55%

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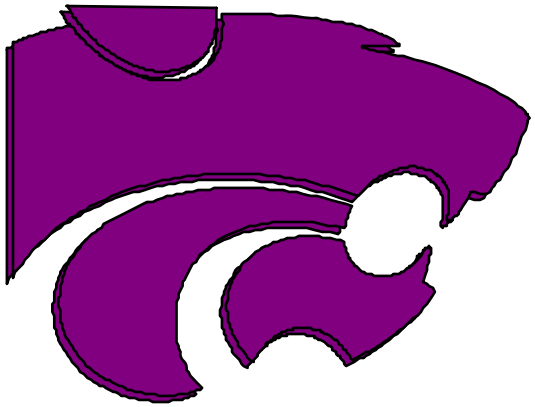
Paylean and fat update



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Effect of sorting and added fat level on performance of grow-finish pigs reared a commercial facility

- A total of 1,032 pigs were individually weighed and fitted with electronic ear tags
- 2 x 3 factorials
  - Three weight groups
    - Light (59 lb)
    - Heavy (77 lb)
    - Mixed (68 lb)
  - Two fat levels
    - 0 or 6% Choice white grease

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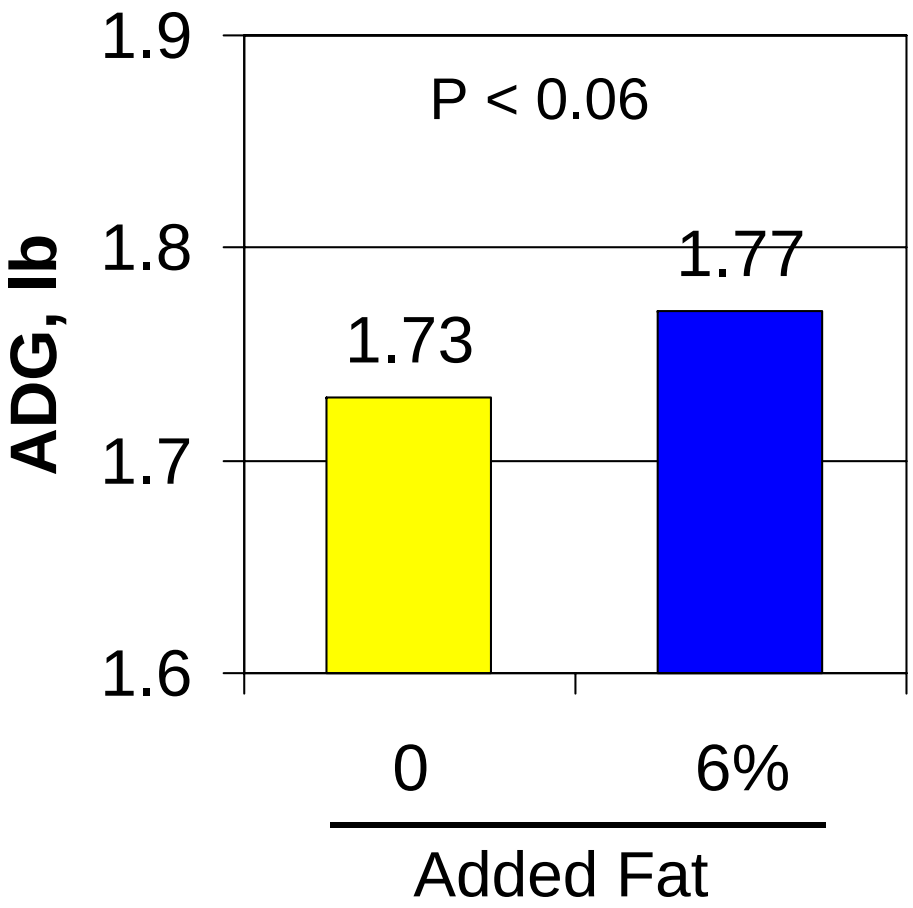
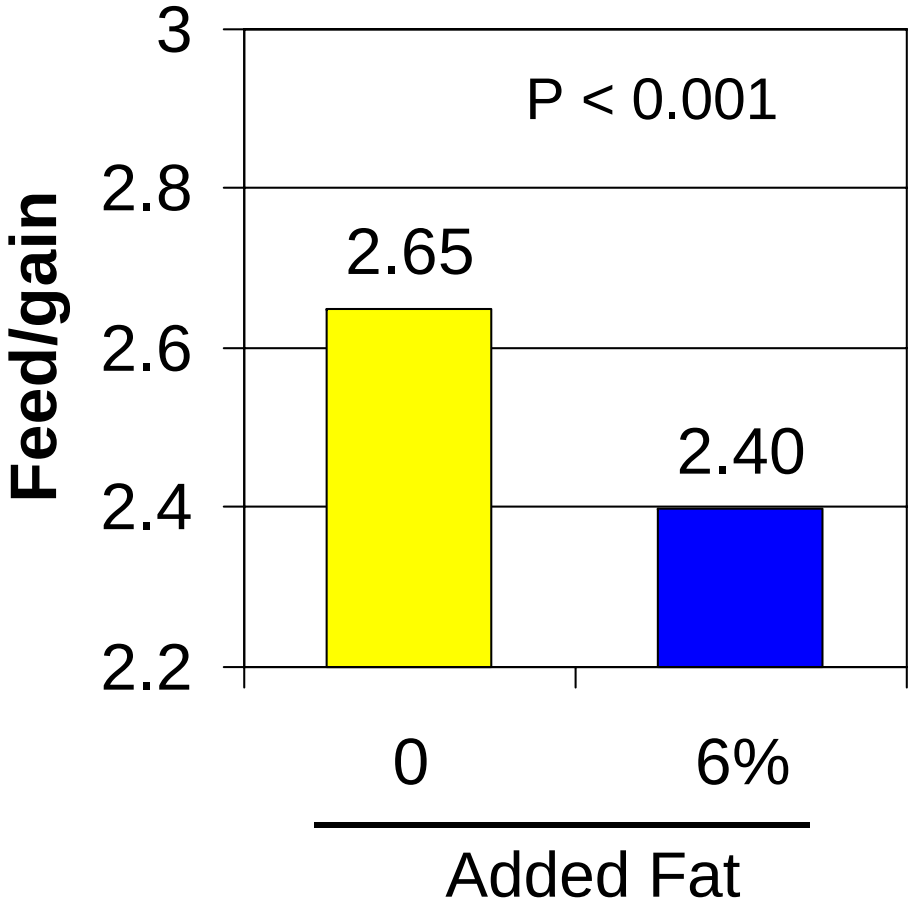
Influence of fat level on performance d 0 to 109





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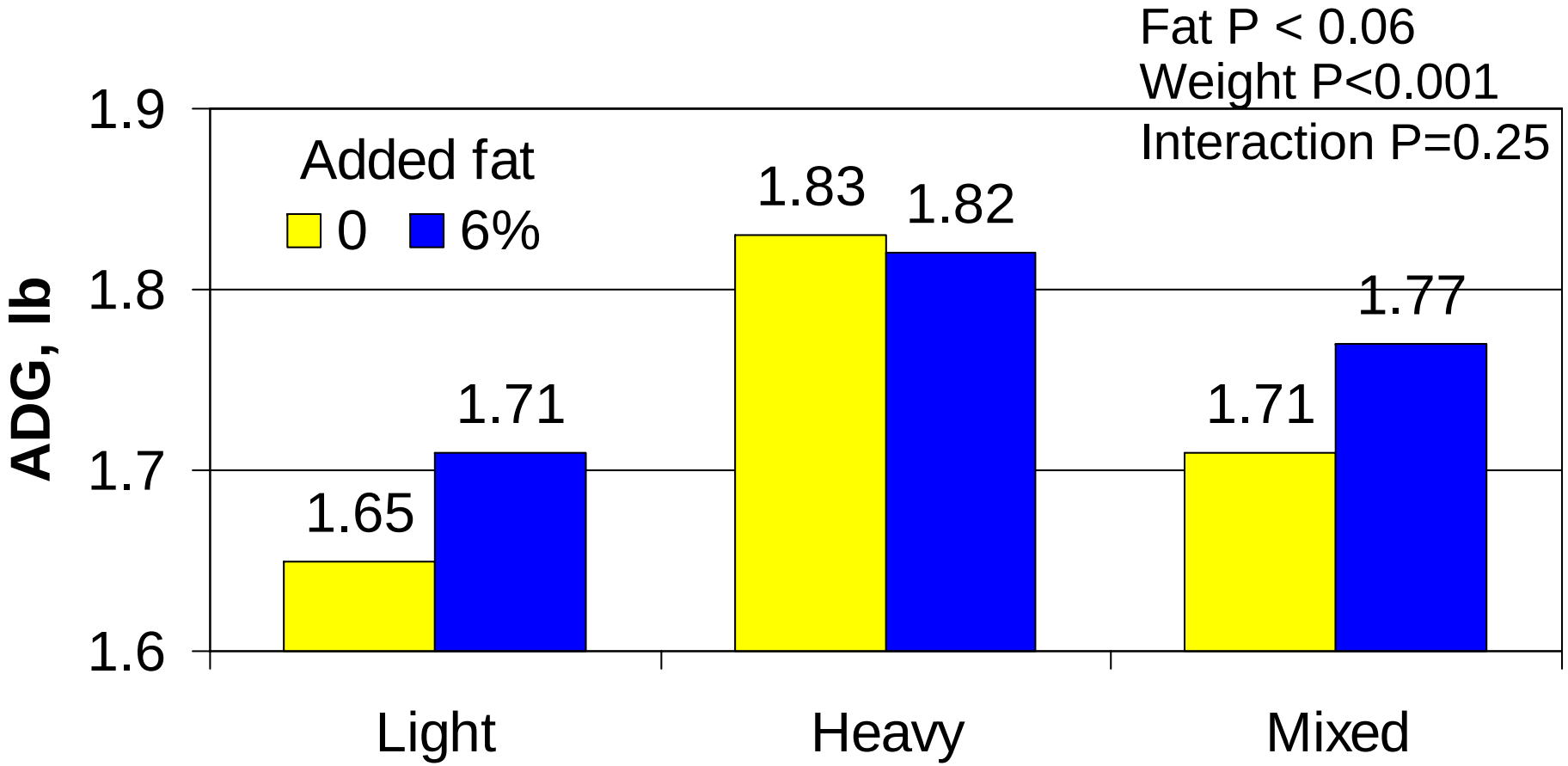
Influence of fat level on performance d 0 to 109



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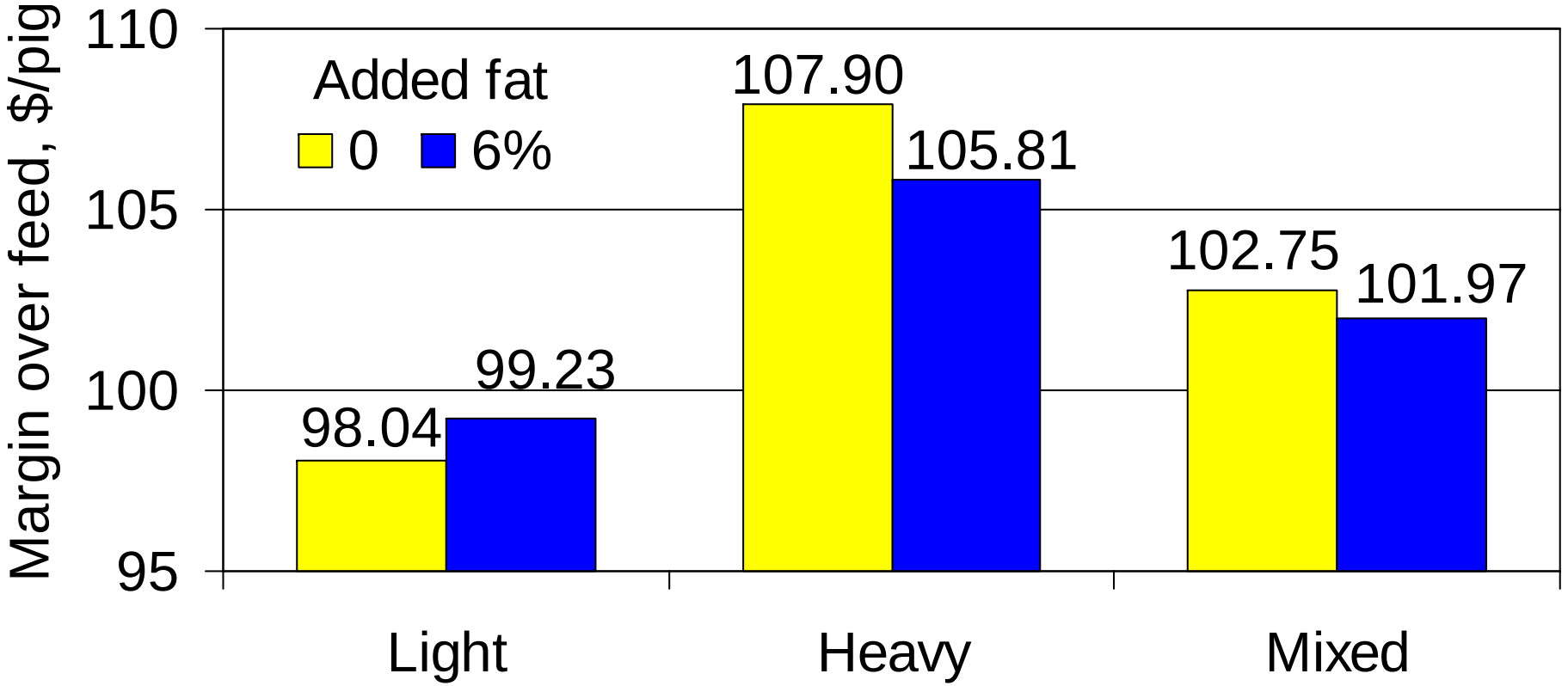
Influence of fat level on economic return d 0 to 109



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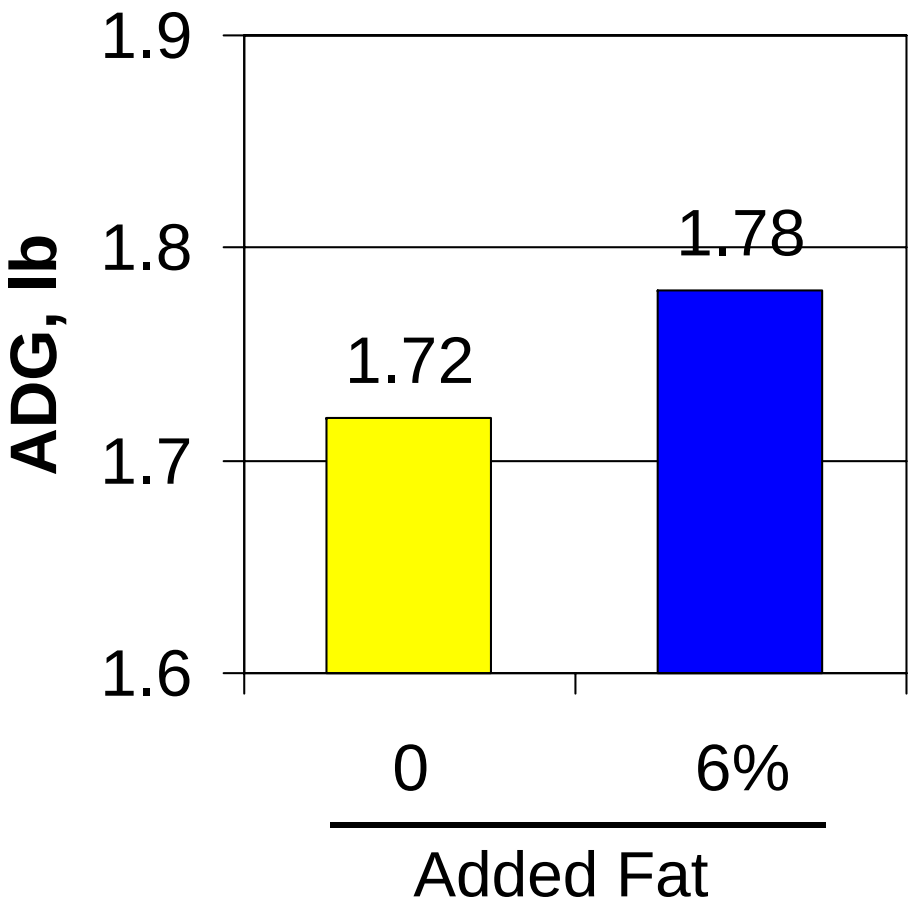
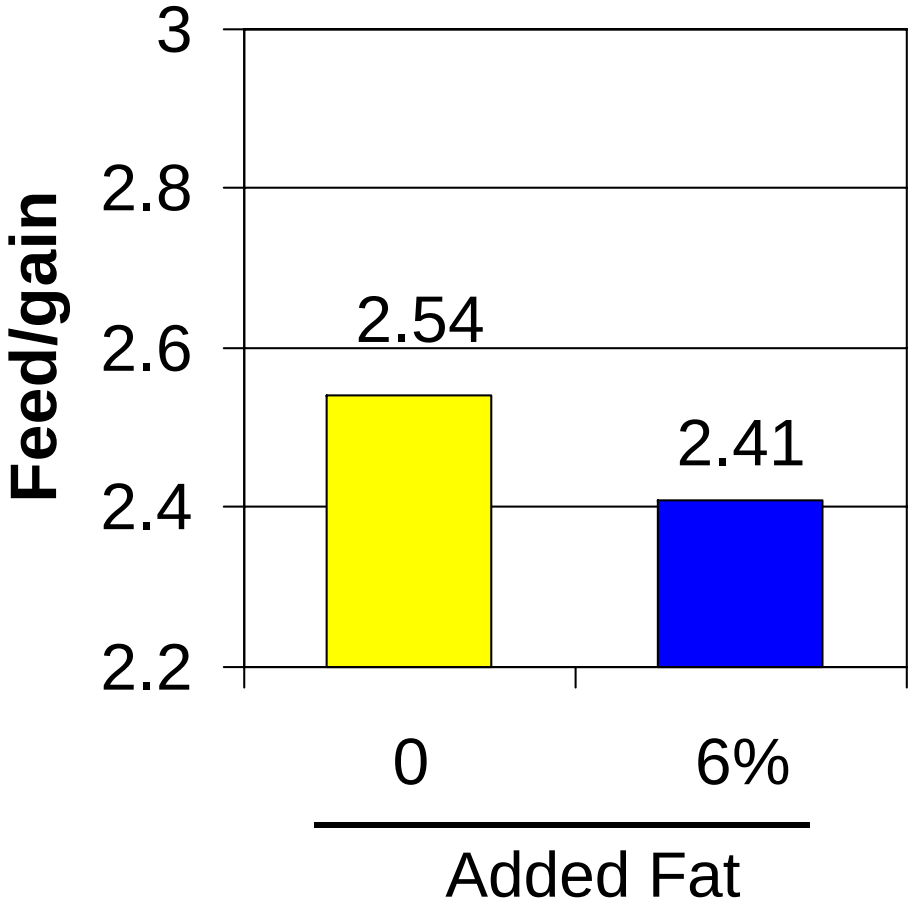
Fat x variation summary

- Light pigs have a greater economic benefit from fat.
- Additional research is being conducted to verify this response.

Influence of fat level on performance from 144 to 180 lb





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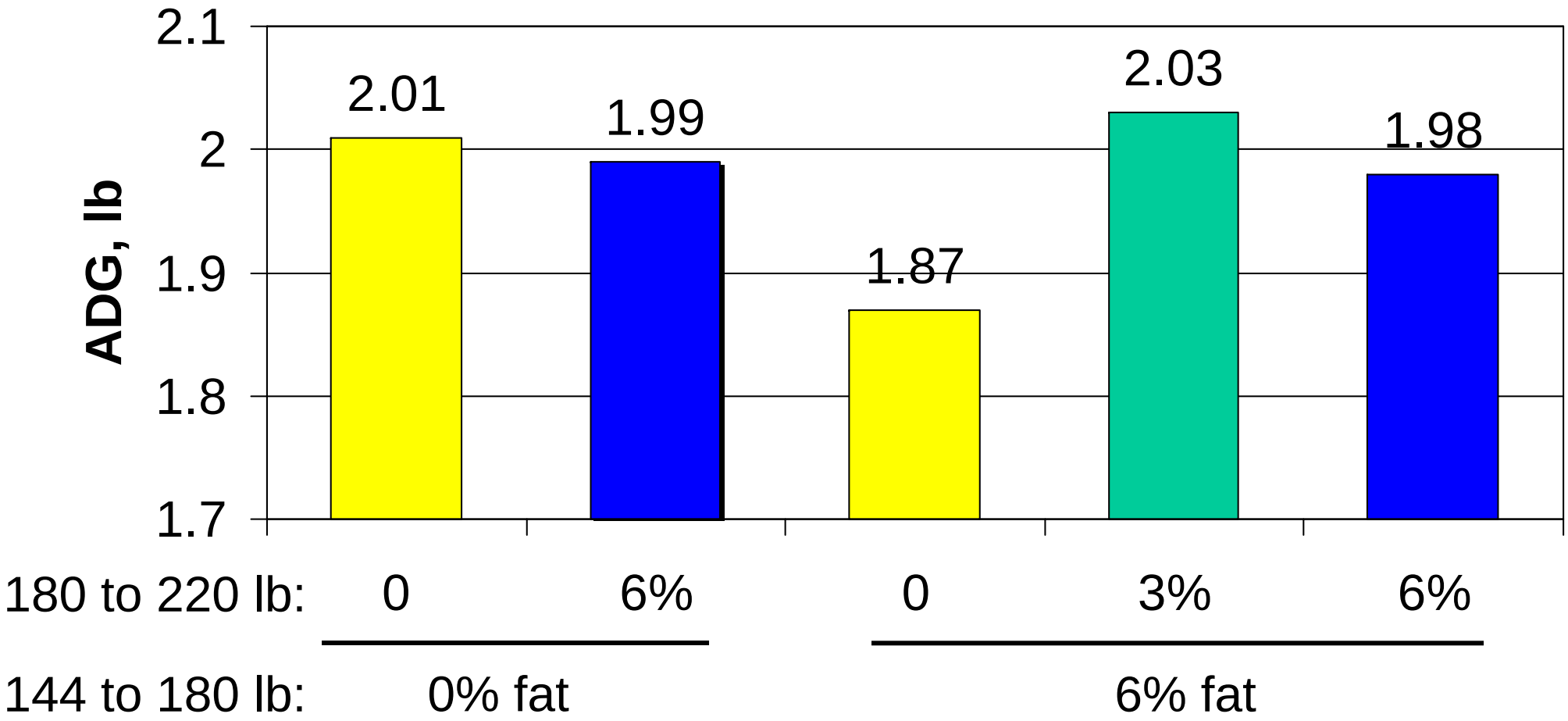
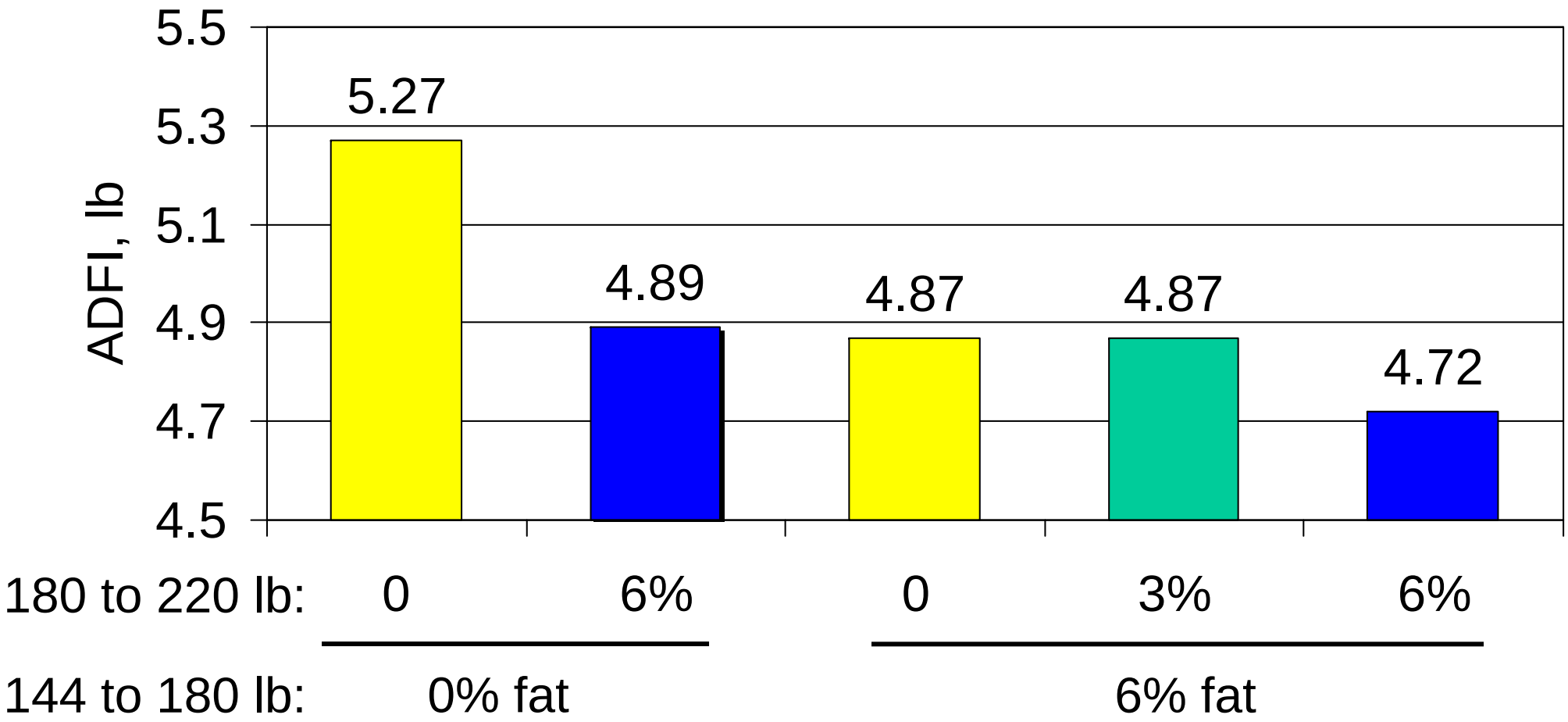
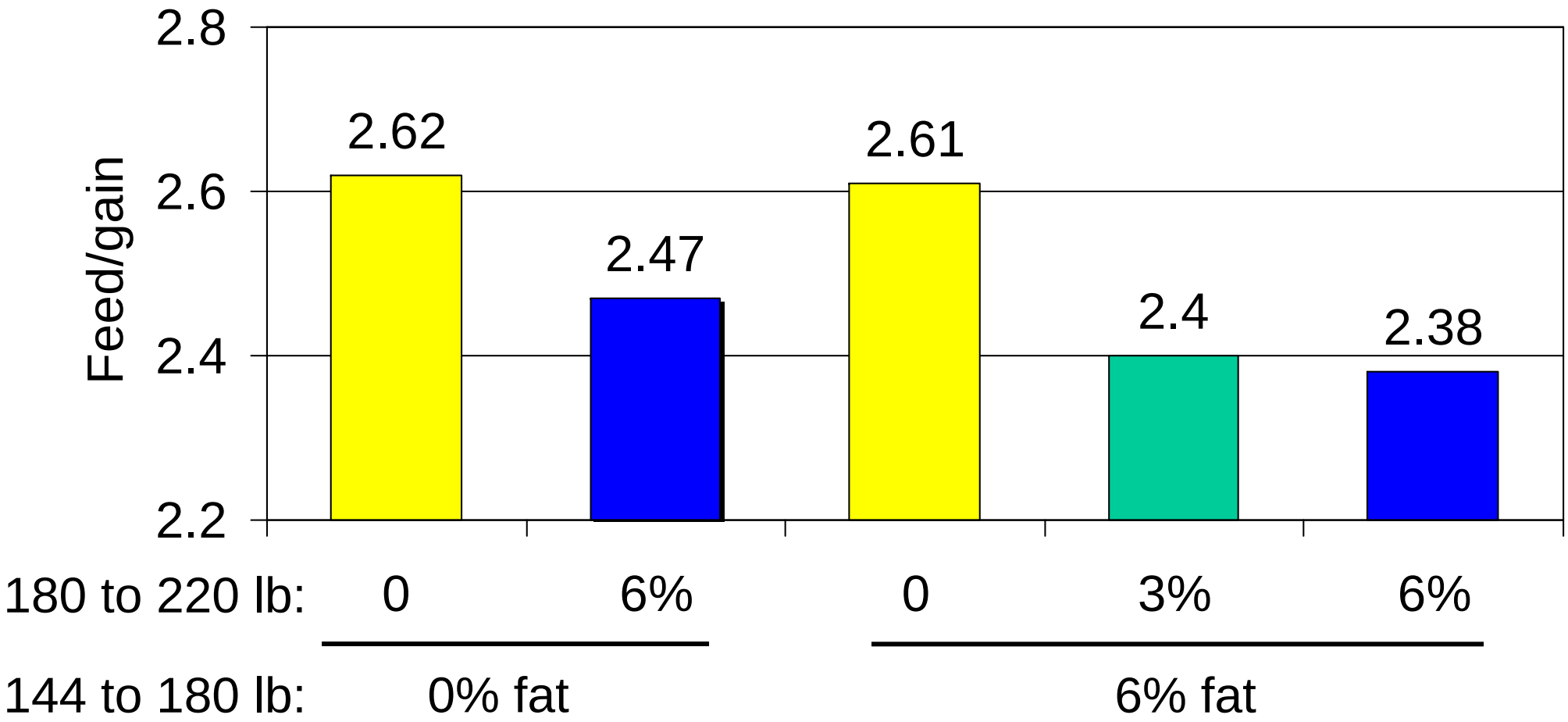
Influence of fat level on performance from 180 to 220 lb



Influence of fat level on performance from 180 to 220 lb



Influence of fat level on performance from 180 to 220 lb



Paylean withdrawal experiment

Days on experiment	A	B	C	D
0 to 21	Control	Paylean	Paylean	Control
21 to 35	Control	Control	Control	Control
35 to 56	Control	Control	Paylean	Paylean

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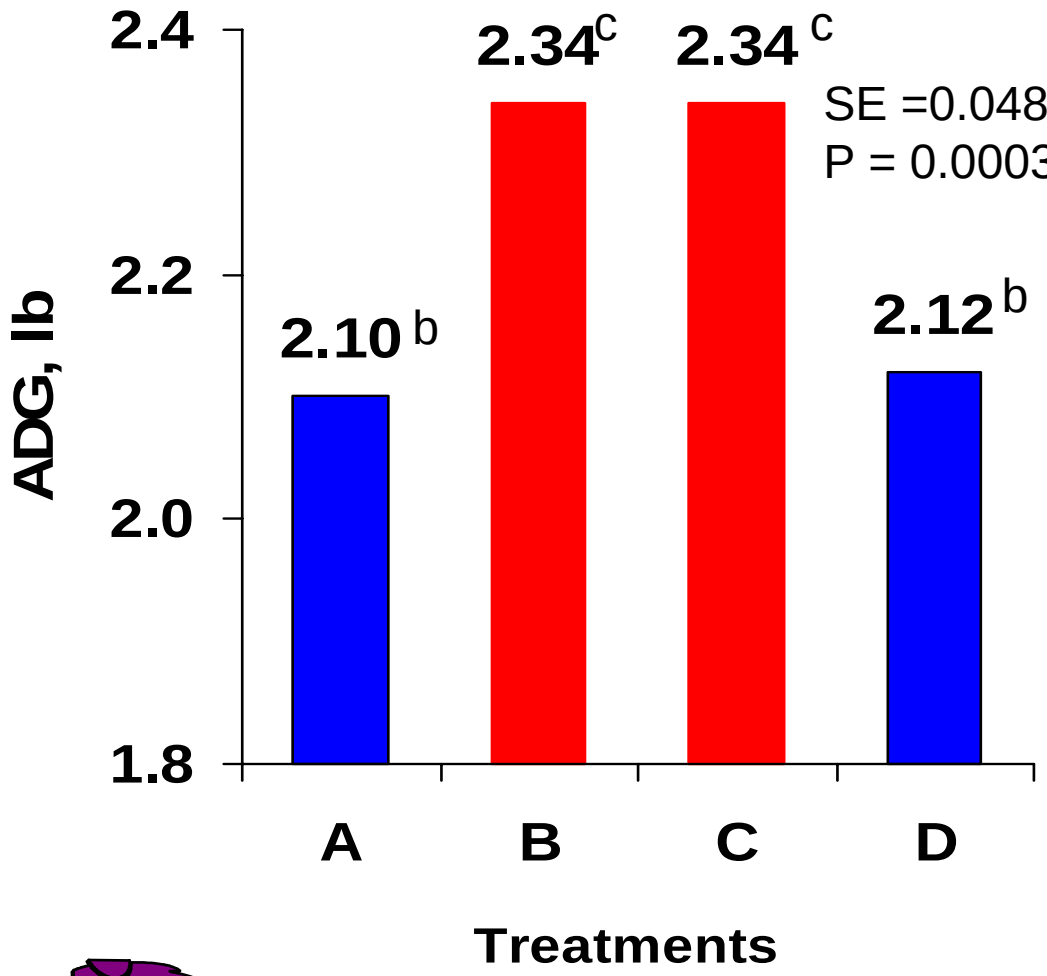
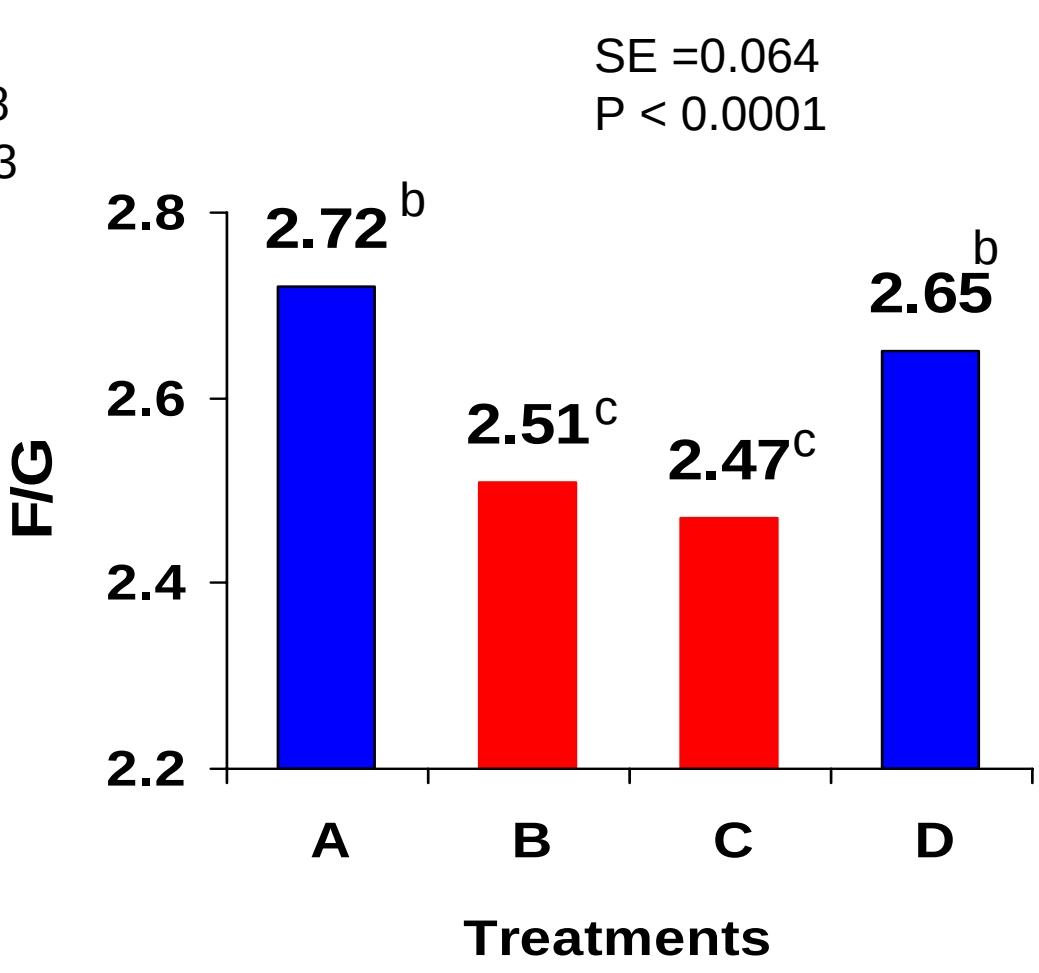
Effects of Paylean from d 0 to 21





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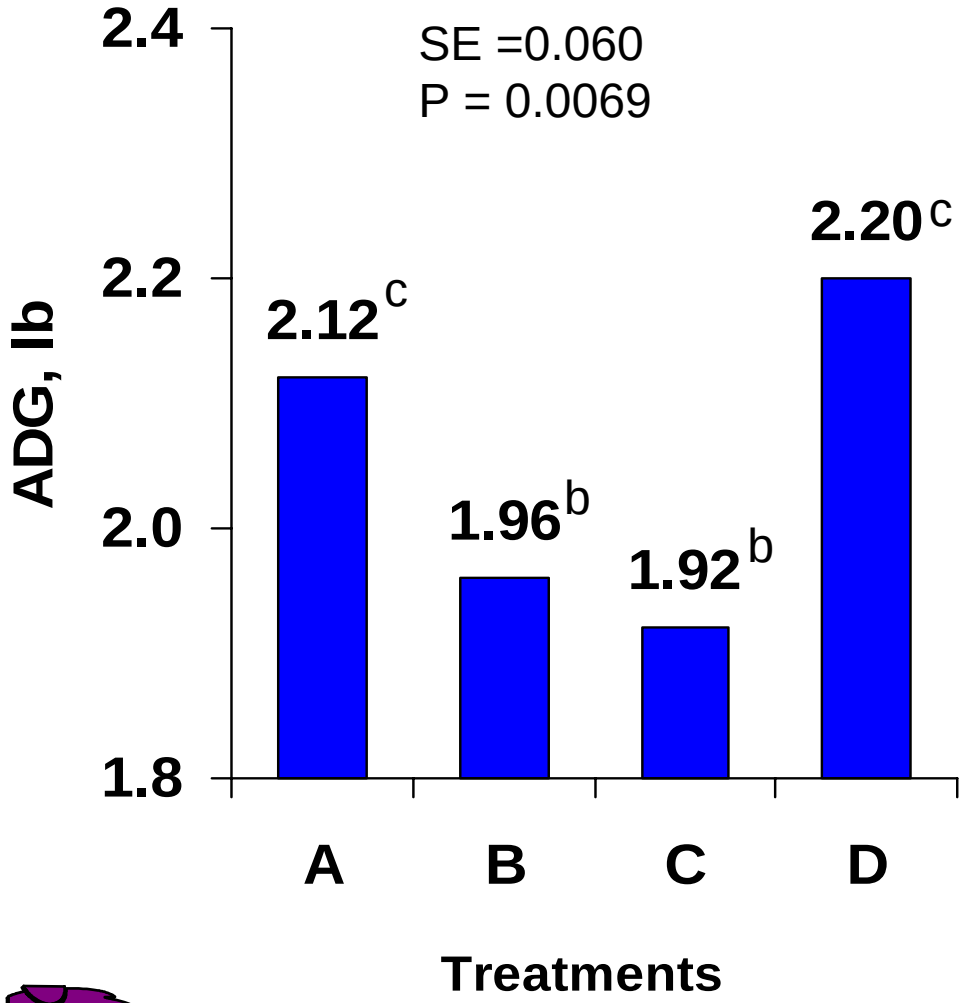
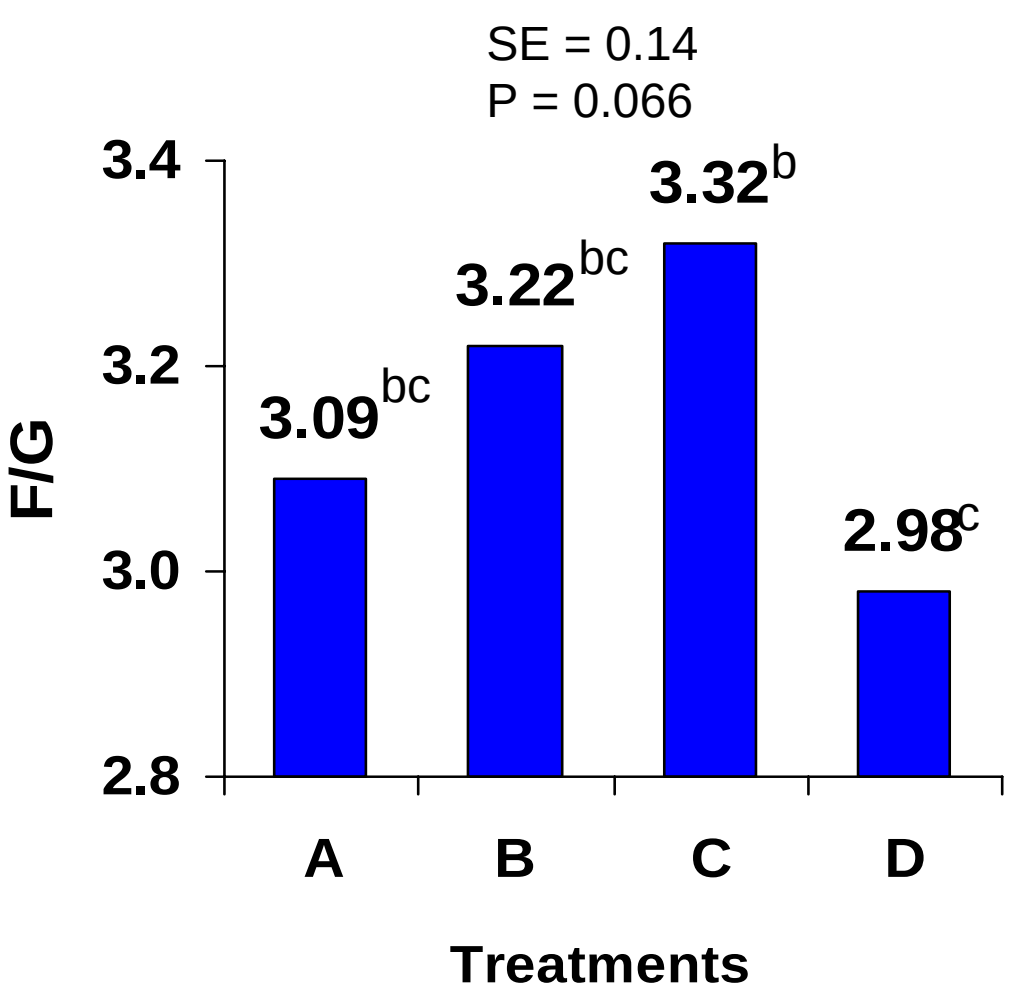
All treatments fed control from d 21 to 35





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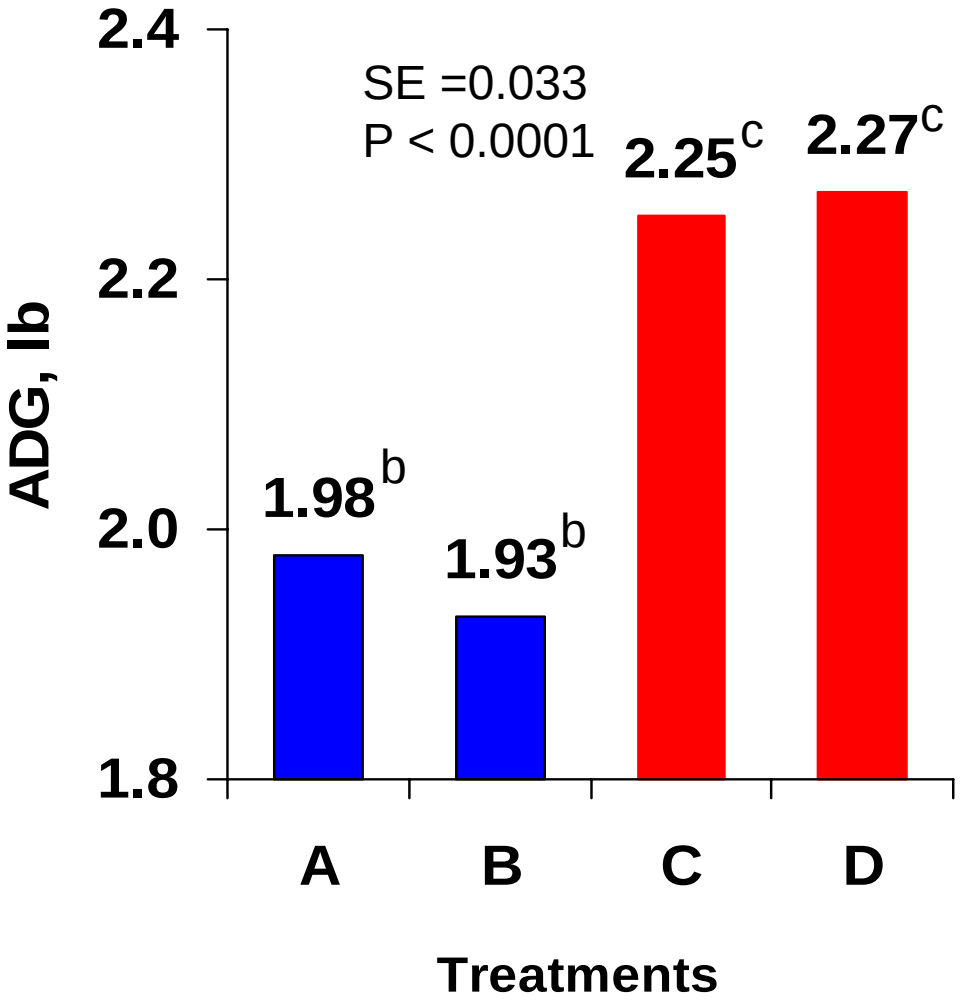
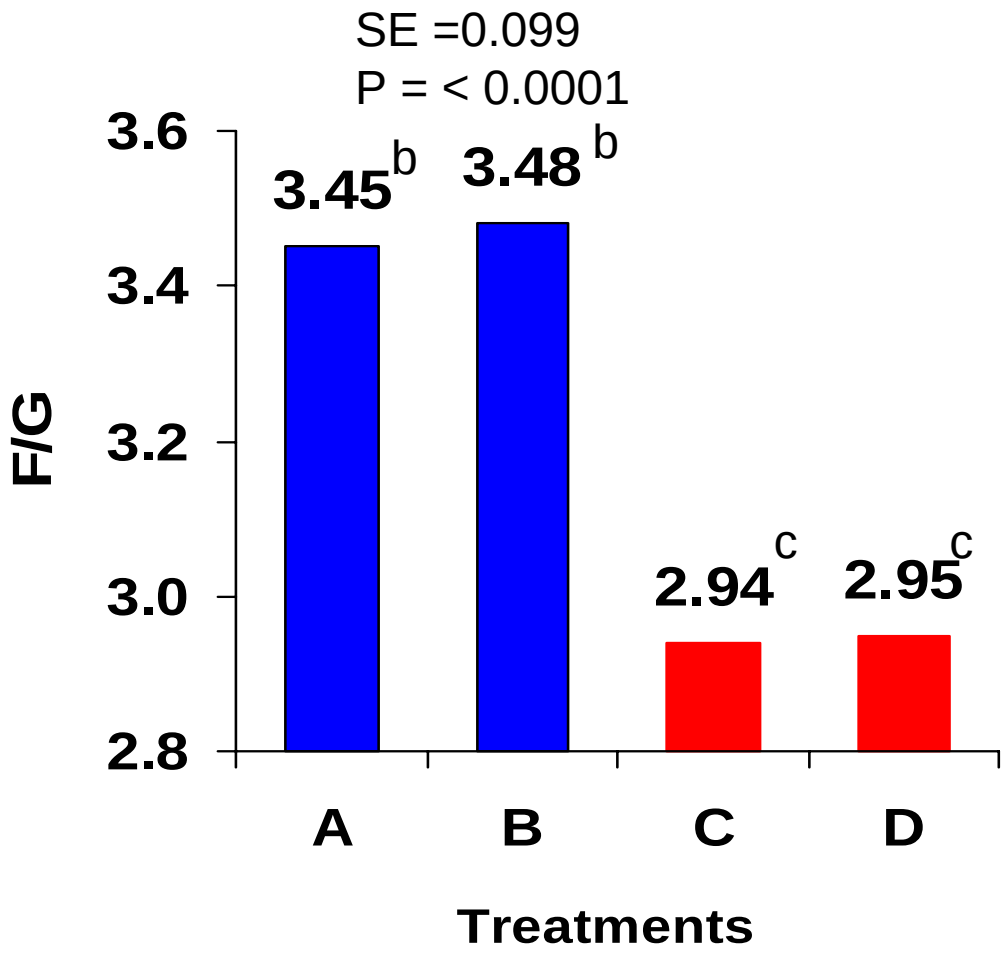
Effects of Paylean from d 35 to 56





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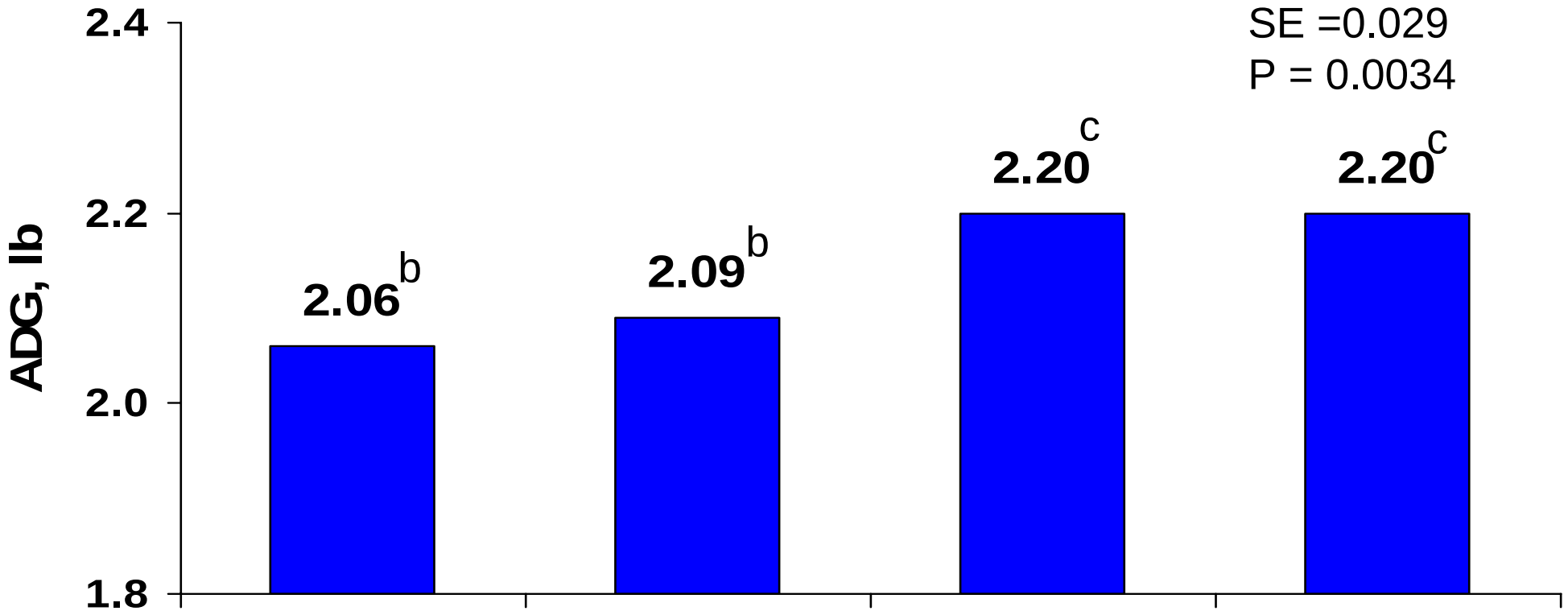
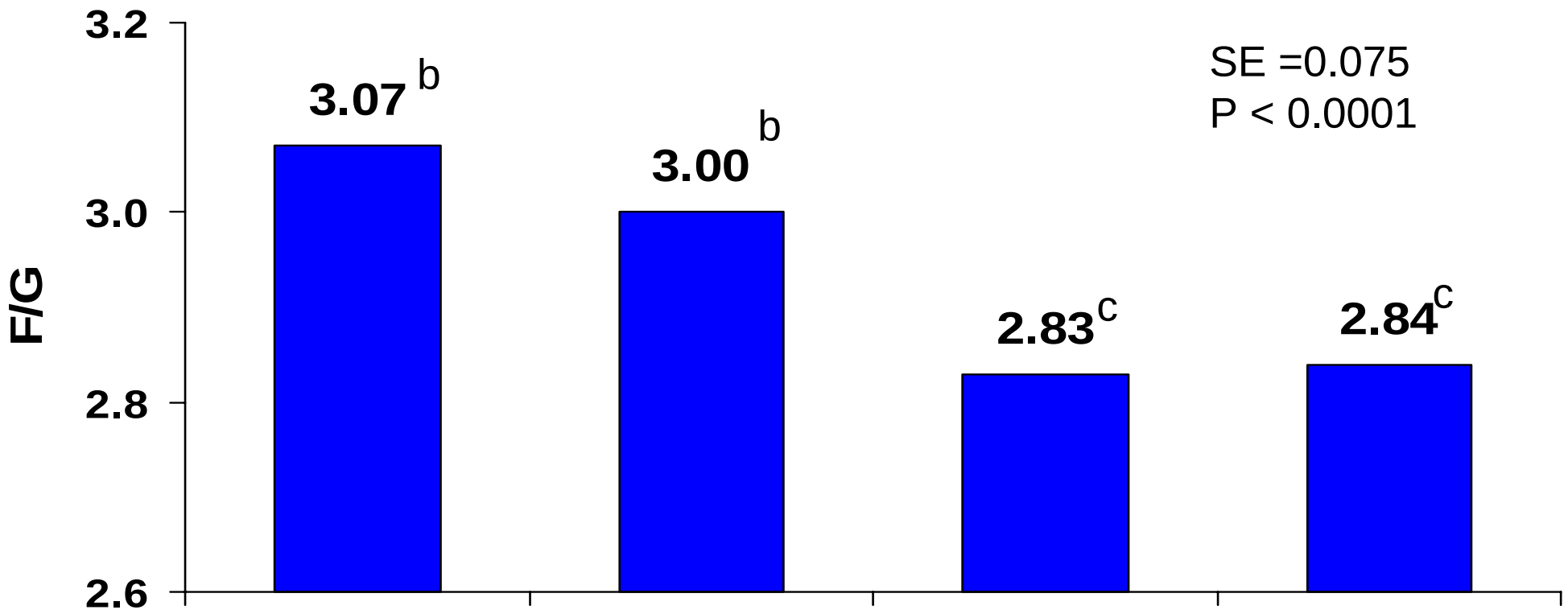
Effects of Paylean from D 0 to 56



D 0 to 21	Control	Paylean	Paylean	Control
D 21 to 35	Control	Control	Control	Control
D 35 to 56	Control	Control	Paylean	Paylean

Effects of Paylean from D 0 to 56

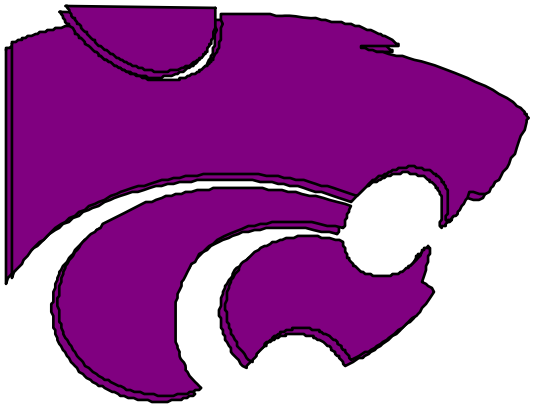


D 0 to 21	Control	Paylean	Paylean	Control
D 21 to 35	Control	Control	Control	Control
D 35 to 56	Control	Control	Paylean	Paylean

Paylean withdrawal conclusions

- Paylean increased ADG and improved F/G over the 56 d trial
  - Feeding Paylean and then withdrawing it for a period of time did not improve or reduce overall performance
  - Re-feeding Paylean after the withdrawal period resulted in the same overall performance as pigs that only received Paylean for the last 21 days prior to market

Feed Processing and Ingredient Update



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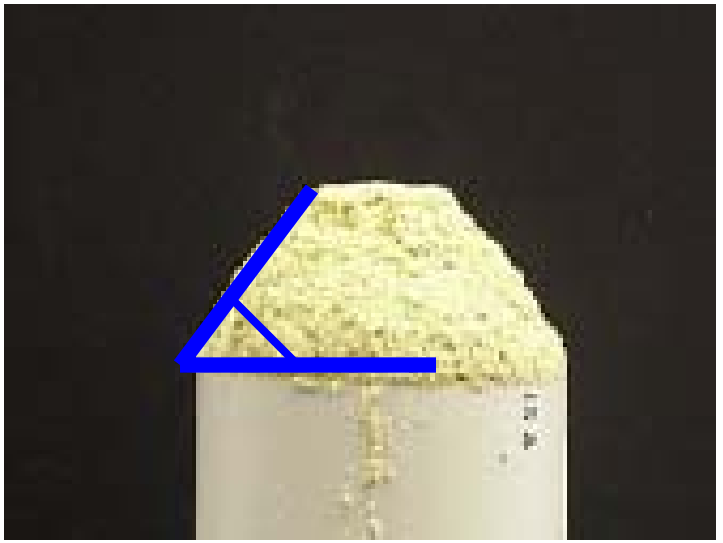
STRETCH FLEX AUGER

Summary of diet flow ability research

- Roller mill better than hammer mill
  - More uniform particle size (less fines)
  - Particle shape
  - Allows use of higher fat levels or other ingredients with poor flow ability



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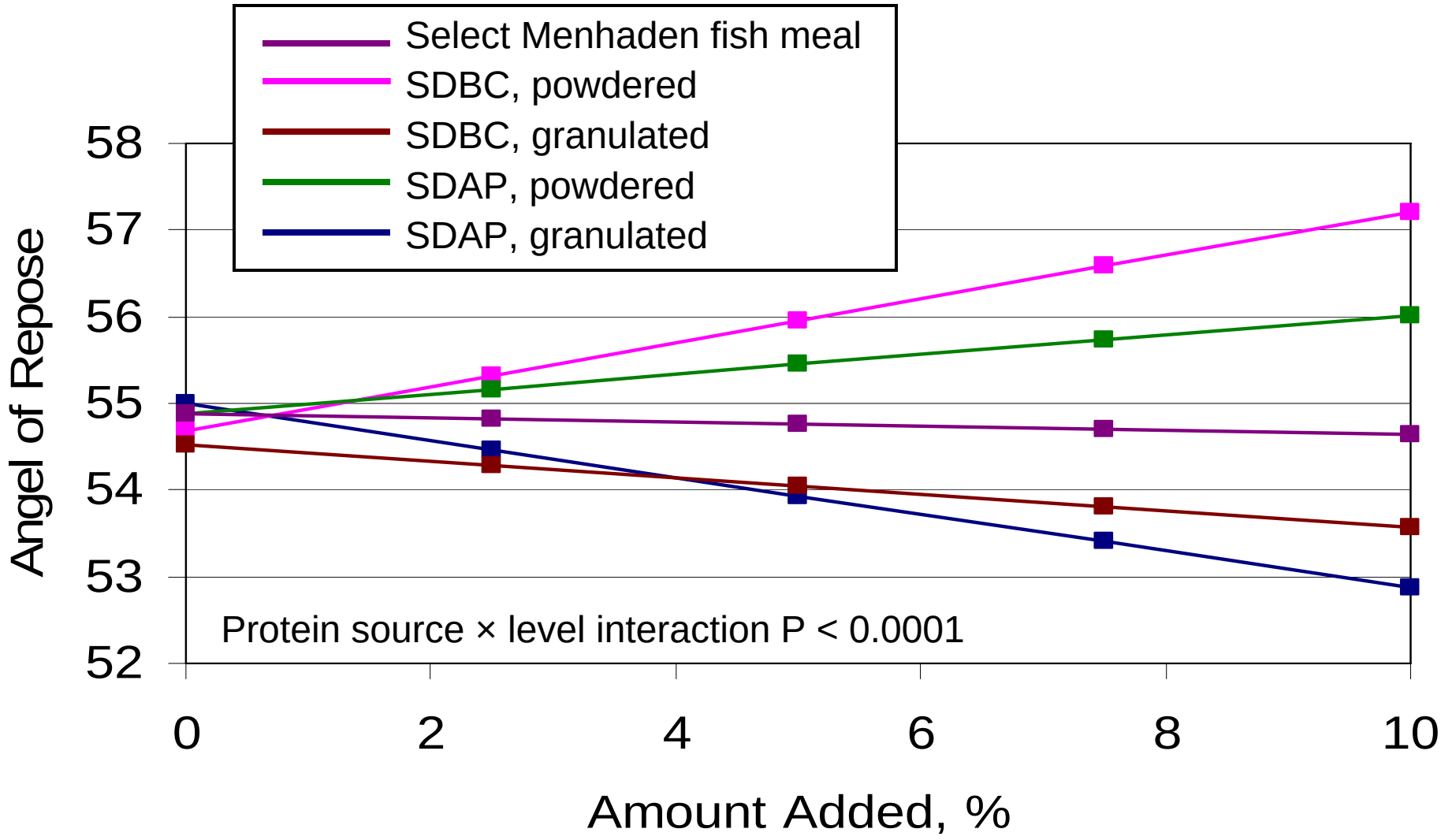
Specialty protein sources influence flow ability



Carney et al., 2005


Will Mixing Time Influence Pig Performance?

Diet Composition

	Phase I	Phase II
Corn	52.25	65.36
Soybean meal, 46.5%	25.26	29.97
Monocalcium P, 21% P	1.00	1.60
Limestone	0.50	1.00
Fine mixing salt	0.30	0.35
Vitamin premix	0.25	0.25
Trace mineral premix	0.15	0.15
Neoterramycin 10/10	**0.70**	**0.70**
Zinc oxide	**0.25**	**0.00**
L-Threonine	**0.12**	**0.13**
Lysine HCl	**0.30**	**0.35**
DL-Methionine	**0.18**	**0.15**
Select Menhaden Fish Meal	3.75	0.00
Spray Dried Whey	15.00	0.00
	100.00	100.00

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Diet Coefficient of Variation

	Mixing Time, minutes				
	0	**0.5**	**1.0**	**2.0**	**5.5**
Phase 1					
Mixer	178	38	26	21	5
Bag	26	20	16	11	7
Phase 2					
Mixer	172	79	60	48	26
Bag	56	45	40	33	12

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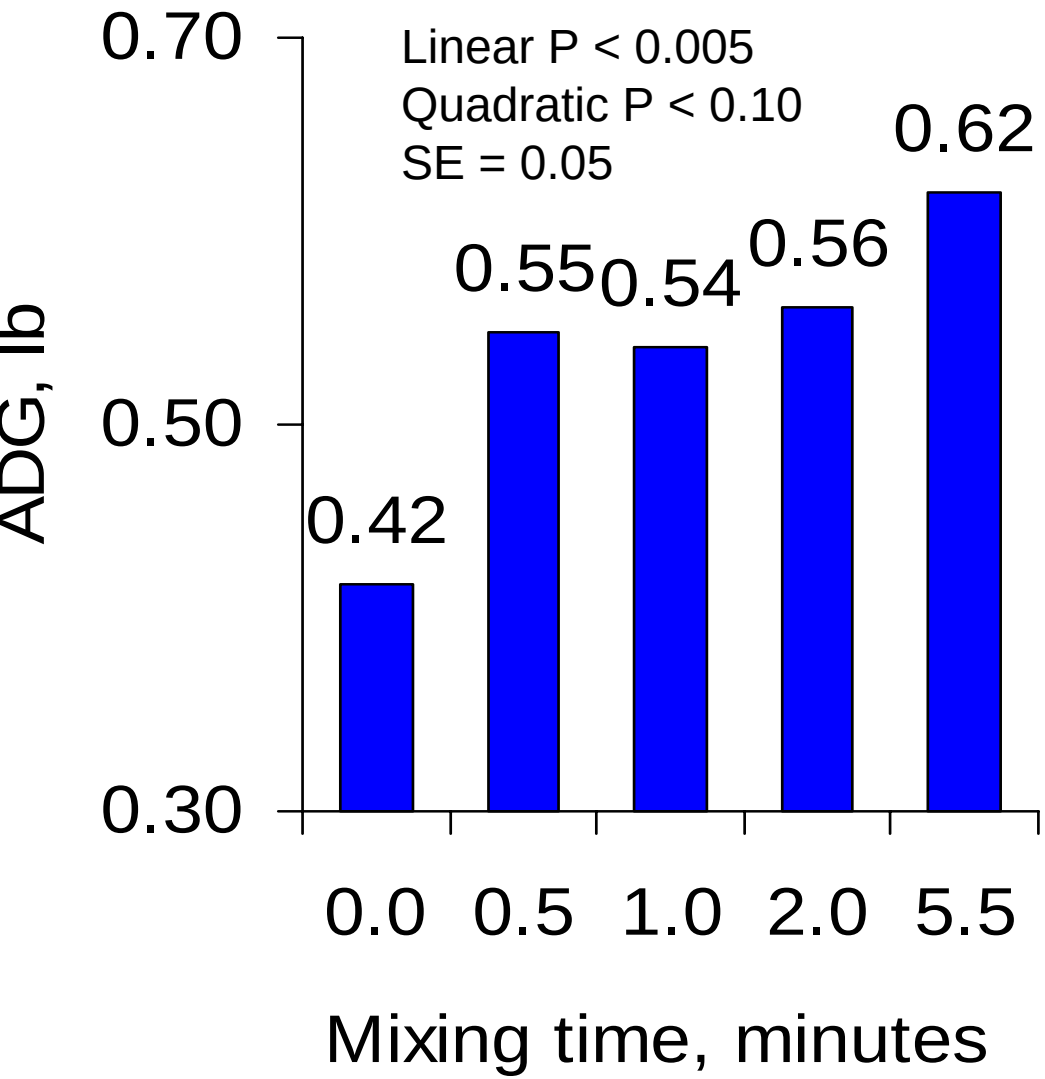
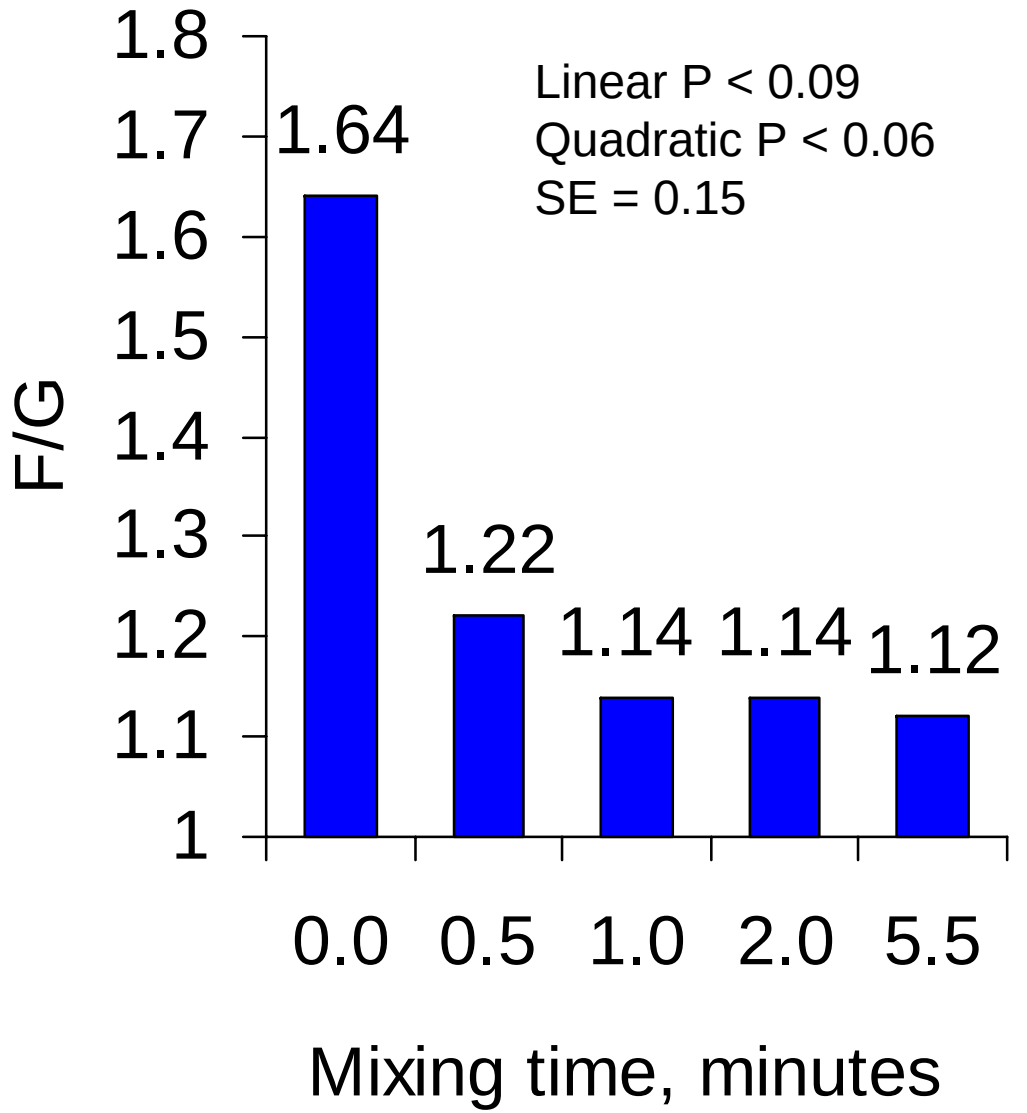
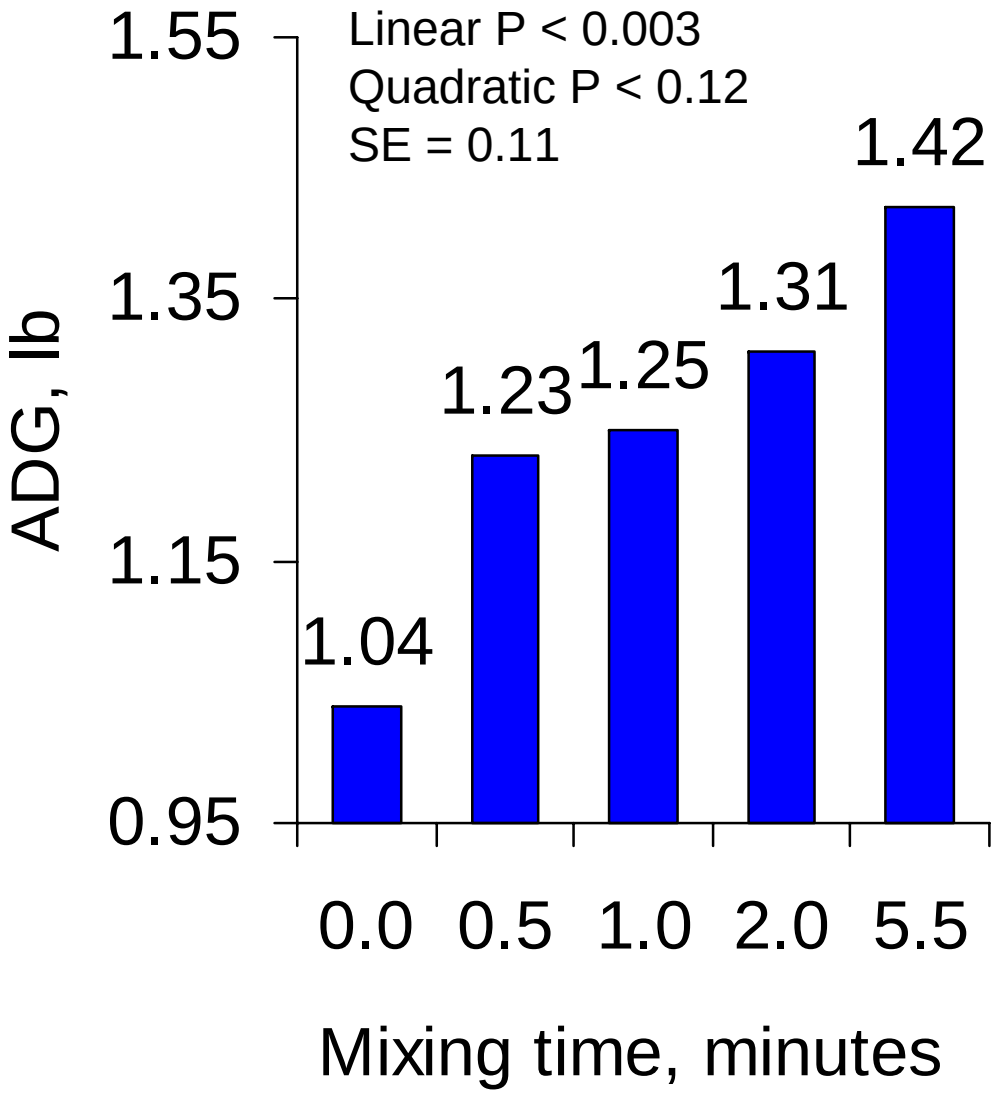
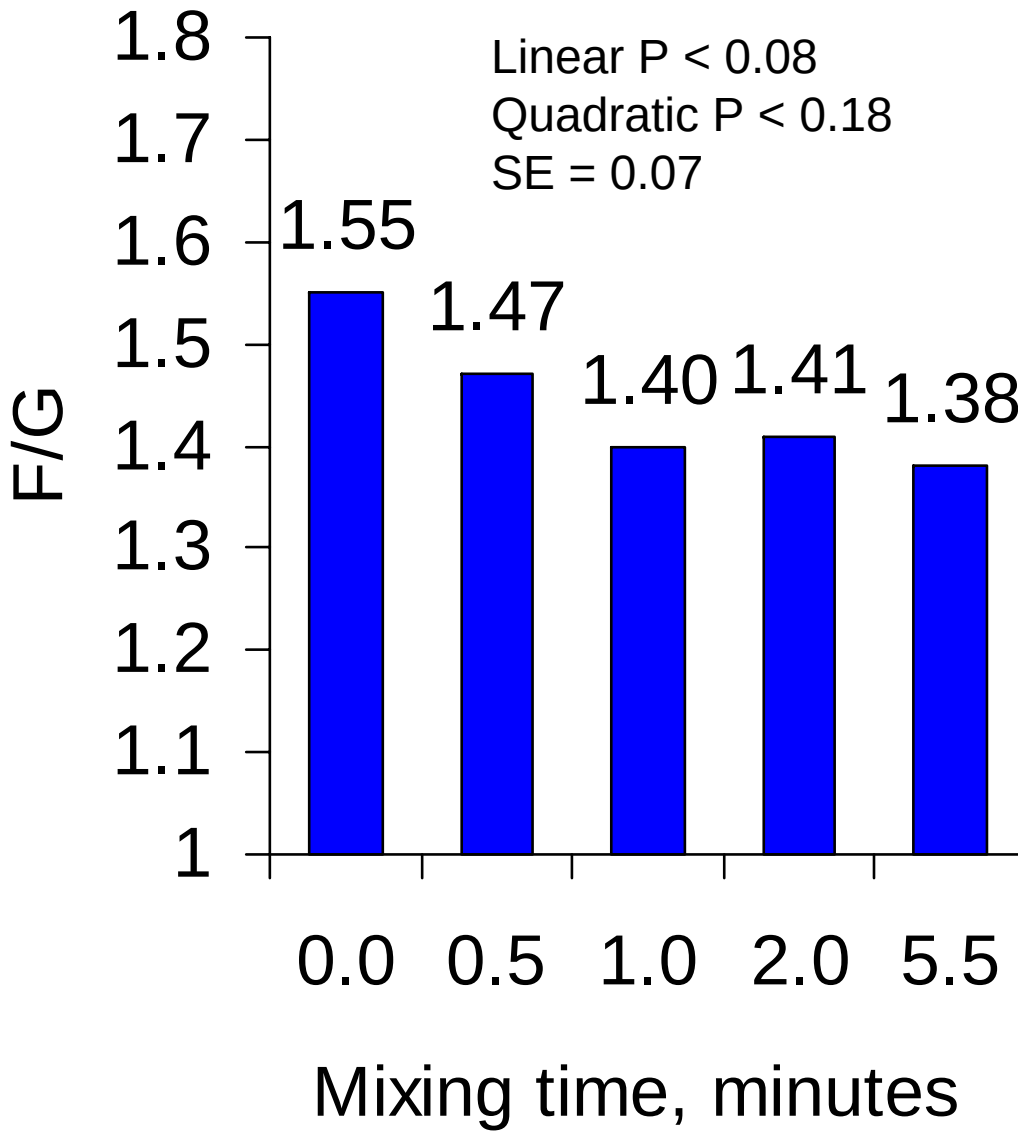
Effects of inadequate diet mixing
d 0 to 14





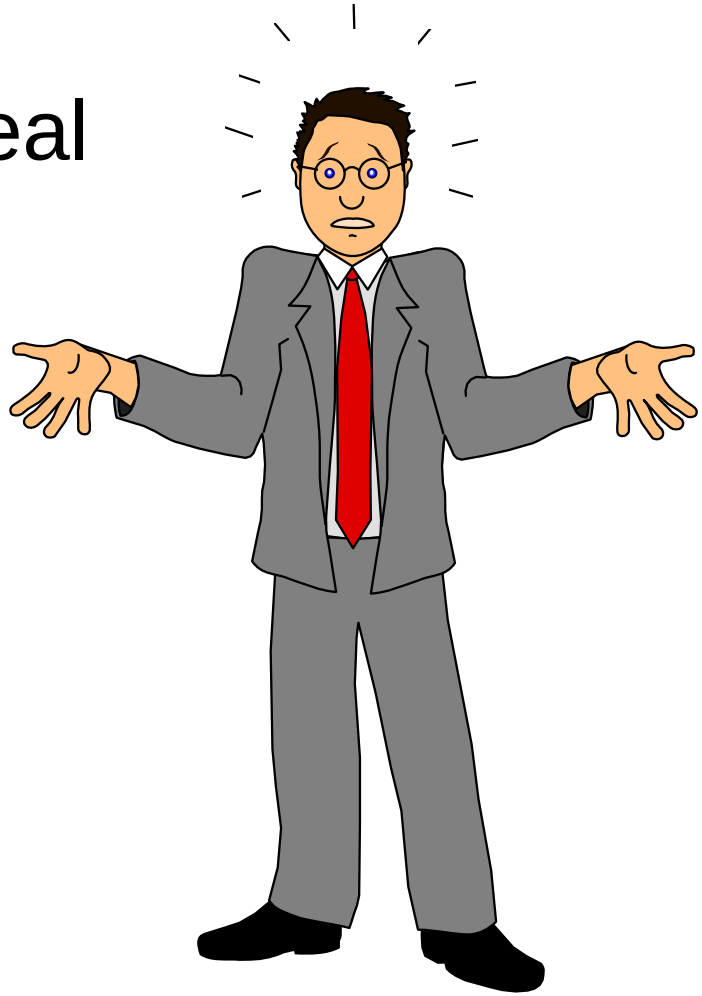
Effects of inadequate diet mixing
d 14 to 28





What to do with the increases in soybean meal price?

- Ruminant Meat and Bone Meal
- DDGS
- Crystalline Amino Acids



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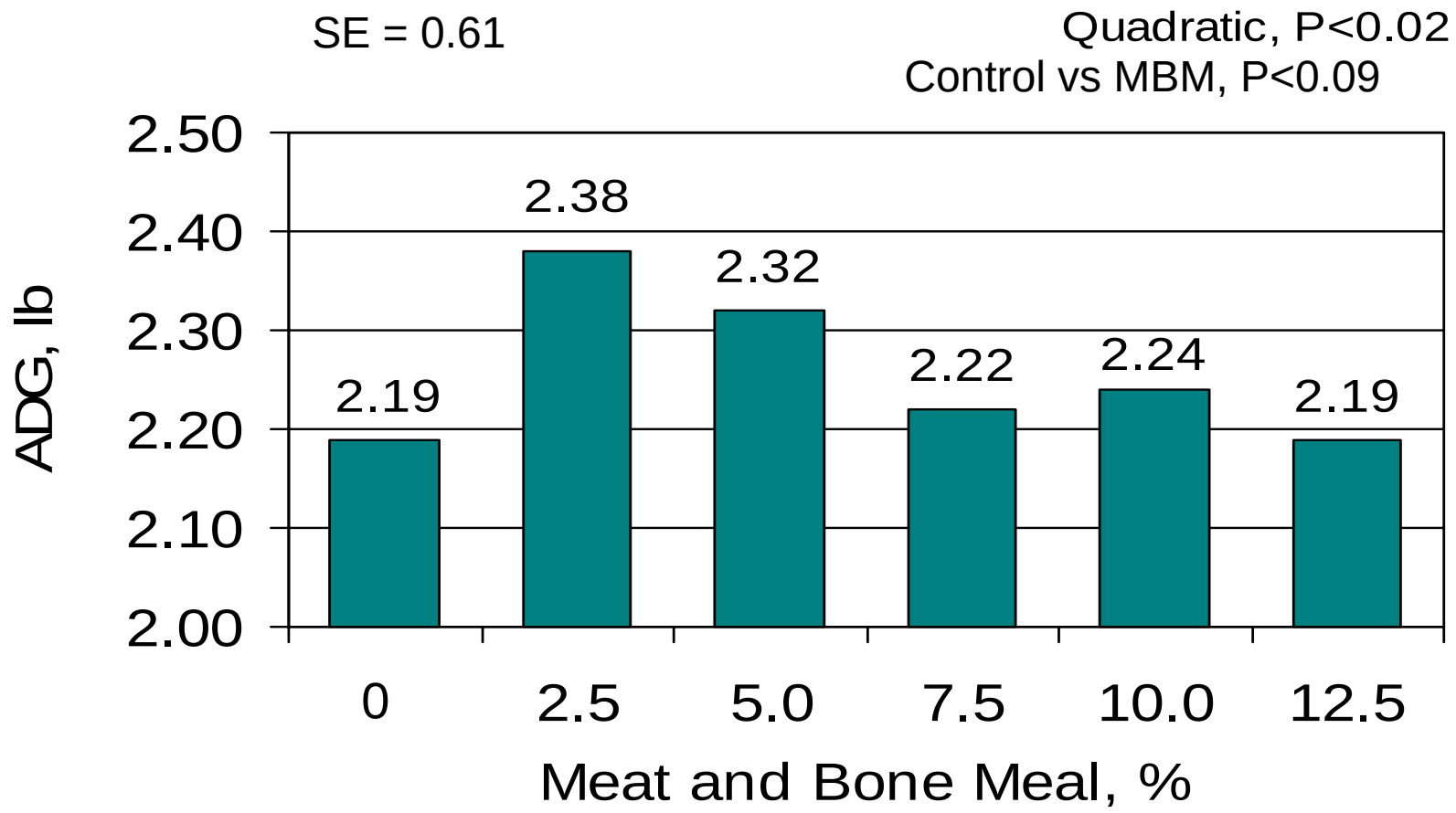
Influence of Meat and Bone Meal Level on Average Daily Gain



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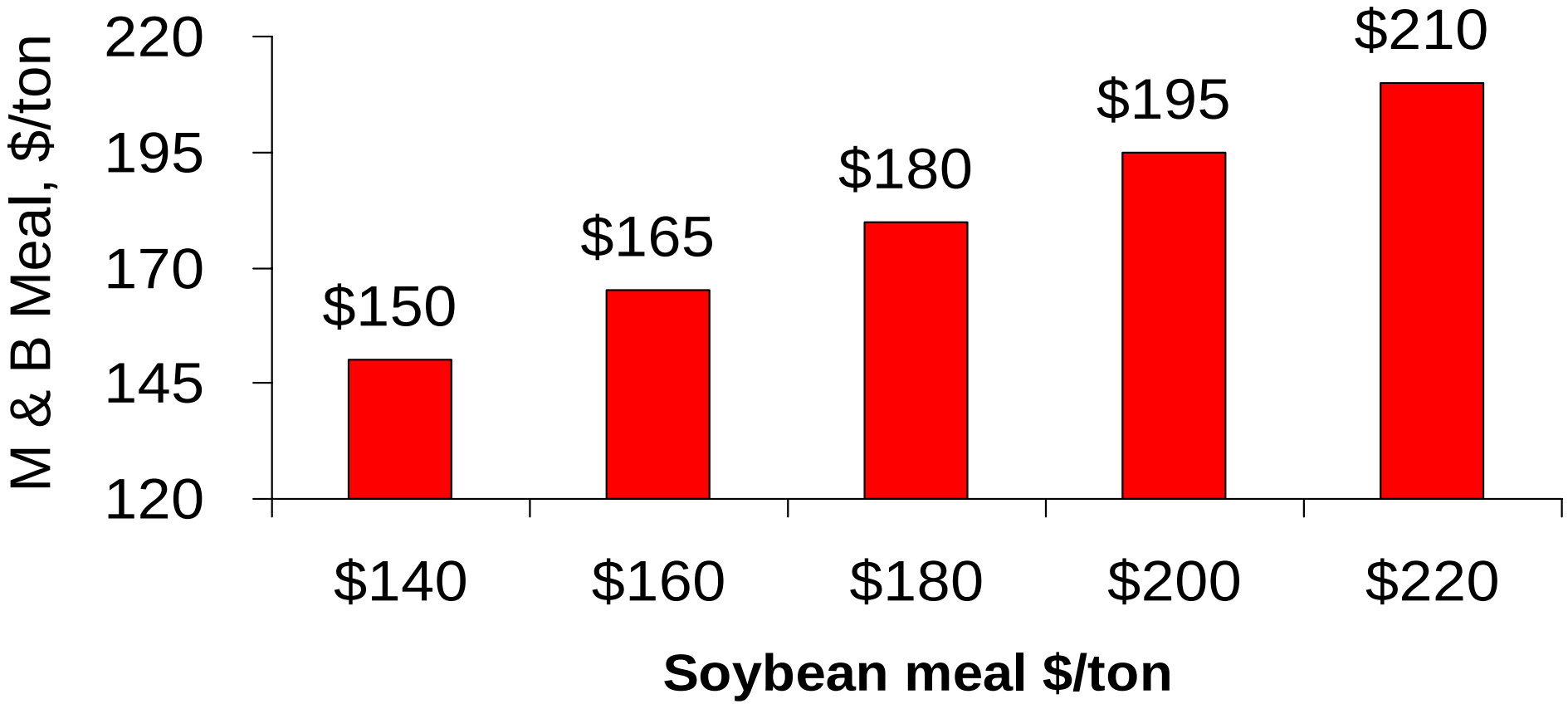
Gottlob et al., 2004

Meat and Bone Meal Breakeven Price Depending on Soybean Meal Price



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"You can add just about 10% of anything to a finishing pig diet."

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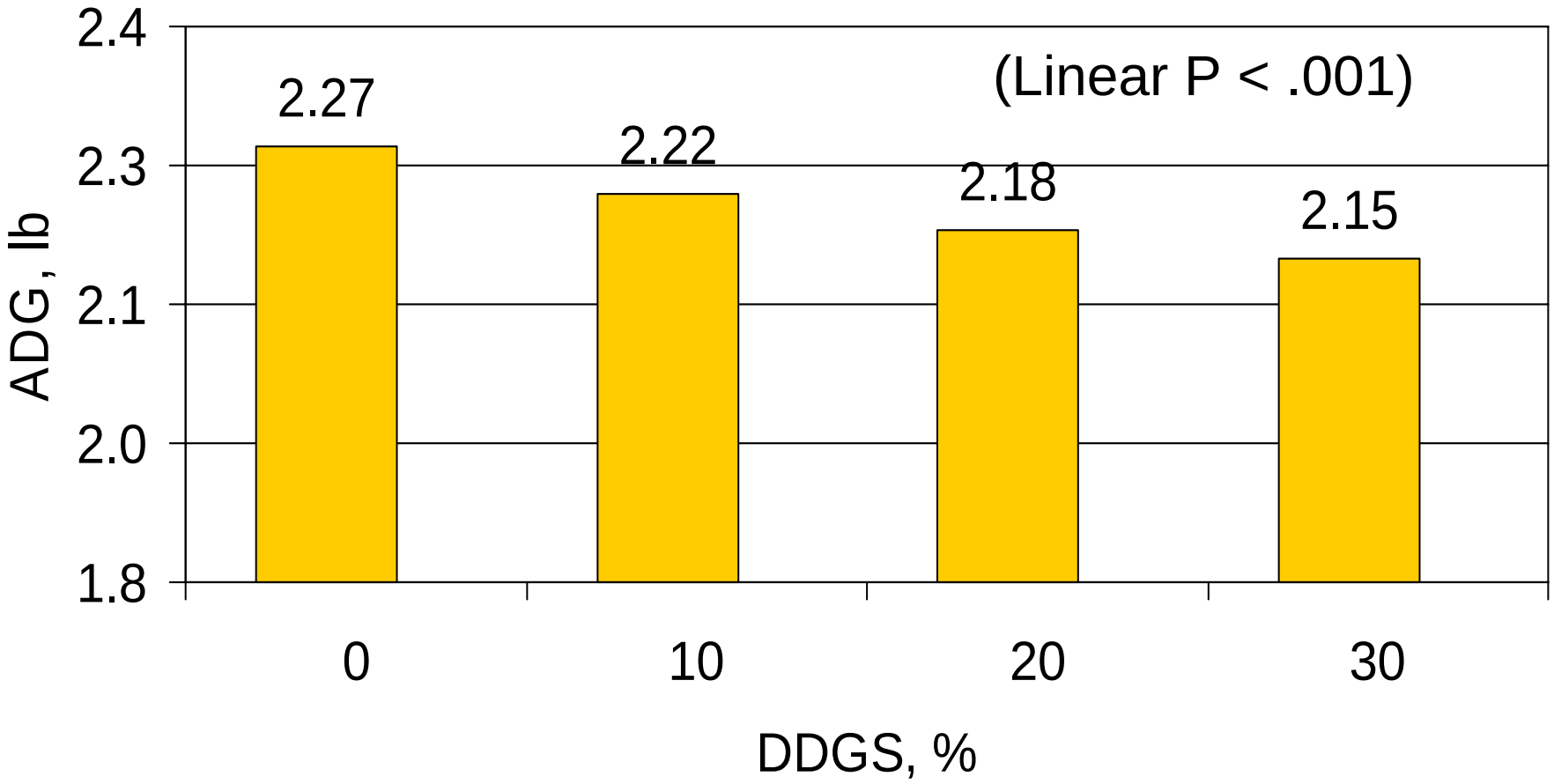
Effect of Increasing DDGS on Finishing Pig Growth



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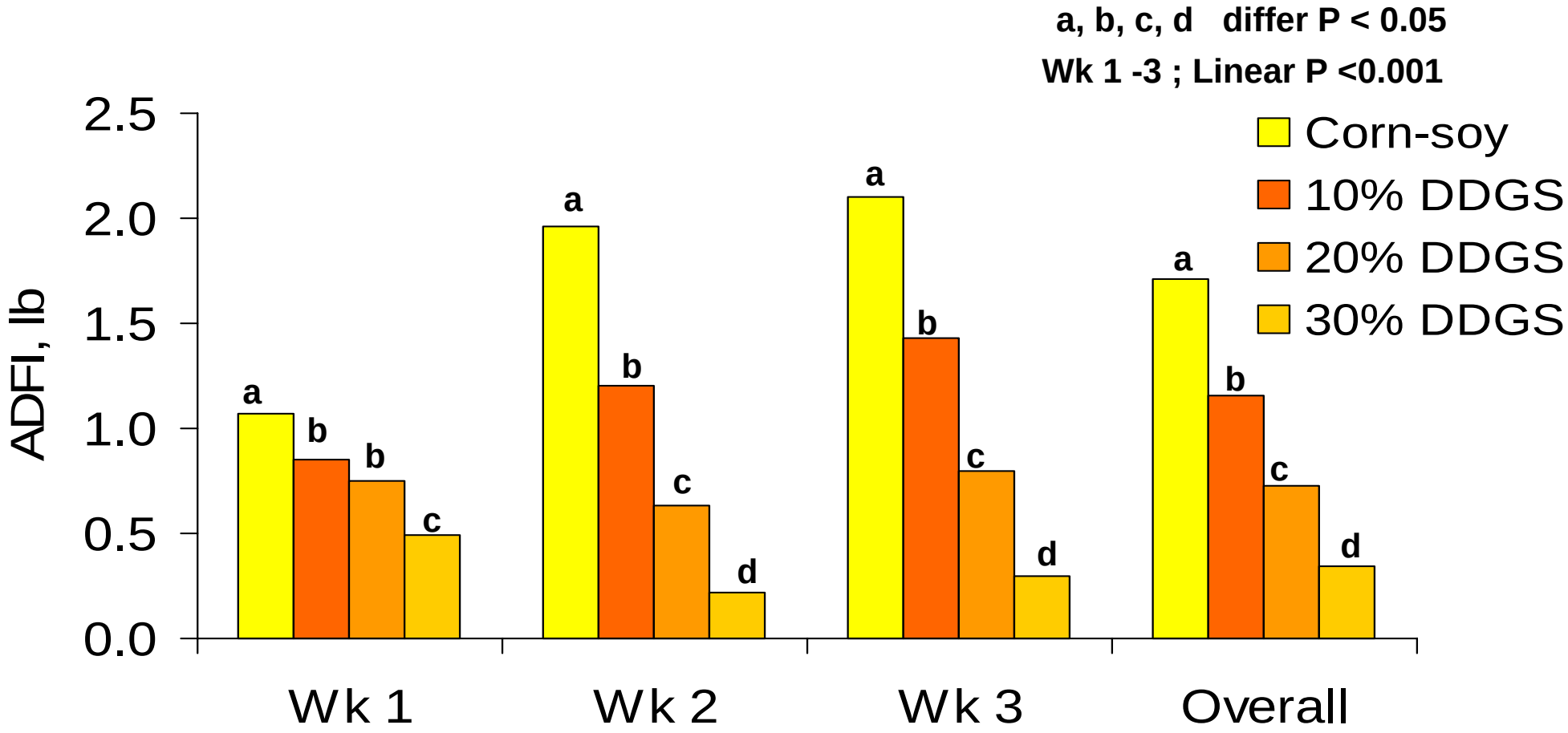
Fu et al., 2004 University of Missouri

Effects of DDGS on feed intake when pigs are given a choice of diets



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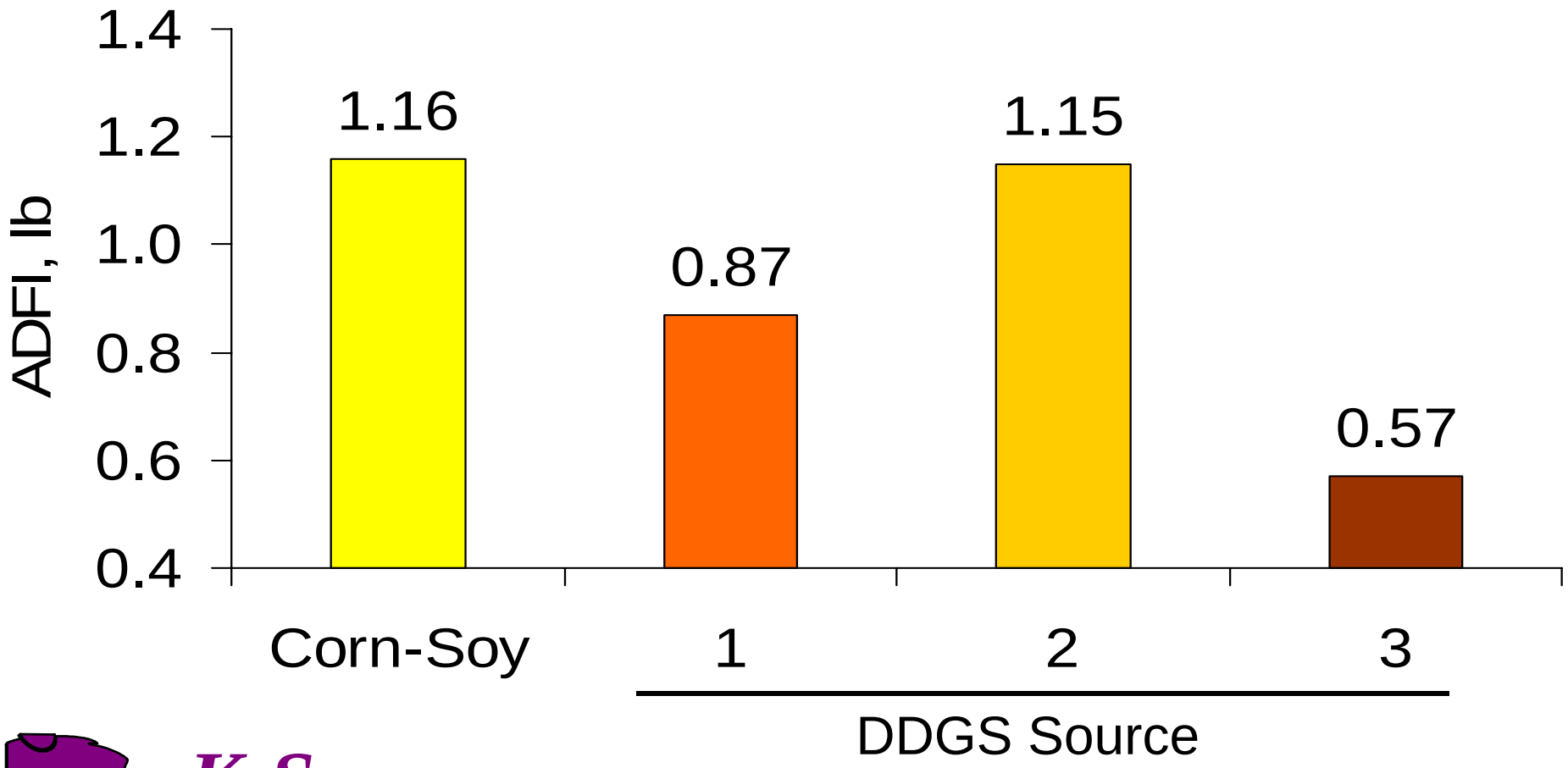
Hastad et al. (2004)

Effects of DDGS from Different Plants on Feed Intake



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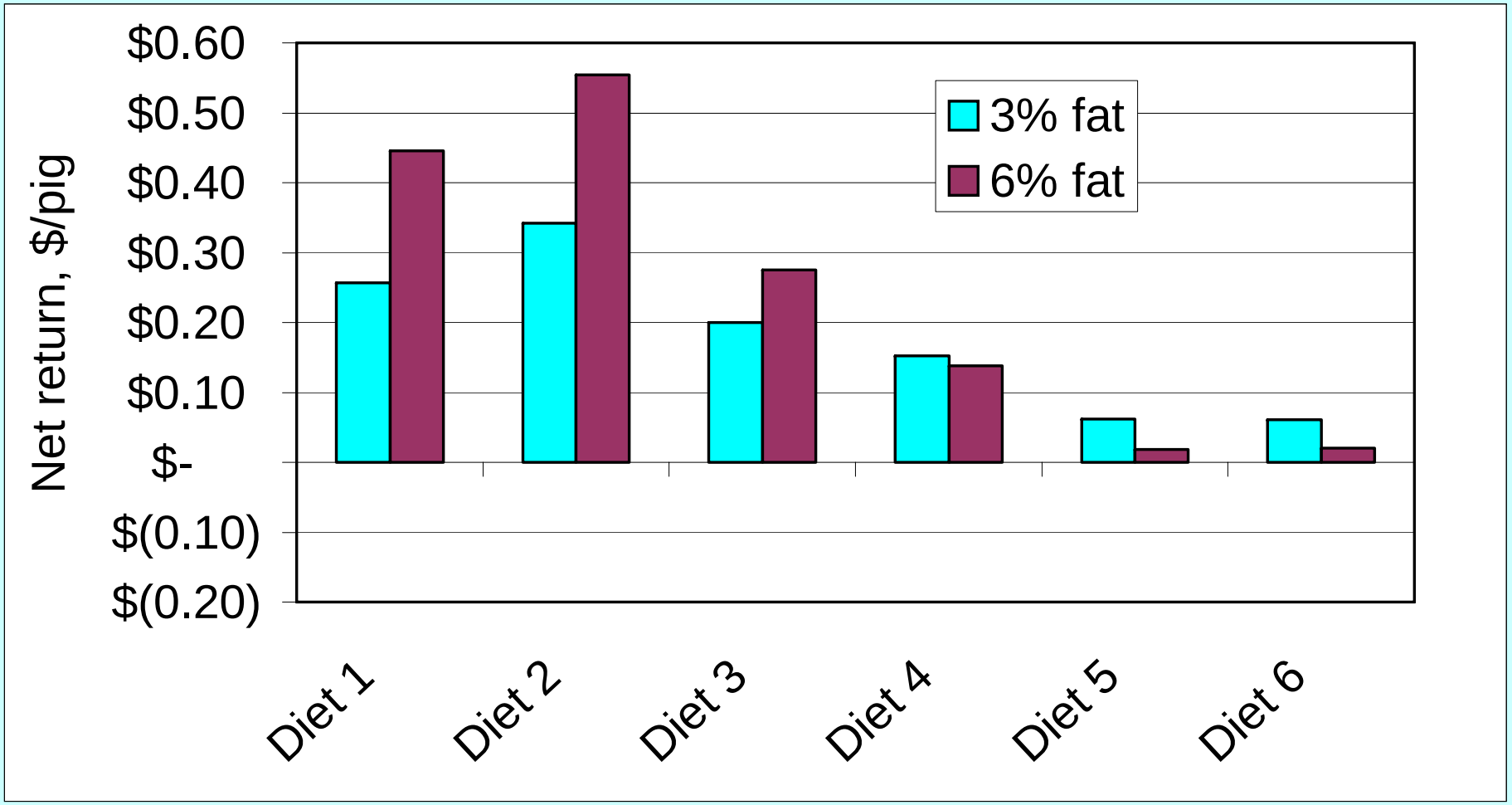
Hastad et al. (2005)

Fat Analysis Spreadsheet

	Prices
Corn, $/bu	$ 1.90
SBM, $/ton	$ 160.00
Fat, $/cwt	$ 13.50
Grind/mix/delivery, $/ton	$ 12.00

	Prices
Carcass price	$ 72.00
Est. live price	55.50

Click to print summary sheets



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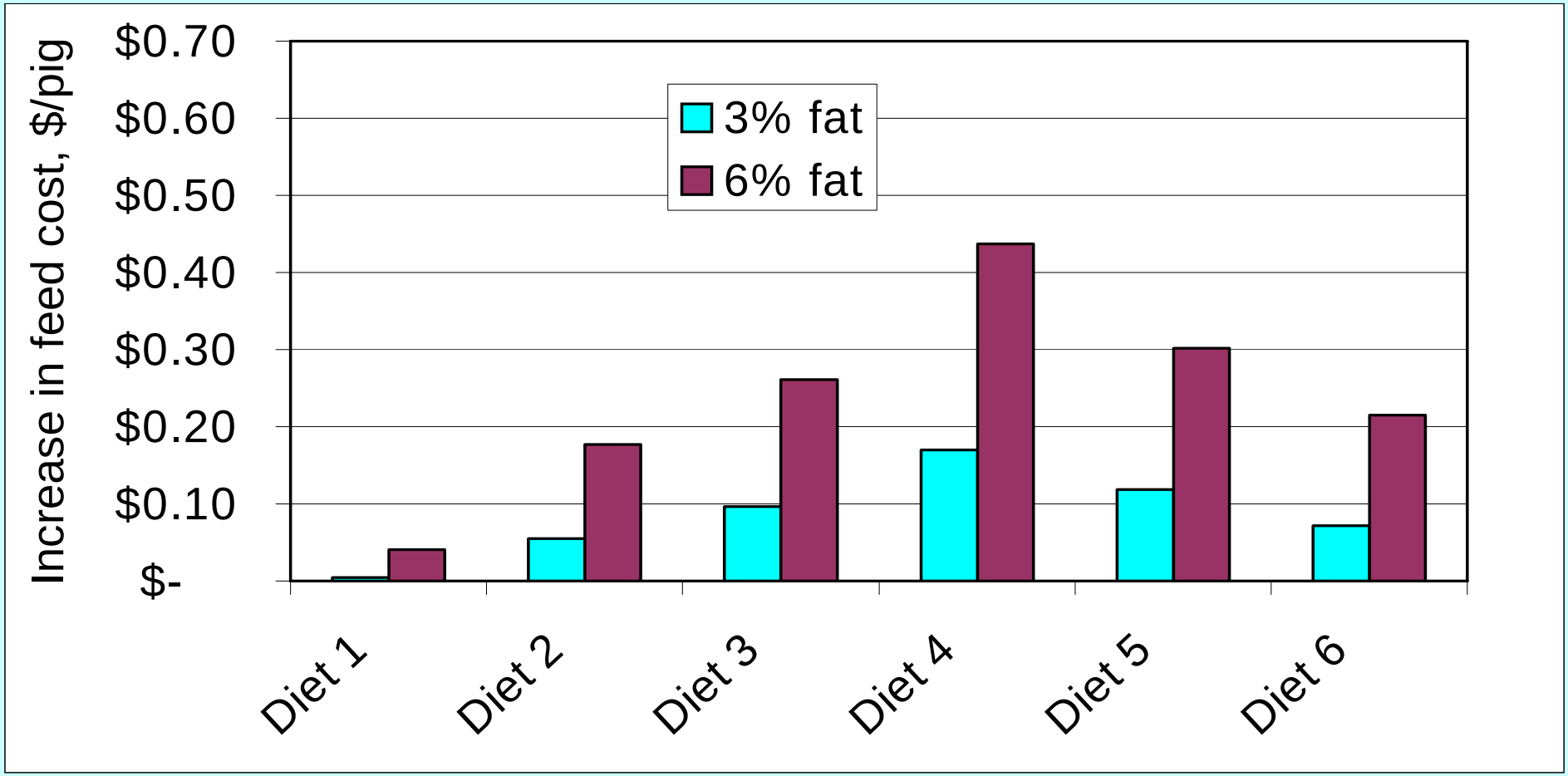
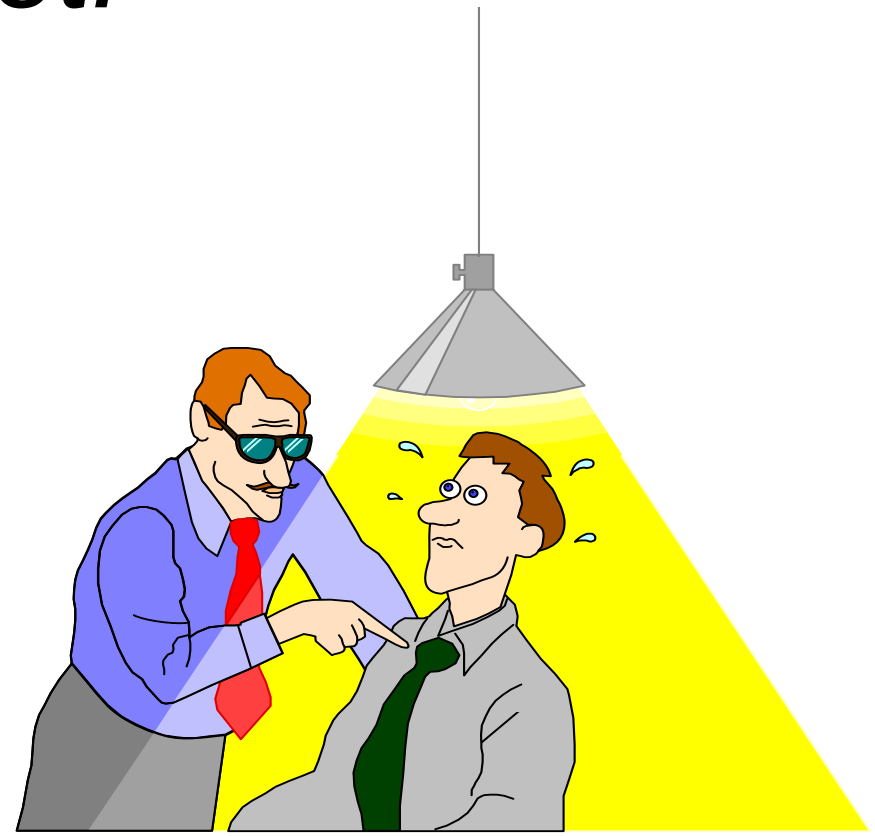
Click to print summary sheets



“It’s pretty hard to beat a milo-soybean meal added fat diet.”



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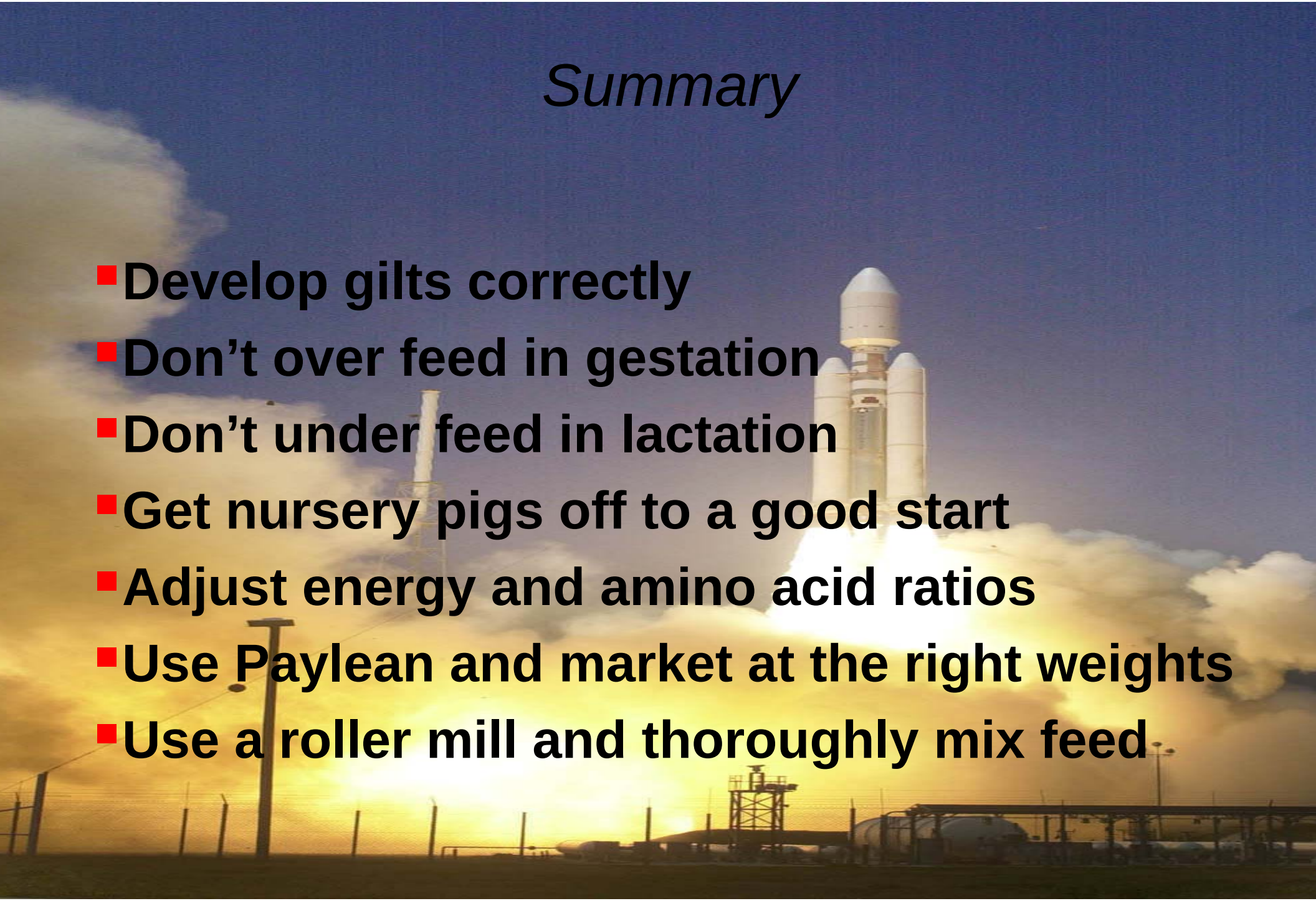
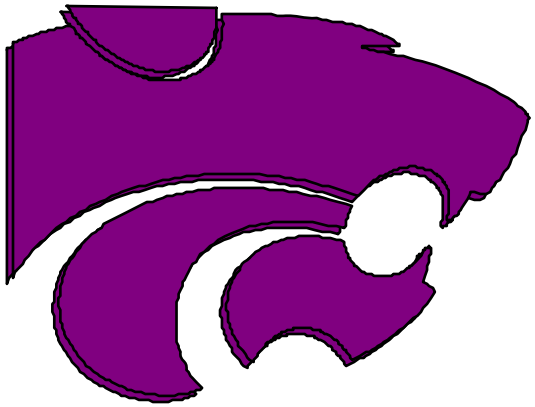


Summary

- **Develop gilts correctly**
- **Don’t over feed in gestation**
- **Don’t under feed in lactation**
- **Get nursery pigs off to a good start**
- **Adjust energy and amino acid ratios**
- **Use Paylean and market at the right weights**
- **Use a roller mill and thoroughly mix feed**

Swine Day 2004



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