Swine Day 2005

Nursery pigs
Water medication for nursery pigs
Effects of feed and water antimicrobials on growth performance
(d 0 to 24 d after weaning)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>ADG, lb</th>
</tr>
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<tbody>
<tr>
<td>Control</td>
<td>0.81</td>
</tr>
<tr>
<td>Neo Terra</td>
<td>0.89</td>
</tr>
<tr>
<td>100</td>
<td>0.91</td>
</tr>
<tr>
<td>200</td>
<td>0.93</td>
</tr>
<tr>
<td>38</td>
<td>0.91</td>
</tr>
<tr>
<td>75.5</td>
<td>0.89</td>
</tr>
<tr>
<td>113.5</td>
<td>0.90</td>
</tr>
<tr>
<td>Combo</td>
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</tr>
</tbody>
</table>

Gottlob et al., 2005
Margin over feed and water costs
(d 0 to 24 after weaning)

K-State

Gottlob et al., 2005
Effects of intermittent water medication on growth performance (d 0 to 28 d after weaning)

K-State

Gottlob et al., 2005
Margin over feed and water costs
(d 0 to 24 after weaning)

Control Neo Terra

M.O.F. and water costs, $

7.44 7.84 7.60 7.45 7.40 7.42

7.00 7.25 7.50 7.75 8.00

Continuous Intermittent

38.0 75.5 38.0 75.5

Pos Con vs Intermittent, P<0.04

Gottlob et al., 2005
Weekly ADG of pigs provided continuous or intermittent water medication

![Graph showing ADG (ADG, lb) across weeks post-weaning (Week postweaning) for different conditions: Neg Con, Pos Con, Continuous, Wk 1/3, Wk 2/4. The graph illustrates the growth trend over time.](image)
Effects of using pelleted SEW diets vs a meal Transition diet on pig growth (d 0 to 10)

Pellets

Meal vs pellet and 1 vs .5 P < 0.01)

Pellets

Meal

ADG, lb

0.40

0.35

0.30

0.25

0.20

0.15

0.33

0.25

0.21

0.24

0.20

0.22

0.15

0.20

0.25

0.30

0.35

0.40

SEW, lb

1

.5

----

Trans. lb

3

1

2

4

Plasma, %

2.5

2

4

4.0

Average initial wt = 12.6 lb

Groesbeck et al., 2005
Effects of using pelleted SEW diets vs a meal Transition diet on percent removals (d 0 to 28)

Average initial wt = 12.6 lb

Groesbeck et al., 2005
Effects of using pelleted SEW diets vs a meal Transition diet on profitability

Average initial wt = 12.6 lb

Groesbeck et al., 2005
Adjust feed budgets for older weaning ages and weights

<table>
<thead>
<tr>
<th>Diet, lb/pig</th>
<th>Weaning Weight, lb/pig</th>
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<tbody>
<tr>
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<td>10</td>
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<tr>
<td>SEW</td>
<td>2</td>
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<td>Transition</td>
<td>5</td>
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<tr>
<td>Phase 2</td>
<td>13 to 15</td>
</tr>
</tbody>
</table>

*K-State*
Swine Day 2005

Grow-finish Pigs
## Triumph Grid

<table>
<thead>
<tr>
<th>Live weight, lb</th>
<th>Lower</th>
<th>Upper</th>
<th>&gt;60</th>
<th>59</th>
<th>58</th>
<th>57</th>
<th>56</th>
<th>55</th>
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<tbody>
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<td>($)9.50</td>
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<td>($)6.00</td>
<td>($)6.50</td>
<td>($)7.00</td>
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<td>($)10.00</td>
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<tr>
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<td>($)5.00</td>
<td>($)5.50</td>
<td>($)6.00</td>
<td>($)6.75</td>
<td>($)7.50</td>
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<td>($)4.00</td>
<td>($)4.50</td>
<td>($)5.00</td>
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<td>($)6.50</td>
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<td>($)8.00</td>
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<td>($)4.75</td>
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<td>($)4.50</td>
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<td>($6.25)</td>
<td>($7.00)</td>
<td>($7.75)</td>
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</tr>
</tbody>
</table>
Triumph weight range (58% lean)
Triumph lean premium
(248 to 305 lb pig)
Iodine Value

- Estimation of proportion of unsaturated fatty acids
- More unsaturated fatty acids lead to increased oxidation rate and rancidity
- Less unsaturated fatty acids lead to more desirable fat color and appearance for the Japanese market
Feedstuff IV Value

- Soybean Meal (46.5%) 19
- Milo 36
- Corn 49
- NCKP SBM 84
- Beef Tallow 440
- Choice White Grease 600
- Soybean oil 1300
Effect of diet on carcass IV value

Feeding NCPK SBM, High Oil Corn, or DDGS will tend to raise carcass IV value

- **Milo**:
  - 5% Added CWG: 66
  - 5% Added Soy Oil: 95

- **Corn**:
  - 5% Added CWG: 71
  - 5% Added Soy Oil: 99
Ingredient price update: What to do?

- Corn vs Milo: Milo needs to be < 96% cost of corn
- Crystalline Amino Acids: Currently > 3 lb per ton
  L-lysine + Met and Thr does not price in.
- Added Fat – In diets for pigs < 160 lb
With inexpensive grain, fat only prices into grower diets – but reduce its amount gradually

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

Experiment 2

- A total of 1,176 pigs were individually weighed and fitted with electronic ear tags
- 2 x 3 factorials
  - Three weight groups
    - Light (71.6 lb)
    - Heavy (83.1 lb)
    - Mixed (77.6 lb)
  - Two fat levels
    - 0 or 6% Choice white grease

Hastad et al., 2005
Influence of fat level on performance d 0 to 95

**ADG, lb**

- 0: 1.92
- 6%: 1.98

**Feed/gain**

- 0: 2.70
- 6%: 2.38

P < 0.01

P < 0.001

Hastad et al., 2005
Influence of sorting and dietary fat level on overall ADG - Exp. 2

Hvy vs. Light × Fat $P < 0.37$  
Fat $P < 0.01$  
SE = 0.018  
Sort $P < 0.91$
Influence of sorting and dietary fat on final weight - Exp. 2

Hvy vs. Light × Fat $P < 0.36$  
Fat $P < 0.01$  
Sort $P < 0.97$  
SE = 1.93

K-State
Influence of sorting and fat level on margin over feed cost - Exp. 2

Hvy vs. Light × Fat $P < 0.07$
Fat $P < 0.12$
Sort $P < 0.96$

SE = 0.929

$\begin{align*}
\text{Heavy} & : & 107.34 & 106.21 & \text{No Fat} & -1.13 \\
& & & & \text{Fat} & \\
\text{Light} & & 99.67 & 102.00 & +2.33 \\
\text{Mixed} & & 104.05 & 103.64 & -0.41
\end{align*}$
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Grow-finish pigs - other ingredients

K-State Research and Extension
NutriDense Corn

• Three experiments with same basic design
  – Late nursery (360 pigs)
    • 5 pigs/pen with 9 pens/treatment
  – Grower (1,189 pigs)
    • 28 pigs/pen with 7 pens/treatment
  – Finisher (1,136 pigs)
    • 27 pigs/pen with 7 pens/treatment

• Yellow dent compared to NutriDense corn
• Increasing levels of synthetic amino acids
  – Lysine, Threonine, Methionine

K-State
Influence of corn source on grower F/G

- **Yellow dent**
  - 0.15 L-lysine HCl: 2.31 Feed/gain
  - 0.3 L-lysine HCl: 2.36 Feed/gain
  - 0.45 L-lysine HCl: 2.52 Feed/gain

- **NutriDense**
  - 0.15 L-lysine HCl: 2.29 Feed/gain
  - 0.3 L-lysine HCl: 2.28 Feed/gain
  - 0.45 L-lysine HCl: 2.38 Feed/gain

Interaction: 0.21
Corn source: 0.01
Linear: 0.01
Quad: 0.08

SE: 0.034
Influence of corn source on energetic efficiency

- **Mcal/kg**
  - **Yellow dent**
  - **NutriDense**

- **Nursery**:
  - Yellow dent: 5.50
  - NutriDense: 5.47

- **Grower**:
  - Yellow dent: 7.97
  - NutriDense: 8.03

- **Finisher**:
  - Yellow dent: 11.66
  - NutriDense: 11.74
DDGS Summary

• Energy level is similar to corn
• Lysine availability is variable, but can be handled in formulation.
• When given a choice, pigs prefer to eat a diet that does not contain DDGS
  – The negative effect on choice increases linearly as DDGS level increases
  – The preference does not change with time on feed
  – The negative effect cannot be masked with sweeteners
• When not given a choice, feed intake is often reduced linearly as DDGS level increases in the diet
• If an individual plant can be identified that does not cause the negative impact on feed intake, DDGS can be an economical ingredient
## DDGS Breakeven pricing at 10% usage

<table>
<thead>
<tr>
<th>Corn, $/bu</th>
<th>SBM, /ton</th>
<th>DDGS, $/ton</th>
<th>DDGS cost / finishing pig</th>
<th>DDGS Breakeven, /ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.60</td>
<td>$160</td>
<td>$95</td>
<td>+ $0.56</td>
<td>$75</td>
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<tr>
<td>$1.60</td>
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<td>$95</td>
<td>+ $0.49</td>
<td>$78</td>
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<td>+ $0.42</td>
<td>$80</td>
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<td>+ $0.31</td>
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<td>$2.00</td>
<td>$200</td>
<td>$95</td>
<td>+ $0.07</td>
<td>$92</td>
</tr>
</tbody>
</table>

**Moncal, 21% P fixed at $320 / ton.**

**Current FOB Garnett, KS = $86.**
Phytase Update - Finishing

• Phytase is approximately $0.65 per ton for 500 FTU.
  – Equates to an increased P availability of 0.10%.

• Cost savings of $0.05 per finishing pig if used as a separate ingredient at the 500 FTU level compared to use in the vitamin premix
  – When used in premix, inclusion rate decreases as pigs grow heavier, thus P release decreases from 0.08% in early finishing to 0.04% in late finishing
Phytase Update - Sows

- For lactating sows, phytase works well with an average P release is 0.093% for 500 FTU.

- For gestating sows, phytase doesn't work as well with an average P release is 0.054 for 500 FTU.
  - Only based on 2 trials and was highly variable in those trials.
Lysine requirement for Paylean® fed pigs in a commercial facility

• A total of 932 gilts (PIC L337 × C22) with an initial weight of 226 lb were used for a 21 d trial.

• 5 lysine levels of TID lysine
  – 0.75%, 0.85%, 0.95%, 1.05%, 1.15%
  – 4.5 g/ton of Paylean®

• Control diet
  – 0.65% TID lysine
  – no Paylean®
Lysine requirement of pigs fed Paylean
ADG from d 0 to 21

Neill et al., 2005

Neill et al., 2005
Lysine requirement of pigs fed Paylean F/G from d 0 to 21

Linear P < 0.0001   SE = 0.112

Neill et al., 2005
Lysine requirement of pigs fed Paylean Shrink (farm to plant)

Linear P < 0.05  SE = 0.415

Neill et al., 2005

K-State

Neill et al., 2005
Lysine requirement of pigs fed Paylean

Carcass weight

<table>
<thead>
<tr>
<th>TID lysine, %</th>
<th>Paylean</th>
<th>Control</th>
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</thead>
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<td>199.2</td>
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<tr>
<td>0.75</td>
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<tr>
<td>1.15</td>
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</tr>
</tbody>
</table>

P = 0.60    SE = 1.500

Neill et al., 2005

K-State

Neill et al., 2005
KSU Swine Day

Sows
Impact of gestation feed intake on lactation intake

• Large production system in the U.S. with high gestation feed usage and low lactation intake

• Changed gestation feeding program to lower intake and tracked changes in reproductive performance
Tracking gestation and lactation feed intake
Six month rolling average

Gestation intake

Lactation intake
Relationship between lactation and gestation feed intake

![Graph showing the relationship between lactation and gestation feed intake from 5/9/03 to 4/28/05. The graph compares lactation intake (red diamonds) and gestation intake (blue squares).](image-url)
Relationship between lactation feed intake and subsequent born alive

Lactation intake

Born alive
Relationship between gestation feed intake and stillborn per litter

Stillborn rate

Gestation intake

Reduced oxytocin?
Relationship between lactation feed intake and interval from wean to estrus

Lactation intake

Wean to estrus

Interval from wean to estrus

Lactation ADFI, lb

Relationship between lactation feed intake and farrowing rate

![Graph showing relationship between lactation feed intake and farrowing rate. The x-axis represents dates from 5/9/03 to 4/28/05, and the y-axis represents lactation ADFI in lb and farrowing rate percentage. The graph illustrates a trend where lactation intake and farrowing rate increase over time.]
Using backfat and flank measurement to set feeding levels
• Flank measurement obtained at estrus detection

• Number is written on the sow card hanging above the stall
• Flank measurement can be used to rapidly monitor weight at first breeding for gilts

• 35” ~ 300 lb
• 90 cm ~ 135 kg
Find the backbone at the last rib and measure about 2.5 inches over.
Renco tips

• Pre-soak sows with oil
  Transmission fluid in oil (color)
  Red light is not an indicator light
  Renco will never overestimate
  fat depth
  Highest backfat found will be
  the actual backfat
Real-Time Ultrasound – More accurate and faster
Procedure on the farm

• Flank measurement
  – Obtained at estrus detection
  – Written on card

• Boxes set at 4 lb from breeding until scanning

• All sows bred during the previous week are scanned
Tray with scanner and supplies that can be easily moved across the top of the stalls
18 to 20 sows are scanned per hour
Fat depth and feed box setting are written on the card and placed facing feed boxes.

Feed boxes are then adjusted accordingly.

Fat depth, flank measurement, and setting can then be easily monitored anytime during gestation.
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Sows
Does the program work?
Average Daily Gestation Intake, lb

- Jan to June 2003: 4.75 lb
- Jan to June 2005: 4.1 lb

Implementation of Gestation Feeding program was July/August 2003
Results in a $100,985 / year reduction in Gestation Feed Cost ($10/sow/year)
Pigs Weaned per Sow Per Year

Jan to June 2003: 20.8
Jan to June 2005: 23.8

K-State
Annual Sow Mortality

Mortality, %

Jan to June 2003: 12.6%
Jan to June 2005: 7.6%

K-State
Feed cost savings have more than covered technician equipment cost while reproductive performance has improved and sow mortality has decreased
Effect of oxytocin on farrowing time

K-State

Mota-Rojas, et al., 2004
Effect of oxytocin on stillbirths and umbilical cord damage

<table>
<thead>
<tr>
<th>Control</th>
<th>Oxytocin</th>
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<td>Still births, No./litter</td>
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<table>
<thead>
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<td>Damaged Umbilical Cords, number/litter</td>
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</tbody>
</table>

P<.05

Mota-Rojas, et al., 2004
Proportion of litters with at least one stillbirth

- Control: 37%
- Oxytocin: 82%

Mota-Rojas, et al., 2002
Influence of oxytocin usage on stillborn proportions by birth order

Mota-Rojas, et al., 2002

K-State

Mota-Rojas, et al., 2002
Recommendations for Oxytocin Usage

• Use 10 IU (0.5 ml) per dose
• Limit use to older parity sows
• Limit use to after the 8th pig farrowed
• Use a maximum of two doses per sow
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