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Optimizing Feed Efficiency to Maximize Your Bottom Line

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The key is to optimize, not simply chase F/G at all costs (feed, labor, capital).

Optimizing F/G

- Dr. Steve Pollman, Murphy Brown LLC, advised attendees at the 2011 International Conference on Feed Efficiency in Omaha, NE that feed efficiency is a useful metric in pork production but it is a poor driver for decision making.
- He was making the point that feed efficiency numbers can be influenced by so many factors that interpreting them can be difficult and that there is a great risk in over-simplifying the many things in the barn that can alter feed efficiency.
- Furthermore, the best feed efficiency is not necessarily going to lead to the highest net income.

Presentation Outline

- Guide to Troubleshooting Feed Efficiency
  - High feed disappearance
  - Low ADG
  - Other factors
    - Feed processing
- Additional resources

Feed Efficiency

- High feed disappearance
  - Genetics
  - Feed wastage
  - Temperature
  - Mortality
  - Feed delivery
  - Amino acid deficiency
  - Low Energy diets
- Low ADG
  - Disease
  - Genetics
  - Feed availability
  - Water availability
  - Diet deficiency
  - Temperature
- Other factors
  - Particle size
  - Diet form

Tokach, 2012
Feed Efficiency

- Genetics
- Feed wastage
- Temperature
- Mortality
- Feed delivery
- Amino acid deficiency
- Low Energy diets

High Feed Disappearance

- Genetics
  - Lower lean, high feed intake genetics will often have poorer F/G

High Feed Disappearance (usage)

- Feed wastage
  - Poor adjustment with pans greater than 60% covered can increase feed wastage, especially in late finishing
  - Old feeders with poor feeder design or inability to adjust will increase wastage

Proper Feeder Adjustment

- Approximately 50% pan coverage without accumulations in the pan corners.

High Feed Disappearance (usage)

- Effective temperature
  - If temperature is too low, pigs will increase their feed intake to maintain body temperature. Because the feed is going towards heat needs and not growth, feed efficiency will become

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<table>
<thead>
<tr>
<th>Item</th>
<th>TEMPERATURE, °F</th>
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<tbody>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td>ADG, lb</td>
<td>1.70</td>
</tr>
<tr>
<td>ADFI, lb</td>
<td>4.86</td>
</tr>
<tr>
<td>Feed/gain</td>
<td>2.91</td>
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</tbody>
</table>

Summary of 3 experiments; Stahly and Cromwell, 1979, 1981.
High Feed Disappearance (usage)

- Mortality
  - Mortality late in the finishing period can lead to feed disappearance calculations being high for the pigs remaining at the end of the period.
    - Each 1% increase = 0.06 in F/G
    - F/G = Total feed delivered / Weight out – Weight in

- Feed delivery
  - Records of deliveries should be checked to ensure that feed credited to the group was not delivered to another group
  - If two deliveries are noted closely together in a time period that is not feasible, it could be a data entry error
  - Review feed budgets to make sure the correct amount of each diet is being fed

High Feed Disappearance (usage)

- Diet deficient (amino acids)
  - Inadequate lysine or other amino acids will often lead to an increase in feed usage as a result of lower ADG to make poorer F/G
  - Can be a problem if feed is not budgeted correctly (ex. switching diets too soon)

High Feed Disappearance (usage)

- Dietary Energy
  - Experiments indicate that the value ranges from a 0.7% to 2.4% increase in dietary energy to create a 1% improvement in feed efficiency.
  - The variation is a result of several factors and exactly why it is important to determine what effect energy has on feed efficiency.
  - As feedstuffs that supply dietary energy increase in price, there is more incentive to determine the energetic efficiency in addition to the feed efficiency of the pigs on a particular diet.
Added Fat Recommendations

• Should I have fat in my diets currently?
  – Long on space = No
    • Gain improvements not required while increasing feed cost
  – Short on space = Yes/No/ Maybe
    • Evaluate net return and determine optimum level by dietary phase.
    • Strategy should be different as economics change (corn-fat-market prices)

• Which season are pigs to be marketed?
  – Pigs placed in midsummer/fall/early winter months can/should forgo added fat due to growth rate improvements to come with cooler weather.
  – Late Spring/Summer marketed pigs have more potential revenue benefit to be fed added fat starting in February/March to capture growth rate (carcass weight advantages)

Energy use by the pig

Gross energy ➔ fecal energy
Digestible energy ➔ urinary energy
Metabolizable energy ➔ maintenance

Low ADG - Disease

• Disease or other stress
  – Disease problems that lower ADFI will greatly lower ADG. High mortality will increase F/G by about 1.5% for each 1% increase in mortality.
  – Stressors are additive
    • Reducing stress will improve F/G

Effect of PCV2 Vaccination on Feed Efficiency

<table>
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<tr>
<th>Feed/gain</th>
<th>Control</th>
<th>Vaccine</th>
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<tr>
<td>2.57</td>
<td></td>
<td>2.52</td>
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<tr>
<td>P &lt; 0.01</td>
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</table>
Low ADG – Feed Availability

- Feed availability
  - Limiting feed intake intentionally or unintentionally (Plugged or empty feeders or bins) will lower ADFI and ADG
  - High stocking density will decrease ADFI and ADG

Low ADG – Water Availability

- Water availability
  - Lack of water availability will reduce ADFI and ADG and F/G will get worse
    - Plugged nipples, dirty cups, low water pressure

Low ADG – Diet Deficiency

- Diet deficient (amino acids, salt, other)
- Often feed intake is reduced as a result of a diet deficiency
  - Amino acid deficiencies
  - Inadequate salt levels will greatly reduce ADG

Low ADG – Barn Temperature

- Effective temperature
  - High environmental temperature will decrease ADFI and ADG.
  - Feed efficiency is not altered much by high temperature, unless it is so high that feed intake is close to the maintenance requirement. Then, F/G will become poorer because there is less energy available for ADG since more of it is going towards maintenance requirements.

Feed Efficiency

- Other factors
  - Particle size
  - Diet form

- Every 100 microns:
  1. F/G improves by ~1.2%
  2. 7 lbs less feed/finishing pig
  3. Current $0.98/pig savings in feed cost
Grain Particle Size

- F/G directly impacted by cereal grain particle size
- Research in high co-product ingredients
  - No benefit to grinding DDGS, wheat middlings, soybean hulls, and soybean meal
  - Whole diet grinding – not a benefit in meal diets

Effects of particle size on feed efficiency

Pelleting on growth performance of grow-finish pigs 2005 to 2011

<table>
<thead>
<tr>
<th>Reference</th>
<th>Meal ADG F/G</th>
<th>Meal ADG F/G</th>
<th>Pellet ADG F/G</th>
<th>Pellet ADG F/G</th>
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</thead>
<tbody>
<tr>
<td>Groesbeck et al. (2005)</td>
<td>0.83 1.25</td>
<td>0.90 1.22</td>
<td>0.62 1.43</td>
<td>0.65 1.37</td>
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<td>Groesbeck et al. (2006)</td>
<td>0.80 1.25</td>
<td>0.78 1.17</td>
<td>1.95 2.12</td>
<td>2.05 2.07</td>
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<tr>
<td>Potter et al. (2009)</td>
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<td>1.81 2.76</td>
<td>1.94 2.82</td>
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<td>Myers et al. (2010)</td>
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<td>1.96 2.73</td>
<td>1.97 2.67</td>
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<td>Frobose et al. (2011)</td>
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<td>1.56 1.97</td>
<td>1.69 2.06</td>
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<td>Average</td>
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<td>1.69 2.06</td>
<td>1.96 2.75</td>
<td>2.03 2.70</td>
</tr>
</tbody>
</table>

Average response = 5.0% for ADG and 4.0% for F/G
Thank you!

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