Feed and Water as Predictors of Tomorrow’s Performance

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Out of Feed Events

- Empty bulk bins – human error
- Increases with toll milling
- Bridging of feed
  - Fat + hammermill + 700 microns
  - DDGS (Distillers Dried Grains w/Solubles) inclusion
- Equipment failures
  - Proximity switches
  - Motors, etc

Out of Feed Events

- Increase with increasing facility age
  - Equipment
  - Caregiver malaise

Out of Feed Events

- Estimates of impact – does the pig recover?
  - Increased variation
  - Health
    - Hemorrhagic bowel syndrome (HBS)
    - Ileitis
    - Ulcers
    - Tail biting?
  - Welfare
Completed Out-of-Feed Trial

- 2 x 2 design
- Out of feed
  - 0 vs 1x per week – random day of the week
  - 20 hrs (noon to 8 am)
- 1019 vs 1264 micron particle size

Health Effects

<table>
<thead>
<tr>
<th></th>
<th>Dead/Pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>2.6%</td>
</tr>
<tr>
<td>Weekly</td>
<td>4.3%</td>
</tr>
<tr>
<td>Coarse</td>
<td>1.7%</td>
</tr>
<tr>
<td>Medium</td>
<td>5.1%</td>
</tr>
</tbody>
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Conclusions

- **Out-of-Feed**
  - Pigs appear to adapt – no effect wk 8-16
  - Impact is daily gain
    - Wk 0-8 0.15 lb/d reduction/event
    - Wk 8-16 no reduction
    - Wk 0-16 0.078 lb/d reduction/event
- **Particle Size**
  - Impact is feed conversion
  - Reduction by 247 microns = 3.2% improved g:f
Which costs more?

- **Out-of-Feed**
  - Loss in wt in constant time system
  - If 5# less sale wt @ $0.50/lb = $2.50/pig
  - If 5 days longer to mkt
  - 5 x $.10/d = $.50/pig

- **Fineness of Grind**
  - Loss in f/g
  - 2.8 x 3.5% = 0.098
  - If 0.1 change in f/g @ $0.06/lb x 200 lb gain = $1.20/pig loss

Current Experiment

- **Out-of-Feed**
  - Never, 1, 2 or 3 times every 2 weeks

- **Fineness of Grind**
  - 8 wk data - no statistics

- **8 wk data - no statistics**
  - 0 1 2 3
  - ADG, lb
  - F/G
  - 1.84 1.82 1.77 1.66
  - 2.24 2.24 2.25 2.23

Water

2 Issues of Concern with Water

1) Daily water needs – total usage
   University of Nebraska grow-finish
   - Nipples 1.5 gal/pig/day
   - Cups 1+ gal/pig/day

   University of Nebraska Wean-Finish (Bowls)
   - 0.92 gal/pig/day

Total Water Use to Grow a Pig

- **Assumptions**
  - 18 pigs sold/female/yr
  - 2.0 l/fy
  - 165 days to slaughter wean-finish
  - 3.5 gal/d gestation
  - 6.0 gal/d lactation
  - 0.95 gal/d wean-finish

- **235 gal drinking water/pig sold**
2 Issues of Concern with Water

1) Daily water needs – total usage per day

2) Instantaneous Delivery Rate
   - Can we meet the need at the moment?
Max recommended flow in plastic pipe - MWPS

<table>
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<tr>
<th>Nominal Diameter, in</th>
<th>Flow, gpm</th>
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<tbody>
<tr>
<td>½</td>
<td>1.5</td>
</tr>
<tr>
<td>¾</td>
<td>3.1</td>
</tr>
<tr>
<td>1</td>
<td>5.7</td>
</tr>
<tr>
<td>1¼</td>
<td>12</td>
</tr>
<tr>
<td>1½</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>35</td>
</tr>
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</table>

Ignores friction loss due to elbows, etc. 4 ft/sec max flow

Let’s do the math!

¾” ID pipe

\[
\frac{1}{4} r^2 \times 4 \text{ ft/sec} \times 60 \text{ sec/min} \times 7.5 \text{ gal/ft}^3
\]

= 5.5 gal/min

Let's do the math!

40 nipple drinkers per side (2/pen x 20 pens/side)
4 cups/min flow (.25 gal/min)

40 \times .25 = 10 gal/min need

1” line = 5.7 gal/min flow
1¼” line = 12 gal/min flow

Drinkers and Water

Drinkers and Water
Drinkers and Water

Other Common Restrictors of Water
- Water Medicator
  - 5/8” hose bib on 1”+ line – 4 gpm max?

5/8” OD plastic elbow
5/8” ID hose

Minimal restrictions

5/8” washing machine hose

Water flow at end of drinkers without medicator in-line @ 11am
Other Common Restrictors of Water

- Water Medicator
  - 5/8” hose bib on 1”+ line – 4 gpm max?

- Filters
  - ¾” inlet on 1”+ line

- Incoming line from well

Follow manufacturers recommendations for water pressure

<table>
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<tr>
<th>Pressure Type</th>
<th>Recommended Pressure</th>
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<td>10 psi wet/dry</td>
<td>20 psi drinkers</td>
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</table>

Effect of pressure on flow

\[
\sqrt{\frac{P_1}{P_2}} = \sqrt{\frac{20 \text{ psi}}{40 \text{ psi}}} = 0.71
\]

Reducing pressure 50% reduces flow to 71% of original

Doubling pressure increases flow to 141% of original
"God gave us two ends - one to sit on and one to think with.
Success depends on which one you use.
Head you win, tail you lose."

--author unknown