Manure Marketing 102

a 44-year learning curve

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Full disclosure

Godfather of Ohio’s mega farms
December 1, 2020

Here’s a farmer, but no one in Ohio — and possibly the nation — has worked more closely with mega farms in the last 25 years than Tom Menke.

The Dayton Daily News has been a consistent partner in dealing with Big Farming. Menke, a consulting firm he founded in 1990, has helped farmers understand the science of agriculture and has also made it a point to balance that knowledge with environmental awareness.

In 2004, Menke decided to focus on the issue of mega farms and their impact on the environment. He started Menke Consulting, a firm that provides consulting services to farmers and others who are interested in the agricultural industry.

Menke has a close relationship with the Ohio EPA, and he has helped farmers understand the regulations governing their operations. He has also helped farmers develop strategies to reduce their environmental impact.

Menke’s work has helped Ohio’s mega farms become more environmentally friendly. He has helped farmers develop strategies to reduce their environmental impact, and he has also helped farmers understand the regulations governing their operations.

The archived presentation is available at: https://lpelc.org/archived-webinars/
It’s a pretty neat system………

NUTRIENT MANAGEMENT

4 million hens

Eggs: 250,000 doz/day

Manure

Grain fields

Feed

Grain

Eggs to grocery

Farm manure sales: $1 million+

The archived presentation is available at:
https://lpelc.org/archived-webinars/
Farm manure sales: $1 million+

Egg sales: $100 million

Broker manure sales 2019: ~$2.6 million

First basic marketing principle: KNOW YOUR PRODUCT!
### Manure Nutrients
**Poultry Layer**

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>lbs/ton</th>
<th>3 T/a rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOISTURE</td>
<td>39.7%</td>
<td></td>
</tr>
<tr>
<td>ORGANIC MATTER</td>
<td>793</td>
<td>2,380 lb.</td>
</tr>
<tr>
<td>TOTAL NITROGEN</td>
<td>79.4</td>
<td>238 lb.</td>
</tr>
<tr>
<td>NH3 - NITROGEN</td>
<td>6.4</td>
<td>19.2 lb.</td>
</tr>
<tr>
<td>Organic – NITROGEN</td>
<td>73</td>
<td>219 lb.</td>
</tr>
<tr>
<td>NO3 - NITROGEN</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>PHOSPHATE - P2O5</td>
<td>43</td>
<td>129 lb.</td>
</tr>
<tr>
<td>POTASH - K2O</td>
<td>39</td>
<td>117 lb.</td>
</tr>
</tbody>
</table>

$N-P-K = 238-129-117$

Current value is approx. $185:

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### Manure – MUCH more than N-P-K

**SECONDARY/TRACE NUTRIENTS – Layer manure**

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>lbs/ton</th>
<th>lbs/ 3 tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALCIUM</td>
<td>145</td>
<td>435 (7 ton high Ca lime)</td>
</tr>
<tr>
<td>MAGNESIUM</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>SULFUR</td>
<td>5</td>
<td>15 (100 lb gypsum)</td>
</tr>
<tr>
<td>BORON</td>
<td>.05</td>
<td>.15 (1 lb of Borate 40)</td>
</tr>
<tr>
<td>IRON</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>MANGANESE</td>
<td>.5</td>
<td>1.5 (0.5 lb MnSO4)</td>
</tr>
<tr>
<td>COPPER</td>
<td>.034</td>
<td>.1</td>
</tr>
<tr>
<td>ZINC</td>
<td>.5</td>
<td>1.5 (1.2 lb ZnSO4)</td>
</tr>
<tr>
<td>OTHERS – ORGANIC MATTER??</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Manure Nutrients
**Swine Deep Pit**

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>lbs/1,000 gallons</th>
<th>5,000 gal/a rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOISTURE</td>
<td>(92%)</td>
<td></td>
</tr>
<tr>
<td>ORGANIC MATTER</td>
<td>503 (72% of solids)</td>
<td>2,515 lb.</td>
</tr>
<tr>
<td>TOTAL NITROGEN</td>
<td>45.3</td>
<td>226 lb.</td>
</tr>
<tr>
<td>NH3 - NITROGEN</td>
<td>31.9</td>
<td>160 lb.</td>
</tr>
<tr>
<td>Organic – NITROGEN</td>
<td>13.4</td>
<td>66 lb.</td>
</tr>
<tr>
<td>NO3 - NITROGEN</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>PHOSPHATE - P2O5</td>
<td>30.4</td>
<td>152 lb.</td>
</tr>
<tr>
<td>POTASH - K2O</td>
<td>32.4</td>
<td>162 lb.</td>
</tr>
</tbody>
</table>

$N-P-K = 226-152-162$

Current value is approx. $205

5,000 gallons = 21 tons: 7x of poultry litter

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The archived presentation is available at: https://lpelc.org/archived-webinars/
Manure Starts as a Seed

And a Seed is a Food Package for the young plant

Are manure nutrients available? Can we count on them when we need them?

The archived presentation is available at: https://lpelc.org/archived-webinars/
**Nitrogen in Layer Manure**

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>LBS/TON availability</th>
<th>3 T/a rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NITROGEN:</td>
<td>79.4</td>
<td>238 lb.</td>
</tr>
<tr>
<td>NH3 - NITROGEN</td>
<td>6.4 100%</td>
<td>19.2 lb.</td>
</tr>
<tr>
<td>Organic – NITROGEN</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>50% is uric acid-N</td>
<td>36.5 100%</td>
<td>109.5 lb.</td>
</tr>
<tr>
<td>50% is organic-N</td>
<td>36.5 33%</td>
<td>36.5 lb.</td>
</tr>
</tbody>
</table>

3 Ton available N = 165 lb/ac
70% of total N is “available”

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**We know the nutrients in manure are not as soluble as fertilizer.**

Water solubility of Phosphorus from various sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Cattle manure</th>
<th>Poultry manure</th>
<th>Swine manure</th>
<th>11-52-0</th>
<th>18-46-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>% water extractable phosphorus</td>
<td>50%</td>
<td>20%</td>
<td>35%</td>
<td>90-100%</td>
<td>90-100%</td>
</tr>
</tbody>
</table>

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**We know the nutrients in manure are not as soluble as fertilizer.**

Rainfall simulator study, NW Ohio, Nov 2009

- P sources applied at 80 lb P₂O₅ per acre
- Total P loss < 2% of amount applied
- Rain @ 2.4”/hour; first 30 minutes runoff

Mullen, 2011, unpublished

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The archived presentation is available at: https://lpelc.org/archived-webinars/
8 different treatments looked at:

- No fertilizer or manure – fall and spring tillage (2)
- Fall and spring applied fertilizer (2)
- 3 tons/a layer manure, fall and spring (2)
- 6 tons/a layer manure, fall and spring (2)
- Each treatment was duplicated.
Manure vs. fertilizer test plots

- Fertilizer used:
  - 42 N, 69 P₂O₅, 90 K₂O, 48 S, 9 Zn
  - 80 N sidedressed
  - No starter fertilizer used.
  - No fertilizer on the manure plots
- Prior crop was wheat and no clover.
- Field had no prior manure history.
- 16 row plots, middle 8 rows harvested.
- 750’ length plots.
- Each plot was replicated.

Manure vs. fertilizer test plots

- Soil tests were taken 4 different times
  - October 11 before any manure or fertilizer applied.
  - March 20 after fall and spring manure or fertilizer applied.
  - June 11 in the standing corn.
  - November 26 after harvest.
- 0-6”, 6-12”, 12-18” and 18-24” samples: 256 total

Fall and spring – no manure or fertilizer

![Graphs showing fall and spring tillage only]

The archived presentation is available at:
https://lpelc.org/archived-webinars/
Livestock and Poultry Environmental Learning Community Webinar Series  December 11, 2020

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Fall and spring – fertilizer only

What timing zone do you want maximum availability?

What timing zone do you want maximum availability?
Fall and spring – 3 ton of layer manure/acre

Fall manure – 3 T

Spring manure 3 T

Fall and spring – 3 ton of layer manure/acre

Fall manure – 3 T

Spring manure 3 T

What about traces (zinc)?

Spring fertilizer (+ 9 lb Zn)

Spring manure 3 T

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Then there’s the resistance......

What we typically hear from those whom manure doesn’t seem to fit their agenda:

1. The nutrients aren't available.
2. The nitrogen is all lost.
3. The high phosphorus ties up elements like zinc.
4. That stuff smells.

In response:

1. The nutrients aren’t available.
In response:

1. The nutrients aren’t available.
   • Yes they are: even more so than fertilizer.

2. The nitrogen is all lost.
   • No it’s not – but you must manage it to maximize its availability.
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   • Nope. Only chemical P seems to do that.

4. That stuff smells.
In response:

1. The nutrients aren’t available.
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2. The nitrogen is all lost.
   • No it’s not – but you must manage it to maximize its availability.
3. The high phosphorus ties up elements like zinc.
   • Nope. Only chemical P does that.
4. That stuff smells.
   • No.

In response:

1. The nutrients aren’t available.
   • Yes they are: even more so than fertilizer.
2. The nitrogen is all lost.
   • No it’s not – but you must manage it to maximize its availability.
3. The high phosphorus ties up elements like zinc.
   • Nope. Only chemical P does that.
4. That stuff smells.
   • No. It doesn’t have a nose.
   • You smell. It stinks.

Get the other goodies fertilizer doesn’t have
Good for the soil and the things that make it alive and healthy: **structural**

- Aggregate Stability
- Infiltration
- Water Holding Capacity
- Bulk Density

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Manure is good for the soil and the things that make it alive and healthy: **biological**

- Bacteria & Fungi
- Abundance
- Respiration
- Earthworms
- Nematodes
- Microbial Diversity (PLFA)
- Microarthropods

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**TAKE HOME MESSAGE**

Based upon the 5th R - the Right Data that all of the other 4 Rs are all based upon:

**Manure is the Right Form**

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The archived presentation is available at:
https://lpelc.org/archived-webinars/
Based upon the 5th R (the Right Data) that all of the other 4 Rs are all based upon:

**Manure is the Right Form**

- **Nutrient availability:**
  - Manure nutrients are sequestered in an organic matrix and are released when the soil warms up
- **Broad source of all important crop nutrients:**
  - All of the major, secondary and trace elements in various, complex forms

**Get the other goodies fertilizer doesn’t have**

**TAKE HOME MESSAGE**

Based upon the 5th R (the Right Data) that all of the other 4 Rs are all based upon:

**Manure is the Right Form**

- **Beneficial impact on soil health:**
  - Positive effects of manure on soil microbes, organic matter, beneficial fungi, soil aggregate stabilization
- **Water quality protection:**
  - Manure P is less soluble than fertilizer P, yet more available

The archived presentation is available at: https://lpelc.org/archived-webinars/
TAKE HOME MESSAGE

Based upon the 5th R (the Right Data) that all of the other 4 Rs are all based upon):

**Manure is the Right Form**

- **Cost effectiveness:**
  - Typically less than 30-50% the cost of the equivalent commercial nutrient values
  - AND – often increases yields over the same applied synthetic fertilizer nutrients.

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THANK YOU!

Strike pay dirt with manure.

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