Phosphorus Management
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Endres Berryridge Farms
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Welcome to the Farm
Economic Impact

- Milk 350 dairy cows three times a day
- 30,000 lbs of milk annually per cow
  - 12 gallons per day per cow
- $21,000 economic value per cow annually
- $7.35 million for whole heard annually
Cropland

- 1,100 acres
- 50% owned & cash rented
Managing the Phosphorus Impact
The Closed Loop Approach

1. Feed Rations (Cow)
2. Manure Pit Storage
3. Nutrient Management Plan
4. Application
5. Crop Practices
6. Harvesting Crops
7. Feed Storage
Step 1: The Cow

• Need to know phosphorous output per cow

• Example for one cow:
  • 45 gal waste X 365 days = 16,425 gal annual waste
  • 16,425 gal / 1,000 gal = 164.25 thousandths
  • 164.25 thousandths X 9.6 lbs p205 per thousand gal
    = 156 lbs total phosphorus per cow annually

• Berryridge’s herd output:
  • 156 lbs X 350 cows = 54,600 lbs of p205 annually
Step 2: Manure Storage

- Adequate storage
- Allows farmers to store instead of haul during times of high risk
- Allows for more efficient hauling
Step 3: Nutrient Management Plan

- Determines Nitrogen, Phosphorus & Potassium amounts
  - Test soil every four years
  - Record harvest yields annually
Step 4: Application

• Different applications used on different types of land

• Application types
  • Top spread
  • Top spread followed by incorporation of tillage
  • Direct injection from manure tanker
  • Direct pump from storage to field and incorporated
Types of Application

Top Spread

Top Spread followed by incorporation of tillage
Types of Application Cont.

Direct Injection from Manure Tanker

Direct Pump from Storage to Field & Incorporated
Step 5: Cropping Practices

- Proper tillages to minimize run-off
- Types of tillage
  - Conventional tillage
  - Minimal tillage
  - No tillage
Types of Tillage

Conventional Tillage

Minimal Tillage
Types of Tillage Cont.

No Tillage
Step 6: Harvesting Crops

- Yield Tracking
- Residue Management
- Cover Crop
Step 7: Feed Storage

- Concrete Bunkers
- Plastic Bags
- Moister
- Run-off
Step 8: Feed Rations

- Test forages, grains & bi-products
- Balance phosphorus levels in rations
The Closed Loop Approach

- Cow
- Manure Pit Storage
- Nutrient Management Plan
- Application
- Crop Practices
- Harvesting Crops
- Feed Storage
- Feed Rations
How do we know how much phosphorus is leaving the loop?
Estimated Phosphorus Leaving the Loop

- UW-Discovery farm’s research of field edge monitoring
  - Average loss per acre=1/2 lb of p205
- Other UW models
  - Average 0.3 lbs per inch of runoff water
What is the percentage of total phosphorus per acre leaving the loop?
Soil Testing

• Top 6 inches of the soil column tests 100 parts per million phosphorus
• Soil test of 100 parts per million = 2,600 lbs p205
• For every inch of rain that runs-off the field, 0.3 lbs of p205 leaves the field
• 2,600 lbs p205 - 1 lb p205 = 2,599 lbs p205
  • This is the total amount of p205 staying on the field
• 2,599 lbs p205 OR 99.96% p205 is left on the fields per acre
Keeping the P on the Field

- Field Practices
- Crop Rotation
- Buffers
- Cleaning Drainage Ditches
Field Practices

- Contour Stripping
- Contour Farming
- Water Ways
- Terraces
- Sediment Containment Structures
Crop Rotation

- Legumes
- Crop Residue
- Cover Cropping
Buffers

- Areas of concentrated flow
- Along drainage ditches
Cleaning Drainage Ditches

- Phosphorus in sediment
- Last chance to close the loop
- Clean and secure
MOVING FORWARD
Farming with the Latest Technology

- Grid Mapping
- Yield Tracking
- Precise Tillage
- Variable Rates
- Precise Planting
Education & Outreach

• Don’t play the “blame game” or pass the buck
• Create alliances between rural & urban entities
• Understand challenges for both rural & urban
• Create a feasible plan that minimizes regulations for all
Sources

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