Opportunities for Precision Manure Application

Kevin Erb, UW-Extension

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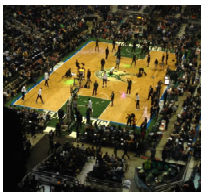
- Fertilizer easily blended on the fly to match need, manure unknown and variable

Why is manure application "late to the game"?

- Economics of precision tech are different in a forage-based livestock system



Why is manure application "late to the game"?

- Forage/manure systems and precision technology
  - Corn-Soy rotation: data every year
  - Yield monitor data lacking on forage harvesting equipment

Why is manure application "late to the game"?

- Forage/manure systems and precision technology
  - Manure density & nutrients variable
  - Limited applicability (could vary rate based on soil grid map, but not on manure's nutrient content)

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- Forage/manure systems and precision technology
  - Equipment considerations
    - Gravity flow unloading issues with flow meters
    - Hose rupture potential of changing rates

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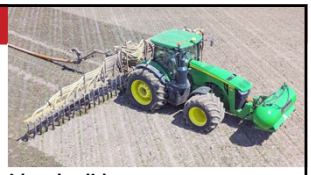

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- Integration of weather/soil data with irrigation/application
- Integration of verified as-applied data with planning software

Real-Time Nutrient Sensing

- Multiple companies with liquid on the market
  - Will hear from John Deere later in this webcast
- Solid manure/compost sensors expected in US later this year

Real-Time Nutrient Sensing

Benefits:

- When excess rain/drought impact nutrient concentrations, over/under applications are less likely

Real-Time Nutrient Sensing

Benefits:

- Can adjust rate for variations in
  - soil type/texture
  - soil fertility
  - crop history

Nutrient Sensing Considerations

- Regulations may still require a sample
  - Are you in violation if lab sample is significantly different?
  - Expect differences – both are "snapshots" of a moment in time
- Be prepared to justify why your rate is different than the plan

Solid Manure Density Sensing

The problem: manure density (moisture, bedding) varies within a spreader load, resulting in uneven spreading

- Density sensors use load cells to constantly measure weight

Solid Density Sensing Technology

Density sensing keeps rate even by adjusting

- Chain speed/belt speed
- Beater speed/spinner speed
- Tractor Speed
- Apron

GPS-enabled automated shutoffs to reduce human error

- Simple on/off (tanker or solid spreader)
- Section control (sections of toolbar)
- Requires GPS controller, pre-mapped field, pump control, and may require diversionary piping on tanker

GPS-enabled automated shutoffs to reduce human error

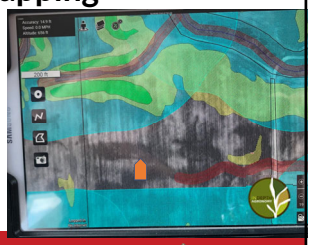
- Automated systems greatly reduce human error spreading in setbacks
- Can also be used to avoid headland application

Low-Cost Hazard Mapping

- Answers the "Where am I at in this field" question
- Ideal for operations that are not able to invest in a full GPS setup

Low-Cost Hazard Mapping

- GPS-enabled Android/iPad tablet with maps pre-loaded (no cellular service req'd)
- Operator knows where they are in relation to setbacks at all times



Low-Cost Hazard Mapping Considerations

- Secure both tablet AND charging cord to avoid "repurposing"
- Requires consultant or knowledgeable employee to set up
- Pilot project: www.InDepthAgronomy.com

Integration of weather/soil moisture data for irrigation systems

- Rainfall sensors automatically turn off irrigation system when triggered
- May be "too late" to prevent runoff
- Remote soil moisture sensing calibration: https://www.cocorahs.org/Content.aspx?page=soilmoisture

Automated updating of planning software (in development)

- As applied data imported into software to reduce work/eliminate data entry errors
- Data MUST BE VERIFIED by crop consultant before being integrated into a reporting platform for regulatory purposes

Future Development

- Many of these technologies highlighted/demonstrated as part of NRCS-CIG grant field days/events
- Integration into Advanced Nutrient Management Scenarios as part of CIG project.

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