Evaluating different types of swine manure for organic hybrid rye production

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WHAT DID WE DO?

- In fall 2021 and 2022, we started field trials at the West Central Research and Outreach Center
- In early September, we applied 5 different rates of 3 different manure types to supply 0 to 240 pounds of first year nitrogen per acre
- Different manure types included:
  - liquid swine finishing manure
  - raw (solid) bedded pack from swine hoop barn
  - composted bedded pack from the hoop barn
- Manure was incorporated within 12 hours and hybrid rye was planted within the following week

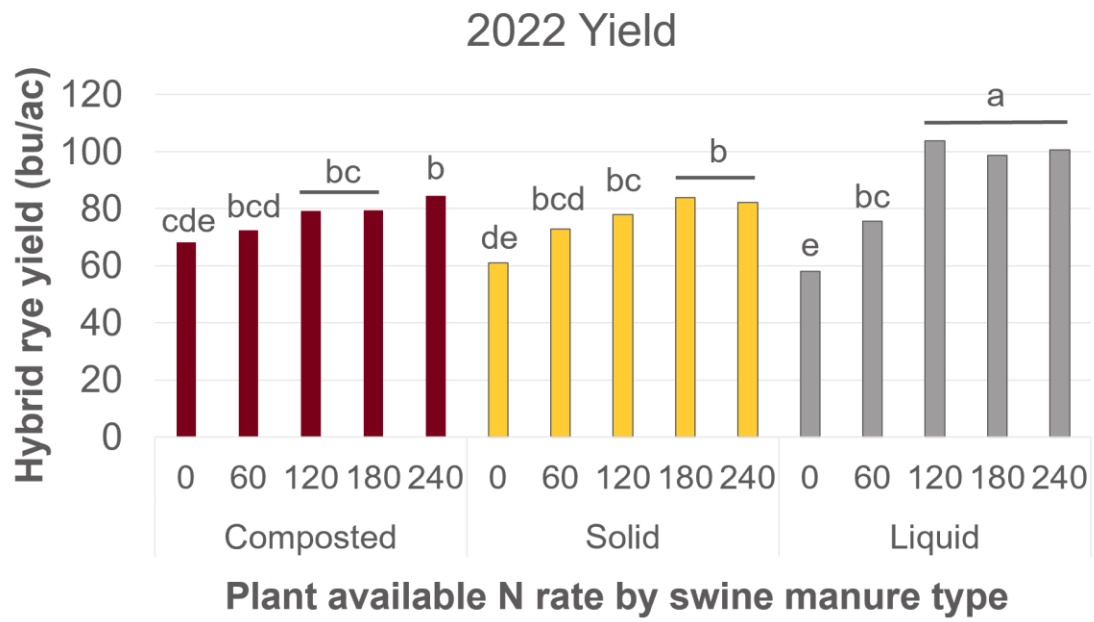
WHY DID WE DO IT?

Hybrid rye is being grown in Minnesota as an alternative to traditional winter rye varieties. In organic production systems, the grain may be used as an alternative feed for livestock while the straw can be used for bedding. A new research project is evaluating hybrid rye for swine production, so we wanted to know if various types of swine manure (liquid, solid, or composted) could be used as a primary nutrient source.

WHAT DID WE FIND?

The first of this two-year study has been completed, but the second-year crop is still being processed! In the first year, we found:

- Use of liquid swine manure resulted in the highest grain yield (around 100 bushels per acre)
- Solid and composted swine manure produced around 80 bushels per acre each at the highest application rates
- Crude protein was not affected by nutrient source, but increased with increased N application rate



*Note that if the same letter appears above two bars that you are comparing, the yield was not statistically different ($P > 0.05$).

WHAT DID WE LEARN?

- Hybrid rye yield was not significantly increased when liquid swine manure was applied above 120 pounds of first-year N per acre (~5,000 gallons per acre).
    - This is in line with fertilizer recommendations for conventionally managed hybrid rye (110-150 pounds of N per acre is recommended).
- For solid and composted manure, yield was not significantly increased above 60 pounds of first year available nitrogen per acre (about 4-5 tons per acre).
    - Higher rates improved yield slightly, but significantly overapplied phosphorus and potassium (anywhere from 60 to 400 pounds of phosphorus and 115 to 480 pounds of potassium!).
- When working with manure, there is always a balance between optimizing the use of nitrogen while preventing buildup of soil phosphorus to very high levels.

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