Calculating Plant Available Nitrogen (PAN)
Available Organic Nitrogen

- Only part of the organic nitrogen in manure becomes plant-available (through the process of **mineralization**) the year it’s applied.

- See *Infocard* for mineralization rates.

- Mineralization rates vary by animal species.
Here are the manure mineralization rates on the Infocard.
Available Ammonium Nitrogen

- Ammonium (NH₄-N) is a plant-available form.

- Ammonium (NH₄-N) can be lost to the atmosphere (through the process of volatilization) when manure is left on the soil surface after application.
Here are the ammonium (NH₄-N) conservation factors on the Infocard.
PAN Calculation

\[ PAN = [(organic\ N \times \text{min. rate}) + (NH_4-N \times \text{conservation factor})] \]

Where: \( organic\ N = (total\ N) - (NH_4-N) - (NO_3-N) \) (if reported)
- beef manure
- operator plans to incorporate via turbo-till within 6 hours of application
1. Total nitrogen (N) (%)  
   - Obtain value from manure analysis.  
   - 0.83

2. Ammonium nitrogen (NH$_4$-N) (%)  
   - Obtain value from manure analysis  
   - 0.21

3. Organic nitrogen (%)  
   - Subtract #2 from #1.  
   - 0.62

4. Manure mineralization factor  
   - Expressed as a decimal.  
   - Refer to the Infocard.  
   - 0.35

5. Available organic nitrogen (%)  
   - Multiply #3 by #4.  
   - 0.22

6. Ammonium conservation factor  
   - Depends upon incorporation practices.  
   - Refer to Infocard.  
   - 0.57

7. Available ammonium nitrogen (%)  
   - Multiply #2 by #6.  
   - 0.12

8. PAN in manure (lbs/T or lbs/1000 gal)  
   - Add #7 to #5. Multiply by 20 if manure is solid or semi-solid.  
   - Multiply by 83.7 if manure is liquid.  
   - 6.8