

### How N is Lost from Soil

- Plant Uptake
- Denitrification
- Volatilization
- Leaching
- Immobilization

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### AMENDMENT TO LAST LECTURE

- Nitrification is conversion of ammonium-N to nitrate-N (covered last week)
- Ammonium is held by the soil
- Nitrate not held by soil and moves with water
- Plants can take-up both ammonium and nitrate-N

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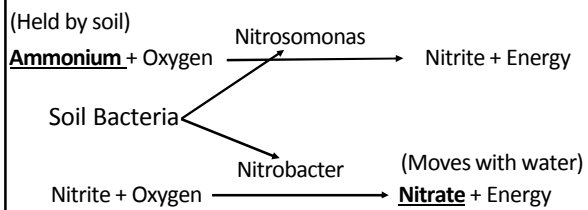
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### NITRIFICATION



Environment needs to favor microbial activity

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### PLANT UPTAKE

- Nitrogen needed in largest amount
- Nutrients taken up through roots in soil water
- Must take-up most N as  $\text{NO}_3^-$  since moves with water
- Need about 275 lbs. N/Acre in plant before maturity




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### DENITRIFICATION

- **Denitrification** is the process of nitrate being converted to a gas and lost to the atmosphere
- Happens when soil is saturated and microbes are involved
- Produces global warming gas (296x more impact than carbon dioxide)




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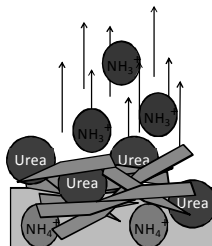
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### VOLATILIZATION

- Loss of N as a gas before entering soil
- Top-dressed urea or urea-containing fertilizers have the greatest potential
- Takes place shortly after application (24-48 hours)
- Affected by soil pH, temperature and residue cover




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### VOLATILIZATION DEMONSTRATION

- Carefully smell the containers
- Untreated will have a strong smell of free ammonia
- Demonstrates volatilization and products that minimize loss




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### LEACHING LOSS

- Movement of N with soil water (nitrate-N)
- Increases with subsurface tile drainage
- Connection between surface and subsurface




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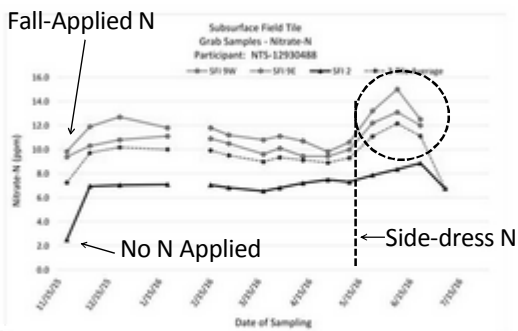
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### Nitrate-N Concentration in Subsurface Tile Water




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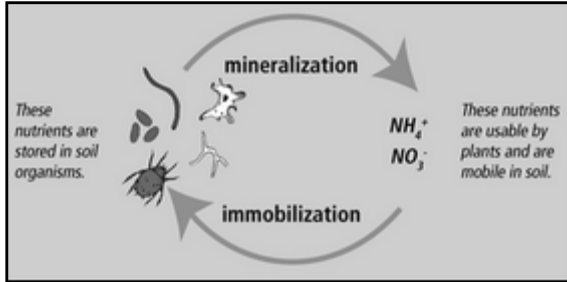
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### IMMOBILIZATION

- The conversion of plant-available forms of nitrogen to plant-unavailable organic forms.




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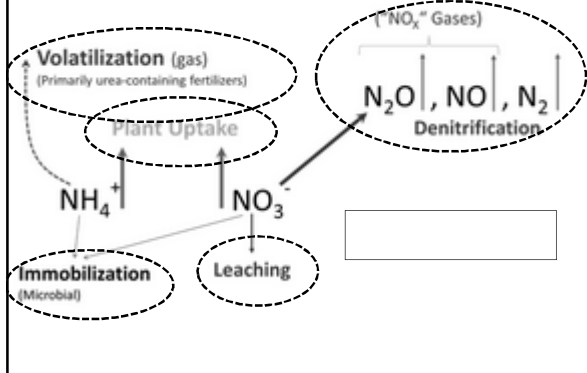
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### NITROGEN LOSS




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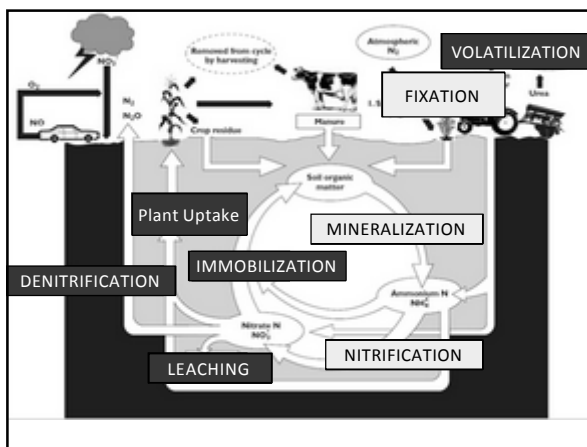
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**ASSIGNMENT 3**

- Watch the Youtube video about the smoking soil
- <https://www.youtube.com/watch?v=eroGrAjlLZk&t=17s>
- Comment on what you thought about the video

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