



Introduction to Nitrogen in the Soil



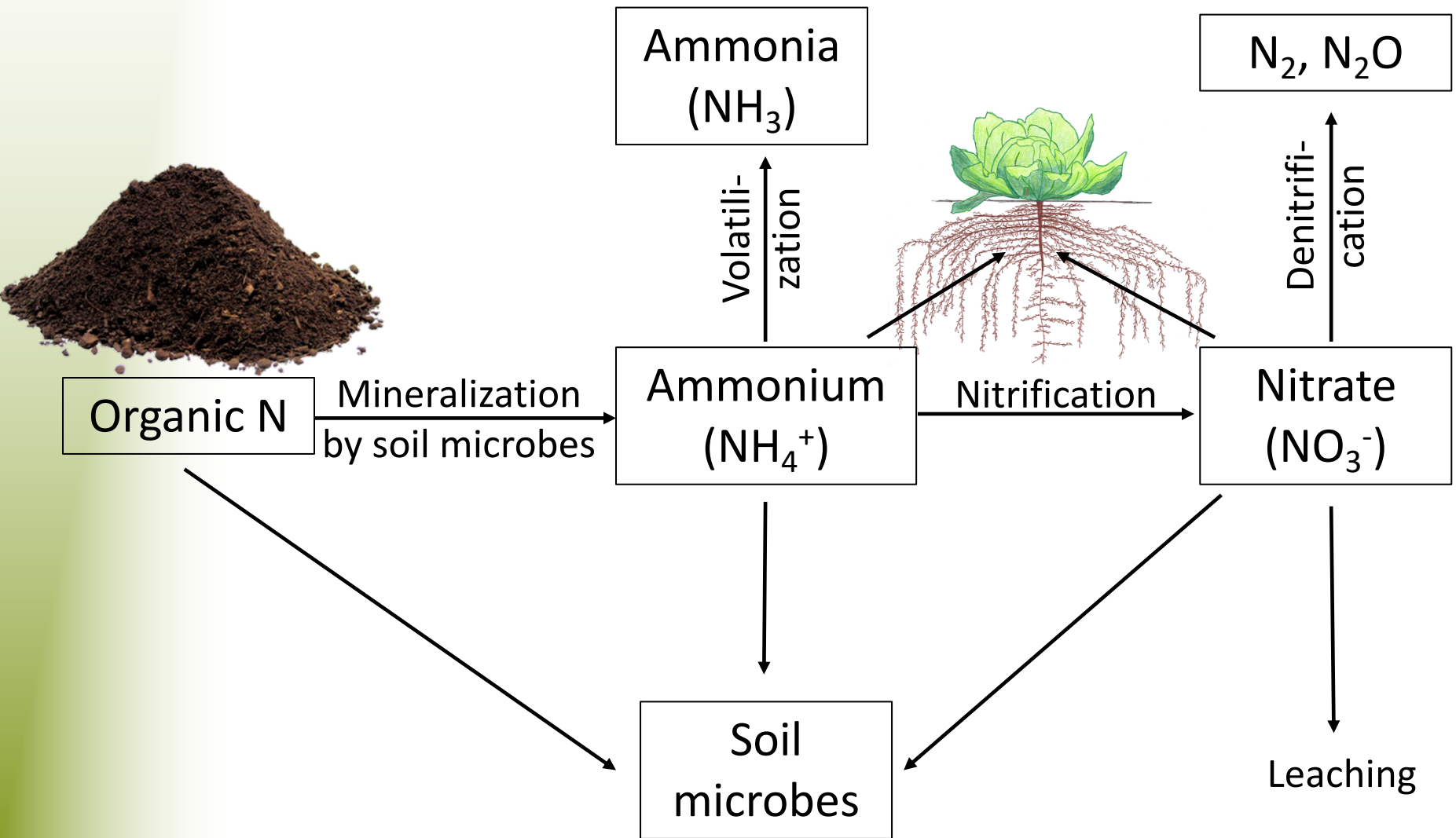
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Organic N Management Workshop
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Nitrogen pools and turnover in soil





Factors affecting decomposition and N mineralization

- Soil temperature
- Soil moisture
- Quality of organic source
 - Nitrogen content
 - C to N ratio
 - Availability of C and N
- Management

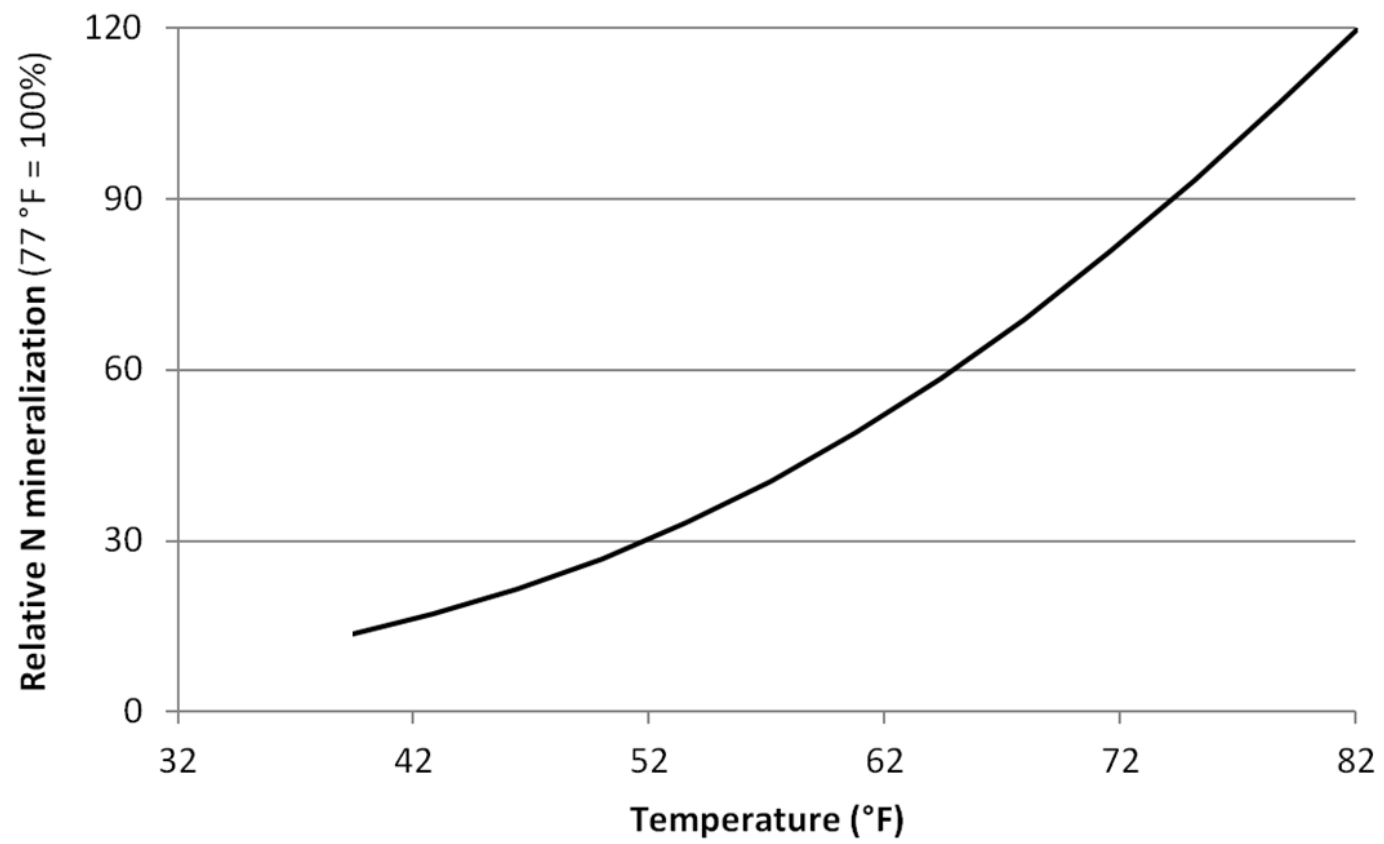


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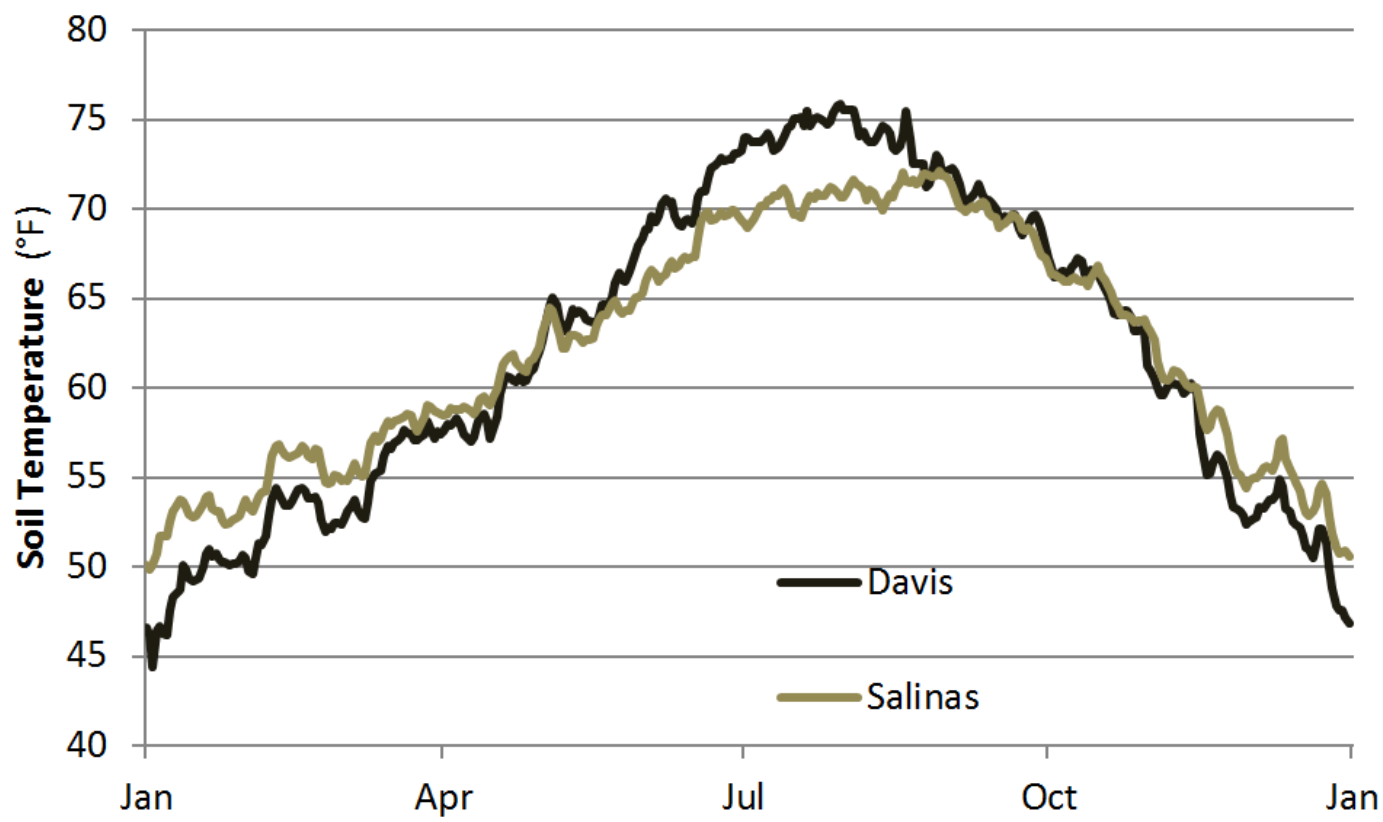


Effect of temperature on N mineralization





Soil temperature



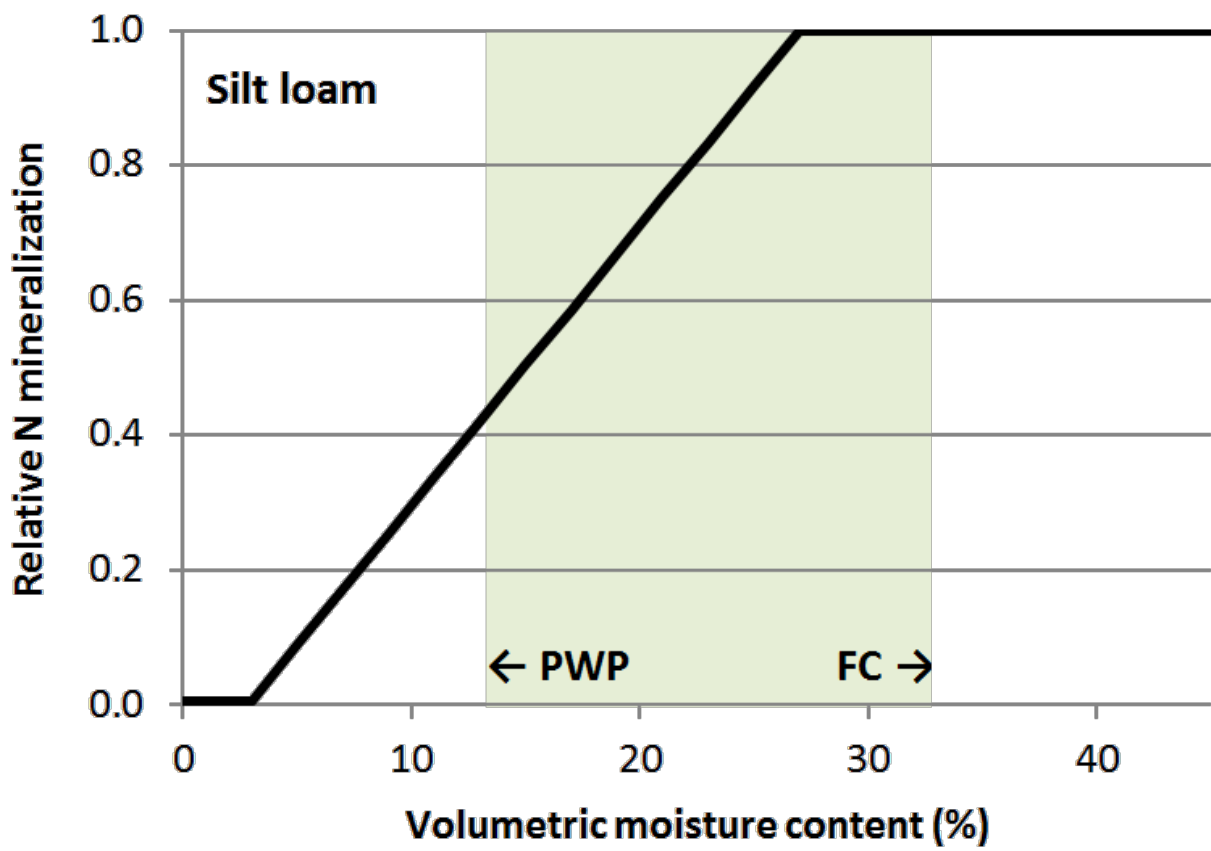


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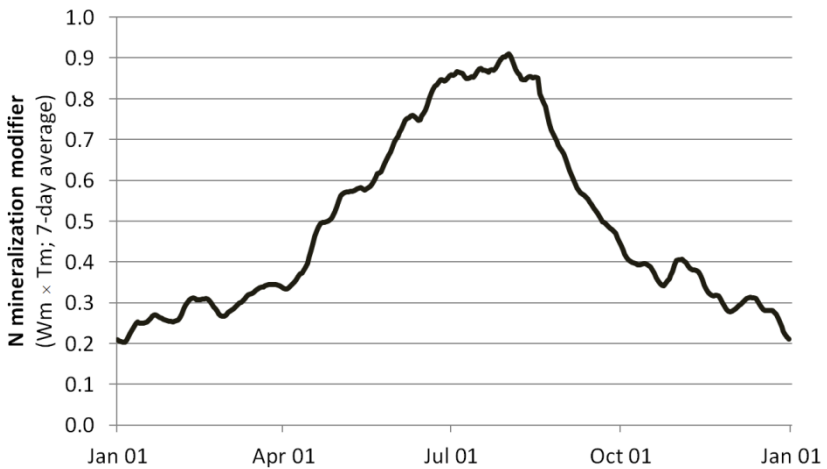
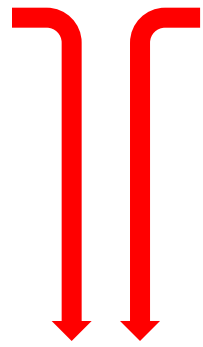
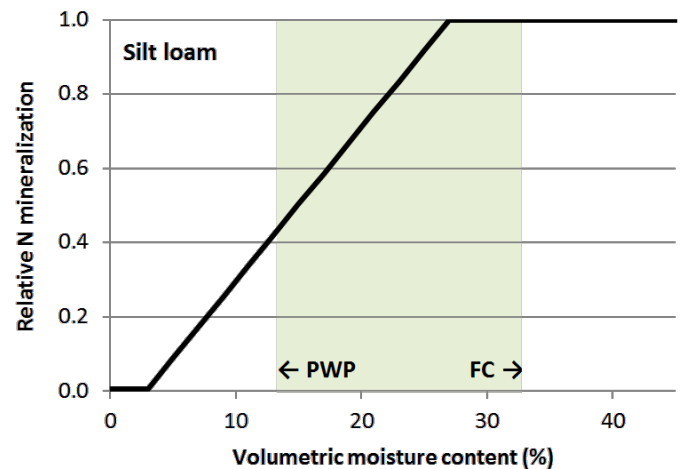
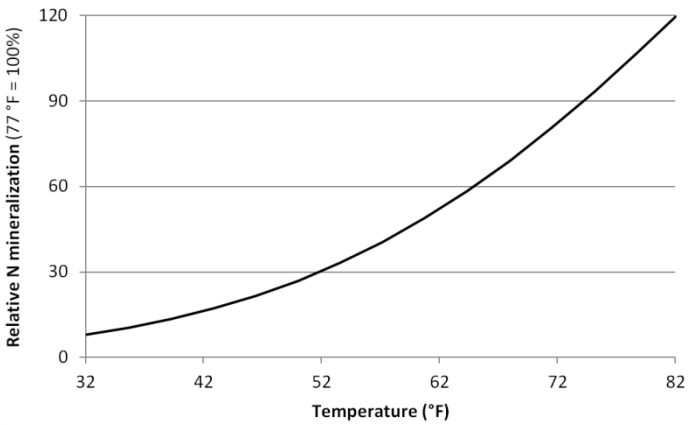


Effect of soil moisture



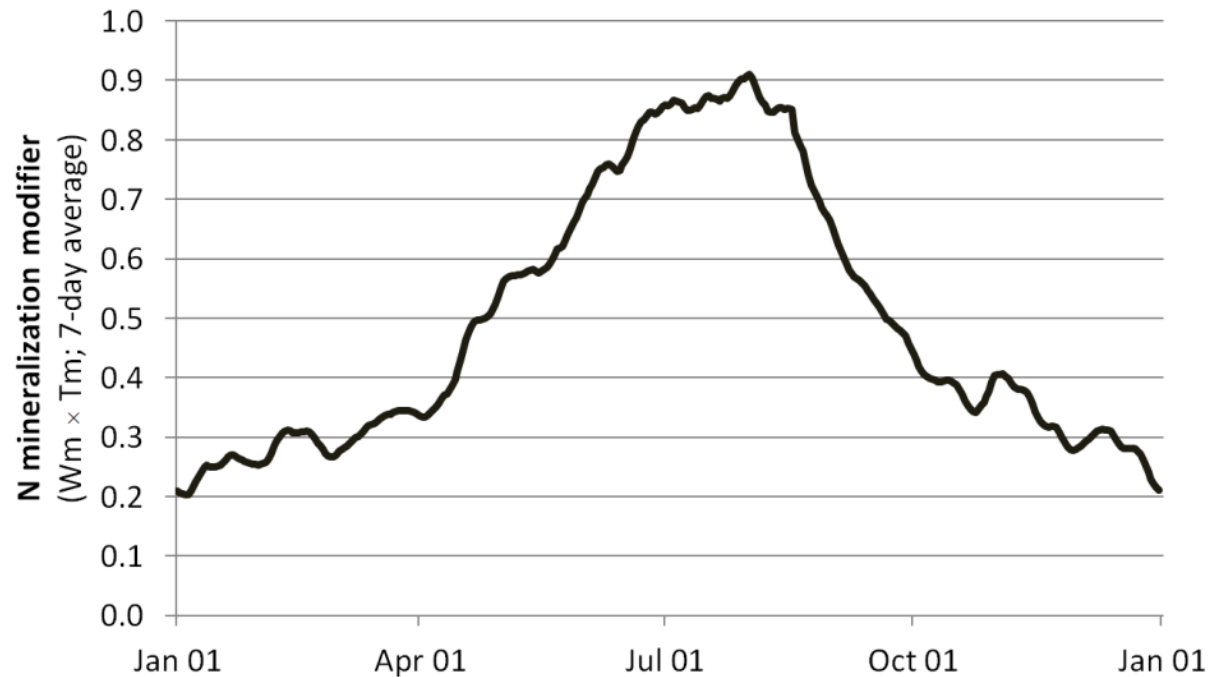


Temperature and moisture effects





Temperature and moisture effects



- Winter, spring: Temperature is limiting
- Fall: moisture is limiting

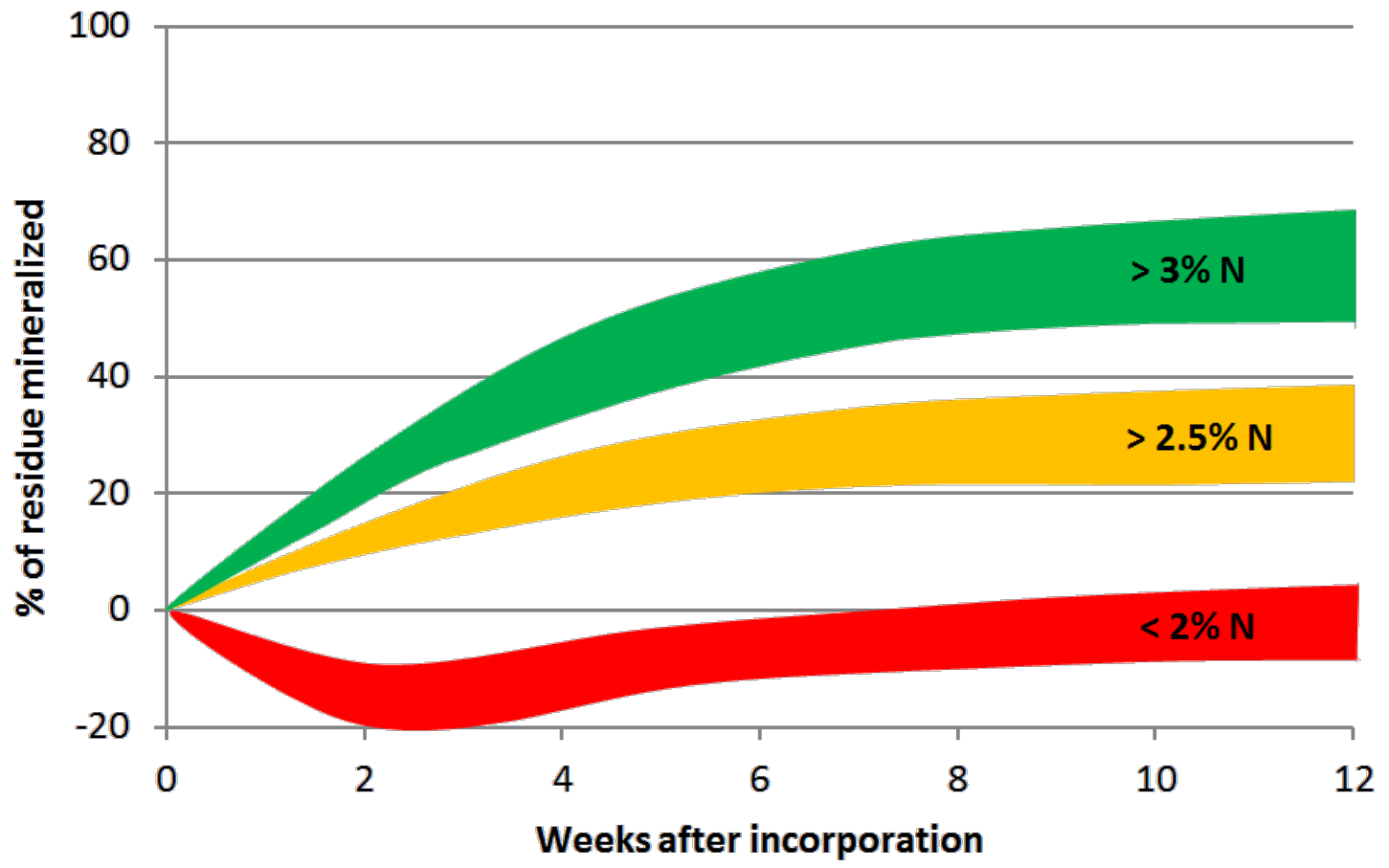


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Factors affecting N mineralization: N content





Nitrogen mineralization

- Soil microorganisms decompose residue
- Need N and C as building blocks for their own biomass
- C is also used as energy source
- **N mineralization:** Release excess N in the form of NH_4^+ into soil solution
- **N immobilization:** Uptake of NO_3^- or NH_4^+ from soil solution and incorporation into microbial tissue



Net mineralization or immobilization?

- Depends mainly on the C/N ratio of the organic substrate
 - $C/N < 20$: Net mineralization
 - $C/N > 30$: Net immobilization

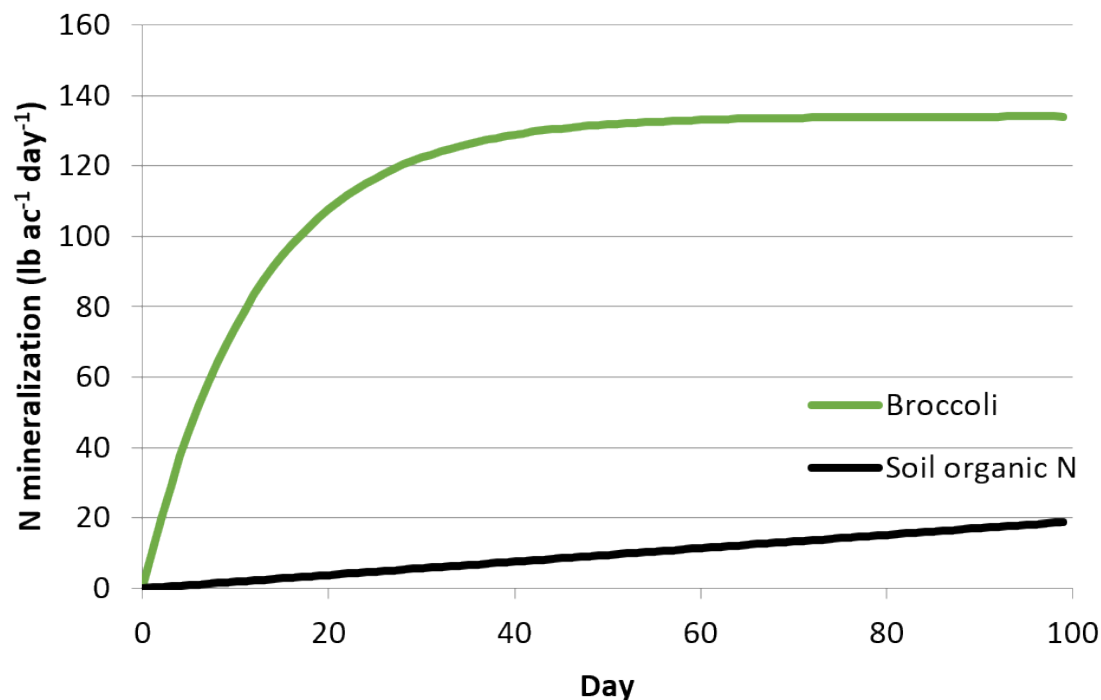


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Availability of C and N



Assumptions:

Broccoli: C/N ratio = 10; 210 lb N/acre

Soil organic matter: C/N ratio = 10; 2 % in top foot (3,500 lb N/acre)



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Management effects

Application of a pelleted organic fertilizer
(4-4-2 \Rightarrow 4% N, 4% P_2O_5 , 2% K_2O)

