

Nitrate Leaching Evaluations in Lettuce



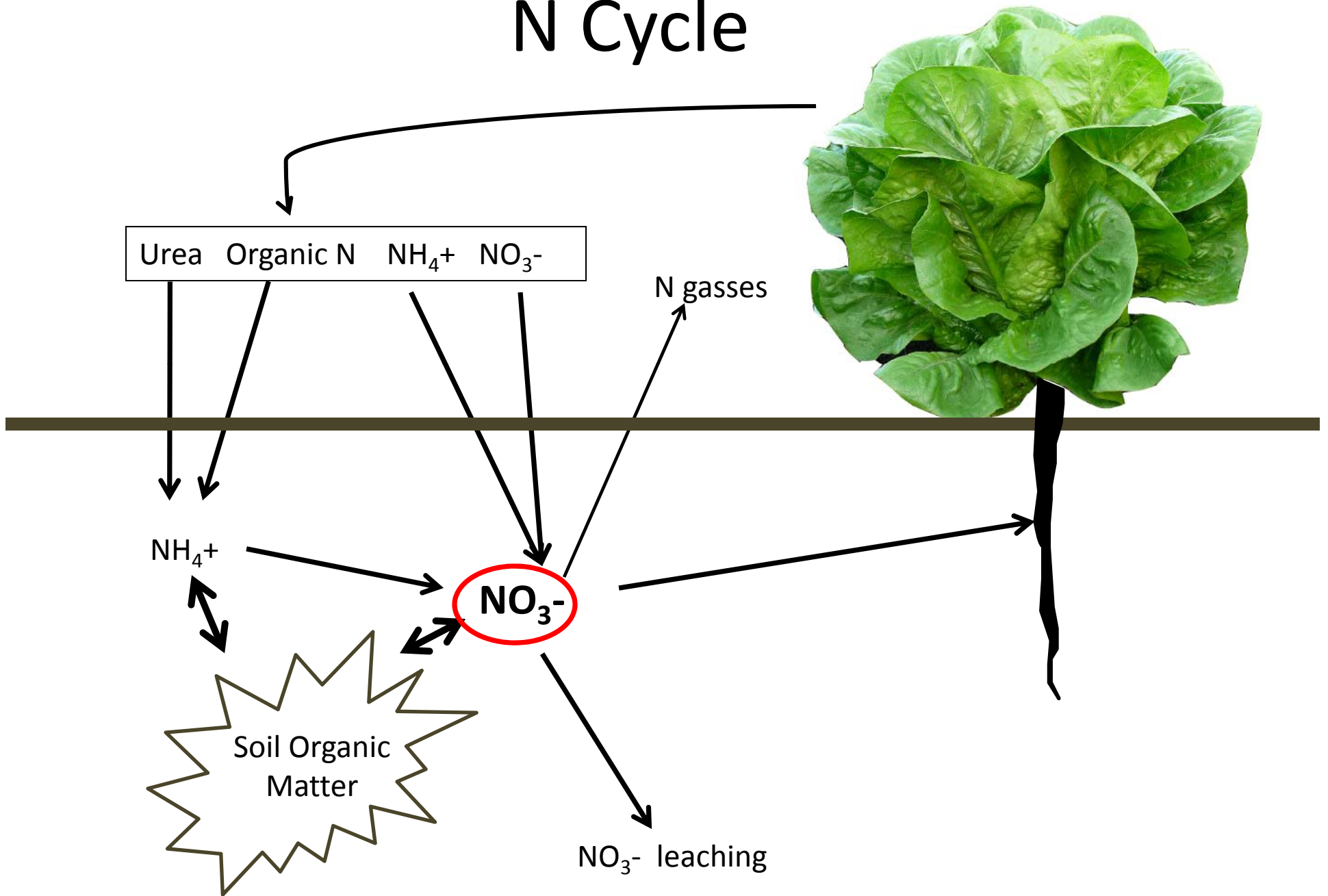
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Introduction

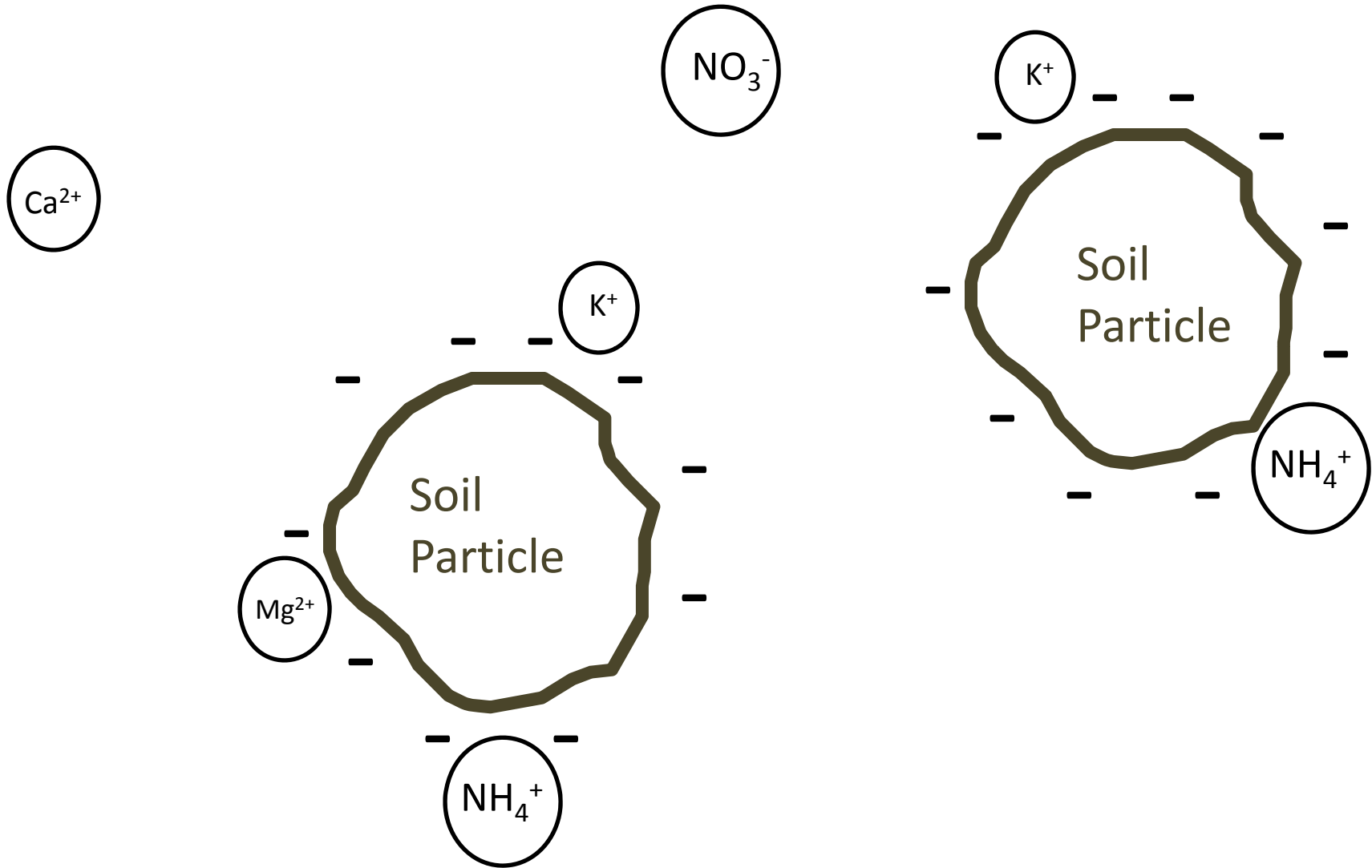
Lettuce production has a high potential for nitrate leaching due to:

1. Low tolerance of moisture stress
2. Shallow root system of lettuce
3. High value crop, relatively low fertilizer costs
4. Not accounting for residual nitrate pools

N Cycle



Why does nitrate leach?



Objectives of field trial

1. Estimate nitrate leaching for a range of fertilizer N applications under moderate leaching conditions.
2. Understand how nitrate utilization efficiency can be improved.

Field Site

- Hartnell east campus on a DG soil
- Romaine seeded on 40" beds (June 24)
- Germinated using buried drip
- Water applied at 116% of cumulative ET_c



Treatments

- 5 nitrogen treatments
- UAN 32 injected in 3 applications



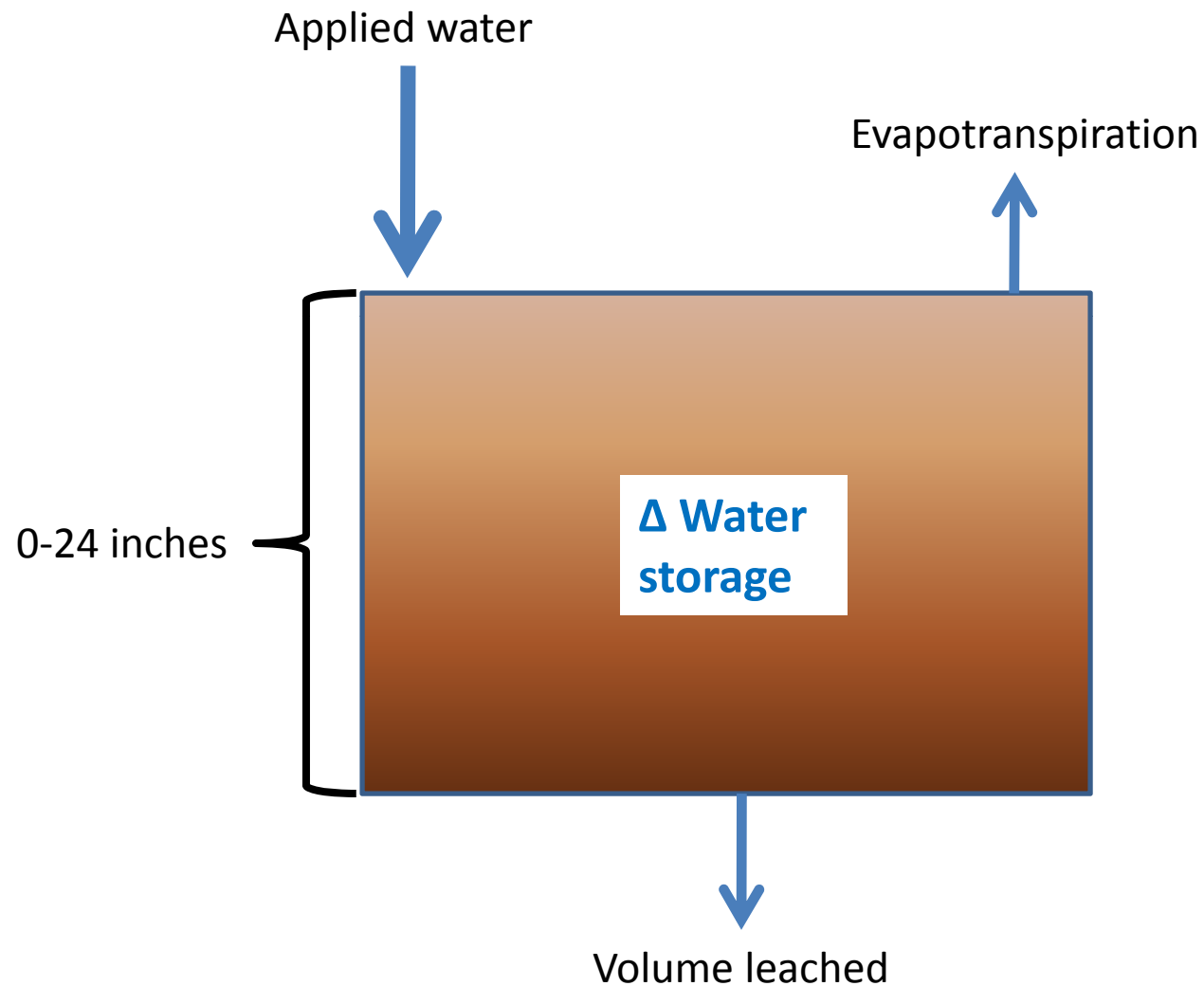
Treatment	Planting 1 DAP	Fertigation 1 27 DAP	Fertigation 2 34 DAP	Fertigation 3 41 DAP	Total (lbs N)
1	10	0	0	0	10
2	10	15	25	25	75
3	10	40	50	50	150
4	10	65	75	75	225
5	10	90	100	100	300

Suction Lysimeters

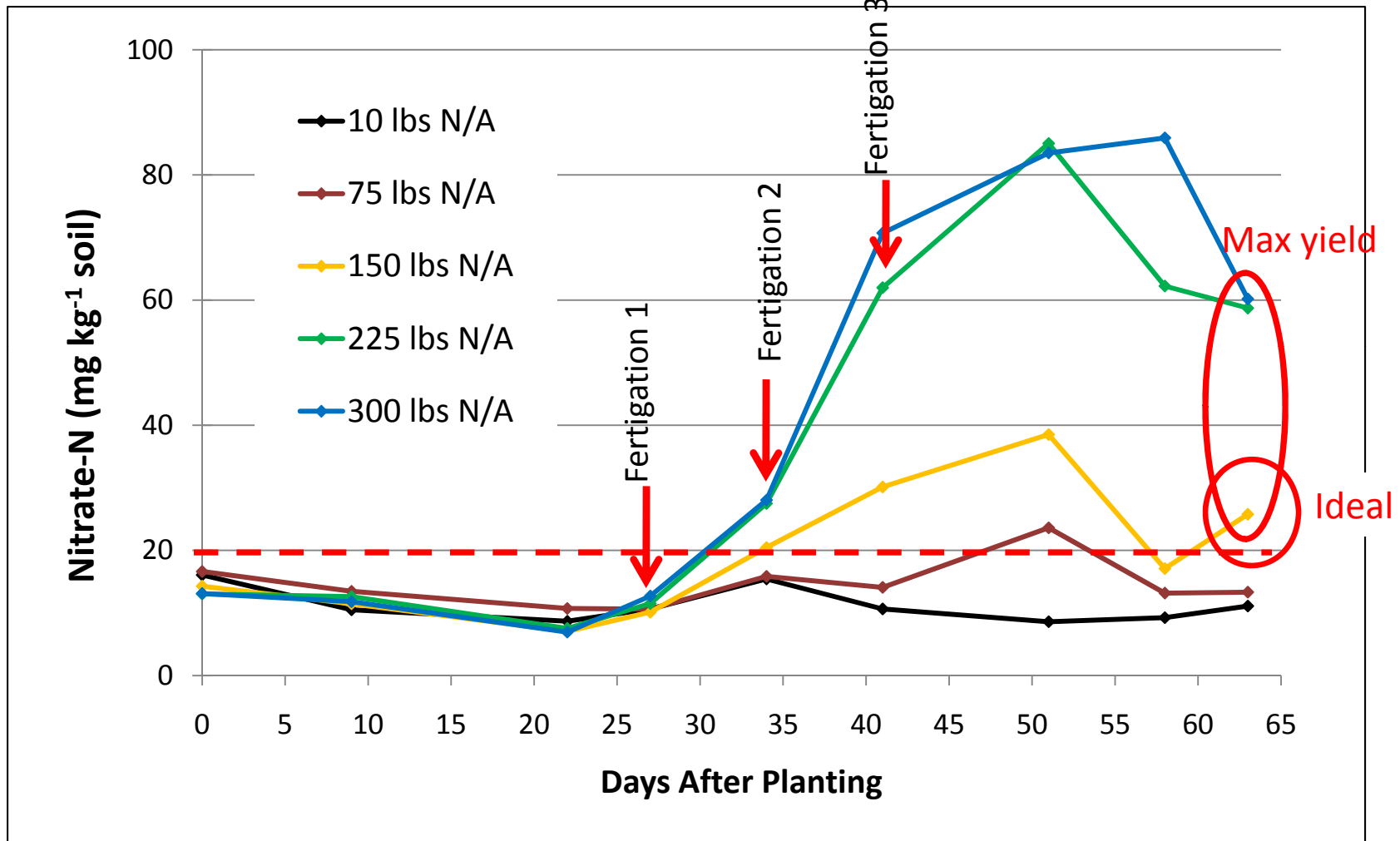
- Installed 24" deep
- Constant suction
- Pump turned on during irrigation
- Leachate collected 24+ hrs later
- Nitrate in leachate quantified



Estimating leaching volumes

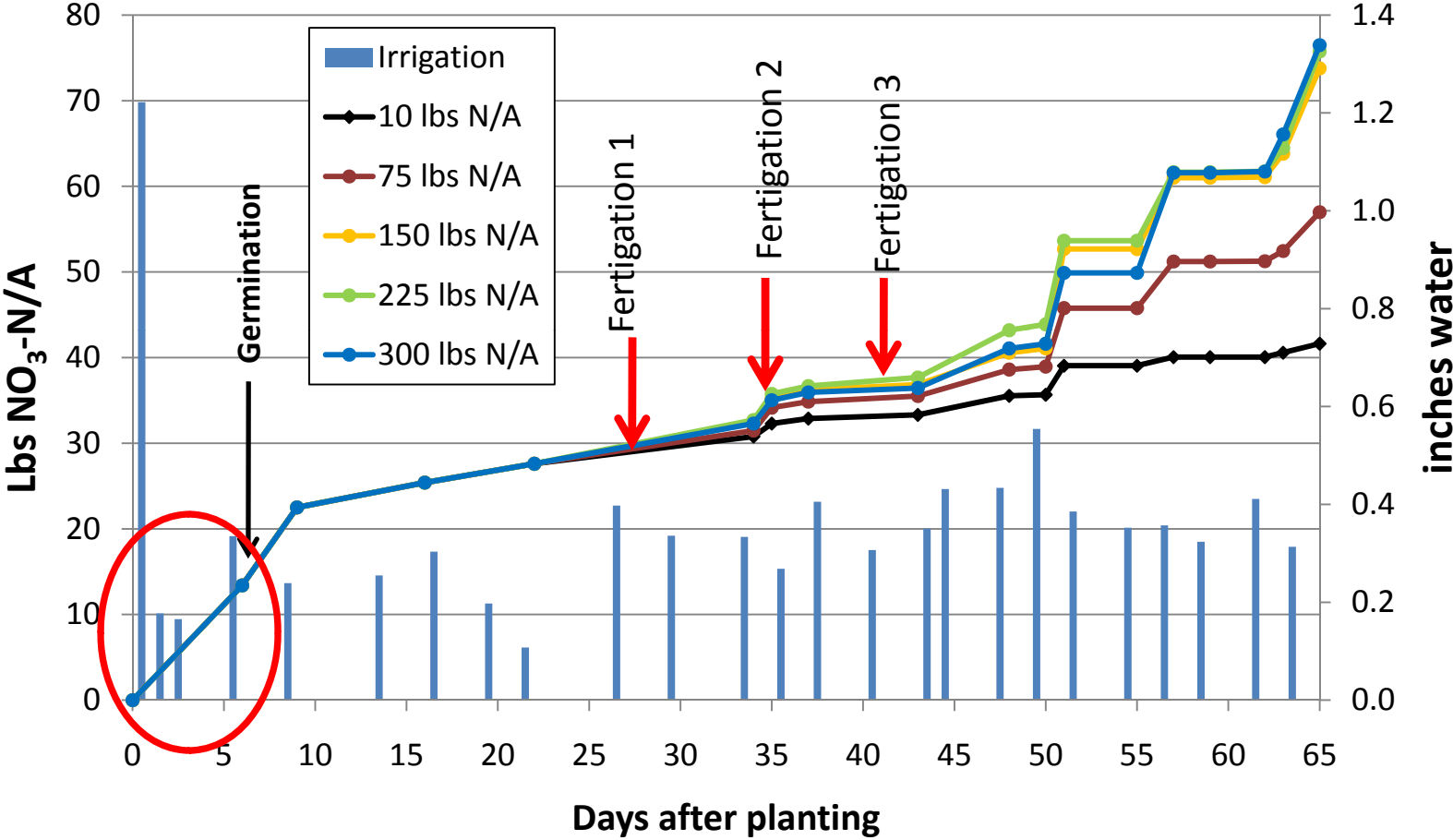


Soil Nitrate (0-1')



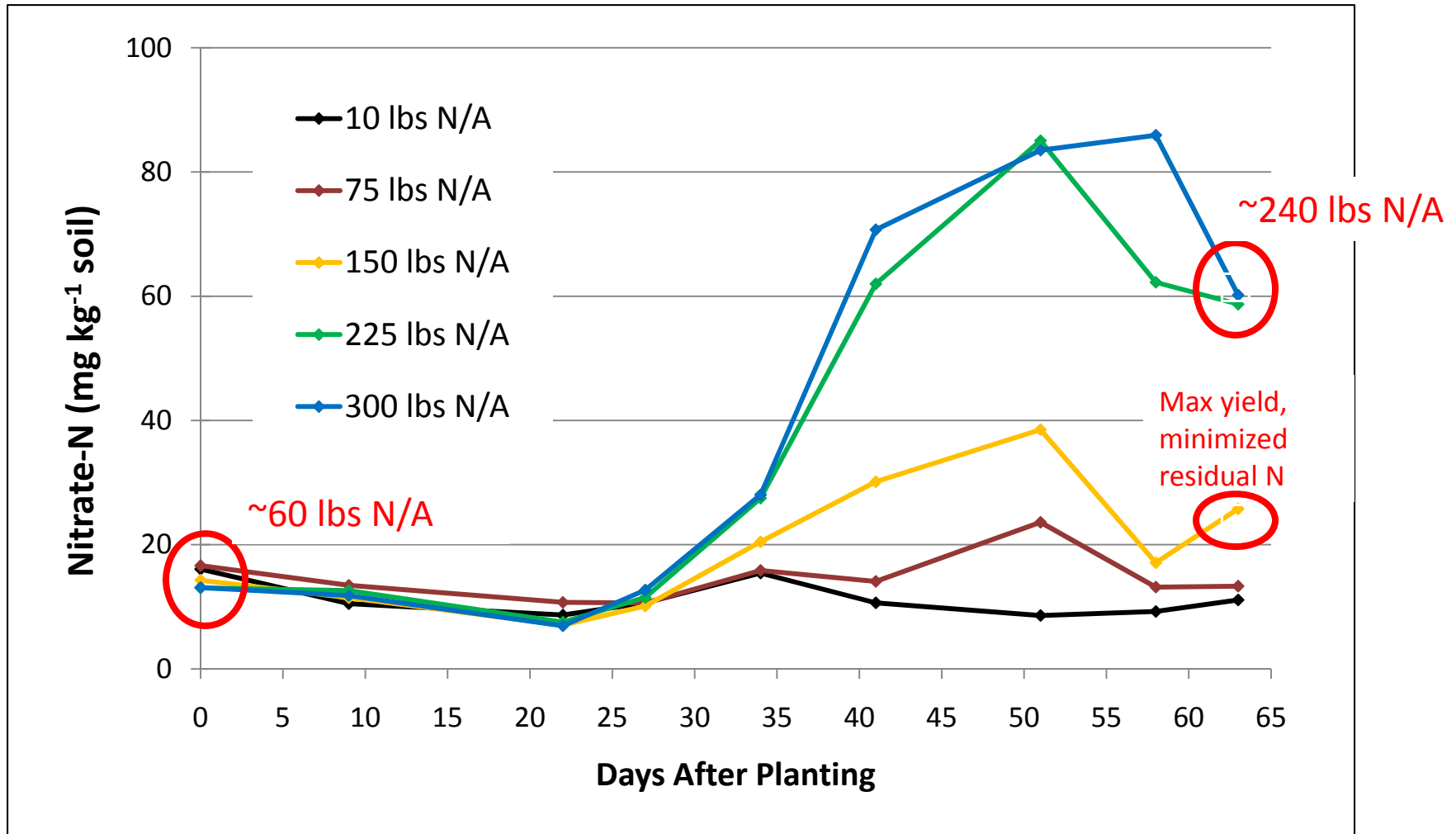
Maximum yield (31 tons/A trimmed) obtained at ≥ 150 lbs N/A

Nitrate Leaching

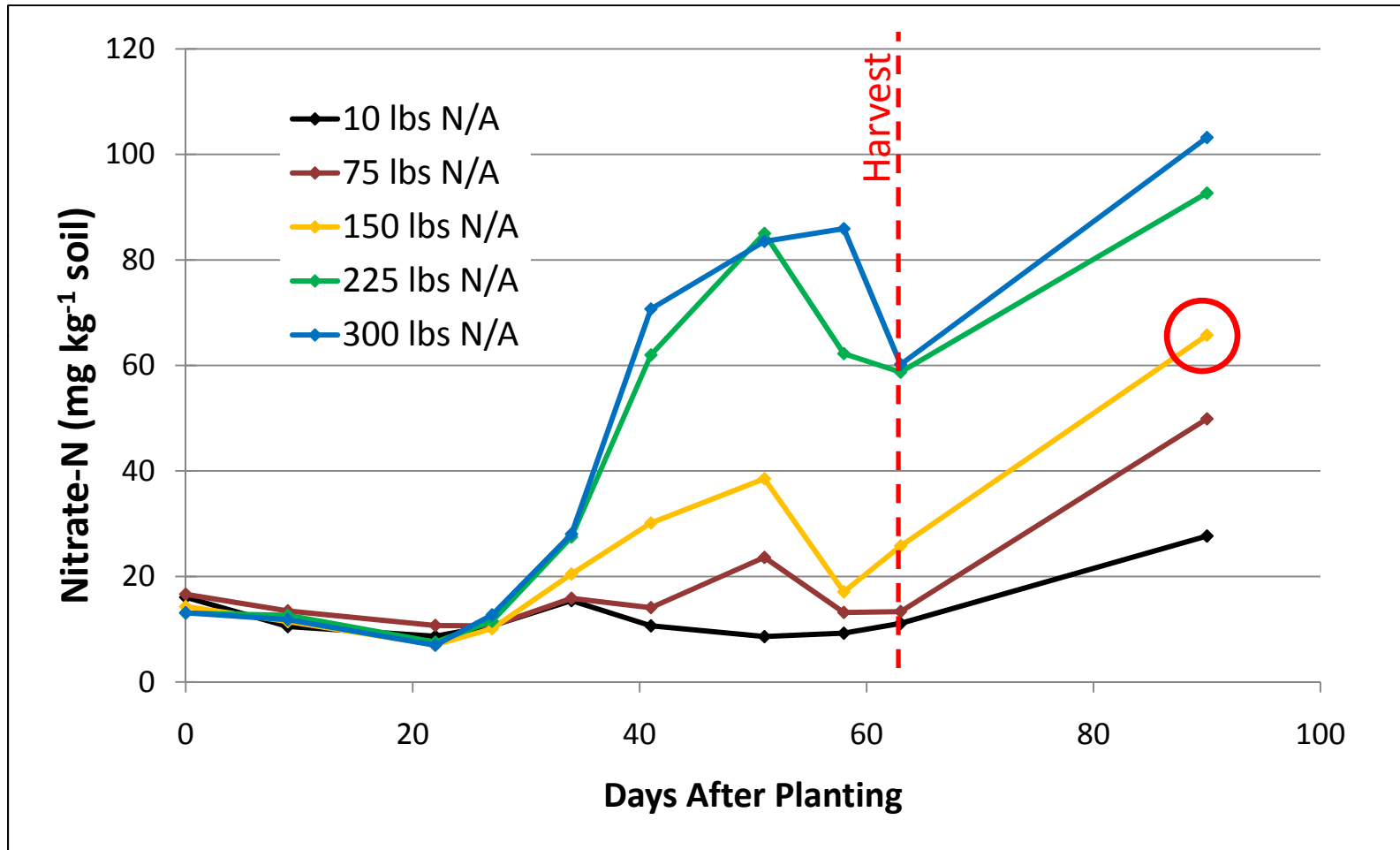


18-32% of total N leached occurred with the germination water

Soil Nitrate (0-1')



Crop Residue Mineralization



On average, **133 lbs N/A** was mineralized in 3 weeks after discing

Conclusions

- To minimize nitrate leaching, soil nitrate levels must be managed to meet the crop needs yet limit residual nitrate
- Managing irrigation volumes critical
- Residual N from mineralization of crop residues and soil N must be accounted for
- High leaching potential, but good nutrient and irrigation management practices can minimize