



# Availability of nitrogen in processing tomato residue



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**Northern San Joaquin Valley Processing  
Tomato Meeting, Modesto**

**January 29, 2020**



# N uptake by processing tomatoes

- Results from field trial at UC Davis
- Average yield: 60 t/ac, no treatment effects
- Average values from 2 years (2017 and 2018)

Treatment	N application lbs/acre	Fruits lbs N/ton	Total N uptake lbs/acre	N in fruits lbs/acre	N in vines lbs/acre
Low N	150	2.5	227	146	81
Intermediate N	200	2.8	255	164	91
High N	250	3.0	314	192	122





# Factors affecting decomposition and N mineralization

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- Soil temperature
- Soil moisture
- Residue nitrogen content; C to N ratio
- Residue moisture
- Residue management





# Factors affecting decomposition and N mineralization

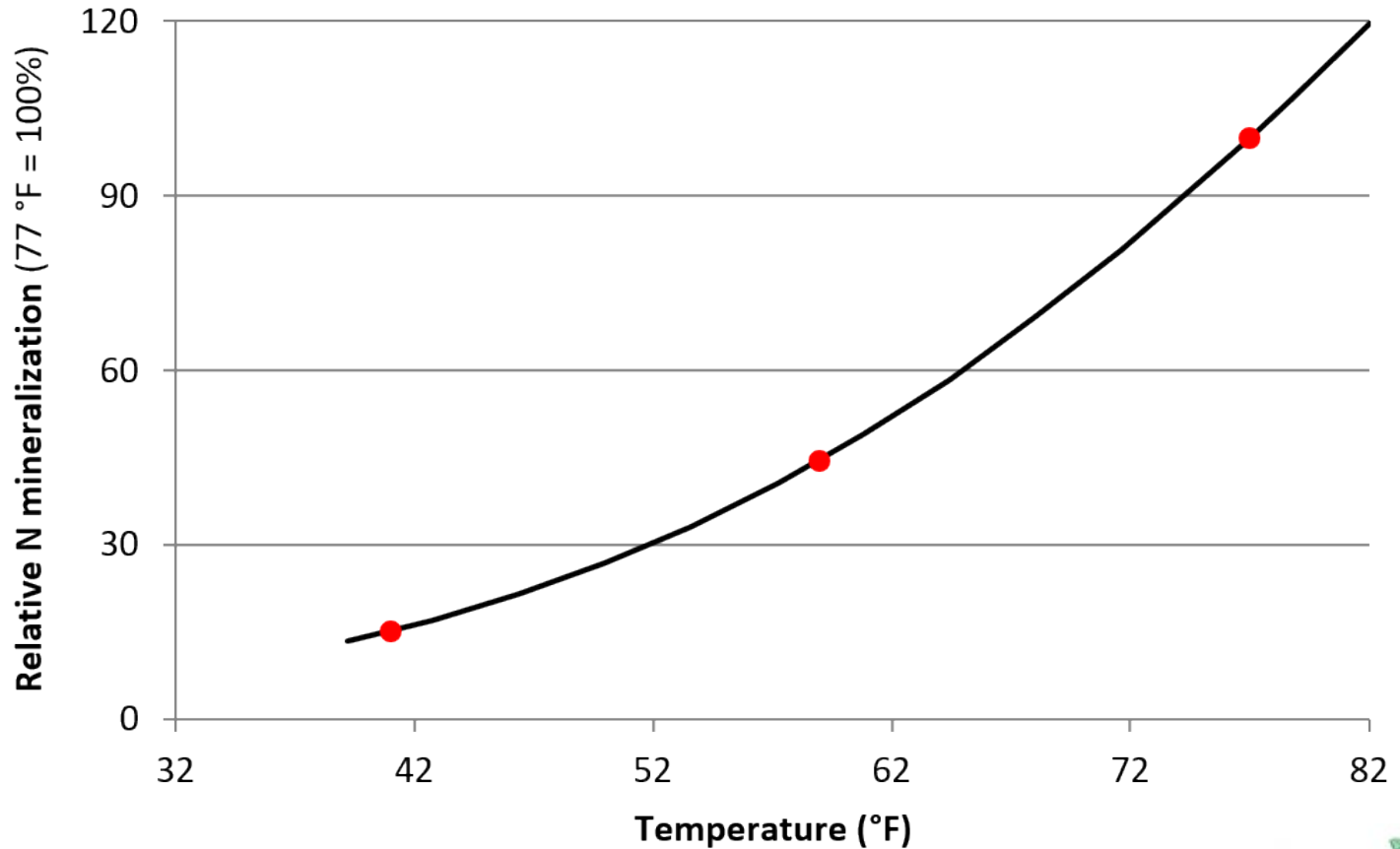
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# Factors affecting N mineralization: Temperature





# Factors affecting decomposition and N mineralization

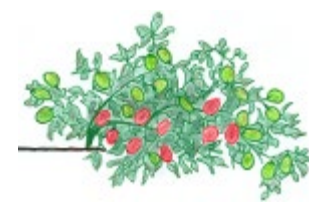
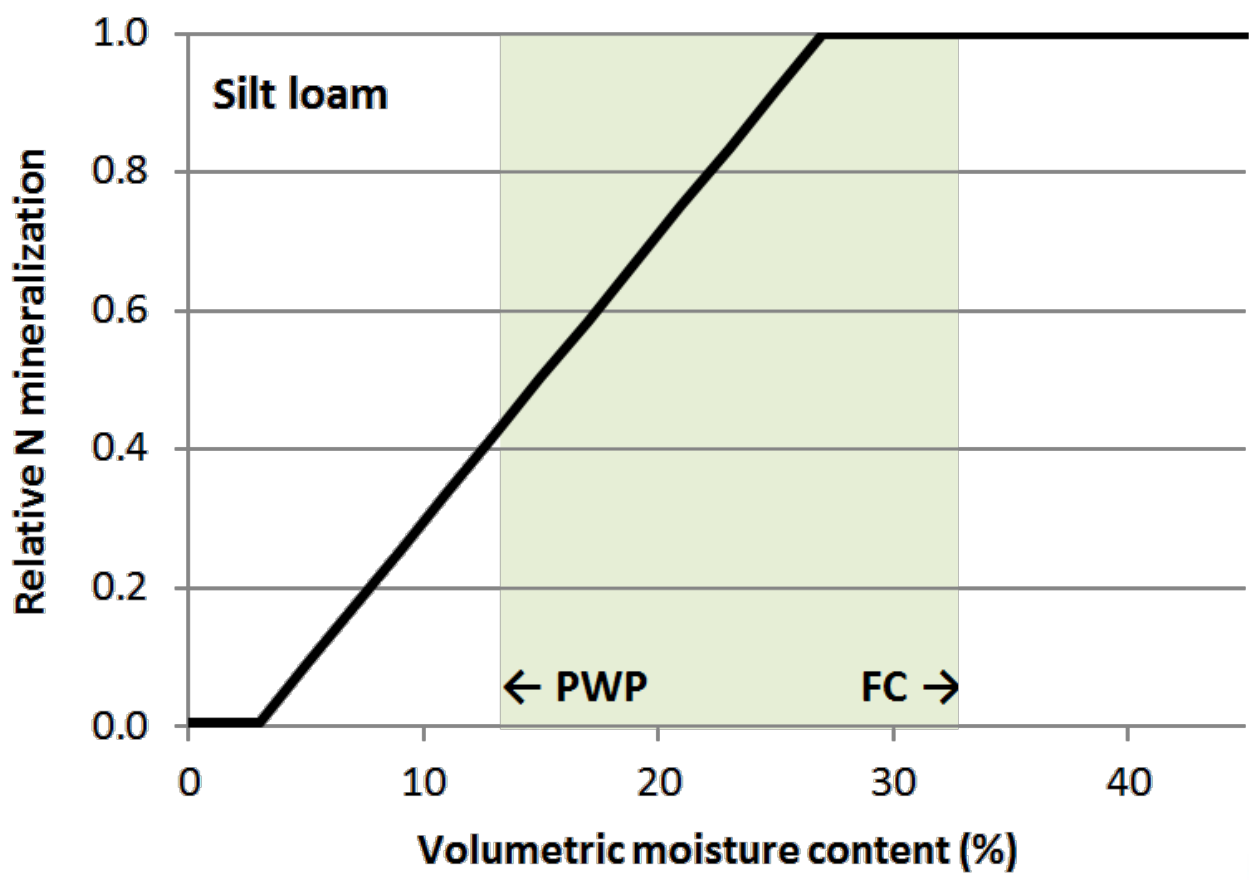
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# Factors affecting N mineralization: Soil moisture





# Factors affecting decomposition and N mineralization

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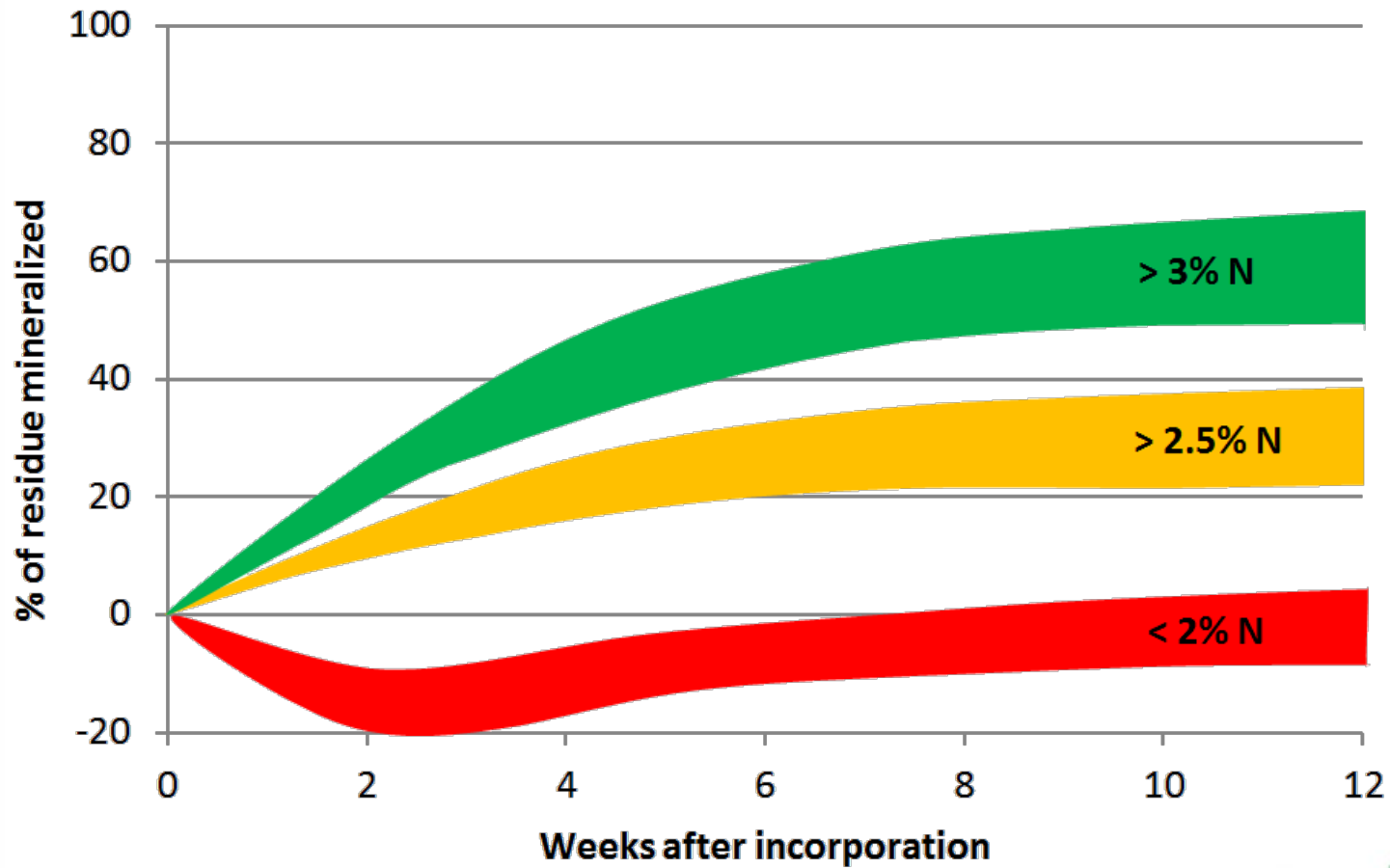
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# Factors affecting N mineralization: Residue N content





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# Studies: Treatments

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## Laboratory incubation:

- Treatments included:
  - Different soil moisture contents (FC, PWP)
  - Different residue moisture (fresh, air dry)
- Constant temperature (77 °F) for 12 weeks

## Field trial:

- Treatments included:
  - Plots with residue incorporation
  - Plots without aboveground residue
- Soil sampling throughout the winter





# Studies: Soils and Residues

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## Residue properties:

- 1.8% N
- C to N ratio of 22:1

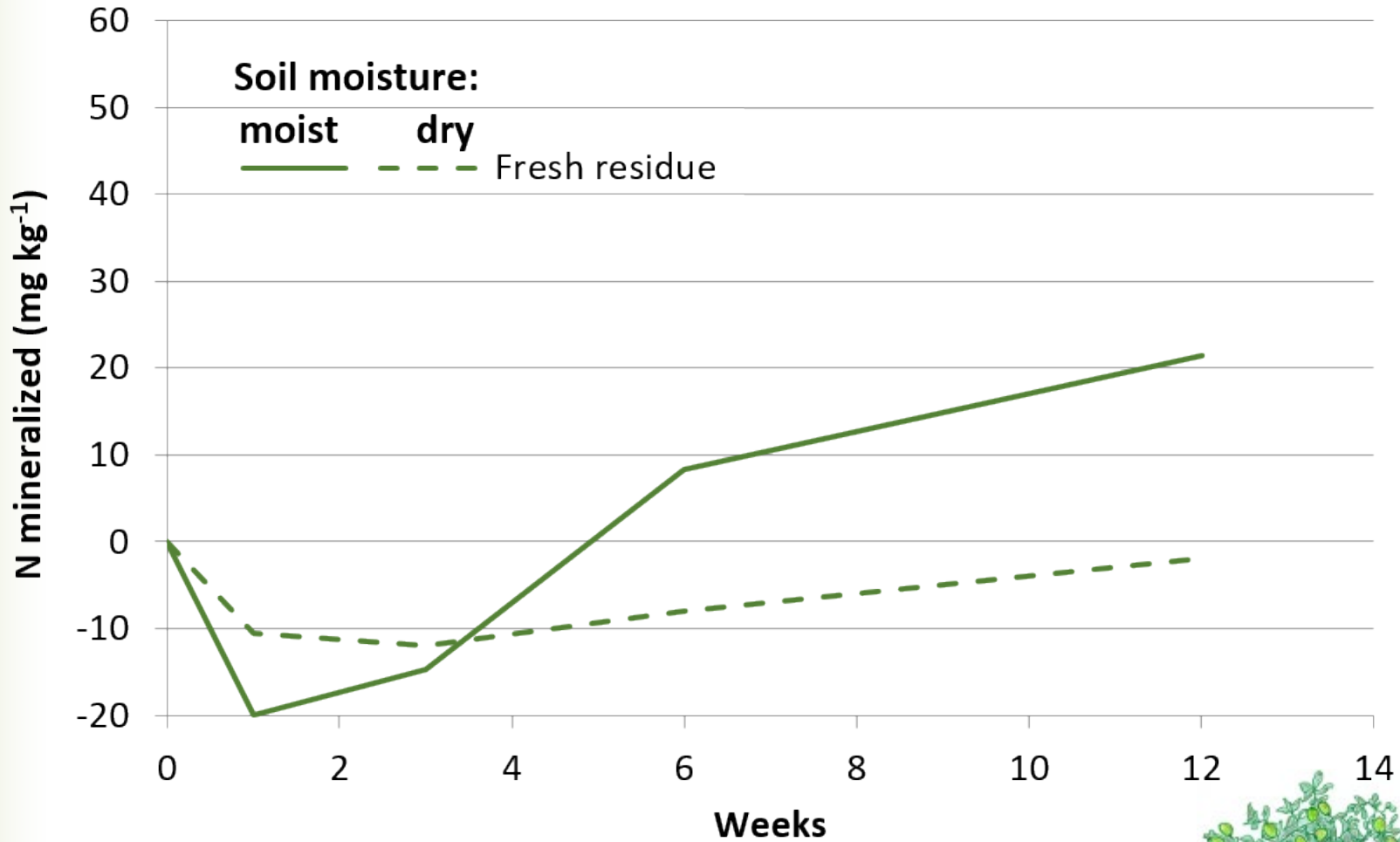
## Soil properties:

- Location: west of UC Davis campus
- Yolo silt loam
- pH 7.6
- 1.4% soil organic matter



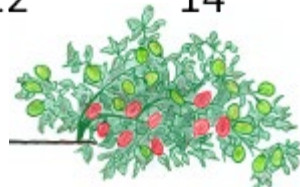
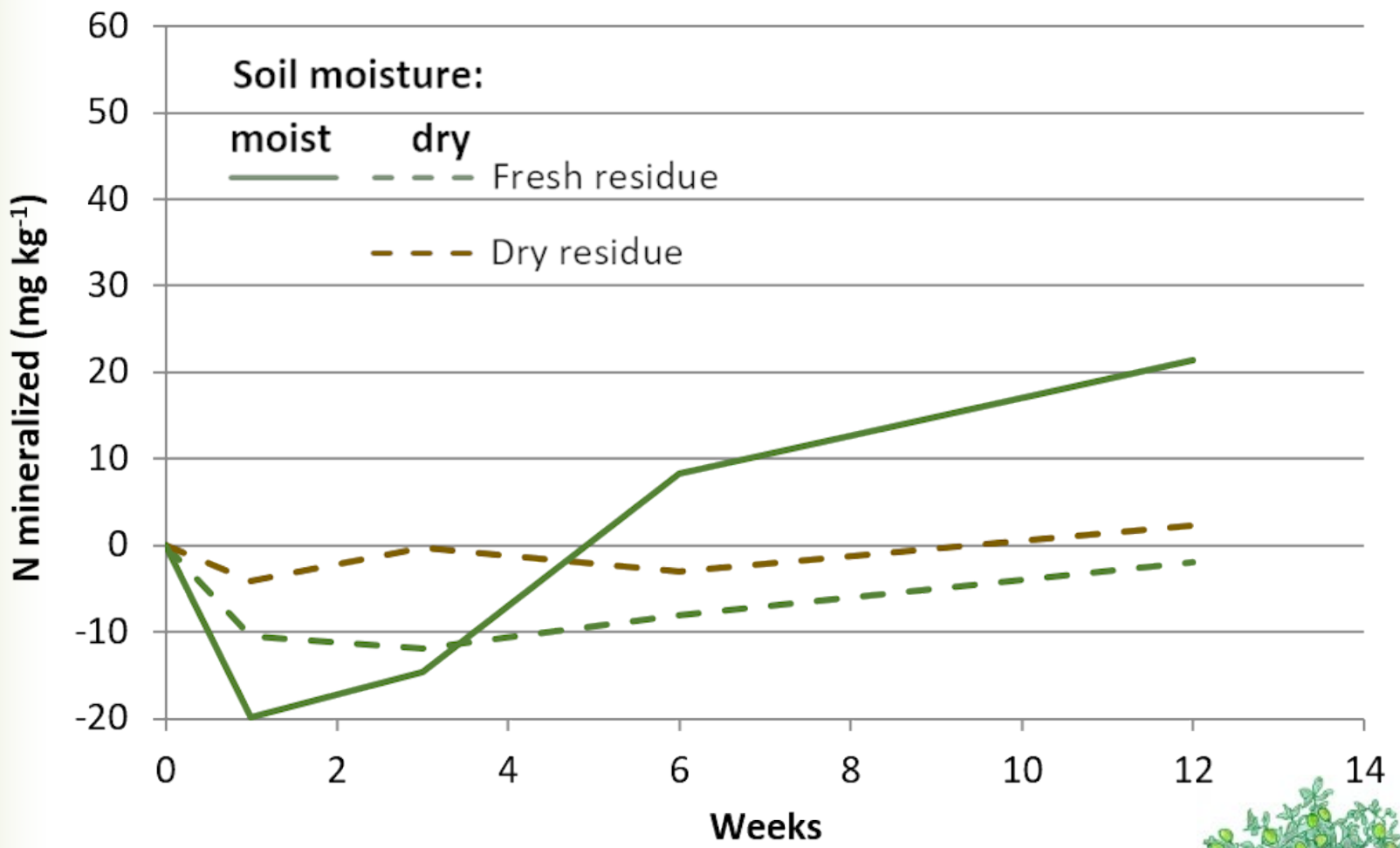


# Nitrogen mineralization



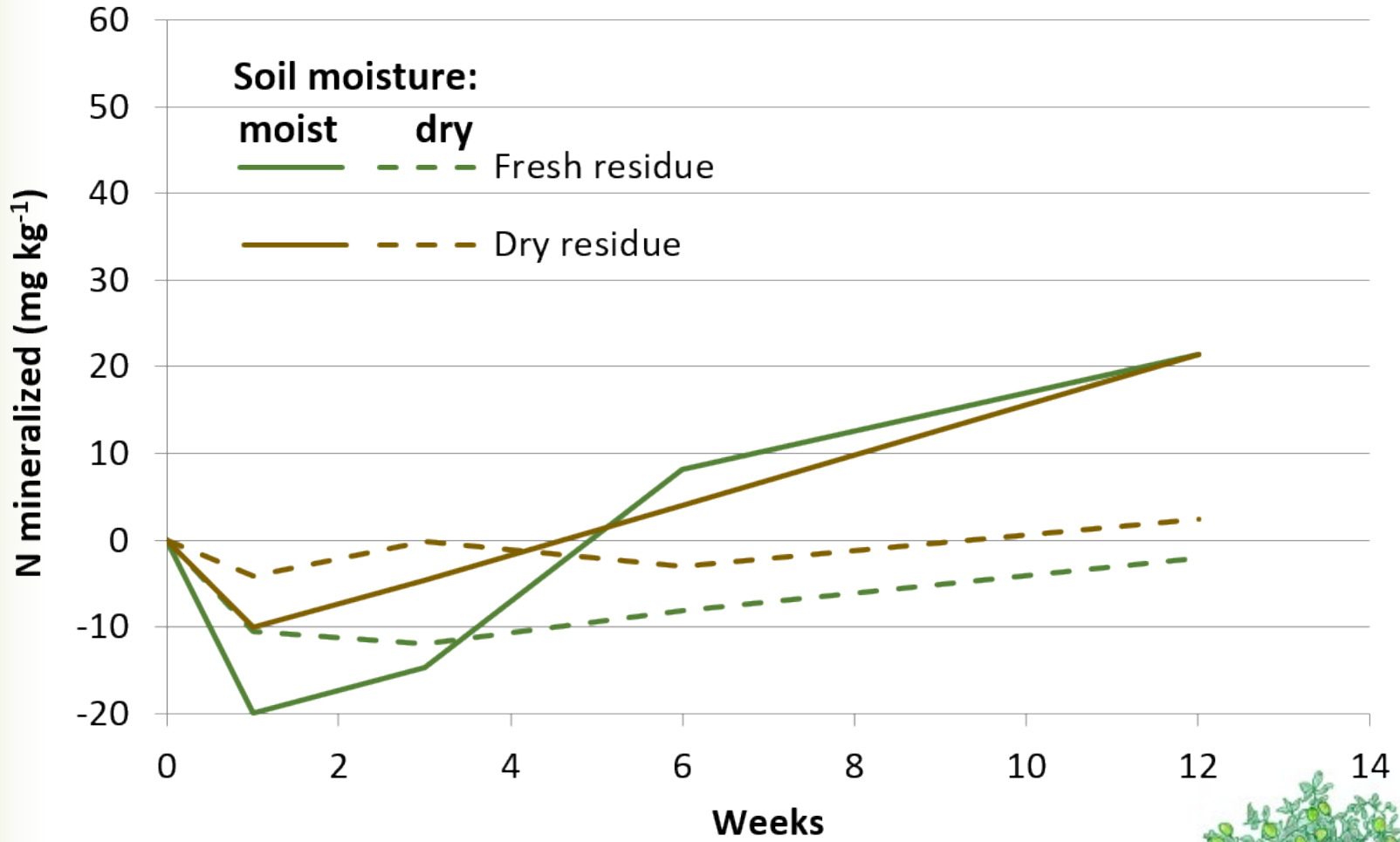


# Nitrogen mineralization



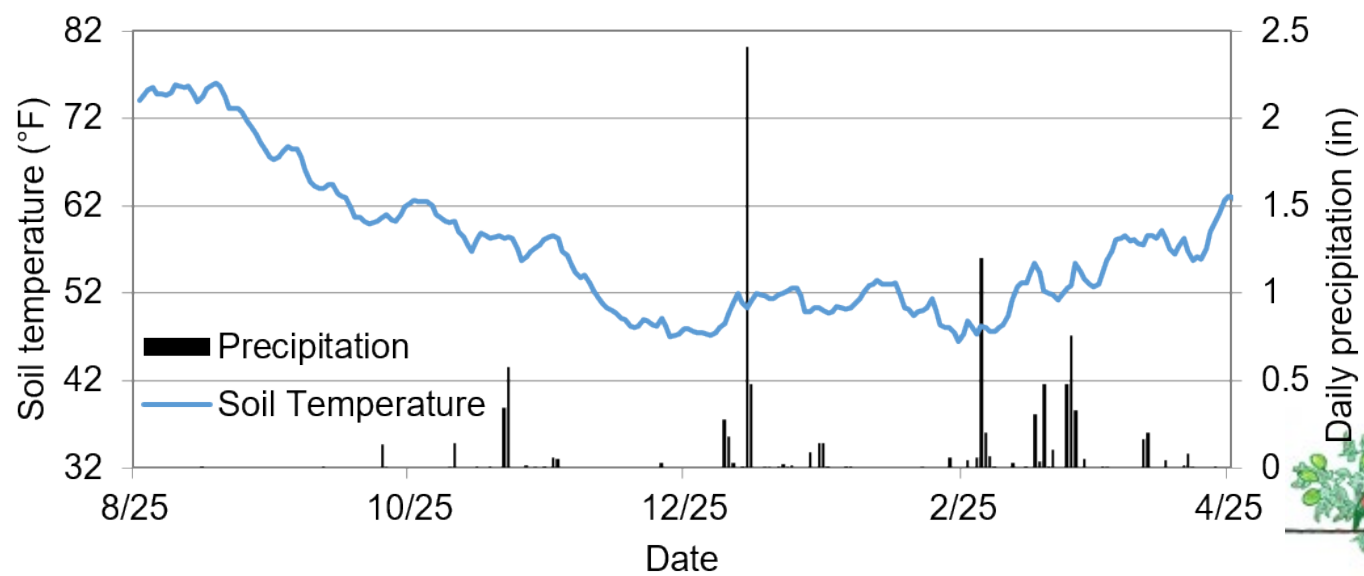


# Nitrogen mineralization





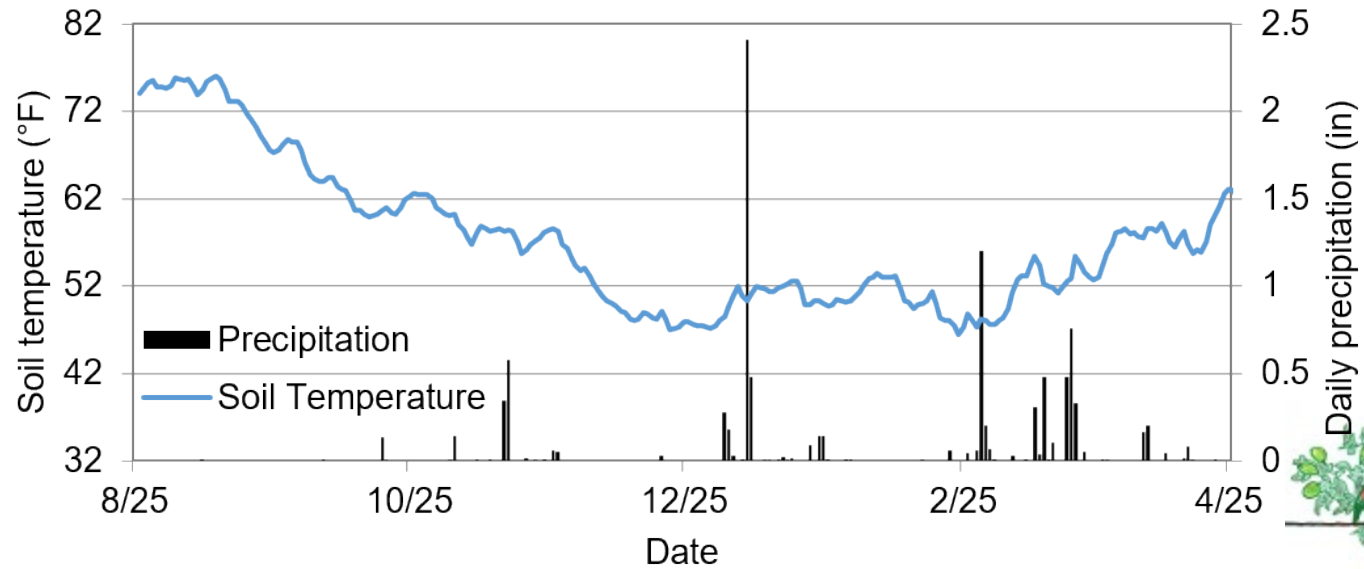
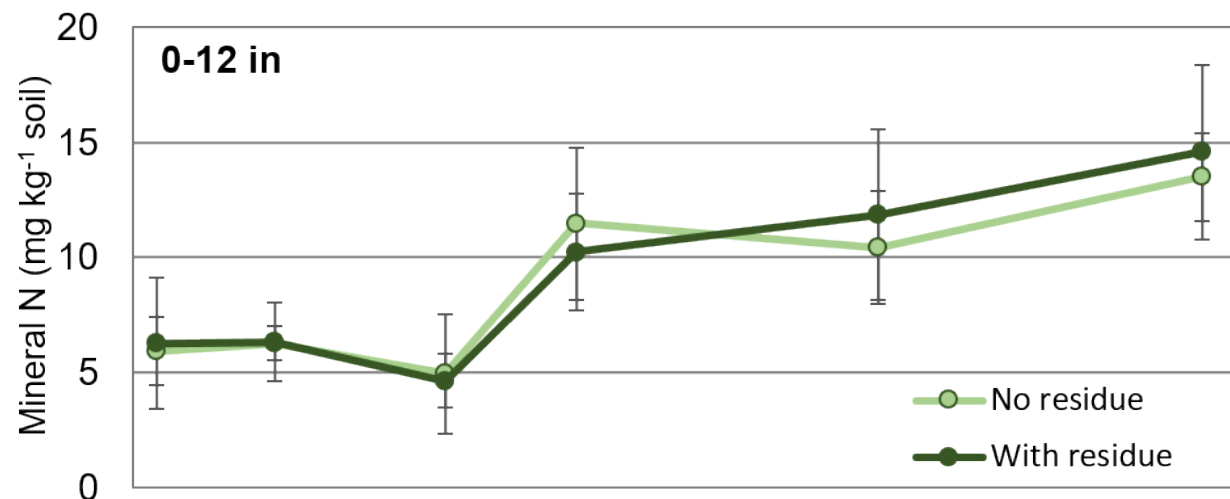
# Nitrogen mineralization in the field during the winter





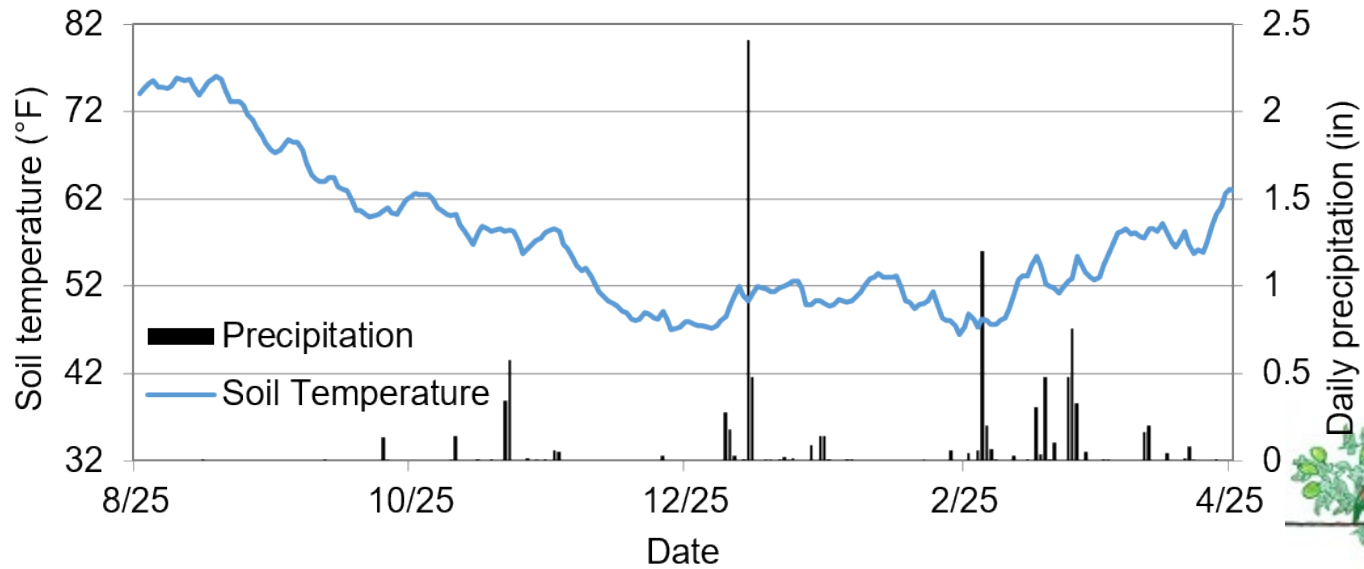
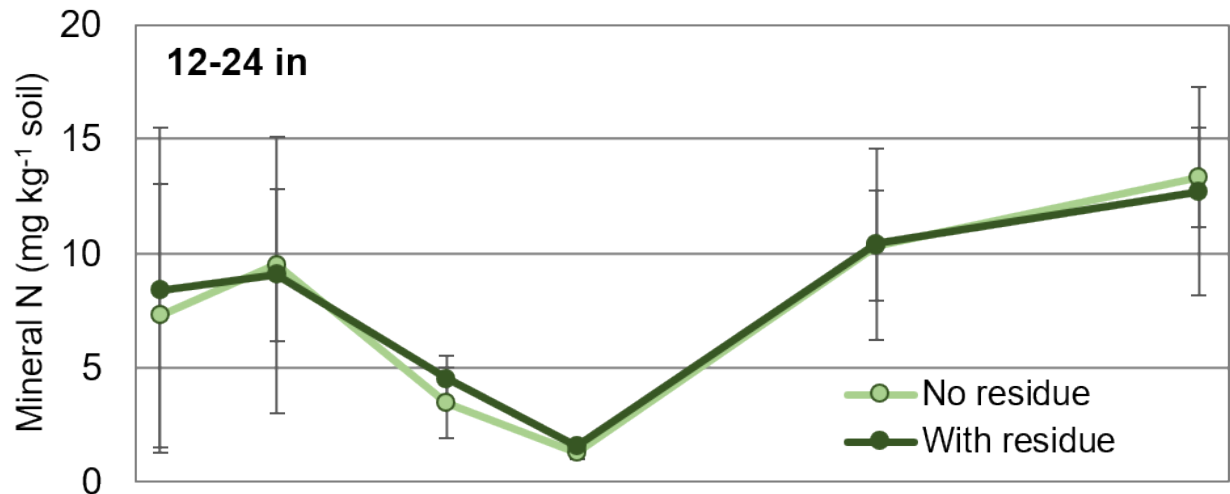


# Nitrogen mineralization in the field during the winter





# Nitrogen mineralization in the field during the winter





# Conclusions

- Plants adjust N uptake to N availability
  - ⇒ Not all of the “excess” N is at risk of being leached
- One third of N in aboveground biomass left in the field as residues
- N mineralization from tomato residue during the winter is slow
  - ⇒ C:N ratio of around 20:1
  - ⇒ Fall: dry soil
  - ⇒ Winter: cool soil





# Acknowledgement

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- UC Agricultural and Natural Resources (UC ANR)
- CDFA Fertilizer Research and Education Program (FREP)
- California Tomato Research Institute
- Gene Miyao, Brenna Aegerter, Tom Turini, Michael Cahn, Tim Hartz
- Suzette Turner, Kelley Liang, Irfan Ainuddin, Ken Miller

