## Predicting N sufficiency in organic processing tomato production

#### 2012-13 study:

37 organic processing tomato fields monitored

- Soil nitrate-nitrogen (NO<sub>3</sub>-N) sampled about 3 weeks after transplanting (WAT)
- Whole plant N concentration at 11 WAT measured in 22 fields to measure overall N sufficiency
- Laboratory incubation to estimate soil N mineralization capacity

## We know how much crop N uptake is required for high-yield tomato production ...



 Critical N concentration = the whole plant N concentration below which crop growth is reduced

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High-yield organic tomato (40-50 tons/acre) must take up > 220 lb N/acre

#### How are N inputs managed?

N management practice	Number of fields
Overwinter cover crop	1
Fall manure or compost application	29
Spring pre-transplant fertilizer application	14
Post-transplant fertilizer application	9

Fields differed widely on soil NO<sub>3</sub>-N at 3 WAT:



# In-season soil N mineralization unlikely to keep up with crop N uptake:

Estimated soil N mineralization in 70 days (lb N/acre)



#### How common was late-season N deficiency?



About 30% of fields developed N deficiency by 11 WAT

Relationship between soil NO<sub>3</sub>-N at 3 WAT and late-season N sufficiency:



- **Conclusions:**
- Nitrogen dynamics in organic production are not radically different from conventional production
- Organic fields must begin the crop season with substantial residual soil NO<sub>3</sub>-N because crop N uptake will outrun the soil's N mineralization potential
- Fields with low initial soil NO<sub>3</sub>-N are candidates for in-season N fertilization

