

Irrigation and Nitrogen Management of Strawberries



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Acknowledgements

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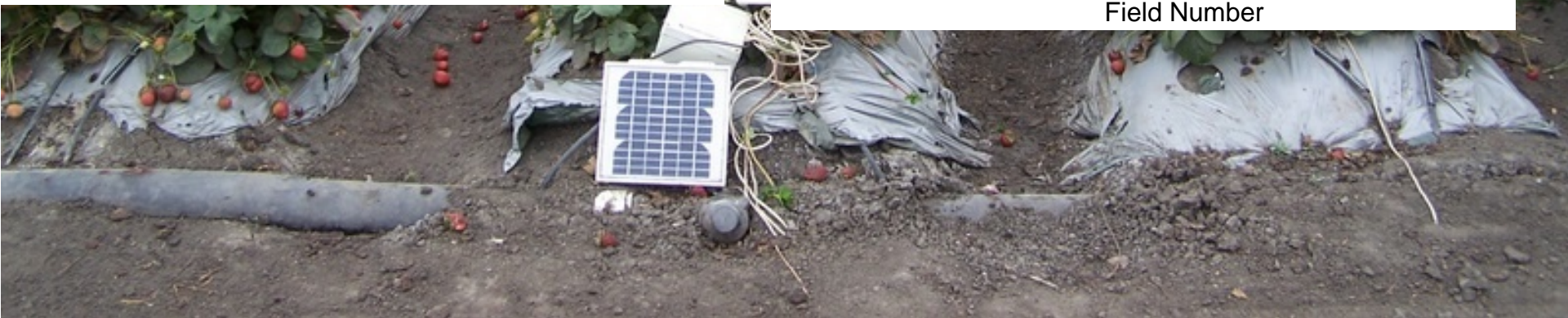
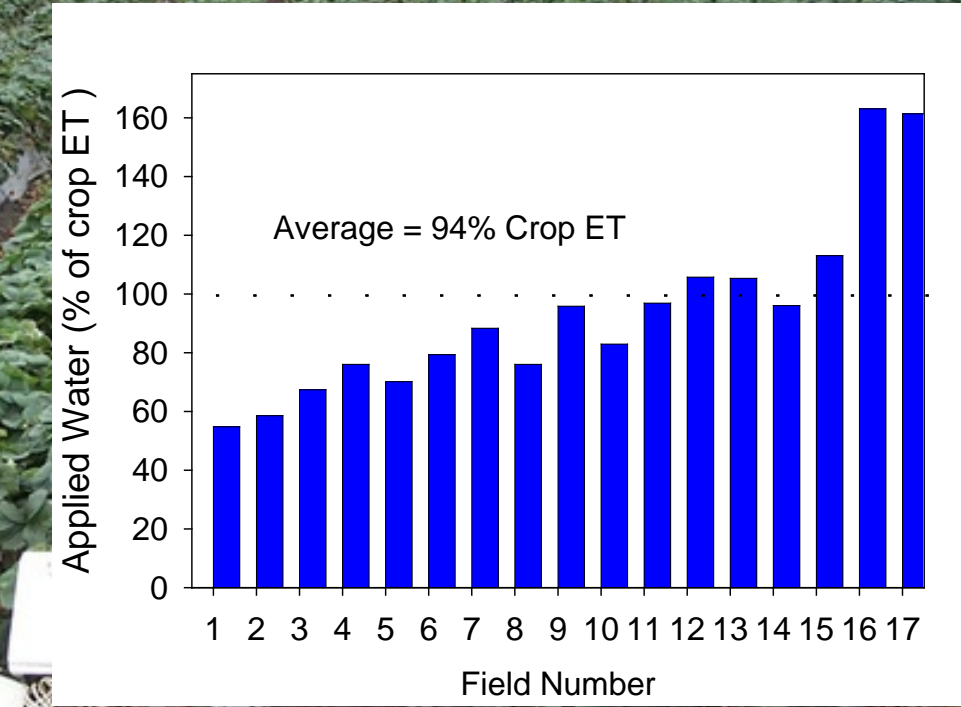
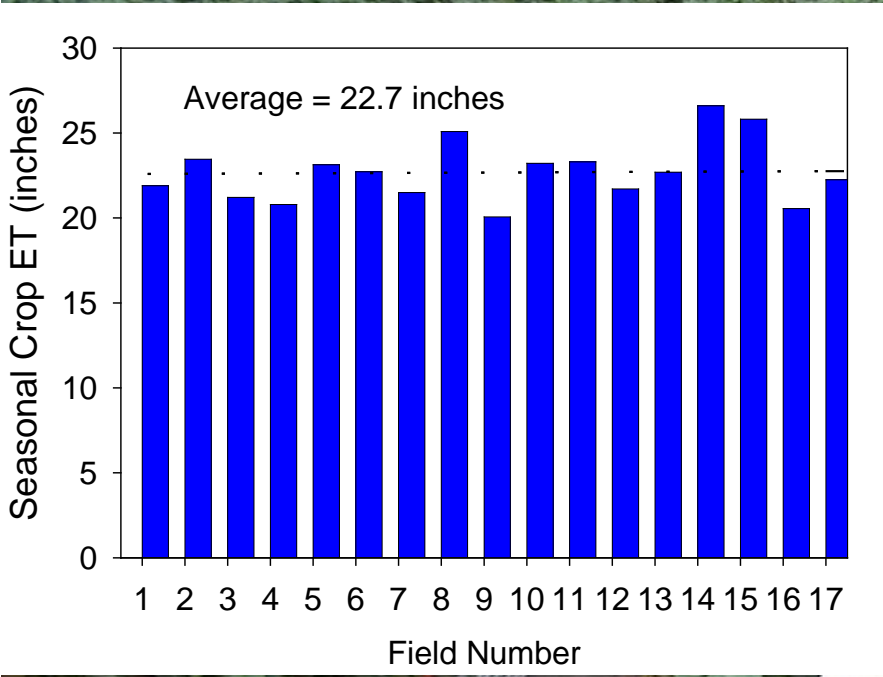
Strawberry Industry and Cooperating Growers

Central Coast Regional Water Quality Control Board

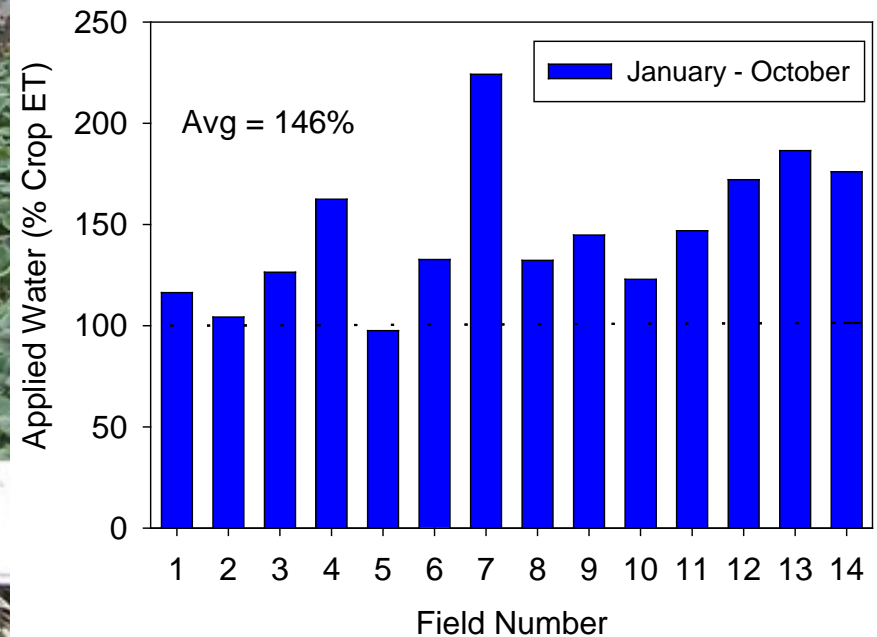
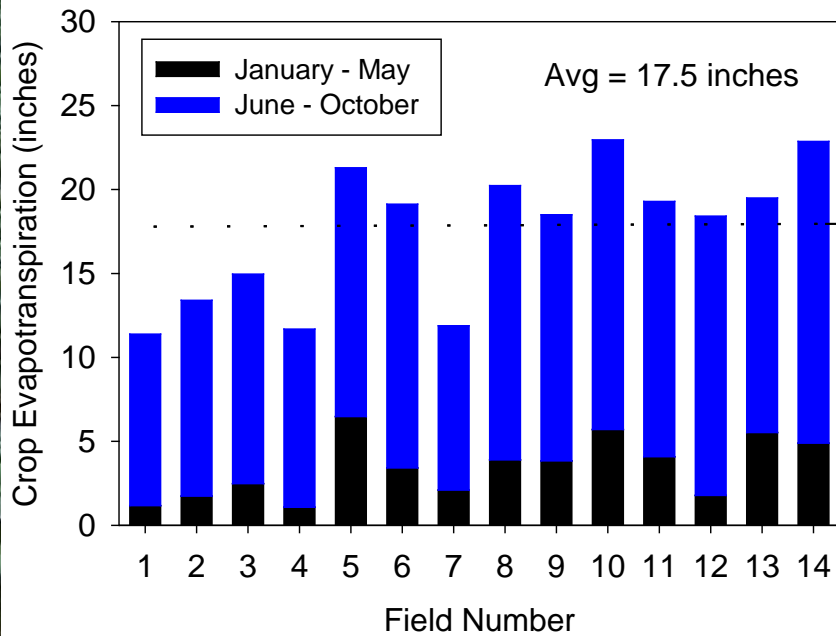
Specific questions about Strawberry Irrigation and N management

- **How much water is applied for establishment and production?**
- **How much N fertilizer is applied for production**
- **Are there opportunities to conserve water and N and improve production with better management?**
- **What are the water quality risks?**

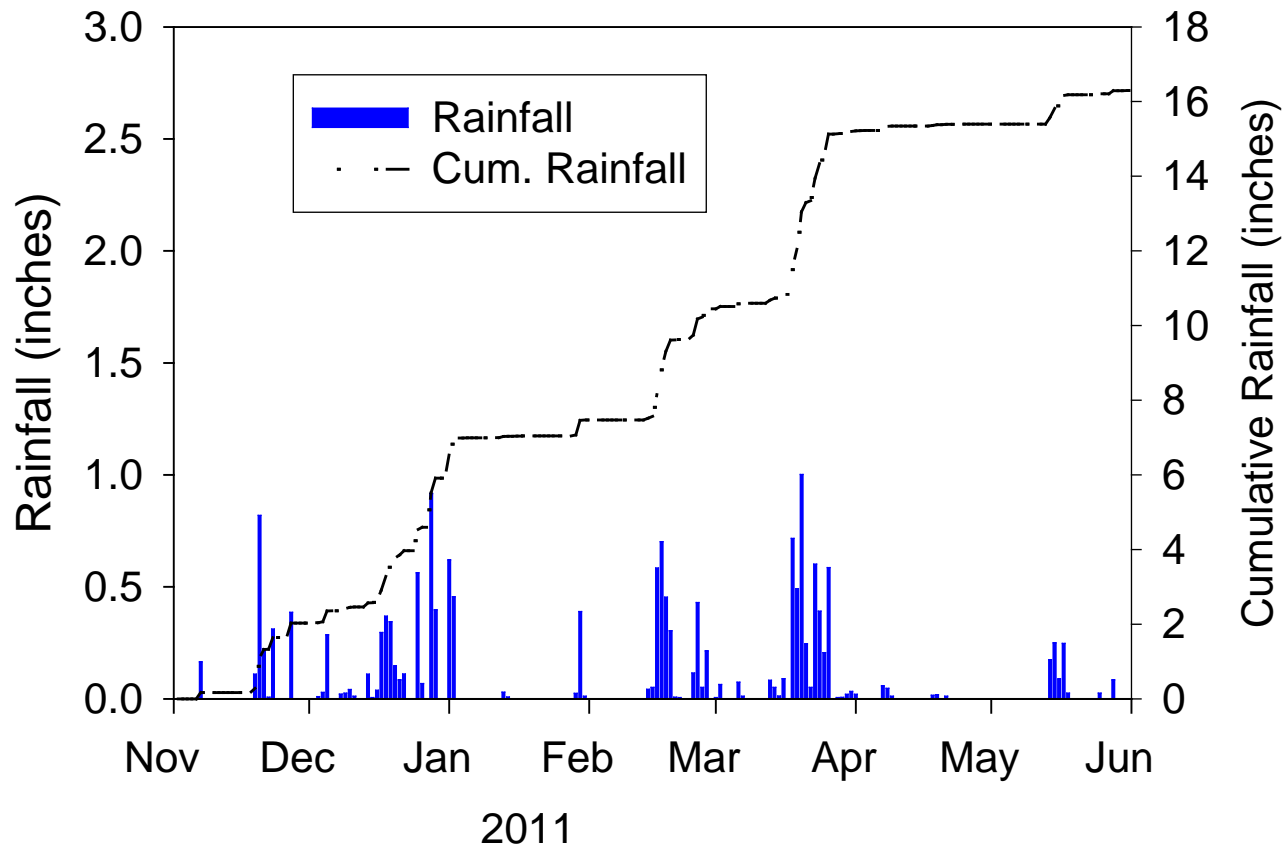
Applied water averaged less than crop ET during the 2010 production season



Applied water averaged 146% of Crop ET during the 2011 production season



Daily and Cumulative Rainfall (November 2010 – June 2011)

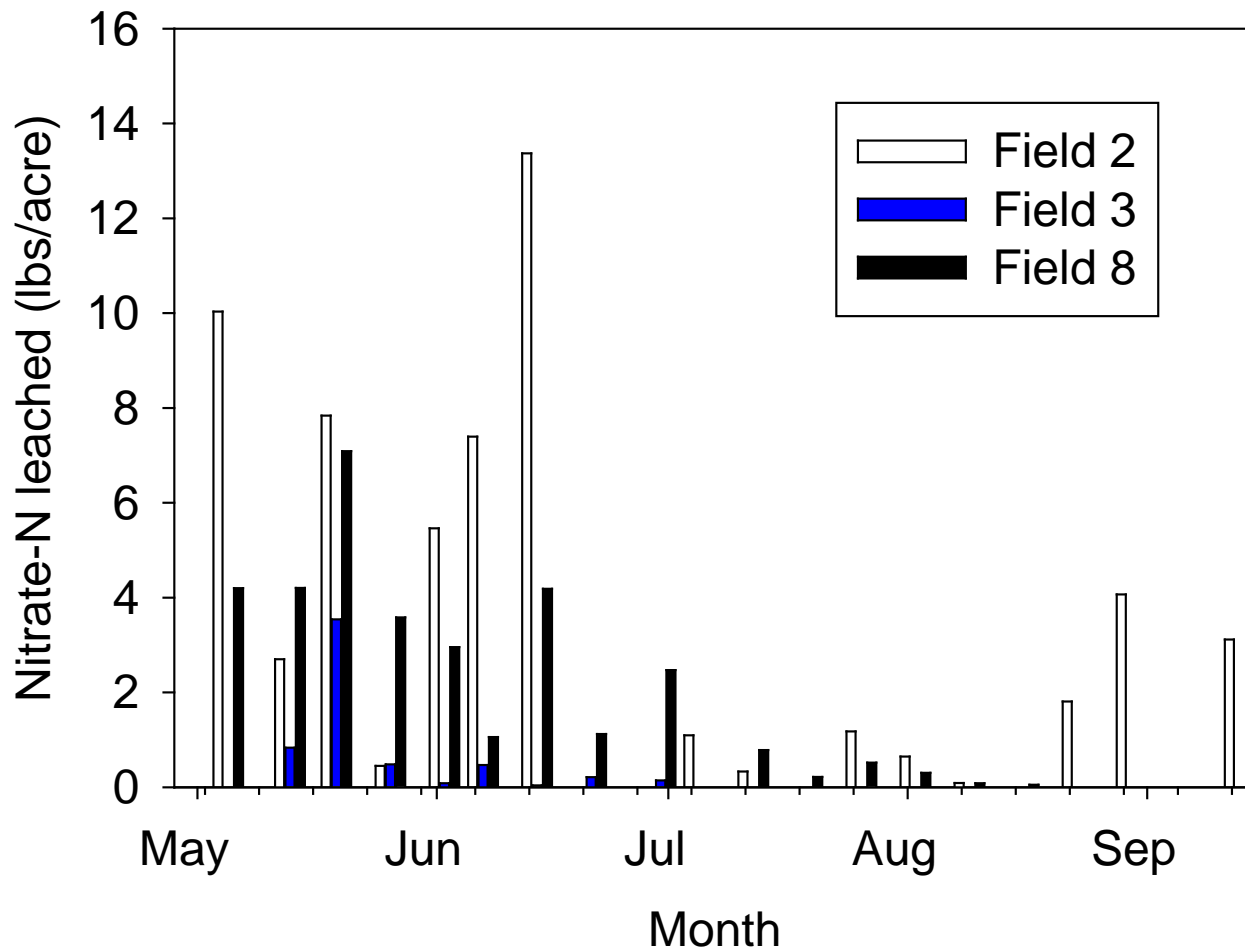


How much water was applied for establishment (2010-2011)?

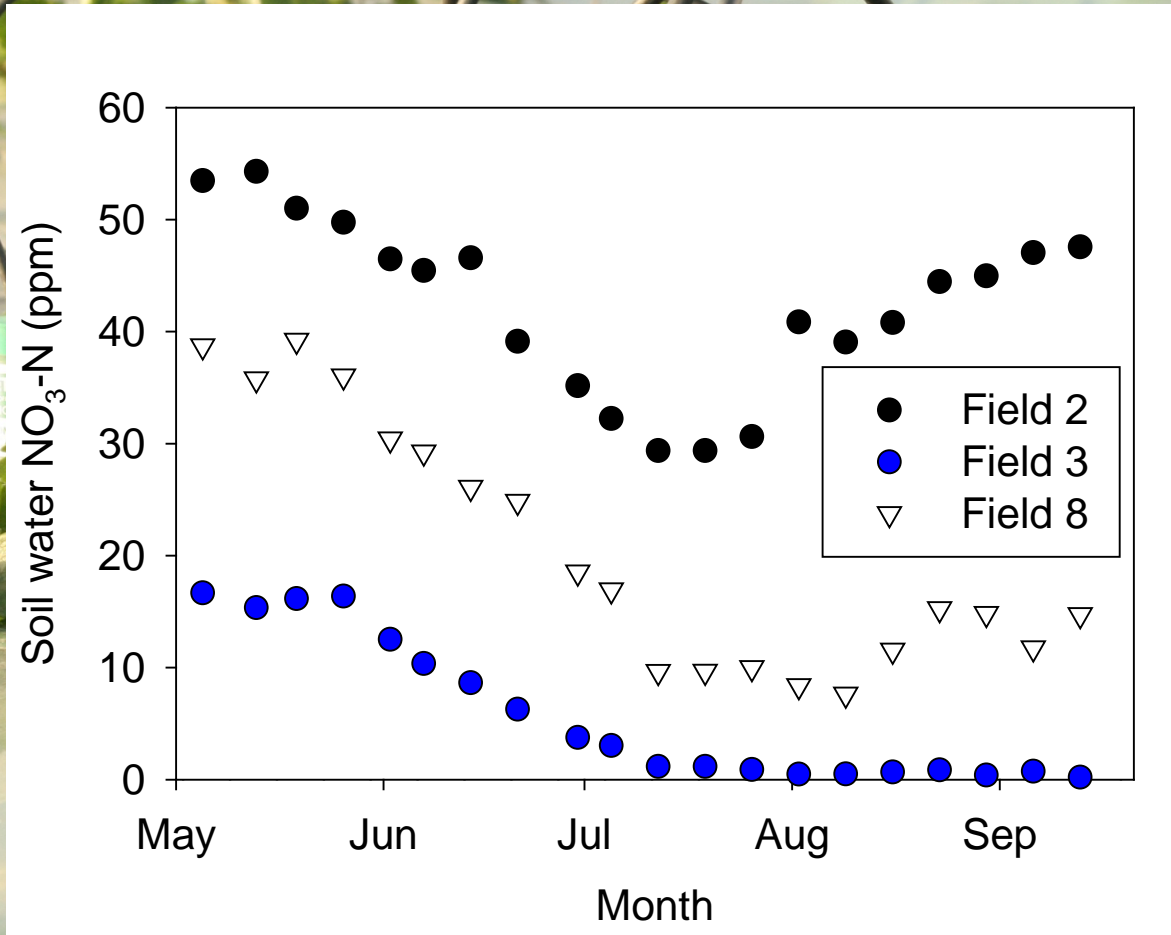
Site ID	Pre-irrigation		Transplant establishment		Post Establishment	
	method	volume	method	volume	method	volume
		inches		inches		inches
92	sprinkler	1.4	sprinkler	1.2	drip	2.0
93	sprinkler	0.5	sprinkler	1.5	drip	2.8
94	sprinkler	2.1	sprinkler	2.9	drip	4.3
97	sprinkler	0.8	sprinkler	1.5	drip	3.7
98	sprinkler	2.2	drip	2.1	drip	4.6
99	sprinkler	1.8	drip	1.0	drip	3.0
Average		1.5		1.7		3.4

Nitrate leaching was relatively low during the production season

Estimated Nitrate losses from May - Sept:
6 to 60 lb N/acre (AVG = 33 lbs N/acre)

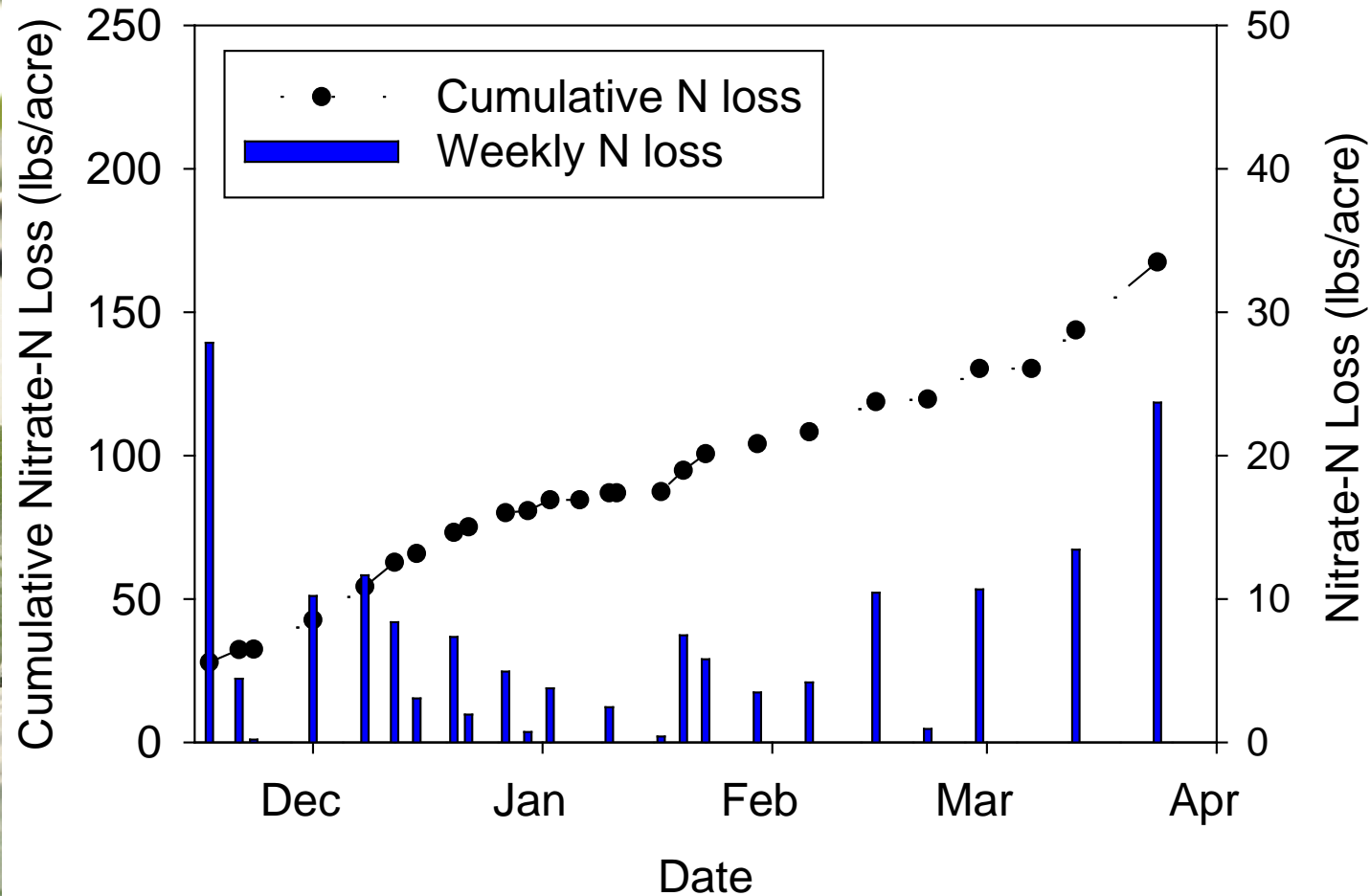


Nitrate concentration in leachate decreased during the production season

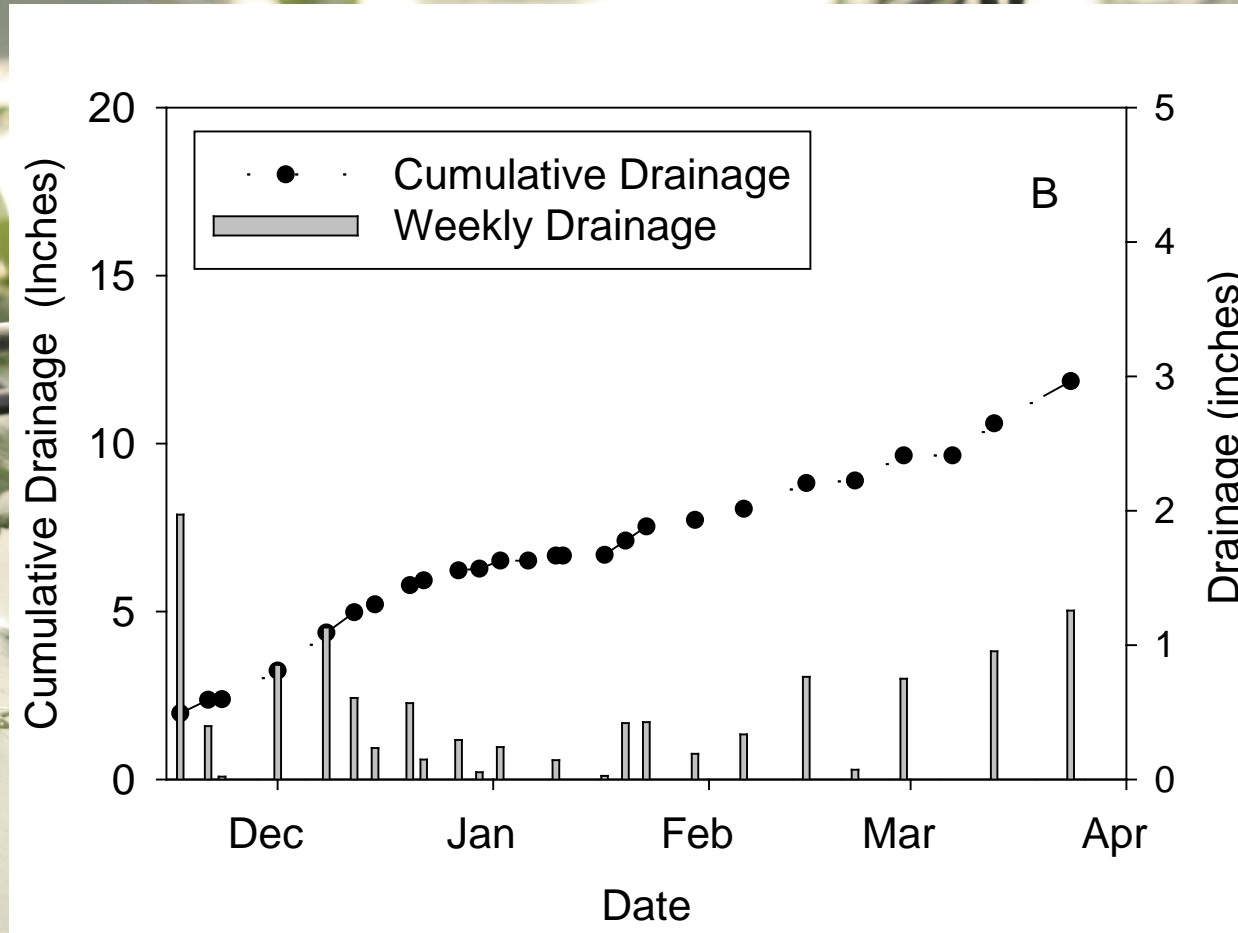


Nitrate leaching during the winter was significant

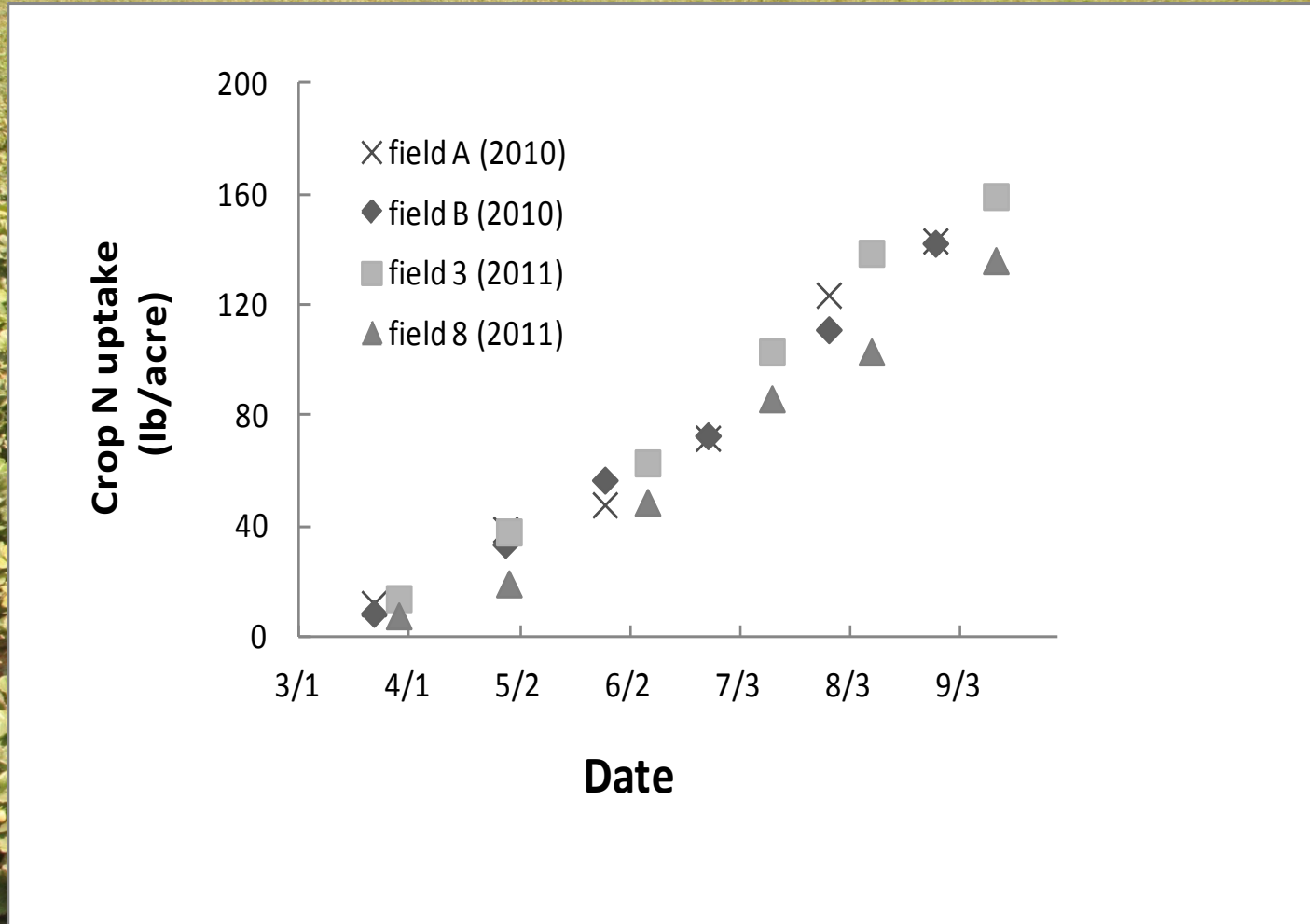
**Estimated Nitrate losses from Dec - March:
169 to 239 lb N/acre**



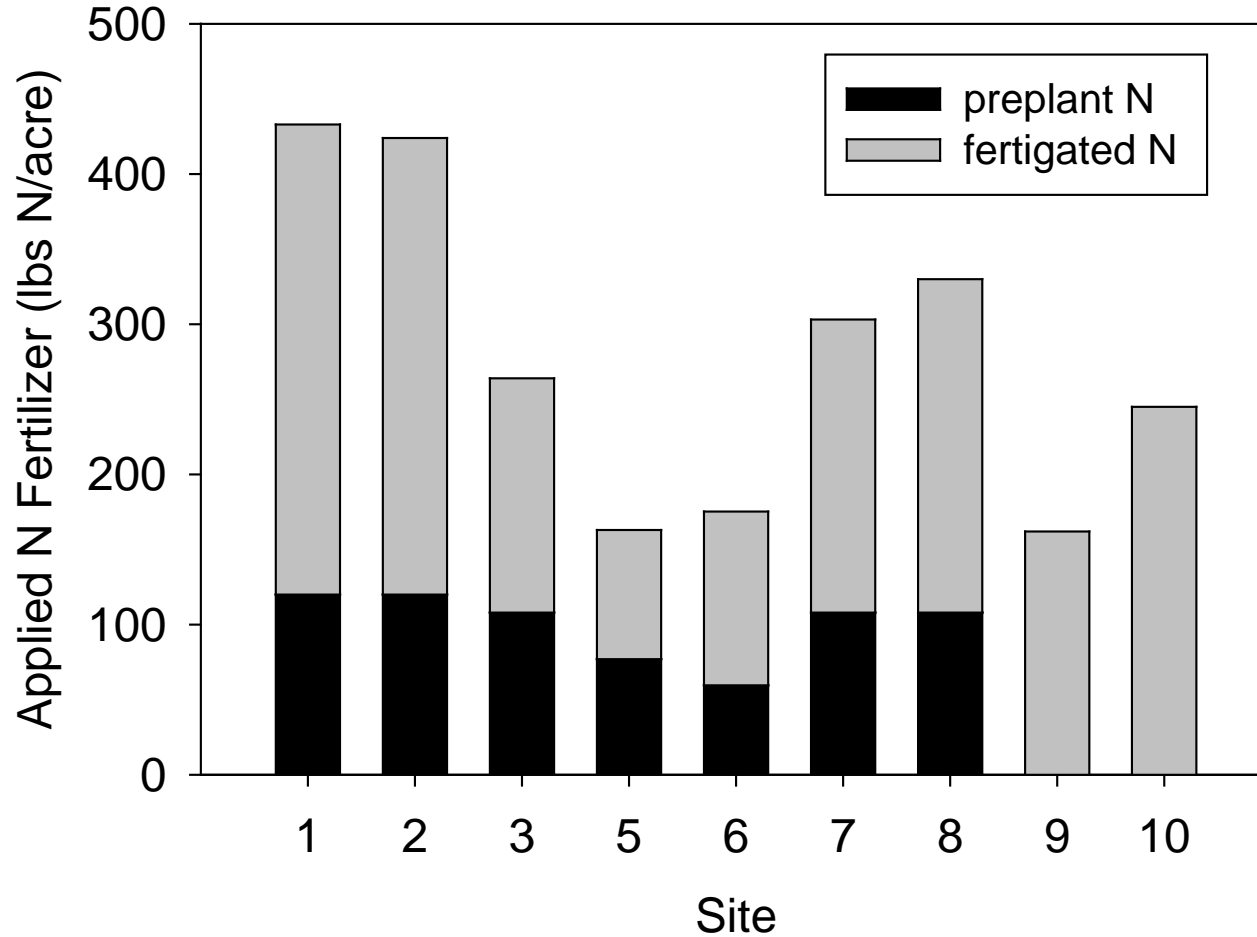
Cumulative drainage was high as 10 inches during the winter



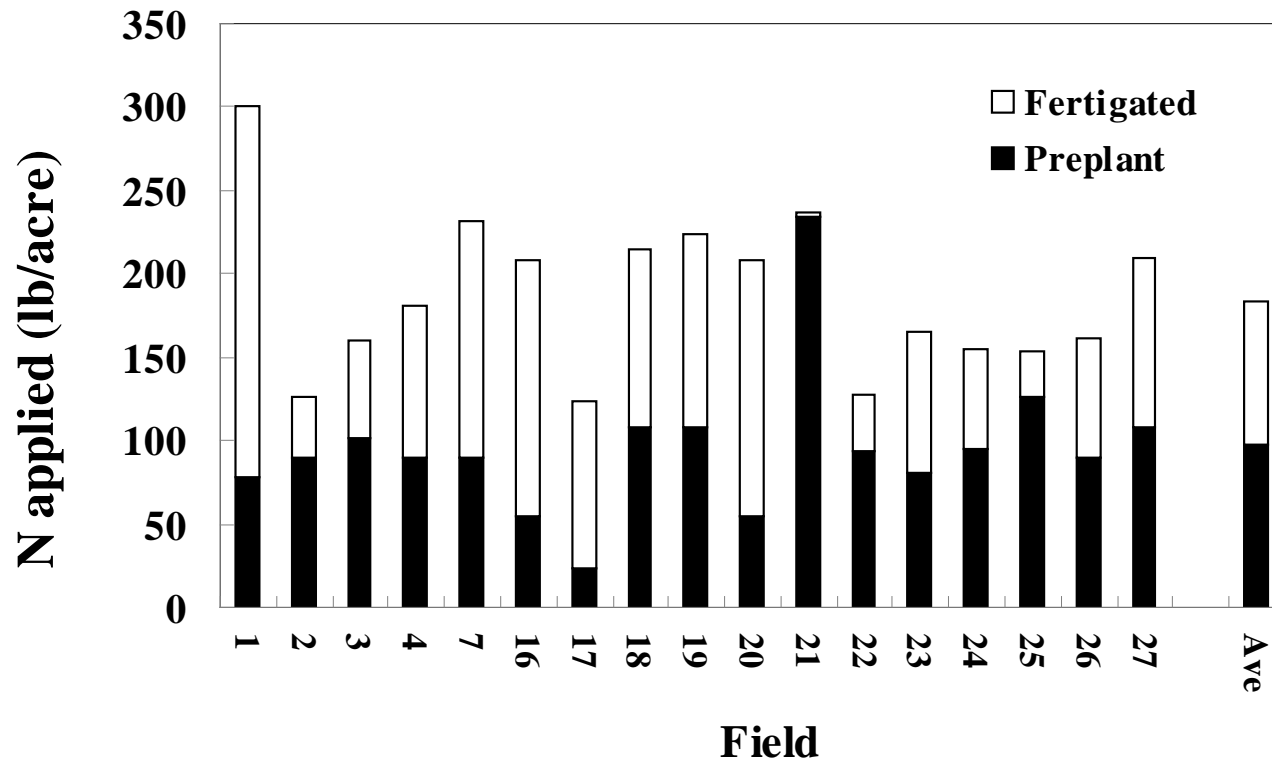
Crop N uptake was minimal until mid March



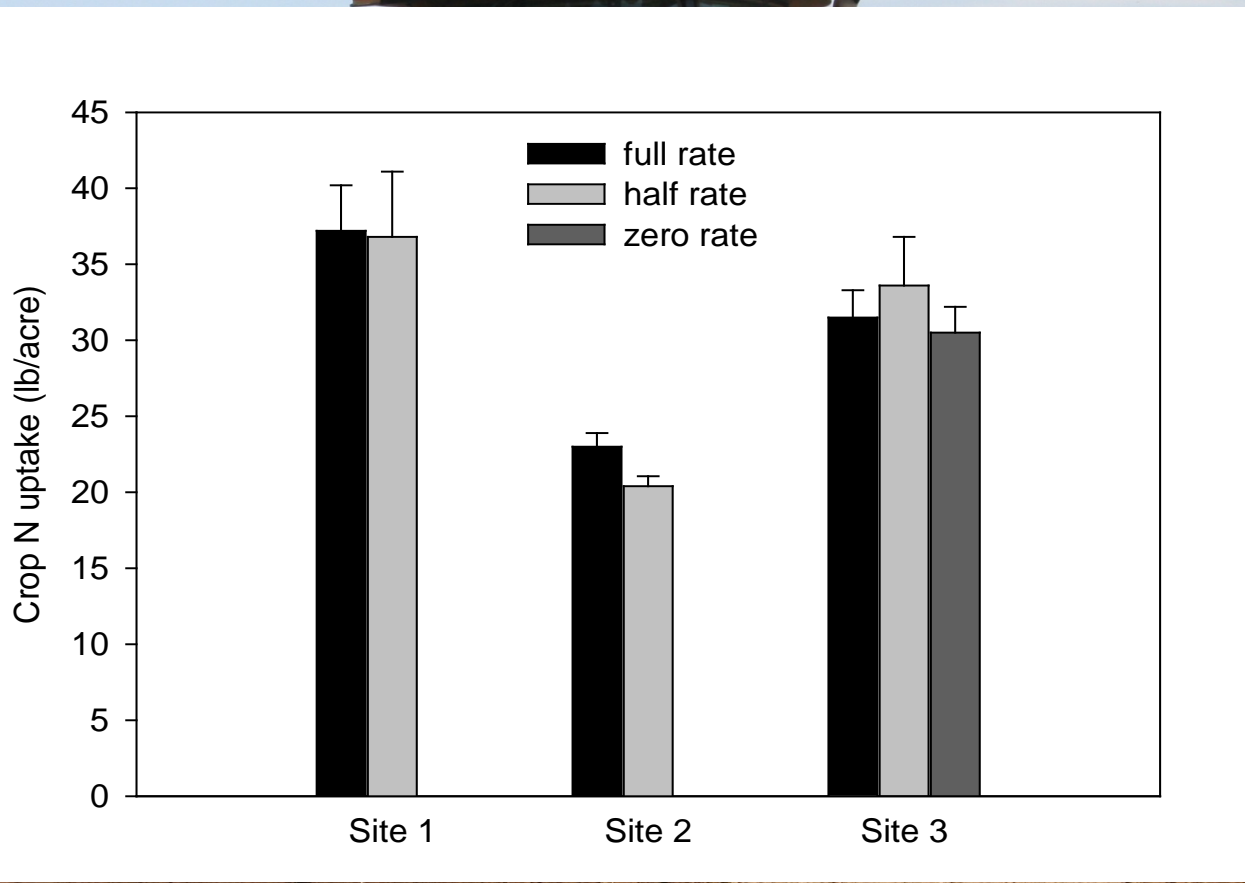
Fertilizer Nitrogen Averaged 278 lbs/Acre in 2011



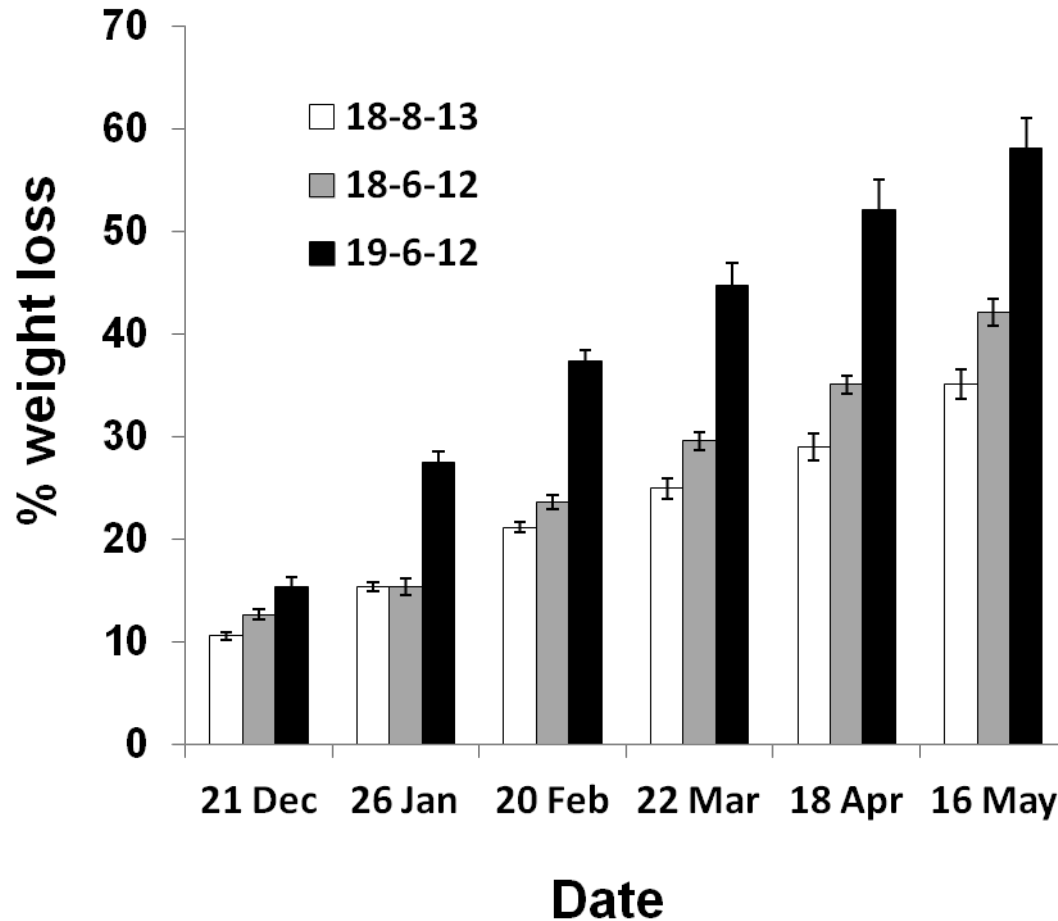
Fertilizer Nitrogen Averaged 187 lbs/Acre in 2010



Preplant nitrogen fertilizer often did not increase plant N uptake during winter establishment



Controlled release fertilizers applied at planting released 30% to 50% of N during the winter



Lessons Learned

- Applied water volumes were generally close to crop requirement during the production season (May – Oct) but greater than crop needs during the winter
- Residual soil nitrate carry over from prior vegetable crops can be high during strawberry transplant establishment
- N uptake of strawberries is low until March and subsequently is about 1 lb N/Acre/Day
- Preplant N fertilizer can often be reduced without harming production
- Nitrate leaching/water quality risks appeared to be low during the production season but potentially high during establishment and winter months