Improving Irrigation and Nutrient Management in Ventura County Strawberry

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University of California
Agriculture and Natural Resources

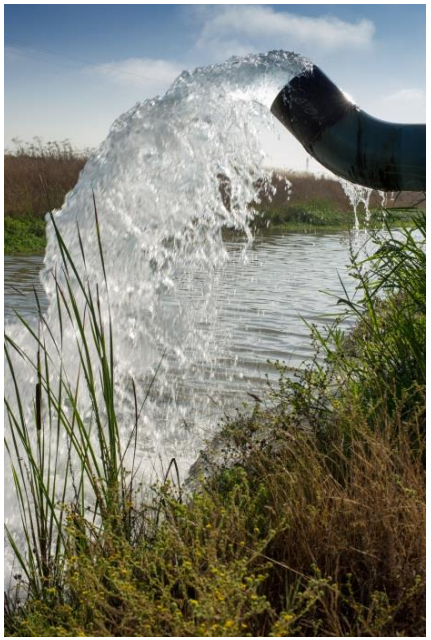
Importance of Water and N Management

- Impact on yield and quality:

  - Sensitivity to water stress

  - Water availability and price

  - Changes in water quality regulation in recent years



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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

STATE WATER RESOURCES CONTROL BOARD

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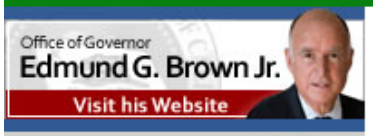

- Cal/EPA
- State and Regional Water Boards' Map
- Board Priorities
- Laws/Regulations
- Plans/Policies
- Programs
- Decisions Pending and Opportunities for Public Participation

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Water Quality

- Agriculture
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- Drinking Water
- Drought Year Info
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- Operator Certification
- Permit / Licensing
- Petitions
- Septic Systems (OWTS)
- Storage Tanks
- Storm Water
- Strategic Plan
- Water Quality Assessment
- Water Rights
- More...

Emergency Water Conservation Regulations Portal

ANNOUNCEMENTS

- State Water Board Approves Voluntary Cutback Program for Delta Riparian Water Rights (05/22/15)
- State Water Board Approves $19 Million for Interim Emergency Drinking Water and Drought-Related Projects (05/19/15)
- State Water Board Addresses Environmental Concerns In New Desalination Facility Standards (05/06/15)
- State Water Board Adopts 25 Percent Mandatory Water Conservation Regulation (05/05/15)

NITROGEN MANAGEMENT PLAN WORKSHEET

1. Crop Year (Harvested): _____

2. Member ID# _____

3. Name: _____

4. APN(s):	5. Field(s) ID	

CROP NITROGEN MANAGEMENT PLANNING		N APPLICATIONS/CREDITS	26. Recommended/ Planned N	27. Actual N
6. Crop		**15. Nitrogen Fertilizers**		
7. Production Units		16. Dry/Liquid (lbs/ac)		
8. Projected Yield (Units/Acre)		17. Foliar N (lbs/ac)		
9. N Recommended (lbs/ac)		**18. Organic Material N**		
10. Acres		19. Available N in Manure/Compost (lbs/ac estimate)		
Post Production Actuals		**20. Total Available N Applied** (lbs per acre)		
11. Actual Yield (Units/Acre)		**21. Nitrogen Credits (est)**		
12. Total N Applied (lbs/ac)		22. Available N carryover in soil; (annualized lbs/acre)		
13. ** N Removed (lbs N/ac)		23. N in Irrigation water (annualized, lbs/ac)		
14. Notes:		**24. Total N Credits** (lbs per acre)		
		25. Total N Applied & Available		

PLAN CERTIFICATION		
28. CERTIFIED BY:	**29. CERTIFICATION METHOD**	**X**
	30. Low Vulnerability Area, No Certification Needed	
	31. Self-Certified, approved training program attended	
DATE:	32. Self-Certified, UC or NRCS site recommendation	
	33. Nitrogen Management Plan Specialist	

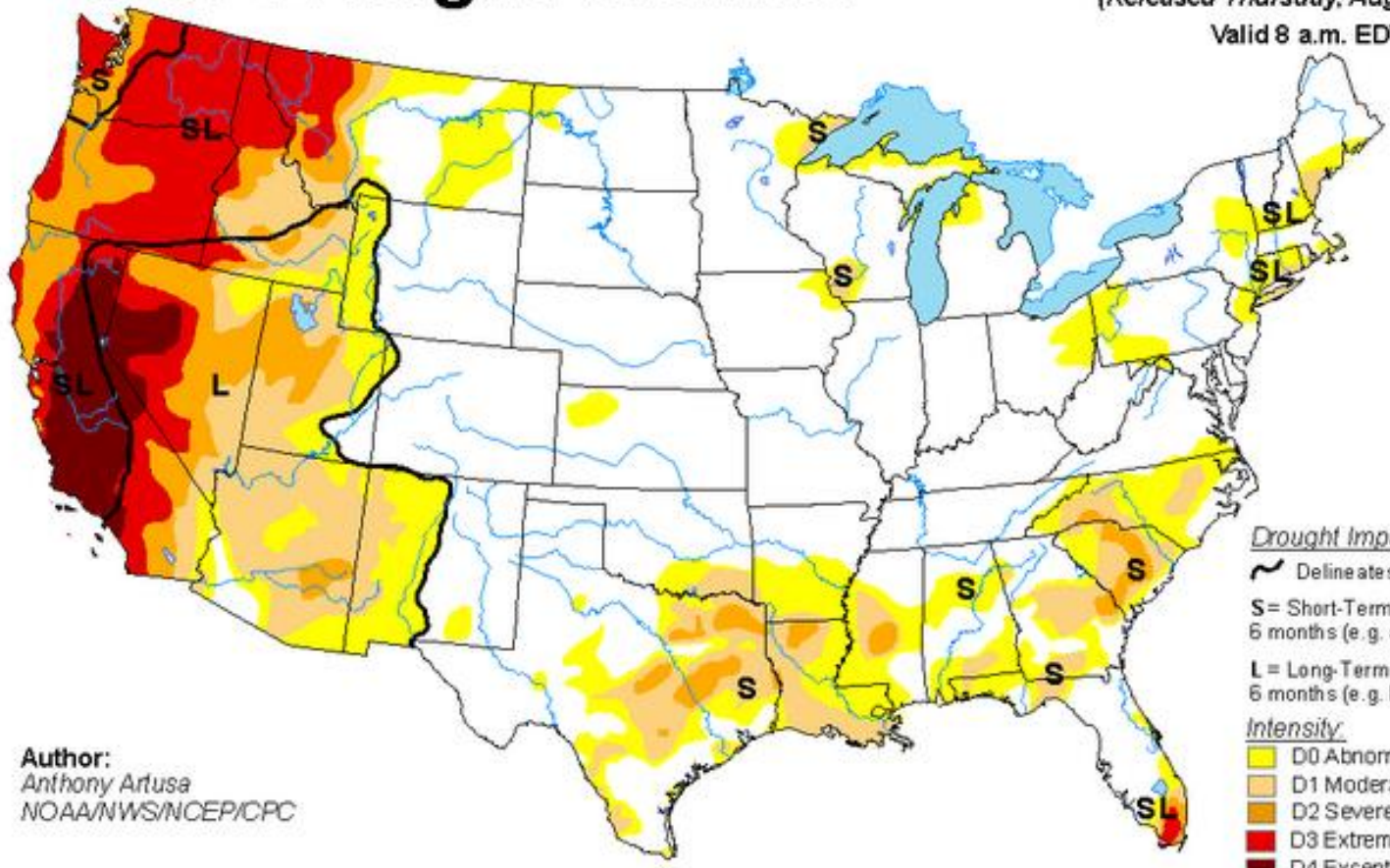
** Your Coalition will provide the method to be used to estimate N Removed.

U.S. Drought Monitor

August 25, 2015

(Released Thursday, Aug. 27, 2015)

Valid 8 a.m. EDT



Author:
Anthony Artusa
NOAA/NWS/NCEP/CPC

Drought Impact Types:

Delineates dominant impacts

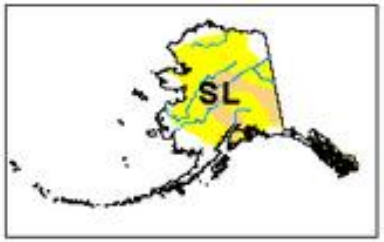
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

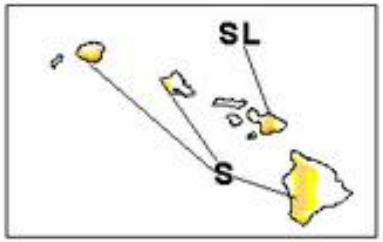
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

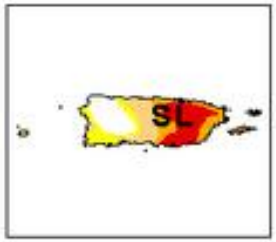
Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.







USDA

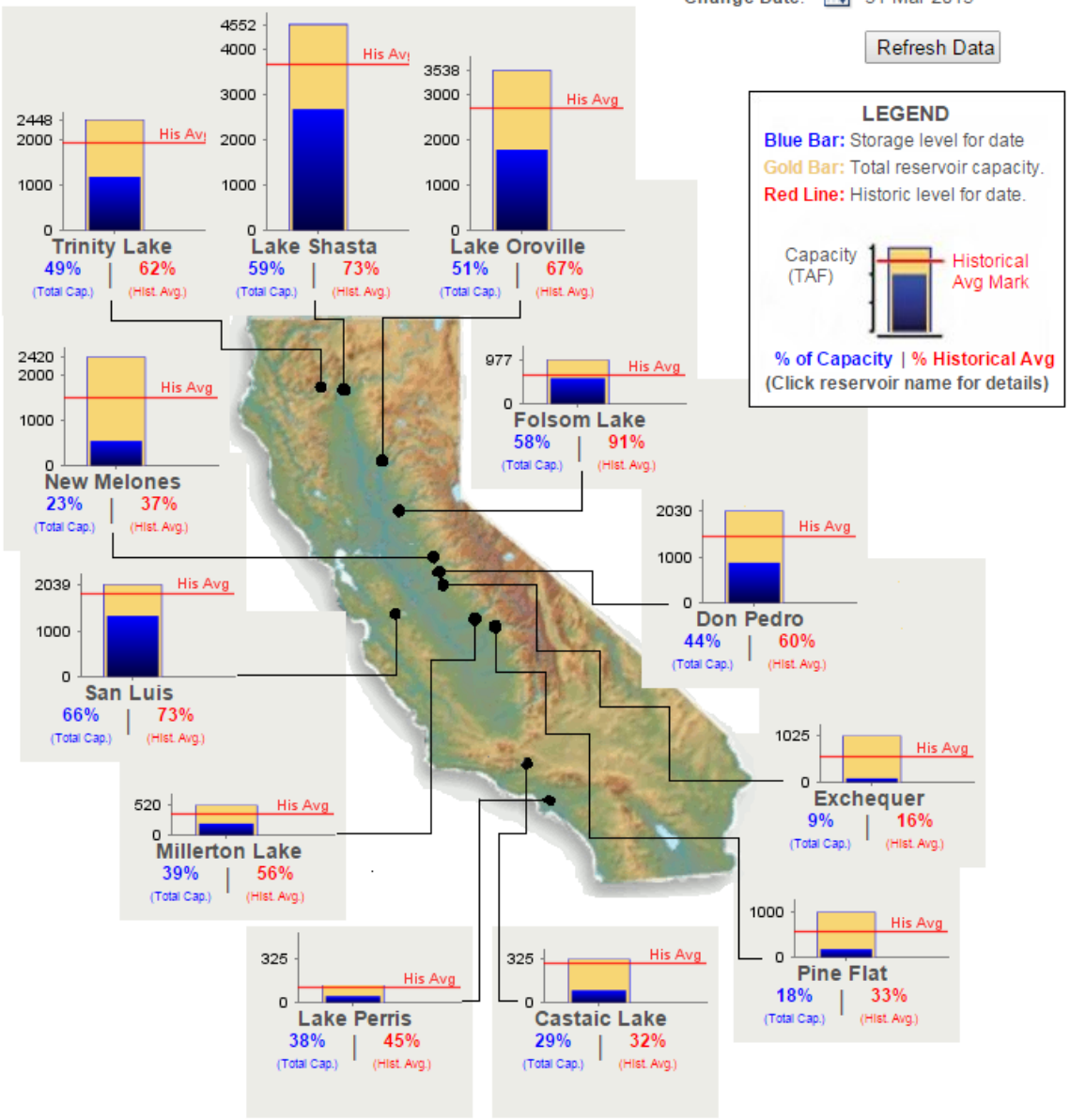
http://droughtmonitor.unl.edu/

CONDITIONS FOR MAJOR RESERVOIRS: 31-MAR-2015

Data as of Midnight: 31-Mar-2015

Change Date: 31-Mar-2015

Refresh Data



Click for printable version of current data.

NOTE: Perris lake has replaced Pyramid lake

Report Generated: 01-Apr-2015 9:14 AM

Objective

- Develop irrigation and nutrient management information

- Help growers target the right amount and the right time of water and nitrogen

Monitoring areas:

University of California
Agriculture and Natural Resources

Measurements

2014/15 season:

- 6 fields
- 2 varieties: San Andreas and proprietary
- 4 sampling locations per field

Monthly:

- Aboveground biomass and nutrient content (NPK)
- Canopy coverage (%)
- Root depth
- Soil mineral nitrogen

Yield and fertilizer records from participating growers

Field Characteristics

- Bed width: 64-68”
- Irrigation: sprinklers + drip tape
- Planting dates: October 7-16, 2014
- Average plant population: ~27,000 plants/A
- Soil type: from sandy loam to clay loam

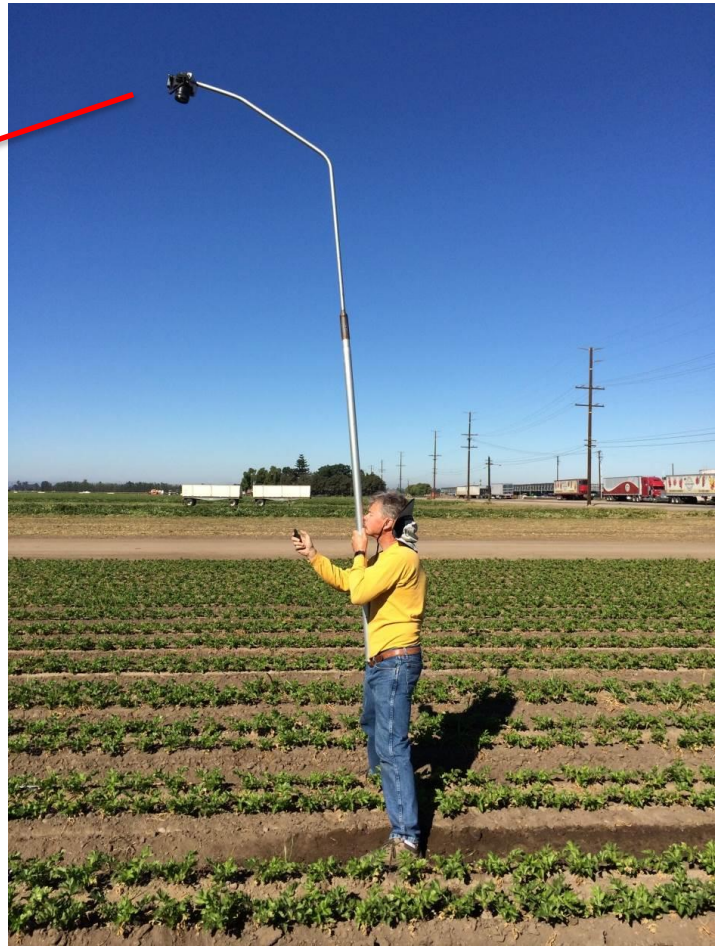
Aboveground-Biomass Assessment

- 4 plants/sampling location
- Count plant population
- 4 locations/field

Root Depth

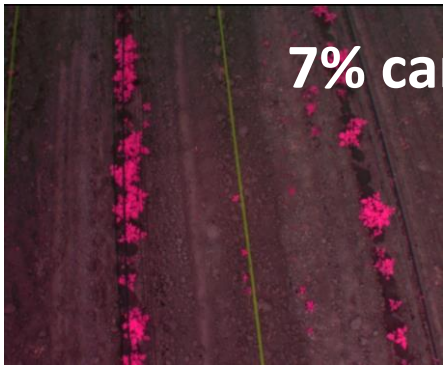
Canopy Coverage

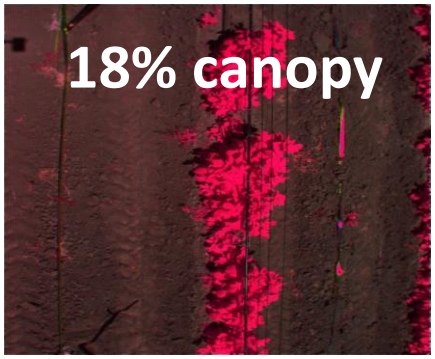
NDVI camera



$$ET_{crop} = ET_o \times K_c$$

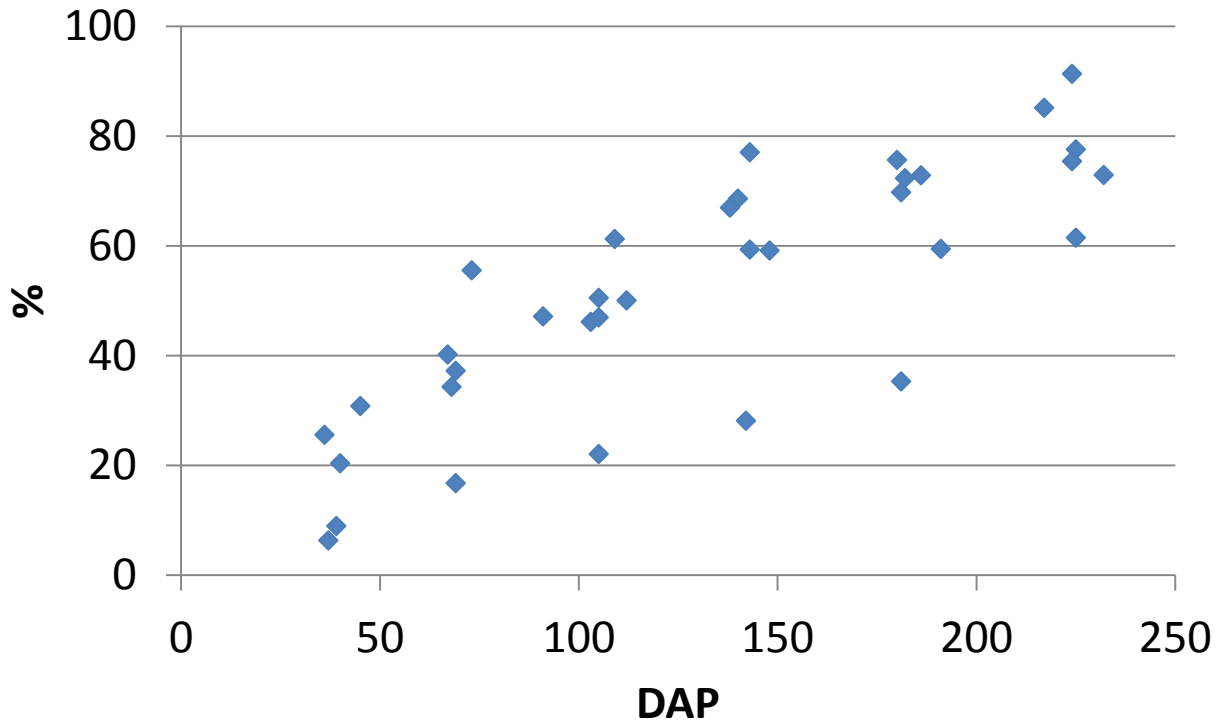
K_c varying from 0.1 to …



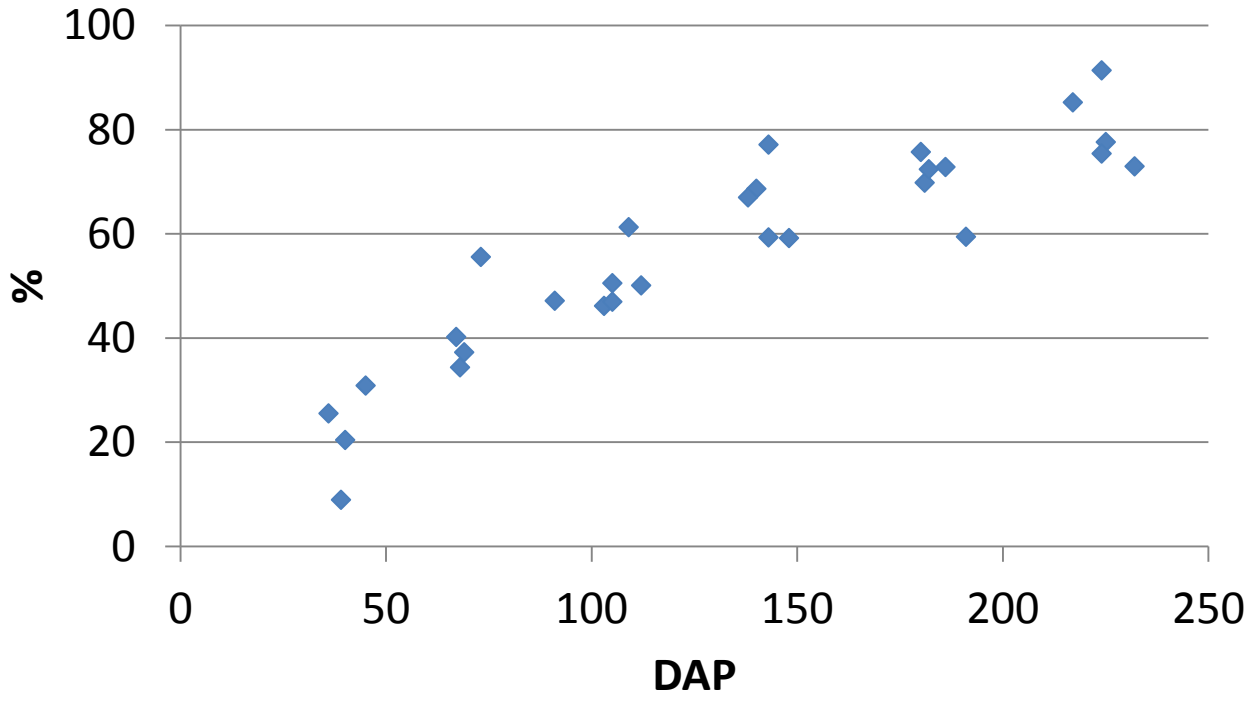


Canopy Coverage

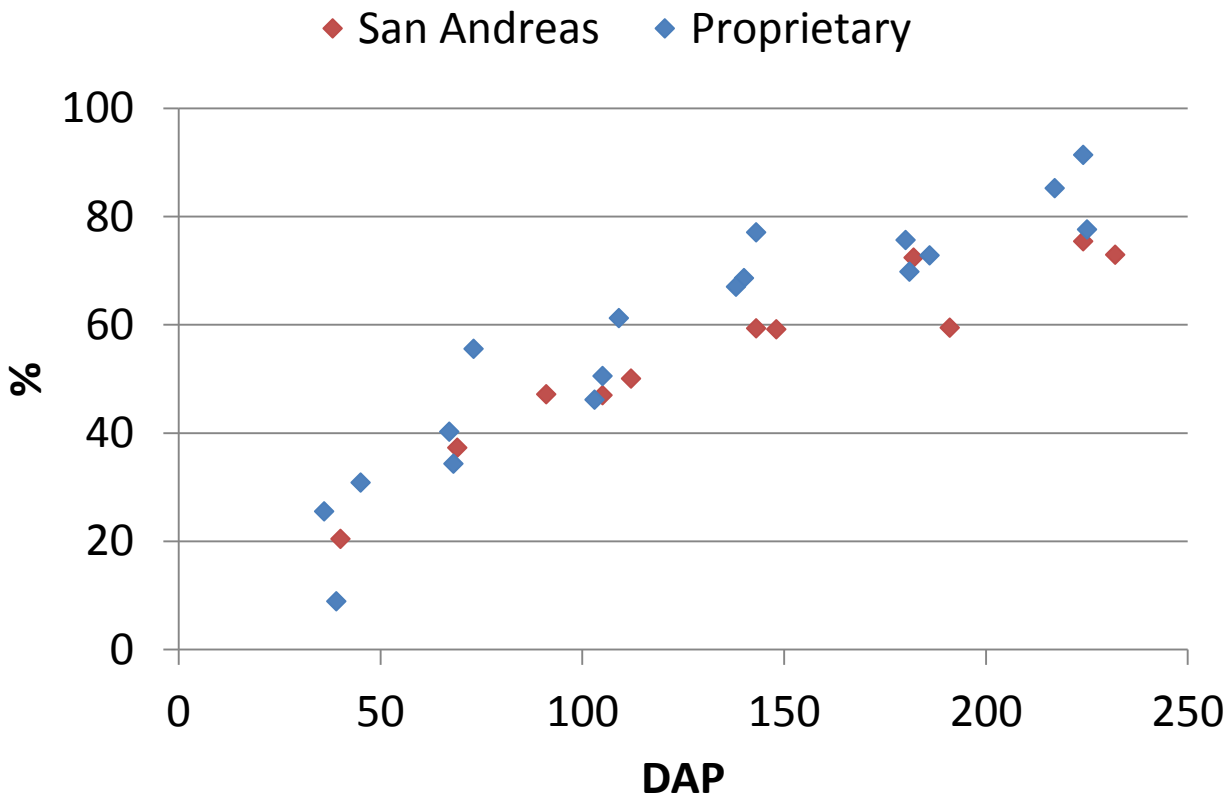
(% of the field covered with plants)



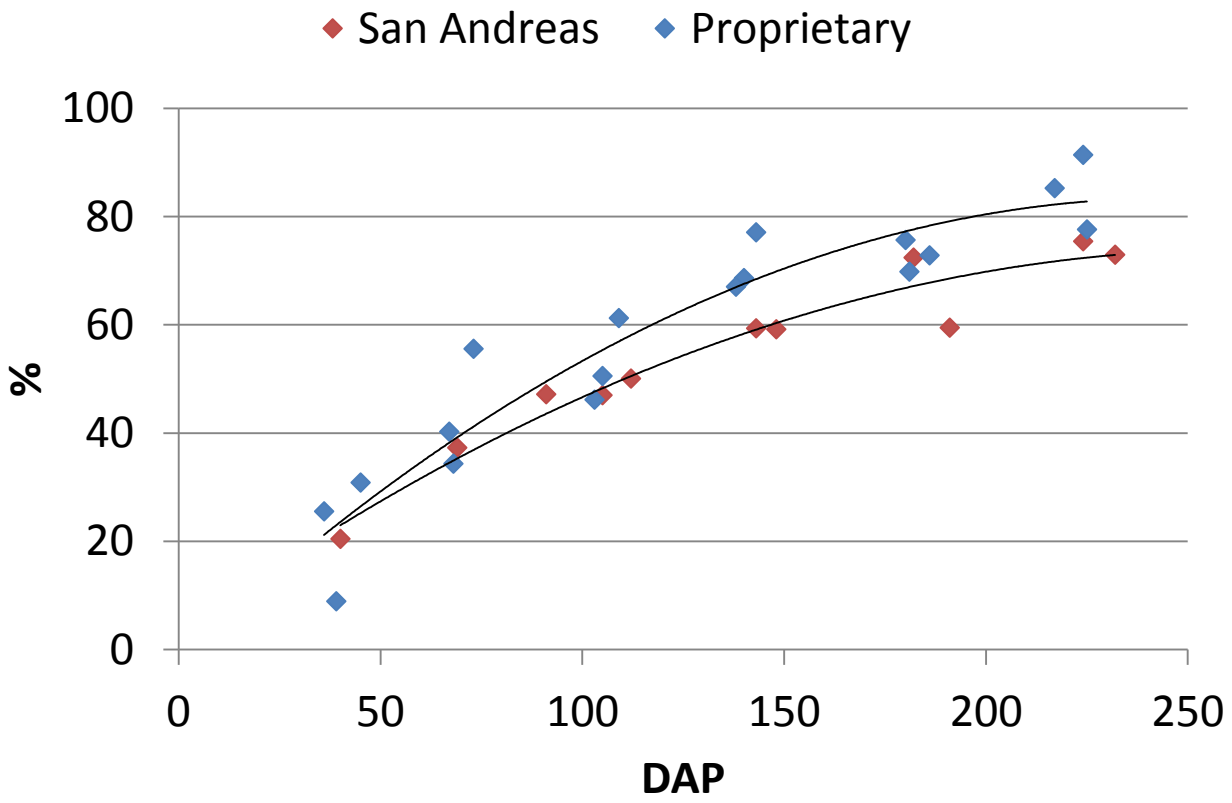
Canopy Coverage



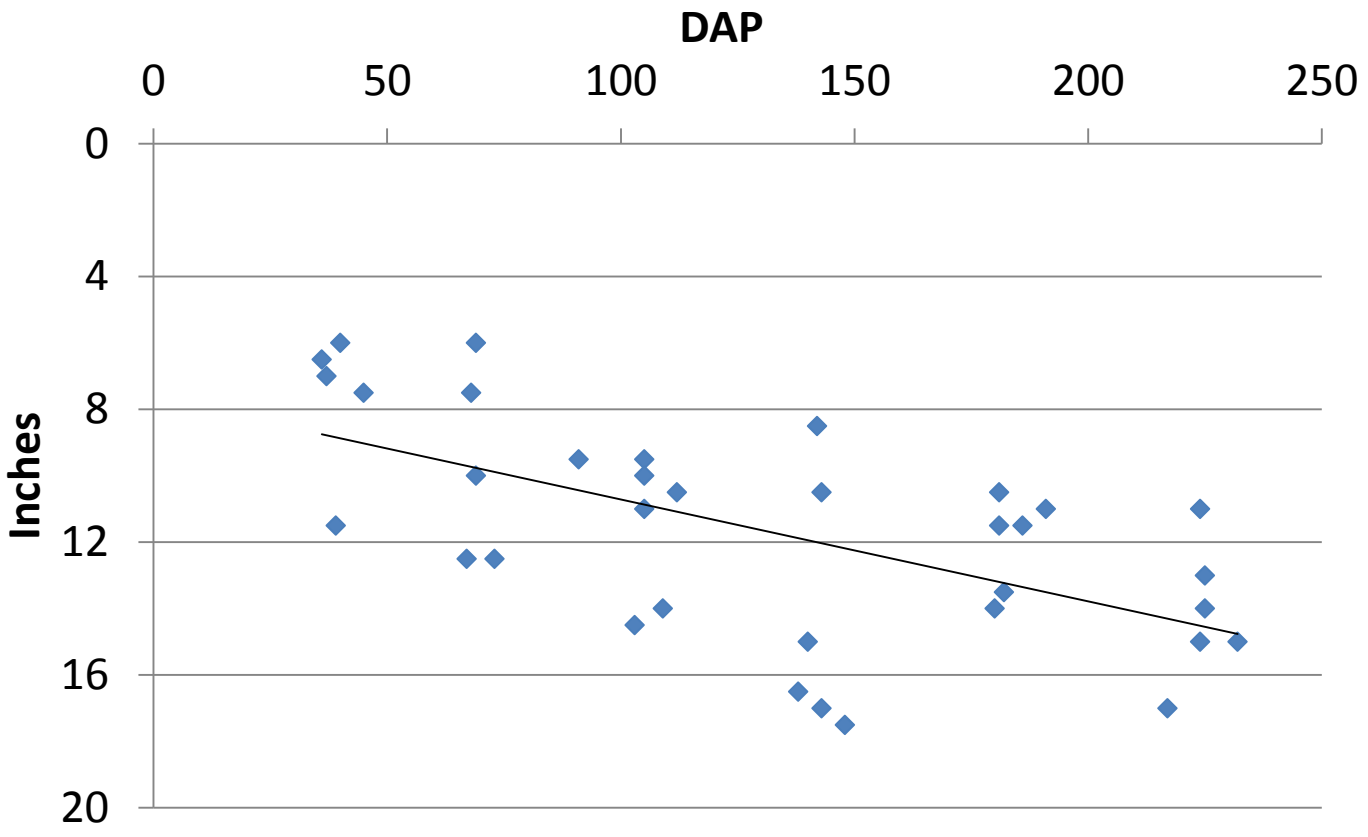
Canopy Coverage



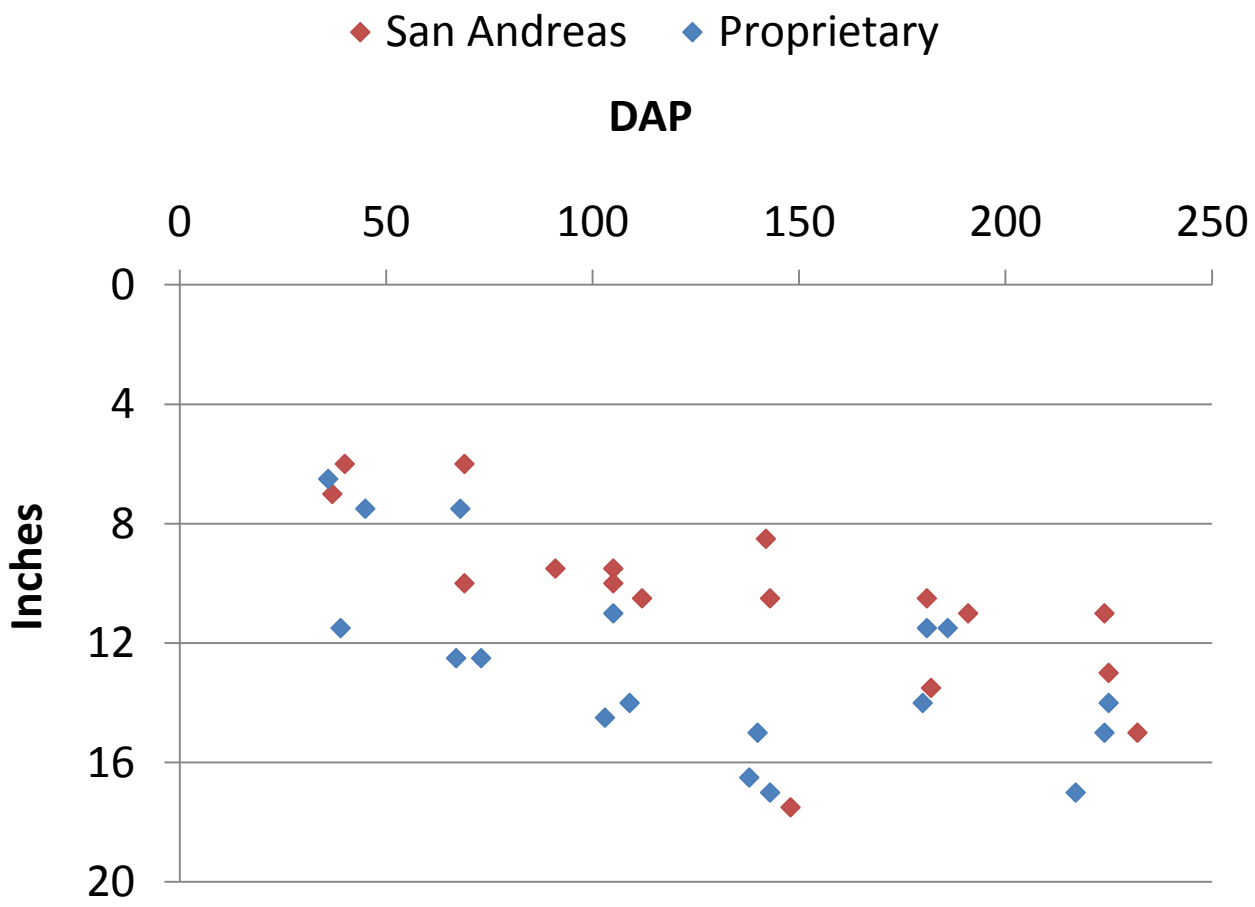
Canopy Coverage



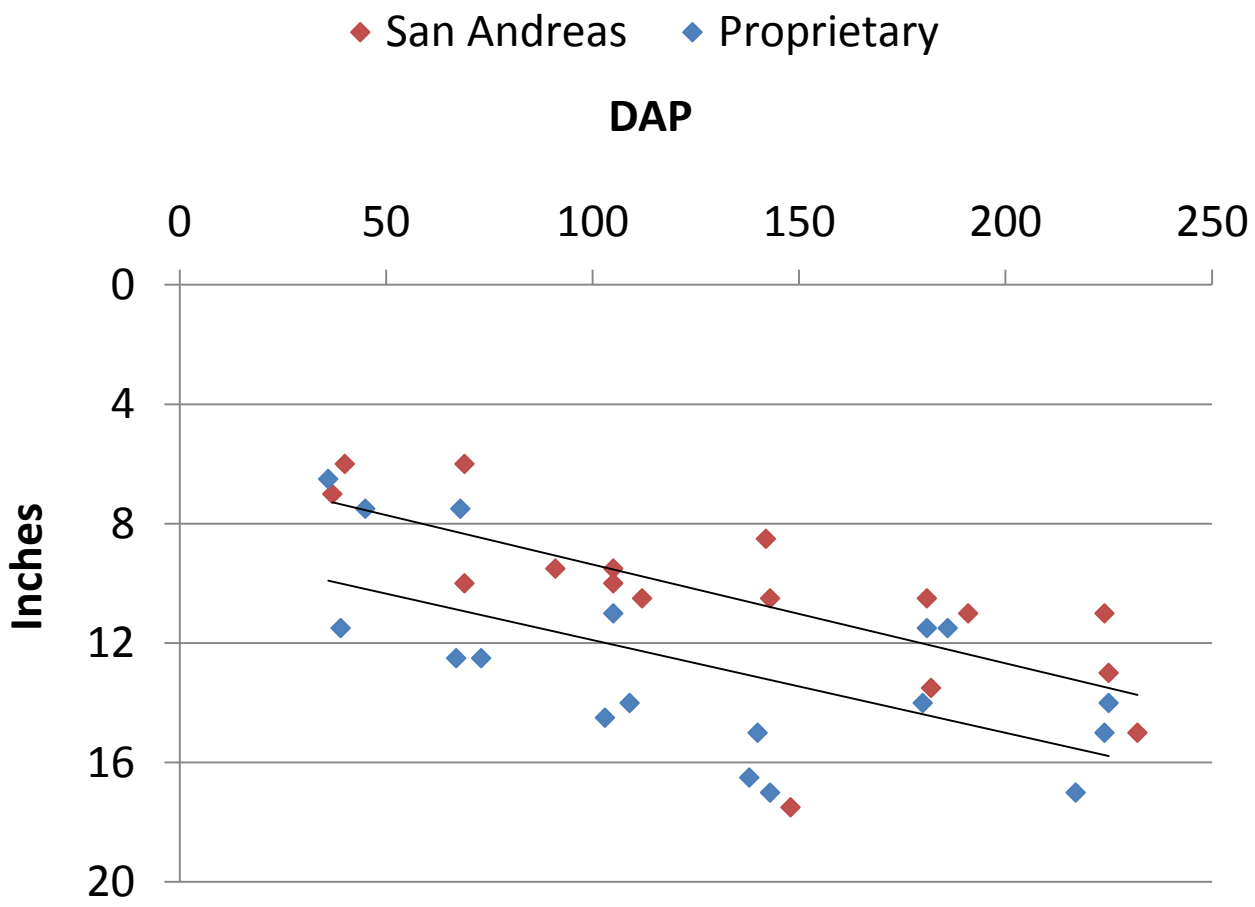
Root Depth



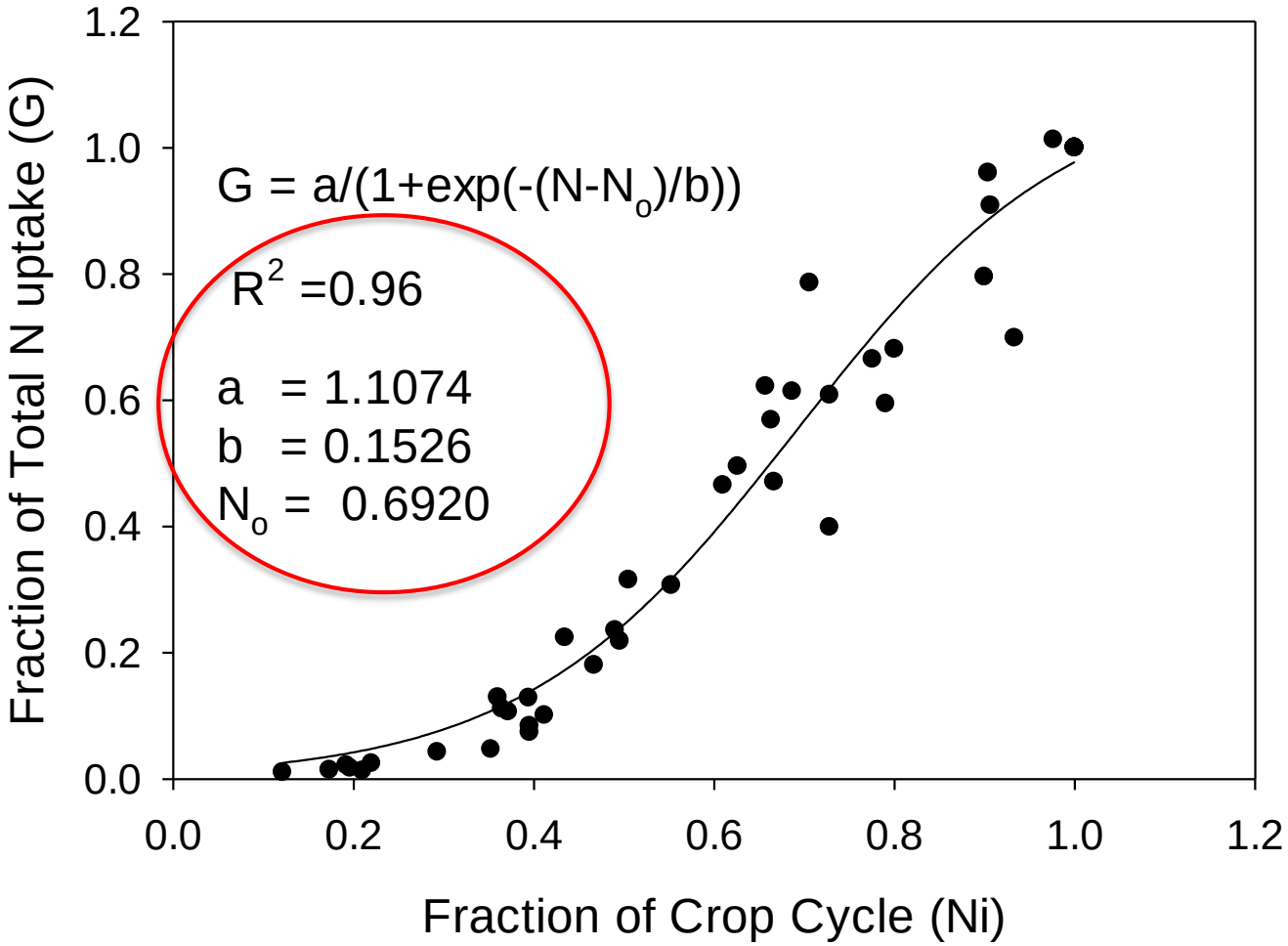
Root Depth


San Andreas
Proprietary
DAP
0
50
100
150
200
250
Inches
0
4
8
12
16
20

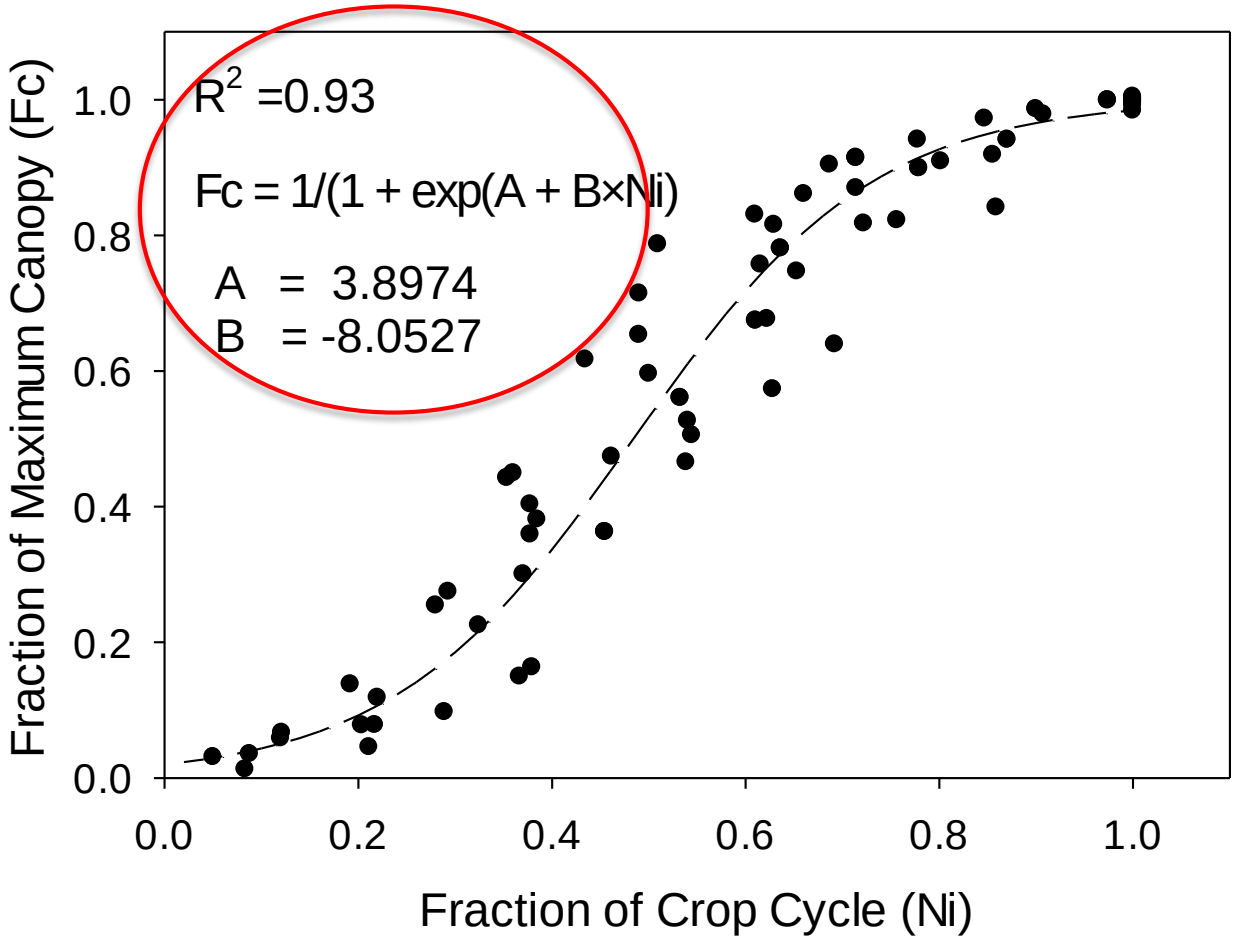
Root Depth


San Andreas
Proprietary
DAP
0
50
100
150
200
250
Inches
0
4
8
12
16
20

Nitrogen Uptake



Results - Canopy Coverage



CropManage

ucanr.org/cropmanage

Database driven web application

Crop ET model

Crop N model

University of California
Agriculture and Natural Resources

Final Thoughts

- Relevant information of N and water management was created
- Data will be used to devise CropManage for Strawberries. Raspberries is next
- Next: validate software with field trials

Approach

Soil Moisture Sensor

Weather Station

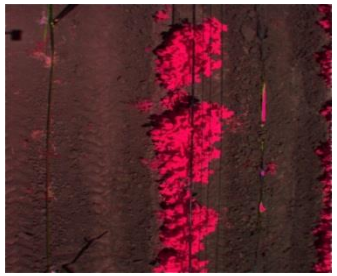
SNQT
(Soil Nitrate Quick Test)

How Much?

ETo

+

Kc



Water recommendation

- ✓ Irrigation system application rate
- ✓ Irrigation system application uniformity (DU)
- ✓ Leaching fraction (water salinity)

How is N fertilizer rate determined?

Fertilizer N = Crop N uptake – Soil N

Soil N:

– Quick Test

(20ppm of NO_3-N @ 12in = 80 lbs N/A)

- Match water and N fertilizer applications to specific demands of the crop

Next:

- Assess the effectiveness of CropManage's water and N fertilizer recommendations

Acknowledgements

- Co-authors: Oleg Daugovish, Michael Cahn, Tim Hartz, Nathan Bradford
- Growers: …
- Grant funds: CDFA, UC ANR and Thelma Hansen Fund

Questions/comments?

Thank you!