



Update on Nitrogen BMP Efforts with Tomato Production in Florida

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- Florida is a major tomato producer in the USA.
- Tomato is the most popular vegetable crop in Florida
- In 2005, 45,000 acres were grown with a value of \$800 million



70% of the tomato production is in the Southwest Florida area: Collier and Manatee County in sandy soils



BMP Background

- U.S Federal Clean Water Act of 1977 required that States assess the impact of non-point source of pollution on surface and ground water and establish programs to minimize them.
- Section 303 (d) required States to identify impaired water bodies and establish Total Maximum Daily Loads (TMDL) for pollutants entering these water bodies

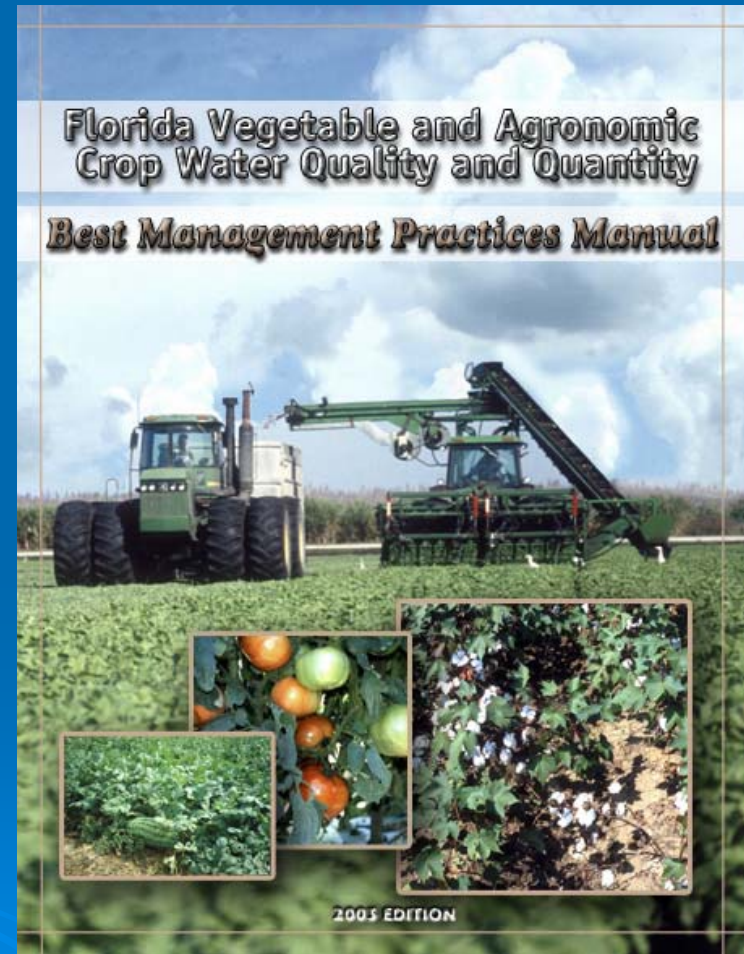
BMP Background

- As a response to the federal TMDL mandate, the Florida legislature passed the Florida Watershed Restoration Act.
- The legislation gave the Florida Department of Agriculture and Consumer Services (FDACS) the authority to develop BMP to reduce pollutants loads in target watershed.

BMP for Vegetables

DACS. 'The BMP manual for vegetable and agronomic crops grown in Florida has been adopted by reference and by rule 5M-8 of the Florida Administrative code on February 9, 2006.'

The BMP program is "voluntary"



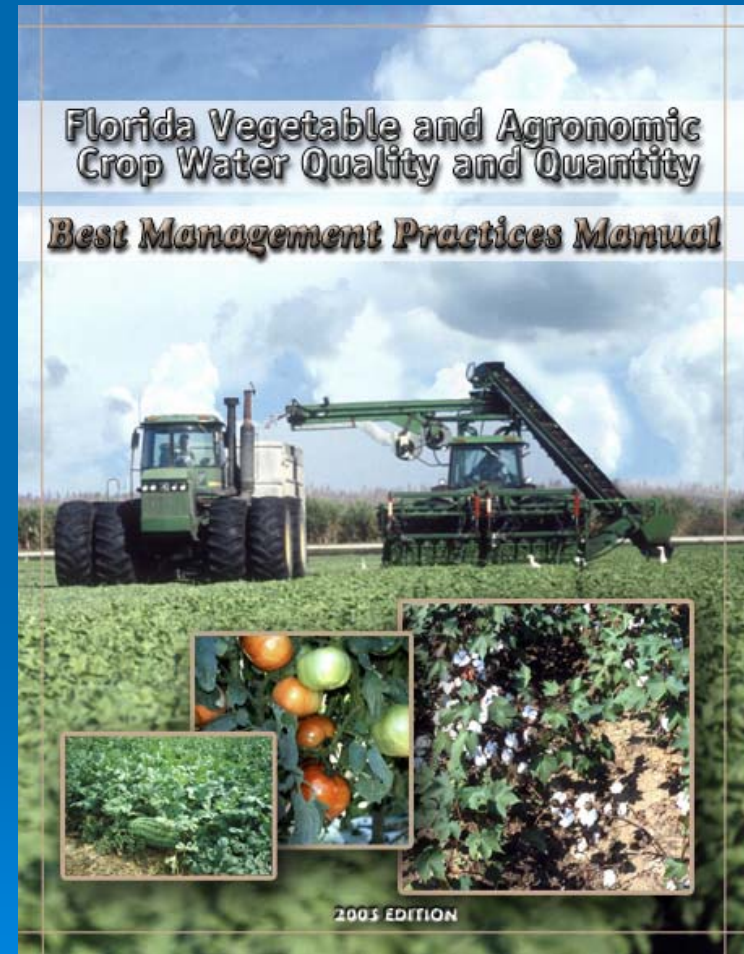
Where can the Manual be Found?

➤ **DACS web-site:**

www.Floridaagwaterpolicy.com

Click on "Best Management Practices"

Scroll down to "BMP Manuals."

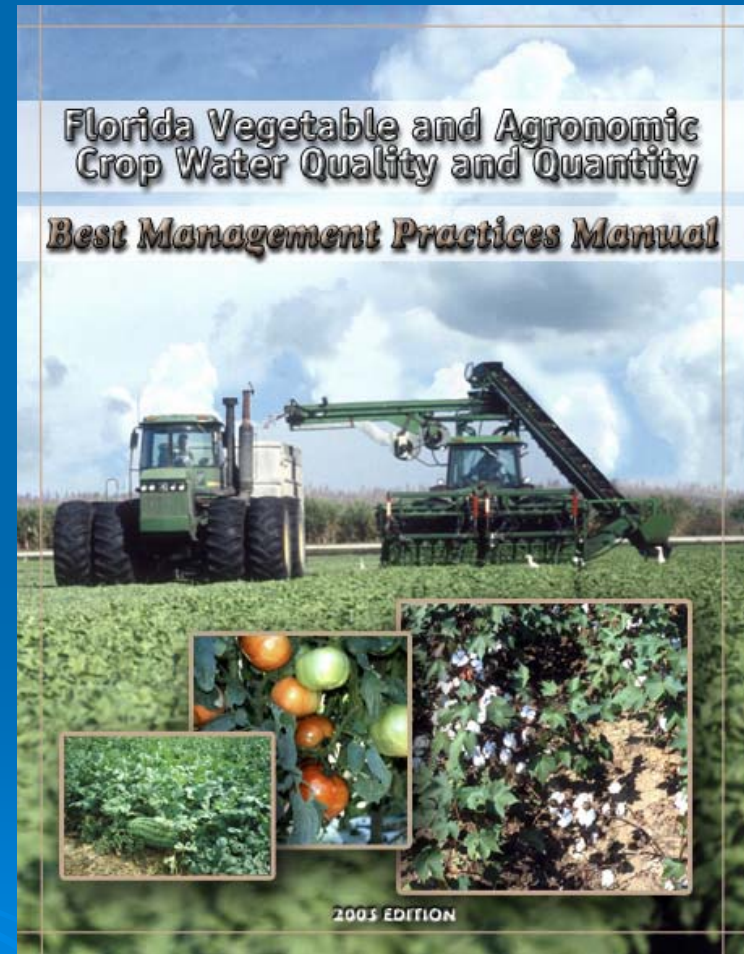


What's in for the growers who adopt the BMP's?

- **Waiver of liability** from reimbursement of cost and damages associated with the evaluation, assessment, or remediation of nitrate contamination of ground water (Florida Statutes 376.307)
- **Presumption of compliance** with water quality standards (FS 403.067 (7)(d))
- Eligibility for **cost-share programs** (FS 570.085) (1).

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- Appendix
- **Total = 49 BMPs!**



Nutrient and Irrigation Management BMP's

➤ Optimum fertilizer management/application (33)

1. Use UF/IFAS (200 lb/acre) or reputable published fertilizer recommendation.
2. If UF/IFAS rates are exceeded, 'grower are expected to employ additional nutrient and irrigation BMP's to negate possible environmental impacts'
3. 'For farming operations in significantly impaired basins caused by nutrients, growers must strictly adhere to all recommendations set forth by the Basin Management Action Plan'

What are we doing?

A. Charge of the IFAS Vegetable Fertilization Standards Task Force

B. Three years funding from DACS:

1. Establish partnerships tomato growers to evaluate the effects of N rates under commercial growing conditions;
2. Evaluate the N rates on plant growth, disease incidences, and production;
3. Determine the optimal N rate and evaluate the cost effectiveness;
4. Propose, if needed, a change in N recommendation

Experiment Locations



Nitrogen Rates

Farm	Season	Irrigation Type	N (lb/acre)	Plot size (acre)
1	Fall	Seep	200, 240, 260, 260& biosolids	0.33
2	Fall	Seep	200 and 255	0.83
2	Winter	Seep	200 and 255	0.83
2	Spring	Seep	200 and 255	0.83
3	Winter	Seep	200 and 300	0.83
4	Fall	Drip	250 and 418	0.10
5	Fall	Drip	200 and 300	25
5	Winter	Drip	200 and 300	17

Seepage Experiments







2-12 plots per treatment with 3 reps
10 plants per plot



Sap Nitrate- NO_3^- - K



Wells-Water Tables



Suction Lysimeter



**Soil Sampling
NO₃-P-K**

**At hot band
and center of
the bed**



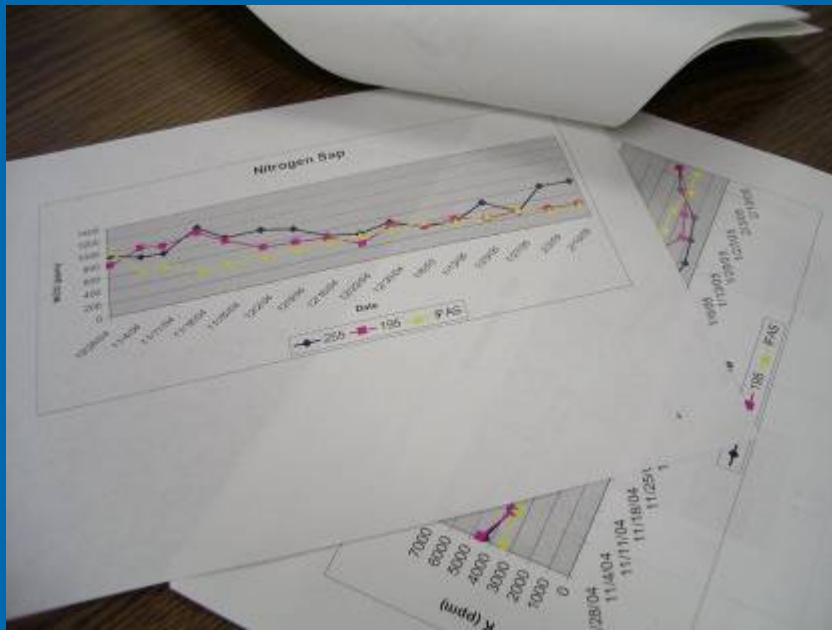
Moisture

Data logger/PC-400

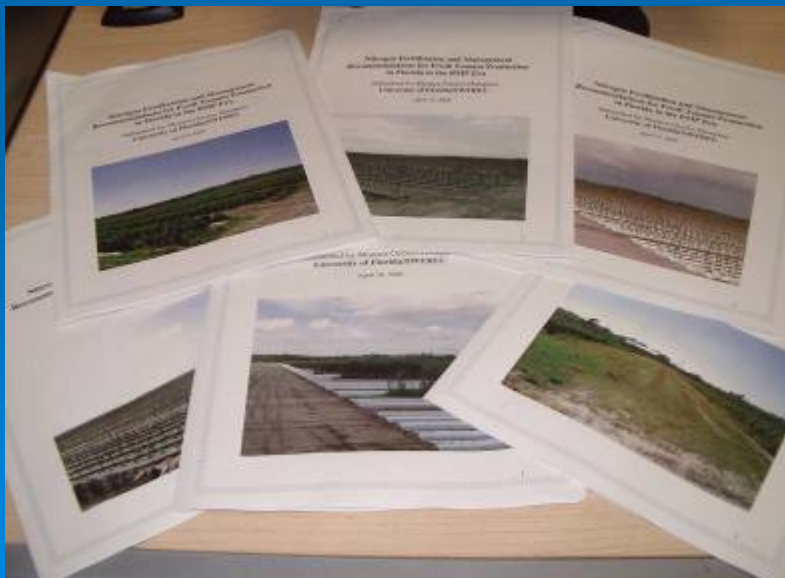


**Three Harvest
5/6, 6/6, 6/7 and culls**





By-weekly report to growers and IFAS



Final report to growers and IFAS

Results and Discussions



Plant Biomass

In general no differences in plant biomass



300 lb N/acre

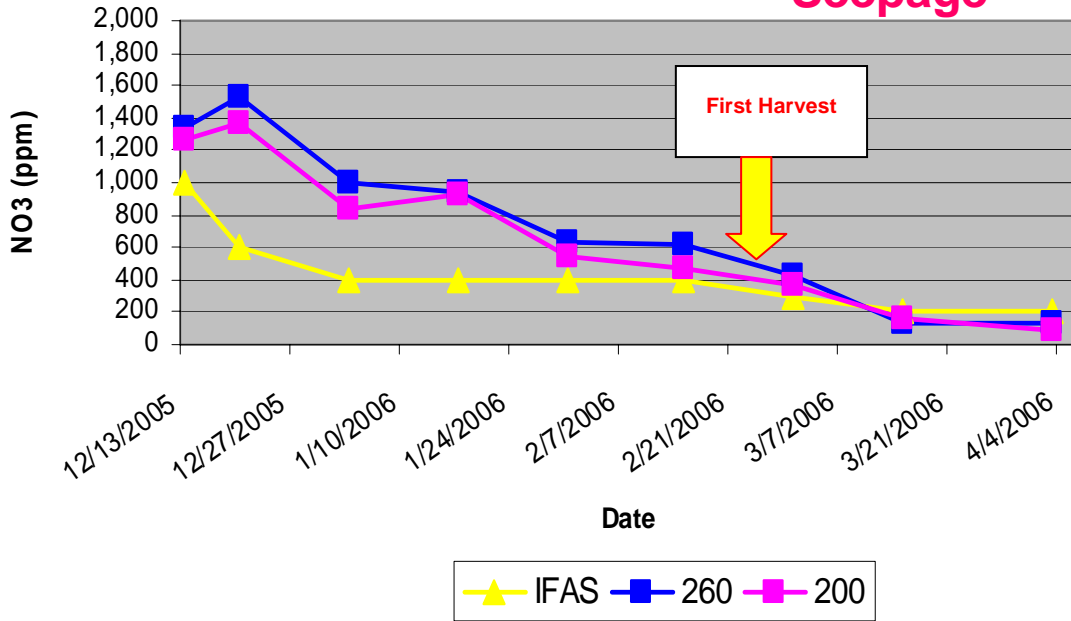


200 lb N/acre

Nitrogen SAP

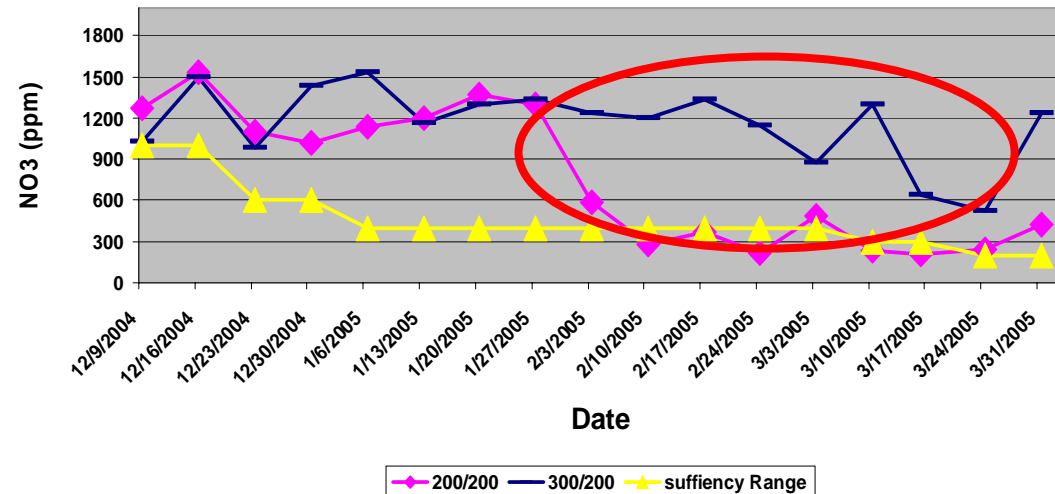
Nitrogen Sap

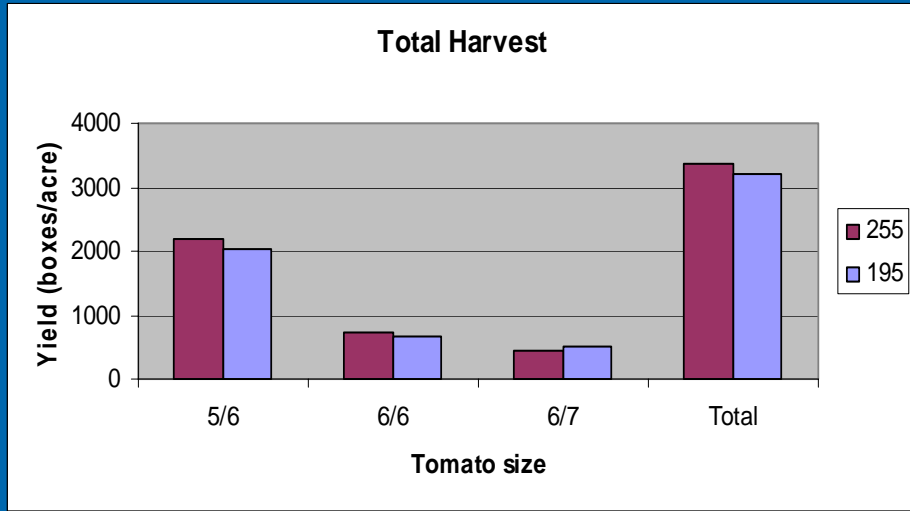
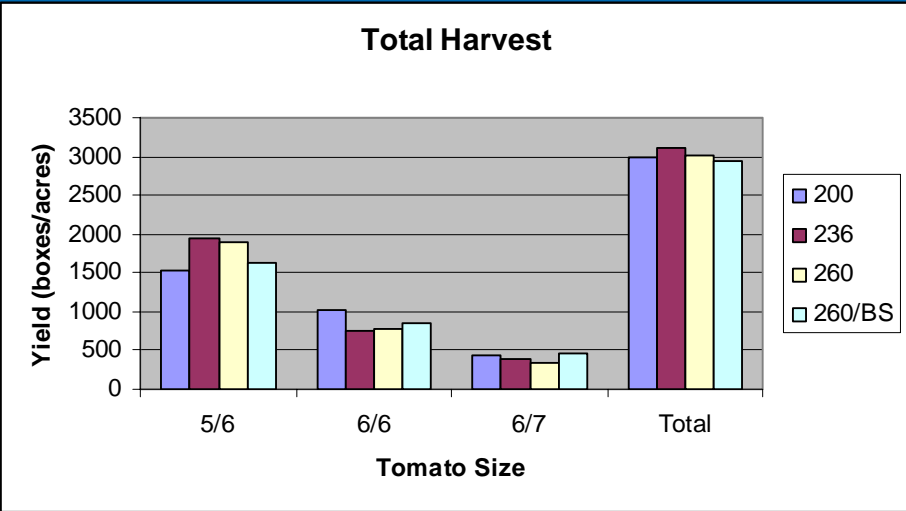
Farm # 2 Seepage



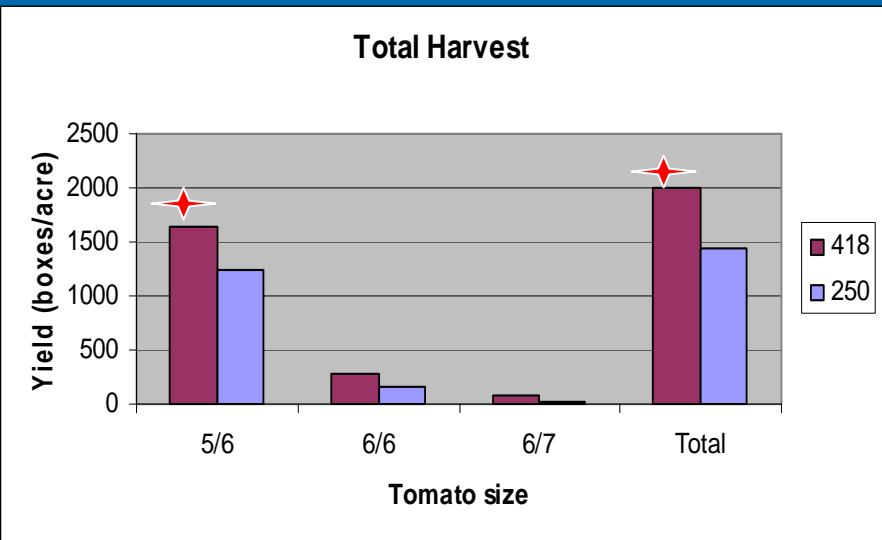
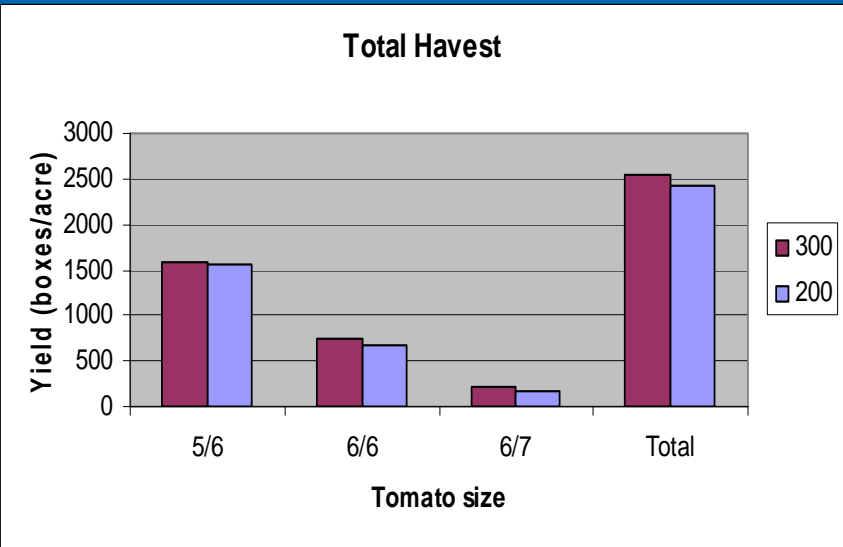
N-Sap

Farm # 5 Drip

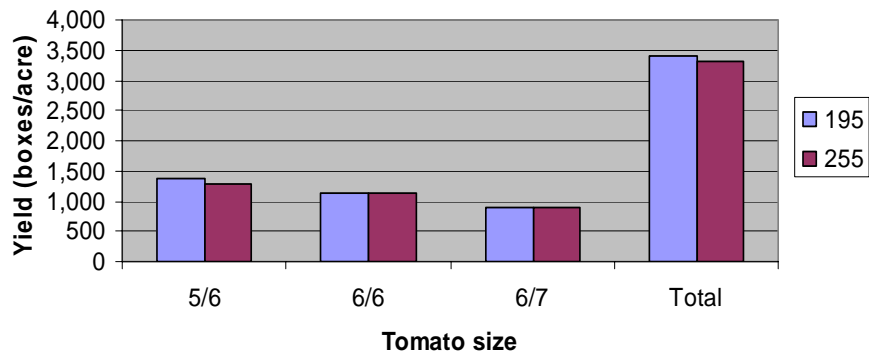




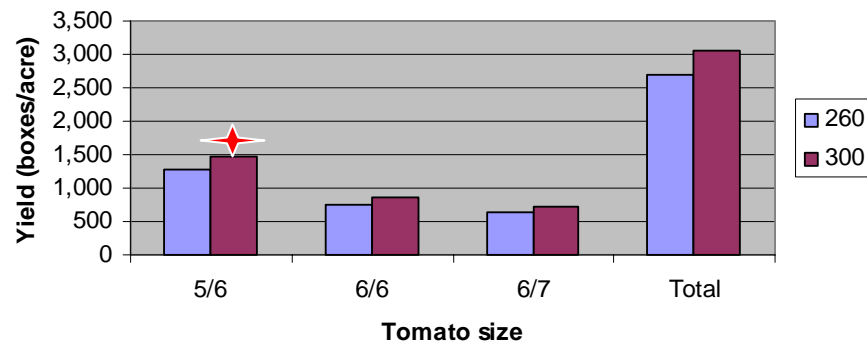
Total Yields 2004



Total Harvest

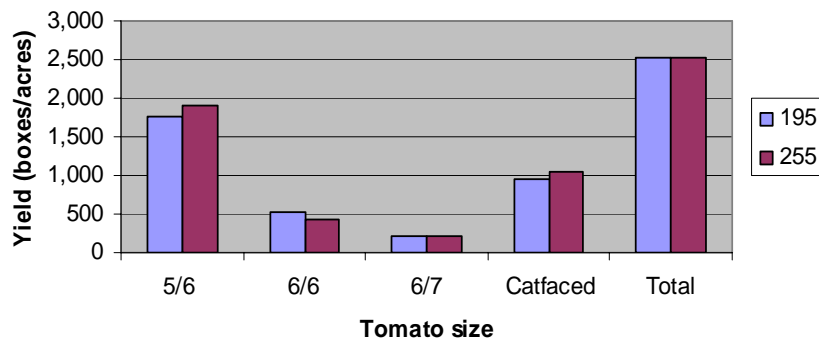


Total Harvest

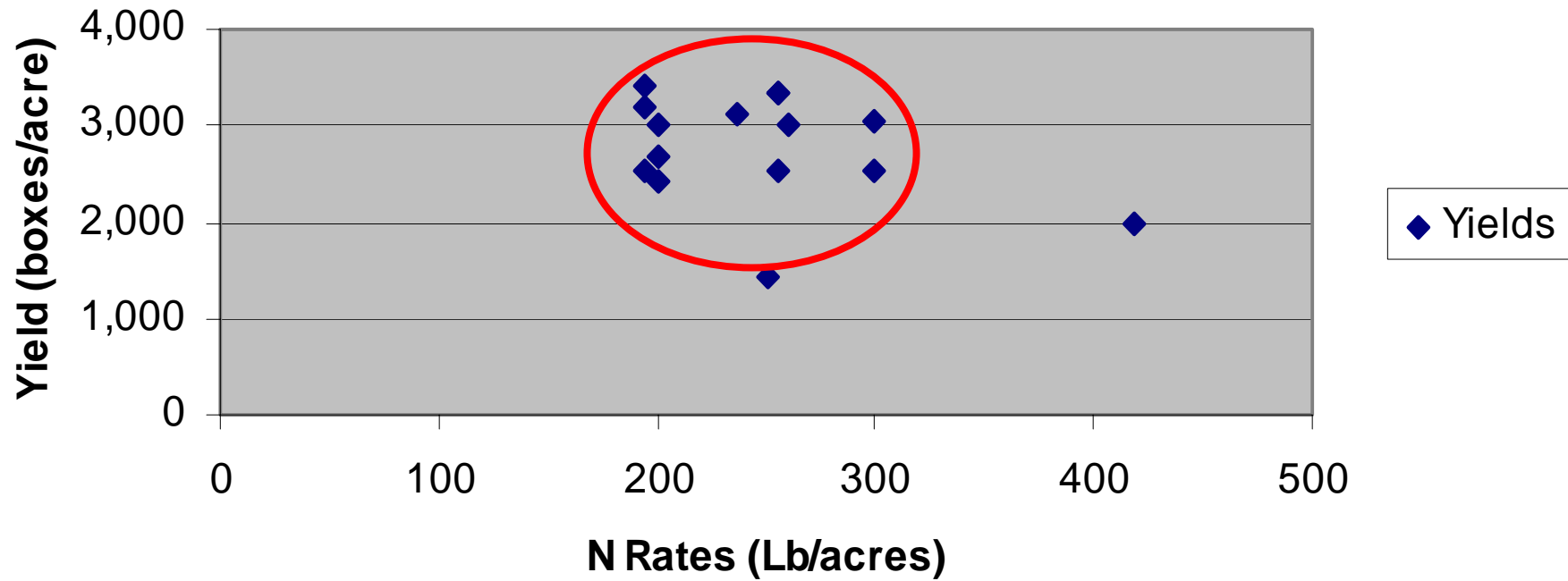


Total Yields 2004

Total Harvest



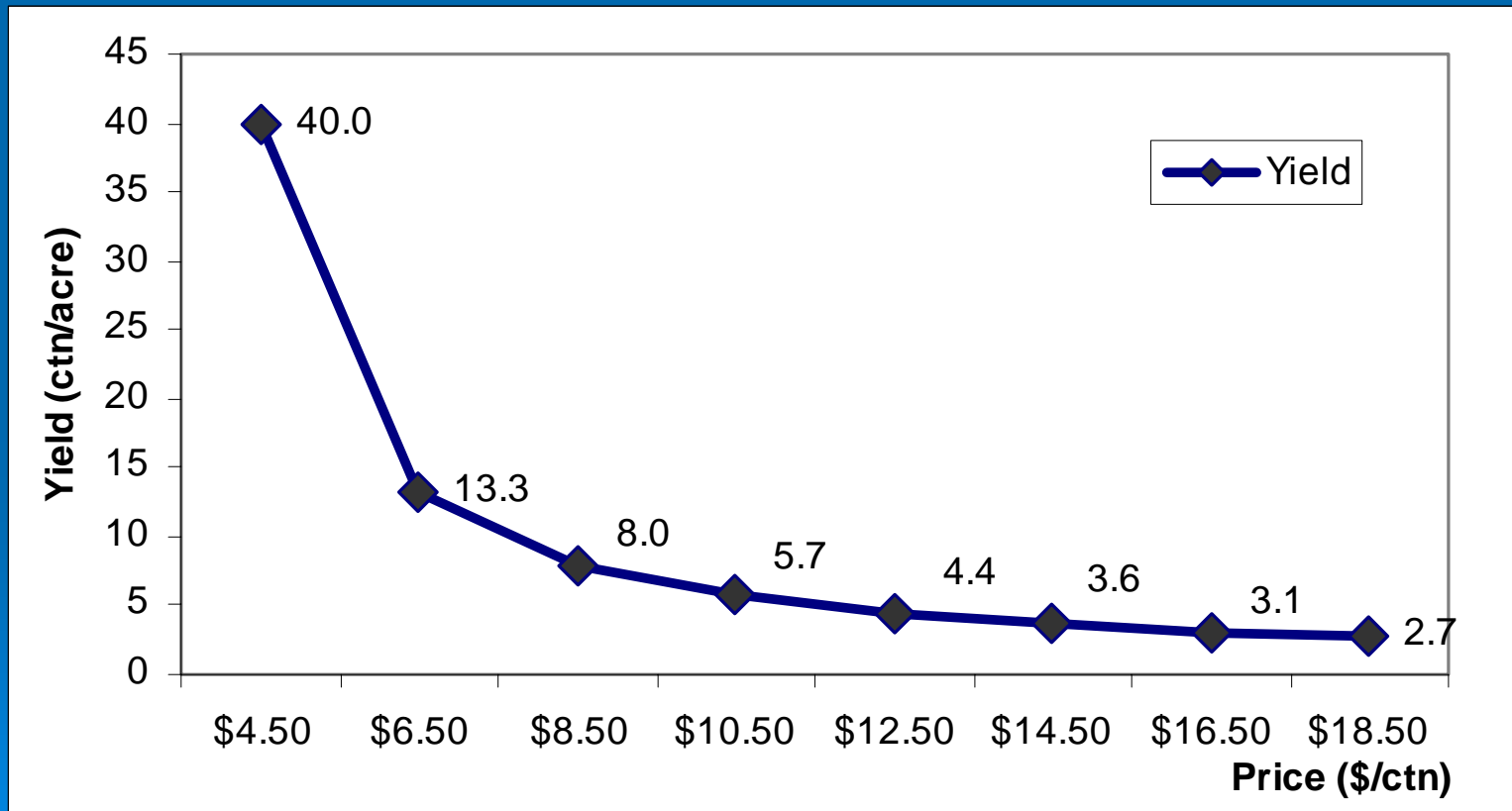
Tomato Yields Season 2004-05



Conclusions

- Growers were highly engaged in the project and a successful partnerships were developed throughout the season.
- Petiole sap $\text{NO}_3\text{-N}$ and K concentrations tended to be above the UF-IFAS sufficiency threshold in all trials, N treatments and throughout the season, but different with seepage and drip.
- There were not differences in plant dry weight 30 and 60 DAP for all trials, except in one trial.
- For a relatively dry year like the 2004-2005 season, grower's rate resulted in significantly greater x-large yields in two out of seven 7 trials and total yield one out of 7.
- Optimal N rate for tomato is not a simple "one size fits all". Recommendations should consider irrigation method and growing season.

Increasing N - 200 to 300 lb/acre @ \$40/acre



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