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
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.
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.
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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- Conservation Practices and Buffers
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- Seasonal Farming Operations Management
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- 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, growers 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

<table>
<thead>
<tr>
<th>Farm</th>
<th>Season</th>
<th>Irrigation Type</th>
<th>N (lb/acre)</th>
<th>Plot size (acre)</th>
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<td>Fall</td>
<td>Seep</td>
<td>200, 240, 260, 260 &amp; biosolids</td>
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<td>Fall</td>
<td>Seep</td>
<td>200 and 255</td>
<td>0.83</td>
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<tr>
<td>2</td>
<td>Winter</td>
<td>Seep</td>
<td>200 and 255</td>
<td>0.83</td>
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<tr>
<td>2</td>
<td>Spring</td>
<td>Seep</td>
<td>200 and 255</td>
<td>0.83</td>
</tr>
<tr>
<td>3</td>
<td>Winter</td>
<td>Seep</td>
<td>200 and 300</td>
<td>0.83</td>
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<tr>
<td>4</td>
<td>Fall</td>
<td>Drip</td>
<td>250 and 418</td>
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<td>Fall</td>
<td>Drip</td>
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<tr>
<td>5</td>
<td>Winter</td>
<td>Drip</td>
<td>200 and 300</td>
<td>17</td>
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</tbody>
</table>
Seepage Experiments
2-12 plots per treatment with 3 reps
10 plants per plot

Sap Nitrate - NO₃ - K

Wells - Water Tables
Suction Lysimeter

Soil Sampling

NO$_3$-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
In general no differences in plant biomass

300 lb N/acre
200 lb N/acre
Total Yields 2004
Total Yields 2004
Conclusions

- Growers were highly engaged in the project and a successful partnerships were developed throughout the season.

- Petiole sap NO$_3$-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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