BMP Research Update: Floating Aquatic Vegetation Impact on Farm Phosphorus Load

BMP Training
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Success of the EAA BMP Program

Baseline Period (WY1980-1988)
Rainfall Adjusted Predicted Load: 218 t

WY2017
TP Load Reduction: 70 %
Measured TP Load: 66 t

25% TP Load Reduction
Requirement (Target)

First Compliance Year

Pre-BMP Implementation
Partial BMP Implementation
Full BMP Implementation

Annual % TP Load Reduction
5-year TP Load Reduction
FAV Project Goal

To provide growers with an additional tool in their efforts to reduce off-farm P loading in the Everglades Agricultural Area.
Objectives

1. Evaluate FAV management practices in the EAA farm canals for impact on
   a) Farm drainage water phosphorus (P) load
   b) P speciation of farm drainage water
   c) Canal sediment properties

2. Use research results to develop a BMP for managing FAV in farm canals that further lowers farm P loads.
Experimental Rationale

**Anaerobic Canal:**
- Max Sed P flux 10X
- Maximum Detritus

**Aerobic Canal:**
- Min Sed P Flux
- Minimal Detritus

Light weight/labile P-sediments

Denser/recalcitrant P-precipitates
**Farm Descriptions and Locations**

**S-5A Sub-basin**
- Farm 0401: 908 acres - cane w/corn
- Farm 2501: 823 acres - cane w/corn → sod
- Farm 1813: 594 acres - cane w/corn
- Farm 6117: 800 acres - cane w/corn

**S-6 Sub-basin**
- Farm 3102: 1608 - cane w/veg+corn
- Farm 3103: 602 acres - cane w/veg+corn

- Farm 4701: 630 acres - cane w/rice
- Farm 4702: 640 acres - cane w/rice
# Data Collection

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Analysis</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FAV Biomass</strong></td>
<td>Species composition, Aerial Coverage, P Content, Biomass</td>
<td>Every two months</td>
</tr>
<tr>
<td><strong>Canal Sediments</strong></td>
<td>TP, Wet Density, Dry Density, OM (LOI), ash content</td>
<td>Twice annually</td>
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<td></td>
<td>Sediment depth surveys</td>
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<td></td>
<td>P fractionation</td>
<td></td>
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<tr>
<td><strong>Ambient Canal Water</strong></td>
<td>TP/TDP/SRP (PP/DOP), Ca, DOC, pH, TSS</td>
<td>Every Two weeks</td>
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<tr>
<td></td>
<td>Hydrolab in situ: Temp, DO, ORP, SpCond</td>
<td>Daily every other week</td>
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<tr>
<td><strong>Drainage Water</strong></td>
<td>Flow volume, velocity</td>
<td>Drainage events</td>
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<tr>
<td></td>
<td>TP/TDP/SRP (PP/DOP), Ca, DOC, pH, TSS</td>
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SELECTED RESULTS

FAV Coverage
Farm Drainage Water
Example farm 4701/4702
Comparative Regression Analysis For P Load

\[ \text{Treated}_i = b_0 + b_1 \times (\text{Control}_i) + e \]
Weekly P UAL - 4702 vs 4701

- Cal: $y = 1.47x$, $R^2 = 0.43$
- TMT: $y = 0.57x$, $R^2 = 0.15$

4702 P UAL (kg/acre) vs 4701 P UAL (kg/acre)
Summary

• To date, the relationships between farm pairs after imposing treatments have shown a positive FAV control treatment effect on farm pairs 4701/4702 and 6117/1813.

• The remaining two farm pairs have shown a modest positive treatment effect.
Activities for 2017-2018

- Continue data collection: Water, Sediments, and FAV
- In depth statistical analysis

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<th>Drainage Water</th>
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<tr>
<td>FAV</td>
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<tr>
<td>&lt;10%</td>
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<td>&gt;10%</td>
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<td>TP (mg/L)</td>
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<td>PP (mg/L)</td>
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<td>0.02</td>
<td>0.04</td>
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<td>SRP (mg/L)</td>
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R = 0.318
p = 0.027

R = 0.338
p = 0.018

R = 0.211
p = 0.150
Extension publications:
http://edis.ifas.ufl.edu/

University of Florida IFAS Extension

Search
Results 1 - 10 of about 36 for Darnell, Samira H. Publication...
Personnel

Samira Daroub, PhD  Principal Investigator
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Johnny Mosley, AA  Field Technician

NELAC Certified LAB: Total P; Ortho P
Thank You!

Questions?