What is the invasion risk of alternative crops through the lens of the UF/IFAS Assessment?

Deah Lieurance
University of Florida
• TOTAL Florida $8,462,652,000 (all commodities)

• Citrus $1,509,307,000 (2013)
  • 18% of all state revenue
  • Oranges: $1.17 Bil per year
  • Grapefruit $117 Mil/yr
  (FDACS https://www.freshfromflorida.com 2018)

• Avocado
  • Overall economic impact of close to $100 million/yr
  • Farm gate sales are worth about $24.4 mil
  • Industry is worth upwards of $35 mil per year
  (Evans and Lozano 2014)
The problem: Citrus decline

- Citrus canker
  - Multiple introductions
  - Bacterial infection
  - Early fruit drop

- Citrus greening
  - Bacterial infection
  - Vectored by Asian psyllid
  - Tree decline & fruit drop
  - $4.5bil loss over 5yrs

(Hodges &Spreen, 2012)
The problem: Hurricane Irma

Additional 50-70% reduction in state’s citrus crop
The problem: Laurel wilt

- Affects members of the Lauraceae plant family
- Threatening Florida’s avocado industry
The problem: Alternative crops

- Bioenergy & other biomass stock species
- Share key traits with invasive species
  - High establishment, tolerate low resource environment, rapid biomass accumulation
- Aggressively marketed in wake of citrus decline
Non-native Planting Rule

“to control the introduction into, or movement within, Florida of plant species intended for biomass plantings.”

• Requires permit to plant >2 contiguous acres

• By law, include weed risk assessment

Eucalyptus urophylla  Millettia pinnata  Miscanthus sinensis
Predictive Tool

• Risk assessment protocol modified for Florida
• Evaluates species
  • New to state
  • Causes problems elsewhere
  • Proposed for new use

• >153 species evaluated

Vitex rotundifolia (Beach vitex) High Risk
Tung oil tree

Industrial hemp

Brassica spp.
Organic bamboo introduced as new crop at Mixon Fruit Farms

BY JAMES A. JONES JR.
jajones1@bradenton.com
October 29, 2017 08:30 AM
Updated October 29, 2017 08:30 AM

BRADENTON — Pressures exerted on the Florida citrus crop by the relentless forces of nature – greening, canker and weather –

FROSTPROOF — Byron and Cynthia Matteson said they don’t plan to give up on their longtime commitment to citrus, but they agreed they need another cash crop to survive the uncertainties of growing Florida’s signature crop.

So they are planting bamboo on 35 acres of their farm near Frostproof, south of Lake Wales in Polk County.
The problem with bamboo

1. The company promoting bamboo is promising unrealistic returns on investment.
2. Initially, they were planting temperate species around the state
3. That temperate bamboo happens to be a running bamboo (*Phylostachys*)
4. When told their plantings required permits and the running bamboo would not be permitted
5. Went to above the head of the FDACs employee who handles permitting, and got an exemption
6. Company publicly treats all bamboo as the same species
Phyllostachys edulis

Common Names: Moso bamboo, moso-chiku, tortoise shell bamboo

Conclusions by Zone

Central, North, South
Invasive (No Uses)
Invasive and not recommended by IPAS. Will be reassessed every 10 years.

Species evaluated with the Predictive Tool.
Predicted to be invasive. In particular cases, the species may be considered for use under specific management practices that have been approved by the IPAS Invasive Plant Working Group.

Assessment Status: Complete

Growth Habit: Graminoid
Origin: Asia Temperate
Tool Used: Predictive Tool
Predictive Tool Score: 11
Dendrocalamus asper

Common Names: Sweet bamboo

Conclusions by Zone:
- Central, North, South

Evaluation:
- Evaluate Further

Description:
This species was evaluated with the Predictive Tool and received an intermediate score (5-6). The Secondary Screening was implemented, but not enough information was available to reach a conclusion.

Assessment Status: Complete

Table:

<table>
<thead>
<tr>
<th>Growth Habit</th>
<th>Graminoid</th>
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<tbody>
<tr>
<td>Origin</td>
<td>Asia Tropical</td>
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<tr>
<td>Tool Used</td>
<td>Predictive Tool</td>
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<tr>
<td>Predictive Tool Score</td>
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Running bamboo species pose a greater invasion risk than clumping bamboo species in the continental United States.
INVEST in Giant Bamboo Farming

ECO-INVEST

YOUR LEADER IN CREATING AND MANAGING GIANT BAMBOO CROPS FOR COMMERCIAL AND INDUSTRIAL PURPOSES
Crop Comparison Chart

<table>
<thead>
<tr>
<th>CROPs</th>
<th>PROFIT x ACRE x YEAR in US $</th>
<th>MACHINERIES INVESTMENTS</th>
<th>APPLICATIONS in MARKETS</th>
<th>RISK FACTORS weather + others</th>
<th>SOWING years</th>
<th>LABOR INTENSIVE PESTICIDES</th>
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<tbody>
<tr>
<td>CORN</td>
<td>50 to 200</td>
<td>hundred thousands</td>
<td>2</td>
<td>few</td>
<td>every year</td>
<td>HIGH</td>
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<tr>
<td>SWEET POTATO</td>
<td>1200-1500</td>
<td>hundred thousands</td>
<td>few</td>
<td>few</td>
<td>every year</td>
<td>HIGH</td>
</tr>
<tr>
<td>TOBACCO</td>
<td>1500-2000</td>
<td>hundred thousands</td>
<td>few</td>
<td>high</td>
<td>every year</td>
<td>very high</td>
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<tr>
<td>BLUEBERRIES</td>
<td>2500-4000</td>
<td>thousands</td>
<td>few</td>
<td>VERY HIGH</td>
<td>every 7-8</td>
<td>very high</td>
</tr>
<tr>
<td>PINE TREES</td>
<td>ridicoulous</td>
<td>thousands</td>
<td>few</td>
<td>pine tree bug</td>
<td>every 15-25</td>
<td>not much</td>
</tr>
<tr>
<td>COTTON</td>
<td>ridicoulous</td>
<td>hundred thousands</td>
<td>2 or 3</td>
<td>high</td>
<td>every year</td>
<td>very high</td>
</tr>
<tr>
<td>WHEAT</td>
<td>ridicoulous</td>
<td>hundred thousands</td>
<td>2 or 3</td>
<td>VERY HIGH</td>
<td>every year</td>
<td>very high</td>
</tr>
<tr>
<td>PEANUTS</td>
<td>1000-1500</td>
<td>hundred thousands</td>
<td>2 or 3</td>
<td>greening disease</td>
<td>once</td>
<td>HIGH</td>
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<tr>
<td>CITRUS</td>
<td>1500-2500</td>
<td>thousands</td>
<td>4 or 5</td>
<td>greening disease</td>
<td>every 1.5 year</td>
<td>HIGH</td>
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<tr>
<td>RICE</td>
<td>800-900</td>
<td>thousands</td>
<td>3 or 5</td>
<td>greening disease</td>
<td>once</td>
<td>HIGH</td>
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<tr>
<td>SUGAR CANE</td>
<td>1600-2000</td>
<td>hundred thousands</td>
<td>more than 5</td>
<td>HIGH</td>
<td>every year</td>
<td>very high</td>
</tr>
<tr>
<td>SOY-BEANS</td>
<td>400-500</td>
<td>hundred thousands</td>
<td>more than 5</td>
<td>HIGH</td>
<td>every year</td>
<td>very high</td>
</tr>
<tr>
<td>WATERMELON</td>
<td>0-200</td>
<td>thousands</td>
<td>more than 5</td>
<td>High</td>
<td>90 days</td>
<td>very high</td>
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<tr>
<td>BAMBOO</td>
<td>15-25.000</td>
<td>none</td>
<td>1500</td>
<td>none</td>
<td>once lifetime</td>
<td>no</td>
</tr>
</tbody>
</table>

$15-25,000 per acre per year!!!
Ancient Tree Has Modern Potential for Florida Growers

Pongamia trees can grow up to 60 feet tall. Topping and hedging will be necessary with the trees.

There is an ancient tree species that is catching some growers’ attention as a potential new alternative crop in Florida. Native to India, the pongamia tree has grown wild there and used by people for thousands of years.

Pongamia produces a legume, which looks similar to a butter bean. It can be crushed to extract oil and used as a fertilizer.

Grower champions sturdy replacement crop for embattled Florida citrus

Peter McClure has been studying Pongamia pinnata for about 10 years and is bullish on its potential to be a new economically viable vegetable oil and protein industry in the Sunshine State.
Received a permit with surety bonds, best management practices, and monitoring from FDACS
Progress: Collaborating with growers
Is this a better approach?

1. Company is currently engaged with UF/IFAS, UF Agronomy, and the Nature Conservancy
2. Collaboration on cradle to grave Best Management Practices
3. Potential teaching opportunity for carbon balance modelling and monitoring programs
4. STILL RESISTANT TO RESULTS OF THE RISK ASSESSMENT
The roundtable: Purpose

To gain a better understanding of the risks posed by biomass crops in Florida, as well as current regulatory tools and strategies that could minimize the risk of biomass feedstocks becoming invasive.
The roundtable: Stakeholders

- Florida Department of Agriculture & Consumer Services
- Florida Fish & Wildlife Conservation Commission
- UF/IFAS
  - UF/IFAS Assessment
  - Biofuel plant breeder
  - Weed scientists
  - Invasive plant ecologists
  - Dean’s for Research and for Extension
- Florida Natural Areas Inventory
- Invasive Plant Management Association
- Florida Exotic Pest Plant Council
Progress: Engaging FDACs

- Sent a policy position letter to FDACs
- Facilitated line of communication between invasive species advocacy group & FDACs
- Developed a plan to review eradication bond estimates
- Advocating to strengthen & enforce the rule
Future actions

• Continue to work with companies to develop BMPs
  • Site visits
  • Draft BMPs for oil nut crops
• Continue to lobby FDACs to close loopholes to planting
  • <2 acres
  • Increased enforcement
  • Revoke agriculture exemptions for offenders
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