

# Palm Nutrition and Diseases



**FLORIDA FIRST DETECTOR**



# Introduction

- Iconic and integral part of Florida's landscape
- **Economic value:** tourism, landscaping, and palm-derived products
- **Ecological benefits:** habitat for native wildlife, erosion control, and climate adaptation
- **Aesthetic appeal:** beautification of urban and residential areas
- **Cultural significance:** historical and symbolic meaning in Florida's identity



*Washingtonia filifera* and *W. robusta*

# Palm Nutrition

- Nutrient requirements for healthy palms

## Macronutrients:

- Nitrogen (N): promotes leaf and stem growth
- Phosphorus (P): supports root development and flowering
- Potassium (K): enhances disease resistance and overall health



*Phoenix canariensis*



# Palm Nutrition

- **Nutrient requirements for healthy palms**

**Micronutrients:**

- Magnesium (Mg): photosynthesis and overall plant health
- Manganese (Mn): enzyme activation and chlorophyll production
- Iron (Fe): chlorophyll synthesis and plant growth
- Boron (B): cell wall formation and nutrient uptake
- Zinc (Zn), Copper (Cu), Molybdenum (Mo), and others: required in trace amounts for various metabolic processes



*Phoenix canariensis*  
**Lethal Bronzing Disease**

# Palm Nutrition

## • Common Nutrient Deficiency and Symptoms

### Potassium deficiency:

- **Leaf necrosis:** dead, brown areas on older leaves
- **Frizzle-top:** new leaves appear scorched, frizzled, and malformed

### Magnesium deficiency:

- **Yellowing (chlorosis):** older leaves turn yellow, especially along the edges
- **Interveinal chlorosis:** yellowing between the veins, while veins remain green



**Magnesium  
(Mg)  
deficiency**

**Potassium  
deficiency  
at leaf tip**

*Phoenix canariensis*



# Palm Nutrition

- **Common Nutrient Deficiency and Symptoms**

Manganese deficiency:

- **Early stage:** Interveinal chlorosis and necrotic streaking on newest leaves
- **Advanced stage:** Frizzled, withered, scorched, and reduced-size leaves; can be fatal to palms

Other deficiencies and symptoms:

- **Nitrogen deficiency:** generalized yellowing and reduced growth
- **Iron deficiency:** interveinal chlorosis in young leaves
- **Boron deficiency:** distorted new growth and reduced flowering

*Phoenix roebelenii*



Manganese deficient new leaf showing longitudinal necrotic streaking.

# Examples of Palm Nutrient Deficiencies

## Nitrogen Deficiency



Solitaire palm  
*Ptychosperma elegans*

## Iron Deficiency



*Syagrus romanzoffiana*

## Boron Deficiency



*Cocos nucifera*

Photo: T. K. Broschat, UF/IFAS for all three pictures



# Fertilization Best Practices

- **Selecting appropriate fertilizers:**
  - **Palm-specific formulations:** optimal nutrient balance
  - **Slow-release fertilizers:** gradual nutrient release for sustained plant health
  - **Organic fertilizers:** natural sources of nutrients, promoting soil health
- **Proper timing and frequency:**
  - **Seasonal application:** during periods of active growth, typically spring and summer
  - **Avoiding over-fertilization:** following recommended rates and guidelines
  - **Adjusting for age and size:** considering the palm's developmental stage and nutrient demands



**Cabbage Palmetto**  
**(*Sabal palmetto*)**

Photo: David Stephens, Bugwood.org, #5513612



# Fertilization Best Practices

- **Soil testing for accurate nutrient assessment:**
  - Identifying existing nutrient levels: helping to target specific deficiencies
  - Monitoring soil pH: ensuring optimal nutrient availability
  - Guiding fertilization decisions: informing adjustments to rates, timing, and frequency
- **Environmental considerations:**
  - Responsible fertilizer use: preventing nutrient runoff and pollution
  - Water management: ensuring proper irrigation for optimal nutrient uptake
  - Mulching and organic matter: improving soil health and nutrient availability.



**Soil sampling on an oil palm plantation**

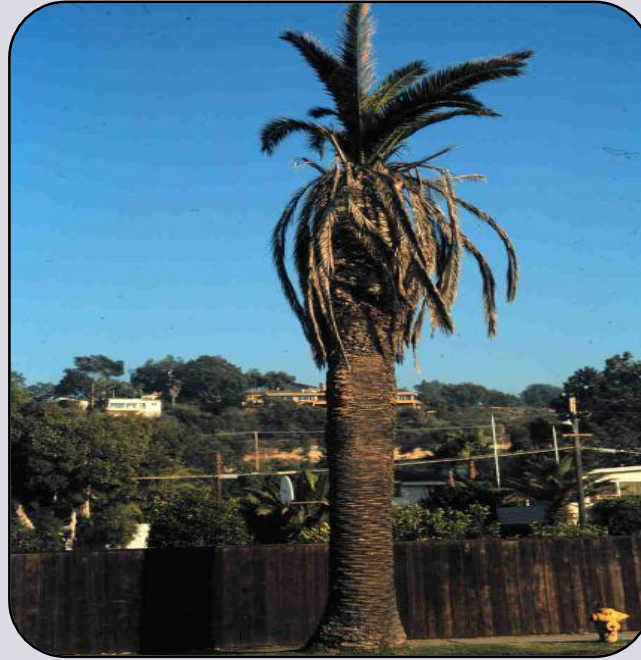
Photo: Nanang Sujana/CIFOR



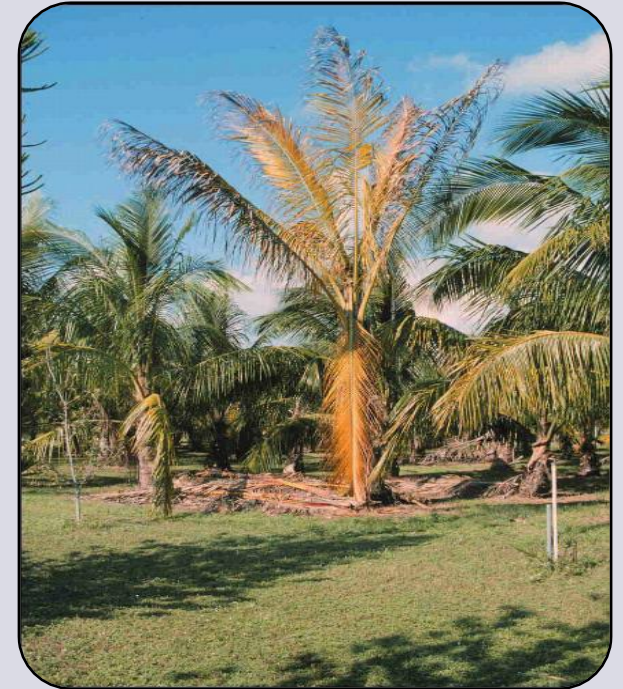
# Common Palm Diseases in Florida



*Phoenix canariensis*  
Lethal Bronzing Disease



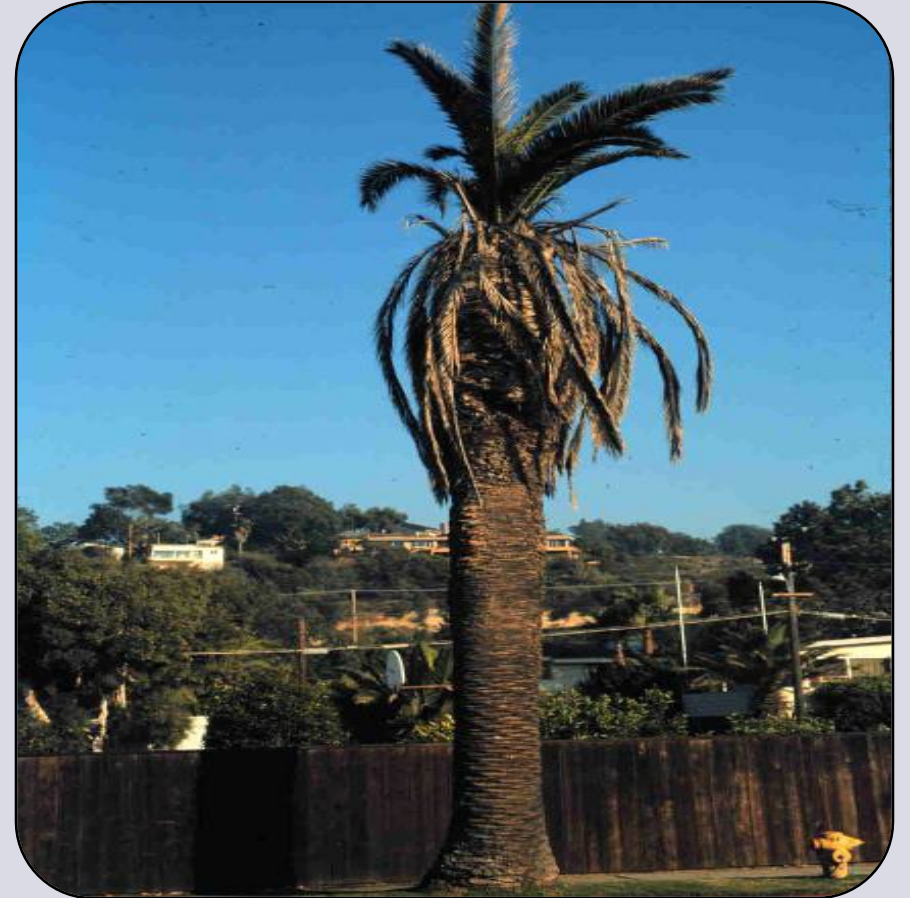
Canary Island date palm  
infected with *Fusarium*  
wilt.



Foliar yellowing symptoms  
of *Cocos nucifera* due to Lethal  
Yellowing.

# Fusarium wilt

- Soil-borne disease with long-lasting spores
- Caused by the fungus *Fusarium oxysporum*
- Affects various palm species, notably Canary Island date palm (*Phoenix canariensis*)



Canary Island date palm  
infected with Fusarium wilt.



# Fusarium wilt

## Symptoms

- Initial one-sided leaf wilt and yellowing
- Progressive leaf death, affecting multiple fronds
- Vascular discoloration in the trunk



**Canary Island Date Palm infect with Fusarium Wilt**

# Fusarium wilt

## Management

- No known cure; management focuses on prevention
- Proper planting and care to reduce stress on palms
- Sanitizing pruning tools to prevent cross-contamination
- Removal and proper disposal of infected palms to limit the spread



Canary Island date palms dying from Fusarium wilt spread by infested pruning tools



# Lethal Yellowing

- Caused by a phytoplasma, a bacteria lacking a cell wall.
- Primarily affects coconut palms and other palm species
- Transmitted by the plant-hopping insect *Haplaxius crudus* (previously called *Myndus crudus*)
- Can be lethal if left untreated



Figure 4. Adults of *Haplaxius crudus* feeding on palm foliage, white arrow on left indicates feeding adult, with close up on right.

Credit: De-fen Mou

Photo: De-fen Mou



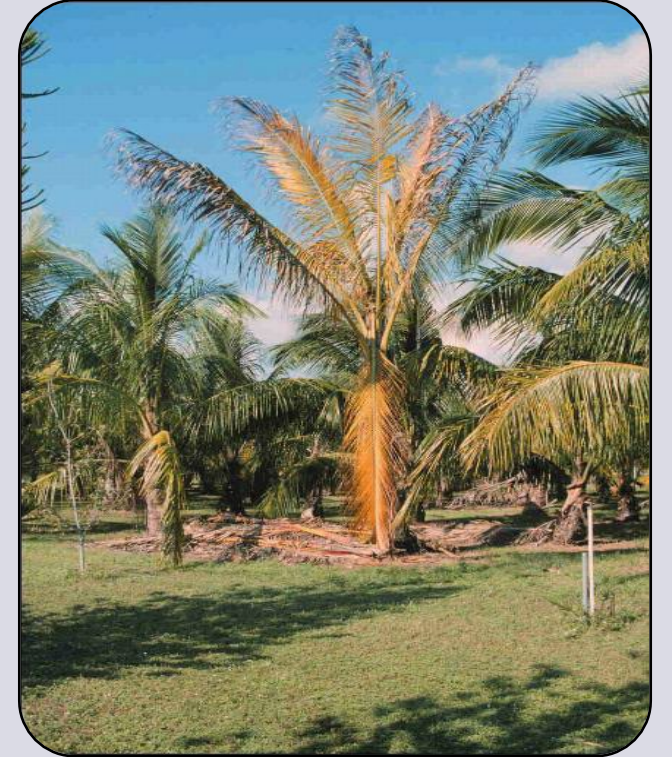
# Lethal Yellowing

## Symptoms

- Premature fruit drop and flower abortion
- Progressive yellowing of leaves, starting with older fronds
- Softening of the trunk and eventual collapse



Fruits that prematurely dropped from *Cocos nucifera* due to Lethal Yellowing.



Foliar yellowing symptoms of *Cocos nucifera* due to Lethal Yellowing.

# Lethal Yellowing

## Management

- Regular monitoring for early detection of symptoms
- Injection of affected palms with antibiotics, such as oxytetracycline (OTC)
- Removal of severely infected palms to limit the spread of disease
- Planting resistant palm varieties when possible
- Vector control: Implement measures to manage the insect vector population
- Community effort: Encourage collaborative efforts among homeowners, landscapers, and local authorities to monitor, report, and manage lethal yellowing in affected areas



**Queen and Mexican fan palms  
infected with Fusarium wilt**



# Reporting to UF/IFAS Faculty in Florida

- Local county extension office

<https://sfyl.ifas.ufl.edu/find-your-local-office/>

- Insect ID Lab - Dr. Lyle Buss

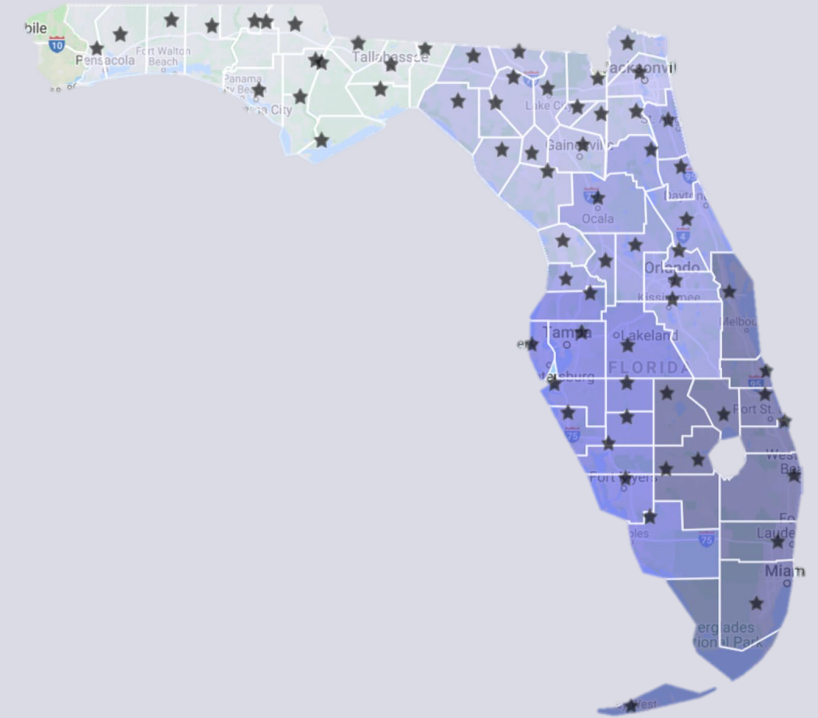
<http://entnemdept.ufl.edu/insectid/>

- Nematode Diagnostic Lab - Dr. Billy Crow

<http://nematology.ifas.ufl.edu/assaylab/index.html>

- Plant Diagnostic Center - Dr. Carrie Harmon

<https://plantpath.ifas.ufl.edu/extension/plant-diagnostic-center/>





# Reporting to FDACS-DPI in Florida

Florida Department of Agriculture and Consumer Services (FDACS)  
- Division of Plant Industry (DPI)

- FDACS, DPI Responsibility

- Announcing detection or establishment of new invasive species.
- Reporting is a legal obligation under Florida Statute 581.091.

- Submission Form

- <http://forms.freshfromflorida.com/08400.pdf>
- <https://www.fdacs.gov/Agriculture-Industry/Pests-and-Diseases/How-to-Submit-a-Sample-for-Identification>

# FDACS, DPI Contact

- Dr. Leroy Whilby, Bureau Chief-Entomology, Nematology and Plant Pathology
  - 352-395-4661
  - [Leroy.whilby@freshfromflorida.com](mailto:Leroy.whilby@freshfromflorida.com)
- Dr. Paul Skelley, Assistant Chief-Entomology, Nematology and Plant Pathology
  - 352-395-4678
  - [Paul.skelley@freshfromflorida.com](mailto:Paul.skelley@freshfromflorida.com)
- Division of Plant Industry Hotline
  - 1-888-397-1517
  - [DPIHelpline@FDACS.gov](mailto:DPIHelpline@FDACS.gov)



# Reporting using DDIS in Florida

## Digital Diagnostic and Identification System (DDIS)

- Digital Diagnostic Collaboration
  - Extension agents
  - Laboratories
  - Clinics
  - Specialists
- <https://ddis.ifas.ufl.edu/>



The screenshot displays the DDIS web interface. At the top, there is a blue header with the UF IFAS Extension logo on the left and the DDIS logo on the right. Below the header is a navigation menu with links for Home, Media Library, Diagnostic Labs, Equipment, Training, and Contact Us. A login section includes links for 'Become a User' and 'Forgot Your Password', along with input fields for 'user name' and 'password', and a 'Sign In' button. The main content area features a photograph of a yellow and black striped caterpillar on a green leaf. To the right of the image, the following sample information is displayed:

- Sample Type:** Insect (Plant)
- Common Name:** Snowbush spanworm
- Scientific Name:** *Melanchroia chephise*
- Family:** Geometridae
- Sample Submitter:** Joe Sowards
- Sample ID:** 15-2335

# Find More Information At:

<https://entnemdept.ufl.edu/ffd/>





# Lab Team

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## **Collaborating Agencies**

- U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS)
- Cooperative Agricultural Pest Survey Program (CAPS)
- Florida Department of Agriculture and Consumer Services (FDACS)
- National Plant Diagnostic Network (NPDN)
- Sentinel Plant Network (SPN)
- University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)
- Protect U.S.



# Educational Disclaimer and Citation

- This presentation can be used for educational purposes for NON-PROFIT workshops, trainings, etc.
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