



International  
Plant Protection  
Convention

Protecting Plants, Protecting Life.



# PROTECT SAINT LUCIA'S PALMS

— FROM THE DEADLY —  
**LETHAL YELLOWING DISEASE**



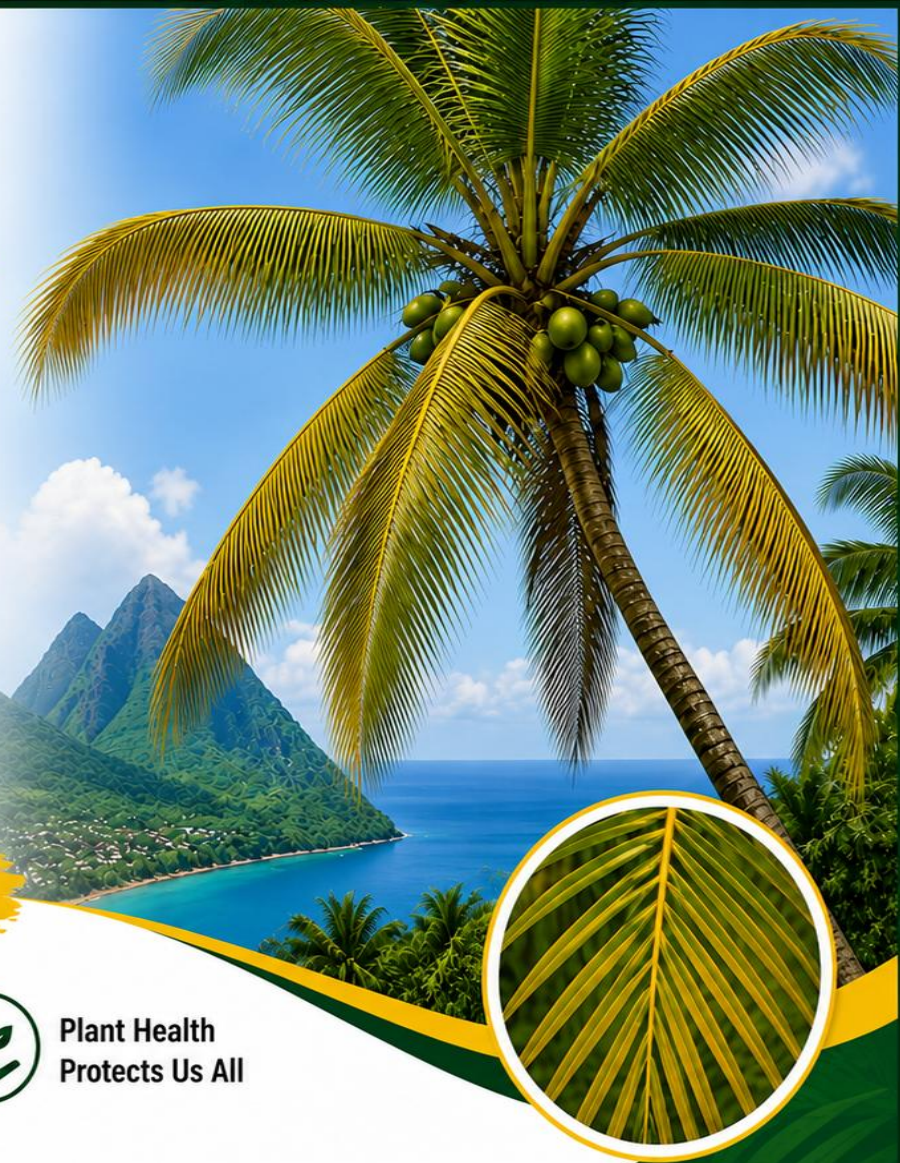
Healthy Palms  
Stronger Future



Early Detection  
Saves Livelihoods



Plant Health  
Protects Us All



**Presented by : Dr. Laura Francis**  
**Plant Research and Development Division**  
**Ministry of Agriculture Fisheries Food Security and Sustainable Development**  
**Division**

# COCONUT (*Cocos nucifera* L.)

*A Vital Palm for People, Livelihoods and Health*



COCONUT IS RECOGNIZED FOR ITS POPULARITY in contributing to **food** and **nutritional security**.



## A MAJOR AND POPULAR PALM

Coconut (*Cocos nucifera* L.) is one of the world's most important palms, supporting the economic, cultural, food, and social well-being of millions of people.



## LIVELIHOODS AND ECONOMIC IMPORTANCE

Coconut farming provides income for millions of rural households and contributes significantly to livelihoods in tropical regions.



## NUTRITION BENEFITS

Coconut is highly nutritious, providing:

**B**

Vitamin B

**Ca**

Calcium

**Mg**

Magnesium

**K**

Potassium



Dietary Fibre



In 2016, approximately **11 million farmers** cultivated coconut on **12 million hectares** across **90 countries** and territories.



Global coconut production reached **61 million tonnes**, with **Indonesia, the Philippines, and India** being the leading producers.

## MAJOR PRODUCING COUNTRIES (2016)

A higher proportion of global coconut production was produced in:



INDONESIA



PHILIPPINES



INDIA



## GLOBAL COCONUT AT A GLANCE (2016)



**11 MILLION**

FARMERS  
cultivated coconut  
worldwide



**12 MILLION**

HECTARES  
under coconut  
cultivation



**90**

COUNTRIES  
AND TERRITORIES



**61 MILLION**

TONS  
total production



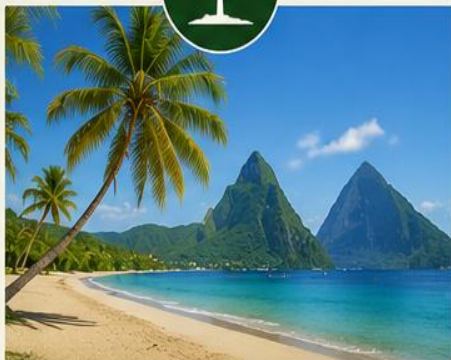
Coconut supports millions of lives, strengthens rural economies, and contributes to food security and sustainable development worldwide.



# Why Palms Matter

## For Saint Lucia's Tourism Industry

Palms are more than beautiful trees.  
They are essential to our tourism  
experience, economy, and island identity.



Create the tropical image  
visitors expect in Saint Lucia



Enhance beaches, resorts,  
gardens, and landscapes



Improve guest experience  
and tourism appeal



Support the beauty and  
identity of the island



Healthy palms. Beautiful places. Stronger tourism. A proud Saint Lucia.

*Saint Lucia*  
LET HER INSPIRE YOU

# Importance to Hotels & Tourism

Palms are essential to Saint Lucia's hospitality and tourism success.



**ATTRACTS TOURISTS &  
IMPROVES AESTHETICS**



Healthy palms attract tourists and improve property aesthetics.



**ICONIC TO SAINT LUCIA'S  
TOURISM BRAND**



Coconut palms are iconic to Saint Lucia's tourism brand.



**SUPPORTS ECO-TOURISM &  
SUSTAINABLE DEVELOPMENT**



Palms contribute to eco-tourism and sustainable tourism development.



**INCREASES VISITOR  
SATISFACTION**



Landscaped hotel environments increase visitor satisfaction.



Healthy palms. Beautiful places. Sustainable tourism. Stronger Saint Lucia.

*Saint Lucia*  
LET HER INSPIRE YOU

# ECONOMIC VALUE

## Palms. People. Prosperity.

Healthy palms and thriving tourism create jobs, support local businesses, and strengthen the economy of Saint Lucia.



### TOURISM DEPENDS ON ATTRACTIVE NATURAL SCENERY



Beautiful landscapes attract more visitors, increase hotel bookings, and boost tourism revenue.



### COCONUT PRODUCTS SUPPORT LOCAL BUSINESSES AND COMMUNITIES



Coconut water, oil, milk, and traditional products create income for farmers, entrepreneurs and local communities.



### HEALTHY PALMS CONTRIBUTE TO EMPLOYMENT AND LIVELIHOODS



Palm care, landscaping, hospitality and tourism services provide jobs and support families.

# LETHAL YELLOWING DISEASE

Lethal Yellowing Disease is one of the most **important** and **destructive** diseases affecting coconut palm (*Cocos nucifera* L.)



Healthy palm



Yellowing of older fronds



Severe yellowing and decline



A fatal disease that causes rapid decline and death of the palm if not managed.



# HOST: LYD AFFECTS OVER 35 SPECIES OF PALMS

INCLUDING COCONUT AND ORNAMENTAL PALMS



Lethal Yellowing Disease (LYD) is a devastating disease that affects **over 35 species** of palms, threatening both food security and landscape beauty.



COCONUT PALM

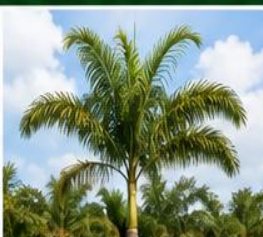


ORNAMENTAL PALMS

## EXAMPLES OF PALM SPECIES AFFECTED BY LYD



Royal Palm  
(*Roystonea oleracea*)



Queen Palm  
(*Syagrus romanzoffiana*)



Areca Palm  
(*Dypsis lutescens*)



Foxtail Palm  
(*Wodyetia bifurcata*)



Bismarck Palm  
(*Bismarckia nobilis*)



Date Palm  
(*Phoenix dactylifera*)



Chinese Fan Palm  
(*Livistona chinensis*)



Manila Palm  
(*Adonidia merrillii*)



Sago Palm  
(*Cycas revoluta*)



Kentia Palm  
(*Howea forsteriana*)

## WHY IT MATTERS



Affects coconut palms which are vital for food, income and livelihoods.



Threatens ornamental palms used in landscaping, tourism and urban greenery.



Causes serious economic losses and increases management costs.



**PROTECT OUR PALMS.**  
**PROTECT OUR FUTURE.**



Early detection, proper management and the use of resistant varieties are key to protecting these valuable palm species from Lethal Yellowing Disease.



Surveillance



Removal of  
infected palms



Use of  
resistant varieties



Vector  
control



Good plantation  
practices



# BIOLOGY OF LYD



## WHAT CAUSES LYD?

A specialized bacterium called a phytoplasma. It is not a fungus or a virus.



## WHERE DOES IT LIVE?

Inside the palm's phloem tissue.

*The phloem carries food (sugars) made in the leaves to the rest of the palm.*



## WHAT DOES IT DO?

- Disrupts the transport of sugars and other nutrients.
- Interferes with normal palm function.
- Causes progressive symptoms.
- Eventually leads to palm death.



## KEY MESSAGE

*"Healthy palms protect tourism, livelihoods, and the beauty of Saint Lucia."*

## HEALTHY VS INFECTED PALM

### HEALTHY PALM



Green leaves



Strong and productive palm

### INFECTED PALM



Yellow leaves



Weak, declining and dying palm

# WHAT IS THE VECTOR?

Primary vector: **Planthopper** *Haplaxius crudus*



Dorsal view



## SMALL, SLENDER PLANTHOPPER

Adults are about 4–5 mm long, pale yellow with dark markings.



## ADULTS FEED ON COCONUT PALMS

Adults are commonly found on coconut palms where they feed.



## NYMPHS DEVELOP ON GRASSES

Immature stages (nymphs) live and develop on grass plants.



## RESPONSIBLE FOR TRANSMITTING

Transmits the Lethal Yellowing phytoplasma while feeding.



## VECTOR OF LETHAL YELLOWING DISEASE

The key vector of Lethal Yellowing disease in coconut.

# IMPORTANT NYMPHAL HOSTS OF *Haplaxius crudus* (AMERICAN PALM CIXIID)

Nymphs develop in the root zone of more than 40 species of grasses (Poaceae) and sedges (Cyperaceae).



## COMMON LAWN / GROUND-COVER GRASSES



**St. Augustinegrass**  
(*Stenotaphrum secundatum*)

Common lawn grass in hotels, resorts and parks.



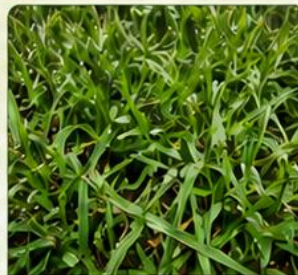
**Bermuda Grass**  
(*Cynodon dactylon*)

Widespread lawn and sports turf grass.



**Guinea Grass**  
(*Megathyrsus maximus*)

Fast-growing perennial tall grass.



**Bahiagrass**  
(*Paspalum notatum*)

Common pasture and lawn grass.



**Elephant Grass**  
(*Cenchrus purpureus*)

Tall perennial grass, often used as fodder.



**Sour Grass**  
(*Paspalum conjugatum*)

Low-growing grass found in lawns and pastures.

## COMMON NUTSEDGES (SEDGES)



**Yellow Nutsedge**  
(*Cyperus esculentus*)

Common sedge in lawns, landscapes and gardens.



**Purple Nutsedge**  
(*Cyperus rotundus*)

Persistent sedge in lawns, landscapes and disturbed areas.



These grasses and sedges are important nymphal hosts of *Haplaxius crudus*.

Nymphs live in the root zone of these plants before emerging as adults that move to palms.

**Why it matters:** Many common lawn and ground-cover grasses in landscaped areas can support nymphs and contribute to the spread of Lethal Yellowing Disease.



# Haplaxius crudus: Life Cycles and Favorable Conditions

## NUMBER OF LIFE CYCLES PER YEAR



Approximately  
**4–5**  
generations per year



Females live longer  
(~81 days) than  
♂ males (~74 days).



Multiple generations can  
occur annually under  
favorable environmental  
conditions.

## LIFE SPAN SUMMARY

Egg stage



~15 days

Nymph stage



~48 days  
(5 growth stages)

Adult female



~18 days

Adult male



~11 days



Total life span (Female)  
~81 days



Total life span (Male)  
~74 days

## FAVORABLE CONDITIONS



WARM TEMPERATURES  
25–30°C



HIGH HUMIDITY



PRESENCE OF  
GRASSES AND WEEDS



Nymphs develop on the  
roots of grasses and weeds.



AVAILABILITY OF  
PALM HOSTS



Adults feed, mate, and live on  
coconut and other palm species.



MOIST SOILS



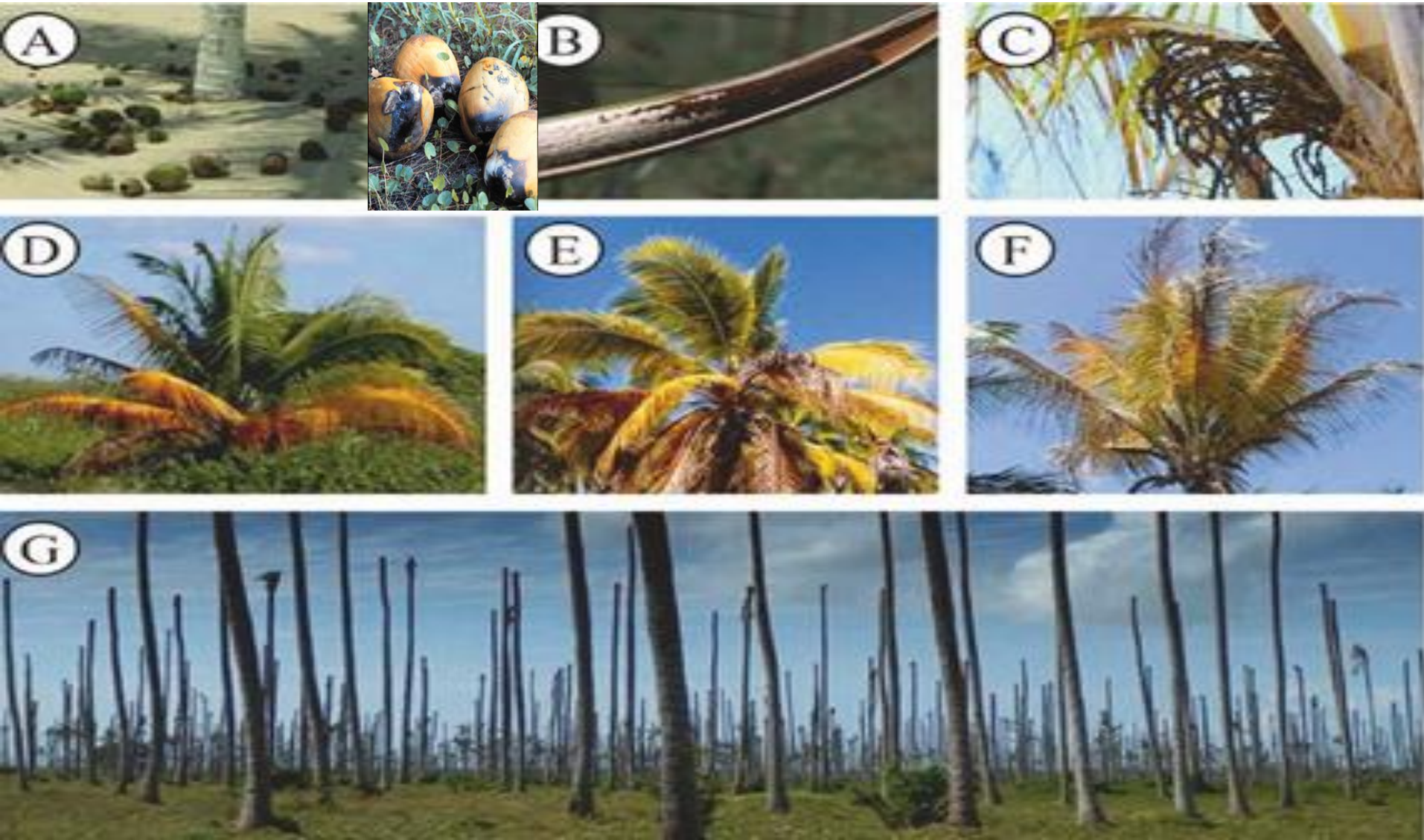
Eggs are laid on or near the  
roots of grasses and palms  
in moist soil.



Warm, humid tropical environments with abundant grasses and palm hosts  
favor the development and spread of *Haplaxius crudus*.



# Symptoms of Lethal Yellowing in Fruit-Bearing Coconut Palms





# SYMPTOMS OF LETHAL YELLOWING DISEASE (LY)



**IMPORTANT:** No single symptom confirms Lethal Yellowing Disease.  
Look for a combination of symptoms that appear over time.

## SYMPTOMS CAN VARY

- Symptoms are different in each palm species.
- In coconuts, symptoms can vary among different varieties.
- Watch the pattern and how symptoms develop over time.



## TALL COCONUT VARIETIES (e.g., Jamaica Tall)

|                                                                                  |                                                                                   |                                                                                        |                                                                                   |                                                                                   |                                                                                    |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |       |  |  |  |
| Older leaves turn yellow first.                                                  | Yellowing spreads upward through the canopy.                                      | A single yellow leaf ("flag leaf") appears near the top of the crown may appear early. | Leaves turn brown, dry up, and hang down.                                         | The center spear leaf collapses.                                                  | The crown dies and eventually falls off.<br><br>A bare trunk is left standing.     |

## DWARF COCONUT VARIETIES (e.g., Malayan Green Dwarf)

|                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |
| Leaves turn brown or reddish-brown instead of yellow.                               | Leaves may fold along the midvein.                                                  | Leaves may become droopy and soft.                                                  | The palm looks wilted and unhealthy.                                                |
|  |  |  |  |

## HOW LETHAL YELLOWING PROGRESSES IN TALL COCONUT (EXAMPLE)

|                                                                                   |                                                                                    |                                                                                    |                                                                                    |                                                                                      |                                                                                      |                                                                                      |                                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |  |  |  |  |  |
| Healthy palm                                                                      | Yellowing of oldest leaves                                                         | Yellowing spreads upward                                                           | Brown, hanging leaves                                                              | Spear leaf collapses                                                                 | Crown dies                                                                           | Crown falls                                                                          | Bare trunk remains                                                                   |



**KEY MESSAGE FOR FARMERS:** If you notice progressive yellowing or browning of leaves, a collapsed spear leaf, and a dying crown, report the palm immediately to the Ministry of Agriculture. Early detection helps reduce the spread of LYD.



**REPORT EARLY.  
PROTECT YOUR PALMS.  
PROTECT YOUR LIVELIHOOD.**





# PROBLEMS THAT CAN LOOK LIKE LETHAL YELLOWING





Different problems can cause yellow leaves.  
**Look carefully and know the difference.**

| PROBLEM                                                                                                                    | WHAT YOU MAY SEE                                                                                                                    | HOW IT IS DIFFERENT FROM LETHAL YELLOWING                                                                                                     | WHAT TO LOOK FOR                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>K</div> Lack of Potassium (K)                                                                                         | Older leaves turn yellow and brown. <div></div>    | Palm stays alive; spear leaf remains healthy. <div></div>    | Spear leaf (center leaf) is green and upright. <div></div>                  |
| <div>Mg</div> Lack of Magnesium (Mg)                                                                                       | Yellow edges on older leaves. <div></div>          | Middle of the leaf stays green. <div></div>                  | Yellow on edges, center remains green. <div></div>                          |
| <div>N</div> Lack of Nitrogen (N)                                                                                          | Whole palm looks pale green or yellow. <div></div> | Yellowing is uniform over the entire palm. <div></div>       | All leaves are pale green/yellow. <div></div>                               |
| <div>Fe</div> Lack of Iron (Fe)                                                                                            | Young leaves turn yellow. <div></div>              | New leaves are affected first. <div></div>                   | Older leaves remain green. <div></div>                                      |
| <div></div> Drought (Dry Weather)           | Leaves yellow and dry out. <div></div>            | Improves when rainfall or irrigation increases. <div></div> | Check if soil is very dry and plants around are also stressed. <div></div> |
| <div></div> Root Problems / Poor Drainage | Yellowing and wilting. <div></div>               | Usually linked to waterlogging or root damage. <div></div> | Soil stays wet, bad smell, or roots are damaged. <div></div>              |

### HOW TO SUSPECT LETHAL YELLOWING

Look for these warning signs:

- 1

Yellowing or browning that gets worse over time.


- 2

Leaves dying from the bottom upward.


- 3

Spear leaf (center leaf) collapses.


- 4

Crown dies and falls off.


- 5

Bare trunk remains standing.





### KEY MESSAGE FOR FARMERS

- ✓ **Not every yellow palm** has Lethal Yellowing.
- ✓ If the spear leaf collapses and the crown starts dying, **report it immediately** to the Ministry of Agriculture.



**REPORT EARLY.**  
**PROTECT YOUR PALMS.**  
**PROTECT YOUR LIVELIHOOD.**



Early detection stops the spread of Lethal Yellowing and protects our coconut industry.

# OTHER PALM PROBLEMS THAT MAY BE CONFUSED WITH LETHAL YELLOWING



Yellowing and wilting of palms can be caused by different problems.

**Look carefully and know the difference.**

## 1. LETHAL YELLOWING DISEASE (LY)



Yellowing of older leaves



Spear leaf collapses



Crown dies and falls off



Bare trunk remains

- Caused by a phytoplasma.
- Spread by the planthopper (*Haplaxius crudus*).
- Progressive yellowing, premature fruit/flower drop, spear leaf collapse, and palm death.

## 2. RED RING DISEASE



Yellowing and wilting of older leaves



Palm decline and reduced growth



Red ring inside the trunk (seen when cut)



Palm death

- Caused by a nematode (*Bursaphelenchus cocophilus*).
- Spread by the South American Palm Weevil (*Rhynchophorus palmarum*).
- Yellowing, wilting, reduced growth, premature nut fall.
- Characteristic red-brown ring inside the trunk.

## SOUTH AMERICAN PALM WEEVIL (SAPW)



- Bores into the palm.
- Damages the growing point.
- Spreads Red Ring Disease nematodes.

## KEY MESSAGE FOR FARMERS

- ✓ Not all dying palms have Lethal Yellowing.
- ✓ Red Ring Disease and South American Palm Weevil damage can look similar, but Red Ring Disease is confirmed by the red ring inside the trunk.
- ✓ If you see yellowing, wilting, spear leaf collapse, or sudden decline, report it immediately to the Ministry of Agriculture.

## SEE SOMETHING? SAY SOMETHING!



Report suspected cases to the Ministry of Agriculture for proper diagnosis.



**EARLY DETECTION HELPS PROTECT OUR PALMS AND LIVELIHOOD!**

# Nutritional Deficiencies and Drought Stress Can Be Mistaken for Lethal Yellowing Disease (LYD)

## Nutritional Deficiency / Drought Stress (Coconut Nut Drop)



- Nuts drop prematurely.
- No obvious black water-soaked calyx (stem) end.

## Lethal Yellowing Disease (LYD) (Coconut Nut Drop)



- Nuts drop prematurely.
- Black water-soaked mark at calyx (stem) end.



**Key Point:** Both can cause nut drop, but only Lethal Yellowing Disease shows **black water-soaked mark** at calyx end.

# BUD ROT vs. LETHAL YELLOWING (LY)

## BUD ROT



### CAUSE:

Fungus-like pathogen  
(*Phytophthora spp.*)

### SYMPTOMS

- Bud and spear leaf begin to rot.
- Spear leaf becomes brown and collapses.
- Rotting tissue may be soft and foul-smelling.



Rotting bud



Collapsed spear leaf



Soft, rotting tissue

## LETHAL YELLOWING (LY)



### CAUSE:

Phytoplasma

### SYMPTOMS

- Premature nut drop.
- Flowers become black/necrotic.
- Leaves progressively turn yellow.
- Spear leaf eventually collapses.
- Palm eventually dies.



Premature nut drop



Blackened flowers



Yellowing leaves



Dead palm  
("telephone pole")



**BOTH DISEASES CAN CAUSE SPEAR-LEAF COLLAPSE AND PALM DEATH, SO THEY CAN BE CONFUSED.**



**FOR SUSPECTED LETHAL YELLOWING  
→ LABORATORY TESTING IS NEEDED  
FOR CONFIRMATION.**

# DISTRIBUTION OF LETHAL YELLOWING DISEASE (LYD)

## (*Candidatus Phytoplasma palmae*)



### SIMPLE TIMELINE



USA

Florida (USA)

Mexico  
(Yucatán Peninsula and other coastal regions)

### CARIBBEAN COUNTRIES

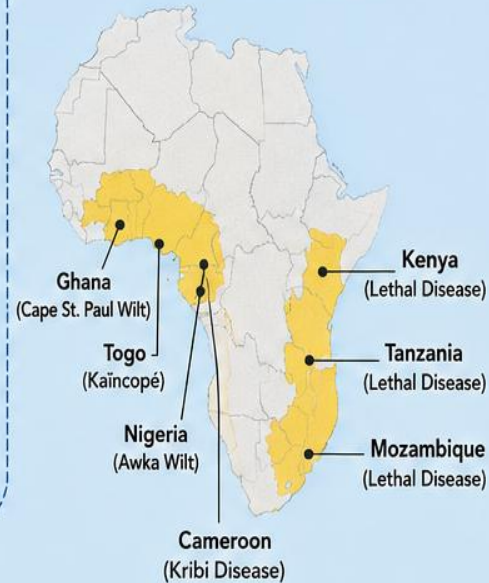


### LEGEND

- Caribbean countries with reported LYD
- Reported in Mexico and Florida (USA)
- LYD-type diseases reported in Africa
- LYD-type diseases reported in Asia

### AFRICA

(LYD-type diseases)



### ASIA

(LYD-type diseases)



Lethal Yellowing Disease (LYD) is a devastating disease of coconut palms caused by the phytoplasma *Candidatus Phytoplasma palmae*. It is transmitted by the planthopper *Haplixius crudus* and affects coconut production in many tropical regions.

# GLOBAL IMPACT OF LETHAL YELLOWING DISEASE



## JAMAICA (CARIBBEAN):

Approximately **85.5%** of coconut palms were lost between 1963 and 1983.



## TANZANIA (EAST AFRICA):

Approximately **38%** of coconut palms were destroyed by the disease.



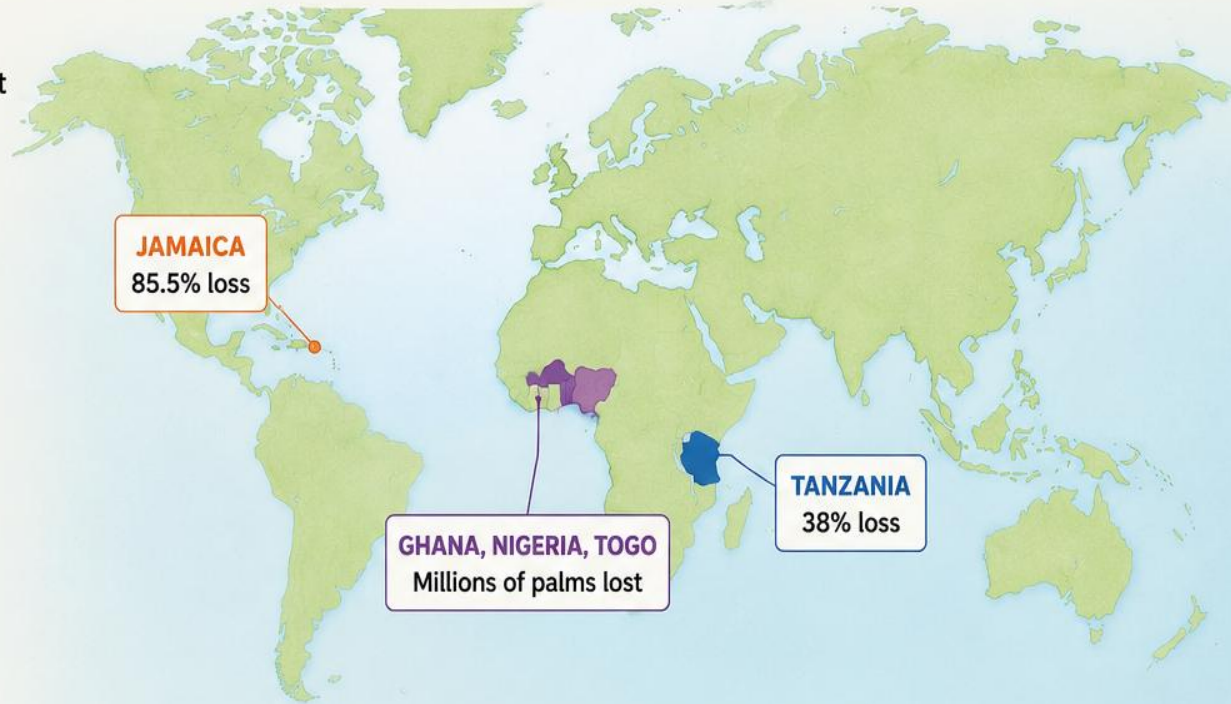
## WEST AFRICA:

Millions of coconut palms have been lost in **Ghana, Nigeria, and Togo**.



## GLOBAL IMPACT:

Over the past several decades, millions of palms worldwide have been killed by Lethal Yellowing Disease.



The disease continues to threaten coconut production, livelihoods, biodiversity, and food security in tropical and subtropical regions.



Lethal Yellowing Disease remains one of the most destructive diseases of coconut palms worldwide.

# Economic Importance



- **Lethal Yellowing (LY)** has killed millions of coconut palms in the Caribbean.



- **Causes severe economic losses** to both ornamental and agricultural sectors.



- **Threatens livelihoods, landscapes, and tourism** in many Caribbean nations.



Lethal Yellowing has caused the death of millions of coconut palms, leading to severe economic losses across the Caribbean.

# Economic importance

*Haplaxius crudus* transmits two important palm phytoplasma diseases:

## **A** Lethal Yellowing

Caused by  
*'Candidatus Phytoplasma palmae'*

## **B** Lethal Bronzing

Associated with  
*'Candidatus Phytoplasma aculeata'*



Both diseases are fatal to coconut and ornamental palms.



**Lethal Yellowing**  
*'Candidatus Phytoplasma palmae'*



**Lethal Bronzing**  
*'Candidatus Phytoplasma aculeata'*

# CRITICAL POINT TO REMEMBER



**6 months** after infection, symptoms of **Lethal Yellowing Disease** manifest.



Infected palms usually die within **3 to 5 months** after the first appearance of symptoms.

# THE FUTURE IS IN OUR HANDS

Protect our palms. Protect Saint Lucia.



Lethal Yellowing  
Awareness &  
Surveillance  
Programme

## OUR SHARED FUTURE: **HEALTHY PALMS, STRONGER SAINT LUCIA**

By acting today, we can protect our palms,  
our beaches, our tourism, and our way of life.

- ✓ Healthier palms and productive coconut farms
- ✓ Protected tourism and increased visitor confidence
- ✓ Stronger food security and local livelihoods
- ✓ A cleaner, greener, and more resilient Saint Lucia

# CONFIRMATION: SYMPTOMS + MOLECULAR DETECTION

*Accurate confirmation is essential for effective management of LYD*

## 1. SYMPTOMS (Field Observation)

Look for characteristic symptoms  
in the crown and leaves.



Yellowing of  
older leaves



Yellowing and  
collapse of spear leaf



Dieback and  
crown collapse



### NOTE:

Symptoms can be confused with other problems.  
Laboratory confirmation is required.

## 2. MOLECULAR DETECTION (Laboratory)

Laboratory testing detects the bacterium  
*Candidatus Phytoplasma palmae* (16SrIV)



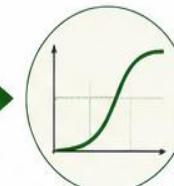
1. Sample  
collection



2. DNA  
extraction



3. PCR  
amplification



4. Results  
interpretation



### RESULT:

A positive result confirms the presence of LYD.  
This guides management and helps prevent spread.



Early detection. Accurate confirmation. Effective action.

*Protect our palms, protect Saint Lucia.*



# MANAGEMENT OF LETHAL YELLOWING DISEASE (LYD)

There is no cure. Early detection and good management can save our palms.

## 1 NO CURE AVAILABLE



- There is currently no cure for LYD. Management is the only way to reduce spread and losses.

## 2 MANAGE INSECT VECTOR (PLANTHOPPERS)



- Control insect vectors (planthoppers, e.g., *Haplaxius crudus*) using approved insecticides and other integrated methods.
- Keep palms healthy to reduce attraction.

## 3 USE RESISTANT OR TOLERANT VARIETIES



- Plant resistant or tolerant varieties where available to reduce risk of severe losses.

## 4 USE ONLY DISEASE-FREE, HEALTHY PLANTING MATERIAL



- Use only disease-free, healthy planting material.

## 5 REMOVE AND DESTROY INFECTED PALMS



- Promptly cut down and destroy infected palms.
- Do not leave stumps or infected material in the field.

## 6 AVOID GRASS UNDER PALMS



- Keep the area around the palm base clean and free of grass.
- This reduces breeding sites for planthoppers.



GOOD MANAGEMENT TODAY, HEALTHY PALMS TOMORROW.  
**PROTECT OUR COCONUT INDUSTRY.**



# Natural Enemies and Control of *Haplaxius crudus*

## NATURAL ENEMIES

Predatory spiders  
(*Theridion* spp.)



Fire ants  
(*Solenopsis invicta*)



Parasitic mites  
(*Leptus* spp. and  
*Erythraeus* spp.)



*Leptus* spp.



*Erythraeus* spp.

Entomopathogenic fungi

*Hirsutella citriformis*



*Metarhizium anisopliae*



## CONTROL MEASURES



**Systemic insecticides  
(neonicotinoids)**  
commonly used in plantations.



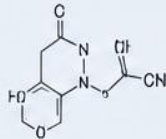
**Frequent chemical use**  
increases production costs.



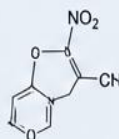
**May negatively affect**  
beneficial insects and  
natural enemies.

### EXAMPLES OF NEONICOTINOIDS

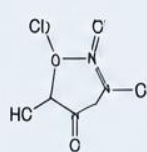
Imidacloprid



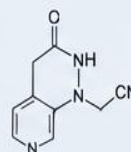
Thiamethoxam



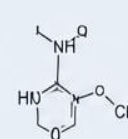
Clothianidin



Acetamiprid



Dinotefuran



Neonicotinoids are systemic insecticides that act on the nervous system of insects, leading to paralysis and death.

### IMPACT



Higher production costs



Affects beneficial fauna



Can disrupt natural biological control



**Integrated management is key:** conserve natural enemies and reduce reliance on chemical insecticides to achieve sustainable control of *H. crudus* in plantations.





# ON GOING ACTIVITIES

## FOR PUBLIC AWARENESS OF

# LETHAL YELLOWING DISEASE

## IN SAINT LUCIA



Early detection. Timely action. Healthier crops. **Stronger future.**



### 1. PUBLIC AWARENESS: DISTRIBUTION OF PEST ALERT AND TRAINING



Empowering our communities with knowledge to recognize symptoms, report early and protect our palms.



### 2. PLACEMENT OF YELLOWING STICKY TRAPS



Yellowing sticky traps help detect the disease vector (zygotetasp) early, supporting timely action and reducing the spread.



### 3. SUPPORTING EARLY DETECTION AND IPM MANAGEMENT



**Early detection**  
find and report  
symptoms early.



**IPM practices**  
use clean planting  
material, good field  
sanitation and vector  
management.



**Working together**  
farmers, communities  
and agencies united  
to protect our  
coconut industry.



**YOUR ROLE MATTERS.** Be observant. Report. Take action. **Together, we can stop Lethal Yellowing Disease.**



REPORT SUSPICIOUS SYMPTOMS TO YOUR NEAREST AGRICULTURAL EXTENSION OFFICE

*Let's protect Saint Lucia, together.*



# Placement and Monitoring of Yellow Sticky Traps in Regions 7 and 8



# Laboratory Processing of Yellow Sticky Trap Samples (Region 7)



# Ongoing Lethal Yellowing Training with the Banana Unit, Customs (South), and Region 5



# Ongoing Lethal Yellowing Training with the Forestry and NFTO



# CHALLENGES TO LYD PREVENTION IN THE TOURISM SECTOR



## EARLY DETECTION

Symptoms easily confused with other problems.



## HIGH PALM NUMBERS

Extensive monitoring required across many tourism properties.



## FINANCIAL COST

Testing, removal and replacement are expensive.



## BIOSECURITY RISK

Movement of palms and plant material can spread LYD.



## COORDINATION

Many stakeholders must work together effectively.



## REPLACEMENT

Limited suitable, disease-tolerant alternatives.



## TOURISM AESTHETICS

Maintaining Saint Lucia's tropical image and visitor experience.



## TRAINING & AWARENESS

Staff need knowledge to identify, report and help prevent LYD.



PROTECTING OUR PALMS → PROTECTING SAINT LUCIA'S TOURISM





# WHAT CAN TOURISM STAKEHOLDERS DO?



**Monitor** palms regularly.



**Report** suspicious symptoms early.



**Avoid moving** suspect palms or plant material.



**Source healthy palms** from approved/reputable suppliers.



**Train** landscaping staff to recognize LYD symptoms.



**Cooperate** with surveillance and inspections.



**Seek technical guidance** before replacing affected palms.



Early action today safeguards our palms, our landscape and our tourism future.



**PROTECT OUR PALMS.**

**PROTECT SAINT LUCIA'S  
TOURISM.**





# PLANT QUARANTINE

SAINT LUCIA PORTS OF ENTRY  
**AIR • SEA**



## PALMS ARE PROHIBITED

The movement, importation and possession of palms, palm plants and palm parts are strictly prohibited to prevent the spread of **Lethal Yellowing Disease (LYD)**.

**DECLARE ALL PLANT MATERIAL TO CUSTOMS AT ALL PORTS OF ENTRY.**



**AIR PORT OF ENTRY**



**SEA PORT OF ENTRY**



**TOGETHER WE CAN FIGHT TO PROTECT SAINT LUCIA AGRICULTURE AND ENVIRONMENT.**



**PLANT QUARANTINE  
PORTS OF ENTRY**



**LIVE PLANTS**

**DECLARE ALL PLANT MATERIAL TO CUSTOMS AT ALL PORTS OF ENTRY.**



# THANK YOU

— For standing with us in the fight against —

## LETHAL YELLOWING DISEASE



EARLY DETECTION  
SAVES PALMS



PRACTICE  
PLANT BIOSECURITY



HEALTHY PALMS  
BUILD OUR FUTURE



TOGETHER,  
WE CAN PROTECT  
SAINT LUCIA

OUR AGRICULTURE, OUR ENVIRONMENT, OUR FUTURE.

— *Protecting our palms. Securing our future.* —