

FUSARIUM

An Alarm Bell Raised by Fresh Del Monte CEO

Non-GMO, Non-Chemical, Non-Pesticides

A Cellular Regeneration Biotech with HQ in Singapore

Official Website: www.iBioStim.com



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ECONOMICS OF BANANA PRODUCTION

132M metric tonnes per annum (FAO, 2023) at risk.

GDP RISK FACTOR IF TR4 100% HIT

\$25B potential losses.

MODE & PERFORMANCE

CPR, Method, Performance.



Early Infection (Left), Terminal (Middle, Right)

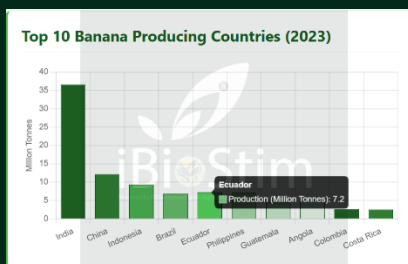
BATS' "HEART BEAT"

Editor Dr. Jeff Lim

Fieldwork by ChongMing

ECONOMY OF BANANA PRODUCTION

Based on the FAOSTAT data for banana production from 2019 to 2023, global cultivation is dominated by a few key producers. India consistently leads in production volume, reaching 36.6 million tonnes in 2023 from a harvested area of 994,000 hectares. China follows as the second-largest producer, with its mainland contributing approximately 11.7 million tonnes in 2023. Ecuador stands out for its exceptionally high yield, consistently harvesting over 35,000 kg/ha, supplying the international market with over 7 million tonnes annually. Other major producers in the Americas include Brazil (around 6.8 million tonnes) and Guatemala (around 4.4 million tonnes). In Africa, Angola has shown significant growth, with production increasing from 4 million tonnes in 2019 to nearly 4.9 million tonnes in 2023. Overall, global banana production remains concentrated in Asia and the Americas, with India and China alone accounting for a substantial portion of the world's output.



GDP RISK FACTOR IF TR4 100% HIT

A Fusarium TR4 outbreak would devastate the top banana-producing nations, with economic impacts ranging from severe to catastrophic. Export-dependent countries like **Ecuador**, **Costa Rica**, and **Guatemala** face the most extreme risk, with potential GDP losses of **2-6%** due to the collapse of a critical export industry. Major domestic producers **India** and **Indonesia** confront extreme threats to food security and rural employment, risking over **1% of GDP**. In total, the top 10 producers could suffer **over \$25 billion in collective output losses**, highlighting the banana industry's role as a pillar of economic and social stability vulnerable to a single pathogen.

FUSARIUM TR4 DISEASE MECHANISM: FROM INFECTION TO DETECTION

Disease Progression Timeline by Plantation Mapping (>1M plants).

1. Initial Infection (Planting to 2 months)

Mode of Entry: Fungal chlamydospores in soil germinate and infect banana roots through natural openings or wounds

Host Penetration: Hyphae colonize root cortex and enter xylem vessels through pits

Early Colonization: Fungus establishes in vascular system; no visible symptoms yet

2. Vascular Colonization (2-4 months)

Systemic Spread: Fungus moves upward through xylem vessels, producing microconidia and macroconidia

Physiological Changes:

- Xylem occlusion by fungal mycelium and gel-like substances
- Production of vascular embolisms blocking water flow
- Plant begins to experience water stress despite adequate soil moisture

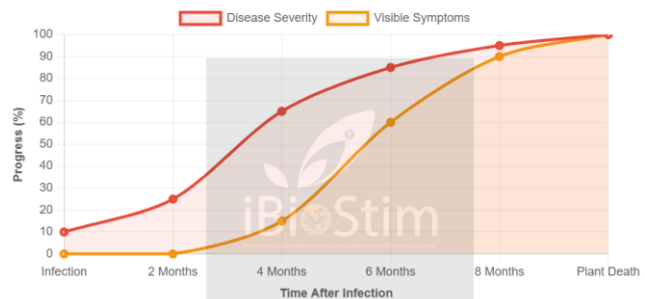
GDP (%) RISK STRATIFICATION

Estimated Economic Impact of Fusarium TR4 on Top Banana-Producing Countries

Country	Banana Production (2023)	Primary Market	Estimated GDP Impact	Estimated Output Loss	Risk Level	Key Vulnerabilities
India	36.6M tons	Domestic (95%+)	0.8-1.2% of GDP	\$8-12 billion	EXTREME	Food security, rural employment, smallholders
China	12.1M tons	Domestic	0.2-0.4% of GDP	\$4-7 billion	HIGH	Domestic supply chain, food inflation
Indonesia	9.3M tons	Mixed	0.6-0.9% of GDP	\$3-5 billion	EXTREME	Rural livelihoods, domestic consumption
Brazil	6.8M tons	Mixed	0.3-0.5% of GDP	\$2-4 billion	HIGH	Export revenue, agricultural diversity
Ecuador	7.2M tons	Export (80%+)	4-6% of GDP	\$3-4.5 billion	EXTREME	National exports, rural employment, trade balance
Philippines	5.8M tons*	Mixed	1.2-1.8% of GDP	\$2-3 billion	EXTREME	Export revenue, rural poverty, food security
Guatemala	4.4M tons	Export	2.5-3.5% of GDP	\$1.5-2 billion	EXTREME	Export dependence, rural economy
Angola	4.9M tons	Domestic	1.0-1.5% of GDP	\$1-1.5 billion	HIGH	Agricultural development, food security
Costa Rica	2.5M tons	Export (90%+)	3-4% of GDP	\$1-1.3 billion	EXTREME	Export concentration, rural employment
Mexico	2.6M tons	Mixed	0.2-0.3% of GDP	\$1-1.5 billion	MODERATE	Export market access, regional employment

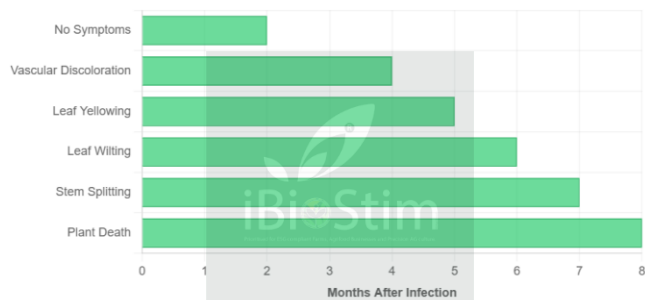
*Philippines data extrapolated from external sources as not a primary producer
Note: Estimates based on 2023 production data, current market prices, and GDP proportions. Impact assessments consider both direct agricultural losses and indirect economic multipliers. Risk levels reflect combination of economic dependence and vulnerability to supply chain disruption.

Fusarium TR4 Disease Mechanism: From Infection to Detection



Visual timeline showing disease progression from initial soil infection through vascular colonization to visible symptoms and plant death.

Symptom Development Timeline



Progressive visibility of disease symptoms from initial infection through advanced stages of plant collapse.

3. Symptom Development (4-6 months)

- Reduced nutrient transport affecting overall plant metabolism

First Visible Signs:

- Yellowing of older leaves progressing upward (chlorosis)
- Leaf wilting and collapse, typically starting with oldest leaves
- Longitudinal splitting of pseudostem base
- Red-brown vascular discoloration visible in cross-sections

4. Advanced Disease (6+ months)

Plant Collapse: Complete wilting, plant death

Soil Contamination: Fungus produces survival spores (chlamydospores) that persist in soil for 30+ years

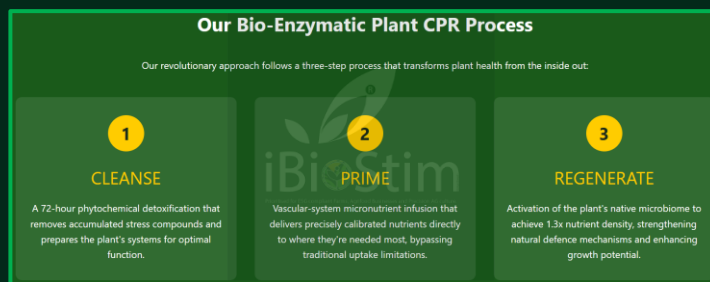
Secondary Spread: Contamination of neighboring plants through root contact, water movement, or human activity

LITMUS TEST 1^{Cleanse}

[**Canker**] Mr Carbon (50x) – Single dose triggered weeping cessation within 7 days.

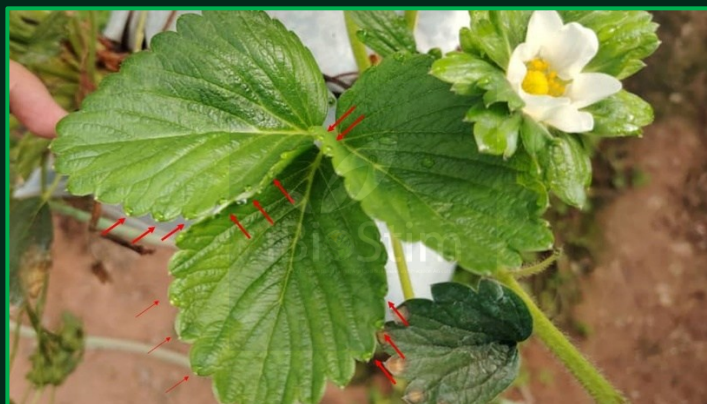


MODE OF ACTION (CPR^{iBioStim-Specific})



LITMUS TEST 2^{Prime}

[**Guttation**] Mr Carbon (200x) – Restore Ca Channel in the absence of irrigation within 12-24hrs.



LITMUS TEST 3^{Regeneration}

[**Glyphosate**] Mr Carbon (200x) – Reactivation of in-plant amino acid synthesis.



PERFORMANCE 3^{Yield}

[Per Plant, kg] 18 vs 25-30;

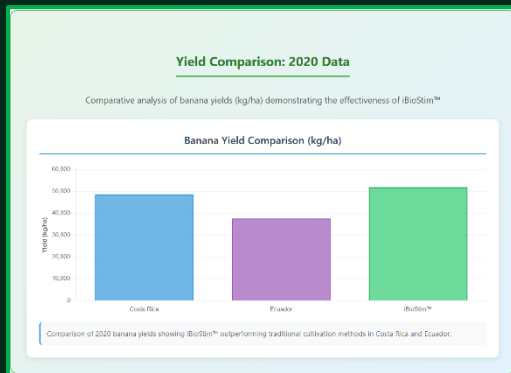
[Per Acre, 700 Plants, MT] 12.6 vs 17.5-21.0

[Nutrient Density] Enrichment by ~1.25x

[Shelf Life Extension] Determined by ISO16679 Method

[Soil Amendments] Inoculated Biochar, Animal Manure (banned), Animal (banned)

PERFORMANCE 4^{Comparison}



CONCLUSION

Disease free (naturally suppressed) banana cultivation is achieved through implementation of smart biochemistry securing harvest and calibrations consistently. Performance is tested for consistency >36 months in Asia on certified plantation [Scale] >1M plants.

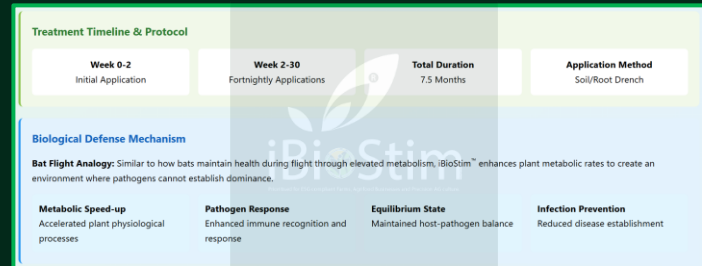
With iBioStim™ integration and Good Agricultural Practice (GAP), the 18M boxes (~22% year-on-year, Q3 2025) of bananas lost to fusarium disease (reported by Fresh Del Monte CEO) could potentially be recovered.

– END –

SOIL/ROOT DRENCHING^{Method}

[New-Planting Only] Conditioning Step: Prepare Mr Carbon (500x) in 8,000L Water/acre

[Existing Plants Only] Mr Carbon (200x) + Junior/Plus (300x)



PERFORMANCE 1^{Calibration}

[Mass Ratio] 1 vs 1.79; [Length,cm] 6 vs 6.9; [Diameter, cm] 25 vs 32



PERFORMANCE 2^{Hands}

[Hands] Number of hands increased with suppression of fusarium disease and elevated metabolism.

