



Food and Agriculture Organization  
of the United Nations

INTERNATIONAL YEAR OF  
**PLANT HEALTH**  
2020



# Update on Banana Fusarium wilt disease TR4

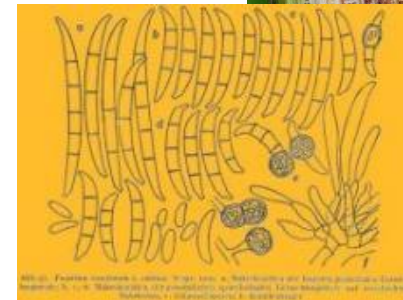
**Fazil Dusunceli**

Plant Production and Protection Division,  
Food and Agriculture Organization, Rome, Italy

``IPPC Regional Workshop for Africa``8-9 September 2020 - Virtual

# Background

- **Cause:** Soil borne fungus *Fusarium oxysporum* f.sp. *cubense* (has four races 1,2, STR4, and **TR4**).
- **Current Concern:** Tropical race 4 (TR4).
- **Challenges:**
  - Cavendish most susceptible
  - **No fully resistant variety**
  - Effective **eradication is not possible**
  - **Prevention and containment is the key**

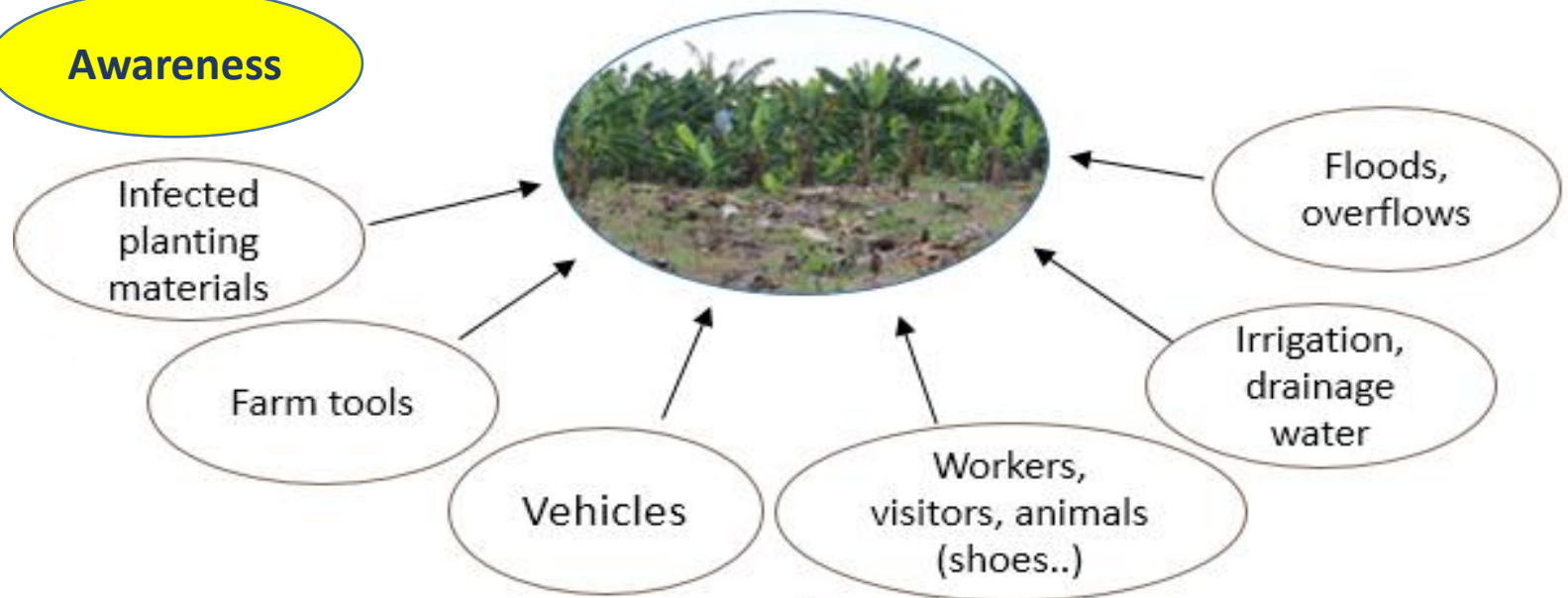


# Factors contributing to spread

At local and farm level



**Awareness**

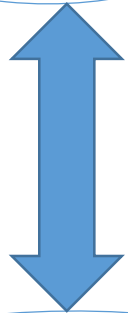




# Challenges at national and global levels



Country  
level



Global,  
international



Collaboration, synergy	Information sharing	Awareness, recognition
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# Historical and Recent Developments

**Past lessons (1950s):** Race 1 on  
Gross Michel costed **USD 2.3 billion**

1990s: **TR4** in SE Asia: **100 000**  
**ha** infested (Cavendish)

**TR4 in 21**  
**countries**

Foc TR4 Distribution  
■ TR4 confirmed countries

Colombia (La Guajira, 6  
farms 175 ha)

**2019: TR4** in Colombia / LAC

**2010s: TR4** in  
Near East, South Asia & Mozambique

1,6 million ha may be infested within 25 years (Assessment of Bioversity – CIAT alliance)

# FAO's Work on TR4

**In collaboration with  
Bioversity – CIAT Alliance, IITA and  
World Banana Forum**



The screenshot shows the FAO website with the following content:

- Header:** Food and Agriculture Organization of the United Nations. Navigation links: العربية, 中文, English, Français, Italiano, Português, Русский, Español. Search bar: Google Custom Search.
- Menu:** About FAO, In Action, Countries, Themes, Media, Publications, Statistics, Partnerships.
- Sub-menu:** Contacts, News archive, Events, Audio & video, Podcast, Broadcast download, Webcasting, Infographics.
- Breadcrumbs:** Home > Media > News Article.
- Article Title:** FAO urges countries to step up action against destructive banana disease.
- Text:** Following its spread to Africa and the Middle East, Fusarium wilt TR4 increases the risks to livelihoods and banana markets.
- Image:** A photograph of banana plants affected by Fusarium wilt, showing yellowing and wilting of the leaves.
- Caption:** Diseased banana plants.
- Text:** The TR4 race of the disease, which is also known as Panama disease, is posing a serious threat to production and export of the popular fruit, with serious repercussions for the banana value chain and livelihoods, FAO said in an information brief.
- Text:** 14 April 2014, Rome – The Food and Agriculture Organization of the United Nations (FAO) is warning countries to step up monitoring, reporting and prevention of one of the world's most destructive banana diseases, Fusarium wilt, which recently spread from Asia to Africa and the Middle East, and which has the potential to affect countries in Latin America.
- Text:** Disease surveillance and reporting of infected plants is crucial to stemming the spread of Fusarium wilt.
- Text:** Banana is the eighth most important food crop in the world and the fourth most important food crop among the world's less developed countries, according to FAOSTAT, the UN's statistics, data-gathering and analysis service.
- Related links:** Read, Interview with FAO plant pathologist Fazl Dusanelli.



# Global Programme on Banana Fusarium Wilt

**More resilient** banana systems with reduced disease risks and impact

## Improved **prevention**

Surveillance, monitoring and early warning conducted

Risk **analysis** and phytosanitary **regulations** improved

**Containment** improved

## Improved integrated **management**

Germplasm and **varieties with resistance** developed

**Integrated** disease management improved

Enhanced **synergies, capacities** and **policy environment** for improved prevention and management of Fusarium wilt disease

International **collaboration** strengthened

Policies, **strategies**, awareness enhanced

National **capacities** improved



# Awareness - Advocacy

IPPC, CFS events  
WBF Conference  
Media...



## FAO and partners intensify efforts to help countries combat banana disease threat

New emergency project targets banana-growing countries in Latin America and the Caribbean, where the fruit is a nutritional and economic mainstay



Learning how to identify the disease in Ecuador.

3 October 2019, Rome - The Food and Agriculture Organization of the United Nations (FAO) has launched an emergency response under its Technical Cooperation Programme to help countries in Latin America and the Caribbean take the control of



Business | World

## Bananas at Risk

January 31, 2020

Rebecca Katzman



## Pests on the March

BUILDING ALLIANCES TO FIGHT ANIMAL AND PLANT PESTS AND DISEASES - SECURING OUR FOOD FUTURE

## COVER STORY





# Guide for travellers

- **Avoid visiting** infested farms unless absolutely necessary
- **Do not move plant** materials from infested areas / farms
- If you have to visit an infested farm,
  - Get permission from plant protection officers and obey biosecurity measures
  - <http://www.fao.org/3/ca7590en/ca7590en.pdf>



Organización de las Naciones  
Unidas para la Alimentación  
y la Agricultura

Prevención de la propagación  
y la introducción de la marchitez  
del banano por *Fusarium*  
Raza 4 tropical (R4T)  
Guía para viajeros



Alianza



Con el apoyo del Foro Mundial Bananero

# Activities in the regions

Africa



Latin America & Caribbean



SE Asia



# Activities in the regions

Focus	SE Asia (Greater Mekong)	Southern Africa*/ Mozambique	Latin America & Caribbean	Lebanon, Turkey, Jamaica***
Regional collaboration	X	X *	X	
Awareness raising	X	X	x	x
Surveillance	X (digital tools)	X		x
Capacity building / training	X	X	x	x
Planning / National strategies		X	x	x

\* A recent regional multi pest project for SADC countries includes a TR4 component; \*\* Under preparation; \*\*\* A multipest national project with components on banana pests including TR4



# Emergency support to Mozambique

Collaboration with IITA and Stellenbosch University

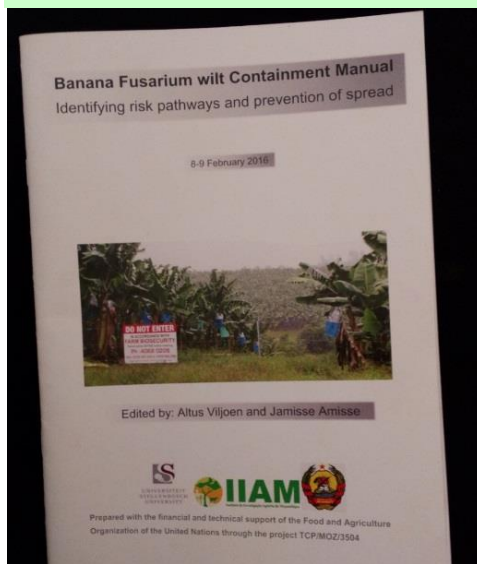
Awareness  
raising/advocacy

Capacity building/  
Training

Surveillance

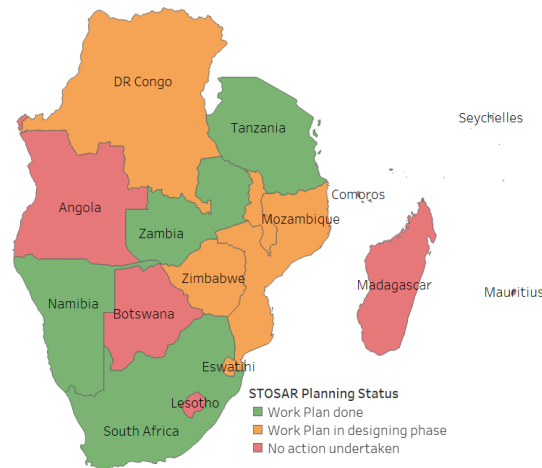
Containment

National strategy



# Follow up to the Mozambique TCP project

- **Mozambique:** USDA – Teknoserve project (Seed system, awareness and training)
- **Southern Africa – SADC project (FAO-SFS):** *Support towards operationalization of the SADC Regional Agricultural Policy (STOSAR)*
  - Subregional ToT Workshop on Management of Banana Foc TR4 in Southern Africa to be held in March 2020 at Stellenbosch University, South Africa
  - A harmonized strategy for the control of TR4 in Southern Africa will be discussed
- **Eastern Africa (FAO - SFE):** Awareness raising activity – Technical brief
- **Stellenbosch University:** An effort to develop a Africa wide strategy
- **Bioversity International – CIAT alliance :** Surveillance project



Understanding, anticipating and managing Banana Fusarium Wilt Disease Tropical Race 4, *Fusarium oxysporum* f.sp. *cubense*

The major threat to economic growth and sustainable development across all the nine East African countries in general is the increasing phenomenon of introduction and spread of emergent/ invasive species/ transboundary plant pests<sup>1</sup>. The Food and Agriculture Organization of the United Nations warns the countries that transboundary plant pests and diseases can spread easily and affect food crops, causing significant losses to farmers and threatening food security<sup>2</sup>.





# FAO support for Colombia response to the outbreak

- **ICA** (Colombian Agricultural Research Institute) and **OIRSA** (Regional Animal and Plant Health Organization for Mexico, Central America and Caribbean) issued **alerts at national and regional levels**.
- Banana Growers' Associations (ASBAMA and (AUGURA) were involved in the efforts
- **Six farms** were put under **quarantine**, 175 ha destroyed & fenced out for containment. Seven **control points** established to limit / check the movements.
- Concerned people have been **trained** on biosecurity measures.





# Regional project for Latin America and Caribbean on TR4 (TCP)

- The regional project in Latin America and Caribbean: Strengthening regional capacities for surveillance, prevention, and management against the eventual spread of banana Fusarium wilt, caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (Foc TR4) (TCP/RLA/3724)
- 11 countries
- **Focus**
  - Regional collaboration and information exchange
  - Regional action plans
  - National action plans
  - Capacity building trainings



# Inception workshop (17-19 Feb. 2020 Panama)

- Expert presentations on various aspects (Epidemiology, Diagnosis, Prevention, Management)
- Awareness raising and training programmes
- Country preparedness
- Regional and na

## Elements of action plans:

- 1: Inter institutional and multistakeholder **coordination**
- 2: **Preparedness, prevention** and early detection
- 3: Response to **emergencies** and improvement of pest management
- 4: **Impact** assessment and mitigation



# Activities in LAC

- Virtual **awareness** raising webinar on IYPH (2200 participants)
- Virtual **training** (July 2020)
- Caribbean subregional consultation, training and **simulation** exercise (May 2020)
- Face to face **workshops** in Caribbean – December 2020





# How to stop and manage TR4 ?

- Once TR4 is established, management is extremely challenging and costly.
- **Prevention** is key
  - Prevention of movement of infected planting materials
  - **Awareness** at all levels
  - Contingency **planning**
  - Rigorous **surveillance**
  - Rapid **containment**, quarantine
  - Capacity strengthening,
  - Information **sharing** and collaboration



# Interdisciplinary approaches for exclusion and prevention of TR4 at **international and country level**



International  
Plant Protection  
Convention

- **Exclusion / Prevention**
  - Policies and **strategic plans**
  - Phytosanitary / **biosecurity** regulations + implementation
  - Targeted **awareness** campaigns
  - Programmes, **projects**: regular surveys, training, breeding resistant varieties
  - International, regional **collaborations**

# Prevention **at country level**

- **Coordination mechanisms / platforms / stakeholders**
- Institutions, **players**, linkages?
  - Plant protection, quarantine,
  - Research and Extension,
  - Plant propagation sector,
  - Seed certification,
  - Producers, private sector,
  - NGOs including investors
  - Transport, trade, customs,
  - **Service providers:**
    - Fertiliser, Pesticides,
    - Logistics
  - Public in general
  - Others....





# Preparedness **at country level**

- Pest risk **assessments**
  - **Pathways**, impact, vulnerabilities
- **Situation** analysis / capacity assessment
  - Review of institutional setup
  - Capacities: Physical, financial, human
- **Contingency** plans ?
  - Deficiencies / weaknesses ?
  - What to do, who, how ?
  - Roles of institutions, officers...
  - Action plan for prevention, containment & implementation
  - Addressing socio economic impacts
  - Simulations



Primer simulacro nacional de erradicación, contención y manejo en campo de un primer brote de *Fusarium oxysporum* f. sp. *cubense* raza 4 tropical (Foc R4T)

Organización de las Naciones Unidas para la Alimentación y la Agricultura

ORGANISMO INTERNACIONAL REGIONAL DE SANIDAD AGROPECUARIA

SERVICIO FITOSANITARIO DEL ESTADO

CORBANA

CARBONO NEUTRAL

Costa Rica, 15 de mayo de 2019

oirsa.org  
@OIRSAoficial OIRSA

# Prevention / Exclusion **at farm level**

- **Prevention / Exclusion:**
  - **Awareness - communication**
  - Farm **planning**, location, mapping, design,
    - Location of the gate and packing house
    - Fencing, ditches/canals, roads
  - Planting **materials**: Start clean
  - **Training** workers
  - Gate and border **control** system
  - Long term resilient systems  
(with emphasis on biodiversity and soil health)



# Preparedness & management **at farm level**

- **Risk analysis**
  - Entry **channels**?
  - Identification of weaknesses
- **Contingency / containment plans : what, who, when, how**
  - Strengthening **biosecurity measures**
  - Awareness - communication among staff, worker,
  - **Training** personnel
  - Strengthening gate / border controls (Vehicles, workers, fencing),
  - **Zoning** parcels, installing disinfection, footbath points,
  - Improving / revising **water management** practices
  - Entry – exit check points (vehicles, workers...)
- **Plan B: If things do not work ?**
  - Alternative varieties, crops
  - **Inoculum** reducing / management approaches
    - fallow, cover crops, intercropping, soil health



# Small steps can make big impacts

Rome airport:  
Warning

Way to Panama :  
Declare plants !



REPÚBLICA DE PANAMÁ  
AUTORIDAD NACIONAL DE ADUANAS  
DECLARACIÓN JURADA DEL VIAJERO  
DINERO, VALORES O DOCUMENTOS NEGOCIABLES  
EQUIPAJE ACOMPAÑADO Y/O MERCANCÍA

Entrada: ☐ TODO VIAJERO MAYOR DE EDAD O MIEMBRO RESPONSABLE DE FAMILIA (ENTIENDASE POR FAMILIA, ESPOSO, ESPOSA E HIJOS MENORES DE 18 AÑOS INCLUYENDO ADOPCIÓN), ESTÁ OBLIGADO A COMPLETAR ESTE DOCUMENTO A LA ENTRADA O SALIDA DE LA REPUBLICA DE PANAMÁ, SIN OMITIR NINGUNA CASILLA.  
Salida: ☐ ANTES DE COMPLETAR LEER AL REVERSO DE ESTE DOCUMENTO. CUALQUIER DUDA CONSULTE CON EL OFICIAL DE ADUANAS. ESTA DECLARACIÓN DEBERÁ SER COMPLETADA POR EL VIAJERO BAJO LA GRAVEDAD DE JURAMENTO A TINTA, CON LETRA CLARA, LEGIBLE Y SIN ENMIENDA, BORRONES O TACHONES

**INFORMACIÓN GENERAL DEL VIAJERO**

1. Nombre: \_\_\_\_\_ 2. Apellido: \_\_\_\_\_ 3. Sexo: ☐ M ☐ F  
4. Nacionalidad: \_\_\_\_\_ 5. Fecha de nacimiento: \_\_\_\_\_ (Día / Mes / Año) 6. País de nacimiento: \_\_\_\_\_  
7. Tipo de documento: ☐ Pasaporte ☐ Cédula ☐ Otros: \_\_\_\_\_ 8. Número de Documento: \_\_\_\_\_ 9. Lugar de expedición: \_\_\_\_\_  
10. Fecha de expiración: \_\_\_\_\_ (Día / Mes / Año) 11. País de residencia: \_\_\_\_\_ 12. Ocupación: \_\_\_\_\_  
13. País de procedencia: \_\_\_\_\_ 14. Países visitados en este viaje: \_\_\_\_\_  
15. País de destino final: \_\_\_\_\_ 16. Lugar de estadía en la Rep. de Panamá: \_\_\_\_\_  
17. Tiempo de Estadía: \_\_\_\_\_ 18. No. de familiares que viajan con usted (entiendase por familia, esposo, esposa e hijos menores de 18 años, incluyendo adopción): \_\_\_\_\_

**INFORMACIÓN GENERAL DEL VIAJERO**

19. Medio de Transporte: ☐ Aéreo ☐ Terrestre ☐ Marítimo ☐ Otros: \_\_\_\_\_ 20. Motivo del Viaje: ☐ Turismo ☐ Residente ☐ Negocios ☐ Otros: \_\_\_\_\_  
21. Fecha de su última visita: \_\_\_\_\_ (Día / Mes / Año) 22. Nombre del Aeropuerto/Puerto Marítimo o Terrestre de entrada o salida: \_\_\_\_\_  
23. Nombre de la Empresa Transportadora: \_\_\_\_\_ 24. N° de Vuelo/Viaje/Identificación del Vehículo: \_\_\_\_\_  
25. ¿Porta usted o algún miembro de su grupo familiar frutas, plantas, granos, alimentos, insectos? SI ☐ NO ☐  
26. ¿Porta usted o algún miembro de su grupo familiar Carnes, animales, productos animales (semes, embriones, huevos fértiles)? SI ☐ NO ☐  
27. ¿Porta usted o algún miembro de su grupo familiar productos Biológicos, medicamentos, suplementos de uso veterinario? SI ☐ NO ☐  
28. ¿Porta usted o algún miembro de su grupo familiar suelo o a visitado una granja/hacienda; fincas y/o establecimientos de sacrificio animal? SI ☐ NO ☐

¿Alguien con el que viaja ha estado muy cerca de \_\_\_\_\_ en los últimos 15 días?

# Panama airport exit: Warning



**DIRECCIÓN EJECUTIVA DE  
CUARENTENA AGROPECUARIA**

#Panamá  
Produce

**¡CUANDO VIAJE,  
NO TRANSPORTE  
PLAGAS!**




**¿DÓNDE**

Origen	
DENVER	
BELO HORIZONTE	
STGO. DE CHILE	
SAO PAULO	
GUAYAQUIL	
NEW YORK JFK	
ASUNCION	
SALTA	
LOS ANGELES	
SAO PAULO	
MENDOZA	
STGO. DE CHILE	
ROSARIO	
QUITO	
RIO DE JANEIRO	
PEREIRA	
CORDOBA	
MONTEVIDEO	
SAN JOSE	
BUENOS AIRES	
SAO PAULO	
BOGOTA	
CARTAGENA	
HAVANA	
BARRANQUILLA	
STGO. DE CHILE	
CARACAS	
MEDELLIN	
PORT OF SPAIN	


Hora Local: 07:49a

**PROHIBIDO EL INGRESO  
DE PLANTAS, RIZOMAS, ARTESANÍAS  
DE BANANO Y PLÁTANO**



**PANAMÁ LIBRE  
DE FUSARIUM (Foc R4T)**

**The entry of plants, rhizomes, and banana  
or plantain crafts is prohibited**

  
 REPÚBLICA DE PANAMÁ  
GOBIERNO NACIONAL

MINISTERIO DE  
DESARROLLO AGROPECUARIO

**¿DÓNDE**

Origen	Hora
DENVER	6:02a
BELO HORIZONTE	6:09a
STGO. DE CHILE	6:13a
SAO PAULO	6:18a
GUAYAQUIL	6:20a
NEW YORK JFK	6:21a
ASUNCION	6:22a
SALTA	6:26a
LOS ANGELES	6:26a
SAO PAULO	6:28a
MENDOZA	6:30a
STGO. DE CHILE	6:32a
ROSARIO	6:33a
QUITO	6:36a
RIO DE JANEIRO	6:36a
PEREIRA	6:39a
CORDOBA	6:40a
MONTEVIDEO	6:45a
SAN JOSE	6:50a
BUENOS AIRES	6:52a
SAO PAULO	8:01a
BOGOTA	8:02a
CARTAGENA	8:04a
HAVANA	8:05a
BARRANQUILLA	8:06a
STGO. DE CHILE	8:07a
CARACAS	8:09a
MEDELLIN	8:10a
PORT OF SPAIN	8:11a

Hora Local: 07:49a

# Thank you !



INTERNATIONAL YEAR OF  
**PLANT HEALTH**

2020

**Spread the message**

**Protect bananas:**

**TR4 is the Corona of banana**