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# Status and management of Foc TR4 in Africa



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# Importance of bananas to Africa





# Musa consumption in Africa



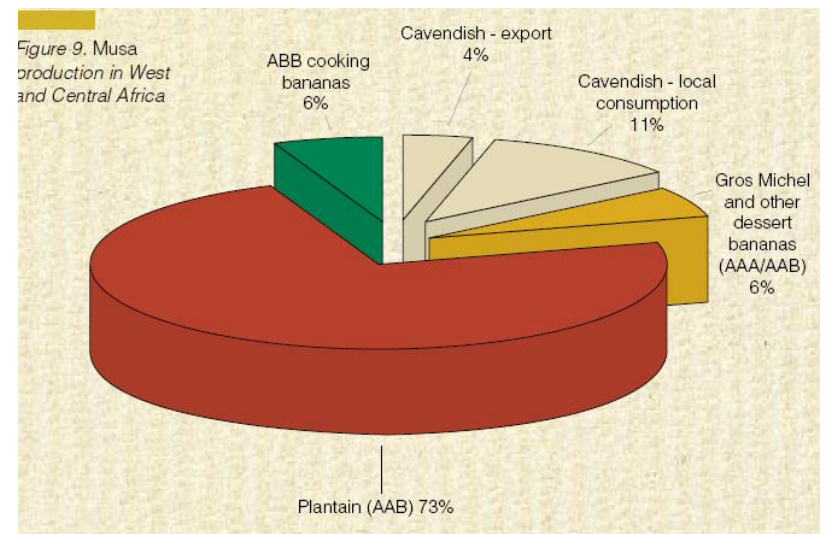
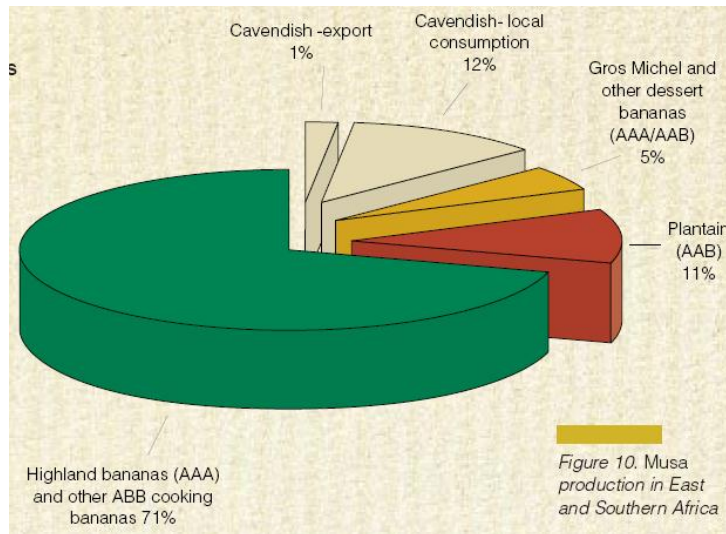
Africa includes several countries with the highest *per capita* consumption of bananas in the world, with Ugandans consuming 243 kg/p/yr

| Country             | Consumption (kg/cap/yr) |
|---------------------|-------------------------|
| Uganda              | 243                     |
| Rwanda              | 197                     |
| Gabon               | 161                     |
| Cameroon            | 128                     |
| Papua New Guinea    | 121                     |
| Sao Tomé & Príncipe | 93                      |
| Ghana               | 92                      |
| Burundi             | 89                      |
| Ecuador             | 88                      |





# Banana production in Africa





# Bananas production in Africa



## Three main production systems:

### *Musa* mixed with other crops in distant fields

- Cultivating banana mixed with other crops for subsistence
- Banana produced on smallholdings (farm sizes <1 ha)
- Resource-poor with limited inputs

### Production next to homestead in the rural areas or in backyards in the urban centres

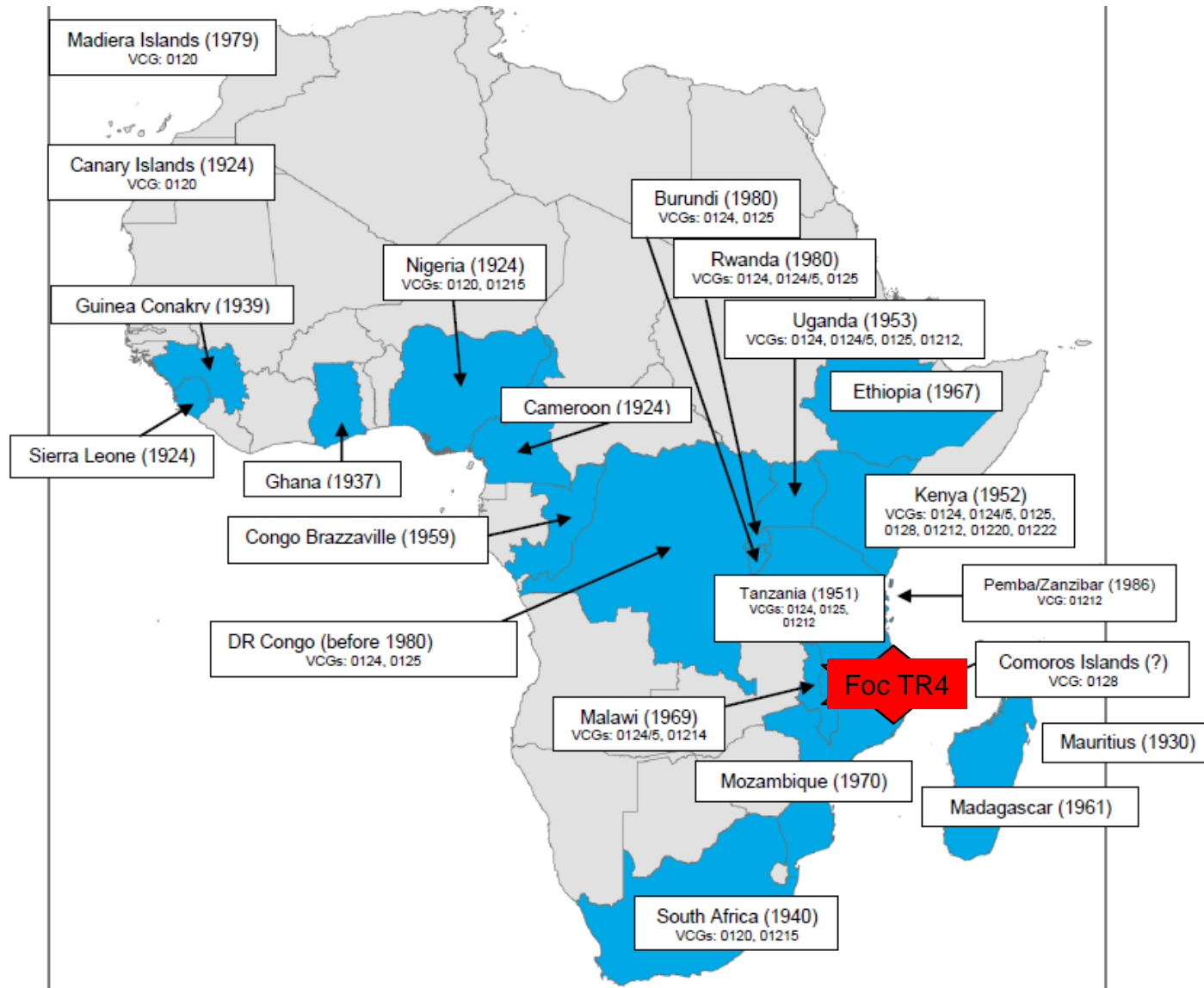
- Became popular because of a reduction in suitable land, problem with transport and theft in distant fields

### Monoculture production

- Intensive production in monoculture
- Inorganic fertilisers are applied, plots are kept weed free and diseases and pests are controlled
- Produce destined for lucrative urban and domestic markets

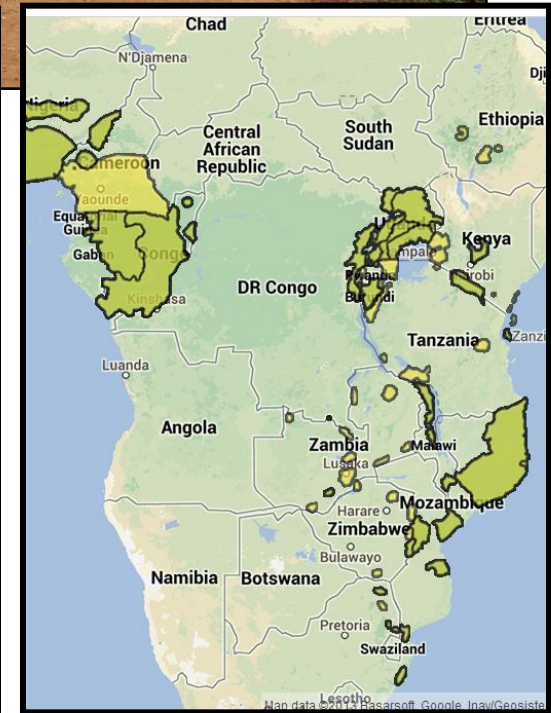
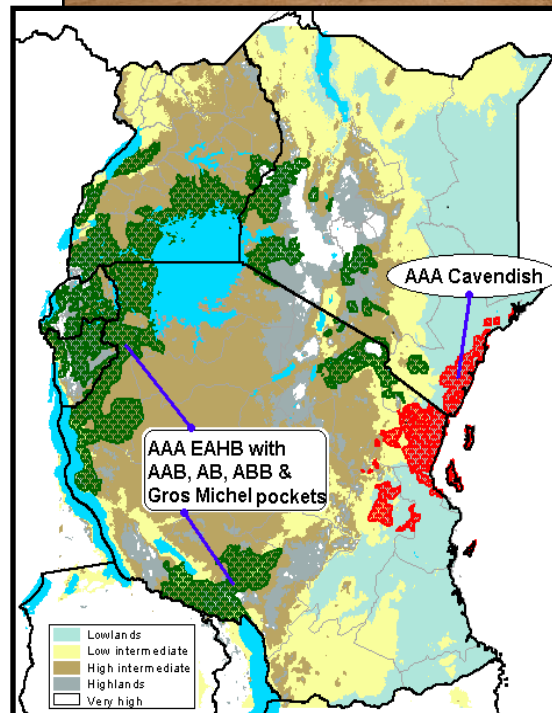


# Fusarium wilt in Africa



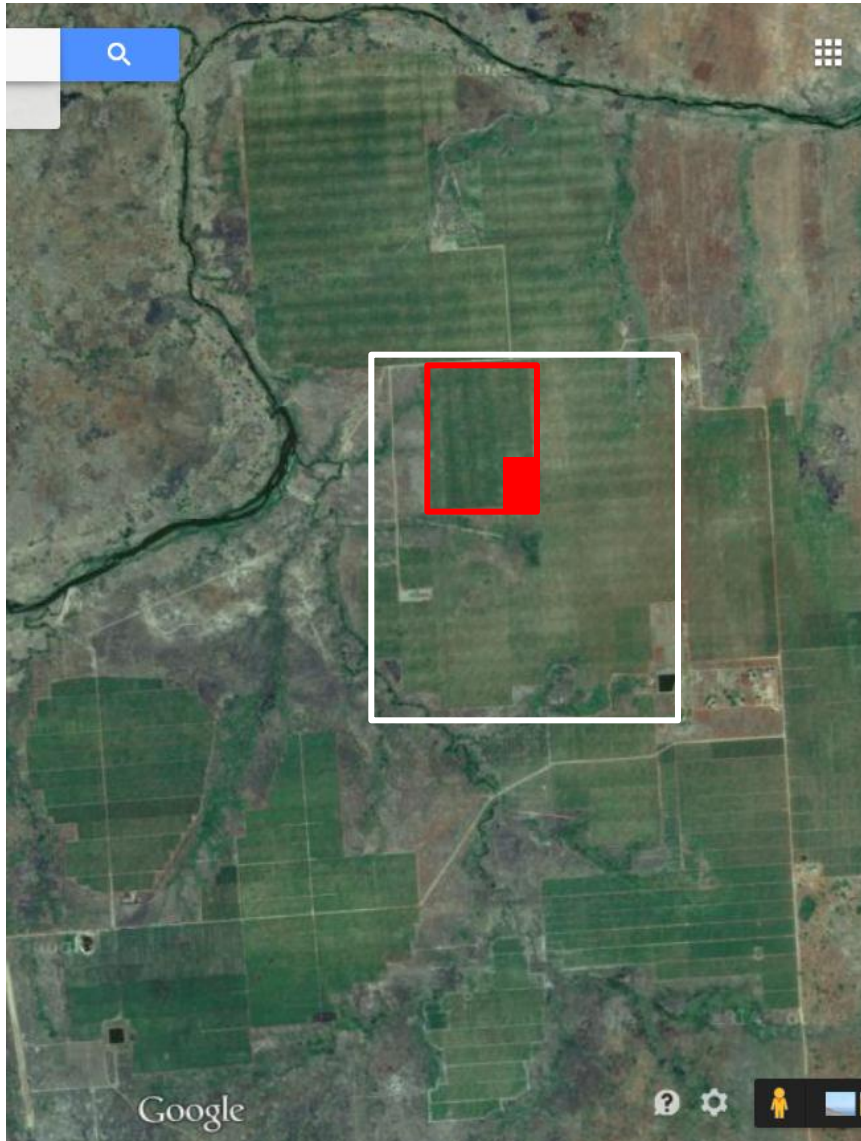


# Introduction of Foc TR4 into Africa





# Introduction of Foc TR4 into Africa



- Farm developed in 2009 near Namialo, a dry region in northern Mozambique
- No other banana farm in a radius of 100 km, with only pockets of volunteer bananas (cooking type)
- Water deficit was experienced in 2012, with Farm 2 being particularly affected
- Symptoms first observed in Feb 2013
- Water from Monapo River feeds into two ponds for sprinkler irrigation
- Considerable pedestrian movement of people from local communities through
- Farm personnel were rotated between fields
- International staff is replaced fairly regularly





# Sequence of actions after discovery



Continental strategy to protect African bananas against Foc TR4



Action plan to mitigate Fusarium wilt TR4 in Africa by increasing capacity and connectivity of national regulatory and research organisations

A proposal submitted to:

- 02/13: First symptoms observed
- 06/13: Fungus identified as FocTR4
- 08/13: Recommendations to farm
- 09/13: Mozambique NPPO visit
- 10/13: Stakeholder meeting: Maputo
- 11/13: Press release on outbreak  
(Dr Serafina Mangana)
- 11/13: Founding of AC4TR4**
- 12/13: RTB provide \$20 000
- 01/14: Concept proposal finalized
- 04/14: FocTR4 strategy meeting



# African consortium for Foc TR4



Consists of intergovernmental bodies, regional research institutions, trade organizations, government representatives, plant protection experts, universities, the private sector, producers, donors and international cooperating partners with the mandate and expertise to curtail the introduction and spread of Foc TR4 in Africa.



# AC4TR4 Task Force

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- To analyse the prevailing situation in Mozambique and determine the risk of Foc TR4 to African bananas
- To formulate extension needs and research gaps
- To map the occurrence and spread of the Foc TR4 in Africa
- To actualise the strategy, document the discussions of the meeting, resource mobilisation, coordinate actions, and follow up on responsibilities
- To develop a communication approach to better manage the media and the messages it portrays to avoid sensationalism and encourage accurate reporting
- To identify and pursue funding opportunities



# Action plan for Foc TR4 in Africa

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## **Goal:**

To control the current disease outbreak of banana Fusarium wilt (Foc TR4) in Mozambique and to prepare other African countries that rely on banana for food security and income generation, against similar incursions.

## **Objectives:**

1. Arrest and contain the spread of Foc TR4 in Mozambique and surrounding countries
  - a. Map, contain and manage current outbreaks of Fusarium wilt at Metocheria farm, Mozambique
  - b. Develop and implement a knowledge-based awareness campaign to facilitate the early detection and eradication of Foc TR4 in Africa
  - c. Raise the awareness of the Foc TR4 threat among decision-makers, farmers and general public



# Action plan for Foc TR4 in Africa

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2. Strengthen the capacity of NARS to sustainably manage the disease in Africa
  - a. Educate and train regional scientists and quarantine officials in the detection, identification and control of Fusarium wilt in Africa
  - b. Create a phased observation system, based on targeted surveillance and supported by appropriate diagnostics, to detect and combat incursions of Foc TR4 in Africa
  - c. Introduce biosecurity legislation on the movement of planting material within and between African countries
  
3. Institute mechanisms to coordinate and communicate AC4TR4 activities in Africa.
  - a. Receive and compile surveillance reports and disease distribution maps
  - b. Organize review and planning meetings
  - c. Manage planned activities of the consortium by means of an African AC4TR4 Task force
  - d. Compile research reports, build annual reports and disseminate public awareness material



# Action plan for Foc TR4 in Africa

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4. Carry out research to generate new information and technologies for sustainable management of Foc TR4
  - a. Establish screening programmes in Asia to select Foc TR4-resistant East African Highland banana, plantain, ABB cooking banana, Sukali Ndizi and their hybrids
  - b. Develop projects to introduce resistance against Foc TR4 into African bananas by cross-breeding
  - c. Determine the adaptability of Foc TR4-resistant Cavendish somaclonal selections from Asia to African banana-growing conditions
  - d. Develop delivery pathways in Africa to provide appropriate and preferred resistant planting material to farmers
  - e. Investigate methods to contain and eradicate Foc TR4 in infested banana fields



# sun.ac.za/banana-fusarium-wilt-africa



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Events Notices

**10** Nov 2014 V Cumbre Mundial de Banano

**19** Nov 2014 International Banana Symposium



# Managing Fusarium wilt: Metocheria







# Metocheria farm, Mozambique





# BARNESA meeting



**BARNESA STEERING COMMITTEE MEETING ON Foc TR4**  
Golf View Hotel, Entebbe, Uganda  
26<sup>th</sup> to 28<sup>rd</sup> October 2014





# BAPNET meeting



**9<sup>th</sup> BAPNET STEERING COMMITTEE MEETING**  
Waterfront Insular Hotel, Davao City, Philippines  
November 17-19, 2014



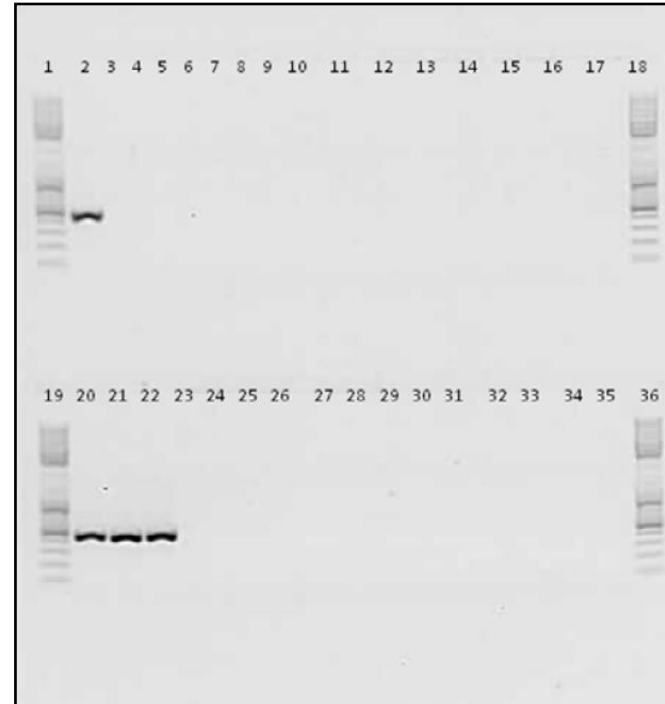


# Collaboration of AC4TR4 with Asia-Pacific





# Collaboration of AC4TR4 with Asia-Pacific



Molecular marker for Foc TR4 – Li et al. (2014)



**BMC Genomics**

**BioMed Central**  
The Open Access Publisher

This Provisional PDF corresponds to the article as it appeared upon acceptance. Fully formatted PDF and full text (HTML) versions will be made available soon.

**Transcriptome profiling of resistant and susceptible Cavendish banana roots following inoculation with *Fusarium oxysporum* f. sp. cubense tropical race 4**

*BMC Genomics* 2012, 13:374 doi:10.1186/1471-2164-13-374

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# Acknowledgements



UNIVERSITEIT  
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**Bioversity**  
International

**IITA**

*Research to Nourish Africa*



**barnesa**



**CGIAR**

**RESEARCH  
PROGRAM ON  
Roots, Tubers  
and Bananas**



**ASARECA**

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