

## Symptoms of TR4


1. Yellowing of the edges of older leaves
2. Withered leaves that fold creating a skirt around the pseudostem
3. Pseudostem split at the base (but not always)
4. Dark brown vascular tissue in the corm and pseudostem




## GlobalG.A.P TR4 Biosecurity Add-On

All Fyffes suppliers must include the **TR4-Biosecurity Add-On for Bananas** in their next GlobalG.A.P audit.

This is an assessment, and does not affect the audit score, but will provide guidance on where the farm can improve its biosecurity measures.

 *By applying these biosecurity measures, you are helping to protect not only your own farm, but also the country's banana industry.*

- ✓ Raise awareness amongst workers
- ✓ Work with National and Local Authorities

 If you see suspicious symptoms on a plant, please notify:

- **Ministry of Agriculture Representative**
- **Fyffes Food Safety and Compliance Department (+506) 83096960**
- **National Plant Health and Protection Authority**

Note: Do not cut the suspected plant until authorities permit it.

If you have any queries, please contact Eimear Lynch at [elynch@fyffes.com](mailto:elynch@fyffes.com)

For more information visit: <http://www.fao.org/world-banana-forum/disease/tr4-global-network>



## ABOUT TR4

**What is TR4?** A soil-borne fungal disease.

**Common Name:** TR4, or 'Panama disease'  
**Scientific Name:** *Fusarium oxysporum f. sp. Cubense*, Tropical Race 4  
**Affects:** Cavendish Bananas

### How does it affect the plant?

The spores germinate and send hyphae into the plant roots. The fungus then blocks the vascular tissue carrying water and nutrients, causing the plant to wilt.

### How does it spread?

The spores can be spread via soil, water and planting material, and can survive up to 30 years, even without the presence of banana crop.

# What can we do? Take these 10 biosecurity measures!

## 1. Zoning

Restrict movement in and out of farms with three zones. This prevents movement in the field without respecting biosecurity measures (such as changing boots, footbaths, disinfection of tools), which reduces the possibility of the fungal spores reaching healthy areas.



## 2. Control Visitor Entry

The visitor questionnaire should ask visitors if they have been to a TR4 affected country in the last three months.

If so, restrict visitor access to the farm or apply extreme biosecurity measures.

## 3. Planting material

Only get your planting material from trusted and certified sources!

## 4. Farm Barriers

Barriers in the **Exclusion Zone** are vital to prevent the entry of vehicles and people without complying with or respecting the required biosecurity actions. Fences, plant barriers and ditches are some options for the perimeter barriers of the farm.



## 5. Footbaths

Clean water and brushes are needed to clean the boots, and footbaths with disinfection.



## 6. Vehicle Washdown & Dip

Locations: Between each zone.

If a vehicle must enter the **Separation Zone**:  
Disinfect it!

If a vehicle must enter / exit the **Production Zone**, **it must be thoroughly cleaned and disinfected.** This is a high risk move and should be avoided unless absolutely necessary.

## 7. Disinfection of Tools

Set up tool disinfection stations and ensure they are used.

Tools for the field (**Production Zone**) should not mix with those from the **Separation Zone**.

No tools should be taken off the farm!



## 8. Change Boots

Personal footwear should **never** be worn on the farm.

A boot changing area must be set up on the farm **Exclusion Zone**, where workers and visitors must

## 9. Monitor Water Sources

change their personal shoes for farm boots.

## 10. Restrict Vehicle Entry

Where is the farm extracting water from?

Well water and public water sources are less likely to be contaminated than rivers.

In the **Exclusion Zone**, ask yourself the question: is it necessary for this vehicle to enter the farm?