

## Yellow Zone

Corresponds to plants growing within a radius of 5 m around the red zone

1. Delimit the zone with barricade tapes.
2. Prevent people, animals, and vehicles from entering this zone.
3. Permanently monitor the plants for Moko disease.
4. Disinfect tools with 2.6% sodium hypochlorite when moving from plant to plant.
5. Trap and control weevils.
6. Cover healthy bunches with plastic bags.
7. If the infection focus is located on a slope, the radiuses of the red and yellow zones should be increased in the slope's direction.

Disinfecting tools with 2.6% sodium hypochlorite.



Growing French marigold around the banana plantation.

Disinfecting footwear with 2.6% sodium hypochlorite.



## Green Zone

Corresponds to healthy areas

1. Permanently monitor the crop to detect plants with Moko disease.
2. Use healthy, certified planting materials from nurseries registered with the national phytosanitary institution.
3. Disinfect tools, boots, vehicles, and parking sites with 2.6% sodium hypochlorite.
4. Do not plant plantains, bananas, heliconias, solanums, or zingibers in areas with Moko disease.
5. Train and keep workers and administrators.
6. Trap and control weevils.

For more information

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# Managing Moko Disease of Banana in Latin America and the Caribbean



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## Importance

Moko disease of banana is also known as bacterial or vascular wilt of banana, *madura viche*, or *ereke*. It is caused by the phytopathogenic bacterium *Ralstonia solanacearum*. The disease constitutes a major phytosanitary problem in plantain and banana crops, causing production losses, high eradication costs, and plant quarantines.

## Managing the disease

1. Recognize plants infected with Moko disease and train workers and technicians to recognize typical symptoms of the disease.



Wilting and necrosis in plants but note the asymptomatic suckers.



Necrosis in vascular bundles.

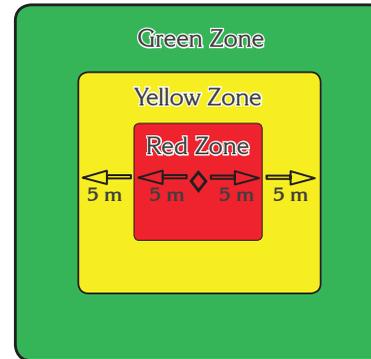


Necrosis and blocking of vascular bundles in the floral rachis.



Necrosis in fruits causes loss of the bunch.

2. Zone the plantain or banana crop to implement disease management practices, as follows:



Eliminating plants from the Red Zone.



Infection focus, showing eradicated plants.

## Red Zone

### Corresponds to the infection focus and neighboring plants

1. Immediately report the appearance of plants infected by Moko disease to the administrator, owner, or phytosanitary control agency.
2. Use wire, isolation mesh, or plastic wrap (saran) to fence off the infection area and healthy plants at 5 m from the central diseased plant.
3. Always enter and leave the infection focus by the same place, stepping into a plastic tray, containing 2.6% sodium hypochlorite, to disinfect footwear.
4. Eradicate infected plants and all the healthy ones around them in a radius of 5 m by injecting a herbicide, recommended and authorized by competent authorities, at three different points of the pseudostem.
5. Cut down infected bunches and pack them into plastic bags for incineration.
6. When the plants have dried out, pull them out and chop them up on site, using a spade, which must be kept permanently disinfected. Do not move the plants away from the plot or throw them into waterways.
7. Prevent people, animals, and vehicles from entering this area.
8. Disinfect boots and tools with 2.6% sodium hypochlorite.
9. Conserve weed cover to protect the area from erosion.
10. Only one person should enter and manage the infection zone; this person should wear clothing and use tools exclusively for the zone.
11. Apply 5–10 kg/m<sup>2</sup> of phosphoric rock to the soil and plant residues.
12. Prepare a mixture of lixivate with flowering French marigold (*Tagetes patula*). Leave the mixture for 2 to 3 days and then apply with a watering can to the eradicated plants and soil.
13. Incorporate composted organic matter into the soil and apply beneficial microorganisms such as *Trichoderma viride* and *Bacillus subtilis*.
14. Do not build drainage ditches.
15. Do not use formol.

Note: The sodium hypochlorite solution should be renewed every 3 or 4 hours to reduce degradation from solar radiation.