Panama disease: Multi-level solutions for a global problem

Panama disease: Multi-level solutions for a global problem is a collaborative project led by Wageningen University & Research Centre and funded by Wageningen University’s Interdisciplinary Research and Education Fund (INREF)\(^1\). The premise of the project is that controlling Fusarium wilt, caused by *Fusarium oxysporum f. sp. cubense* (Foc), requires an approach that integrates new insights, such as on the impact of genetic and agro-ecological diversity on the spread and severity of the disease, with coordinated action and regulation. The project aims to address the management and containment of tropical race 4 (TR4) under different production settings in a range of agro-ecological environments and various governance structures by establishing methods for immediate containment and management of TR4 where it is present, or arrives, and by developing long-term control strategies in banana-producing regions affected by the other races of the *Fusarium* fungus.

The INREF project is one of three research projects on Fusarium wilt that are managed Wageningen University & Research Centre. The other two are: **KNAW-SPIN**, a Scientific Program Indonesia Netherlands (SPIN) funded by the Royal Netherlands Academy of Arts and Sciences, which aims to deliver fundamental knowledge on banana and Foc, and **PromoBanana** (Protect and Modernize Philippine Banana Production), which aims to establish a professional service laboratory to detect and contain rapidly spreading diseases, and to optimize fertilizer management\(^2\).

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Study areas

Project activities take place in the Philippines (where TR4 is present), Ecuador, Colombia, Costa Rica and Tanzania (where other Fusarium wilt races are present) and the Netherlands (for specific laboratory and greenhouse experiments). The study areas represent different types of production systems (smallholder and large-scale commercial plantations) as well as different agro-ecological setting and governance models and histories.

Main research questions

The analytical framework of the research approach considers three main domains that are important drivers of disease outbreaks: biology, environment and human action. The multidisciplinary approach is programmed in a series of projects that address seven main research questions linking the different domains and scale levels, from individual plants to entire regions.

1. What Foc genotypes are present in different banana growing regions, and which banana cultivars are susceptible to these strains?

2. What banana and plantain cultivars are resistant to TR4 and what is the genetic basis for resistance to TR 4 and other Foc strains?

3. What are the dispersal and survival strategies of Foc under various agroecological settings?

4. What is the contribution of diversified germplasm pools and diverse agroecological conditions to lowering Fusarium wilt pressure in mixed cropping systems?

5. What are the effects of abiotic stress or specific farm management strategies on the alleviation of disease pressure in susceptible banana germplasm in areas infested with Race 1 of Foc?

6. What are the enabling and constraining mechanisms for coordination and joint action in managing Fusarium wilt in the diverse banana industry in southern Mindanao?

7. What are the conditions for effective forms of governance that help to control Fusarium wilt at different levels?

Partners by country

The project brings together 25 partners in 10 countries.

Brazil
Embrapa (Empresa Brasileira de Pesquisa Agropecuária)

Colombia
CIB (Cooperación de Investigaciones Biológicas)
UNAL (Universidad Nacional de Colombia)
Augura (National Banana Corporation of Colombia)
Colciencias (National Science Foundation)

Costa Rica
CORBANA (Corporación Bananera Nacional)
Chiquita
Dole
Earth University
Ecuador
AEBE (Association of Ecuadorian Banana Exporters)
Senescyt (National Science Foundation)
ESPOL-CIBE (Escuela Superior Politecnica del Litoral, Centro de Investigaciones Biotecnológicas del Ecuador)

El Salvador
OIRSA (Organismo Internacional Regional de Sanidad Agropecuaria)

Philippines
PBGEA (Philippines Banana Growers and Exporters Association)
Federation of Cooperatives in Mindanao
MBFEA (Mindanao Banana Farmers and Exporters Association)
University of the Philippines-Mindanao

Tanzania
SUA (Sokoine University of Agriculture)

France
CIRAD (Centre de coopération internationale en recherche agronomique pour le développement)

Italy
FAO-World Banana Forum

Netherlands
AgroFair
BLGG (bedrijfslaboratorium voor grond en gewasonderzoek)

References

1. Project information on Panama disease in banana
2. Research projects on Fusarium wilt managed by Wageningen University & Research Centre.

See also on this website

News on the project: A global effort to contain a global threat

External links

Official website of the work on Fusarium wilt of banana conducted by the Wageningen University & Research Centre.

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Page last modified on Tuesday, 16 January 2018 14:42:28 CET by System Administrator.
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