



Horticulture

# An integrated management response to the spread of Fusarium wilt of banana in Southeast Asia

## Overview

**Fusarium wilt Tropical Race 4 of bananas has spread widely throughout Southeast Asia, and is threatening smallholder banana production in countries like Indonesia, the Philippines and more recently, Laos. Confirmed cases have also been reported in north Queensland, Australia's main banana production area.**

Efforts have been made to develop banana production management systems that suppress the disease. This research has found that increased diversity in cropping systems can lead to increased diversity of soil biology, which can suppress the development of Fusarium wilt throughout Southeast Asia.

This project builds on the collective knowledge gained from more than 30 years of Fusarium wilt research and 15 years of soil health research on bananas in Australia. It brings together experience from practical field research linked to the needs of growers and high end analytical techniques, to deliver outcomes to smallholder growers. Experience gained and developed in Australia from working with banana growers and the use of in-field tools will result in practical outcomes in the management of Fusarium wilt.



## KEY FACTS

**ACIAR Project No.** HORT/2018/192

**Duration:** January 2020 to December 2024 (5 years)

**Target areas:** Philippines, Indonesia and Lao PDR

**Budget:** A\$2,800,091

### Project Leader

Anthony Pattison, Queensland Department of Agriculture and Fisheries

### Key partners

- University of Queensland
- Australian Banana Growers Council
- Horticulture Research Centre, Laos
- University of Southeastern Philippines
- Department of Agriculture, Lao PDR
- Provincial Agricultural Office – Region XI, Davao Del Norte, The Philippines
- University Gadjah Mada, Indonesia
- Indonesian Tropical Fruit Research Institute

### ACIAR Research Program Manager

Irene Kernot

## Objective

**The project aims to characterise how management practices shape the microbiome and affect the susceptibility of bananas to Fusarium wilt, by increasing the understanding of host-pathogen-microbiome interactions.**

The objectives are to:

- ◆ Determine the microbiome differences that exist in current banana production systems.
- ◆ Develop farm management options for banana growers to reduce Fusarium wilt.
- ◆ Understand grower networks and the factors that guide decision making processes, and provide decision support tools to manage Fusarium wilt of bananas.

## Expected scientific results

- ◆ Increased skills in soil ecology and microbiome analysis for scientists in banana production systems with “in-country” procedures for measuring the banana microbiome.
- ◆ Increased knowledge for banana grower’s on how farm practices and land use alter the banana microbiome, from “wild bananas” to export production in Southeast Asia.
- ◆ Increased knowledge for banana growers of how farm management practices alter the microbiome and can suppress development of Fusarium wilt.
- ◆ Increased soil health testing skills for researchers and extension personnel using ‘in-country’ tests to account for physical, chemical and biological soil properties, and increased farm advisor knowledge on disease risk with changing farm practices.
- ◆ Development of portable, in-field instruments for microbiome analysis.
- ◆ Increased knowledge on the role played by the microbiome in protecting banana plants from Fusarium wilt.
- ◆ Potential benefits for banana industries globally.

## Expected impact/outcomes

- ◆ Increased capacity to undertake research to determine how microbiomes change under different scenarios of farm management or cropping systems.
- ◆ Grower knowledge that farm management practices such as excessive tillage, agro-chemicals and fertiliser applications in long-standing monocultures, while highly productive, create more vulnerability to soil borne diseases than smallholder systems with diverse cropping and inputs.
- ◆ Suppression of Fusarium wilt and ongoing banana production in Southeast Asia through the adoption of farm management practices.
- ◆ Increased ability of farm advisors to offer soil health risk assessments to facilitate practice change and improve disease suppression.
- ◆ Increased researcher and extension staff knowledge about who influences banana grower’s decision making in banana producing countries in Southeast Asia and Australia, allowing targeted campaigns to change management systems.
- ◆ Increased confidence for growers to produce bananas in the presence of Fusarium wilt with targeted farm management practices to optimise productivity and disease suppression.

