

Cultivated and wild bananas in northern Viet Nam threatened by a devastating fungal disease

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Fusarium infection on bananas in Viet Nam. Credit: Loan Le Thi

Fusarium is one of the most important fungal plant pathogens, affecting the cultivation of a wide range of crops. All over the world, thousands of farmers suffer agricultural losses caused by *Fusarium oxysporum* f. sp. *cubense* (referred to as Foc for short), which directly affects their

income, subsistence, and nourishment.

As a soil-borne fungus, Foc invades the root system, from where it moves into the vascular tissue that gradually deteriorates, until eventually the plant dies. What makes it particularly hard to deal with is that, even 20 years after all infected plants and tissue are removed, spores of it still remain in the soil.

One industry significantly affected by Foc is global banana export, largely dependent on the cultivation of members of the Cavendish subgroup, which are highly susceptible to some of the Foc strains.

For over 100 years, the fungus has affected [banana production](#) worldwide. Researchers predict it will continue spreading intensively in Asia, affecting important banana-producing countries such as China, the Philippines, Pakistan, and Viet Nam.

For Viet Nam, predictions on the impact of Foc for the future are dramatic: an estimated loss in the banana production area of 8% within the next five years, and up to 71% within the next 25 years. In particular, the recent rise of the novel TR4 strain has resulted in worldwide anxiety about the future of the well-known Cavendish banana and many other cultivars. *Fusarium oxysporum* f. sp. *cubense* is, however, not limited to TR4 or other well-known strains, like Race 1 or Race 2; it is a species complex that plant pathologists are yet to fully disentangle.



Fusarium infection in a banana tree, Viet Nam. Credit: Loan Le Thi

In Viet Nam, like in the rest of Asia, Africa, Latin America, and the Caribbean, most [bananas](#) are consumed and traded locally, supporting rural livelihood. This means that any reduction in crop harvest directly affects local people's income and nourishment.

It has thus become necessary to find out what are the [individual species](#) causing the Fusarium wilt among Vietnamese bananas. Only by understanding which species are infecting the cultivated bananas can concrete measures be taken to control the future spreading of the disease

to other regions.

Using DNA analyses and morphological characterization, an international team of researchers from Viet Nam (Plant Resources Center, Vietnam National University of Agriculture), Belgium (Meise Botanic Garden, KU Leuven, Bioversity Leuven, MUCL) and the Netherlands (Naturalis Biodiversity Center) investigated the identity of the *Fusarium* wilt infections. They recently published their joint research in the open-access, peer-reviewed journal MycoKeys.



Fusarium infection in banana fruit, Viet Nam. Credit: Loan Le Thi

The study shows that approximately 3 out of 4 Fusarium infections of the northern Vietnamese bananas are caused by the species *F. tardichlamydosporum*, which can be regarded as the typical Race 1 infections. Interestingly, Foc TR4 is not yet a dominant strain in northern Viet Nam, as the species causing the disease—*F. odoratissimum*—only accounts for 10% of the Fusarium infections. A similar proportion of Fusarium infections is caused by the [species](#) *Fusarium cugenangense*—considered to cause Race 2 infections among bananas.

More importantly, Fusarium wilt was not only found in cultivated bananas: the disease seemed to also affect wild bananas. This finding indicates that wild bananas might function as a sink for Fusarium wilt from where reinfections towards cultivars could take place.

More information: Loan Le Thi et al, Diversity of Fusarium associated banana wilt in northern Viet Nam, *MycoKeys* (2022). [DOI: 10.3897/mycokeys.87.72941](https://doi.org/10.3897/mycokeys.87.72941)

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