

Enemies on the move

Like the banana itself, most of the pests and diseases attacking the crop can trace their origins to Asia. However, in natural forest habitats and diverse traditional farming systems they are often held in check by natural enemies or competing species—or simply do not encounter enough susceptible hosts to launch a real epidemic. Once they turn up in the large-scale commercial plantations of the banana exporters, on the other hand, it is a different story. Both pests and diseases can run rampant, sending researchers and plantation managers scrambling to find solutions. Meanwhile, small-scale farmers often suffer ‘collateral damage’ as new pathogens spread from the commercial plantations into nearby smallholdings, whose owners are poorly equipped to combat the invaders.

The first global epidemic to affect bananas was of fusarium wilt, or Panama disease, the fungal disease responsible for the demise of the dessert banana Gros Michel that had dominated the export trade since its early days. This soil-borne fungus cannot be controlled with chemical pesticides and eventually the tasty and hardy Gros Michel banana had to be replaced by varieties belonging to the Cavendish group, which are resistant

to the fungus. However, a highly virulent strain of fusarium wilt (Tropical Race 4) is presently spreading through Southeast Asia, where it attacks a wide range of varieties, including the Cavendish ones.

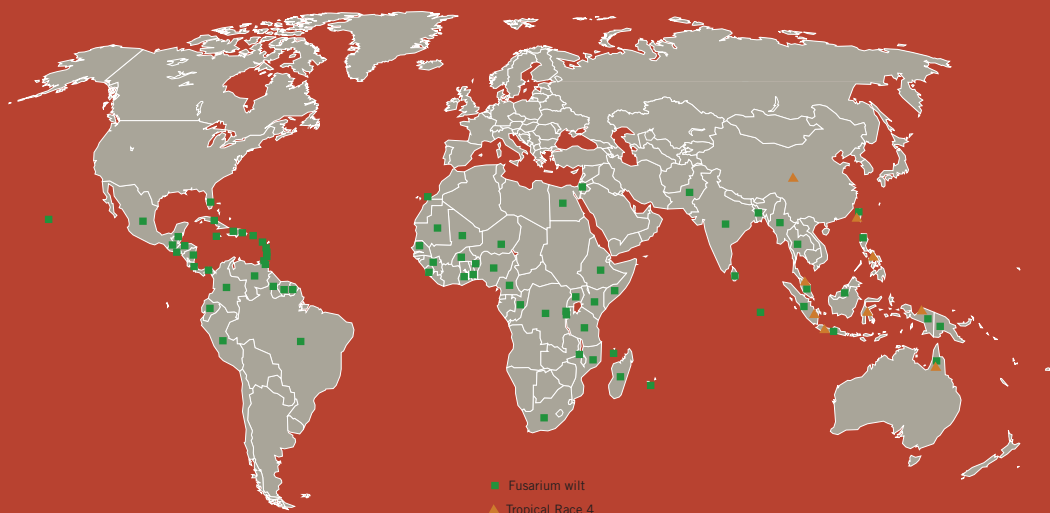
In the Americas, the main threat is, and has been since the 1980s, a fungal disease called black leaf streak, but better known as black Sigatoka. In this case, the disease attacks the leaves and can be controlled by spraying fungicides on the plant. The large commercial plantations of Latin America are sprayed almost weekly to keep this disease in check. Moreover, new virulent isolates capable of overcoming the pesticides frequently appear. Now present throughout the humid tropics, this disease also reduces the productivity of bananas grown by smallholders who have few options for controlling it—the challenge that INIBAP was originally set up to meet. It had been preceded by the closely related Sigatoka disease, better known as yellow Sigatoka, which is also caused by a fungus belonging to the genus *Mycosphaerella*.

Nematodes and weevils damage the root systems and cause toppling of the plants. They too have travelled around the world

The fungus that never goes away



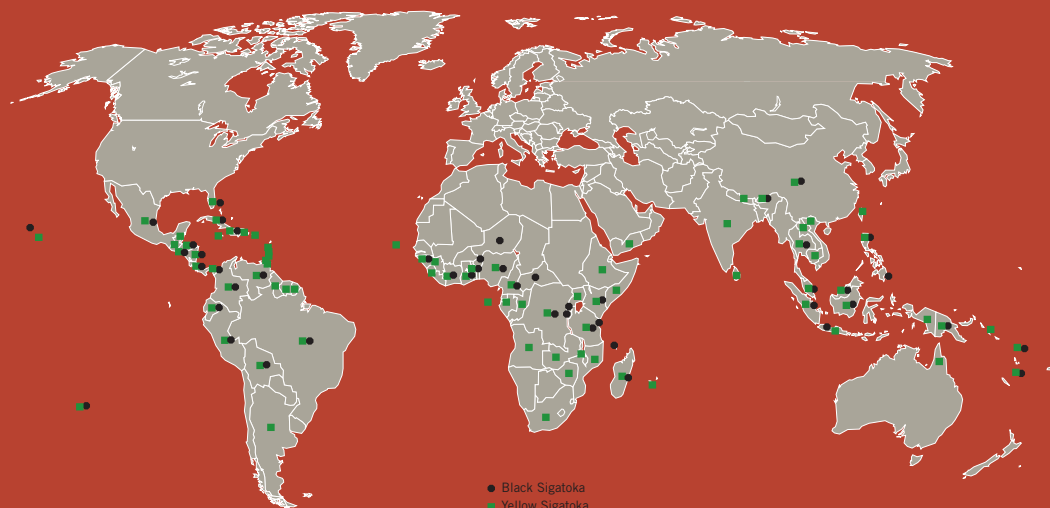
The soil-borne fungus that causes fusarium wilt invades the vascular system of the plant. A. Javellena



The banana's No.1 enemy



By attacking the leaves, the *Mycosphaerella* fungi disrupt photosynthesis, the process that feeds the growing bunch. E. Fouré



with the banana and are, especially in the case of nematodes, sometimes subjected to environmentally damaging (and only partially effective) pesticide treatments. In Africa, nematodes and weevils are regarded as a growing problem, contributing to an ill-defined 'banana decline' syndrome which reduces productivity and the productive life of banana plantings.

In parts of Asia, one of the main threats is the *Banana bunchy top virus*, which stunts plant growth and has driven many farmers to stop growing bananas, for instance in parts of the Philippines. The disease is now on the move in Africa.

Bacterial diseases also threaten bananas. The same pathogen causes 'moko' when spread mainly by infected tools (especially in Latin American plantations) and 'bugtok' when it is spread by insects visiting the flowers of bananas (especially in Asia) while the related, but even more virulent, 'blood disease' is spreading through the area of origin of bananas in Southeast Asia, threatening traditional cultivars and wild relatives alike.

Meanwhile, a new threat has surfaced more recently in East and Central Africa, where a bacterial wilt has long been a chronic problem in the enset crop of Ethiopia, but is now spreading like wild-fire through the staple food and beer bananas of Uganda and its neighbours.

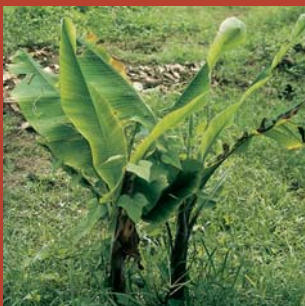
Researchers and banana farmers will have to continue to innovate and share best practices, in order to keep up with these new threats as they arise.

KEEPING TABS ON PESTS AND DISEASES

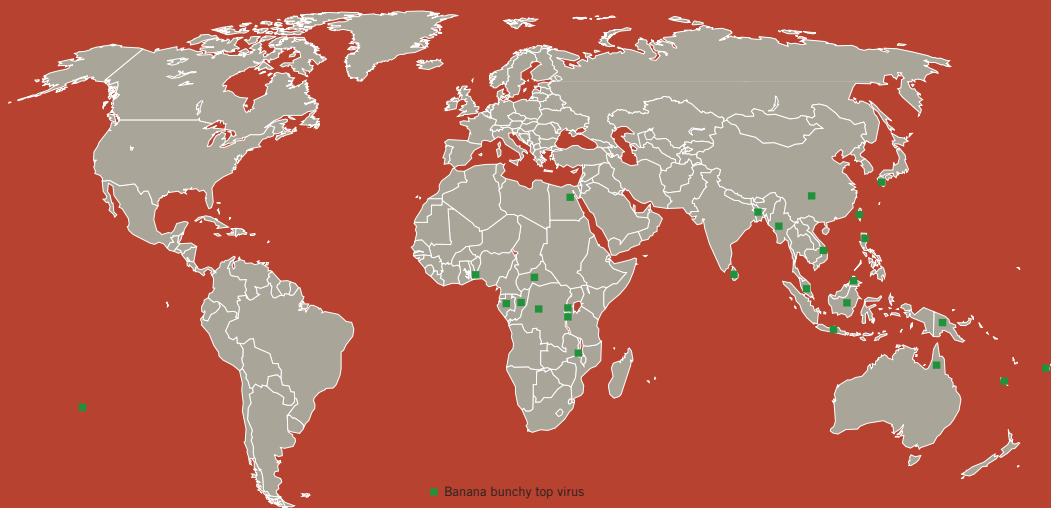
Ever since its creation, INIBAP has not only played an active role in monitoring the spread of the key pathogens, studying their diversity and promoting the use of the most effective diagnostic techniques available, it has also complemented the research effort with information exchange and capacity building. Between 1991 and 2004, for instance, INIBAP organized 21 research coordination workshops and training courses on black Sigatoka alone. Fifty-six articles on the disease have appeared in *InfoMusa* and by the end of 2005 there were 1144 articles on this subject recorded in the *MusaLit* database. Working Groups on the main pest and disease problems within *ProMusa* have played an active role in organizing meetings and promoting other forms of information exchange. And currently the separate groups on Sigatoka, fusarium, nematodes and weevils are being drawn together into a unified Crop Protection Working Group, to promote the search for integrated solutions.



The virus that dwarfs plants



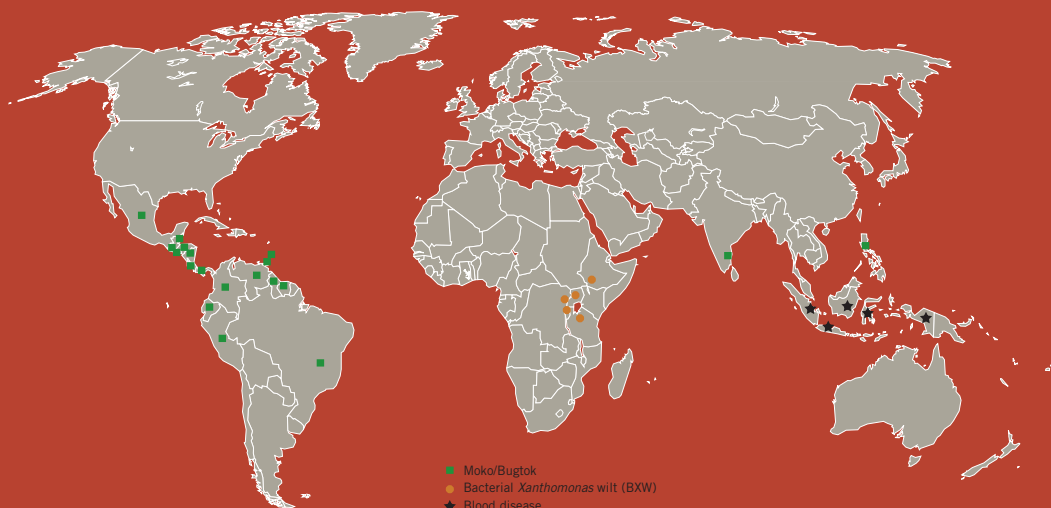
The Banana bunchy top virus stunts growth and was named after the bunchy appearance of infected plants. S. Sharrock



The bacterial trinity



The three pathogenic bacteria can spread through the entire vascular system of the plant and destroy the fruit. G. Blomme



Sources: Crop Protection Compendium - Global Module, 3rd edition. © CAB International, Wallingford, UK, 2001. Diseases of banana, abaca and enset. Edited by D.R. Jones. CAB International, Wallingford, UK, 2000.