



## Battling Black Sigatoka Disease in the banana industry



Banana and plantain production plays an important social, economic and cultural role in the lives of rural communities in many of the countries of the Lesser Antilles and in Guyana and Suriname.

Though the contribution of the banana industry to regional agriculture has dwindled, largely due to competition from lower-cost Latin American banana producers and reduced European Union trade preferences, a significant proportion of the labour force still depends on this industry for its livelihood. Trade continues within the region to Barbados and Trinidad and Tobago, and many islands have entered into specialized arrangements to capture niche markets, particularly in the UK.

Farmers have been encouraged to diversify their cropping systems to include plantain as well and countries have implemented initiatives that seek to bring more value to banana and plantain. The strides that have been made in trying to find a new relevance for the banana and plantain industry in the marketplace face a constant series of challenges - institutional, political and financial.

Currently however, a production and environmental threat is causing the greatest concern for those involved in the industry. Already accustomed to the annual risk of hurricanes, flooding and drought, banana farmers are now grappling with the dreaded Black Sigatoka Disease (BSD). Between 2008 and 2012, the fungus spread rapidly through Guyana and the main banana-producing countries of the Lesser Antilles, affecting farmer livelihoods and the very sustainability of the already-weakened banana and plantain industries of these countries.

### KEY FACTS

- ▶ Sigatoka Disease, one of the most dangerous diseases to bananas and plantains, is caused by a fungus.
- ▶ On infected leaves the fungus continuously produces spores, which are spread from plant to plant and further afield by water and wind.
- ▶ Affected plants bear smaller bunches and underweight fruit which ripens prematurely, making it unsuitable for export.
- ▶ Export has been gravely affected by the disease with up to 100% decline in Guyana and 90% decline in Saint Vincent and the Grenadines.
- ▶ In 2011 five countries requested FAO assistance - Dominica, Saint Lucia, Saint Vincent and the Grenadines, Grenada and Guyana.
- ▶ FAO collaborated with the CARICOM Secretariat, IICA and CARDI to develop several interventions in a coordinated approach.
- ▶ An FAO project - TCP/SLC/3402 - provided each country with a baseline of current practices together with a National Action Plan; a draft proposal for resource mobilization; and intensive technical training in the selection and effective use of fungicides to manage the disease.

There are few diseases as harmful to the Caribbean banana and plantain industry as BSD. Not to be confused with the slightly-less-harmful Yellow Sigatoka Disease (YSD) which has little or no effect on plantains, BSD is a leaf spot disease that affects plantains as severely as it does bananas. By far the most widely-distributed, destructive and important diseases of banana and plantains globally, BSD is considered one of the top ten threats to food security.

Both YSD and BSD infect the leaves, reducing the plant's ability to photosynthesize. The fungus produces spores, which are spread by wind and water not only from plant to plant but also over wide areas. The disease thrives in warm, wet and humid climates. In as little as three hours after being deposited on a leaf, the spore can begin to grow and start spreading the disease.

Affected plants produce smaller bunches and underweight fruit, which ripens prematurely and has a creamy pulp. These fruits are rejected by importers on arrival at their destination resulting in further losses.

## Impact

Black Sigatoka Disease arrived in the Caribbean in 1991 at a time when most countries were already affected by, and were managing, YSD on bananas. The region's warm

climate and high humidity provides the perfect environment in which the spores that cause the disease can multiply and spread.

Economic impact can be grave. The fruit of an infected plant, though not harmful if consumed, is not suitable for export. The cost of protection measures, including the regular application of fungicide treatments, can be prohibitively expensive and add to production costs by 25% or more.

Small farmers and householders, unable to bear this high cost, often abandon their farms. Left untended, these infected plants then pose a further threat to surrounding farms.

Wherever BSD has taken hold in the region, banana and plantain yields have been severely affected. In 2007 St. Vincent and the Grenadines exported 22 657 tonnes of the fruit, valued at EC\$29 128 451. BSD was first discovered there in 2009 and just two short years later, banana export was a mere 1 750 tonnes, a decline of nearly 90%.

In Guyana the situation was even worse. Since its first case of BSD in 2008 the industry has been decimated. The country has registered a 100% decline in the export of plantains within 2-3 years, and in fact has resorted to importing bananas to meet local demand.



The wilted leaves of an affected plant

## Coordinated Support

In November 2011, five countries (Dominica, Grenada, Guyana, Saint Lucia and Saint Vincent and the Grenadines) requested technical assistance from FAO to develop comprehensive national and regional management plans for Black Sigatoka Disease. It was considered critical that mitigation, adaptation and control measures be identified and implemented against BSD in the earliest possible time period.

In an effort to effectively coordinate the delivery of technical assistance requests from the five affected countries and avoid duplication, several regional/international institutions including FAO, the CARICOM Secretariat, the Inter-American Institute for Cooperation on Agriculture (IICA) and Caribbean Agricultural Research and Development Institute (CARDI), worked together to develop a coordinated response.

FAO sought funds for a project under its Technical Cooperation Programme (TCP), with the Ministries of Agriculture, IICA and CARDI as the main partners and small producers in the region as the key beneficiaries.

IICA in collaboration with FAO and CARDI organized a virtual seminar on the management of Black Sigatoka targeted at producers, technicians and policy makers explaining in simple terms how the disease could be managed in a sustainable and cost-effective manner. The seminar provided the fundamentals of BSD integrated management and presented an outlook of the state



A comparison of fruit from a healthy plant (left) and the fruit of an affected plant (right)

of affairs of the banana industry in relation to the challenges created by BSD. The seminar also created a forum for exchanges among participants based on experiences in managing the disease.

It was anticipated that FAO, IICA and CARDI would collectively formulate and deliver a package of technical assistance to the countries on the basis of the Report and other outputs of the TCP Project.

## FAO Project

FAO formulated and implemented the Regional TCP Project titled *Development of Integrated Programmes and Action Plan for Black Sigatoka Management in five countries of the Caribbean (TCP/SLC/3402 (D))*.

An experienced Expert Consultant from Cuba, Dr. Luis Perez-Vicente, was recruited to undertake activities in two missions. Dr. Perez-Vicente spent one week in each of the five beneficiary countries, assessing the current situation and meeting with stakeholders.

One of the first activities undertaken by the FAO Consultant was the production of a draft Technical Manual on the Integrated BSD Management Program, which is based on three basic principles:

1. **improving cropping practices and nutrition to foster speed of banana development and response to the infection;**
2. **elimination of the fungal spores;**
3. **proper timing and application of effective fungicides for the protection of emerging leaves.**

The Manual was finalized during the in-country missions and distributed to all the countries.

FAO also facilitated a Regional Consultation, where country representatives and participants from regional agencies were able to



FAO provided a Cuban Expert Consultant to visit the countries and carry out assessments

provide input into a Caribbean-wide strategy for controlling the disease.

There were several final project outputs:

- ▶ *Detailed manuals which field and laboratory technicians are utilizing to more effectively support national BSD management programmes;*
- ▶ *Current baseline on BSD, together with National Integrated Management Programmes and Action Plans (based on national assessments and developed participatively), submitted to the five countries in October 2012;*
- ▶ *Regional Management Programme and Action Plan developed in collaboration with the five countries and regional partners (CARDI, IICA, CARICOM and OECS Secretariats, CIRAD, Banana Board (Jamaica), Caribbean Farmers Network (CaFAN), Ministry of Agriculture - Trinidad and Tobago) and submitted to the countries and the regional partners in December 2012;*
- ▶ *The Regional Proposal was also shared with the Caribbean Development Bank (CDB) in anticipation of the countries and regional partners seeking additional funding*

*for ongoing and future BSD management activities;*

- ▶ *To support mobilization of funds, six Draft Proposals – five national, one regional – were developed and shared with the countries in December 2012;*
- ▶ *A six-day training workshop (for two participants from each country), carried out in June 2013, is helping countries in appropriate selection and application of fungicides in order to prevent the development of resistant fungus populations and to prolong the effective life of the pesticides currently in use.*

Countries have already seen the benefits of participation in the process. Dominica, Saint Lucia and Saint Vincent and the Grenadines have used the Action Plans to develop specific components/activities under the EU-funded Banana Accompanying Measures (BAM) project. National funds are also being mobilized in each of these countries, specifically to deal with abandoned fields and to support spraying activities.

Saint Lucia has in addition received specific funding from the Taiwanese Government to support BSD management efforts.

In Guyana, BSD management principles from the Action Plan

are being applied for plantain production in farmers' fields and on demonstration farms, where IPM strategies (field sanitation, nutrition, proper pesticide use) are proving to be very successful. Indeed, the expectation of 50% increase in plantain production by the end of 2013 had already been realized by June 2013. Based on current projections, plantain exports should be resumed within 2-3 years.

## The way forward

Black Sigatoka Disease is seriously affecting farmer livelihoods in the Windward island countries and Guyana and is threatening the already weak sustainability of banana and plantain industries of these countries.

Over the past few years, region-wide coordination for managing problems such as Black Sigatoka Disease has been strongly urged at the meetings of the Council for Trade and Economic Development (COTED).

Given its pervasiveness in several countries, BSD is best managed through a regional approach, bringing together key stakeholders (farmers, technicians, marketers and other industry players), Ministries of Agriculture and regional/international organizations. This would require strong regional coordination, enabling the sharing of benefits and problems among the participating countries.

Along the same vein, it is essential that all affected countries use common procedures to collect data (related to disease incidence, climate, fungicide effectiveness etc.) and record this in a regional, publicly-shared database, leading to the creation of a regional public good. It is also necessary to harmonize protocols, specifically in the following areas:

- ▶ *establishment of field and laboratory experiments (germplasm trials, new management practices, new*

*agricultural inputs, testing for resistance etc.);*

- ▶ *building of capacity and leadership;*
- ▶ *regional protocols for the introduction of germplasm;*
- ▶ *generation of public awareness and support for control measures.*

Several of these actions are being addressed under ongoing or imminent programmes/projects. Increased resource mobilization is also needed.

National planners and policy makers should be fully involved to promote the changes needed to ensure a holistic approach and the long-term sustainability of the banana and plantain industry in the Caribbean. FAO will continue to work closely with all its partners towards fostering a region-wide, collaborative approach in the fight against BSD in the Caribbean.

## Additional resources

Perez-Vicente, Luis. 2012. *Technical Manual: A Holistic Integrated Management Approach to Control Black Sigatoka Disease of Banana caused by Mycosphaerella fijiensis*. Food and Agriculture Organization of the United Nations, Subregional Office for the Caribbean (FAO-SLC), Barbados. Available for download at <http://j.mp/1aGV7Aj>

Perez-Vicente, Luis. 2013. *Manual on Fungicides and Fungicide Resistance Monitoring in Banana*. Food and Agriculture Organization of the United Nations, Subregional Office for the Caribbean (FAO-SLC), Barbados. Available for download at <http://j.mp/132tj7Y>

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