



Subregional Office for the Caribbean ISSUE BRIEF

Managing Huanglongbing/Citrus Greening Disease in the Caribbean

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KEY FACTS

- ▶ Citrus Huanglongbing (HLB) or Citrus Greening Disease, caused by a bacterium (*Candidatus Liberibacter asiaticus*).
- ▶ HLB is one of the most serious and devastating of all the diseases affecting citrus. Globally, HLB has destroyed more than 100 million trees.
- ▶ In the Caribbean, Jamaica and Belize have been severely affected by the disease. FAO projects were implemented in both countries in 2011-2013 and have had some success in salvaging trees and increasing yields.
- ▶ **A regional project for Latin America and the Caribbean was launched in November 2012 and is establishing:**
 - Standard Operating Procedures to communicate risks, surveillance, diagnostics and management
 - a Regional Information and Communication System
 - networking mechanisms among subregional plant health agencies
 - a proposal for a regional programme on plant health and management of emerging cross-border diseases
 - a panel of experts

Transboundary movement of plant diseases has always existed, presenting a constant threat and, in some instances, causing devastation to entire industries. But in an increasingly globalized world with greater and more rapid flow of people and goods across borders, prevention of transboundary movement of diseases has become far more difficult and requires the coordinated intervention of all stakeholders on national, regional and even international levels.

One industry of great importance to several Latin American and Caribbean countries is currently facing a potentially devastating disease. The regional citrus industry provides products such as fresh limes, lemons, oranges, tangerines, grapefruit and other citrus as well concentrates and juices, contributing both to domestic food security as well as to foreign exchange earning via exports. The emerging threat comes in the form of Citrus Huanglongbing (HLB) or Citrus Greening Disease, caused by a bacterium (*Candidatus Liberibacter asiaticus*).

HLB is one of the most serious and devastating of all the diseases affecting citrus. It is estimated that globally HLB has destroyed more than 100 million trees and has spread to several continents including the Americas. Its high socio-economic impact is linked to the fact that all species of citrus are affected and there is no known cure.

The disease is spread by the Asian citrus psyllid (ACP), *Diaphorina citri* Kuwayama, a tiny insect about 4 mm long, which feeds on the leaves of citrus trees. When the ACP feeds on an infected leaf for about 30 minutes, it can pick up the bacterium,

carrying it for many days and transferring it when feeding on an uninfected tree. This bacterium blocks the phloem and prevents the flow of nutrients, causing loss of leaves, deformation of fruits which can become bitter and hard, early fruit drop and the eventual death of the tree. Grafting infected plant tissue onto a healthy plant can also spread the disease.

Management of the disease is compounded by the ubiquitous presence of citrus trees across the region, not only on commercial orchards, but also in backyards as a household fruit crop and as a particularly favoured ornamental plant, *Murraya paniculata* or orange jasmine (a host for both the ACP and HLB), wherein subtle changes in the health of the trees may go unnoticed. Symptoms may not begin to show until a year or more after the tree has been infected, by which time several or all neighbouring trees may have become infected.

Impact

Fruits affected by HLB lose their commercial value. Along with the direct economic impact of losses in yield, volume and value of production, management of the disease is very costly. Estimates from Brazil, where HLB was first discovered in 2004, place costs at approximately US\$403 per hectare, too high for small and medium-sized producers in the Caribbean to bear.

It takes 6-8 years for citrus trees to reach peak production levels. The disease tends to target younger trees, making it difficult for growers to quickly replace plants that have been lost. In many cases, farmers switch to the cultivation of other crops in order to salvage their livelihoods, rather than engage in the costly and time consuming programme of management required to revive their orchards. The reduction and loss in citrus production directly affects employment in the field and along the entire value chain. Although to date there is no data on social impact, preliminary estimates in the case of Mexico indicate that, in the absence of preventative action, direct employment would be reduced by 14% within 3 years and 39% within 5 years of HLB taking hold.

Management of the disease may also bring with it a detrimental effect on the environment associated with the disposal and burning of millions of trees. Alternately, the intensive use of pesticides can cause pollution of soils, ground water resources and air, and affect biodiversity.

National projects

Jamaica and Belize are two countries of the Caribbean where the citrus industry is socially and economically important and where HLB was discovered in 2009. National programmes for the management of HLB were initiated

in both countries and subsequently, requests were made to FAO for technical assistance to fill critical gaps.

Jamaica

The citrus industry is of vital importance to Jamaica's economy in terms of employment, exports and local production. The total value of the industry is estimated at US\$40 million, generating employment for approximately 19 500 persons at the industry level (including on-farm operations, processing, packaging plant, wholesale and retail trades). Citrus yields have fluctuated over the last several years largely due to the effect of Citrus Tristeza Virus (CTV), adverse weather conditions, poor management practices, an ageing farming community and declining acreages. With the industry in the midst of the steady march to recovery following the mass replanting of trees between 5–15 years ago, the encroachment of HLB was a source of grave concern.

The TCP project, *TCP/JAM/3302 – Assistance to manage Citrus Greening in Jamaica*, was approved in October 2011 and implemented between January 2011 and January 2013 in conjunction with the Ministry of Agriculture and Fisheries (MOAF), and in close collaboration with the Jamaica Citrus Protection Agency (a national body with the mandate to regulate citrus nurseries in the country), and the Rural Agricultural Development Authority (RADA). The project resulted in:

- ▶ *an assessment of available HLB management options and methods suited to the Jamaican context and the determination of appropriate implementation mechanisms;*
- ▶ *development and implementation of an Area-wide Integrated Management Strategy (AIMS), to facilitate a cooperative approach to HLB management by geographically connected farmers;*
- ▶ *Training of Trainers (ToT) in HLB management and record keeping.*



Area-wide management strategies for the psyllid and HLB were implemented and reviewed

A total of 97 persons were trained under this component - 57 Extension Officers of RADA, 27 farmer leaders/key farmers, one nursery operator and one Plant Quarantine Officer;

- ▶ *improved national capability for diagnosis and detection of HLB, through structural renovation and equipping of laboratory facilities and training of eight technicians in disease management. Participants were drawn from the Scientific Research Council (SRC), MOAF's Research and Development Division, the Jamaica Citrus Protection Agency (JCPA) and Trade Winds Ltd (the largest private citrus producer and processor);*

- ▶ *increased capacity to produce disease-free planting material through the establishment of a screen house for bud-wood production and an insect-proof demonstration nursery; training of 20 nursery operators in new nursery management protocols; training of 11 technicians and officers to introduce new shoot-tip/micro-grafting techniques for the elimination of graft-transmissible pathogens of citrus;*
- ▶ *development of a public awareness campaign including support to produce training materials, information pamphlets and posters on symptomology and management, as well as a training video on HLB and its management.*

At a project review held in January 2013, several farmers indicated that by following the practices highlighted throughout the project, they were rewarded with higher quantity yields and better quality fruit. A detailed sustainability plan for management of the disease (prepared in collaboration with FAO and partner organizations) was presented by the MOAF and endorsed by all participating stakeholders, who gave their full commitment to help build on the project gains.

Free of ACP and/or HLB	ACP is present	HLB is present
<ul style="list-style-type: none"> ▶ Launch public awareness and surveillance campaigns. ▶ Train technical staff in the identification of ACP and HLB. ▶ Limit / eliminate importation of citrus plants. ▶ Develop a Rapid Response Plan, in the event that ACP (and HLB) are detected. 	<ul style="list-style-type: none"> ▶ Develop a National Action Plan for ACP management to include: <ul style="list-style-type: none"> – surveys / surveillance activities to detect presence / spread of ACP (and HLB) – introduction of biological control - the parasitoid <i>Tamarixia radiata</i> (if not already present) 	<ul style="list-style-type: none"> ▶ Reduce the vector psyllid through the introduction of biological control to slow the rate of spread of HLB. ▶ Lengthen the life and productivity of the trees through improved nutrition and weed / grove management.

Differentiated management approaches based on disease status

Belize

The citrus industry is very important to the economy of Belize in terms of employment, livelihood of rural communities, exports and local production. It is estimated that the total value of the industry to the Belize economy is approximately US\$50 million. Employment at the industry level is estimated at 10 000 persons. Like Jamaica, Belize went through the process of replanting citrus groves to combat CTV in the mid-2000s.

The project, *TCP/BZE/3402 - Assistance to manage Huanglongbing in Belize*, was approved in February 2012 and its implementation is well underway. It has achieved several positive outcomes including a better protected citrus industry through:

- ▶ *establishment of an Area-wide Management Programme including support for a biological control programme (using parasitoids and indigenous entomopathogens) as well as the review of nursery protocols and training for nursery owners;*
- ▶ *strengthening of HLB diagnostic capacity of the government-appointed laboratory through provision of key equipment*

and materials for providing HLB testing service to farmers and growers;

- ▶ *identification of crop diversification opportunities for former citrus growers and a review of institutional support required for displaced farmers;*
- ▶ *recommendations for sustainable funding mechanisms for nursery certification and HLB control programmes;*
- ▶ *improvement of public awareness and grower education, including posters and brochures for farmers and three training videos.*

A regional approach

Early in 2011, FAO developed a project, *TCP/RLA/3304 - Building regional and national capacities to address the sustainable and efficient management of Huanglongbing*, as a starting point to determine the status of HLB in the region. This project has subsequently informed a joint action strategy to allow countries to reduce and prevent the spread of the disease.

Under the project, a Regional Consultation on HLB was held in

June 2011, which reported that the disease was found in 10 countries in the region (Belize, Brazil, Costa Rica, Cuba, Guatemala, Honduras, Jamaica, Mexico, Nicaragua and the Dominican Republic), while the ACP was found in 19 countries. Thus, even though countries could be classified as “disease-free”, they still provided sources of potential infection for neighbouring territories. As governments prepared to face this situation a number of weaknesses were noted, namely

- ▶ *insufficient technical and institutional capacities for disease control;*
- ▶ *absence of a system for risk communication;*
- ▶ *lack of harmonized standards;*
- ▶ *lack of knowledge and application of the most appropriate management measures;*
- ▶ *absence of a specific institutional structure with the necessary financial resources to manage the disease.*

FAO was given the mandate to provide the necessary coordination for the management of Citrus Greening Disease at the hemispheric level. Subsequently a project, *TCP/RLA/3401 - Technical Assistance for the regional management of Huanglongbing (HLB) in Latin America and the Caribbean*, managed from the Regional Office in Chile, commenced in November 2012, with the endorsement of regional organizations: CARICOM (Caribbean Community), COSAVE (South America),

CAN (Andean countries) and OIRSA (Central America).

The regional strategy revolves around the implementation of a series of integrated, synchronized and coordinated measures and actions aimed at reducing the burden of inoculum sources in an effective and timely fashion, reducing the infective psyllid population in affected geographic areas, and reducing the risk of infestation by external psyllid populations migrating from an infested geographic area to an uninfested area. Complementary strategic components were identified including:

- ▶ *Standard Operating Procedures (SOPs) to communicate risks, surveillance, diagnostics and management, based on Pest Risk Assessment (PRA), as well as a proposal for PRA specific to HLB;*
- ▶ *Regional Information and Communication System for early warning, surveillance, diagnosis of technical capacities and proposals for national/ sub-regional action plans;*
- ▶ *establishment of a Panel of regional HLB experts;*
- ▶ *networking mechanisms among subregional Plant Health Agencies with regard to HLB and establishment of a permanent Consultative Committee on HLB*
- ▶ *a proposal for a regional program on plant health and management of emerging cross-border diseases based on the experience of HLB.*

The way forward

Next steps in the efforts to manage this disease include

- ▶ *ensuring the prevention management knowledge gained is widely disseminated and practised;*
- ▶ *finalizing the development of a regional information and communication platform;*
- ▶ *concluding and promoting the Standard Operating Procedures agreed by a panel of HLB experts;*
- ▶ *responding to requests for specific assistance from Caribbean countries (Antigua and Barbuda, Barbados, Saint Kitts and Nevis, Saint Vincent and the Grenadines and the Bahamas) to develop an appropriate national Action Plans.*

The trees currently affected by HLB will succumb over the next few years. Unavoidably, some farmers will opt out of citrus production. It is therefore important to guide them towards alternative livelihood options.

For those farmers who remain, the continued viability of the citrus industry will depend on extensive replanting of trees using certified disease-free planting material. Concurrently psyllid populations must be effectively managed.



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