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FAO SUPPORT TO THE MANAGEMENT OF CITRUS GREENING DISEASE IN JAMAICA

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ABSTRACT: The citrus industry is very important to Jamaica's economy in terms of employment, exports and local consumption, with an estimated value of J\$4 billion. Local citrus production has declined significantly over the last six years spurred by the effects of the Citrus tristeza virus (CTV), adverse weather conditions, poor management, ageing farmers and declining acreages, raising concerns of the negative impact of the decline on food security and the local economy. Since October 2009, the industry has faced a new threat when the presence of the Citrus Huanglongbing (HLB) or Greening Disease was confirmed. An island-wide survey in February 2010 revealed that HLB was present in all major citrus producing areas with the exception of the parish of Manchester. Further spread of the pathogen (*Liberibacter asiaticus*) is expected given the island wide distribution and abundance of the vector, the citrus psyllid, *Diaphorina citri* (Kuwayama). In addition, *Murraya paniculata* (L) Jack, a known host plant for the psyllid and recently reported a host for the HLB, is also extensively planted in the Jamaican landscape. The Government of Jamaica approached the FAO for technical support, as a result of which the two-year Project TCP/JAM/3302 "Assistance to manage Citrus Greening in Jamaica" was approved in October 2010. The Project aims to support the national effort to effectively manage the HLB, particularly in the small farms, through coordinated protection, mitigation and resuscitation strategies, resulting in sustained productivity of orchards. This is underpinned by a multi-pronged approach with five diverse components: Development of (1) an area-wide strategy for HLB management, (2) physical infrastructure, (3) capacity to produce disease-free nursery material, (4) diagnostic and detection capability, and (5) a public education and awareness campaign. Activities under project began in November 2010 and progress to date is presented in this paper. HLB has serious implications for the citrus industry in the Caribbean. The management strategies developed under the FAO Project in Jamaica will provide a model that other countries in the region can follow in the event that their citrus becomes infected by the HLB.

Keywords: Citrus Greening, Huanglongbing, Jamaica, FAO Technical Support

INTRODUCTION

The citrus industry is very important to Jamaica's economy in terms of employment, exports and local consumption, with an estimated total value of approximately J\$4 billion. Ninety-six percent (96%) of total citrus production is utilized locally for the fresh fruit market or in processing, while 4% of citrus is exported. The citrus industry is also very important to Jamaica's rural economy as it is an integrated industry from on-farm production to distribution of processed products. On-farm employment is estimated at 6,000, out of which are self-employed small farmers. Other aspects of the sector (including on-farm operations, processing, packaging plant, wholesale and retail trades) account for about 19,500 jobs in rural areas. Total land area under citrus production is estimated at 9,000 hectares (ha), with about 5,000 small farmers, 260

medium farmers and 11 large farmers comprising the industry. The varieties grown are sweet-orange, tangelo, tangerine, grapefruit, ortanique and lime.

Local citrus production has declined in recent years, from 140,196 tonnes in 2003 to 122,291 tonnes in 2008, the contributing factors being the Citrus Tristeza Virus (CTV), ageing farmers, poor management practices, declining acreages and adverse weather conditions. In October 2009, the dreaded Citrus huanglongbing (HLB) / greening disease, caused by the pathogen *Liberibacter asiaticus*, was confirmed in commercial groves in the parish of St. Catherine and subsequently throughout the island. This rapid spread was expected given the wide distribution and abundance of the vector, the citrus psyllid, *Diaphorina citri* (Kuwayama), and extensive plantings of *Murraya paniculata* (L) Jack, a known host plant of both the psyllid and the HLB.

This was not the first time that the citrus industry in Jamaica faced a serious pest problem. In the 1990s, CTV became a major threat to the industry with the introduction of the aphid vector. A technical assistance project, supported by the Food and Agriculture Organization of the United Nations (FAO) resulted in the establishment of a mandatory citrus certification programme (Vapnek, 2009). In 2000, the Government of Jamaica, with assistance from the Interamerican Development Bank (IDB), provided loans to farmers under a citrus replanting programme. Still recovering from the impact of CTV, the citrus industry is now faced with the most debilitating of citrus diseases, which could adversely affect the rural communities in which the field and processing facilities are located.

In order to mitigate the impact of the disease on an already-ailing industry, it was considered imperative that actions be taken urgently to implement a cost-effective and appropriate area-wide management (AWM) programme. The Government of Jamaica was challenged by limited technical and human resource capacity with the necessary experience to design and implement an AWM strategy for citrus greening. In light of these constraints, technical assistance was requested from the FAO to develop the AWM strategy.

The two-year Project TCP/JAM/3302 “*Assistance to manage Citrus Greening in Jamaica*” was approved in October 2010. The Project aimed to support the national effort to effectively manage the HLB, particularly in the small farms, through coordinated protection, mitigation and resuscitation strategies, resulting in sustained productivity of orchards. This was underpinned by a multi-pronged approach with five diverse components: Development of (1) an AWM strategy for HLB, (2) physical infrastructure, (3) capacity to produce disease-free nursery material, (4) diagnostic and detection capability and (5) a public education and awareness campaign.

Activities under the project began in November 2010 with the development of a work plan. This paper provides an overview of the project management structure and progress on each of the five components to the end of June 2011, followed by a regional perspective on the HLB problem.

Project Management and Implementation

The Ministry of Agriculture and Fisheries (MoAF), the executing agency, appointed a Project Coordinator (PC) from within the MoAF to coordinate the activities. Support and guidance for the management of the project is provided by a Project Steering Committee (PSC), comprising of the major implementation partners. The PSC is chaired by the Chief Technical Officer, MoAF, with representation from the following agencies: FAO, Division of Planning, Policy & Development (MoAF), Director and Head R&D Division (MoAF), Senior Research Director (MoAF), Plant Quarantine (MoAF), Jamaica Citrus Protection Agency (JCPA), Rural Agricultural Development Authority (RADA), and Jamaica Citrus Growers' Association (CGA). The PSC meets every three months.

The Technical Working Group (TWG), chaired by the PC, undertakes planning and implementation of activities and reports to the PSC. It is comprised of technical staff from the Plant Protection Research Unit (MoAF), the Plant Quarantine Branch (MoAF) and JCPA. The TWG meets 2-4 times a month and liaises with other groups involved in implementation such as CGA and RADA extension.

Consultancies in three areas are being provided by regional / international experts for developing these critical components: Area-wide strategy, Nursery Production and Shoot-tip grafting. A National consultant has also been contracted to provide support to the international / regional consultants.

In addition, FAO entered into a Letter of Agreement with the University of the West Indies (UWI), Mona Campus, to plan and implement a training programme in diagnosis and detection of HLB

The FAO Representation office in Jamaica provides administrative and logistical support to the project, whereas the Plant Production and Protection Officer, based at the FAO Sub-Regional Office in Barbados, provides backstopping as the Lead Technical Officer for the project.

Component 1: Area-wide Strategy for HLB Management

The development of the AWM strategy for HLB was considered to be one of the key components of the project. Two expert Plant Protection consultants were contracted to develop the AWM Strategy based on the following Terms of Reference:

- Review citri-culture, disease and vector distribution in Jamaica
- Assess current management options available and their suitability in the Jamaican context
- Determine implementation mechanisms for the options identified as being feasible
- Undertake stakeholder consultations: formulation & review of strategy / management programme.

The consultants undertook the first of three planned Missions for three weeks during May-June 2011. Based on field visits and consultations with stakeholders of the citrus industry and following a detailed assessment of the situation, the consultants made the following recommendations:

- a. The HLB management had to include aspects of sanitation, i.e. propagation and availability of disease-free material for replanting. In tandem with a revision of nursery

regulations, existing nurseries needed to be modified and the prototype facilities for plant propagation (including bud wood) and testing provided for under the project needed to be established as soon as possible. The certification process needed to be visible, transparent and amenable to compliance. Investment by the nursery producers was therefore needed in order to establish adequately-designed screen-houses, preferably outside the production areas. These would produce certified nursery plants that would be used for commercial replanting.

- b. It was necessary to ensure effective psyllid control to reduce the spread of the HLB. This strategy would involve using chemical control in commercial and backyard plantings and biological control for inaccessible areas / hedges of *Murraya* in residential areas close to commercial citrus. Simultaneous, improved production practices were necessary, specifically the use of foliar nutrients to relieve tree stress, improve growth/yield and prolong the productive life of the trees.
- c. Critical to the success of implementation of the AWM strategy was the establishment of regional management clusters. There was a need for revisiting stakeholder roles and improved collaboration among the various agencies involved in the programme. There was also a suggestion for a restructuring of the Citrus Growers' Association (CGA) to facilitate market redesign. And last but not least, an island-wide awareness programme on the AWM strategy to foster public buy-in.

Component 2: Infrastructure

Support is being provided under the project to develop infrastructure that is necessary to meet the urgent need of providing clean planting material to farmers. In this regard, four activities are being implemented:

- Design and erect structures for bud wood & nursery protection to demonstrate production of quality nursery material
- Establish a screen house for bud wood production
- Establish insect proof demonstration / model nursery
- Train nursery operators in nursery management protocols

Work is ongoing on the design for a demonstration screen house for bud wood production as well as for the insect proof demonstration / model nursery. A consultant has been identified to undertake training in the production and multiplication of bud wood material and will be contracted in due course (pending construction of structures).

Component 3. Production of Disease-Free Materials

The production of disease-free materials for distribution to farmers is another key component of the project. Towards this end, two activities are being undertaken:

- Upgrade of the Plant Protection Laboratory to support the production of pathogen-free bud-wood material for distribution to nursery producers
- Train five Officers from public and private sector institutions [Scientific Research Council, Research & Development Division (MAAF), Trade Winds Ltd] in micro-grafting technique

The process has begun to procure materials and equipment for the upgrade of the Plant Protection Laboratory that will support production of pathogen-free bud-wood material. The training of five Technical Officers in micro-grafting technique is to be undertaken once the laboratory upgrade has been completed. As a result, the hiring of the consultant to undertake training will be contracted in due course.

Component 4. Diagnostic and Detection Capability

Since the diagnosis of HLB by a private laboratory in Jamaica is expensive, the project aims to develop national capacity through the training of six officers in HLB diagnostic and detection capability, with emphasis on molecular techniques. In addition, the project provides for an upgrade of the Plant Protection Laboratory, including installation of the necessary equipment to enable HLB diagnostic support for the citrus industry.

In this regard, the University of the West Indies (Mona Campus) has been contracted to:

- Design an appropriate program and train six officers
- Prepare a Manual on Techniques for HLB Detection & Diagnosis (based on training)
- Provide technical assistance in upgrade of MOAF laboratory to carry out PCR diagnostic work
- Conduct three separate assessments to ensure / verify that persons trained carry out tests accurately

The civil works for upgrade Plant Protection Laboratory (to support HLB diagnosis / detection) is currently underway.

Component 5. Public Awareness and Education Campaign

The TWG is in the process of collating a number of training materials into a Manual. Support from the Information Unit of the MoAF is being sought in the production information pamphlets and posters on symptomology as well as a training video on HLB and its management.

CONCLUSIONS

Despite a number of challenges, mainly the timely implementation of a complex work plan, the project is more or less on schedule. It is anticipated that most of the objectives and outcomes will be realized by the time the project comes to an end.

Regional Perspective

HLB is the most destructive disease of citrus; therefore, it has serious implications for the citrus industry of the Western Hemisphere. The vector *D. citri* is native of Asia and was introduced in Brazil in the 1940s. However HLB was only detected in Brazil in 2004. The psyllid was reported from Florida and Guadeloupe in 1998 and HLB some years later. The psyllid and HLB are now widespread, occurring throughout Central America and in several countries of the Caribbean (Belize, the Bahamas, Cuba, Dominican Republic, Jamaica and Puerto Rico (Halbert and Núñez, 2004; Lopes, 2011). HLB has caused economic losses of the tune of millions of dollars around the world. In Brazil alone an estimated 10 million infected trees have been eliminated. In Mexico, the disease has been detected in 39% of the citrus producing states.

A hemispheric consultation was held at FAO's Regional Centre for Latin America and the Caribbean (RLC) from 20-23 Jun 2011. The objective of the consultation was to review the status of the disease, analyze case studies on its management and most importantly to generate a joint action plan to address this serious threat to citrus. The consultation brought together researchers, plant protection authorities and representatives of the citrus industry from throughout the region. A number of the infested countries —Brazil, Mexico and USA—shared experiences with countries of Central / South America and the Caribbean (Cuba, Dominican Republic, Grenada, Guadeloupe, Jamaica, St. Lucia and Trinidad & Tobago). Among the outcomes of the consultations is a Regional TCP for Central America that is set to begin shortly. The Caribbean countries present at the consultation recommended that surveys should be undertaken in those countries that have yet not reported the psyllid and HLB to determine status so that an early detection / response could be launched accordingly. The consultation also urged collaboration among countries in combating HLB and in particular continued information-sharing and networking. A major outcome of the consultation was that FAO was given the responsibility for developing a hemispheric strategy, and a regional TCP project is to be used for providing the necessary technical support.

Citrus is an important crop in all the countries of the Caribbean that would be negatively impacted if the psyllid and HLB are introduced. At this time, the major citrus producing countries (Jamaica, Belize, and Dominican Republic) are seriously affected by HLB. The status of both the psyllid and HLB in the countries of the Eastern Caribbean, as well as Barbados, Guyana, Suriname and Trinidad and Tobago is not known. It is necessary to determine if the psyllid and HLB is present in these countries so that the necessary measures could be put in place to manage both. It is anticipated that the management strategies developed under TCP/JM/3302 will provide a model that other countries in the region can follow in the event that their citrus becomes infected by the HLB.

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