

1.2 Current HLB situation and Citrus producer's perspective in South America

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HLB current situation

Brazil is the only country in South America, where HLB has been detected. The disease is present in the states of São Paulo, Minas Gerais and Paraná (fig. 1).

Fig.1. South America – Brazil – States of Paraná, São Paulo, Minas Gerais



The presence of HLB in Brazil was first confirmed in July 2004, in the region of Araraquara, State of São Paulo. At that time, 46 municipalities were found to have symptomatic trees.

The disease is caused by the bacteria *Candidatus Liberibacter asiaticus* and *Candidatus Liberibacter americanus* and it has been proved that the Asiatic psyllid (*Diaphorina citri*) is the vector of both Ca. L. asiaticus and Ca. L. americanus.

The first survey was done by Fundecitrus in October 2004 which confirmed the presence of HLB in 98 municipalities in the State of São Paulo, with 3.4% of the blocks affected. At that time, HLB was restricted to the center and south of the state and also found in one municipality in the State of Minas Gerais.

A second survey for HLB in September 2007 confirmed the disease in 12.9% of the blocks, and that it was still restricted to the center (19.28%) and south (18.15%) of Sao Paulo State.

The third and latest survey in April 2008 revealed 18.57% of the blocks with HLB present in at least one symptomatic tree and the disease, at this point, had spread to all citrus production regions of the state. Because this survey was done without using platforms, it was expected that the level of infection could be twice as much. In the center of the state, where the disease was first found, nearly 100% of the blocks were affected with HLB.

Spatial data analysis

Using *Kriging* estimation, a geostatistical analysis was done on the third survey data to estimate the exposure of the groves to HLB in the citrus production regions of the state. It was found that 79.2 million trees (41% of the total state citrus trees) are located in municipalities which have at least 30% of the blocks affected with HLB. Those trees, therefore, are highly exposed to the disease and considered to be at high risk of infection in the short term.

Fig.2. Estimated HLB exposure in citrus production regions of São Paulo

Region	Trees (million trees)	% Blocks with HLB *	
		<30%	≥30%
Center	65.895	40%	60%
South	71.576	45%	55%
North	40.438	100%	0%
Northwest	14.504	100%	0%
Total	192.413	113.227	79.187
Trees		59%	41%

* Municipalities average % of block with HLB

The center of the state has the highest density of citrus groves and 26.7% of the citrus blocks infected with HLB. This situation leads to faster spread of HLB than in any other citrus production area. Therefore, the proximity of the groves and the level of infection are important factors that should influence the producer's behavior and attitude in relation to HLB control measures.

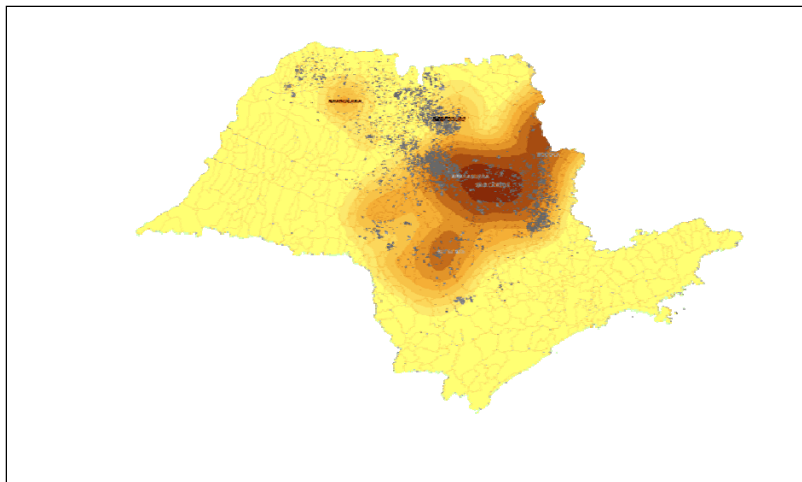


Fig.3. Kriging estimation of HLB spread in Sao Paulo State – Fundecitrus's Oct 2008 - survey data

Growers' Strategies

The main factors that affect the grower's strategies for control of HLB are: the grove location, the age and size of the grove, technology level, access to information and the costs of production.

Although the majority of the growers have their own scouting crew, there are just a few growers performing exclusive and routine HLB inspections. Also, other practices such as use of platforms, inspection training programs and prompt elimination of symptomatic trees are adopted by only a few growers and large companies. The control programs for psyllids are also deficient in many instances and the average grower is still far behind in use of the best practices and precautionary measures. Contributing to this lack of implementation is the additional operation costs of HLB management which averages about US\$560/hectare, including pesticides (55%), labor (23%) and machinery (22%).

Legislation and Official Support

In March 2005, the Brazilian Ministry of Agriculture published a Normative Instruction mandating the elimination of all citrus plants showing HLB symptoms as well as *Murraya paniculata*. Since May 2005, the Vegetal Defense Coordination of Agriculture Secretary of São Paulo State, in collaboration with Fundecitrus and Centro Apta Citros *Sylvio Moreira* has conducted the control program for HLB.

In October 2008, a new and more strict Normative Instruction was published by the Ministry of Agriculture, mandating the grove inspection every 3 months and a grower's report of the disease situation every 6 months. Under this new normative instruction, the blocks found to have more than 28% of trees infected with HLB, must be completely and promptly eradicated.

In addition to this legislation, since 2003, there has been an existing mandatory program to produce nursery trees under screen protected structures to prevent HLB and citrus canker infections. Finally, the research network in São Paulo, with coordination from Fundecitrus, increases the chance of success for developing a more effective program for controlling HLB in Brazil.

In support of all these efforts, Fundecitrus and the Agriculture Secretary of São Paulo State have launched a communication campaign on TV, radio, and in technical magazines to call grower attention to the need for adoption of proper control measures.

Conclusion

From the producers' perspective, the challenges for control and suppression of HLB spread in Brazil can be summarized as the following:

Better understanding of the disease and its consequences is required

Control of the insect vector should be year round for effective disease management

IPM control of psyllids is not yet not practical

Regional control of psyllids has not yet been implemented

Disease and psyllid surveillance and tree removal are expensive

HLB has a long latent period

Disease risk is high for planting/replanting new citrus groves in highly infected areas

To face these challenges, the producers are counting on comprehensive support from the state and federal authorities, the research community, as well as fellow producers that includes: HLB-free nursery trees production, removal of abandoned groves and host species, advertising and educational programs for growers, legislation enforcement, improvement of HLB detection methods, better management practices for psyllids including new and more efficient insecticides, HLB resistant varieties, and educational programs for acceptance of GMO juice products in the international market.

Literature cited

1. Ayres AJ. 2006. Actual situation of HLB in São Paulo State, Brazil. Proc.of the Huanglongbing – Greening – International Workshop, Ribeirão Preto, Brazil, 11.
2. Andrade AG. 2008. The use of neural network, geostatistics and geographical information system on study of citrus disease epidemics. Thesis – FCAV/UNESP, Jaboticabal, Brazil.