



INTERNATIONAL ORGANIZATION OF CITRUS VIROLOGISTS

NEWSLETTER

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From the Chairwoman

Núria Duran-Vila, Chairwoman



Núria Duran-Vila

Time goes by fast, and soon we will face another IOCV Conference. In the mean while, IOCV members have the chance to meet, discuss and share their knowledge with other plant pathologists. This is especially true for those who struggle with HLB, the most devastating disease of citrus, as well as for those who are afraid that sooner or later they may have to face such a difficult problem. The war against HLB is still going on in Brazil and Florida, where meetings have been held to discuss old and new strategies. This certainly will require a joint effort! The concern about HLB has also been taken into consideration during the 9th International Congress of Plant Pathology that was held in Torino, last August, and in the 11th International Citrus Congress (ICC) held in Wuhan, China, last October. IOCV members participated in both Congresses where they had the opportunity to learn about activities going in those parts of the world that are missed in IOCV Conferences. In this regard, IOCV accepted the invitation of the ICC organizing committee to have an IOCV Workshop that was chaired by myself and Georgios Vidalakis in place of Ricard Lee who could not make it because his passport got lost somewhere in the USA. The Workshop was well attended and covered five issues: i) Presentation of the IOCV with an open invitation to everybody to join the organization; ii) “Fifty years of IOCV” covered by J.M. Bové; iii) Presentation of the project “Citrus Diseases – on line” (see below) available at the IOCV web (www.ivia.es/iocv/); iv) “HLB worldwide and its management in Brazil” by J.M. Bové; and v) Graft-transmissible disease of citrus in China presented by C.Y.Zhou.

Here, I would like to express my grateful appreciation to all those who, working on graft-transmissible disease of citrus, take advantage of IOCV as an international forum to announce and discuss their results.

In this Issue

Click to jump to page

From the Chairwoman	1
Citrus Diseases – On line	2
News from the 11 th International Citrus Congress.....	2
News from the 8 th International Congress of Citrus Nurserymen.....	4
From Chet Roistacher	5
Etrog: Taxonomy, Nomenclature and Orthography	5
International Research Conference on Huanglongbing (IRCHLB)	7
Asian citrus psyllid and Huanglongbing-A snapshot of California and U.S.A.....	7
California Citrus Research Board Operations	8
From the HLB front line	9
The unusual names of citrus diseases .	11
Citrus Sudden Death, Brazil.....	13
CTV research in Croatia	13
CTV research in Colombia	13
ANNOUNCEMENTS.....	13
Second International Citrus Biotechnology Symposium.....	13
International Workshop on Citrus Quarantine Pests.....	14

Citrus Diseases – On line

N. Duran-Vila

At the 16th IOCV conference in Monterrey, Mexico, and following an initiative of Luis Navarro, Pedro Moreno and Josy Bové, it was decided: (i) to produce the third edition of "Virus and virus-like diseases of citrus: a collection of color slides" under the new name "*Description and Illustration of Graft-transmissible Diseases of Citrus: an IOCV Presentation*", and (ii) to make it available on the IOCV web site located within the web site of IVIA. To carry out this work, a committee was appointed by the IOCV chairman, John da Graça, and re-appointed by me. This committee is composed of the following IOCV members: Pat Barkley, Nuria Duran-Vila,

Steve Garnsey, Pedro Moreno, Chet Roistacher, Ray Yokomi, and Josy Bové, co-editor of the two previous editions and chairman of the committee. On June 23, 2006, the committee asked 23

IOCV members to coordinate (i) an updating of those diseases and topics already described in the previous editions as well as (ii) to provide descriptions and illustrations for new diseases. In spite of many positive answers from the coordinators, the project has progressed relatively slowly. However, several topics are already available on the IOCV web (www.ivia.es/iocv/): Cristacortis, Citrus blight, Citrus Tatter leaf, Dwarfing, Dweet Mottle disease, Fungal diseases of citrus, Graft-transmissible budunion disorders, Gummy bark, Gummy pitting, Huanglongbing, Indian Ringspot, Kassala disease, Leprosis, Rio Grande gummosis, Satsuma dwarf, Vein enation-woody gall, Quantitative epidemiology tools, and

Concave gum and Mineral deficiencies & excesses are already in revision.

I would like to gratefully acknowledge the input of the coordinators as well as all those who were involved in the project: J.M. Bové, C.N. Roistacher, L.W. Timmer, R.H. Bransky, J.V. da Graça, P. (Broadbent) Barkley, R.J. Hutton, M.C. Vives, P. Moreno, J. Guerri, J.H. Graham, R.G. Milne, R.P. Pant, Y.S. Ahlawat, E.W. Kitajima, C.M. Chagas, J. Freitas-Astua, J.C.V. Rodrigues, C.A. Powell, M. Koizumi, T. Iwanami, T. R. Gottwald, A. Bergamin-Filho, D. Mattos Jr and J.A. Quaggio. I would like to point out the tremendous effort and generosity of J.M. Bové for providing the most updated revision on HLB (January 2009) and for sharing his fantastic photos with all of us.

Unfortunately, the project has not yet come to an end because many important diseases and issues have not been covered yet. I take this opportunity to encourage all those who have accepted the task of being coordinators to

accomplish their share. In our continuous efforts to always try to serve you better, I invite all of you to visit our web site (www.ivia.es/iocv/) and help us improve it.

News from CRI, CAAS on the 11th International Citrus Congress Held in Wuhan P.R. China

Changyong Zhou & Georgios Vidalakis

From October 26-30, 2008, the Chinese Society of Citriculture (CSC) and Huazhong Agricultural University hosted the 11th International Citrus Congress (ICC) in Wuhan, P.R. China. There were over thousand attendees from 35



countries/regions, including over 600 from P.R. China. About 750 abstracts were collected. Professors Michael Roose and Zhao Xueyuan gave the only two congress invited talks.



Prof. Michael Roose giving the invited congress talk

ISC president Deng Xiuxin, member of the Chinese Academy of Engineering, was awarded the “Fellow of ISC” by Luis Navarro, next ISC president elected. The next ICC will be held in Valencia, Spain in 2012. The host country for ICC in 2016 was competed between Brazil and Argentina, final decision has not been made so far. On 23rd and 31st October, ca 90 delegates from over 10 countries/regions did their pre- and post-conference tours to Chongqing Agriculture Commission and Citrus Research Institute (CRI) of the [Chinese Academy of Agricultural Sciences](http://www.jxaas.com) (CAAS) at Beibei, Chongqing, P.R. China.



Ca 30 delegates of ICC did pre-conference tour to CRI, CAAS on 23rd October 2008

The conference covered a variety of subjects including citrus biotechnology and biochemistry, economics and trade, post harvest pathology and quality, effects of climate, environment, and abiotic stresses in citrus production, citrus genomics and physiology.

8:30-17:15
柑橘基因组学
Citrus Genomics
 14:00-16:00
柑橘溃疡病
Citrus Canker

8:30-12:00
品质生理
Quality Physiology
 14:00-18:00
柑橘化学调控
Citrus Regulation by Hormones

Pest and weed control as well as citrus breeding, new rootstocks, and scions with special reference to Blood Oranges was also part of the program. Special sessions were dedicated to virus and fungal diseases of citrus and two workshops were organized for Huanglongbing and Citrus Canker.

During the Congress, an IOCV workshop was organized by IOCV Chairwoman N. Duran-Vila, J. Bove, and IOCV Secretary G. Vidalakis. The IOCV Chairwoman opened the workshop by introducing to the audience the Organization, who we are, what is our mission and how the public can access information in regard to the organization and citrus diseases.



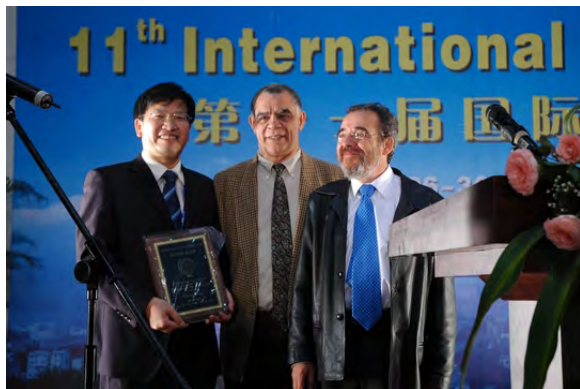
Zhou Changyong, Georgios Vidalakis and Mariano Cambra with a volunteer at the IOCV Workshop on 27th Oct., 2008

J. Bove presented the 50 year history of our Organization and highlighted the major discoveries and breakthroughs in the area of citrus virology produced by the members of IOCV. In the second part of his talk Josy presented an extended overview of the world wide status of the citrus Huanglongbing. Zhou Changyong was invited to give an introduction on citrus virus and virus-like diseases in China and the workshop ended with an open discussion on graft-transmissible diseases of citrus.

The 11th ICC was concluded with a beautiful closing ceremony were C. Zhou was presided and L. Navarro announced the 12th ICC in Valencia, Spain.



The ICC closing ceremony & farewell party



Prof. Deng Xiuxin was awarded the “Fellow of ISC” at the closing ceremony

News from the 8th International Congress of Citrus Nurserymen held in Chongqing, P.R.China

Changyong Zhou

From October 22-25, 2008, Chongqing Agriculture Commission and Citrus Research Institute of [Chinese Academy of Agricultural Sciences](#) (CRI, CAAS) hosted the 8th International Congress of Citrus Nurserymen (ICCN). There were about 240 attendees from 19 countries/regions, including ca 160 from P.R.China.



Organizers at the cocktail reception

About 60 abstracts were collected. Four IOCV members, Drs. Chester Roistacher, Zhao Xueyuan, Catalina Margarita Anderson and Zhou Changyong, presented oral talks as invited speakers. Dr. Zhou Changyong (Director of CRI, CAAS) presided the opening ceremony. On 24th October, most delegates visited Genges Nursery and orchards in Jiangjin District and CRI,CAAS at Beibei, Chongqing. The decision on the host country for the next ICCN was made to Argentina in 2011. Mr. Francisco Llaster from Spain was elected as the present Chairman of International Society of Citrus Nurseryman (ISCN) during this meeting. After the closing ceremony, most delegates moved to Wuhan to attend the 11th ICC.



Organizers at the cocktail reception

In October 2008, CRI as a wire-pulling institute, established the Citrus Nurserymen Branch within the Chinese Society of Citriculture (CSC), aiming at strengthening the exchange of nursery and budwood reproduction technology and production experiences, and accelerating the exchanges with ISCN.



Prof. Ian S. Tolley (O.A.M. C.P.Ag) from Australia was showing the container citrange seedling

The congress successfully held in Chongqing, enhances the reputation of CRI, CAAS and will certainly promote the international exchange and cooperation for CRI.



Delegates of ICCN visited CRI, CAAS on 24th October 2008

From Chet Roistacher

Chet Roistacher

Chet is still actively involved in citrus virology. He is deeply concerned with what is happening worldwide with HBL/greening disease and believes this disease is a serious threat to all citrus producing countries. During the 5th IOCVC Conference in Japan in 1972 in an informal discussion on this emerging serious problem of citrus, someone stated “When greening comes in, citrus goes out!” The truth of this is now apparent in Florida and Brazil. The threat is real and devastating and must be taken seriously worldwide.

Chet was the invited speaker at the 8th International Congress of Citrus Nurserymen at Chungqing, China in November, 2008. His topic was: **Indexing for Graft-Transmissible Diseases of Citrus: its History, Importance, Current Status and use in Certification Programs.**



Chet Lecturing at ISCNC Conference Chongqing

This lecture has been developed as a slide show and can be accessed in EcoPort.org as:

<http://ecoport.org/ep?SearchType=slideshowList&ID=209>

This was Chet’s 6th trip to China and it was good to see many old and dear friends including Zhao Xueyuan and Zhou Changyong.



Chet in front of Citrus Research Institute new building in BeiNei

Chet will be teaching his 23rd Year at the Istituto Agronomico Mediterraneo di Bari in early April, 2009. All of his EcoPort slide shows and various reports on his consultancies can be found in the EcoPort website:

<http://ecoport.org/ep?SearchType=domainContents&id=9&type=group>

Please feel free to send any editing suggestions or new information on any of these slide shows. Send to chetroist@charter.net. I would be pleased to hear from you. Chet Roistacher at chetroist@charter.net

Etrog: Taxonomy, Nomenclature and Orthography-Beyond the S1-‘Arizona 861’

David Karp

‘Etrog’ citron (*Citrus medica* L.) plays an important role both in religion, in the Jewish Sukkot harvest festival, and in plant pathology, as an indicator for citrus exocortis viroid. Standard citrus reference works (Hodgson, 1967; Saunt, 2000) basically treat ‘Etrog’ as one cultivar, although Hodgson writes of “minor differences” in “selections made for ritual purposes.” However, it is clear that

this name may refer to a dozen or more distinct cultivars or genotypes, some of which differ significantly in morphology. Moreover, the word “etrog” has several meanings, of varying degrees of specificity:

1) On the most general level, in Hebrew and Yiddish “etrog” simply means “citron,” including all members of the species *C. medica*; thus, an Israeli might call a ‘Buddha’s Hand’ (syn. ‘Fingered’) citron a “Fingered etrog,” although it is unsuited for Jewish ritual use.

2) The primary and most common meaning, however, includes the cultivars or types of citron that are considered suitable for Jewish ritual use, for reasons both of tradition and morphology (shape, size, thickness of albedo, etc.). It was with such a

meaning in mind that the Chazon Ish (1878-1953), a revered ultra-Orthodox rabbi, remarked of a particular tree whose purity and authenticity he endorsed, “That is an etrog.” However, Jewish sects and individuals differ in the

characteristics and varieties they require or prefer; so it seems reasonable to define “etrog” in this sense as including all those genotypes that some group of observant Jews considers suitable for ritual use. Etrog cultivars include ‘Diamante’ (syn. ‘Yanaver’, [CRC 3523 / PI 539424](#)), which is acid and seedy, grown in Calabria; ‘Assads,’ which is acidless and often seedless, grown in Morocco; Israeli selections such as ‘Braverman,’ ‘Halperin,’ ‘Lefkovich,’ and ‘Kibilevitch,’ which are acid and seedy; and ‘Yemen’ (syn. ‘Temoni,’ [CRC 2847 / PI 105957](#)), which has seeds but no juicy flesh, and originated in Yemen. These cultivars are very likely all pure citrons (Nicolosi et al., 2005), but do not comprise a monophyletic family group: the etrog group, as a



taxon, is either paraphyletic, meaning that it does not contain all the descendants of its most recent common ancestor, or possibly polyphyletic, if the trait that its members have in common – suitability for Jewish ritual use – was selected separately from different branches of the phylogenetic tree of *C. medica*.

3) To the extent that scientific writers and germplasm collections have attached the name “Etrog” to particular genotypes, without knowing or being more precise about the variety, it could be argued that these genotypes are, as a practical matter, named “Etrog.” For the reasons adduced above, however, such inexact nomenclature is not ideal.

“Etrog” is the most common romanization of the original Hebrew letters, and accords with the pronunciation of Sephardic Jews, of Middle Eastern, North African and Spanish origin; “esrog” follows the usage of Ashkenazi Jews, of Central and Northern European

ancestry. Alternative spellings include “ethrog,” “athrog,” etc. All these variations have no botanical or taxonomic significance, just as a “lychee” is the same as a “litchi.”

The identity of the particular cultivar of the accession historically labeled ‘Ethrog’ ([CRC 3891 / PI 508265 / VI 426](#)) at the [Citrus Variety Collection](#) at Riverside is not certain. Experts who have examined specimens and photos of the fruit suggest that it might be the ‘Ordang’ variety. There is another, similar accession (CRC 3526 / [PI 539425](#)) named ‘Etrog’ in the CVC at the [UC South Coast Research and Extension Center](#) in Irvine. ‘S-1’ ([CRC 3878 / PI 600651 / VI 357](#)), from a seedling selected from ‘Arizona 861’ citron, is used around

the world in plant pathology because it has been found to be especially sensitive as an indicator for mild citron viroid.

Literature Cited

1. Hodgson, Robert W. 1967. "Horticultural varieties of citrus," in W. Reuther, H.J. Webber, and L.D. Batchelor (eds.). *The citrus industry*, vol. 1. Univ. Calif., Berkeley.
2. Nicolosi, Elisabetta, Stefano La Malfa, Mohamed El-Otmani, Moshe Negbi, and Eliezer E. Goldschmidt. 2005. The search for the authentic citron (*Citrus medica* L.): historic and genetic analysis. *HortScience* 40(7):1963-1968.
3. Saunt, James. 2000. *Citrus varieties of the world*. 2nd ed. Sinclair International, Norwich, UK.

International Research Conference on Huanglongbing (IRCHLB)

John da Graça & Tim Gottwald

The International Research Conference on Huanglongbing (IRCHLB) was held in Orlando Florida December 1-5, 2008. The purpose of the conference was to assemble the greatest number possible from the international research community, plus regulatory agency representatives, and commercial industry leaders with specific expertise on HLB for the express purpose to exchange the latest information, knowledge, ideas and concepts relative to HLB. We also wanted to provide a venue for increased international collaboration as well to deal with a disease that does not respect the political or physical boundaries of states or countries. Invited scientists and participants were asked to reach beyond current information, thinking, scientific disciplines, and dogma in an attempt to broaden our global knowledge, provide new researchable goals and horizons and foster progress toward new and innovative solutions to HLB.

The Theme of the IRCHLB was "Reaching Beyond Boundaries", indicating our determination and need to reach beyond political, scientific and national boundaries in an attempt to find commercially feasible solutions to this devastating disease.

A highlight of the meeting were the three keynote addresses by Bernard Aubert, Hong-Ji Su, and Andrew Beattie, whose long careers and dedication have all contributed significantly to our present knowledge and understanding of HLB.



IRCHLB 2008 Keynote Speakers: (Left to right) Prof. Hong-Ji Su, Prof. Andrew Beattie, and Dr. Bernard Aubert.

The conference was well attended with over 425 registered participants from 26 countries. The numerous sponsors were a tremendous help and support during the development and throughout the conference. A special thanks goes out to the many people in Florida Citrus Mutual for tremendous help in logistics, meals, registration, and overall organization.

We are planning to publish the Proceedings of the IRCHLB, which will be placed on the Plant Management Network (PMN). In the interim, a draft of the proceedings as distributed at the conference can be found at: http://www.doacs.state.fl.us/pi/hlb_conference/event_s.html. When published, the final Proceedings will likely be in excess of 400 pages, indicating the wealth of knowledge and interchange of ideas by the international participants at the conference.

Moving forward, because of the tremendous concern over HLB by multiple citrus industries around the world, we hope to repeat as conference again in one or two years. An organizing committee and transition team has already been looking into opportunities for the next venue location, potential dates, and meeting organization.

Asian citrus psyllid and Huanglongbing-A snapshot of the current status in California and U.S.A.

Georgios Vidalakis

The Asian citrus psyllid (ACP) was first detected in southern California (CA) and more specifically in San Diego County (asterisk on the left), in August 29, 2008. A single adult was found in a trap in a lemon tree located at a residential property - approximately 11 miles north of the

international border with Mexico. A few months later (October, 2009) the insect was found at three different locations in the Imperial County east of the San Diego County (asterisk on the right).



California (CA) San Diego (left asterisk) and Imperial (right asterisk) Counties

These findings triggered the establishment of 6,015 square miles quarantine zone in south California restricting the movement of ACP host plants. To this day inspectors of the California Department of Food and Agriculture (CDFA) have been surveyed

in total 25,000 sites and 174 have been found infested with ACP (usually single adults). The ACP sites are treated with insecticides in a 400 meter radius around the finding. So far no infestations have been re-detected in the treated areas. The HLB bacterium has not been detected in any psyllid or plant samples tested to this day.

The ACP was detected in the state of Florida (FL) in June of 1998 and seven years later (August 2005) the HLB disease was first identified. Since then the ACP was detected in the state of Texas (TX) in the spring of 2001 while between the spring and the summer of 2008 the ACP was found in the states of South Carolina (SC), Georgia (GA), Alabama (AL), Mississippi (MS), and Louisiana. On June of 2008 the HLB pathogen was detected in Louisiana and on April of 2009 South Carolina reported the first HLB positive tree.



Current distribution of Asian citrus psyllid (ACP, red) and Huanglongbing (HLB, shaded and highlighted) in the U.S.A. Mexico has reported ACP but not HLB.

For more information on Mexico visit <http://148.243.71.63/?id=1013&idioma=2>

The federal and state governments have issued quarantines in all cases where ACP and/or HLB have been found in order to restrict the movement of host plants. In addition, a collaborative program between the U.S.A. (USDA) and Mexico (SAGARPA) was initiated in 2009 for the detection, delimitation, treatment, and quarantine for the ACP in the northern areas of the Mexican states of Baja California and Sonora.

For more information and updates visit:

- SAGARPA: <http://148.243.71.63/default.asp?id=1000>
- USDA: http://www.aphis.usda.gov/plant_health/plant_pest_info/citrus_greening/index.shtml
- CDFA: <http://www.cdfa.ca.gov/phpps/acp/>
- International Research Conference on HLB. Orlando Florida December 1-5, 2008: http://www.doacs.state.fl.us/pi/hlb_conference/events.html

California Citrus Research Board Operations-Same enthusiasm, different focus

MaryLou Polek

On December 1, 2008 MaryLou Polek began a new position as Vice President of Operations with the California Citrus Research

Board (CRB). Having an operational component is a totally new endeavor for the CRB. Historically it funded research projects and provided educational programs for citrus growers. With the detection of the Asian citrus psyllid (ACP) in southern California, the citrus industry realized this threat to be a great danger, one that the State Department of Agriculture would require assistance battling. Hence, growers voted in favor of raising their assessment on field boxes of fruit to fund an Operations Department. This department will consist of two components, laboratory and field.

The short-range goal of the Operations Department is to detect and eliminate reservoirs of the HLB-associated pathogens in ACP vectors and plant material before the ACP becomes established and spreads the disease. Field staff will develop a program to educate and train key industry personnel in the detection of ACP and to identify disease symptoms of HLB in field trees. In addition, they will augment the trapping and survey activities of the USDA, CDFA, and County Agricultural Offices. A high throughput diagnostic laboratory will be established to analyze as many psyllid and plant tissue samples as possible.

Knowing that there are other threats lurking, the long-range goals of the Operations Department is to expand the tasks described above to detect, eradicate, contain, and/or manage all pests and pathogens of citrus. In addition, CRB personnel will become involved in technology transfer that is, taking new technologies developed by researchers and adapting them for practical use by diagnostic labs and/or growers and nurserymen.

The objectives of the Operations Department include:

- Establish diagnostic laboratories throughout California to detect exotic pests and pathogens of citrus and citrus relatives that would serve California, Arizona, Texas, and Mexico with initial efforts focused on HLB (citrus greening disease)
- Analyze psyllids for the presence of HLB-associated bacteria
- Analyze plant material within urban, nursery and commercial settings for HLB-associated bacteria in advance of ACP infestations
- Support and/or augment survey activities for ACP and collection of samples
- Establish and maintain a database of trapping and survey information including relevant data such as

age, variety, tree health, trap type and associated laboratory results

- Utilize above database for analyses of ACP infestations and development of management strategies

The first lab will be located in Riverside, California and should open its doors this March. Eventually there will be a second laboratory located in the San Joaquin Valley (Central Valley) where approximately 85% of the citrus industry is located.

There is an active industry-wide effort to establish a regional management program for the ACP and huanglongbing (HLB)-associated bacteria within the southwest citrus production area (California, Arizona, Texas, and Mexico). Currently, the United States Department of Agriculture (USDA), the California Department of Food and Agriculture (CDFA), and County Agricultural Offices are intensively surveying, trapping and treating areas along the California/Mexico border for ACP. The hope is to keep the psyllid contained in this area.

A statewide HLB/ACP task force was formed in August, 2006. In addition to the Steering Committee, there are three subcommittees; Communication and Outreach, Science and Technology, and Regulatory. Committee members include scientists from Florida, Texas, and Arizona. An action plan was developed as a fluid document; it changes as new knowledge is gained and as the ACP spreads.

Visit also CRB's HLB/ACP web site at:

<http://www.californiacitrusthreat.org/>

From the HLB front line

Josy Bove

It would be more accurate to add an "s" to "line" and write "HLB front lines"! Indeed, there are many front lines where the war against HLB is raging. It is good that we do have some front lines. Having no front lines would mean that we are overrun by HLB, and that the war is over and lost. South-Africa, several decades ago, had a tough HLB front line. But, as stated by Hennie Le Roux: "*Huanglongbing (HLB) has been present in South Africa since the 1920s. It remains one of the most dangerous citrus diseases in the country, however, since the late 1980s, the industry has developed strategies which have succeeded in suppressing the advance of the disease ensuring the continuation of*

profitable citrus production in areas threatened by the disease. These strategies included restrictions on the movement of citrus and citrus related planting material, the provision of HLB-free nursery trees certified by the South African Citrus Improvement Scheme, a reduction of the inoculum through an ongoing program of removing plants showing HLB symptoms and the use of systemic insecticides applied either as trunk applications or soil drenches to control the vector, *Trioza erytreae* (Del G.). This led to the re-introduction of citrus to areas previously abandoned because of HLB. Orchards well managed are performing well.” Of course HLB in South Africa is of the African type, restricted to cool areas, and less aggressive than the heat tolerant Asian form of HLB, a situation that some of us were able to witness again, last August in Natal, at the occasion of the 5th Citrus Symposium. Inversely, the front lines in the oases of south-western Saudi Arabia were overrun in the late 1970s, early 1980, and all mandarin trees and sweet orange trees disappeared under Asian HLB. Oases being islands in the desert, biological control of *Diaphorina citri* could have worked, like it worked on Reunion island in the Indian Ocean, had it been given a real try. Similarly, Asian HLB in Nepal was introduced with planting material from India in the 1960s or so. In spite of numerous words of warning, the war on HLB was never declared, and today orchards with 100% of moribund HLB mandarin trees are countless. The situation is the same in Bhutan. True enough, Saudi Arabia, Nepal and Bhutan are not among the biggest citrus producing countries in the world! India is, but it has never established a serious front line against HLB. Is it to say that the war against Asian HLB cannot be won? If you don't try, you will never know! Asian HLB has been identified in Brazil in 2004, Florida in 2005, Cuba in 2006, and in 2008 in the Dominican Republic, Iran and Louisiana; the rumors say that Mexico is affected. Undoubtedly, the most serious efforts to control HLB have been deployed in São Paulo State (SPS), Brazil. The results obtained by most citrus farms involved in HLB management since 2004 have been analyzed by Fundecitrus. As a consequence, several situations or parameters that make it easier or more difficult to control HLB have been identified. The set of measures used for HLB management in a given farm have to be adapted to the situations characteristic of this farm. For instance, one of the most critical parameters for HLB control in a given farm, say farm A, is the

presence, close to this farm, of a neighboring farm, say farm B, in which NO HLB control is carried out. The psyllids from farm B invade farm A and jeopardize its HLB control, especially if the trees of farm A are young. Indeed, young trees, because of their many flushes, are more susceptible to HLB than mature trees, which have less flushes. Even though many large farms in SPS participate in HLB control, more of the smaller farms do not, often for lack of funds or because it is too late, HLB management having not been applied early enough, as soon as the disease entered the farm. These results were presented by Jose Belasques from Fundecitrus at the International Research conference on HLB in Orlando, Florida, early December 2008. HLB has also been covered in other Citrus meetings that took place in the second part of 2008: (i) the 5th South African Citrus Research Symposium, Champagne, Natal, August 2008, organized by Citrus Research International; (ii) the 9th International Congress of Plant Pathology, Torino, Italy, August 2008. In the session on Fastidious bacteria, a potato liberibacter (*Candidatus Liberibacter solanacearum*) was described in addition to a communication on the three HLB liberibacters as well as the HLB phytoplasma. A communication on HLB control in South and North America was also presented. An evening session on citrus diseases comprised a lecture on “HLB in Africa, Asia and America: global perspectives”; (iii) the 11th International Citrus Congress, Wuhan, China, October 2008. Two oral sessions and one poster session were devoted to HLB (HLB management and Characterization of HLB hosts, psyllids, and pathogens).



J. Bove presenting in the IOCV workshop during the 11th ICC conference, Wuhan, P. R. China

These sessions were followed by an IOCV workshop organized by Nuria Duran-Vila and Georgios Vidalakis, with two powerpoint presentations on HLB: (1)

“Huanglongbing 2008: the world situation” and (2) “A joint effort of Citrus Farmers to control the disease in São Paulo State, Brazil”.

In addition to the discovery of the first non-citrus liberibacter; *Ca. L. solanacearum*, four other results are worth mentioning: (i) the presence of *Ca. L. americanus* in southern China, *i.e.* its first description outside of Brazil. (ii) After the HLB phytoplasma of group 16Sr IX, discovered in SPS, a second HLB phytoplasma has now also been identified in Southern China, but the Chinese HLB phytoplasma belongs to group 16Sr I. (iii) S. Lopes at Fundecitrus has shown that *Ca. L. americanus* is heat sensitive and resembles therefore *Ca. L. africanus*, also heat sensitive, while *Ca. L. asiaticus* is heat tolerant. This result might contribute to explain the distribution of *Ca. L. americanus* and *Ca. L. asiaticus* in SPS. (iv) A paper on citrus liberibacter cultivation is in press in Phytopathology.

Finally, the Asian vector, *D. citri*, but not (yet) the disease, is present in the USA (Alabama, California, Georgia, Hawaii, Maui, Mississippi, South Carolina, Texas), Argentina, Belize, Costa Rica, Honduras, Mexico, Venezuela, the Caribbean region, Oman,...The African vector is present in Madeira island and the Canary islands, and is a menace for the Mediterranean basin. The presence of Asian HLB in East Timor and Papua New Guinea endangers Australia. The examples of Florida, Cuba, the Dominican Republic, and Iran have shown that when the psyllid vector has been seen, the disease is not far. This is why the countries with *D. citri*, but not HLB, are also on the front line. Surveying for symptomatic citrus trees by visual inspections and for liberibacters (and phytoplasmas ?) in symptomatic citrus and in psyllids by PCR, is essential for early identification HLB and preventing the disease to become established.

The unusual names of citrus diseases- Greening & Huanglongbing, or better call it Dracula?

Moshe Bar-Joseph

Last year I lectured at the Israeli Phytopathology Society meeting on the threat of the citrus greening pandemic and I have delivered several talks on this topic to local and foreign citrus extension specialists and grower groups.

My first slide in all these presentations dealt with a critical question: why shall anyone be concerned with a disease named Greening? Green these days is a popular buzzword of almost all successful grant applications. Just browse for green

through any search machine (see table), press enter and your screen will be flooded by millions of promises for a far better world, if just things will turn Green. So why should we citrus pathologists ruin the party and scare citrus growers all over the citrus world by alking about the threat of a disease causing Greening?

Google search results	
Green	788.000.000
Greening	4.190.000
Citrus greening disease	31.800
Huanglongbing	18.700

Answering this question makes me change my mind on the events of the 1995 IOCV meeting in China where Josy Bove introduced Huanglongbing and its acronym HLB as a more proper name for citrus greening disease. In retrospect, I must admit that at that time I could not see a good reason to change the name of this dreadful disease. At this time greening was already known to be caused by a bacteria rather than a virus, yet it was still considered within the domain of citrus virologists. Plant virologists have rarely adopted the practice of entomologists and fungal and bacterial pathologists who constantly keep changing names of their causal agents whenever someone somewhere and somehow mentioned that an organism was sometime in the past already described with a different binomial name.

Furthermore, the commonly accepted rules of International committee taxonomy of viruses (ICTV), differ from those used for the binomial names of pests and pathogens by not associating the name of a virus with its first descriptor. That's why IOCV and ICTV still use the name *Citrus tristeza virus* even though Podredumbre de las raicillas was coined for it some years earlier.

In retrospect, I must admit that for years Joesey's act seemed to me mainly as clever political act making our Chinese hosts proud of IOCV's recognition of their compatriot's originality and hoping that introducing a Chinese term for the disease would help them gaining more research funds for developing new methods for controlling the disease.

Even though I could not get rid of my habit of calling the disease greening, I gradually understood the importance of fixing the misnomer for this disease, which in every aspect is far better described as a yellowing dragon (or even call it

Dracula) rather than as a disease with a favorable name like greening.

My association with greening started during the first IOCV meeting that I attended which was held in South Africa and Swaziland in 1972. The late APD McLean showed us several small and decimated trees affected by greening, and except for the greening of the lopsided fruits these trees looked rather similar to the symptoms associated with stubborn disease. Nothing in about these miserable trees seemed to fit this misnomer of greening.

On my way home I stopped for 3 days in Kenya, where I was taken to visit the Tica experiment station. Many of the trees there showed symptoms similar to those shown to me just few days earlier by Dr. Mc Clean. Next afternoon, after visiting the magnificent Flamingo loaded-lake at Nakuru, Mr. Gad Shalitin (who, later served as the general manager of the Israeli Ministry of Agriculture and whose son Dror, characterized a panel of CTV monoclonal antibodies in my laboratory) drove me to visit a very citrus grove owned by Lord Cholmondeley one of the few remaining English growers in Kenya at that time. Before entering the grove the owner indicated that due to lack of money he had not fertilized his grove properly, but then after visiting it was clear that the yellowing of scattered branches was not due to lack of fertilizers, but to greening vectored by the many Psyllas whose presence was confirmed by damage easily spotted on the leaves. I don't know if the owner of the grove was relived or just confused when I told him that investing in fertilizers would had not much helped to turn green the many yellow branches infected with "greening" I assume that if I had told him that his trees were infected with HLB, which in Chinese means yellowing, he would had understand his problem much more easier.

By the way, the name stubborn which originated in California came into use only after the late Prof. Reichert gave such a vivid description for a new disease which he termed little leaf and rightfully described it as belonging to the yellowing diseases. Again, in this case one should be remembered that the Arab citrus growers had apparently at that time a far better name for the diseased fruits which they called as Abu Tiz, (a name that h I don't dare to translate).

Essentially, this lengthy treatise on such a minor issue as coining names is mainly addressed to the future IOCVists, to suggest to them to think carefully on choosing the most proper name, for

future citrus diseases. Just remember that names are important, at least as long as numerical taxonomist do not prevail and diseases agents and diseases will be catalogued just by numbers. With the current system names may evoke either an overreaction or no reaction and both situations will not help the real IOCV mission of helping growers deal with their diseased trees.

Josy Bove commendatory

My dear friend Moshe,

Thank you for your thoughts on disease names.

I have pointed out several times the reason why, on my proposal at the 1995 IOCV meeting in Fuzhou (China), the name "huanglongbing" (HLB) or "yellow shoot disease" replaced the name "greening", first used in South Africa. The reason is simple. It is because Prof. Lin was the first to transmit the disease agent (unknown at that time) by graftinoculation and to show in this way that the disease was of infectious nature. In his 1956 paper, he used the name huanglongbing, which was the name employed by the growers in the Chaozhou district, a name that referred to a characteristic symptom of the disease. Therefore, the name given to the disease in the publication in which it is shown for the first time that the disease agent is transmissible by graft-inoculation, has priority. This name is huanglongbing. Prof. McClean showed similar graft-transmission of "greening" only 9 years later, in 1965. Changing the name from greening to huanglongbing in 1995 was rendering justice to our Chinese colleague, Kung Hsiang Lin. I am sure that our young IOCVists are receptive to the notion of justice.

There are at least two other precedents. The name Cachexia has received priority over xyloporosis because Childs, who used the name Cachexia, was the first to show that the disease was transmissible by graft-inoculation. Similarly, Calavan was the first to transmit by graft-inoculation the agent of a disease, for which he used the name stubborn. Therefore, the name "stubborn" has priority over "little leaf". Regarding the use of "Spiroplasma citri", my group (Saglio et al., 1973) was the first to characterize this new organism. We could have given it whatever name we wanted, and today I regret that I did not call it helicoplasma. But "spiroplasma" had been used previously as a trivial name, and I kept it voluntarily in order to avoid confusion. As I said, I should have used helicoplasma!

Citrus Sudden Death: Susceptibility of Rangpur lime selections and use of interstocks-Citrus Research Center Cordeiropolis, Brazil

J. Pompeu Jr & S. Blumer

Since 2001, citrus sudden death (CSD) or morte súbita dos citros affects all sweet orange cultivars and some mandarin trees grafted on Rangpur lime and Volkamer lemon rootstocks, in thousands groves of the Sao Paulo state (Brazil). The disease was observed affecting two-to-six years old trees; after showing general decline symptoms, affected trees suddenly collapse and die. Trees on Cleopatra and Sunki mandarins, Swingle citrumelo and trifoliolate orange showed no symptoms of CSD. Cambial yellowing in the rootstock can be observed being this the main diagnostic symptom of the disease. The transmission of CSD by graft-inoculation and the spatial evolution suggests that CSD is caused by an insect-vectored pathogen. In order to search for tolerant rootstocks five nursery trees of Valencia sweet orange budded on each of 254 rootstocks were planted in May 2003 and May 2004 in soils where citrus trees affected by CSD were eradicated. Until November 2008, symptoms of the disease were observed on trees budded on the following Rangpur lime selections: Santa Barbara red lime, Borneo red lime, Limão Cravo Taquaritinga, Rangpur India C-26-1, Rangpur rose lemon, Rangpur Kusaie lime, Rangpur red lime D-33-40, Rangpur Egyptian lime, Rangpur lemon India and Japanshe citroen. The use of an interstock of trifoliolate or Cleopatra mandarin between Rangpur lime and the Valencia sweet orange scion did not avoid the disease.

CTV research in Croatia

Dijana Škorić

The research of the Croatian CTV isolates was started in the year 2003 with an informal collaboration between Gustavo Nolasco (Universidade do Algarve, Faro, Portugal) and Dijana Škorić (University of Zagreb, Faculty of Science, Department of Biology). Another Croatian institution, the Institute for Adriatic Crops and Carst Reclamation in Split joined in after a while with the aim of laying grounds for the establishment of citrus foundation block in the frame of one of their projects. The expertise and collaboration from citrus

researchers Anna Maria D'Onghia and Khaled Djelouah of the Mediterranean Agronomic Institute in Valenzano (Bari) has been a great support for all our actions. So far, one Ph. D. thesis on CTV is almost completed by Silviya Černi and another by Katarina Hančević is under way. Interesting data on CTV isolates from the East Adriatic has been obtained in these last five years and published in:

- Černi S., Škorić D., Krajačić M., Gatin Ž., Santos C., Martins V., Nolasco G. (2005): Occurrence of Stem-Pitting Strains of *Citrus tristeza virus* in Croatia *Plant Dis.* 89: 342.
- Černi S., Ruščić J., Nolasco G., Gatin Ž., Krajačić M., Škorić D. (2008): Stem pitting and seedling yellows symptoms of *Citrus tristeza virus* infection may be determined by minor sequence variants. *Virus Genes* 36: 241-249.
- Černi S., Škorić D., Ruščić J., Krajačić M., Papić T., Djelouah K., Nolasco G. (2009) East adriatic-a reservoir region of severe *Citrus tristeza virus* strains. *Eur. J. Plant Pathol.* (DOI 10.1007/s110658-009-9444-0)

CTV research in Colombia

Monica Guzman Barney

I continue working on Citrus tristeza virus at the Universidad Nacional de Colombia with Corpoica –Meta collaboration. We are looking for CTV variants in Limes (Tahiti and Mexican) and in sweet oranges, using specific probes hybridization, SSCPs and major coat protein gene sequence. We are looking for CTV variants on Tahiti Lime grafted on different rootstocks too.

ANNOUNCEMENTS

Second International Citrus Biotechnology Symposium

Catara Antonio & Rosa La Rosa

We are pleased to announce that from 30th November to 2nd December 2009, the 2nd International Citrus Biotechnology Symposium will be held in Catania, Italy. The event follows the first one organized eleven years ago in Eilat, Israel.

The Symposium is organized as an activity of the Section Citrus, a joint Section of both the International Society for Horticultural Science and the International Society of Citriculture, and in

particular of the newly set up Working Group of this Section. The event will also be set up in collaboration with the Commission Biotechnology and Molecular Biology and the Section Tropical and Subtropical Fruits.



SECOND INTERNATIONAL CITRUS BIOTECHNOLOGY SYMPOSIUM

CATANIA, ITALY, NOVEMBER 30 – DECEMBER 2, 2009

Location of the meeting

The Symposium will be held in the Aula Magna, Faculty of Agriculture, University of Catania, Via Santa Sofia 100, Catania (Italy).

Symposium organization

Seven Symposium sessions:

Session 1. Genomics: structural and functional genomics, genetic and physical mapping, sequencing, cytogenetic studies;

Session 2. Genetic transformation: technical advancements, applications for rootstock and cultivar improvement, and functional genomic studies;

Session 3. Environmental and physiological stress: molecular tools and physiological methods for screening;

Session 4. Biotic stress: detection and control of the major pests and disease;

Session 5. *In vitro* culture applied to breeding and propagation;

Session 6. Molecular biology of plant and fruit growth and ripening;

Session 7. Fruit quality, health and nutrition including studies on volatiles, flavour, and nutraceutical compounds.

Critical dates

Registration: July 15, 2009

Abstract submission: May 31, 2009.

For more information visit:

www.citrusbiotech2009.it

International Workshop on Citrus Quarantine Pests

Georgios Vidalakis

The North American Plant Protection Organization (NAPPO) is organising an international workshop on citrus quarantine pests aiming at the training and preparation of technical staff for the management of Huanglongbing, citrus leprosis, canker and variegated chlorosis.



Location and workshop dates

The workshop will be held between July 27 and 31, 2009 at Camino Real Hotel, Paseo Tabasco No. 1407, Villahermosa, Tabasco, Mexico

Workshop program and additional information at

<http://www.nappo.org/>

and

<http://www.nappo.org/Workshop%20Citrus%20QuarantinePests-UP23-4-09.pdf>

or

<http://www.nappo.org/Workshop%20Citrus%20QuarantinePests-UP23-4-09.pdf>