INTERNATIONAL ORGANIZATION OF CITRUS VIROLOGISTS

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IOCV NEWSLETTER **January, 2003**

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FROM THE CHAIRMAN

Dear Friends and colleagues,

First, let me wish you all peace, happiness and successful work during 2003, even if the present situation does not seem to precisely announce peaceful times.

The end of 2002 provided very sad news for IOCV: our colleague and good friend Robert Vogel passed away at Bastia, Corsica (France). His scientific work on characterization of cristacortis, a disease that he discovered in Corsica, but that has also been observed in many other citrus areas, is still today essentially the only information available on this subject. His unselfish contribution with Josy Bové to prepare, for more than a decade, the outstanding bibliographic reports on citrus diseases, and to edit the `Description and Illustration of Virus and Virus-like Diseases of Citrus'. A collection of color slides, one of the major achievements of the IOCV to disseminate knowledge on graft-transmissible diseases of citrus and procedures for their detection and control, should be deeply acknowledged by our Organization and all people involved in the citrus industry. His deep capacity of observation, permanent disposition to share his wide knowledge on citrus, and his personal warmth and bonhomie, will always remain in our memory. Josy Bové, the IOCV member closest to Robert Vogel, has prepared a summary of his life and achievements.

In a different regard, John da Graça and Mario Rocha-Peña have worked in the preparation of a preliminary program of activities for the next IOCV Conference to be held in Texas/Monterrey/Veracruz in the fall of 2004. An advance of this program, which promise to be most exciting, is presented here, so that everyone can start planning for attending this meeting. John also presents a report on the situation of a less enviable, but equally important duty: editing and publication of the Proceedings of the XV IOCV Conference. I know that it has been a heavy duty, not exempt from problems, and once more we have to thank the editors for their effort. New ideas and possibilities are being considered to speed up publication of papers presented in futu re conferences and to make it less expensive, among them, electronic submission and on-line publication. However, these ideas have to be further matured in the Board of Directors and eventually presented at the business meeting for discussion.

It is gratifying to see how many people have contributed to this Newsletter, and how soon reports arrived from so many different countries. This is an indication that the Newsletter is felt as an appro
priate system to convey information on research activities and observations on diseases, thus enriching this instrument which contributes to fulfil the IOCV objectives. I want once more to encourage all you to participate in this fruitful exchange by contributing with news in following issues, and also thank Chet for his unselfish dedication to organize and timely prepare it.

Pedro Moreno, December, 2002

15TH PROCEEDINGS IOCV

John da Graca, Nuria Duran & Bob Milne

Of the 113 papers and posters presented in Cyprus, we received 76 manuscripts (2 invited reviews, 55 full papers and 19 short communications). The remaining 37 were submitted as abstracts. All the full-length papers were reviewed by two referees, and after these reviews, editing and revisions, the final proceedings will have 2 reviews, 39 full papers, 32 short communications and 40 abstracts.

Final editing of the last 7 papers will be completed early January, and everything will then be sent to the printers (E.O.Painter Printing Co., FL). Galley proofs should be with authors shortly thereafter.

MEXICO AND TEXAS AS HOSTS FOR 16TH IOCV CONFERENCE - NOVEMBER, 2004

John daGraça and Mario Rocha Peña

The citrus industry in Mexico is of major economic and social importance. It is a permanent source of income and provides employment for nearly 28 million people per year. Currently, there are approximately 57,000 citrus growers with more than 175 packing houses and numerous related industries nationwide.

The first citrus plants were brought to Mexico by the Spaniards as early as 1518. However, the first commercial grove was established with the sweet orange Washington Navel in the 1890's in Montemorelos, Nuevo Leon. The majority of the citrus in Mexico was planted between 1920 and 1950 using propagative material from California, Florida, and Texas. At that time, little was known about virus and viroid diseases and no certification or testing programs existed. Since little attention was given to the disease condition of the various cultivars brought into Mexico, it is thought that the citrus diseases that exist in Mexico were brought in with these propagation materials.

Citrus species

At present there are approximately 495,000 hectares of citrus in Mexico. The industry consists of 67% sweet orange (70 % of which are old line Valencias), 19% Mexican lime, 5% Tahiti lime, 6% mandarins and mandarin hybrids, and 3% grapefruit and lemon. Most of the sweet orange, grapefruit, mandarin and Tahiti lime trees are on sour orange rootstock. Within the last 10 years however, rootstocks such as Troyer and Carrizo citrange, and Cleopatra mandarin have become more popular. Approximately 45% of the Mexican lime industry consist of seedling trees and the rest are trees grafted primarily on Alemow and a few on other rootstocks such as sour orange, Volkamer lemon, and *Citrus amblycarpa* .

Citrus regions

Citrus in Mexico is grown in different climates and ecological regions. In the northeastern states of Nuevo Leon and Tamaulipas, citrus is grown under high temperatures in the summer and low temperatures in the winter, which provi des an appropriate environment for excellent fruit color and juice quality. Rainfall is erratic and scarce (ca. 700 mm/yr); therefore most groves are irrigated. The main problems in this part of the country are limited water supplies and the risk of recurrent freezes every year. Citrus is also grown in the northwest part of the country in the state of Sonora. Here the climate is hot and extremely dry most of

the year, with no more than 200-300 mm/yr of rainfall. Fruit color and juice quality in Sonora are also good. Most of Mexico's citrus is grown in the central and north of Veracruz and the eastern part of the San Luis Potosi region along the Gulf of Mexico where it is hot and humid. Rainfall is abundant (ca. 1500-2000 mm/yr), but not well distributed throughout the year. Some of the plantations are irrigated to compensate for the periods when the rainfall is erratic. In this part of the country some groves are grown on rolling hills and slopes, which makes grove management difficult. Fruit quality is generally only fair under these tropical conditions.

Sweet oranges are the predominant crop along with some mandarins and grapefruits in the states of Nuevo Leon, Tamaulipas, Sonora, San Luis Potosi, Veracruz, Tabasco and Yucatan. Most of the Mexican lime industry (80,000 hectares) is grown in the central pacific coast of Mexico in the states of Colima, Michoacan, and Guerrero. Here the climate could be considered tropical dry, with annual rainfall between 700-800 mm. The other state where Mexican limes are grown is Oaxaca where the climate is tropical humid with 1000-1200 mm of rainfall every year. In general Mexican lime fruit quality is good. Tahiti limes have become very popular in the last 10 years. At present there are approximately 32,000 ha distributed mostly in the states of Veracruz, Tabasco, and Campeche, with increasing areas in Colima, Michoacßn and Oaxaca. The color and juice quality of Tahiti lime fruit is good.

Proposed IOCV program

Days 1-2: The delegates would travel from overseas to any point in the United States (New York, Los Angeles, Miami, Houston, etc.) From there take a connecting domestic flight to McAllen or Harlingen, via Houston or Dallas-Fort Worth.

Day 3-5: Pre-Conference tour. Visit the Texas Citrus Industry, research facilities at the Texas A & M University Citrus Center and Experiment Station in Weslaco.

Day 6: Ground transportation from Weslaco, Texas down to Monterrey, Mexico (4 hours).

Day 7-11 Conference. 1) the Oral and Poster presentations; 2) Tour to the Montemorelos and General Teren citrus industry area to visit packing houses, processing facilities and citrus groves. 3) Visit to some local tourist places.

Day 12. Transportation from Monterrey to Veracruz by plane (90 min flight). Ground transportation Veracruz-Martinez de la Torre area (4 hours).

Day 13-14. Post-Conference tour. Visit the citrus industry in the Martinez de la Torre area. Visits to citrus groves, packing houses, processing facilities and certified nurseries.

Day 15 Ground transportati on from Martinez de la Torre to Veracruz (4 hours).

Day 15-16 Departure from Veracruz to any destination to either inside Mexico or overseas via Mexico City or Cancun.

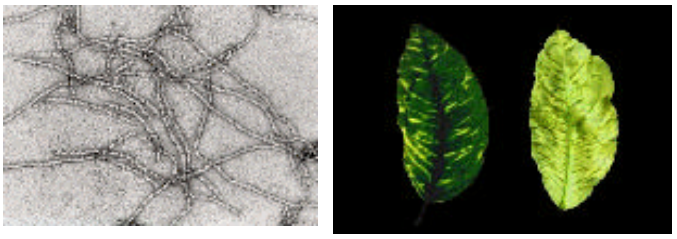
PRE-CONFERENCE TOUR: The Lower Rio Grande Valley (LRGV) is located in the southern part of the state of Texas bordering on the northeastern part of Mexico. The citrus industry, which really got established around 1920, covers about 30,000 acres (12,000 hectares) and is composed of grapefruit (70%) and sweet orange (30%); it is primarily for fresh fruit production. The Texas A & M University-Kingsville Citrus Center is located in Weslaco; some citrus research is also conducted at the nearby Texas A & M University Experiment Station and USDA-ARS center. The LRGV is where most of the pigmented grapefruit varieties (Ruby Red, Ray Ruby, Henderson, Star Ruby and Rio Red) originated.

CONFERENCE: The city of Monterrey is the capital of the state of Nuevo Leon in the northeast part of Mexico. The city is well known for the hospitality and friendship of the people. Monterrey is selected every year for a great number of events and scientific meetings, both from Mexico and abroad, mostly because of its excellent infrastructure and lodging facilities to organize these events. But that's not the whole reason. The city offers visitors lots of fun and entertainment, and whoever honors the city with their presence will not only attend a first level event, but will also enjoy everything the city has to offer.

POST CONFERENCE TOUR: The citrus industry in the state of Veracruz represents close to the 40% of the whole citrus industry in Mexico. The citrus industry there consists of more than 190,000 hectares of citrus, mostly planted with oranges, and to a lesser extent with Tahiti lime tangerines and grapefruits with 70 packing houses and 20 other processing facilities.

FROM INDIA
Y.S. Ahlawat

Dr. A.A. Alshami a Ph.D. student from the republic of Yemen did very good work for his Ph.D. thesis on citrus yellow vein clearing disease. He established the etiology of this disease as filamentous virus which was found to be different from Indian citrus ringspot virus (ICRSV). The antibodies were prepared and diagnostics with ELISA and ISEM developed.



Showing the symptoms of yellow vein clearing disease (right) and association of filamentous virus particles (left)

Another students of mine Mr. Hoa from Vietnam has developed skills for STG and now we have nucleus stock of commercial varieties free from viruses.

Dr. R. P. Singh, Virologist, Potato Research Centre, Agriculture & Agri. Food Canada is presently with us to work on diagnosis of citrus viruses in Multiplex PCR. He was in this Department from 6th Nov. to 7th Dec., 2002. I am glad to inform you that we can now detect CTV, HLB, CRSV, CYMBV and exocortis viroid in PCR systems individually and in certain combinations using the primers cocktail.

FROM BAHIA, BRAZIL
BAHIA CITRUS BARK SCALING

Cristiane de Jesus Barbosa, Hermes Peixoto Santos Filho, Osmar Nickel and Orlando Silva Passos

The first detection of citrus psorosis in Brazil was at the end of the 1930's. Since that time, the disease has caused considerable damage to sweet oranges in the Brazilian northeastern region. Thirty years after the first appearance of psor osis, a bark scaling disorder was identified in sweet orange and grapefruit trees in the State of Bahia. The lack of typical citrus psorosis-A leaf symptoms

in the field or even in inoculated indicator plants was attributed to the interference of climate and the high, tropical temperatures which might prevent citrus psorosis symptom expression. The hypothesis that the disorder was not due to Psorosis -A was not considered at that time. However, accumulated observations over the years on inoculated plants maintained under controlled lower temperatures, led to the conclusion that this disease could not be true psorosis-A, and it was given the name Bahia-type psorosis (tBa psorosis).

In numerous surveys in orchards of the State of Bahia it was shown that the disease affects all sweet orange varieties. In over sixty surveys conducted in orchards of the State of Bahia it was shown that the disease can affect more than 80% of the ¨Bahia`, Baianinha`, ´Natal` and ´Pera D9` varieties. Later, symptoms of tBa psorosis, were observed in sweet orange, mandarin and grapefruit varieties, independent of age or origin, whether nucellar or old clone, micrografted plants or seedlings. The typical psorosis-A leaf symptoms have never been observed on field plants.

Different types of inoculum have been tested under field and greenhouse conditions in the attempt to graft-transmit the disease to citrus and related genera, including buds, leaves, lesion-bark pieces, roots and also Cuscuta spp.

Under controlled conditions in greenhouses, (day temperatures of 28ºC+/-2ºC and minimum night temperatures of 16ºC) no psorosis type leaf symptoms have been observed. However when, in one experiment, temperatures were maintained at 18ºC in a cold chamber, Dweet tangor and Madam Vinous sweet orange indicators reacted with typical, clear leaf symptoms, such as vein clearing, banding and oak leaf patterns. Chenopodium quinoa could not be infected with sap from these symptomatic plants, neither could symptoms be propagated by grafts. It should be taken into consideration that at least the Dweet tangor indicator is known for its propensity to a genetic reaction with mild spotting and for occasional physiological reaction to environmental conditions producing false positives.

Mechanical transmission with partially purified leaf extracts from diseased plants and aphid transmission was attempted to herbaceous plants. The soybean cv. ´Braag` reacted with symptoms to both inoculation methods. Samples of these experimentally inoculated plants and from affected orchard grapefruit plants, examined by electron microscopy, did not show virus particles.

In order to check the hypothesis of the existence of an insect vector, due to natural spread of the disease, in the beginning of the 1990's 244 young grapefruit trees free of symptoms were planted in a field close to a block of affected old grapefruit plants. Four trees were maintained in several screened cages. Two to three years after planting, the first plants with bark scaling were observed. Presently over 90% of the trees left unprotected show several degrees of scaling and gumming, while the protected plants remained healthy. The data show a clear progressive advancement of the disease beginning close to the inoculum source and becoming less dense with increasing distance. However, in another experiment established in 1987 with 7 sweet orange varieties close to a block of heavily affected Marsh seedless grapefruit trees, no trees with bark scaling was observed by 1994, when the experiment was discontinued. These results indicate that there may be considerable differences between sweet oranges and grapefruits respecting epidemiology and disease development.

Histopathological studies demonstrated that trees with Bahia bark scaling do not have the classical staining lesions in the trunk wood associated with psorosis-A. However, the primary lesions of Bahia bark scaling observed in affected samples are identical with those of psorosis-A. Cross-protection tests between Bahia bark scaling and psorosis-B have been negative.

When affected grapefruit samples were analyzed by RT-PCR using CPV specific primers and molecular hybridization with psorosis-A specific probes, negative results were obtained.

The etiology of the disorder is still not clear and its nature remains unknown. Experimental data, however, show that it should not be included in the citrus psorosis virus disease group. Therefore it is suggested that the name Bahia Citrus Bark Scaling be adopted for this disease.

FROM SPAIN
Nuria Duran-Vila

Following the finding that in addition to CEVd and the causal agent of the cachexia disease, commercial citrus were also infected with other citrus viroids, we felt it was necessary to investigate the effect of all the citrus viroids under field conditions. With the input of Prof. Bové, a cooperative project between the Instituto Valenciano de Investigaciones Agrarias (IVIA) and the INRA station located at San Giuliano in Corsica was established. Clementine mandarin grafted on Pomeroy trifoliate was the scion/rootstock combination chosen as appropriate for the observation of exocortis and cachexia symptoms. In May 1989, Pomeroy trifoliate orange seedlings were graft-inoculated with 12 single viroid sources and 31 viroid combinations (six plants per treatment and six non-inoculated controls). Buds of the commune clementine SRA85 selection from the Corsican budwood registration programme were grafted on the trifoliate orange seedlings and the following year, the young trees were transplanted to a field plot of the SRA station located at San Giuliano (Corsica, France). Dr. Vogel was personally involved in preparing the plants and establishing this assay in the field. After his retirement, Christian Chabrier at first and then Christian Verniére in cooperation with Albert Dubois and Lucien Botella have been in charge of monitoring the field plot. Nuria Duran-Vila has made several trips to Corsica for the evaluation of symptoms and the personnel of the San Giuliano Station have done a tremendous amount of work maintaining the trees and taking yearly data on tree size and production. This year we decided to terminate the experiment, and Prof. Bové, Christian Verniére, Albert Dubois and Nuria Duran spent 10 days together in Corsica taking the final data, after decapitating the trees and peeling the bark. We are now in the process of evaluating the results and we hope to be able to produce a joint publication very soon. We are all very happy about this lasting cooperation between Corsica and Spain and we are entertaining further joint collaborations on citrus viroids.

We are now also in the process of initiating a cooperative project with the National Institute of Agricultural Research in Tunisia (INRAT) to evaluate the effect of citrus viroids on trees of their excellent Maltaise sweet orange grafted on several rootstocks. The General Director of INRAT has supported the proposal presented last October and Mme. Najar Asthma agreed to be in charge of coordinating the activities. In this way we hope to learn more about citrus viroids in Tunisia.

FROM FRANCE
Monique Garnier

1. Josy Bové and myself were in Nepal in September, 2002 and we created a PCR laboratory for HLB detection at RONAST (Royal Nepalese Academy of Sciences and Technology) in Kathmandu. This was done in the framework of a program and with the support of the French Minister of Foreign Affairs.
2. Following the invitation of the Bhutanese government, Josy Bové and myself surveyed citrus in the Punakha valley of Bhutan during a week in August, 2002 and demonstrated the presence of "Candidatus Liberibacter asiaticus" in symptomatic citrus trees by PCR.

FROM NEPAL
C. Regmi

1) The establishment of (PCR) Laboratory at RONAST

The Royal Nepal Academy of Science and Technology (RONAST) has established the Polymerase Chain Reaction (PCR) Laboratory with full-fledged facilities for the diagnosis of Huanglongbing disease of citrus.

The French embassy to Nepal provided financial support and Prof. J. M. Bové and Dr. Monique Garnier of INRA, France not only made their effort to select and procure the required equipments and chemicals, but also to dispatch them from France to Nepal and also to come to Nepal for their installation. They kindly gave training to RONAST scientific staff to properly handle the equipment. The various equipment was handed over by the current First Secretary of French Embassy Ms. D. Plassard to the Vice Chancellor of RONAST in a very special ceremony on September 10, 2002 . The equipment was made available with the kind cooperation of His Excellency Mr. C. Ambrossini, the Ambassador of France to Nepal. We extend our great appreciation to His Eminence Mr. Ambrossini, Prof. J. M. Bové, Dr. Garnier and Ms. Plassard for their kind cooperation in this regard.

2) A Training Workshop on PCR Technique for the diagnosis of Huanglongbing of citrus.

RONAST organized a 10 day training programme on the PCR technique for the diagnosis of Huanglongbing during September 2 -11, 2002. Prof. J.M. Bove and Dr. Monique Garnier were the resource persons and the trainees were ten scientific staff members from RONAST and one scientist from Bhutan. The training workshop covered procedures of sample collection, DNA extraction, running PCR as well as running electrophoresis for the final visualization of the gel under a trans-illuminator. The resource persons also gave relevant lectures and demonstrated the entire PCR procedure in the lab while the trainees, after getting training, performed all the activities themselves under the supervision of the resource persons. As a result of this training, RONAST scientists have now developed all the skills for running the PCR technique for the diagnosis of Huanglongbing of citrus.

Huanglongbing has been considered as the most important problem for citrus development in Nepal. With the establishment of PCR Laboratory and after getting the training on technical know how on PCR, RONAST has developed its capability for the quick and reliable diagnosis of Huanglongbing disease of citrus and it is fully devoted to provide service for the same in the country.

FROM FLORIDA
Richard Lee

Dr. Mahrokh Rastegar, Fersowsi University of Mashhad, Mashhad, Iran is spending a sabbatical with Richard Lee and Ron Brlansky, University of Florida, CREC, Lake Alfred. She arrived in Florida in July and will return in March 2003. She is working on the evaluation of transgenic plants for resistance to CTV and populations studies on CTV. Dr. Kajal Biswas, Indian Agricultural Research Institute, West Bengal, India, is spending a year -long sabbatical leave with Richard Lee working on population studies of CTV and characterization of citrus leprosis virus.

FLORIDA BUDWOOD PROGRAM
Michael Kesinger

It has been five years since the Florida budwood program became mandatory and the nursery industry strives to increasingly utilize screen-protected budwood. Forty-nine percent of the nursery source material originates from scion groves, twenty percent of which is under screen. Propagating material from increase blocks rose to 41%, of which 57% percent is greenhouse grown. Of the 1,621 budwood scion trees planted in the past twelve months, 67% are in screenhouses or greenhouses.

Florida decline strains of citrus tristeza virus continue to wreak havoc on the state's sour rooted trees. Decline strains are still only showing up at a relatively low level in budwood scion source trees at 4.7% infection. Detection in nursery increase blocks after two years is still at less than 1%. In the past five years 1,529 scion trees have been lost to severe CTV infection.

Currently, Florida has 71 active commercial citrus nurseries that propagated 5.8 million trees last year. Valencia, Hamlin, Earlygold and Midsweet continue to be the state's most propagated sweet orange varieties. Swingle, Carrizo, Smooth Flat Seville and Volkamer lemon are the four top used rootstocks for 2001-2002. The heavy use of trifoliate hybrid rootstocks in Florida emphasizes the need for viroid free propagating material. An aggressive viroid indexing program, testing approximately one thousand source trees a year, both biologically and then following up with PCR detection, identified twenty-two scion trees which were lost to viroid infection in the past five years.

The bureau hopes to do more indexing for citrus leaf blotch virus and tatter leaf virus in the near future as we pursue funds to build a cool temperature greenhouse for this purpose.

Dr. Sieburth has been testing new techniques to differentiate tristeza stem pitting strains from endemic Florida decline strains.

The budwood program recently started housing some of their newest germplasm in a greenhouse at another location. This has helped somewhat with overcrowding and the diversity of another location affords some additional protection.

FROM IRAN
A. Pakniat, A. Izadpanah and A. Shahsavar

A decline of Navel orange characterized by yellowing and browning of veins in Darab (Fars) .

A type of decline affecting Frost and Washington Navel sweet orange on Mexican lime (*Citrus aurantifolia*) and Bakravi (*C. limettiodes*×*C. reticulata*) rootstocks has been observed in Darab (Fars province) since 1998. The symptoms of the disease consist of vein clearing in young leaves in early spring followed by yellowing and browning of the veins and die back of young shoots which later extends to older shoots. Bark eruptions, gum exudation and stem pitting are observed on affected shoots. Blossoming is greatly reduced.

Buds from affected trees produced mild vein clearing in Mexican lime seedlings under greenhouse condition. Citrus tristeza virus (CTV) was detected in affected navel orange trees by ELISA and electron microscopy of bark samples.

The disease , however , was eliminated from six Frost Navel sweet orange plants by shoot tip grafting while CTV was still present in these plants.

A. gossypii and *A. craccivora* transmitted CTV from infected Washington navel to Mexican lime, the latter showing vein clearing , growth reduction, defoliation and decline.

These results show that although CTV may play a role in the development of the Navel orange disorder, other factors which were excluded by shoot tip grafting are also involved.

FROM CROATIA
Djana Skoric

The first steps of the citrus certification in Croatia

Contrary to almost everybody's beliefs, Croatia does grow citrus in the southern coastal region - Dalmatia, which is between the north latitudes 42° and 44°, and probably represents the northernmost commercial citrus growing area in the world. Therefore, our cultivars are mostly limited to the cold tolerant satsuma mandarin (Citrus unshiu Marc.), but also lemon and sweet orange only in some of the warmer micro-locations. The

early ripening season of satsuma cultivars allows them to avoid potential winter freeze of the fruits. Compared to the biggest, our citrus industry with the production of 30,000 tons of satsuma mandarins per year is tiny but ever since the introduction of early satsuma cultivars it has been a lucrative family business.

The development of the modern citrus industry in Croatia started less than 40 years ago, as an integral part of an FAO project of land reclamation in Lower Neretva Valley (The Neretva Project, UNDP/SF/FAO. No.63). In order to realize such a project it was necessary to create a suitable varietal program. By the help of FAO experts (A.D. Alexandrov, Luis Blondel, E. Calavan, H. Chapot, C. Roistacher and others), more than 110 types of citrus were collected from Corsica, California, Georgia (ex USSR republic) and Japan.

Unfortunately, the complete foundation citrus stock - species, cultivars and clones collected and established in the Experimental Field Station in Neretva Valley from 1964 onwards, was lost at the time of war (1991-1995) in ex-Yugoslavia. The rebuilding of the citrus foundation stock is indispensable for further development of our citrus industry. Nevertheless, we are lagging with the implementation of the citrus certification program.

An effort of the team lead by the citriculturist Dr. Zivko Gatin from the Institute for Adriatic Crops and Carst Reclamation in Split has finally resulted as a project: "Organization and Implementation of the Foundation Mother Blocks of the Genus and Species of the Fruit Trees Cultivated on the Adriatic Region of Croatia". The Institute has managed to build facilities (an insect-proof greenhouse and a tissue culture laboratory) that are going to be used for the citrus certification. This is quite an achievement in our present conditions! Some of the procedures leading to the production of the clean citrus material (thermotherapy, shoot-tip grafting) will take place at the Institute under the supervi sion of Dr. Danijela Hartl. Most of the virus and viroid testing is planned to be performed in Zagreb, some 400 kilometers away, at the Department of Biology/Botany (Faculty of Science, University of Zagreb) by a supporting team of molecular biologists and virologists Dr. Dijana Škorik, Dr. Mladen Kraja and Silvija Cerni.

We are open to suggestions and cooperation in the hope that our «shaky toddler» will take its real first steps soon.

FROM BELIZE

Francisco Gutierrez

Swingle decline

The Swingle decline problem reported last year was diagnosed as being caused by a soil factor. The rootstock variety, which is a cross between grapefruit and trifoliate orange, does not tolerate soils with high clay content or soils with compacted sub layers. The studies conducted to determine the cause of the decline included laboratory and field analysis of probable graft transmissible diseases and root pathogens, as well as soil studies. One soil study consisted of digging observation pits in the affected areas as well as areas of good production on Swingle rootstock. The study revealed that all affected groves contained soils with compacted clay layers. Non-declining groves presented soil profiles that were deep and light with no compacted layers. The results of this study have been reported in our Belize publication `CitriNews' and `CitroScope' and through the meetings carried out in the communities. Swingle is no longer planted out in heavy soils and growers are approaching CREI for recommendations regarding the use of rootstocks.

CONFERENCE IN CHINA

Andrew Beattie, Zhou Chang-yong, Xu Zhi-hong

The 15th International Plant Protection Congress will be held in Beijing, China, July 6-11, 2003. Details of the Congress can be found at the Second Circular at http://www.ipmchina.net/ippc/. At present various symposia are being organized. We have been asked and have accepted an invitation from the Chairman of the Organizing Committee to act as co-organizers for one of the many symposia. This is a very comprehensive congress and should prove exciting. The symposium we have been placed in charge of developing is: Symposium # 9.2 entitled "ORCHARD PEST MANAGEMENT---Pests of Citrus Fruits". We are presently inviting a number of leading scientists (researchers) working in the area concerned with increasing our understanding of citrus orchard pest management to participate in this symposium. We plan a full day of presentations with each participant having about 15 minutes. However, this time period may change depending on the number of participants and the time we are given.

We are aware that IOCV has been very active in this area of research and we are writing to ask you to participate in our symposium. We believe that your participation in this symposium will help bring attention to this important area of research. Hoping to receive a positive response, we would like you to provide us with 2 things. 1) A tentative title and 2) An abstract. We also need a response from you by the middle of February, 2003. This will allow us time to fill in any gaps in the program. It is our intent to develop an outstanding symposium and anticipate your active participation to make this a successful one.

Please note that as the symposium co-organizers we are unable to provide any financial assistance for your participation in this Congress. However, we will be glad to develop a special invitation letter directed to whom ever you indicate if such a letter will help you in leveraging funds. Just let us know.

Co-Organizers are: Dr Andrew (GAC) Beattie, Associate Professor, Centre for Horticulture and Plant Sciences, University of Western Sydney, Locked Bag 1797, Penrith South DC NSW 1797 Australia; Dr. Zhou Chang-yong, Citrus Research Institute of the Chinese Academy of Agricultural Sciences, Beibei, Chongqing, 400712 P.R. China. Email: cyz021102@sina.com. Prof. Xu Zhi-hong, Institute of Applied Entomology Agriculture & Biotechnology College, Zhejiang University, Hangzhou. Email: zhhxu@zju.edu.cn

FROM VIETNAM

Thu Hong Le Thi

Citrus Huanglongbing (HLB) is still a big problem of citrus plantations in Vietnam. From 1995 to now, SOFRI-Vietnam with the kind cooperation of personnel and organizations have thus far developed a total of 194 good clones of 15 citrus cultivars. These were "cleaned " by shoot tip grafting and indexed for CTV and HLB.From March 26th to April 16th, 2000 Prof. Bove and Dr. Garnier visited SOFRI and helped us in improvement of HLB detection on pummelo. As a result of their work it was found that in the leaves of pummelo there was an inhibitor of TAQ polymerase action in PCR. Hence the detection gave unstable results and false negative PCR. Therefore, for field pummelo sampling we have to extract DNA from the inner bark of the branch. From July 23rd to August 15th, 2002, Dr. Onuki (JIRCAS -Japan) visited SOFRI and worked in our laboratory for 2 weeks. We found that the idostarch histological method could detect HLB and it may be a good alternative or an additional tool for rapid diagnosis. Dr. Federic Gatineau of CIRAD, France is working long term at SOFRI and also for HLB research under the framework of CS2/2000/043 huanglongbing management for Indonesia, Viet Nam and Australia.

FROM THAILAND

Meisaku Koizumi,
Director of ARC-AVRDC

I have been, with my wife Sumiko, in Bangkok, Thailand since May 2001. Both of us are very well and enjoying our stay

here. I still have an office at HQ in Taiwan, but only go back three times per year for a short stay. I am managing the Asian Regional Center (ARC) of the Asian Vegetable Research & Development Center and coordinating two big projects which target the Mekong Region Countries and somewhat includes China. I often travel to these countries to visit project sites or attend in-country training workshops to which local extension peoples and lead-farmers are invited. Our clients are poor farmers in rural areas. There are so many farmers having income annually USD $150 or less. It is still difficult to access new information and technologies to them which will improve their situation once after adoption. We intend to provide and extend opportunities for them to access useful information and technologies.

I can not consult local people for controlling citrus diseases because of the shortage of my time. However, I try to ask local peoples about the current situation of the Huanglongbing disease. In southern Vietnam, especially in the Mekong Delta, there are many new plantation of pummelo (*Citrus grandis*), even in paddy fields. Apparently, there are no symptoms of HLB disease. I think, there is one institute for fruits in the Mekong region which is having some success in producing pathogen-free stocks and increasing them to be delivered for farmers production. We can see lots of pummelo fruit selling at small shops along the national road. In contrast, there seems to be a complete lack of information about greening disease in Cambodia, Laos and Myanma filtering down to the farmers. Since the potential of fruit production in those countries could be very big as a cash crop for rural, upland or steep lands, we need some projects to disseminate information and transfer technologies soon.

FROM ITALY

Bob Milne

Gabriella Rustici, Bob Milne and Gian Paolo Accotto from the Torino lab have recently published "Nucleotide sequence, genome organization and phylogenetic analysis of Indian citrus ringspot virus" (ICRSV) in Archives of Virology 147:2215-2224 (2002). It is shown that ICRSV, with flexuous filamentous particles, somewhat resembles potexviruses but differs from them in having a larger coat protein and an extra open reading frame at the 3' end of the RNA. Somewhat similar ORFs are possessed by carlaviruses and allexiviruses. The bottom line is that a new viral genus will probably have to be invented to accommodate ICRSV. Ahlawat's group in Delhi are continuing work on this virus, and Bob Milne hopes to visit there in February, 2003 to collaborate.

Anna Maria Vaira, Gian Paolo Accotto, Antonella Costantini and Bob Milne have examined highly conserved sequences in the polymerase genes of different ophioviruses, deriving PCR primers that have detected all ophioviruses examined (three citrus psorosis virus isolates, and isolates of ophioviruses from freesia, lettuce, ranunculus and tulip). Other viruses were not recognized by the primers. This is preliminary work, but the hope is that these primers will function as a 'universal' ophiovirus detection tool. That would hopefully mean the ability to detect all types of citrus psorosis virus, and also any other ophioviruses out there, at present unsuspected. Sequencing of the PCR products obtained enabled us to construct a tentative ophiovirus family tree. The work will appear shortly in Archives of Virology.

CITRUS LEPROSIS MEETING

John daGraca

The Surveillance & Emergency Programs Planning & Coordination of USDA-APHIS-PPQ organized a citrus leprosis workshop in December, 2002 in Lake Alfred Florida; the coordinator was Joel Floyd. This disease currently causes major losses in Brazil, and its appearance in some Central American countries and the existence of the Brevipalpus mite vectors in the United States has raised concerns about its possible introduction. The meeting was well attended by people from Florida, California, Texas and Arizona, who heard presentations on the current status and knowledge of the disease and its vectors. Amongst the presenters were Elliot Kitajima, Jose Carlos Rodrigues, Richard Lee, Ronald Brlansky and Carl Childers. Amongst the attendees were some other familiar IOCV faces: Dave Gumpf, Tim Gottwald, Ken Derrick, Mark Hilf, Peggy Sieburth, Laurene Levy, and John da Graca. It was clear that much research needs to be done. After much discussion research needs were identified covering early detection, identification of both virus and mites, survey methods, regulatory responses and control strategies.

USDA-ARS NATIONAL CLONAL GERMPLASM REPOSITORY AT RIVERSIDE, CALIFORNIA

Robert R Krueger, Curator

The Germplasm Repository continues its core mission of acquiring, maintaining, and distributing germplasm of citrus, related species, and date palms. The maintenance of a Protected Foundation Block makes it possible to distribute pathogen-tested citrus budwood to qualified requesting scientists. Available accessions now number over 300.

A new project for the Repository which was initiated in 2002 is the development of a technique for rapid detection in field trees of *Spiroplasma citri*, the causal agent of citrus stubborn disease. Most regulatory language currently requires the somewhat time consuming culture method developed in the 1970's by the California and French workers under Calavan and Bove. A greenhouse indexing method using sweet orange indicators in a warm chamber is also available, as are PCR primers. These techniques work well with small trees maintained in a greenhouse or screenhouse. However, detection in field trees has been problematic due to the irregular spatial and temporal distribution of the pathogen within the tree as demonstrated by Calavan's group many years ago.

We are working at refining the PCR technique and sampling procedure so as to make sampling from mature field trees feasible. We are also attempting the synthesis of broad-range anti-sera suitable for a serological test, which would be the most suitable technique for large-scale testing. As a part of this research, we are collecting a range of isolates from within California and assessing the genetic diversity present. The diversity of *Spioplasma citri* from different geographical areas of California has not been determined previously. This work is being performed by Dr Benjamin Rangel, a recent and valuable addition to our staff.

More detailed information on our Germplasm Repository activities, including Annual Reports, can be accessed at <http://www.ars-grin.gov/riv>, or by e-mailing to: <rkrueger@citrus.ucr.edu>. See also slide show # 117 in <www.Ecoport.org>

FROM BRAZIL-1

Marcos Antonio Machado

Citrus sudden death: current situation

Citrus sudden death is a new disease affecting almost all citrus varieties grafted on Rangpur lime, the most important rootstock in the Brazilian citrus industry. In the first stage of the disease, trees present pale green leaves, followed by a pronounced drop of leaves, dieback of twigs, and occasionally growth of suckers of the scion and the rootstock. This symptomatology develops very quickly to the third and last stage, in which all leaves drop, and according to the season of the year, fruits in the initial stage of development remain attached to the plant. The tree wilts completely, and dies. Yellowing of the tissue in the cambium of the rootstock can be also observed. About six months elapse from the beginning of symptoms to the death of the tree. The symptomatology is more striking during spring. So far the symptoms are observed only on trees older than two years. No clear alterations associated to incompatibility between scion and

rootstock have been detected. A root system with few feeder roots and different stages of root rot can be observed. Neither fungus, Phytoplasma, bacteria, viroids, nor nematodes are associated with this disease.

The spatial evolution of the anomaly, which affects up to 85% of trees in the grove in a six-month period, points to the existence of focus and transmission by airborne vectors. Both sweet orange varieties (Valencia, Hamlin, Natal, and Pera) and mandarins grafted on Rangpur lime develop symptoms. Other rootstock varieties (Cleopatra, Sunki, Volckameriana lemons, Swingle citrumelo) are thus far tolerant. Under several aspects the symptoms are quite similar to quick decline of sweet orange grafted on sour orange rootstock caused by CTV. The disease seems to have an incubation time of over two years, and is still limited to few orchards in the northwestern Sao Paulo and southwestern Minas Gerais states. A great joint effort of Fundecitrus, Citriculture Center in Cordeiropolis and Universities, supported by the Science and Technology Secretary is underway to establish the etiology, transmission, epidemiology and control using new rootstocks.

FROM BRAZIL-2

Alessandra Alves de Souza

Functional genome of Xyllela fastidiosa

Microarrays approach has used as tools for comparison of expressed genes of *X. fastidiosa* growing under different conditions. The group from the Citriculture Center in Cordeiropolis and the group of the University of Mogi das Cruzes verified that the majority of the genes show the same expression pattern, even though when the bacteria have different virulence. Primary isolates from infected trees are more virulent than bacteria growing in artificial medium for a long time. Bacteria growing in primary growth conditions (PGP) express some genes involved with adhesion biofilm formation. Genes encode afimbrial adhesions, which are directly associated with the bacterial cell surface. These adhesions are found in human and animals pathogens, where they promote adherence to epithelial tissue. The expression of these genes just under PGP conditions suggests that these genes could be involved in the adhesion of *X. fastidiosa* and blocking the xylem vessels. Pathogenicity tests with cells in PGP show that cells are able to colonize the plant faster, leading to a faster development of symptoms.

FROM BRAZIL-3

Maria Luisa Targon)

Haplotypes of CTV in plants affected with citrus sudden death .

The evaluation of CTV haplotypes in sweet orange trees with and without symptoms of citrus sudden death (CSD) by SSCP and sequencing of p20, p23 and p25 genes have been carried out at the Citriculture Center in Cordeiropolis. The results of SSCP showed high haplotype variation between trees. Sequencing data showed that there is a great variation in all the genes evaluated, showing that plant with sudden death present higher genetic diversity of CTV. However, to date, there is not a clear association between this high genetic diversity of CTV and sudden death. Experiments of transmission are underway to confirm or not the role of CTV in this new disease.

FROM ITALY

Angelo Caruso

First report of serious outbreak of tristeza

For our genetic improvement program, the Istituto Sperimentale per Agrumicoltura at Acireale, Sicily, made surveys in several Italian citrus regions with the purpose of selecting different clones of the most popular citrus cultivars. During these surveys, a high percentage of trees showing decline symptoms were found in some areas. Several diagnostic procedures were carried out on these trees in order to verify the cause of the decline. At the same time immunoenzymatic and electrophoretic tests were performed to know the phytosanitary status. These assays have been conducted in collaboration with the Dipartimento di Scienze e Tecnologie Fitosanitarie Sez. Patologia of the University of Catania.

What we found was positive diagnosis for the Citrus Tristeza Virus (CTV).

This is the first severe CTV outbreak with a large amount of dead and dying trees found in Italy. The disease has spread to several Italian areas on different citrus cultivars and thousands of trees are infected in field.

The first focus has been found in the area of Syracuse (Sicily) on plants of `Nova' tangelo , `Fortune' mandarin, `Miyagawa' satsuma and `Marsh seedless' grapefruit. A second outbreak was discovered in the province of Catania (Sicily) on Tarocco sweet orange. A third outbreak was reported in the area of Taranto (Apulia) on trees of old line `Navelina' sweet orange. The infections have been confirmed by RT-PCR using specific primers for the genes p20 and p23. Furthermore different isolates have been analyzed by the SSCP technique.

Because of these results we have started a more intensive monitoring so that the real situation of infection can be defined in order to begin a disease control program.

During the month of September, 2002, Dr. Adrian Sambade coming from the Institute Valenciano of Investigaciones Agrarias of Valencia-Spain has been a guest at our Institute. He has started a molecular characterization of the CTV isolates in collaboration with Dr. S. Davino and Dr. M. Guardo.

A first short-note about results is in press in Plant Disease.

PRESENCE OF 2 FOCI OF CTV IN APULIA , ITALY

Anna Maria d'Onghia and Khaled Djelouah

In the framework of the National Programme for the Mandatory Control of CTV in Italy (Ministerial Decree 16 November, 1996), several surveys had routinely been carried out in several Apulian citrus sites (mainly in nurseries and commercial orchards) by the Instituto Agronimico Mediterraneo di Bari (IAMB) in collaboration with the Regional Phytosanitary Service and the University of Bari. During the 6 years programme only 5 ornamental citrus out of about 20.000 tested plants have been found CTV-infected, all in the nursery. During the monitoring activity in the year 2002, two consistent foci of CTV infection weredetected in two commercial orchards along the Ionic sea, which represents the most important citrus growing area of Apulia. In the two foci, the symptomatology of the infected plants were apparently different. In one orchard only five CTV-infected plants of Navelina orange (14 years old) showed severe stunting and pitting in the wood of both rootstock and scion; in the second orchard the typical quick decline symptoms were showing in a larger number of plants: 40% in Navelina orange and 19% in Common Clementine. All were showing the typical necrosis at the bud union, inverse stem pitting in the sour orange rootstock and small sized fruits.

Following the directives in the Ministerial Decree, all infected plants (whose origin was Sicilian), were eradicated and a security area set up around the two foci. This area will be continuously and rigerously monitored. Moreover, a detailed map of the trees in this area was done and a study on the epidemiology of the disease has been carried out. The results will be published shortly.

FROM SOUTH AFRICA

Fanie Van Vuuren

PERSONAL - I am still recovering from two major operations where surgery was done on my lungs during the beginning of 2002. I went for a check-up in November and the specialists are satisfied with my progress to recovery. I want to thank every-one who thought about me during this difficult time. Thank you for all the e-mails and telephone calls. The most precious gift in life is health.

BUSINESS - Fanie van Vuuren, Michael Luttig and Kobus Breytenbach are doing all research concerning citrus graft transmissible diseases (GTD) in southern Africa. Kobus was the assistant of Lawrence Marais when he was with Outspan. The Outspan Citrus Center has been taken over by the citrus industry of southern Africa and is now called Citrus Research International (CRI). Funding for research on GTD is mainly by two institutions, the Agricultural Research Council-Institute for Tropical and Subtropical Crops (Fanie, Michael), and the southern African Citrus Growers Association (CGA-CRI) (Kobus). The latter organization includes growers from Mozambique, Swaziland and Zimbabwe. Fanie co-ordinates all research on GTD.

Our main objective is to control GTD of citrus. The most important aspect being the elimination of the diseases by shoot tip grafting. With our limited human resources, the two insect vectored diseases caused by Citrus tristeza virus (CTV) and Candidatus Liberobacter africanus (Huanglongbing) (HLB), get the most attention in our research.

On the citrus viroid front we have one trial where we investigate gum pocket disease. Four CVd-GRP III isolates were inoculated in Valencia on different *Poncirus trifoliata* selections (large and small flower types) and hybrid rootstocks. Two of these isolates have been sequenced and we are busy with the other two.

Research is continued on the CTV isolate that provides protection against HLB. This isolate reduces the canopy size of sweet orange and gives partial protection to HLB infection. The trees are now five years old and HLB reduction occurred in un-pruned and pruned trees. Michael is doing an in-depth study on this isolate for his PhD.

Another aspect on HLB control is embryo rescue from healthy chimeras of HLB infected fruit. Karin Hannweg, a biotechnologist, does the embryo rescues and then we evaluate the plants for HLB resistance or tolerance. We have challenged the first group of plants by exposing them to field psylla.

A little bit of work is also being done on bud-union creasing. This problem occurs mainly on Kumquat and Turkey Valencia (a new early Valencia).

Apart from the above, to give an idea on the CTV and HLB research we are doing, the following presentations were made at a recent southern African Citrus Symposium, held at Stellenbosch, where we reported on CGA-funded research:

Glasshouse evaluation of Beltsville Nartia Citrus tristeza virus sub-isolates. By J.H.J. Breytenbach, S.P. van Vuuren, M. Luttig & L.J. Marais.

Characterization of sub-isolates obtained by single aphid transmission from a Citrus tristeza virus isolate that interferes with Huanglongbing symptom expression. By M. Luttig, S.P. van Vuuren & B.Q. Manicom.

Differentiation of single aphid cultured sub-isolates of two South African Citrus tristeza closterovirus isolates from grapefruit by single-strand conformation polymorphism. By M. Luttig, S.P. van Vuuren & J.B. van der Vyver.

Changes in the Citrus tristeza virus status of pre-immunized grapefruit field trees. By J.B. van der Vyver, S.P. van Vuuren, M. Luttig & J.V. da Graça.

Searching for a cross-protecting Citrus tristeza virus isolate for Star Ruby. By S.P. van Vuuren.

The response of different red grapefruit cultivars to Citrus tristeza virus isolates. By S.P. van Vuuren.

Effects of Citrus tristeza virus isolates on Palmer navel and Delta Valencia on different rootstocks. By S.P. van Vuuren.

The effect of the rootstock and Citrus tristeza virus isolates on Huanglongbing (greening) infection of Palmer navel and Delta Valencia. By S.P. van Vuuren.

Constructing a superior Citrus tristeza virus isolate for the protection of grapefruit. By S.P. van Vuuren & M. Luttig.

Evaluation of Citrus tristeza virus isolates in clementine. By S.P. van Vuuren & J.G.J. Maritz.

Control of citrus graft-transmissible diseases in southern Africa.

By S.P. van Vuuren, M. Luttig & B.Q. Manicom.

FROM FRANCE
Bernard Aubert

During my visits in Haiti for consulting with Grand Marnier, the problem of extremely severe woody galls on sour orange twigs and branches was so far unexplained. I never believed that the vein enation - woody gall virus (VEWGV) was at stake in spite of the arrival of the brown citrus aphid over the last several years in this territory. I rather focused the attention on a fungus attack, and advised Christian Vernière accordingly. Christian confirmed that DNA testing for VEWGV was negative and succeeded to consistently isolate *Sphaeropsis tumefaciens* from recently affected green twigs. As a result, a new nursery, though badly affected, will be saved.

In May 2002 I visited Weizhou Island (South China near the Vietnamese border of Along Bay). This tiny Island is dedicated to banana production and some pummelos. A project of developing Huanglongbing-free citrus is being envisaged.

NEW ECOPORT LECTURE

A new http://Ecoport.org lecture will appear this February, 2003 titled "THE BENEFITS OF AND ARGUMENTS FOR MANDATORY CERTIFICATION OF CITRUS" by Chester Roistacher and Richard Lee.

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Robert Vogel (1929-2002)

J. M. Bove

Robert Vogel was born in Lyon, at the foot of the French Alps, in September of 1929. After his secondary education, he entered the prestigious "National School for Horticulture" located on the grounds of the "Château de Versailles", and received the diploma of "Ingénieur Horticole". Soon thereafter, in the early 1950s, he started his career in à Rabat, Morocco (still under French rule in those days), within the department of Horticulture, where he gained his experience in subtropical fruits, including avocados. At that time, Research on Citrus in Morocco was under Henri Chapot from the French Institute for Tropical Fruit and Citrus Research (IRFA). This was the time when IRFA decided to develop citrus in Corsica, and Vogel was asked to join the new citrus experiment station at San Giuliano, on the East coast of Corsica. He arrived there in May of 1959, and served at the station until his retirement in May of 1990.

After having lived for several years in his home on the station, where he welcomed such visitors as Leo Klotz, Gerald Norman, Victoria Rossetti, and Clair Calavan, he built a house, nearby, at Cervione, overlooking the Mediterranean Sea, where he also spent his years of retirement, enjoying the company of his 10 grandchildren, and growing delicious vegetables in his garden so beautifully kept. Since the late 1980s, he could not travel anymore, having had repeated surgery on the lower end of the digestive tube. The 1986 IOCV conference in Spain, where he reported on " An Agent Inducing Budunion Crease in Parson's Special Mandarin Grafted on Volkamer Lemon Rootstock", was the last one he attended. He lost his wife Madeleine in 1988. He died on the 18th of December, 2002 at the Bastia hospital after having had, a few weeks before, a pulmonary oedema. He is survived by three children, Chantal, Christian, and Evelyne.

Robert Vogel had devoted his life to the sanitary improvement of citrus in Corsica. When he began his work in 1959, "San Giuliano" was merely a "pilot" orchard, with no research tradition. Citrus grown on the island went from blood oranges to mandarins and clementines via grapefruits, lemons and citrons. Vogel surveyed the orchards for symptoms of virus diseases, and started right away to index suspicious trees on indicator plants. Over the years, and with the help of his technicians, Lucien Sire and Dominique Rossi, Vogel kept improving the indexing methods, and was eager to try every new technique or indicator plant that came up. An expert with the budding knife, he did not hesitate to use ELISA for CTV, or culture media for Spiroplasma citri. With the help of Maryse Nicoli, and later Albert Dubois, he

was the one who got the shoot tip grafting system going in Corsica. In this way, he could proudly report in 1988, that the Corsican station had a citrus collection of over 500 species and varieties free of virus and virus-like diseases. He was in charge of the program for the production of healthy citrus material, and he personally collected the budwood sticks requested from many citrus growing countries all over the world.

Louis Blondel became director of the San Giuliano station in 1962. It was he who guided Corsica to specialize in clementines. Therefore, Vogel devoted many efforts to successfully obtain many clementine cultivars free of graft-transmissible pathogens. In view of the tristeza threat, but also for obvious pedological reasons, sour orange, the only rootstock used up to 1959, became progressively replaced by other rootstocks, and especially Poncirus trifoliata, well adapted to the acid soils of Corsica. This required that efforts be concentrated on exocortis. One of the last papers by Robert Vogel, published in 1986, concerns the influence of exocortis on the growth and production of clementine trees grafted on 39 lines of P. trifoliata.

The very last experiment that he carried out before retirement, also involved exocortis. He undertook this experiment in collaboration with the group at IVIA in Moncada, Spain, and more particularly, Dr. Nuria Duran-Vila. In 1989, they inoculated clementine trees on P. trifoliata with single viroids, and combinations of 2, 3, 4, and 5 viroids, totalling 31 combinations and over 500 trees. Nuria Duran Vila, Christian Verniére and I analysed the trees, last July, and at this occasion we were glad to have lunch with Robert Vogel at Madame Costa's restaurant, at the beach. He told us that he had wanted to participate in the analyses, but did not feel well enough to do so. He would have been happy to see the beautiful symptoms on some of the trees he had inoculated some 13 years ago.

Robert Vogel came to know very well the symptoms of graft transmissible agents of citrus because of his many graft-transmission experiments, determining the host ranges of these agents, comparing their symptoms, separating viruses from mixed infections, obtaining single virus sources, graft-transmitting viruses with pollen, etc. At one stage, his experiments covered more than 15 hectares of land at the citrus station. Thus, well aware of symptomatology, in 1963, he was able to notice some strange symptoms on Tarocco sweet orange trees grafted on sour orange. The same symptoms occurred on both the sweet orange scion and the sour orange stock This observation led him to the discovery of cristacortis, a new graft-transmissible disease of citrus, hitherto confused with concave gum / blind pocket or cachexia, and widely distributed throughout the Mediterranean basin. The study of this new disease was the subject of his Ph-D thesis, which he defended at the University of Bordeaux in December of 1973.

Vogel was a rough person, but he was straightforward and loyal. He and I have passionately argued over experiments late into the nights, but after 43 years of arguing, we were still the best of friends. He was totally devoted to his work, and conveyed this spirit to his coworkers. He could be totally trusted. Together with Louis Blondel, Jacques Cassin, Guy Vullin, and Camille Jacquemond, he contributed greatly to the improvement of citrus in Corsica. Within 30 years, from 1960 to 1990, the Corsican experiment station became known for its competence in virus and virus-like diseases of citrus. Its reputation was based on rigorous policies for citrus sanitation. Today, paradoxically, and in spite of three tristeza outbreaks, it seems as if citrus in Corsica has had enough protection, since the last citrus pathologist has left the island a year ago.

Robert Vogel organized the Corsican part of two courses on citrus viruses, one in 1969 and one in 1976. He was responsible for the IOCV post-conference tour in Corsica in 1966. He was elected chairman of IOCV in 1975 in Athens, Greece, but declined the function because he felt not fluent enough in spoken English. From 1963 to 1986, he participated in all IOCV conferences, except one. He wrote over 100 papers, mainly published in "Fruits" and the proceedings of the IOCV conferences. He contributed greatly to the two editions of the IOCV slide collection, as well as to the exhaustive bibliography list of publications on citrus viruses up to 1975.

The name of Robert Vogel will forever remain associated with Cristacortis, which benefitted so much from his scientific talents and his experimental skills, with Corsica, which he served so well, and with Citrus, which was his life.

So long Robert.

INVOICE FOR IOCV PROCEEDINGS

DATE: _____

NAME: _____

ADDRESS: _____

FOR: _____

AMOUNT: _____

Vol	No.	Price	Shipping	Total	Shipping	
		US$	US$	US$	US$	US$
7	___	15.00	4.00	19.00	12.00	27.00
8	__	30.00	5.00	35.00	14.00	49.00
9	__	30.00	5.00	35.00	15.00	50.00
10	__	30.00	5.00	35.00	15.00	50.00
11	__	35.00	5.00	40.00	15.00	55.00
12	__	35.00	5.00	40.00	15.00	55.00
13	__	40.00	5.00	45.00	15.00	60.00
14	__	40.00	5.00	45.00	15.00	60.00
15	__	40.00	5.00	45.00	15.00	60.00

(15th Proceedings to be available Spring 2003)

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