

**REPORT ON THE 12th INTERNATIONAL PLANT VIRUS EPIDEMIOLOGY SYMPOSIUM – Evolution, Ecology & Control of Plant Viruses -, held at Arusha, Tanzania. 28 January – 1 February 2013.**

**The 12th International Plant Virus Epidemiology Symposium** marked a special milestone in our ICPVE's history - **the first one in Africa** -, a unique feat for which we are very proud. This Symposium was the 12<sup>th</sup> of international symposia held every 3 years under the auspices of the International Committee on Plant Virus Epidemiology (ICPVE) (<http://www.isppweb.org/ICPVE/>), which is part of the International Society of Plant Pathology. The main symposium organizer was Dr. Lava Kumar from the International Institute of Tropical Agriculture (IITA).

The Symposium covered the following 10 sessions: (1) Changing Phase of Plant Virus Epidemiology, (2) Climate Change and Modeling, (3) Virus Vectors and Virus-Vector Interactions, (4) IPM (CRSP, special session), (5) ICPVE Business Meeting, (6) Diagnostics and Surveillance, (7) Epidemiology and Ecology, (8) Disease Control, (9) Virus Evolution, (10) Plant Virology in Sub-Saharan Africa

All contributions were organized in a series of Keynote presentations and invited talks as well as a number of 15-20 min oral presentations and poster exhibitions.

The symposium was attended by 150 participants coming from the five continents and was organized by the ICPVE and IITA in partnership with the Mikocheni Agricultural Research Institute (MARI, Tanzania), the National Agricultural Research Organization (NARO, Uganda), the West and Central African Council for Agricultural Research and Development (CORAF/WECARD), Biodiversity International and the Asian Vegetable Research and Development Center (AVRDC- The World Vegetable Center). It was sponsored by other institutions and private companies: CGIAR's RTB and SP- IPM programs, CORAF/WECARD, Plant Virus Ecology Network (PVEN), the USAID- funded IPM- CRSP and Africa RISING projects, Agdia- Biofords, BASF, and Inqaba Biotec.

Monday 28<sup>th</sup> January. The programme started with registration and the inauguration ceremony with introductory talks by Victor Manyong (IITA East Africa), Alberto Fereres (ICPVE), Joseph Ndunguru (Mikocheni Agriculture Research Institute), Nteranya Sanginga (IITA), Fidelis Myaka (Ministry of Agriculture Food Security and Cooperatives, Tanzania) and Lava Kumar (IITA).

The first Session on Changing Phase of Plant Virus Epidemiology was opened by Mike Thresh, the founder and past chairman of the ICPVE, who offered a keynote lecture on plant virus epidemiology over the past century. He discussed the major milestones and achievements in plant virus epidemiology since the beginning of the 20<sup>th</sup> century. His talk was followed by Roger Jones, who offered a keynote lecture on recent advancements, trends and new technologies applied to plant virus epidemiology including knowledge enhancement, data collection and processing, and provision of more effective prediction and decision support systems to optimize virus control measures. The following talk by Alberto Fereres covered aspects on plant virus-vector interactions, on how some plant

viruses can directly and indirectly manipulate the behavior and performance of their insect vectors to maximize their transmission and spread.

The Climate Change and Modeling session was opened by Karen Garrett that described how decision support systems (DSS) and certain indexes (Index of Insurance) based on weather data could be used by farmers for prediction of plant virus epidemics and yield loss under new climate scenarios. This was followed by a keynote talk by Roger Jones who offered a very comprehensive and holistic review on the influence of climate change on plant virus epidemics. He explained all the gaps and identified all the needs for research to understand how changes in climate (eg. an increase in temperature and CO<sub>2</sub>) could affect plant viruses, host plants and virus vectors. One of the likely effects of a raise in temperature is the increase in virus titer and earlier symptom expression as shown in the talk by Fiona Constable for BYDV. George Kennedy gave an interesting talk on a weather-based model on TSWV infecting tobacco in North Carolina. The model is based on the density of vector populations the preceding year and specific weather parameters that influence vector abundance and dispersal as well as the abundance and persistence of virus sources.

Tuesday 29<sup>th</sup> January. The session on Virus-Vector Interactions was opened by Stewart Gray who gave an overview on luteovirus, vector and host protein interactions and how several aphid proteins can be used as effective biomarkers for identifying and predicting which aphid populations are efficient virus vectors. His talk was followed by Nilsa Bosque-Perez who explained how viruses may modify host plant physiology to attract their vectors and increase the probability of virus transmission and spread. She used two examples of Luteoviridae, BYDV and PLRV, to show that viruliferous aphids prefer non-infected plants while non-viruliferous aphids prefer virus-infected plants. A talk by James Legg described the prevalence and distribution of different haplotypes of *Bemisia tabaci* driving cassava virus disease epidemics throughout East and Central Africa. A review on the endosymbiont proteins of *B. tabaci* and their role on begomovirus transmission was the topic of the talk by Murad Ghanim. The ecology of the banana aphid, the vector of banana bunchy top nanovirus and the different integrated control options of BBTD were covered by Rachid Hanna. The gaps and future prospects for research on nanovirus transmission by aphid vectors were discussed by Stephane Blanc. The session ended with a talk by Martin Verbeek on the mode and transmission mechanisms of torradoviruses by their whitefly vectors, *B. tabaci* and *Trialeurodes vaporariorum*.

The special session on IPM-CRSP included talks on management of aphid, beetle, seed and contact-transmitted viruses in tropical cropping systems (Sue Tolin), followed by a talk by Judy Brown on the biodiversity and prevalence of begomoviruses and the different *B. tabaci* haplotypes in Central America and sub-saharan Africa. Naidu Rayapati spoke about the epidemiology and management of tospoviruses in South Asia, including IPM strategies to mitigate their negative impact on tomato production. The session was finished by Lawrence Kenyon who offered a talk on the emergence and diversity of begomoviruses infecting solanaceous crops in Southeast Asia.

The Business Meeting Session at the end of the day was a very special one, because we had the opportunity to honor Karl Maramorosch in his 98<sup>th</sup> birthday who gave us a talk on the biography of Nathan Salaman, first professor of plant virus diseases. The talk was followed by a very emotional moment in which the organizing committee offered a series of awards and honors to scientists for their outstanding contribution to the field of plant

virus epidemiology. A plaque to honor their achievements was given to Karl Maramorosch, Mike Thresh, Roger Jones, Mike Irwin, Benny Raccach, Herve Lecoq and Alberto Fereres.

*Wednesday 30<sup>th</sup>, January.* An excursion to Ngorongoro Crater, Arusha National Park and a Flower Plantation were excellent choices for visiting the exuberant wildlife and beautiful landscapes of Tanzania.

*Thursday 31<sup>st</sup> January.* Two parallel sessions, one on Diagnostics and Surveillance and another on Epidemiology and Ecology were offered. Stephan Winter gave a presentation on next generation diagnostic technology of plant viruses and Jan Kreuze on field level diagnostic procedures. Monica Carvajal covered a talk on viruses in the diagnosis of cassava viruses present in Colombia while Susan Seal spoke about the characterization of badnaviruses and pararetroviruses in West Africa.

The session on epidemiology and ecology was opened by Herve Lecoq who gave an overview on the molecular epidemiology of *Zucchini yellow mosaic virus* in cucurbits and alternative reservoir host plants in France. Eugenie Hebrard followed on a comprehensive study on the distribution, and molecular diversity, origin and diversification of *Rice yellow mottle virus* in Tanzania. Michael Pearson gave an update on the present situation of viruses of kiwifruit in New Zealand. The session ended with a talk by Nikos Katis on the epidemiology of criniviruses in Greece.

A Session on Disease Control was offered covering several aspects of virus control, including cultural methods (Alvin Simmons), host plant resistance (Gad Loebenstein, Ismail Tabbi and Benoit Moury). A Session on Virus Evolution was also part of the evening parallel sessions that included talks by Rob Briddon on the molecular basis for resistance breaking in cotton against the virus complex causing cotton leaf curl disease in South Asia. The micro-evolution of *Beet necrotic yellow vein virus* using next-generation deep sequencing was the topic of the presentation by Claude Bragard.

*Friday, February 1<sup>st</sup>.* The meeting ended with a special session on Plant Virology in Sub-Saharan Africa. The keynote talk by Claude Fauquet described the many different viruses infecting cassava and the devastating pandemics occurring in Africa since 1935 followed by the coordinated plans that are being prepared to prevent Cassava brown streak disease from reaching West Africa. The session finished with a talk by Rene van der Vlugt on the Q-bank plant virus database (<http://www.q-bank.eu>), a very valuable reference collection in plant virology, provides the identification and description of many plant viruses.

This 12th in the series of International Symposia on Plant Virus Epidemiology was very well organized, maintaining the high standards set by past meetings of our ICPVE. Lava Kumar and his team are to be congratulated over a job well done.

Alberto Fereres  
11/03/13