

International ISHS-ProMusa Symposium:
Global Perspectives on Asian Challenges

14-18 September 2009 • Phoenix City Hotel, Guangzhou, China



ProMusa



Programme

Sunday, 13 September

Arrival of participants

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| 10:00-12:00 | Registration |
| 14:00-17:30 | Registration |
| 18:00 | Welcome reception |

Monday, 14 September

Arrival of participants

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| 07:00-08:00 | Registration |
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Opening Session

Session chair: Inge Van den Bergh

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| 08:00-08:45 | Welcome remarks |
| 08:45-09:00 | Group picture taking |
| 09:00-09:30 | Opening Keynote 1: Status, Challenges and Trends of the Chinese Banana Industry <i>G.J. Yi, C.Y. Li, Y.L. Wu, B.Z. Huang and Y.R. Wei</i> |
| 09:30-10:00 | Opening Keynote 2: Using <i>Musa</i> Genes in the Fight against Production Constraints <i>E. Frison</i> |

Session 1: Novel approaches to understanding, conserving and using banana genetic diversity

Session chairs: Huang Bingzhi and Mike Smith

10:00-10:30 Keynote 1: Non-Conventional Breeding of Banana (*Musa* spp.)
X.L. Huang, X. Huang, W. Xiao, J.T. Zhao, X.M. Dai, Y.F. Chen and Q. Gong

10:30-11:00 Coffee break

11:00-11:30 Keynote 2: From Fundamental Research Discoveries to Applications for Banana Improvement
R. Swennen, S.C. Carpentier, I.M. Henry, A. Vertommen, I. Van den houwe, G. Kovacs, S. Remy and B. Panis

11:30-11:45 Genomics, Banana Breeding and Superdomestication
J.S. Heslop-Harrison

11:45-12:00 Analysis of Genome Structure and Organisation in Banana (*Musa acuminata*) Using 454 Sequencing
E. Hřibová, P. Neumann, J. Macas and J. Doležel

12:00-12:15 Genome-Wide BAC End Sequencing of *Musa acuminata* 'DH Pahang' Reveals Further Insights into the Genome Organisation of Banana
M.T. Souza Jr, N. Roux and G.H.J. Kema

12:15-12:30 Identification and Validation of EST-Derived Molecular Markers, TRAP and VNTR, for Banana Research
S.A.L. Garcia, R. Talebi, C.F. Ferreira, I. Vroh, L.V. Paiva, M.T. Souza Jr and G.H.J. Kema

12:30-14:00 Lunch

14:00-14:15 Wild *Musa* species in China
M. Häkkinen

14:15-14:30 *Musa* Collection and Characterisation in Central and Eastern DR-Congo: a Chronological Overview
B. Dheda Djailo, B.D. Nzaweke, N. Roux, F. Ngezahayo, N. Vigheri, E. De Langhe, D. Karamura, S. Channelière, M. Ruas, C. Picq and G. Blomme

14:30-14:45 Morphological Characterisation of East African AAB and AA Dessert Bananas (*Musa* spp.)
M. Onyango, D. Karamura, S. Keeley, R. Manshardt and D. Haymer

- 14:45-15:00 The Complementarity of Farmers' and Botanical Descriptors of the East African Highland Banana Cultivars (*Musa*, AAA)
D. Karamura, A. Kiggundu and E. Karamura
- 15:00-15:15 Standardised Procedures for *Musa* Germplasm Characterisation – Use of a Reference Collection – Towards a *Musa* Identification Key?
S. Channelière, A. Vezina, E. Arnaud, J-P. Horry, M. Ruas and N. Roux
- 15:15-15:30 Diversity Analysis in Indian Cooking Bananas (ABB) through Morphotaxonomic and Molecular Characterisation
M.S. Saraswathi, S. Uma, E. Vadivel, P. Durai, S.A. Siva, G. Rajagopal and S. Sathiamoorthy
- 15:30-15:45 Application of Cytoplasmic and Nuclear DNA-Based Marker Systems for Elucidation of the Phylogenetic Relationship of *Musa acuminata* and *Musa balbisiana* and their Hybrids
R. Boonruangrod, D. Desai, M. Berenyi, S. Fluch and K. Burg
- 15:45-16:00 Phylogenetic Relationships in the Family Musaceae Based on the Genic Sequences, Sequence of the ITS1-5.8S-ITS2 Region and DArT Markers
P. Němcová, E. Hřibová, M. Valárik, J. Čížková, L. Schillerová, A. Kilian and J. Doležel
- 16:00-16:30 *Coffee break*
- 16:30-16:45 Molecular Analysis Reveals Multiple Domestications of Edible Bananas
H. Volkaert
- 16:45-17:00 Microsatellite Markers for Classifying and Analysing Genetic Relationship of Banana Cultivars in Indonesia
A. Retnoningsih, R. Megia and A. Hartana
- 17:00-17:15 Validation of Rapid (Colour-Based) Pre-Screening Techniques for Analysis of Fruit Provitamin A Contents in *Musa* spp.
L.C. Pereira, G.N. Newilah, M.W. Davey and I. Van den Bergh
- 17:15-17:30 Micronutrients Biofortification in *Musa*: Status, Bottlenecks and Prospects
M.W. Davey, J. Keulemans, N. Roux and I. Van den Bergh
- 17:30-18:30 *Poster session 1*

Tuesday, 15 September

Session 1: Novel approaches to understanding, conserving and using banana genetic diversity (continued)

Session chairs: Huang Bingzhi and Mike Smith

- 08:45-09:00 Candidate Gene Discovery: Resistance Gene Analog Characterisation and Differential Gene Expression Analysis in *Musa-Mycosphaerella* Host-Pathogen Interactions
R.N.G. Miller, M.A.N. Passos, F.L. Emediato, C. de Camargo Teixeira and G.J. Pappas Jr
- 09:00-09:15 MA-ACS1: a Key Operator in Ethylene Biosynthesis in Banana - Its Role and Regulation during Fruit Ripening
S.R. Choudhury, S. Roy, S.K. Singh and D.N. Sengupta
- 09:15-09:30 Combination of Suppression-Subtractive Hybridisation with cDNA Microarray, a Novel Way to Identify Genes from Banana Involved in Fruit Ripening, Quality Improvement and Tolerance to Stress
Z.Q. Jin and B.Y. Xu
- 09:30-09:45 Developing Resistant Banana and Plantain Cultivars through Conventional Breeding Techniques
R. Menon, A. Cherian, A. Suma, A. Maicykutty, P. Mathew, S. Nair and K.C. Aipe
- 09:45-10:00 Exploitation of Diploids in Indian Banana-Breeding Programmes
S. Uma, M.M. Mustafa, M.S. Saraswathi and P. Durai
- 10:00-10:15 Breeding Increases Genetic Diversity of East African Highland Bananas (*Musa* spp.): an Assessment Using Molecular Tools
N. Moses and M. Pillay
- 10:15-10:30 Use of Molecular Markers in Banana and Plantain Improvement
J. Lorenzen, S. Hearne, G. Mbanjo, M. Nyine and T. Close
- 10:30-11:00 *Coffee break*
- 11:00-11:15 The Use of Molecular Markers in CIRAD's Current Banana Breeding Programme
J-P. Horry

11:15-11:30 Development of Highly Regenerative Embryogenic Cell Suspensions of Banana Cultivar 'Nanjangud Rasbale' (syn. 'Rasthali', AAB, Silk Subgroup) and Transformants with *AMP* Gene
S. Mohandas, H.D. Sowmya , R. Manjula , K.Y. Pratibha , M. Manamohan and S. Meenakshi

11:30-12:30 Discussion

12:30-14:00 Lunch

Session 2: Integrated approaches to managing Fusarium wilt and other emerging disease threats

Session chairs: Catur Hermanto and Wei Yuerong

14:00-14:30 Keynote 1: Studies on Some of the Early Events in the *Fusarium oxysporum*-*Musa* Interaction

C.Y. Li, G.J. Yi, S. Chen, Q.M. Sun, C.W. Zuo, B.Z. Huang, Y.R. Wei, Y.H. Huang, Y.L. Wu, L.B. Xu and C.H. Hu

14:30-15:00 Keynote 2: Fusarium Wilt of Banana: Renewed Threat and Renewed R&D Interest

A.B. Molina

15:00-15:15 Incidence and Distribution of Fusarium Wilt in Indonesia

C. Hermanto, A. Sutanto, Jumjunidang, H.S. Edison, J. Daniells, W. O'Neill, V.G. Sinohin and A.B. Molina

15:15-15:30 Status of Fusarium Wilt Research in India

M.M. Mustafa and R. Thangavelu

15:30-15:45 Raising Awareness of the Threat of Tropical Race 4 of Fusarium Wilt for Latin America and the Caribbean

L.E. Pocasangre, R. Ploetz, A.B. Molina and L. Perez Vicente

15:45-16:00 Development of a Detection Method for Tropical Race 4 of *Fusarium oxysporum* f. sp. *cubense*

C. Waalwijk, M.A. Dita, I. Buddenhagen, K., L.V. Paiva, M.T. Souza Jr.1 and G.H.J. Kema

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| 16:00-16:30 | Coffee break |
| 16:30-16:45 | Characterisation of Isolates of <i>Fusarium oxysporum</i> f. sp. <i>ubense</i> into Vegetative Compatibility Groups in Brazil <u>A.P. de Matos</u> , J.d.S. da Silveira, D.M.V. Ferreira, Z.J.M. Cordeiro and R.O. Trocoli |
| 16:45-17:00 | Vegetative Compatibility Group Analysis of Indonesian <i>Fusarium oxysporum</i> f. sp. <i>ubense</i> Isolates <u>W.T. O'Neill</u> , L.M. Gulino, A.B. Pattison, J.W. Daniells, C. Hermanto and A. Molina |
| 17:00-17:15 | Cross Infection Potential of Fusarium Wilt Isolates and their Diversity Analysis by Vegetative Compatibility Grouping, Sequencing of rDNA-ITS region and rDNA-IGS- RFLP Analysis <u>R. Thangavelu</u> , P. Suganya Devi and P. Maria Chrismala (presented by M.M. Mustaffa) |
| 17:15-17:30 | Gene Expression Analysis in Roots of <i>Musa acuminata</i> ssp. <i>burmannicoides</i> 'Calcutta 4', a Resistant Genotype for Fusarium Wilt in Banana <u>K.V. Ravishankar</u> , A. Rekha, V. Swarupa and G. Savitha |
| 17:30-17:45 | Application of gfp-Transformed <i>Fusarium oxysporum</i> f. sp. <i>ubense</i> for the Tracking of the Infection Process and the Evaluation of Resistant Banana Cultivars <u>C.Y. Li</u> , G.J. Yi, S. Chen, Q.M. Sun, C.W. Zuo, B.Z. Huang, Y.R. Wei, Y.H. Huang, Y.L. Wu, L.B. Xu and C.H. Hu |
| 17:45-18:00 | Characterisations of Early Events in the Fluorescent-Tagged <i>Fusarium oxysporum</i> f. sp. <i>ubense</i> and Banana Root Interaction <u>X.M. Yin</u> , W. Zheng, B.Y. Xu, J.B. Wang ZhiQiang Jin |
| 18:00-19:00 | Poster session 2 |

Wednesday, 16 September

Session 2: Integrated approaches to managing Fusarium wilt and other emerging disease threats (continued)

Session chairs: Catur Hermanto and Wei Yuerong

- 08:45-09:00 A Greenhouse Bio-Assay for the *Fusarium oxysporum* f. sp. *ubense* (Tropical Race 4) x Banana (Cavendish Subgroup) Interaction
M.A. Dita, C. Waalwijk, L.V. Paiva, M.T. Souza Jr and G.H.J. Kema

- 09:00-09:15 Discrimination of Banana Genotypes for Fusarium Wilt Resistance in Greenhouse
L.R. Ribeiro, E.P. Amorim, Z.M. Cordeiro, S.O. Silva and M.A. Dita
- 09:15-09:30 Reaction of Diploid (AA) and Tetraploid (AAAB) Banana Hybrids to Fusarium Wilt under Field Conditions
A.P. de Matos, Z.J.M. Cordeiro, S. de Oliveira e Silva and D.M.V. Ferreira
- 09:30-09:45 Fusarium Wilt Management through Use of Resistant Genotypes, Chemical and Biological Approaches
A. Cherian, P.M. Mathew, R. Menon, A. Suma, K.C. Aipe and S.N. Nair
- 09:45-10:00 Selection of a New Somaclone Cultivar 'Tai-Chiao No.5' with Resistance to Fusarium Wilt of Banana in Taiwan
S.Y. Lee, Y.U. Su, C.S. Chou, C.C. Liu, C.C. Chen and C.P. Chao
- 10:00-10:15 Comparison of Host Reaction to *Fusarium oxysporum* f. sp. *cupense* Tropical Race 4 and Agronomic Performance of Somaclonal Variant 'GCTCV 119' and 'Grand Naine' in Commercial Farms in the Philippines
E.T. Fabregar, R.O. Soquita, V.S. Sinohin and A.B. Molina
- 10:15-10:30 Combating Banana Wilts – What Do Resistant Cultivars Have to Offer?
J.W. Daniells
- 10:30-11:00 *Coffee break*
- 11:00-11:15 Fusarium Wilt Incidence, Growth, Yield and Post-Harvest Quality of Banana as Affected by Organic Farming System in Taiwan
C.M. Chang, C.P. Chao, S.N. Huang and S.C. Chiang
- 11:15-11:30 Efficacy of Clay-Based Formulated *Serratia* in Reducing Inoculum of *Fusarium oxysporum* f. sp. *cupense* Race 4
A.S.Y. Ting, M.T. Fang and C.S. Tee
- 11:30-11:45 Genetic Structure of *Mycosphaerella fijiensis* Populations in Costa Rica
S.A.L. Garcia, M. Guzmán, E.C.P. Verstappen, T.A.J van der Lee, S.B. Goodwin, M.T. Souza Jr and G.H.J. Kema
- 11:45-12:00 Transcriptome Analysis of *Mycosphaerella fijiensis*, the Causal Agent of Black Leaf Streak Disease in Banana
C. Diaz-Trujillo, B. Te Lintel Hekkert, E.A. Lindquist, J. Carlier, M.T. Souza Jr and G.H.J. Kema
- 12:00-12:15 Bridging the Technology Gap in Banana Improvement: The Case of Biotechnology Adoption by Developing Countries
M.N. Mwangi

12:15-12:30 Characterisation of the Digestive Proteases in the Banana Weevil (*Cosmopolites sordidus*) Gut and the Effects of Recombinant Phytocystatins and Bt Cry6A on Early Larval Growth and Development
A. Kiggundu, K. Kunert, D. Michaud, A. Viljoen, W. Tushemereirwe and E. Karamura

12:30-14:00 Lunch

14:00-14:15 Screening 40 *Musa* Genotypes for *Banana Bunchy Top Virus* Resistance in Burundi
C. Niyongere, E. Miinda Ateka, T. Losenge, P. Lepoint and G. Blomme

14:15-14:30 *Banana Bunchy Top Virus*-Resistant Transgenic Banana Plants
W. Borth, E. Perez, K. Cheah, Y. Chen, W.S. Xie, D. Gaskill¹, S. Khalil and J.S. Hu

14:30-14:45 Management of Banana Diseases and Pests by Use of Tissue Culture-Derived Planting Material in Kenya
J. Njuguna, S. Nguthi, F. Wambugu, D. Gitau and M. Karuoya

14:45-15:00 Virus-Indexing Technology in Banana: A Boon to the Tissue-Culture Industries and Banana Growers for Production of Quality Planting Material in India
R. Selvarajan, V. Balasubramanian, M. Mary Sheeba, R. Raj Mohan and M.M. Mustaffa

15:00-16:00 Discussion

16:00-16:30 Coffee break

Closing Session

Session chair: Zaag de Beer

16:30-17:00 Closing Keynote 1: Harnessing the Potential of Banana and Plantain in Asia and the Pacific for Inclusive Growth
H.P. Singh

17:00-17:30 Closing Keynote 2: Making Science Relevant - Linking Agricultural Research Networks to Innovation Platforms
S. Weise

17:30-17:45 Closing remarks: I. Van den Bergh

19:30 Gala dinner
Announcement of election results for the position of chair and vice-chair of the ISHS Section on Banana and Plantain

Thursday, 17 September

Field trip

08:00-23:00 Visit to various places, such as the Guangdong Academy to see their banana collection, Panyo to see traditional Chinese architecture, the banana production area in Zhongshan, and Zhuhai for cultural entertainment and dinner

Friday, 18 September

Workshop 1: The role of genomics in banana crop improvement

Facilitators: Huang Xuelin, Nicolas Roux and Mike Smith

09:00-09:30 Opening of Workshop 1: Opportunities for Bridging the Gap between Genomics and Genetic Improvement in *Musa* spp.

N. Roux, M. Smith, M. Rouard, X.L. Huang and the GMGC consortium

09:30-10:30 Workshop

10:30-11:00 *Coffee break*

11:00-12:30 Workshop

12:30-14:00 *Lunch*

14:00-15:30 Workshop

15:30-16:00 *Coffee break*

Workshop 2: Mitigating the threat of Fusarium wilt

Facilitators: Altus Viljoen, Randy Ploetz and Alice Churchill

09:00-09:30 Opening of Workshop 2: Fusarium wilt – A Banana Disease that Refuses to Go Away

R. Ploetz, A. Churchill and A. Viljoen

09:30-10:30 Workshop

10:30-11:00 *Coffee break*

11:00-12:30 Workshop

12:30-14:00 *Lunch*

14:00-15:30 Workshop

15:30-16:00 *Coffee break*

Reporting back to plenary

Session chairs: Inge Van den Bergh and Zaag de Beer

16:00-16:30 Report from workshop 1

16:30-17:00 Report from workshop 2

17:00-18:00 Discussion about ISHS-ProMusa symposia 2010-2012
Any other business, Open floor