



X International Symposium on Banana ISHS-ProMusa symposium
**Agroecological approaches to promote
innovative banana production systems**

Programme at a glance

Full programme
with links to abstracts*

Host institute

Organizers

Sponsors

Committees

**Note to readers: The abstracts are the final version submitted by the authors.
They have not been copy edited for spelling, grammar, punctuation, syntax and style.*





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Organizers

ProMusa

International Society for Horticultural Science

Bioversity International





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Cirad (host institute)

Cirad, working together on tomorrow's agriculture

Biodiversity, a development factor

Agro-ecology position paper





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Sponsors

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Languedoc-Roussillon - Midi-Pyrénées

CGIAR Research Program on Roots Tubers and Bananas
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The Union of groups of Guadeloupe and Martinique
banana producers

Compagnie Fruitiere





Agroecological approaches to promote innovative banana production systems

10-14 October 2016
Montpellier, France



Programme at a glance

		Morning	Afternoon	
October 10	07:00 - 08:30	Registration	13:45 - 15:00	Session A: Sharing the concepts of agroecology
	09:00- 10:45	Welcome address Session A: Sharing the concepts of agroecology	15:00 -15:30	Break
	10:45 - 11:15	Break	15:30-17:15	Session B: Managing plant diversity
	11:15 - 12:15	Session A: Sharing the concepts of agroecology	18:00 - 20:00	Welcome cocktail
	12:15 - 13:45	Lunch		
October 11	09:00- 10:45	Session B: Managing plant diversity Panel discussion	13:45 - 15:00	Session C: Enhancing biological regulations
	10:45 - 11:15	Break	15:00 -15:30	Break
	11:15 - 12:15	Session C: Enhancing biological regulations	15:30 - 17:45	Session C: Enhancing biological regulations Panel discussion
	12:15 - 13:45	Lunch		
October 12	09:00- 10:30	Session D: Improving soil functioning	13:45 - 15:00	Session E: Drivers of stakeholder strategies
	10:15 - 10:45	Break	15:00 -15:30	Break
	10:50 - 11:30	Session D: Improving soil functioning Panel discussion	15:30 - 17:00	Session E: Drivers of stakeholder strategies Panel discussion
	11:30 - 12:30	Session E: Drivers of stakeholder strategies	17:00 - 17:15	Closing remarks
	12:30 - 13:45	Lunch	19:30	Gala dinner
October 13		Morning	Afternoon	
	08:30 - 15:00	Field trip including lunch		
October 14		Morning	Afternoon	
	09:00- 10:00	Workshops		
		Break		
	10:00 - 11:30	Workshops		
	11:30 - 13:00	Workshops		
	13:00	Lunch		

Posters will be on display the whole week of the symposium



RESEARCH PROGRAM ON
Roots, Tubers and Bananas



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Programme (with links to abstracts)

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Monday, 10 October

08:00	Registration
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09:00 - 09:15	Welcome address - <i>J.M. Risède</i>
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SESSION A: SHARING THE CONCEPTS OF AGROECOLOGY AND ILLUSTRATING THEIR USAGE
Chair: *G. Blomme*, Panel moderator: *J.M. Risède*

09:15 - 09:45	Keynote: Ecological engineering with earthworms: principles, ecosystem services and mechanisms - M. Blouin
09:45 - 10:15	Keynote: Agroecology: the key role of beneficial rhizosphere microorganisms in ecosystem services - S. Declerck
10:15 - 10:45	Keynote: The banana microbiome: stability and potential health indicators – M. Köberl , <i>M. Dita, J. Nimusiima, J.B. Tumuhairwe, J. Kubiriba, C. Staver and G. Berg</i>

10:45 - 11:15	COFFEE BREAK
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11:15 - 11:30	Step by step tools to identify agroecological intensification alternatives for banana cropping systems - C. Staver , <i>M. Turmel, A. Omondi, M.Dita, P. Siles, O. Bustamente, E. Alvarez, G. Calberto, S. Mpiira, and S. Zheng</i>
11:30 - 11:45	Effects of Banana Xanthomonas wilt and other banana diseases on ecosystem services in banana based agroecosystems - W. Ocimati , <i>J.C. Groot, P. Tittoneil, and G. Blomme</i>
11:45 - 12:00	A trait-based approach for the choice of cover-crops in banana cropping systems: theoretical developments and practical applications - G. Damour , <i>H. Tran Quoc, F. Tardy, C. Meynard and M. Dorel</i>
12:00 - 12:15	Introducing cover crops in the Caribbean banana fields: which determinants for adoption of innovative banana cropping systems in the French West Indies and Dominican Republic? H. Tran Quoc , <i>D. Dural, L. Gervais, M. Hery, K. Vincent, G. Gandini, R. Le Guen and M. Dorel</i>

12:15 - 13:45	LUNCH BREAK
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13:45 - 14:00	Agroecological integration of shade tolerant and drought tolerant food/feed crops for year round productivity in banana-based systems under rain-fed conditions - G. Blomme , <i>W. Ocimati, J.C. Groot, J. Ntamwira, L. Bahati, R. Remans, P. Tittoneil</i>
14:00 - 14:15	Biological control in the microbiome era: challenges and opportunities for banana production <i>A.R. Sare, C. Berhal, H.M. Jijakli and S. Massart</i>
14:15 - 14:20	Agroecology: a key for the emergence of productive and sustainable plantain-based cropping systems? - <i>S. Depigny and T. Lescot</i>

14:20 - 15:00	PANEL DISCUSSION
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15:00 - 15:30 COFFEE BREAK

SESSION B: MANAGING PLANT DIVERSITY TO ENSURE ECOSYSTEM SERVICES

Chair: *I. Van den Bergh*, Panel moderator: *Gaëlle Damour*

-
- 15:30 - 16:00 Keynote: [Functional agrobiodiversity: approach, examples, and applicability to banana cropping systems](#) - **P. Bàrberi**
- 16:00 - 16:30 Keynote: [Ecosystems Services from Agriculture](#) - **F. DeClerck**
- 16:30 - 16:45 [What variety for sustainable banana cropping system: Cavendish clones or new BLSO resistant hybrids? Management of banana functional traits](#) - **M. Dorel**, *G. Damour, F. Salmon and S. Ricci*
- 16:45 - 17:00 [Banana genotypes resistant to Fusarium Wilt identified under infested area and greenhouse conditions](#) - **E. Amorim**, *T. Rebouças, L. Costa, C. Bragança, V. Amorim, F. Haddad, C. Fortes and C. Ledo*
- 17:00 - 17:15 [CARBAP K74: a plantain-like hybrid designed to promote sustainable plantain-based cropping systems](#) - *S. Depigny, P. Noupadja, K. Tomekpe and Frédéric Bakry*
- 18:00 Welcome cocktail

Tuesday, 11 October

08:00 Registration

SESSION B: MANAGING PLANT DIVERSITY TO ENSURE ECOSYSTEM SERVICES *continued*

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- 09:00 - 09:15 [Revision of the Global Strategy for the Conservation and Use of Musa Genetic Resources](#)
E. de Langhe, B. Laliberte, R. Chase, R. Dommage, J.P. Horry, D. Karamura, M. Rouard, M. Ruas, J. Sardos, J. Thomas, I. van den Bergh, I. van den Houwe and N. Roux
- 09:15 - 09:30 [Management of post-harvest fruit quality for ecologically intensified banana cropping systems](#)
P. Brat, *M. Lechaudel, L. Segret, R. Morillon, O. Hubert, O. Gros, F. Lambert, N. Leclerc, C. Bugaud and F. Salmon*
- 09:30 - 09:35 [Weed control ability of two cover crops *Neonotonia wightii* and *Centrosema pascuorum* intercropped as living cover in banana plantations: impacts on soil nitrogen availability and crop productivity](#) - **R. Achard**, *A. Fevrier and J.R. Estrade*
- 09:35 - 09:40 [Are common crops associated with plantain a source of ecological services?](#) - **S. Depigny**, *P. Bonneviot, M. T. Djomessi, D. E. Ngando, G. Fansi and T. Lescot*
- 09:40 - 09:45 [Do suckers from superior mother plants produce bigger bunches? Preliminary results for plantains](#) - **C. Staver**, *M. Turmel, D. Rengifo, B. Dzomeku, J. Castellon, O. Bustamente, V. Aguilar and P. Siles*
- 09:45 - 09:50 [Genetic variability in plantain genotypes using agronomical and molecular data](#) - **E. Amorim**, *Z. Gonçalves, D. Invenção, V. Amorim, C. Ledo and C. Ferreira*



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- 09:50 - 09:55 [Germplasm evaluation and cropping systems enhanced sustainable plantain and banana production in Nigeria](#) - **P. Baiyeri**, S. Aba and R. Ortiz
-
- 09:55 - 10:00 [Genotype x environment interaction effect and selection of cooking banana hybrids for yield and other relevant traits in Uganda](#) - **R. Tumuhimbise**, H. Buregyeya, A. Barekye, R.T. Ssali, D. Talengera, J. Kubiriba, P. Namanya, G. Arinaitwe, W.K. Tushemereirwe, D. Karamura and E. Karamura
- 10:00 - 10:05 [Musa acuminata x Mycospharella musicola: Preliminary results of RNA-Seq analysis](#)
E. Amorim, C. Ferreira, M. Costa, O. Silva, R. Togawa, R. Santos, C. Bragança, N. Martins, A. Gesteira, I. Santos Filho, A. Gomes, J. Santos Serejo, F. Haddad, R. Miller, A. Vilarinhos, Z. Cordeiro and H. Rocha
- 10:05 - 10:10 [The influence of different banana cultivars on pathogenic and non-pathogenic Fusarium oxysporum](#) - **P. Deltour**, S. França and M. Höfte
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- 10:15 - 10:45 PANEL DISCUSSION
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- 10:45 - 11:15 COFFEE BREAK
-
- SESSION C: ENHANCING BIOLOGICAL REGULATIONS IN BANANA CROPPING SYSTEMS (FIELD LEVEL)**
Chair: E. Amorim, Panel moderator: S. Declerck
-
- 11:15 - 11:45 Keynote: [Enhancing ecological regulations in banana cropping systems: an example of a fine-tuned management approach for Cosmopolites sordidus](#) - **P. Tixier**
- 11:45 - 12:15 Keynote: [Biodiversity and soil health: the role of the soil food web in soil fertility and suppressiveness to soilborne diseases](#) - **S. Sánchez Moreno**
-
- 12:15 - 13:45 LUNCH BREAK
-
- 13:45 - 14:00 [Development and implementation of agroecological approaches in Australia's banana cultivation](#) - **A. Drenth**
- 14:00 - 14:15 [Ecologically sustainable technologies for the management of the highland banana pests in East and Central Africa](#) - **W. Tinzaara**, W. Ocimati, J. Kubiriba and E. Karamura
- 14:15 - 14:30 [Disentangling the impact of plant diversity on the regulation of multiple pests in banana agroecosystems](#) - **C. Poeydebat**, D. Carval, L. De Lapeyre De Bellaire and P. Tixier
- 14:30 - 14:45 [Experimental approaches for agroecological management of black leaf streak in dry and humid tropical conditions](#) - **C. Guillemet**, R. Le Guen, Marc Dorel, T. Lescot and L. de Lapeyre de Bellaire
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- 14:45 - 15:00 [Recovering banana production in BBTD affected areas in sub-Saharan Africa: Strategies to reduce infection pressure prior to and after replanting](#) - **L. Kumar**, C. Staver, R. Hanna, A. Omondi, M.L. Iskra-Caruana, C. Onyeani, D. Ogunfunmilayo, C. Niyongere, P. Mobambo, B. Dheda, M. Soko, M. Tachin, S. Akinyemi, M. Adeime and AC. Mvila
-
- 15:00 - 15:30 COFFEE BREAK
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- 15:30 - 15:45 [Monitoring microbial functional and structural diversity for management of disease suppressive soils](#) - **A. McBeath**, David East and A.B. Pattison



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- 15:45 - 16:00 [An integrated approach to reduce yield losses caused by Fusarium wilt of banana in São Paulo, Brazil](#) - **M. Dita**, L. Teixeira, E. Damatto, W. Moraes, F. Haddad and C. Staver
- 16:00 - 16:15 [Effects of endophytic non-pathogenic *Fusarium oxysporum* V5w2 and mulching on field-grown tissue culture banana plants and root infection by *Radopholus similis*](#) - **D. Ochieno**
- 16:15 - 16:30 [Integrating management practices to support banana production in the presence of Fusarium wilt](#) - **A.B. Pattison**, A.B. Molina, C.P. Chao, A. Viljoen and S. Lindsay
- 16:30 - 16:35 [Recovering banana production in bunchy top-affected areas in Sub-Saharan Africa – Ensuring banana bunchy top virus-free planting material for smallholders](#) - **B. Omondi Aman Oduor**, C. Staver, S. Ajambo, L. Kumar, M.L. Iskra-Caruana, C. Niyongere, P. Mobambo, B. Dhed'a, M. Soko, M. Tachin, S. Akinyemi, A. Mvila, R. Hanna, and Y. Mathieu
- 16:35 - 16:40 [Field control of Fusarium wilt \(Foc race 1- VCG 0124\) and plant growth promotion mediated by native microbes and botanical Zimmu in banana cv. Grand Naine](#) - **R. Thangavelu** and M. Gopi
- 16:40 - 16:45 [Management of Fusarium wilt of bananas in Minas Gerais, Brazil](#) - **M. Dita**, F. Haddad, L. Rocha, I. Martins, L. Teixeira and C. Staver
- 16:45 – 16:50 [Contrasting effects of a cover crop on the regulation of the banana weevil](#) - **D. Carval**, R. Resmond, R. Achard and P. Tixier
- 16:50 – 16:55 [Biological management of eumusae leaf spot disease using native epiphytic and endophytic microbes in banana cv. Grand Naine \(AAA\)](#) - **R. Thangavelu** and P. Ganga Devi
- 16:55 - 17:00 [Study of the volatile organic compounds in the interaction between banana plants and the fungal disease *Fusarium oxysporum* f.sp. *cubense* Tropical Race 4 \(FocTR4\)](#) - **C. Berhal**, C. De Clerck, G.C. Levicek, M.L. Fauconnier, H.M. Jijakli, F. Verheggen and S. Massart
- 17:00 - 17:05 [Screening of endophytic and rhizosphere bacteria for controlling wilt disease of banana](#) **A. Wibowo**, R. Kusbari, N.H. Hadiba, J. Widada, S. Subandiyah and A.B. Pattison
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- 17:05 - 17:45 PANEL DISCUSSION

Wednesday, 12 October

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- 08:00 Registration
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- SESSION D: IMPROVING SOIL FUNCTIONING THROUGH OPTIMIZING MINERAL AND WATER RESOURCE USE (FIELD LEVEL)**
Chair: T. Lescot, Panel moderator: M. Dita
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- 09:00 - 09:30 Keynote: [Soil Biological interactions: a driver to improve soil ecosystem services](#) - **J.L. Chotte**
- 09:30 - 09:45 [Soil indicators respond to changes in banana plantation management](#) - **A.B. Pattison**, T. Kukulies, M. Smith and F. Sciacca
- 09:45 - 10:00 [Root traits are predictive of cover crop effects on soil structuration](#) - J.C. Govindin and **M. Dorel**



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- 10:00 - 10:15 [Agronomic consequences of vegetative groundcovers and reduced nitrogen applications on banana production systems](#) - **A.B. Pattison**, D. East, K. Ferro and G. Dickinson
- 10:15 - 10:30 [Managing the interactions between soil abiotic factors to alleviate Fusarium Wilt in bananas](#) **R. A. Segura**, J.J. Stoorvogel, J.Z. Samuels and J.A. Sandoval F.
-
- 10:30 – 10:50 COFFEE BREAK
-
- 10:50 – 10:55 [Effects of different mulch materials on morphological features, quality and yield of banana](#) R. Balkic, **H. Gübbük**, I. Tozlu and L. Altinkaya
- 10:55 – 11:00 [Comparison of open-field and protected banana cultivation for some morphological and yield features under subtropical conditions](#) - **H. Gubbuk**, E. Gunes and D. Guven
- 11:00 - 11:05 [The frequency and effects of weather events on banana productivity – results of a global survey](#) **G. Calberto**, D. Blake, M. Carvajal, C. Staver and D. Brown
- 11:05 - 11:10 [Musa cropping systems in the face of current challenges: a need for system amendment](#) **S.O.S. Akinyemi**, O. Arogundade, O. Matthew, A. Osijo, H. Onyeanusu and C. Nweke
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- 11:10 - 11:30 PANEL DISCUSSION
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- SESSION E: PROCESSES, MULTI-CRITERIA ASSESSMENT OF PERFORMANCES, AND CONTEXTUAL FACTORS DRIVING STAKEHOLDER STRATEGIES (AT FARM, LANDSCAPE OR HIGHER LEVELS)**
Chair: D. Loeillet, Panel moderator: G. Gandini
-
- 11:30 - 12:00 Keynote: [Agroecological banana production in Guadeloupe and Martinique: from pesticide reduction to sales price improvement](#) - **S. Zanoletti**
- 12:00 - 12:30 Keynote: [Multicriteria assessment of farming systems with indicators: state of the art and methodological issues](#) - **C. Bockstaller**
-
- 12:30 - 13:45 LUNCH BREAK
-
- 13:45 - 14:00 [Multi-criteria assessment of innovative cropping systems in French West Indies: A step of the improvement process](#) - **P. Feschet**, D. Loeillet, J.M. Risède and L. de Lapeyre de Bellaire
- 14:00 - 14:15 [Assessing the environmental impact of pesticide use in banana cropping systems](#) – **I.Comte**, P. Cattan, J.B. Charlier, M. Lesueur-Jannoyer, C. Mottes and M. Voltz
- 14:15 - 14:30 [Conceptualizing a new method to evaluate banana farmworkers pesticide exposure](#) **S. Di Cesare**, P. Feschet, C. Macombe, L. Petti, S. Mathé, and D. Loeillet
- 14:30 - 14:45 [TR4 as a driver of agroecological approaches in banana production](#) - **J. Daniells** and S. Lindsay
- 14:45 - 15:00 [A quantified approach to project losses caused by Fusarium wilt Tropical Race 4](#) - **C. Staver**, D. Pemsl, M. Dita, L. Scheerer and L. Perez Vicente
-
- 15:00 - 15:30 COFFEE BREAK
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- 15:30 - 15:45 [Recovering banana production in bunchy top-affected areas in Sub-Saharan Africa: developing gender-responsive approaches](#) - **S. Ajambo**, L. Nkengla, A. Rietveld, A. Omondi, C. Staver, R. Hanna, L. Kumar and A.Tegbaru



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15:45 - 16:00	Banana-based beverages in East and Central Africa: money-maker for rural value chain actors? <i>M. Kakuru, A. Rietveld, S. Mpiira, S. Ajambo and G. Mbabazi</i>
16:00 - 16:05	Innovative integrated systems for intensification of banana, pig and cattle production in Yunnan province of southwest China - S. Zheng , Z. Guo, X. Li, L. Zeng, S. Xu, K. Yin, T. Bai, P. Yang, H. Fan and L. Zhang
16:05 - 16:10	Strengthening local systems to control Xanthomonas wilt in Eastern Democratic Republic of Congo - G. Mbure , D. Nzaweze and J.M. Byamungu
16:10 - 16:15	Land-use/cropping pattern changes in retrospect across Xanthomonas wilt- infected landscapes W. Ocimati , J.C. Groot, J. Ntamwira, L. Bahati, P. Tiftonell, G. Taulya, M. Bumba, M. Kamira, D. Amin, and G. Blomme
16:15 - 16:20	Beer-banana value chains in Eastern DR Congo: importance for livelihoods and consumption - D.B. Nzaweze, A. Rietveld , S. Ajambo, S. Salumembe and M. OMollo
16:20 - 16:25	Postharvest quality and performance of a promising plantain-like hybrid 'CARBAP K74' from Cameroun using contrasted agronomic practices - G. Ngoh-Newilah and O. Gibert
16:30 - 17:00	PANEL DISCUSSION
17:00 - 17:15	CLOSING REMARKS
18:00	BUS TO GALA DINNER

Thursday, 13 October

08:30 – 15:00 FIELD TRIP

Friday, 14 October

09:00 - 10:00	ProMusa workshop Moderator: <i>I. Van den Bergh</i>
10:00 - 11:30	Workshop 1: The true potential of biological control in bananas Moderators: <i>J. Sandoval</i> and <i>L. de Lapeyre de Bellaire</i>
11:30 - 13:00	Workshop 2: Sanitary and agronomical quality of planting material Moderators: <i>T. Lescot</i> and <i>C. Staver</i>
13:00 – 14:30	LUNCH BREAK



Posters *Will be on display the entire week*

[Crotalaria spectabilis combined to Rhizophagus irregularis MUCL41833 decreases the incidence of Radopholus similis in banana](#) - A. Abia and S. Declerk

[Banana and plantain diversity and uses in Oriental province, Democratic Republic of Congo](#) - J. Adheka Giria, J. Komoy, C. Sivirihauma, D. Karamura, E. De Langhe, R. Swennen, B. Dhed'a, and G. Blomme

[Biological control of banana Red Rust Thrips: Preliminary lab results](#) - M. Arias, R. Corozo, T. Vera and A. Jines

[Determination of Chl a/Chl b ratio as a physiological indicator of hyperpigmentation phenomenon in baby banana \('Bocadillo'\) production as affected by environmental factors](#) - M. Castro-Benitez and P. Winterhalter

[Cover crops in organic-export banana systems: Farmer experiences and soil health in Ecuador](#) - R. Corozo, M. Arias, W. Durango, C. Staver and M. Turmel

[Intercropped cultivated plants control ant community stability and banana weevil damages in plantain agroecosystems](#) - A. Dassou, D. Carval, S. Depigny, P.M. Loubana and P. Tixier

[Virus indexing and sanitation of international banana collection: insights from a multi-years collaborative effort](#)
C. De Clerck, K. Crew, I. Vandenhoeve, C. Berhal, L. Lassois, N. Roux, H.M. Jijakli, J. Thomas and S. Massart

[Harmful or beneficial? Graminoids as reservoir of pathogenic and non-pathogenic Fusarium oxysporum](#)
P. Deltour, S. França and M. Höfte

[The influence of alum, bicarbonate and chlorine treatments on crown rot disease progress in organic bananas](#)
M.A. Kamel, P. Cortesi and M. Saracchi

[Potential of banana and plantain production and commercialization improvement in the Democratic Republic of Congo](#) - R. Ortiz and L. Hellebuyck

[Extracellular compound from culture filtrate of Fusarium oxysporum f. sp. cubense could be useful in agroecological approaches for banana production](#) - A. Soler, N. Portal, P.A. Marie-Alphonsine, J. Mendoza Rodriguez and R. Santos Bermudez

[Challenges and opportunities for keeping nutrients in balance in organic-export banana systems](#) - D. Rengifo

[The influence of irrigation method on banana soil health - a comparison of organic banana production systems in Dominican Republic, Peru, and Ecuador](#) - J.C. Rojas Llanque, U. Vegas, M. Turmel, C. Staver, Domingo Rengifo, A. Perez, Rosa Corozo and W. Durango

[Causes of fruit loss post-harvest among organic banana growers in Peru, Ecuador and Dominican Republic](#)
J.C. Rojas Llanque, U. Vegas, D. Rengifo, P. Suarez, R. Corozo, M. Arias, A. Jines and L. Clercx

[Biomass degradation and mineral fertilization by mulches: a new alternative for reducing chemical fertilizer](#)
E. Rosalie and G. Ornem

[Induced systemic resistance and native tolerance to pathogens in banana: preliminary results](#) - A. Soler, P. Quénehervé, N. Portal and P.A. Marie-Alphonsine

[Establishment of innovations platforms to support ecological intensification of plantain production in Côte d'Ivoire](#) - E. Angbo-Kouakou, L. Temple, A. Assemien and S. Mathe



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[Field evaluation of control options against the banana weevil *Cosmopolites sordidus* and termites *Microtermes* spp. in *Musa* spp.](#)

V.C. Umeh and D. Onukwu

[Comparing the efficacy of banana weevil borer traps and pheromone lures](#) - M.Weinert, R. Piper, D. Peasley, D. Papacek and S. Morris

[A remotely-sensed time series analysis of organic banana in Piura, Peru using MODIS Data](#) - P. Schlesinger and M.C. Yamamoto

[Effects of planting density and irrigation on *Musa* AAB cv. 'Agbagba' under sub-optimal agroecological conditions](#)
A. zum Felde, K. Murphy, D. Amah and R. Swennen

Committees [Organizing and Scientific committee](#)

The influence of alum, bicarbonate and chlorine treatments on crown rot disease progress in organic bananas

M.A. Kamel, P. Cortesi and M. Saracchi

Università degli Studi di Milano, Dipartimento di Scienze per gli Alimenti, Via Celoria 2, 20133 MilanoMI, Italy

Keywords: Crown tissue, postharvest disease, potassium alum, protective treatment, sodium bicarbonate.

Abstract

Crown rot is a post-harvest fungal disease causing a great negative impact on fruit quality. The infection mainly occurs by different etiological agents at harvest time but the symptoms appear after 10-14 days later, usually after overseas transportation. The use of synthetic fungicides to control this disease is restricted and regulated in organic farming. Therefore, it is necessary to find safe alternatives to fungicides useful to reduce the incidence under acceptable threshold levels. The effect of alum, bicarbonate, and chlorine on crown rot disease progress was assessed on organic bananas in some pathogen strains. *In vitro*, mycelium and conidia of strains belonging to the main fungal species identified as etiological agent of crown rot in Dominican Republic were assessed for the germination and growth against different concentrations of the substances to report their activity as fungicidal/fungistatic on artificial media and crown tissues. Results obtained were corresponding to those reported in disease incidence, whereas the alum mainly acts as fungistatic, the chlorine was fungicidal, and sodium bicarbonate didn't demonstrate effect on conidia germination at the tested concentration. In packing stations, 240 hands of banana were used immediately after the second washing bath in three separate treatments; 1) alum as normally adopted in packing stations, 2) 5 g/L of sodium bicarbonate in water, and 3) 3 ppm chlorine in water. The results showed significant differences between the different treatments. Sodium bicarbonate improved the infections causing highest disease incidence 81%, followed by alum with 23%. In contrast, no symptomatic fruits were present among bananas treated with chlorine.