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## Happy New Year!

First we would like to wish you an excellent New Year 2014, while hoping that your New Year's resolutions will all be fulfilled, both personally and professionally! Although we do not yet know what will happen this year, we do know what took place in 2013 - the Cabaré project was involved in many events that we showcase in this fourth issue of the Cabaré Newsletter. Enjoy it!

## 14<sup>th</sup> Plant Virology Meeting at Aussois (France)

From 13 to 17 January 2013, Pierre-Yves Teycheney and Reina Teresa Martinez participated in the 14<sup>th</sup> Plant Virology Meeting held at Aussois (France). R.T. Martinez (IDIAF) presented the findings of research she is carrying out within the framework of the project and of her PhD thesis. Her initial results showed that several banana streak virus (BSV) species occur in the Dominican Republic on Macho x Hembra and FHIA21 banana varieties—the focus of her thesis. They also revealed that BSOLV virus species prevalence levels were significantly higher on the FHIA21 banana variety than on the MxH variety at all sampled sites, suggesting that the OL1 infection allele is more highly expressed in FHIA21 than in MxH. These studies have meanwhile been supplemented and the results confirmed through an analysis of a high number of samples (see below).

## First scientific workshop on black Sigatoka control and banana production held in Havana (Cuba)

The first scientific workshop on controlling black Sigatoka of banana crops in the Caribbean region was held in Havana (Cuba) from 18 to 21 March 2013.



Group photo of the workshop participants.

There were some 50 participants: CIRAD, UGPBAN, IT2, IDIAF, INIVIT, INISAV and IBP partners involved in the INTERREG Cabaré and Banane durable Caraïbes (BDC) projects; institutional partners from the French Embassy in Cuba, producers' groups and organizations from Guadeloupe, Martinique, Dominica, St. Lucia, Costa Rica and the Dominican Republic; and radio and newspaper journalists. The aim of this seminar was to review recent advances in black Sigatoka research in order to lay the groundwork for a regional targeted research partnership geared towards promoting sustainable black Sigatoka control initiatives throughout the Caribbean region.

This workshop highlighted the need for further research on the epidemiology of the disease and for the breeding and selection of resistant dessert and cooking banana varieties. Concerning the latter aspect, GMOs are being studied by Cuban research institutes, whereas other partner institutes are focusing on banana breeding.

Moreover, initiatives under way to develop sustainable cropping systems should be pursued so as to come up with alternatives to chemical control, including biological control and biopesticides.

One key point of this workshop is an initiative to create a regional banana research and experimentation platform, which was jointly supported by all partners. The workshop also had substantial media coverage and boosted awareness on the project.



Cabaré project members proudly display project promotional items (T-shirts, bags and caps). From left to right: Luis Minière (SEA-IDIAF), Lilian Morales (INIVIT), Catherine Abadie (CIRAD) and T. Martinez (IDIAF).



Monitoring black Sigatoka leaf symptoms during a field visit in Artémisa province (Cuba).

## Departure of Olivier Simon (CIRAD)

Olivier Simon, Cabaré project manager since 2011, completed his civic service and voluntary work contract in March 2013. He subsequently obtained a post in metropolitan France as a project officer under a European EAFRD-funded Leader Programme devoted to rural area development and activities.



## Regional training on virological diagnosis in banana organized by CIRAD in Guadeloupe

From 22 to 26 April 2013, CIRAD Guadeloupe organized and hosted a banana virus disease diagnosis training session at its Neufchâteau research station (Guadeloupe). This was the fourth regional training session organized and presented within the framework of the Cabaré project. Nine participants from Puerto Rico, Martinique, Dominica, Dominican Republic, Cuba, de Trinidad and Tobago, St. Lucia, St Vincent and Guadeloupe participated in the training offered by Pierre-Yves Teycheney (CIRAD Guadeloupe) and Marie-Line Iskra-Caruana (CIRAD Montpellier).

Over a 1-week period, the trainees attended theoretical and practical laboratory training sessions. The training week began with the collection of leaf samples for molecular analysis in CIRAD research plots.



Collection of banana leaf samples in Neufchâteau research plots during the first training day.



Practical laboratory training at CIRAD.



The trainees received a training certificate.

## Second scientific workshop on black Sigatoka control and sustainable banana production in the Caribbean held at Gosier (Guadeloupe)

The first workshop on black Sigatoka was a first step towards sharing research results on this banana disease. To advance in this direction, CIRAD, IT2 and UGPBAN organized a second workshop that was held from 25 to 27 June 2013 at the Créole Beach Hotel in Guadeloupe. This workshop, supported by the Banana World Forum and the INTERREG IV Caribbean programme, was attended by about 100 participants from

10 countries and involving Plan Banane Durable, Banane Durable Caraïbes and Cabaré project partners.



This workshop was attended by over 100 people from the West Indies, Latin America and South America—Caribbean farm, research and civil society representatives.

There were five thematic roundtables: gaining insight into the pathogen, optimizing control methods, black Sigatoka disease treatments, genetic strategies, and a last one devoted to innovative low-input cropping systems. This workshop provided an opportunity to review efficient cultivation techniques for controlling this banana disease and brought together the four banana genetic improvement programmes based in the Caribbean region (INIVIT-Cuba, FHIA-Honduras, EMBRAPA-Brazil, CIRAD-French West Indies). It also highlighted the need to promote sustainable cropping systems based on integrated pest management strategies to curb the use of chemical inputs, while meeting societal, ecological, economic and toxicological requirements. From this standpoint, studies on service plants, which help to control pests and weeds and limit the need for pesticide treatments, are of major interest. In Guadeloupe and Martinique, CIRAD is developing innovative low-input cropping systems based on service plants, which the workshop participants discovered during field visits at the end of the workshop. Participants were also taken to hybrid banana selection plots set up by CIRAD where they were introduced to the CIRAD *Musa* Germplasm Collection hosted at the Tropical Plant Biological Resource Centre in Guadeloupe.



Visit of the CIRAD *Musa* Germplasm Collection led by Kodjo Tomekpe, CIRAD banana breeder and geneticist.



## Black Sigatoka disease monitoring set up in the Dominican Republic (IDIAF).

In July 2013, IDIAF, a project partner based in the Dominican Republic, set up a black Sigatoka disease monitoring project on commercial plots with resistant banana hybrids (FHIA21). This project aims to monitor the dynamics of the disease in different environmental settings.

## Things are changing at Cabaré!

**Aurore Cavalier** also completed her civic service and voluntary work contract. She left CIRAD in August 2013 and was hired by INRA for 1 year on the merits of the surveys she conducted during her Cabaré contract. Her Cabaré project research led to three conference papers and the findings will be published in a scientific journal in 2014.

**Jean Carlier** is being hosted for a year (as of August 2013) by the Ecology Department at the University of Toronto (Canada). He is developing genomics and sequencing approaches to study fungus evolution in response to banana resistance. He will focus especially on the analysis of *M. fijiensis* populations (black Sigatoka causal agent) that were isolated on tolerant banana plants (FHIA hybrids) in Cuba and the Dominican Republic in 2011 under the Cabaré project.

## They're talking about us in Puerto Rico!

The Puerto Rican journal *Agrotemas* of August 2013 devoted an article on the Cabaré project. The project is commended for promoting cooperation between Caribbean countries in controlling black Sigatoka. The article points out that the project enables the pooling of economic and human resources in favour of research through collaborations with its Cuban and Dominican partners.

It specifies that the project's primary motivators are the importance of the dessert banana and plantain market and the negative impact black Sigatoka has on agricultural production. The article finally adds that the Cabaré project is an excellent model of cooperation and that the results are eagerly awaited: setting up networking between Caribbean countries and the dissemination of knowledge in countries affected by the disease bring hope for all stakeholders in the banana marketing sector.



## 20<sup>th</sup> ACORBAT International Meeting

The 20<sup>th</sup> ACORBAT International Meeting was held from 7 to 14 September 2013 at Fortaleza (Brazil). The project provided funding support for four participants who presented Cabaré and the project results: Catherine Abadie (CIRAD), Aurore Cavalier (CIRAD), Elisa Javier Higginson (INISAV) and Pierre-Yves Teycheney (CIRAD). Other project participants were also present: J. Clase Salas and L. Minier (Dominican Republic), L. Perez Vicente (Cuba) and T. Lescot (France).



The eight Cabaré project partners who attended the meeting.

C. Abadie and A. Cavalier presented their work on black Sigatoka. C. Abadie, who presented her research on black Sigatoka invasion routes worldwide and in the West Indies, was awarded a prize for the best paper of the meeting. A. Cavalier presented her research on the impact of environmental factors on the severity of black Sigatoka noted on initially resistant hybrid banana varieties. This paper is the result of a survey carried out during the 2 years of her civic service and voluntary work contract under the Cabaré project. E. Javier-Higginson presented research carried out in Cuba and the Dominican Republic under the project on the prevalence and diversity of BSV species. Finally, P-Y. Teycheney presented the Cabaré project, activities, partnerships and expected results.

Participants at the meeting visited an intensive commercial plantation on which the Prata Ana variety is grown.

The meeting also provided an opportunity for the project partners to hold two black Sigatoka research coordination meetings in the presence of L. Minier, J. Classe Salas, L. Perez Vicente and T. Lescot.



Catherine Abadie receiving her prize for the best paper on black Sigatoka.



## Stay of Yanetsy Montero (INISAV) at CIRAD Montpellier (France)



From 12 September to 11 December, Yanetsy Montero Sanchez, agronomist at INISAV (Cuba), a project partner, was hosted at the CIRAD Montpellier laboratories. During her stay, she studied the evolution potential of the black Sigatoka causal agent, *Mycosphaerella fijiensis*, through an analysis of banana leaf samples collected in Cuba. These studies were carried out as part of research on the sustainability of resistance of hybrid banana varieties to black Sigatoka. Following this stay, Yanetsy plans to use the same techniques in Cuba to analyse new samples collected in Cuba in late 2013.

## Mission of C. Abadie, J. Carlier and M-F. Zapater (CIRAD) in Cuba and participation in the INIVIT Symposium

C. Abadie, J. Carlier and M-F. Zapater (CIRAD) were in Cuba from 15 to 21 October 2013 to study the impact of cropping black Sigatoka tolerant banana varieties on the fungus that causes the disease. They sampled banana leaves at three sites that had previously been analysed in 2011 (Villa Clara, Mantanzas and Ciego de Avila) and at three new sites (Artemis, Cienfuegos and Sancti Spiritus).



Marie-Françoise Zapater collecting samples in Cuba.

During this mission, C. Abadie also participated in the 2<sup>nd</sup> International Symposium on roots, rhizome, tubers, plantain,

banana and papaya organized by INIVIT and held from 22 to 25 October at Cayo Santa Maria (Villa Clara province). She presented a paper on the history of banana black Sigatoka invasions worldwide and in the West Indies. This symposium provided an opportunity to promote the project and boost awareness on some project findings. On this occasion, L. Perez (INISAV) gave a talk on the results of the epidemiological surveys conducted by A. Cavalier in 2011 and 2012 within the framework of the project. Two posters were also presented by L. Morales (INIVIT) to outline the Cabaré project and by E. Javer (INISAV) to present BSV prevalence results obtained under the project.

## Stay of R.T. Martinez (IDIAF) at CIRAD Guadeloupe

Reina Teresa Martinez, Cabaré project coordinator for the Dominican Republic (IDIAF), was hosted at CIRAD Guadeloupe from 28 October to 21 December 2013 as part of the third year of her PhD studies. Her research is focused on assessing the risk of dispersal of the banana streak virus (BSV) through the dissemination of interspecific banana and plantain hybrids bearing endogenous infectious BSV sequences.

Schemes to develop new banana varieties use two parents, *Musa acuminata* (A) and *Musa balbisiana* (B), to obtain interspecific triploid (AAB) or tetraploid (AAAB) hybrid varieties. However, *M. balbisiana* parents host endogenous banana streak virus sequences (eBSV) in their genome. Some of these sequences are infectious and can be expressed following biotic or abiotic stress, leading to plant infection. The thesis of R.T. Martinez is focused on assessing, on a field scale and via multilocation trials, the risk of BSV dispersal through the dissemination of interspecific banana and plantain hybrids bearing infectious endogenous BSV sequences.



This was Térésa's second stay in Guadeloupe. In 2012, she had already stayed for 2 months (September-November) when she began an analysis of samples of FHIA-21 (AAAB) and Macho x Hembra (AAB) banana hybrids that had been collected in the main Dominican banana growing provinces. The aim was to determine the BSV prevalence and diversity in the Dominican Republic.

During her 2013 stay, she carried out more in-depth analyses on new samples collected in Montecristi and Puerto Plata provinces: "I am currently working on these samples and particularly on the characterization of endogenous BSV sequences (eBSVs) present in the *Musa balbisiana* genome. We know that infectious eBSVs can be expressed following



stress. As Dominican banana producers plant this hybrid in high quantity, it is very important to be aware of the potential virus dissemination risk from this hybrid. I would like to thank my colleagues Luis Miniere and Domingo Reginfo who helped me in the sample collection.”

R.T. Martinez is registered in the third year of a PhD programme at the University of the French West Indies and Guiana (UAG). Her second dissertation committee meeting was held on 12 December 2013. The thesis supervisors are Graciela Godoy (IDIAF) and Pierre-Yves Teycheney (CIRAD), with Silvina Gonzalez-Rizzo (UAG), Marie-Line Iskra-Caruana (CIRAD Montpellier) and Damien Meyer (CIRAD Guadeloupe) being committee members.

## Arrival of Sandra Kermorgant

Following Olivier Simon's departure last March, CIRAD recruited Sandra Kermorgant to take over as project manager. Sandra took office on 4 November 2013, within the framework of a 1-year renewable civic service and voluntary work contract. She is 24 years old and has a Master's degree in European Project Design and Management from the Université de Brest.



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