Towards Safer Plant Genetic Resources through improved viral diagnostics (SafePGR). Final outreach report

Claude Pavis

1st call for projects

Final Outreach report

*This document is to be filled out by the coordinator in collaboration with the project partners. It must be sent by the coordinator, within the 2 months after the official end of the project with a copy to all the funding bodies of the project It reports on the activity of **all the project partners**. All the partners must have a copy of the version sent to the JCS and to the funding bodies.*

SafePGR

Date: 28 October 2015

A. MAIN OBJECTIVES OF YOUR OUTREACH ACTION

SafePGR: how to limit the risk of spreading viral diseases through the exchange of tropical plant germplasm

The general objective of the SafePGR project was to improve the knowledge of the diversity of viruses infecting the crops addressed by the partner's plant collections, in order to develop or optimize diagnostic techniques, ultimately permitting the sanitation and safe movement of plants between project partners and beyond.

Deciphering viral diversity in conserved tropical plant germplasm and refining diagnostic tools

Biological Resources Centres (BRCs) conserve and distribute plant germplasm for research and development purposes. They provide breeding programs with genitors that are critical for crop adaptation to ongoing environmental and societal changes. In order to prevent the spread or emergence of diseases, BRCs must guarantee the sanitary status of the resources they distribute. Guadeloupe, Madeira, Azores and Réunion BRCs conserve banana and plantain, sugarcane, yam, sweet potato, garlic and vanilla germplasm. These crops are vegetatively propagated and are prone to the accumulation of viruses, due to the lack of sexual reproduction which would act as a natural sanitation process since most plant viruses are not seed transmitted. Our knowledge of the viruses infecting these crops is also only partial.
Sanitation methods exist for recovering virus-free plants but they require sensitive, polyvalent and reliable diagnosis tests. The general objective of the SafePGR project was to improve the knowledge of the diversity of viruses infecting the crops addressed by the partner's BRCs, in order to develop or optimize diagnostic techniques, ultimately permitting the safe movement of plants between project partners and beyond.

Combining classical molecular biology and next generation sequencing approaches to explore viral diversity

To reach its objective, the project combines classical molecular biology and next generation sequencing (NGS) approaches, leading to unprecedented virus discovery in the targeted crops. The NGS-based approaches have the advantage of not assuming any prior information and of therefore very broadly targeting viral genomes, even in the case of novel agents. These NGS-based approaches (so-called metagenomics approaches) are based on random screens of the plant viromes. Because they allow to detect viruses that would have escaped classical detection methods that use known viral sequences as targets, these approaches are complementary to the traditional PCR-based approaches that are widely used in forensics and diagnostics. The innovative approaches developed in the SafePGR project have enabled unprecedented virus discovery in the target crops, from which specific primers were designed, leading in fine to a systematic, optimized and efficient screening of the plants maintained in the partners BRCs.

1st call for projects

Final Outreach report

B. PARTNERS AND AUDIENCE

Territory	Who is impacted ?	Level of impact *	Who contributes ?	Level of involvement *
Guadeloupe	Growers	Low		Low
Guadeloupe	Extension services	Fair	Chambre d'Agriculture, Institut technique IT2	Fair
Guadeloupe	Media	High	TV, radio, newspapers	High
Guadeloupe, La Reunion, Madeira, Azores	Research teams (diagnostic lab)	High		High
La Reunion	Growers	Low		Low
La Reunion	Extension services	Fair	Provanille, Plantation Vanille Roulof	Low
Azores	Growers	Low		Low
Azores	Extension services	Fair		Fair
Madeira	Growers	Low		Low
Madeira	Extension services	High	Centre of Bananiculture, Online pubication of Directorat for Agriculture and Development	High

*: indicate: low, fair, high …

C. PROCESS OF OUTREACH: DESCRIBE YOUR OUTREACH ACTIONS

Please be as specific and precise as possible

A few examples:
Website
Scientific publications
Other publications
Video, radio program, etc …. (with date)
Actions specific to a given territory

Other outreach actions that seem to you interesting

1st call for projects

Final Outreach report

Action	When ?	Where ?	Partner	Target
Development and implementation of a project website	2012	Web	Coordinator	Project partners, stakeholders (funding agencies, partner institutions, governmental agencies, extension services, education services)
TV programme	12/03/2012	Madeira	All	General public
Newspaper	12/03/2012	Madeira	All	General public
Training molecular diagnostic	09/2012	Madeira	P3	P7 technical staff
Training (metagenomics)	2013	Montpellier	CIRAD Montpellier	Scientific and technical staff of "outermost" partners. Non-permanent staff hired for the project.
Scientific publications (5 released, 6 in preparation)	2013-2015		All	Academic and diagnostic research teams
Posters	2013	Ghana, Açores	Guadeloupe, Açores	Academic teams
Oral presentation	2014	La Réunion	La Réunion	Teams in charge of cassava diseases in the Indian Ocean region
Oral presentations	2013, 2015	Aussois (France)	All	French academic teams
Training (bioinformatics)	2015	Guadeloupe	INRA Bordeaux	Scientific and technical staff of "outermost" partners. Non-permanent staff hired for the project.
Sequences on GenBank	2015	Web	All	Academic and diagnostic research teams
CBA-UAc open meeting	20/02/2015	Azores	Azores	Azorean academic teams, growers and extension services
Newspaper	14/04/2015	Guadeloupe	All	General public
TV programme	17/04/2105	Guadeloupe	All	General public
Radio programmes	17/04/2015 21/04/2015	Guadeloupe	All	Growers and extension services, grand public
Meeting to explain goals and results of the project	2015	Guadeloupe	All	End users
Project outcomes booklet	2015	Guadeloupe	All	End users
Revision of the Technical Regulation for the production of vanilla cuttings	2015	Reunion	PVBMT	Extension/Nurseries

Did you meet specific difficulties during the outreach process ?

We had to adapt our messages to non scientific audience. Good exercise!

Did you get feed back from external actors ?

Yes, during the meeting with the end users of Guadeloupe. Many interesting questions emerged, both scientific and on the possible benefits of the project.

Examples:

Is it pertinent to remove all the viruses from the conserved germplasm, as beneficial viruses may occur in plants? Do you know if there is a correlation between interesting traits in plants, and the presence of some given viruses?

Which viruses need absolutely to be removed and which viruses may add qualities to the plants?

What about the viruses which are integrated in the plant genome? Are the new diagnostic methods developed during SafePGR discriminating them from viral particles causing viral diseases?

Are some plant species more vulnerable than other to viral diseases?

Will the CRBs be more useful for local development and regional exchanges when the results will be transferred?

These questions underlined an interesting topic, if we want to continue this project. It deals with the role played by some known or new viruses in the targeted crops. Pathogens agents or beneficial organisms?

D. TOOLS

Did you consider using the following tools:

- **meetings with policy makers and civil society ? Yes**
- production of videos ? No
- **website ? Yes**
- **other : Press kits**

E. STAKEHOLDERS INVOLVEMENT

Could the outreach have been improved with a higher involvement of stakeholders during the design and implementation of the project?

Yes. In fact, the project was built only with scientific actors, and a co-construction would have generated more interest than an *a posteriori* communication.

F. COLLABORATION INTRA-NETBIOME CALL

Did you collaborate with other Netbiome projects for outreach actions?

No direct collaboration but exchanges during the Netbiome meeting in Guadeloupe in October 2014.

How could the Netbiome network be used to capitalize and build on the work done ?

G. FURTHER ACTIONS

After the end of the project, what are the key elements for extending the impact of your project?

To implement diagnostic and sanitation strategies in the BRCs.
New projects derived from the methodologies developed in the Safe-PGR:

- French Etandard project involving several partners of Safe PGR
- Regional project on cassava sanitation in Reunion, Mayote and Comoros (PVBMT)
- NGS indexation plateforme in Guadeloupe (CPER-PO project).
- Project of a Yam quality seed production sector, with scientific, extension services and economic actors in Guadeloupe (RITA network project).

Other comments: