Cassava Bacterial Diseases
needs and prospects

Valérie Verdier

Interactions Plantes Microorganismes Environnement
Expertise in Plant Pathology
48 permanent staff.

1. EAVIR
VIRus
Emergence and Adaptation
D. Fargette

2. IPPS
Interaction Plant-Parasite
and Silencing
C. Brugidou

3. GTIPP
Genomic Transcriptomics
Inter. Plants Procaryotes
R. Koebnik, L. Gagnevin

4. ABIP
Burkholderia
Plant Adaptation and Interaction
L. Moulin

5. NEFONEV
Nematology: Functional and evolution
S. Bellafiore

6. CoffeeAdapt
Plant Adaptation to stress
H. Etienne

Bioinformatics
Risks associated with the expansion and intensification of crop cultivation:
emergence of virulent strains of pathogens
introduction of new pathogens
Severe attacks of CBB

Xanthomonas

RDC, Katanga
R. Congo, Brazzaville, Haut Plateaux

Source: H. Maraite
**Xanthomonas**

- Gamma proteobacteria

- 20 to 25 genomic species

- Infects more than 400 host plants:
  - important crops
  - High degree of host and tissue specificity

0.1 \( \mu m \)
Xanthomonas causes two bacterial diseases of cassava

CBB: *X. axonopodis pv. manihotis*
- Bacterial Blight
- Intercellular and vascular: moves and lives in xylem vessel

CBN: *X. cassavae*
- Bacterial leaf necrosis
- Intercellular
CBB is listed among the TOP10 most important plant bacterial diseases (Mansfield et al., MPP 2012)

Re-emerging, neglected diseases
Food security
In the recent years:

- Reports of CBB outbreaks (Africa, Asia, S & C America)
- New disease report / confirmation (I.Coast, Mali, Burkina)
- No priority for work on bacterial diseases

Challenges

Evidence of priority
Rapid/sensitive diagnostic tests
R genes and breeding strategies
Sample Processing & Identification

Xam specific PCR
We need: Tools to help with identification and to produce clean seeds

1. Strain collections (X.cassavae and manihotis)

2. Diagnostic multiplex PCR (X.cassavae and manihotis)

3. LAMP - Loop mediated isothermal amplification

4. VNTR - MLVA scheme (R.Koebnik)

5. Race - Pathotypes genetic markers
We need

✓ Exploit resistance sources

✓ Develop markers for known R genes (Lopez et al.)

✓ GBS - GWAS Platform HT phenotyping

✓ New approaches for developing R (genome editing)
Projects we prioritized:

1. Understanding Population Dynamics to Support Pathogen Management of Bacterial Diseases

2. Pathogen Informed Next-Gen Breeding for Durable Resistance to Bacterial Diseases in a context of climate change

3. Strengthening capacity and networking in control of bacterial diseases
What is next?

- Bellagio RoadMap and RTB BDI roadmap into practice
- Establishing a Pan-African monitoring CD network
- International cassava transit site, certified CBB pathogen-free cassava
- Funding for CB research