



Epidemiology of Yam Viruses in Guadeloupe: Role of Cropping Practices and Seed-Tuber Supply

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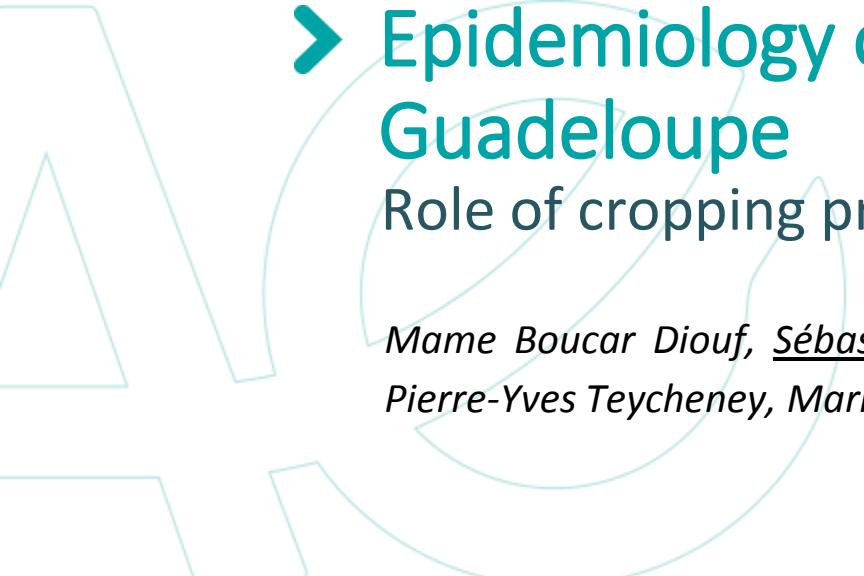
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➤ Epidemiology of yam viruses in Guadeloupe

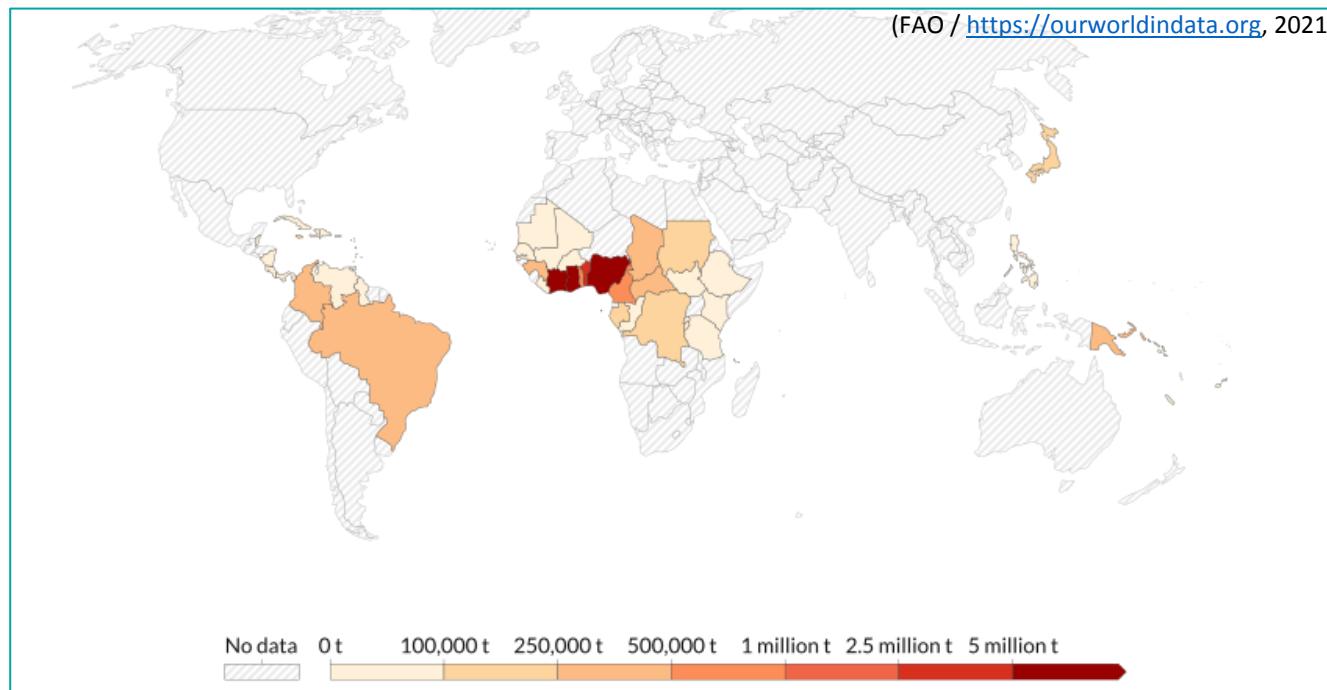
Role of cropping practices and seed-tuber supply

*Mame Boucar Diouf, Sébastien Guyader, Olyvia Gaspard, Eric Francius,
Pierre-Yves Teycheney, Marie Umber*



➤ YAM – A vital root crop for the intertropical world

- Ranks 4th among the root crops (metric tons produced)
- Dietary, medicinal and cultural importance, especially in west Africa (> 95% of the worldwide production)



➤ YAM – The first food crop in Guadeloupe



Dioscorea alata



D. cayenensis



D. rotundata



D. trifida



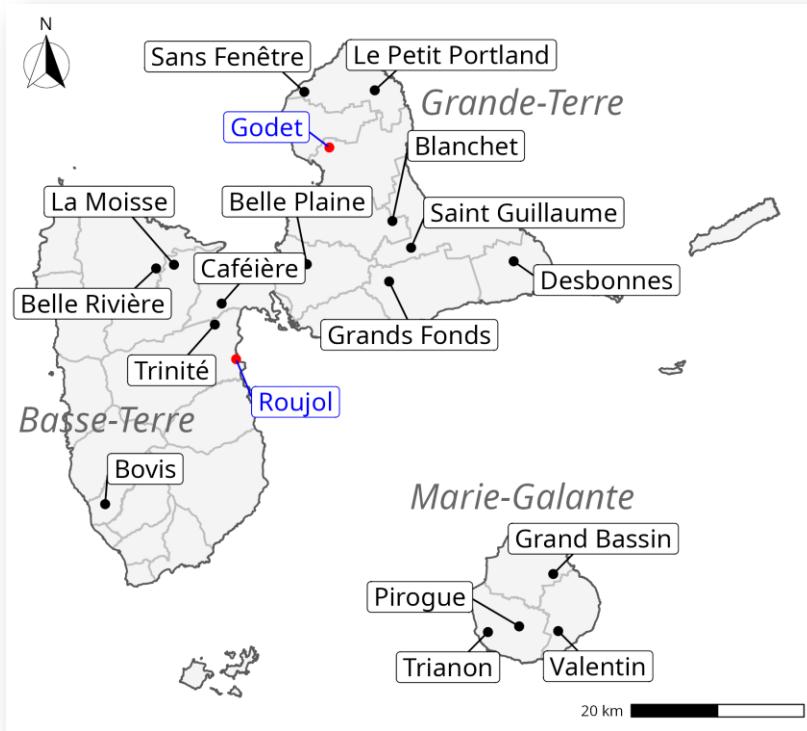
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➤ YAM – *Constraints to the production*

- Only 20-40% of the yield potential is attained:
 - high requirements in soil nutrients
 - competition with itself and weeds
 - pests and pathogens... ↗ viruses
- ICTV recognizes 25 virus species worldwide
- In Guadeloupe, 9 viruses reported in yam:
 - assigned genera:
Ampelovirus, Badnavirus, Banmivirus, Cucumovirus, Macluravirus, Potexvirus, Potyvirus, Sadwavirus, Velarivirus
 - unassigned genus of *Betaflexiviridae*
- Since the advent of HTS technologies, “novel” viruses keep surfacing and being characterized at the genomic level
- Much less is known about impact and epidemiology...

➤ Epidemiology of yam viruses in Guadeloupe

Methods



2019

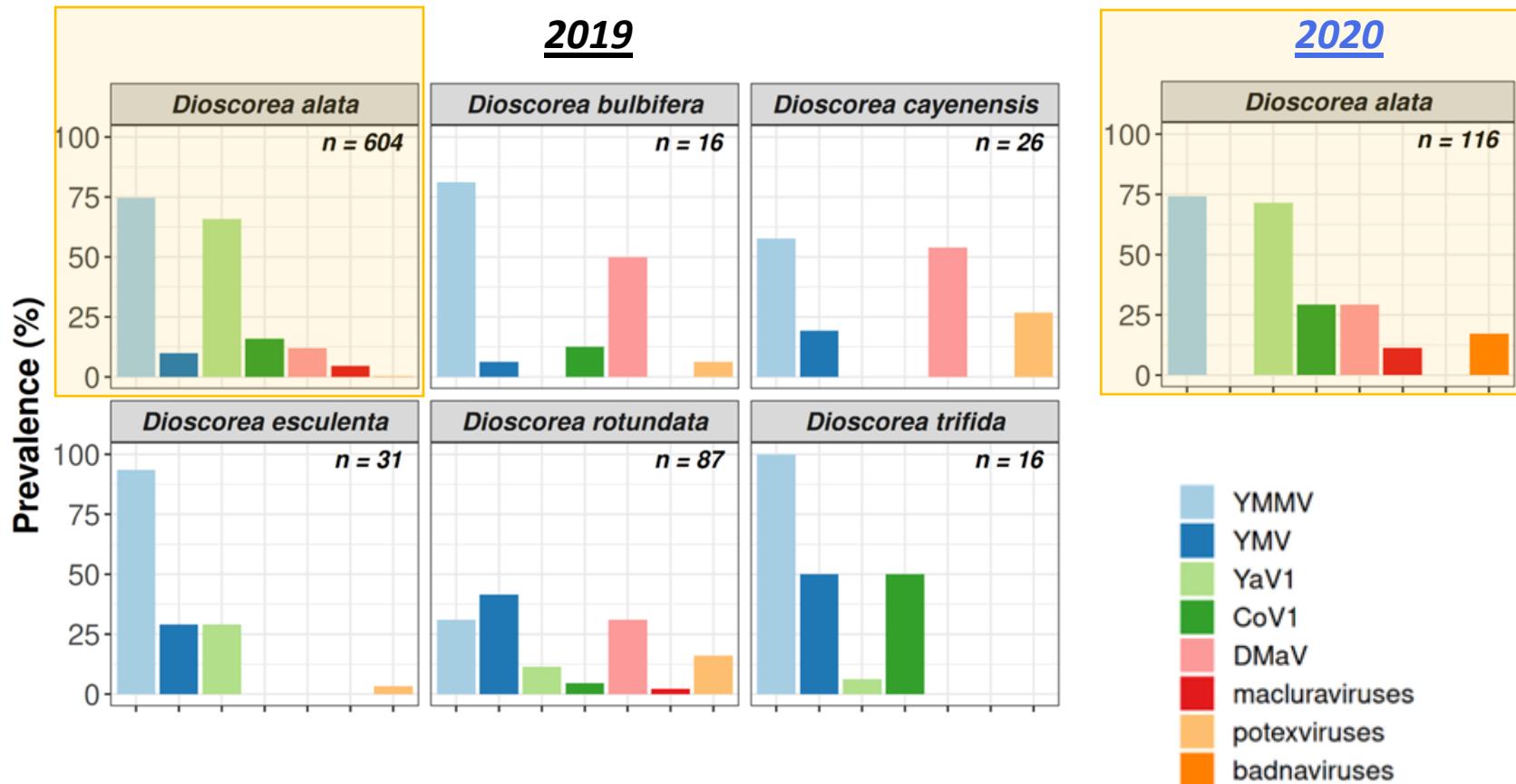
- **18** plots surveyed (records on what yams were grown, cropping practices, environment)
- **780** yam leaf samples collected (6 yam species, 15 cultivars)
- **46** weed leaf samples collected

2020

- **2** plots
- **117** samples of *D. alata* collected (1 yam species, 7 cultivars)
- **80** weed leaf samples collected

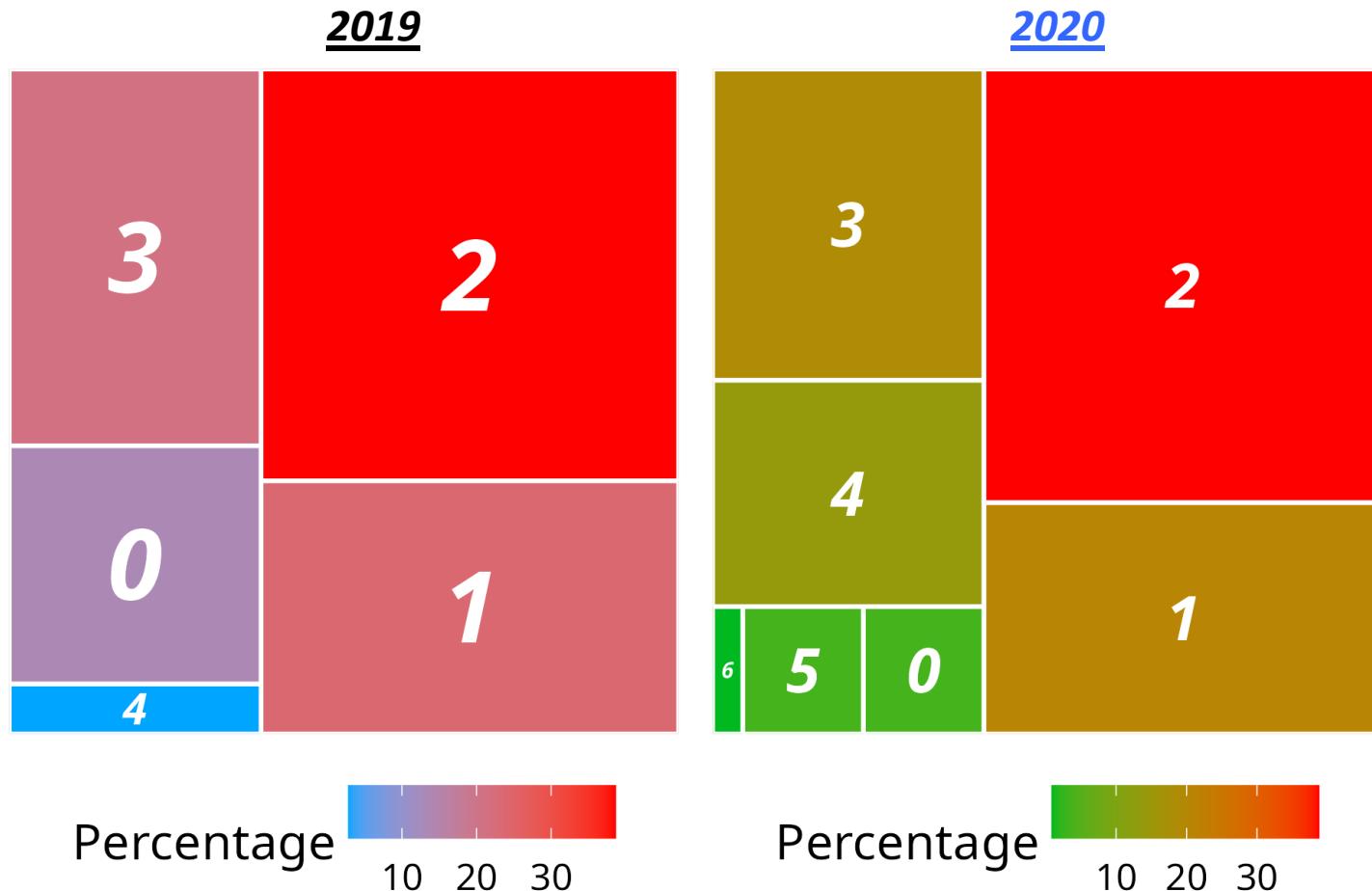
➤ Epidemiological survey in Guadeloupe

Results: prevalence of viruses in yams



➤ Epidemiological survey in Guadeloupe

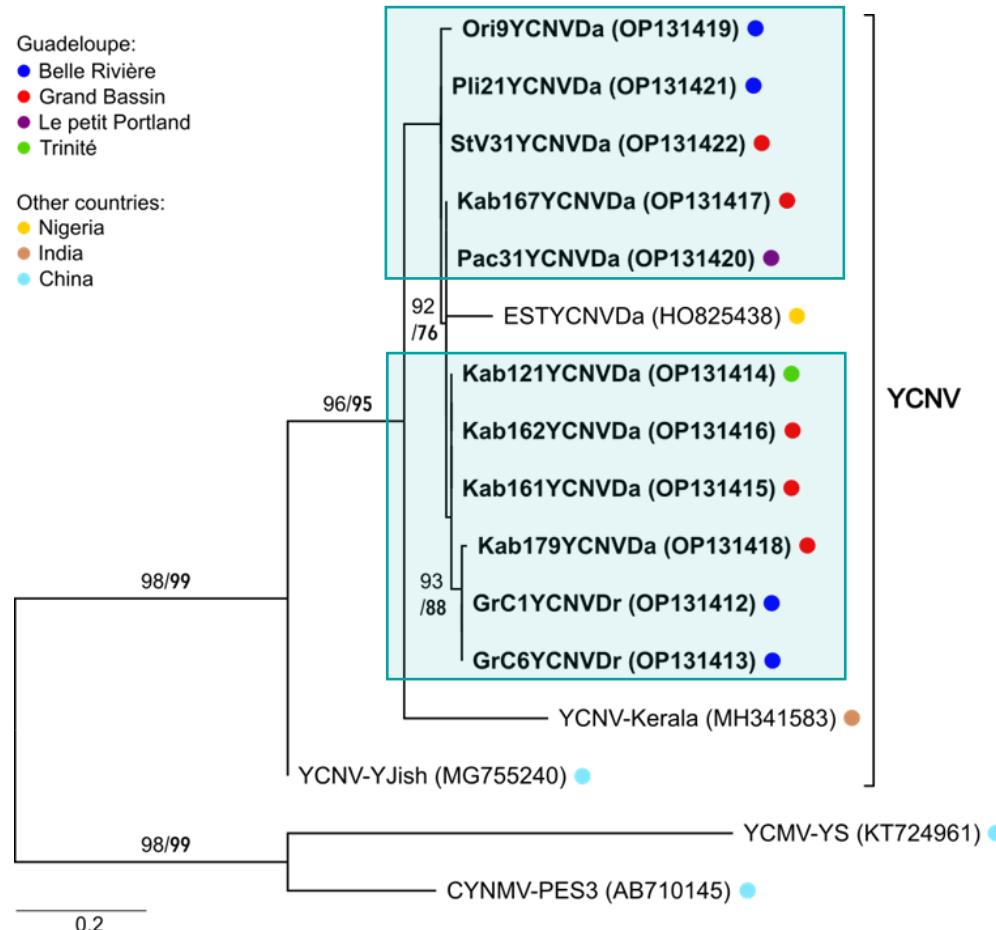
Results: mixed infections



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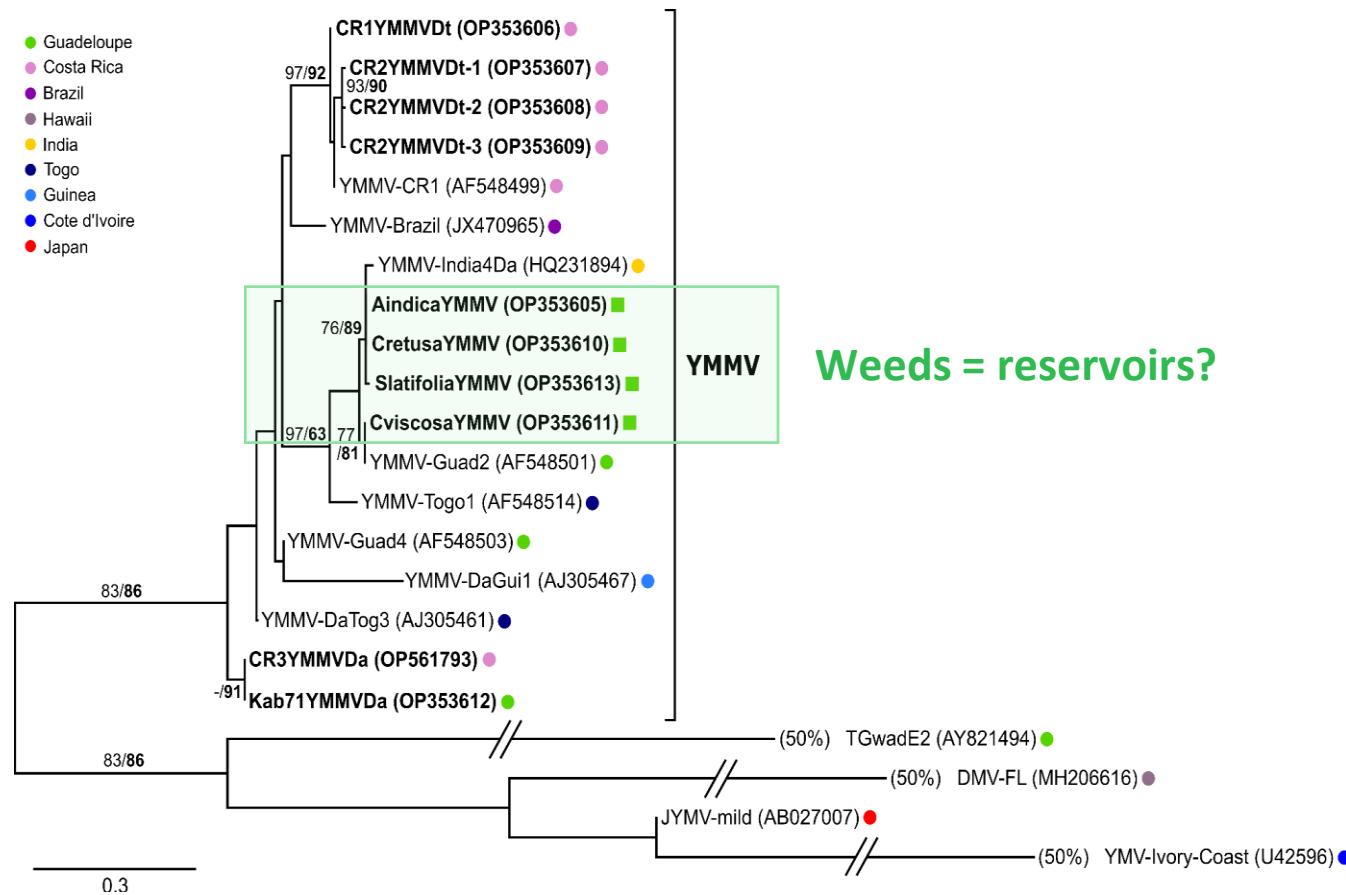
➤ Epidemiological survey in Guadeloupe

Results: yam macluraviruses in Guadeloupe



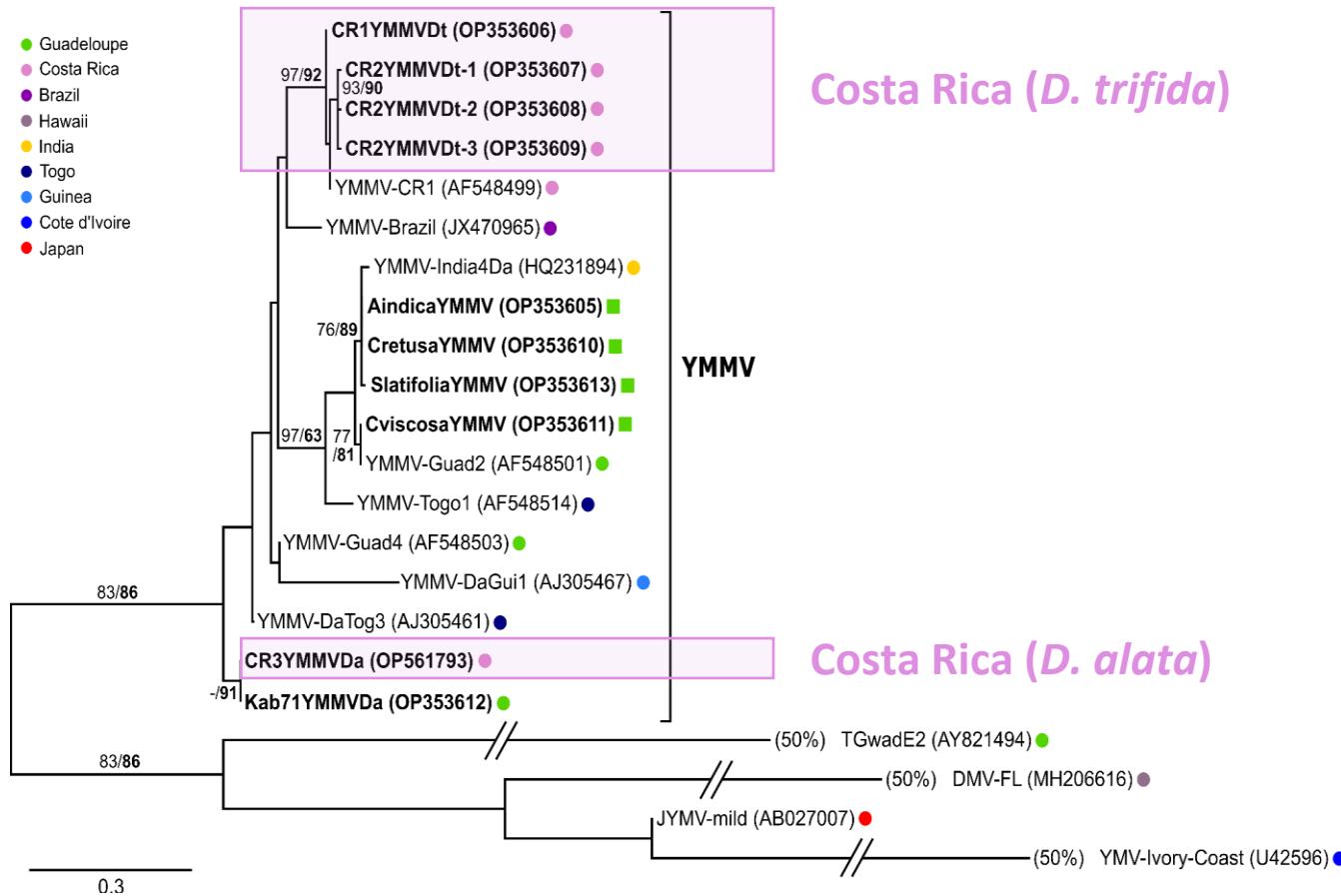
> Epidemiological survey in Guadeloupe

Results: yam viruses in weeds



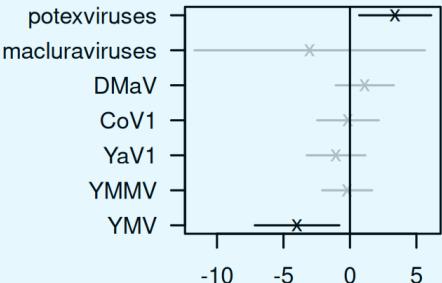
> Epidemiological survey in Guadeloupe

Results: yam viruses in weeds

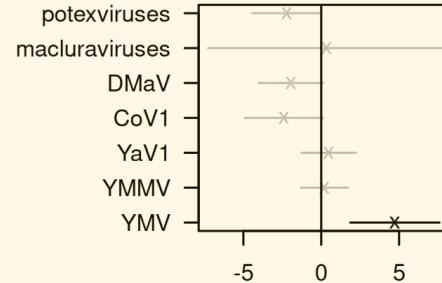


➤ Epidemiological survey in Guadeloupe

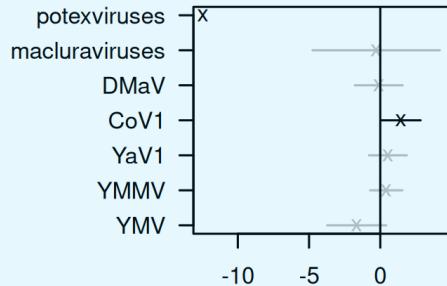
Results: effect of crop-related variables on virus occurrence



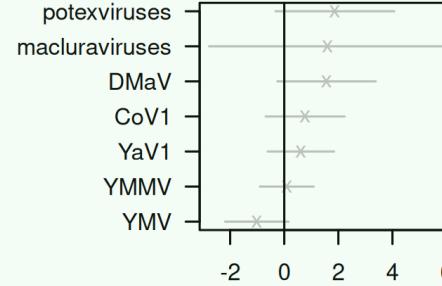
Weeds_management: mechanical



Use_of_pesticides: yes



Weeds_management: mulching



Seed_supply: own

➤ Epidemiological survey in Guadeloupe

Results: efficiency of vertical transmission



D. trifida mother plants:
YMMV
YaV1

Daughter tubers



96% YMMV
0% YaV1

Daughter plants

➤ Epidemiological survey in Guadeloupe

Summary

- **YMMV** and **YaV1** are the most prevalent in Guadeloupe
- **Mixed infections** are predominant
- First detection of **YCNV** in Guadeloupe
- Weeds likely act as reservoir of **YMMV**
- Evidence that imported tubers from abroad can **introduce viruses**
- **Vertical transmission:** high for YMMV / non-existent for YaV1
- Some **cropping practices** seem to correlate with the **occurrence** of some viruses... but these correlations are sometimes counterintuitive

The image shows a thumbnail of a journal article. At the top left is the logo for 'viruses' with a red circular icon. At the top right is the logo for 'MDPI'. Below the logos, the word 'Article' is written in a small gray font. The main title of the article is 'Epidemiology of Yam Viruses in Guadeloupe: Role of Cropping Practices and Seed-Tuber Supply'. Below the title, the authors are listed: Mame Boucar Diouf ^{1,2,3}, Sébastien Guyader ¹, Olyvia Gaspard ¹, Eric Francius ¹, Pierre-Yves Teycheney ^{4,5} and Marie Umber ^{1,*}.

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