

BOOK OF ABSTRACTS
POSTERS

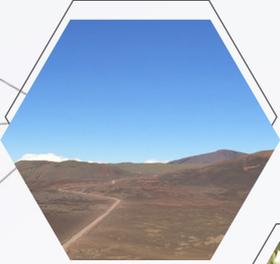


Island BIOLOGY

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📍 **Université de la Réunion**
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Deciphering the invasive history of a bacterial crop pathogen in the Southern Indian Ocean islands: insights from historical herbarium specimens

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Crop pathogens have been a threat to human kind since the birth of agriculture. However, little is known on the evolutionary processes and ecological factors that underlie their emergence and success, and explain epidemics. Insular ecosystems are especially vulnerable to exotic disease invasions and thus provide a model of particular interest. Nowadays, our understanding of plant pathogens and the diseases they cause greatly benefits from molecular genetics and genomics. In this context, herbarium collections are an enormous source of dated, identified and preserved DNA material that can be used in comparative genomic and phylogeographic studies to elucidate the emergence and evolutionary history of pathogens. In this study, we reconstructed the genomes of 6 historical strains of the Citrus phytopathogen *Xanthomonas citri* pv. *citri* (*Xcc*) obtained from infected herbarium specimens. We designed a specific extraction protocol suited for bacterial ancient DNA (aDNA) from herbarium specimens, and showed the authenticity of our historical samples by assessing DNA damage patterns. We then compared the historical strains to a large set of modern genomes to reconstruct their phylogenetic relationship and estimate several evolutionary parameters at the scale of the Southern Indian Ocean (SIO) islands, using Bayesian tip-calibration inferences. Our results first confirm that *Xcc* originated in Asia and subsequently spread to the rest of the world, including the SIO islands. We dated the arrival of *Xcc* in the SIO area to the mid-19th century and hypothesize that it was linked to human migrations following the abolishment of slavery. By analysing the phylogenetic structure of SIO *Xcc* we suggest that the introduction of the disease happened first in La Réunion and Mauritius, from which it spread to all other SIO islands. Finally, our results also include the first estimation of a mutation rate for a plant pathogenic bacterium. Our study shows the great potential hidden in herbarium collections to bring light on the evolutionary dynamics that drive pathogens invasion at the scale of the Southern Indian Ocean islands, ultimately helping us to better control current and future crop epidemics.

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