Exploring the phylogenetic evolution and geographic transmission patterns of the rice blast *Magnaporthe oryzae* in Africa

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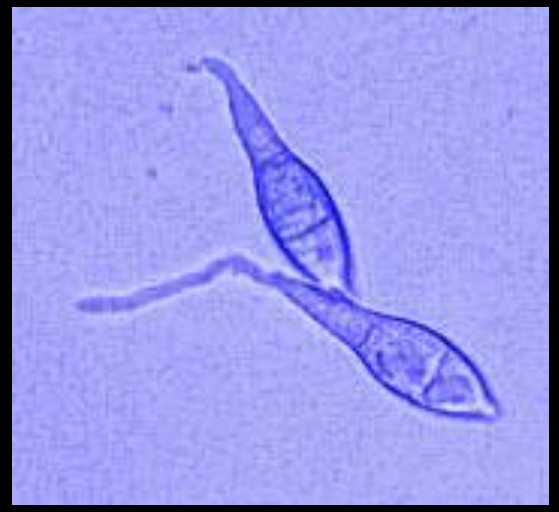
Introduction

- **Rice blast** is caused by a fungal pathogen, ***M. oryzae***
- Reproduces both **sexually** and **asexually**
- Sexual reproduction was evident at the point of origin and the lineage here was largely genetically diverse
- As the pathogen spreads to other continents, it loses the sexual reproduction capability and becomes asexual
- The subsequent lineages are said to be **clonal** and tend to be less genetically diverse



Magnapothe image from https://twitter.com/the_telomeres
Plant parts affected by rice blast from https://microbenews.wordpress.com

Image of rice field affected by rice blast from https://ucanr.edu

Hypothesis

Null hypothesis

- There is no genetic diversity of the pathogen within the African strains

Alternate hypothesis

- There is a genetic diversity of the pathogen within the African strains

Objectives

Main objective

1. To determine the possible point of entry of the *M. oryzae* pathogen to Africa and find any possible transmission patterns within Africa

Specific objectives

1. To investigate insights into the evolution of genes that are known to be important for virulence and pathogenicity
2. To examine the signatures of adaptation within the African strains

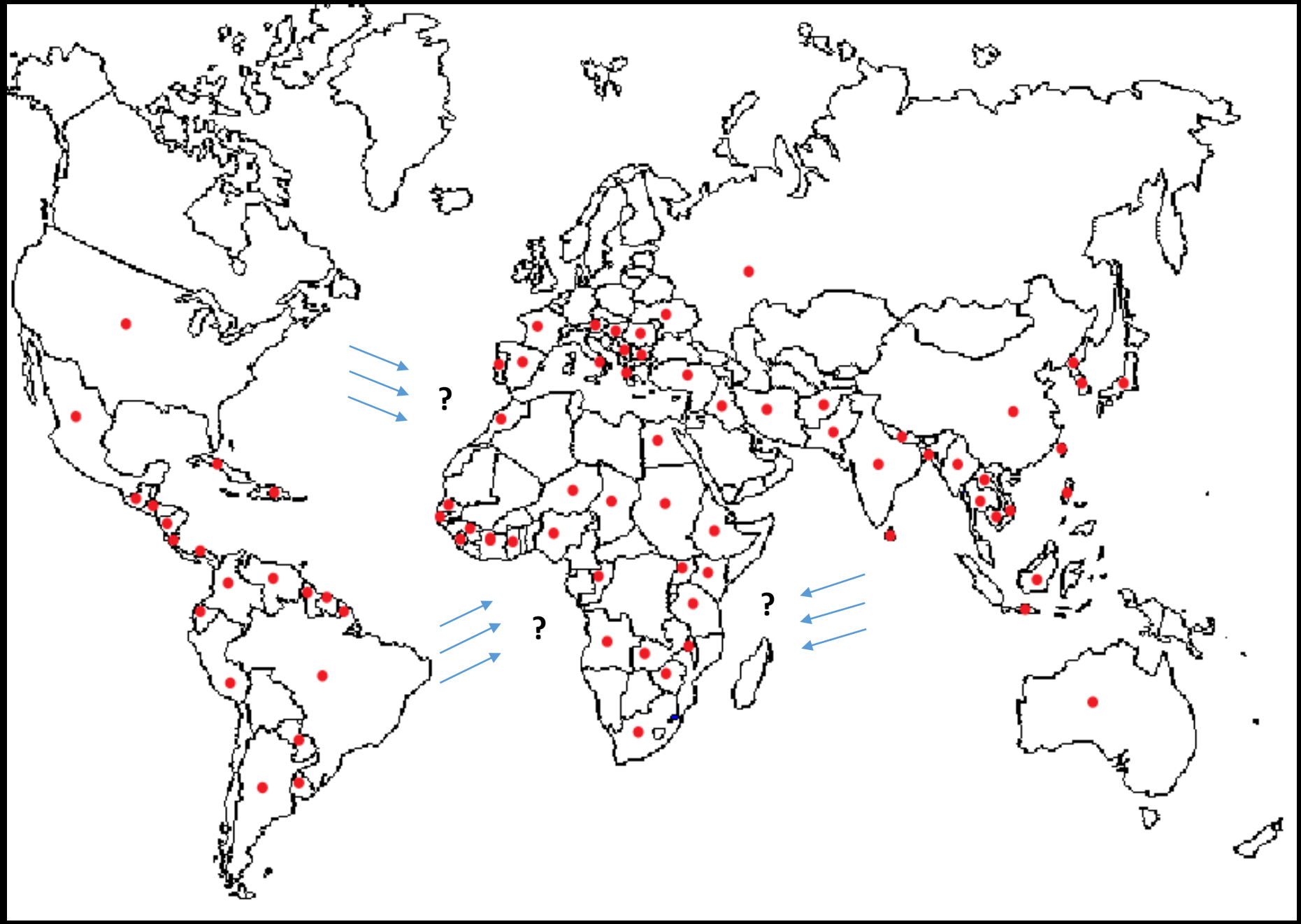


Image showing world wide distribution of rice blast from https://www.researchgate.net

Methodology

M. oryzae isolates

Image from www.illumina.com

Sequence reads

SNP calling

Population structure analysis

Phylogenetic analysis

Conclusion

- Having a better understanding of the pathogen's **phylogeograhy** will help in informing future measures taken towards combating the spread and management of rice blast such as ;

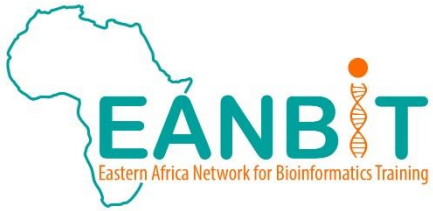
1. The development of more effective fungicides to control the disease
2. Controlling the spread of the disease by preventing its movement through the wind by windborne spores, by water and on infected plant material
3. Development of resistant varieties of rice
4. Ensuring that the seeds planted by farmers are disease free

Work plan

Activity	Timeline											
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug
Developing project concept												
Proposal writing												
Proposal presentation												
Data analysis & project work												
Dissertation writing												
Dissertation presentation												
Dissertation corrections, writing of manuscript												

Acknowledgements

Jean-Baka Domelevo Entfellner
Wilton Mbinda
Geoffrey Onaga



Thank you!