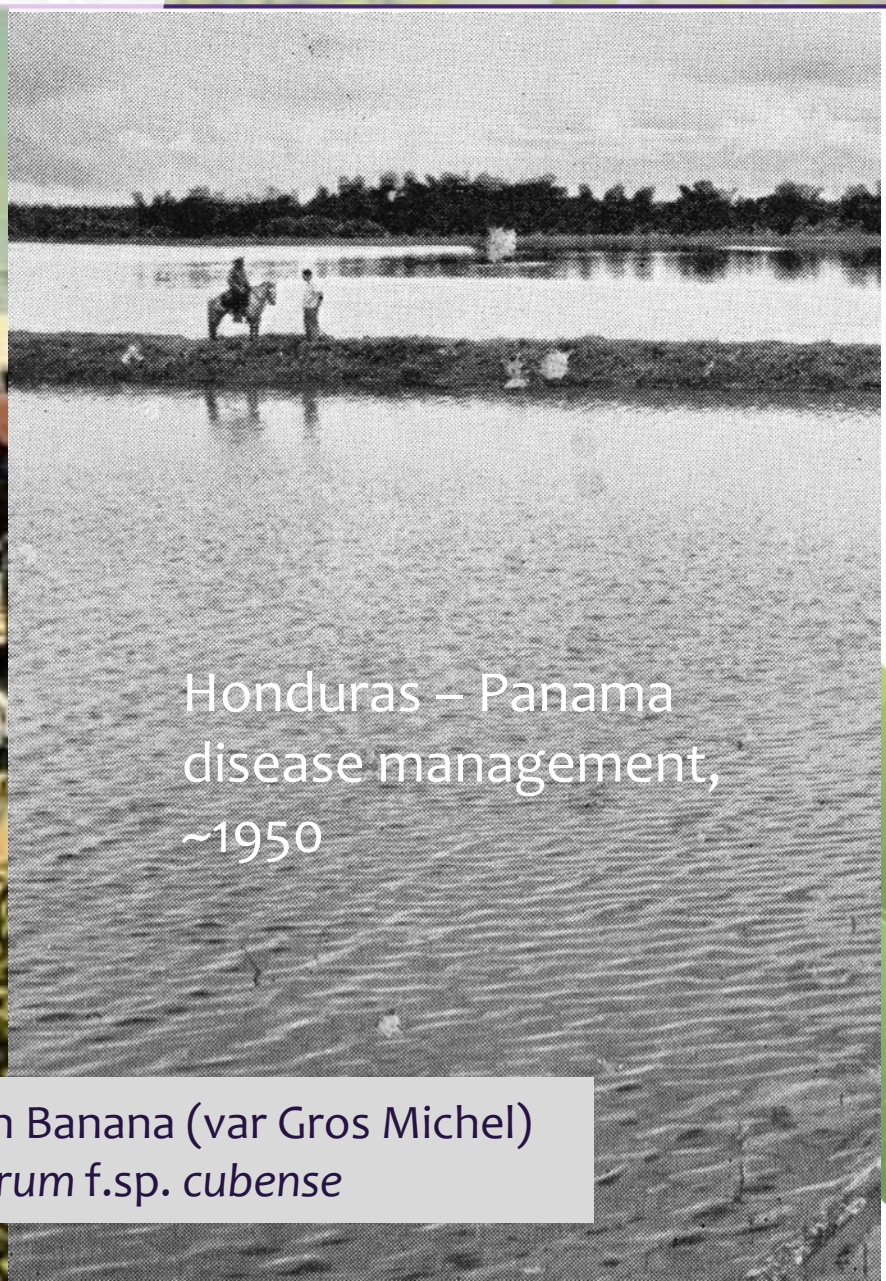
The Future of Banana is Diversity

Crop Innovation & Business, April 15th 2019

Banana diversity

Why not?

“Gross Michel” grandmothers banana



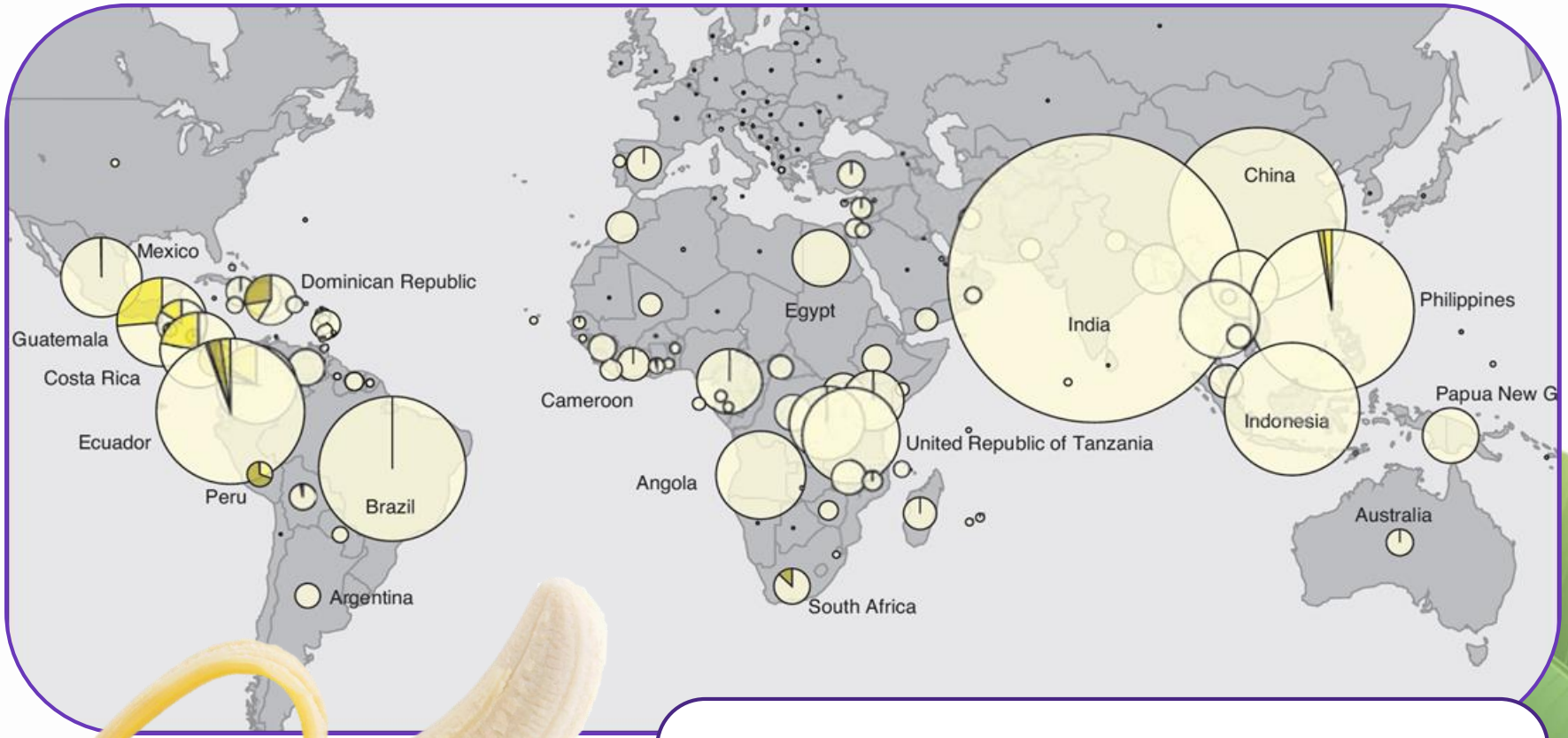
Honduras – Panama disease management, ~1950

Panama disease (Race 1) in Banana (var Gros Michel)
Fusarium oxysporum f.sp. *cubense*

Cavendish Banana for Export

Foc Race 1 resistant

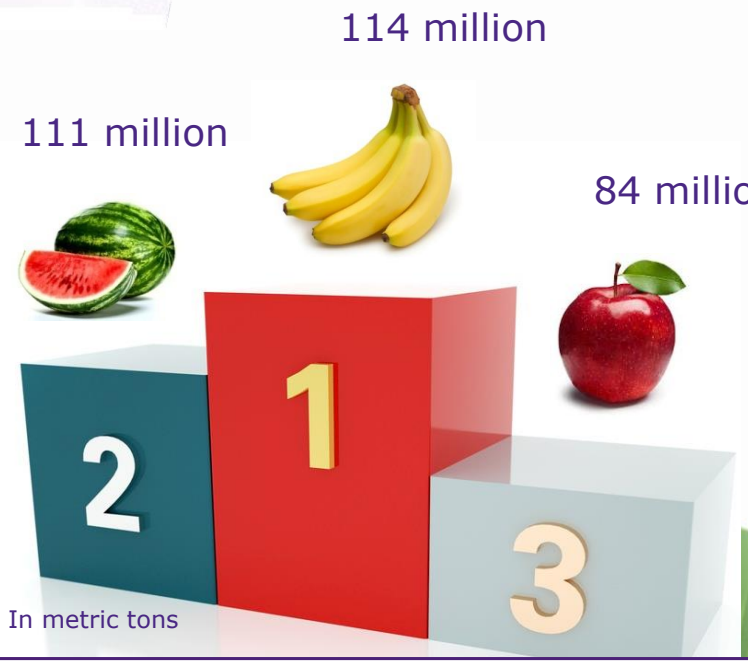
[source: SSI review 2014]



5.3 M ha. - ~70% SA & MA
15% export - ~50 large companies
9000 M export value –
25000 M retail value

Cavendish Banana for Export

"Biggest" fruit, Closed chain



Value chain	R&D and Breeding	Inputs	Producer	Export	Import, wholesale, ripening	Distribution	Consumer
Players		Agrochemicals	Transnational banana companies			Food service	
		Material supplier	SME farmers	Exporting Companies	Importers	Traditional retail	
		Lab services	Small farmers	Transporters	Wholesalers	Big retail chain	
		Planting material			Ripeners		

Cavendish under threat

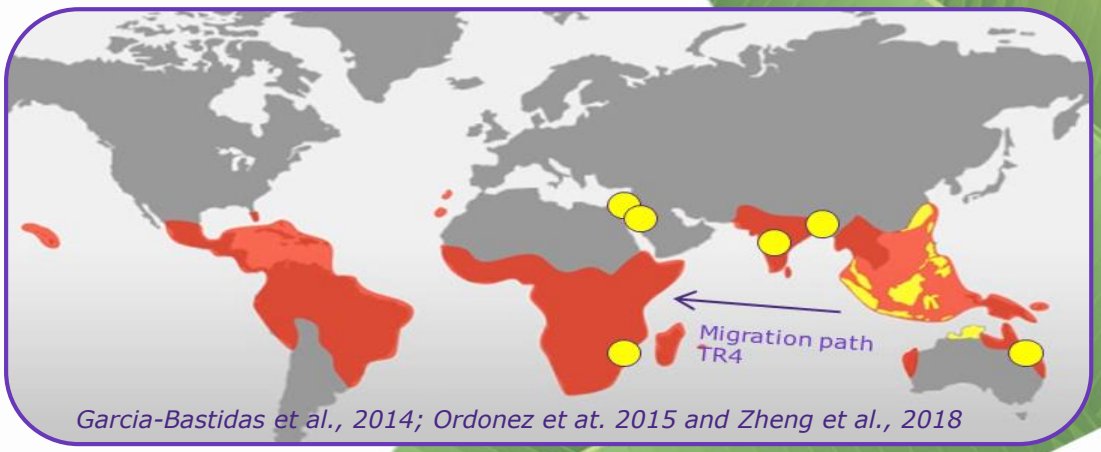
Black Sigatoka (Pseudocercospora fijensis)

Production, cost distribution

Cavendish under threat

Filippines since 2014; Foc TR4 epidemic

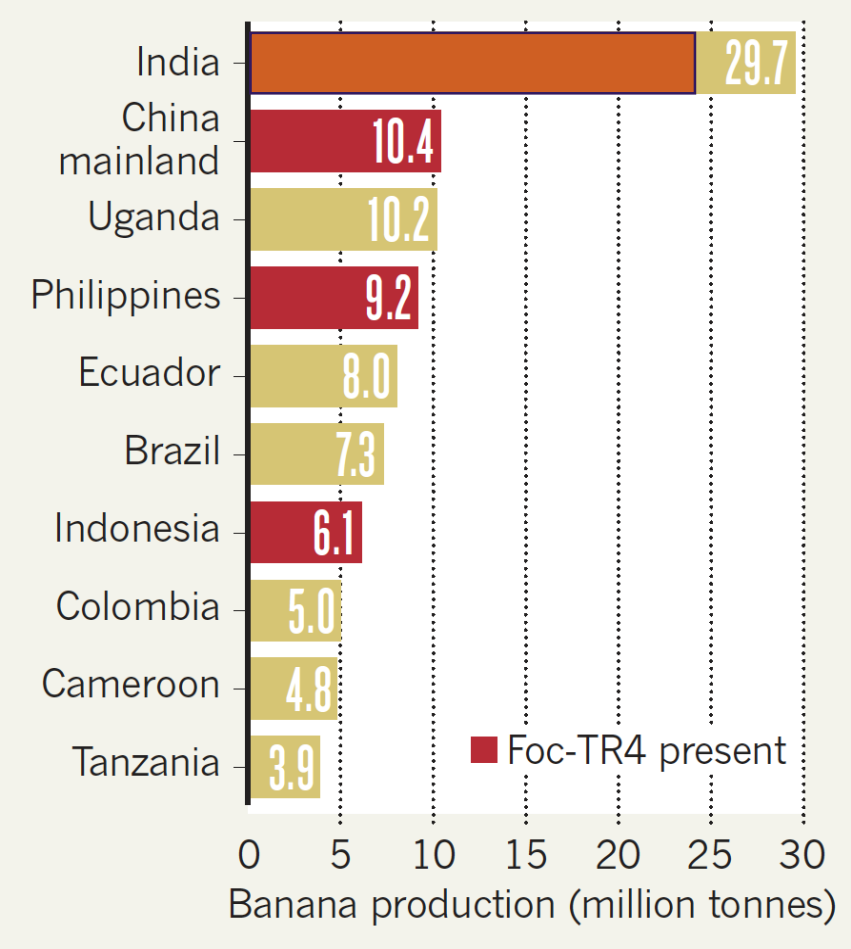
Panama disease(Fusarium oxysporum f.sp. cubense) Tropical Race 4 (TR4)



Garcia-Bastidas et al., 2014; Ordonez et at. 2015 and Zheng et al., 2018

Cavendish under threat

Crash of a clone!



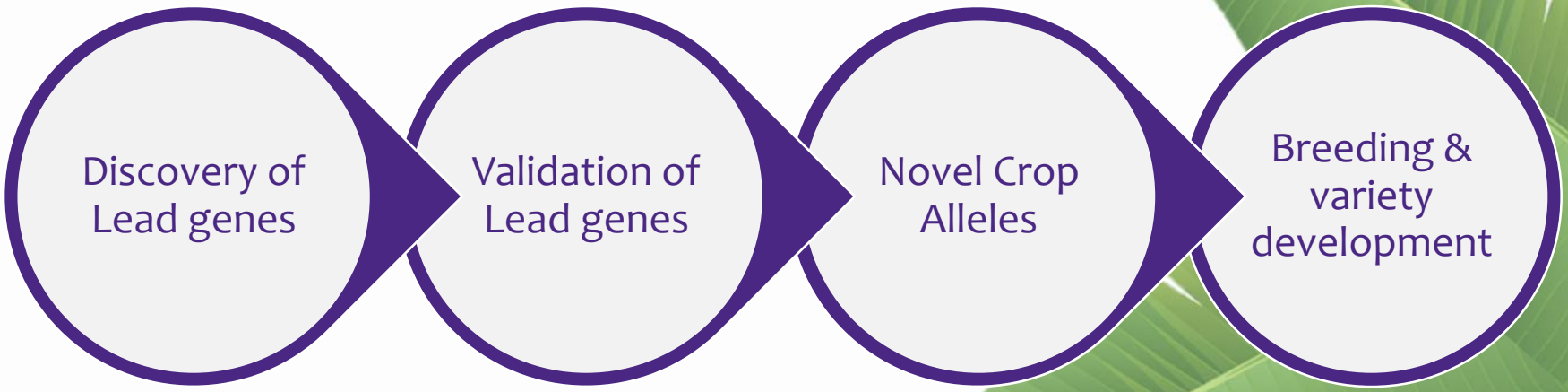
Unique Collaboration since 2018

Banana Breeding

MusaRadix
Bringing Better Bananas

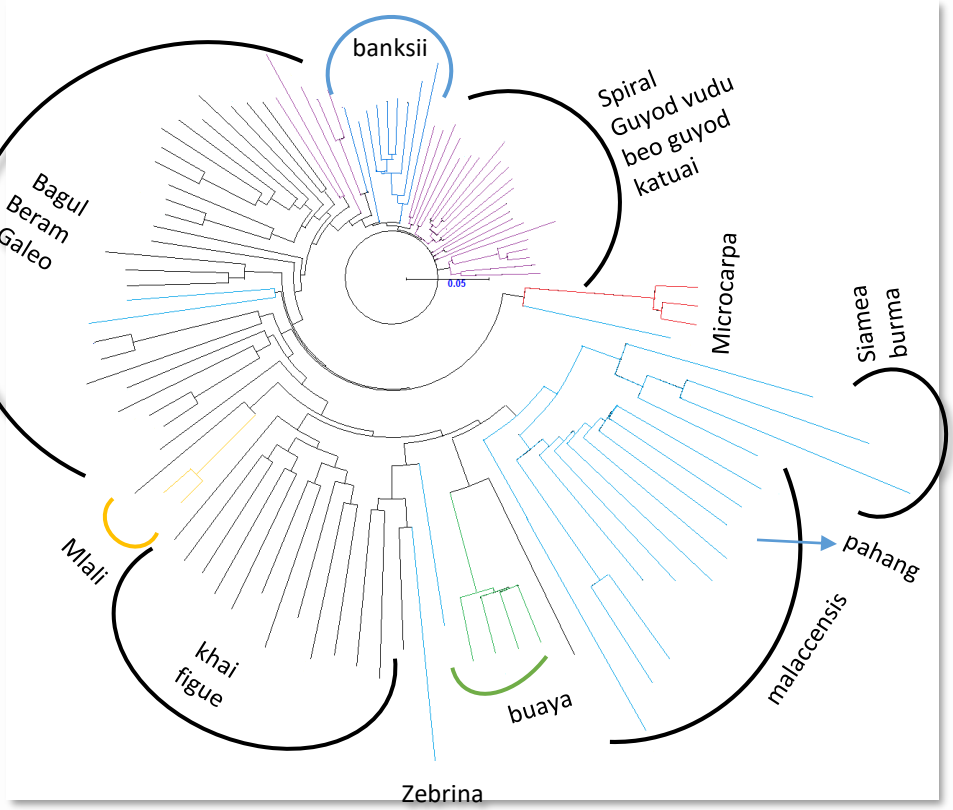
KeyGene

WAGENINGEN UR
For quality of life

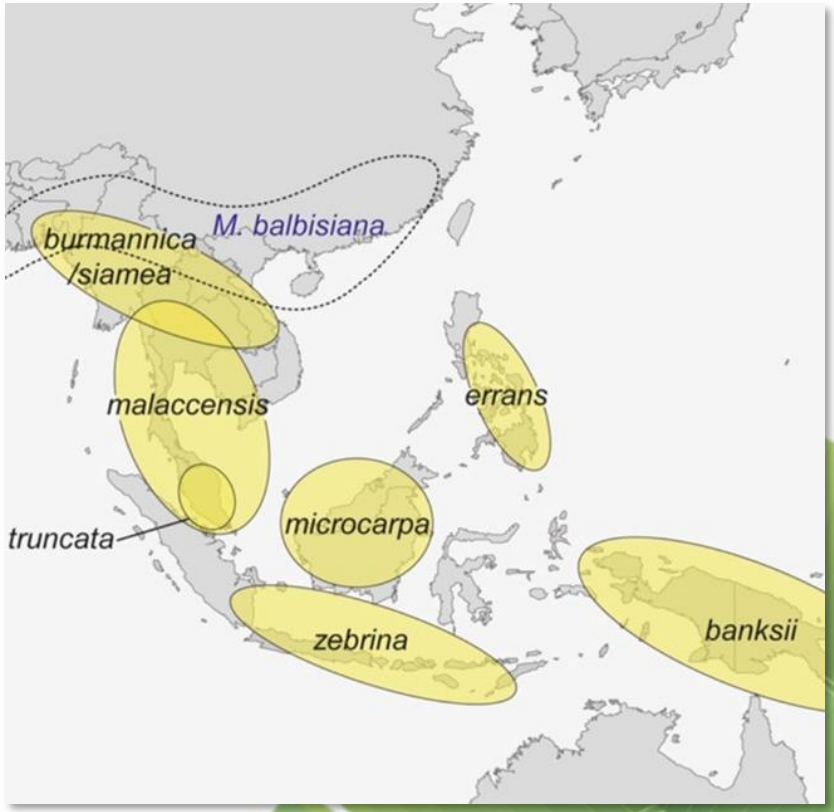


Banana Diversiteit & DNA markers

7 M DNA polymorphisms



Diversity based on DNA profile

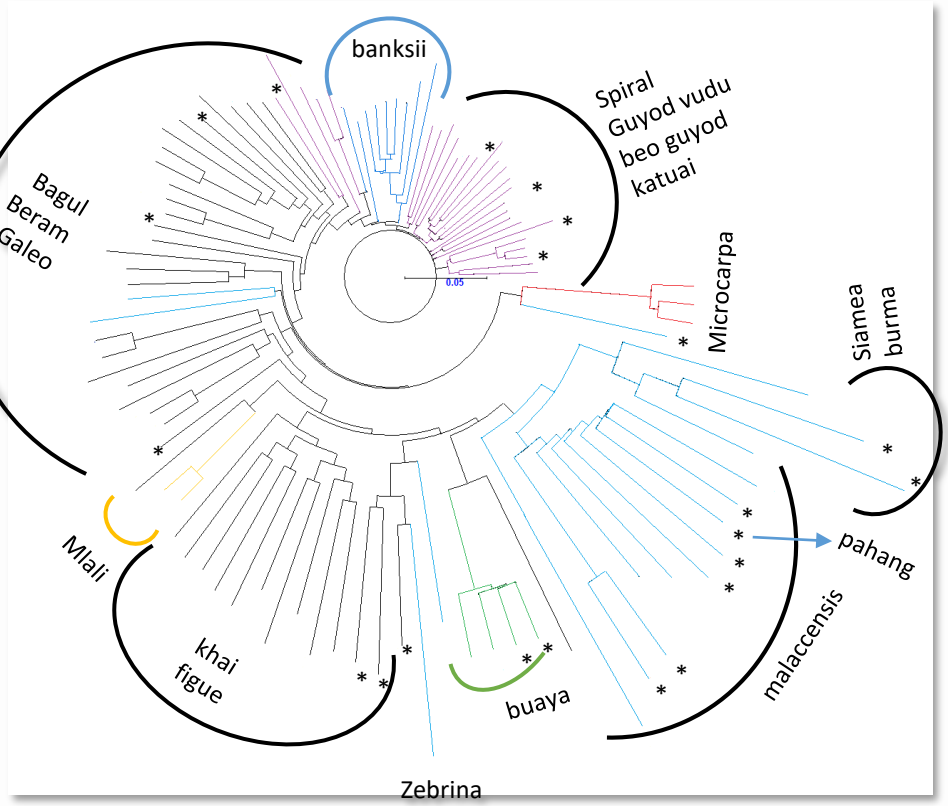


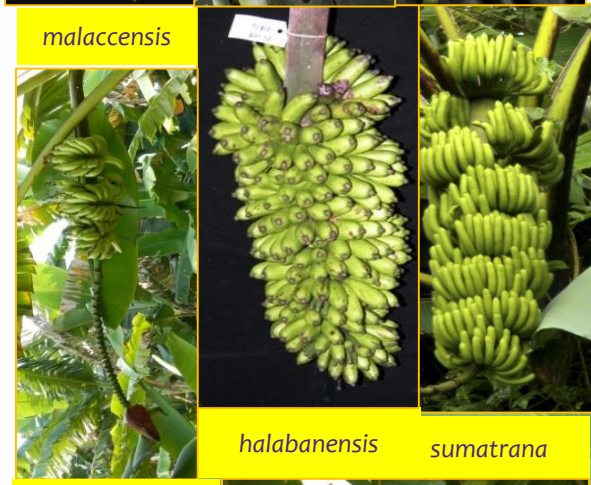
Origin of banana South East Asia

Photos: Fajar Ahmad

Banana Diversiteit & DNA markers

Diversity in Phenotype & Disease Resistance



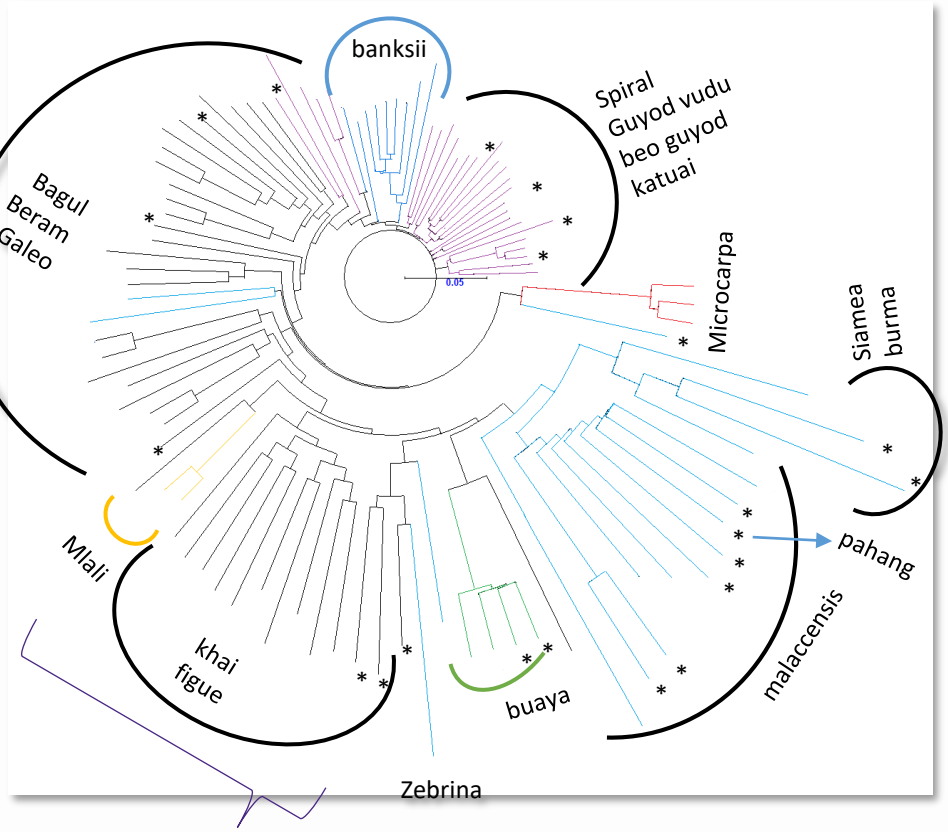


Diversity of phenotype
TR4 resistance is available in germplasm

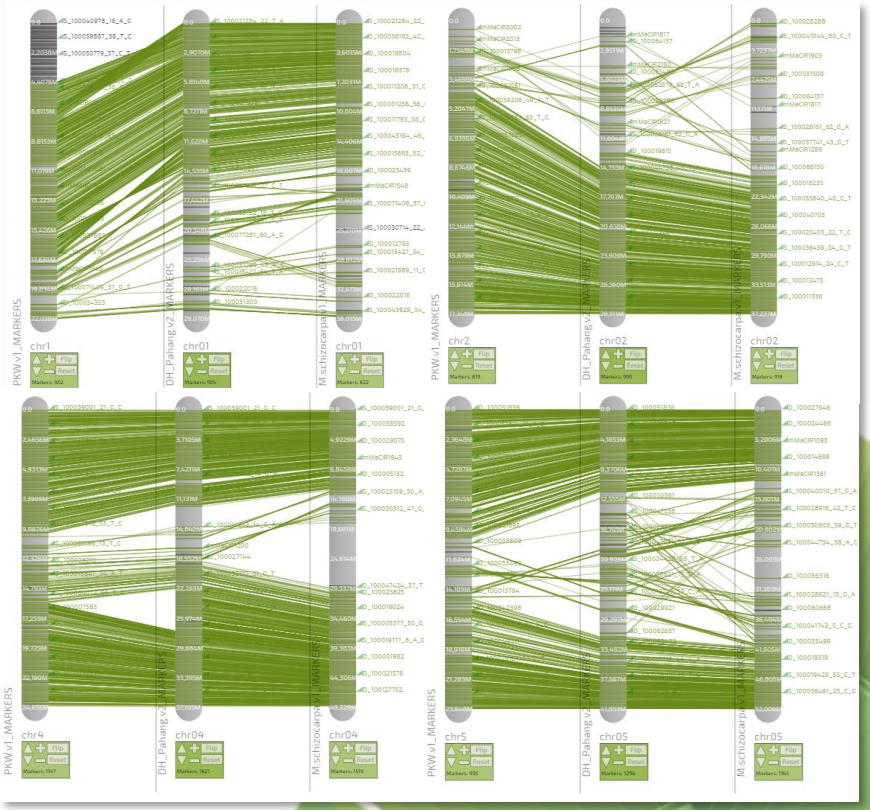
Photos: Fajar Ahmad

Molecular breeding in Banana

Knowledge based breeding approach



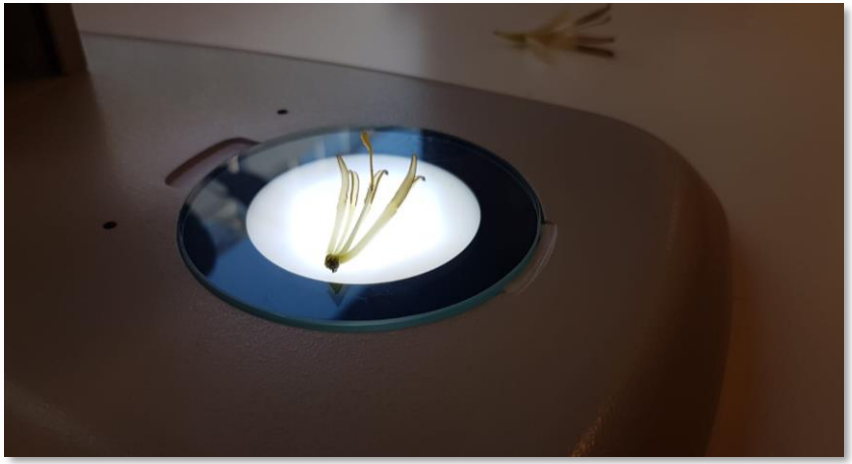
Proposed ancesters of Cavendish



Comparing Genomes
(re)-constructing edible bananas (with Disease Resistance)

Banana Breeding in NL Greenhouse

Tool development – Crosses & Pollen

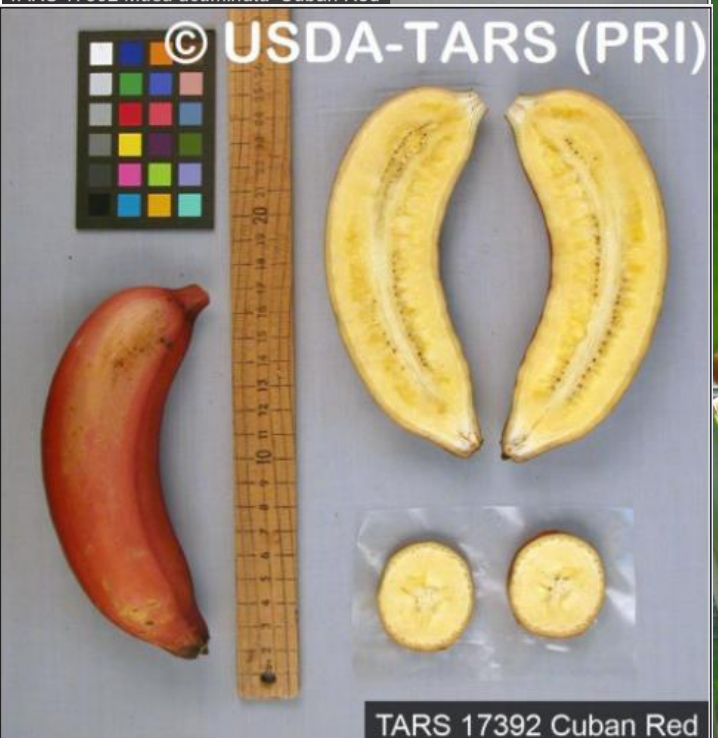


Banana Breeding in the Field

TR4 trials in greenhouse & the Philippines

Bananas of the future

Healthy and different

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