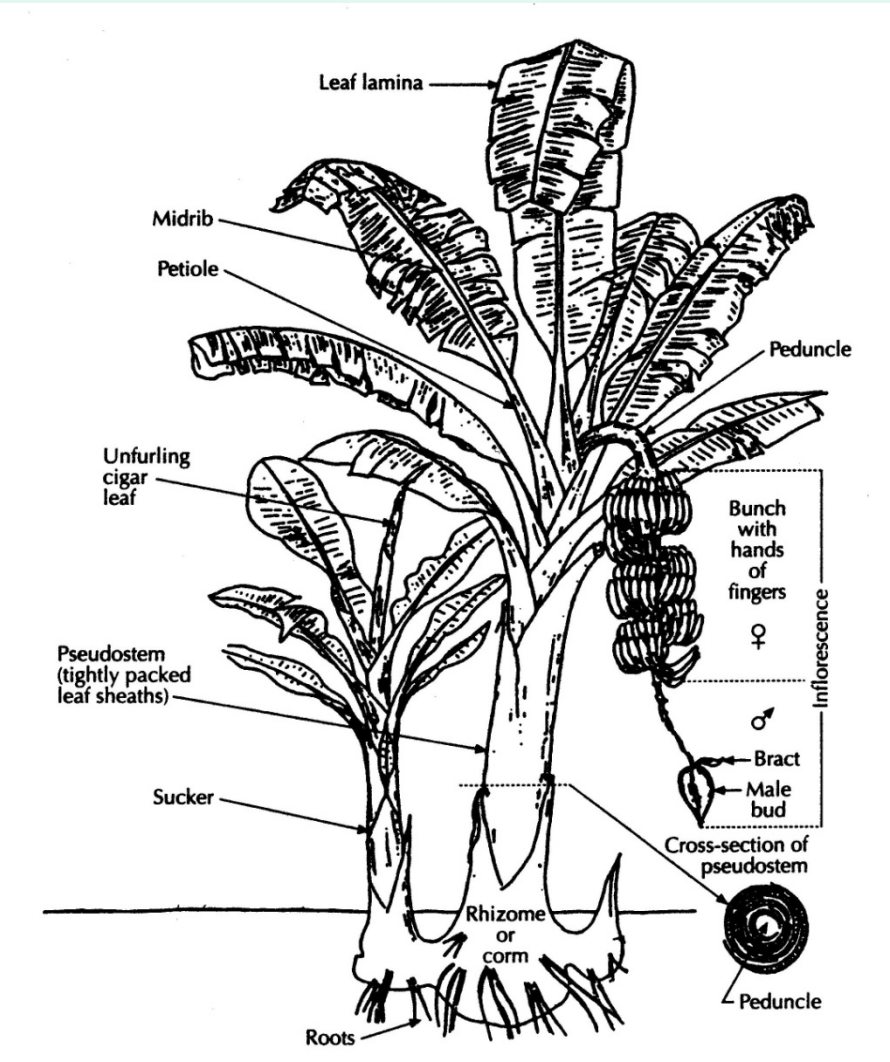
Methodologies for the Characterization of Banana Germaplasm collection originated from Rwanda

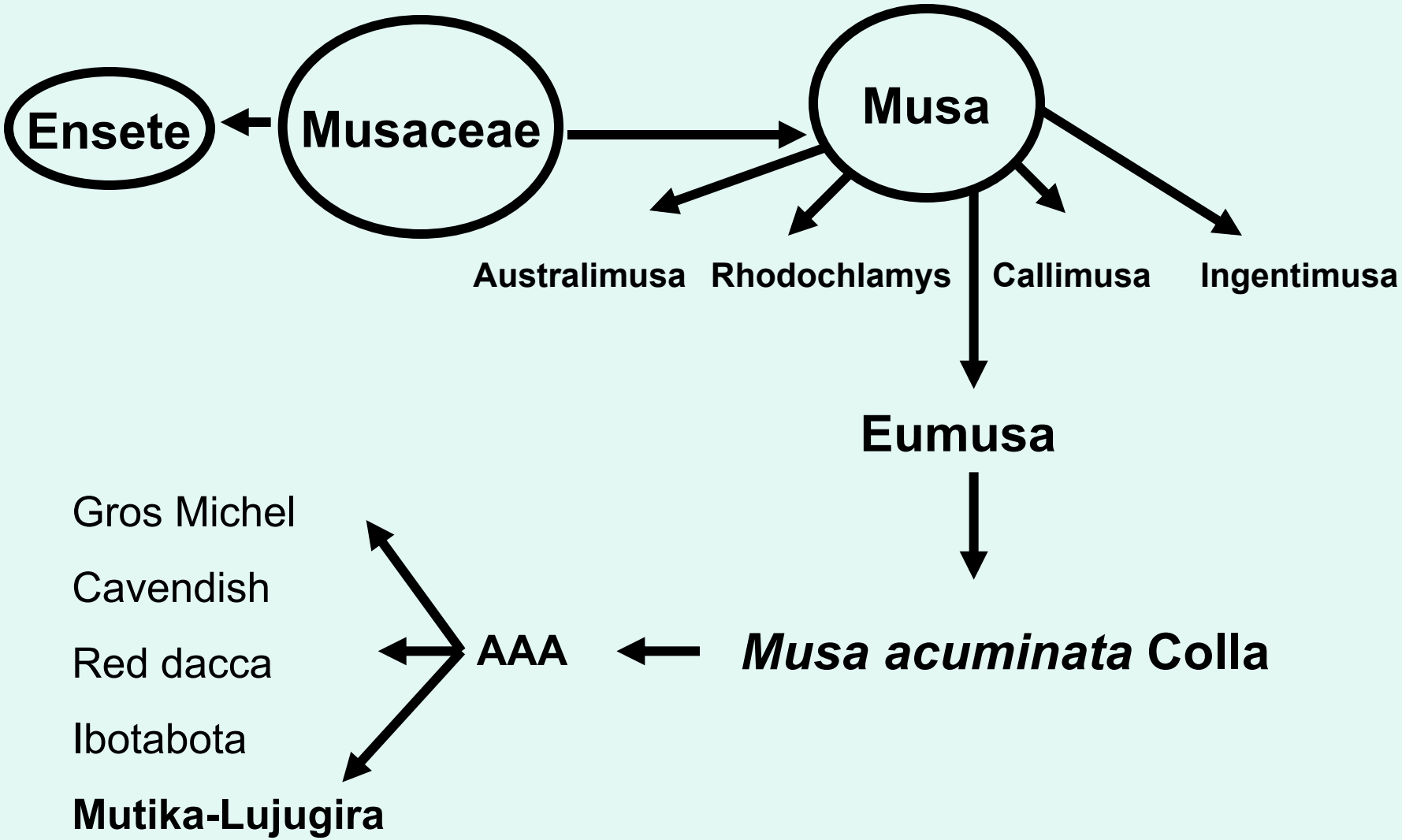
Professor Antoine Nsabimana
Department of Biology
School of Science
College of Science and Technology
University of Rwanda

1st International Autumn School-Conference on Food Biotechnology November 2022. URFU

Diagrammatic representation of a fruiting banana plant

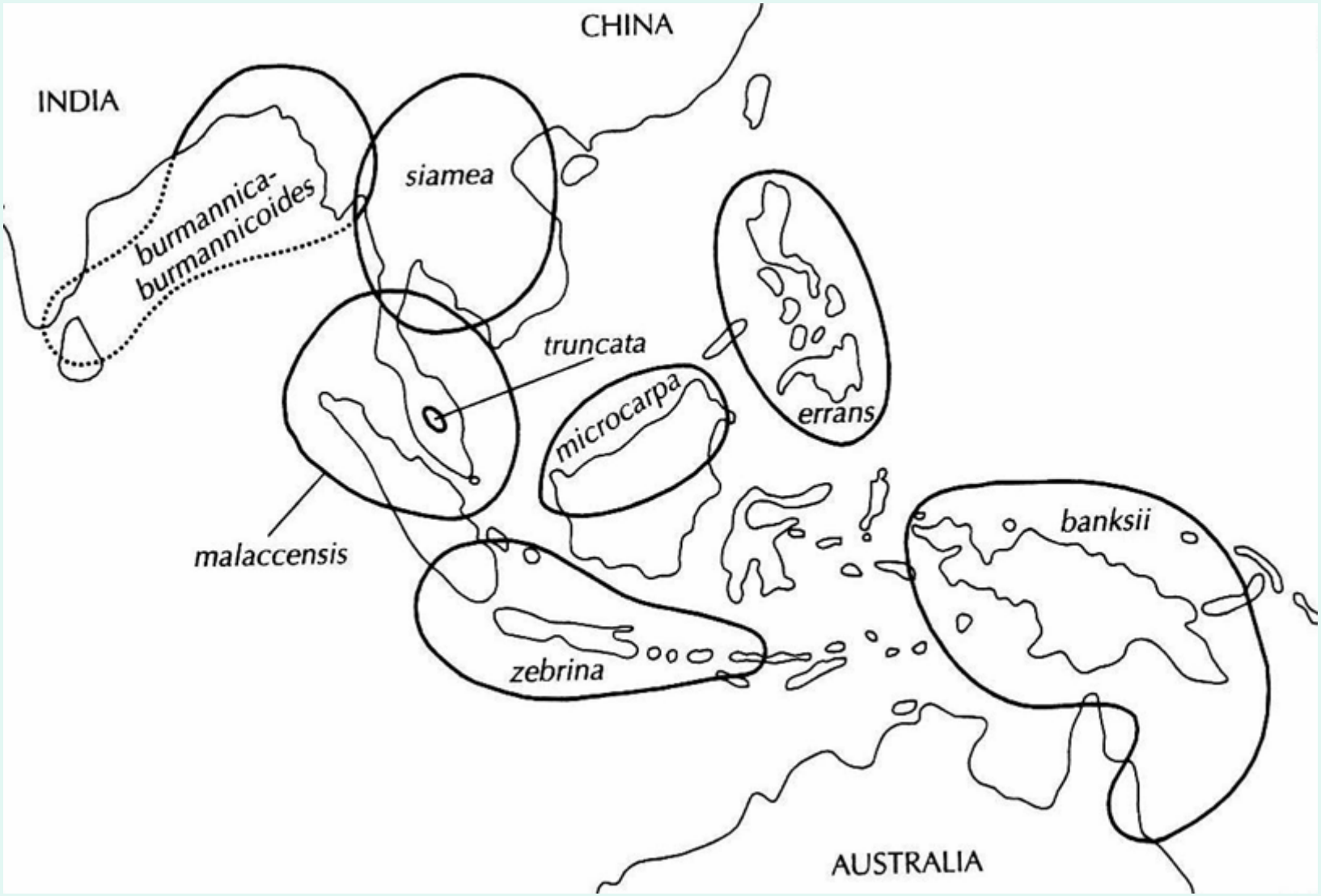


(CHAMPION, 1963)



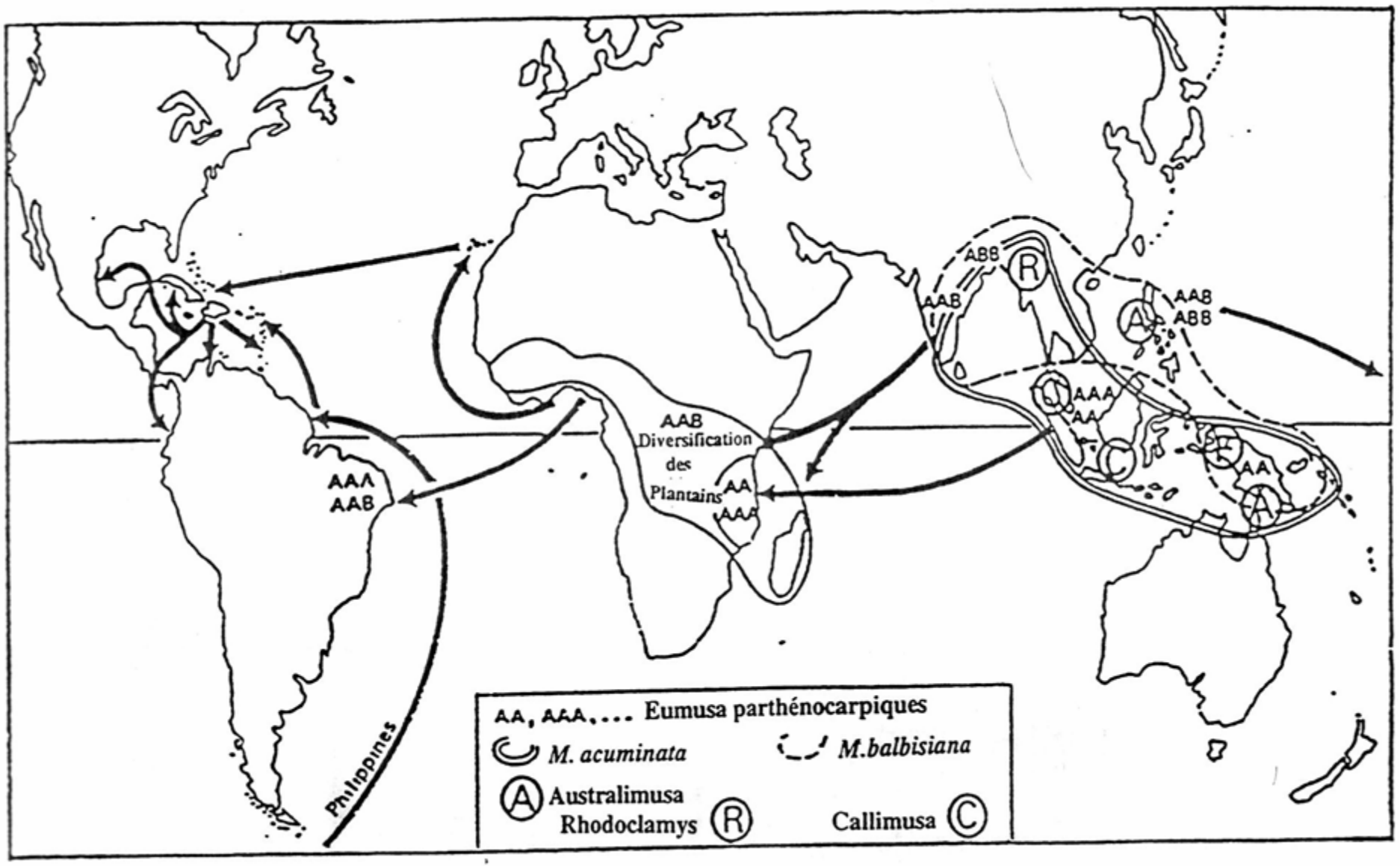
Simmonds and Weatherup, 1990 a, Valmayor et *al.*, 2002

Origin



JONES, 1999

Distribution



CHAMPION, 1967

The introduction of bananas (*Musa* spp.) in Rwanda

1st International Autumn School-Conference on Food Biotechnology November 2022. URFU

Classification of bananas by Rwandese

← Cooking Dessert →

Brewing

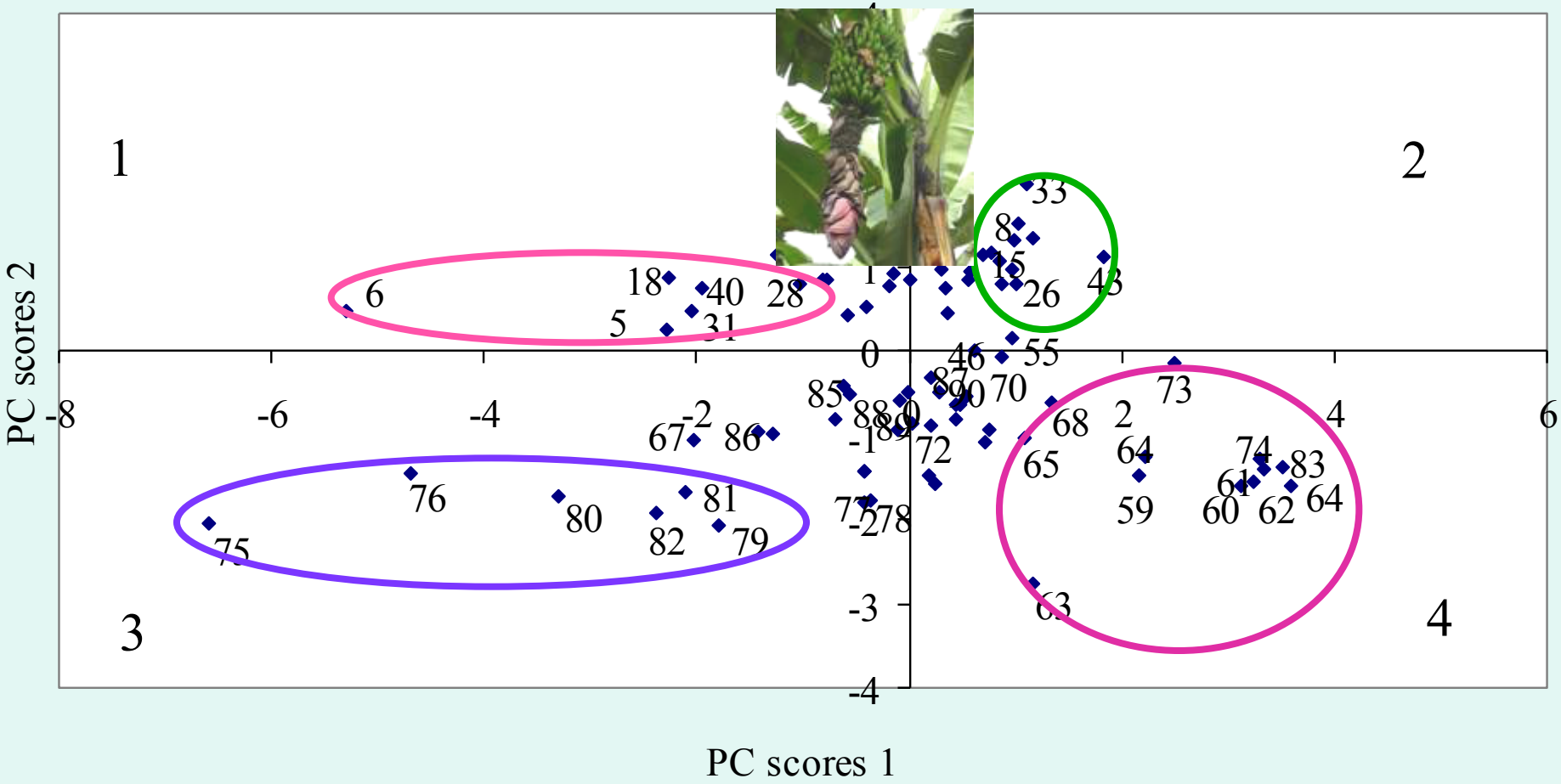
Morphological characterization

- **Length of interior and exterior sides of the fruits.**
- **Weight of fruits.**
- **Circumference of fruit.**
- **Green life (days) and post green life (days) of fruits.**
- **The end of post green life of fruit.**

Eigenvector contribution of quantitative traits of fruit to first and second principal components estimated in a collection of 90 accessions of bananas (*Musa* spp.) at the National Banana Collection Rubona - Rwanda

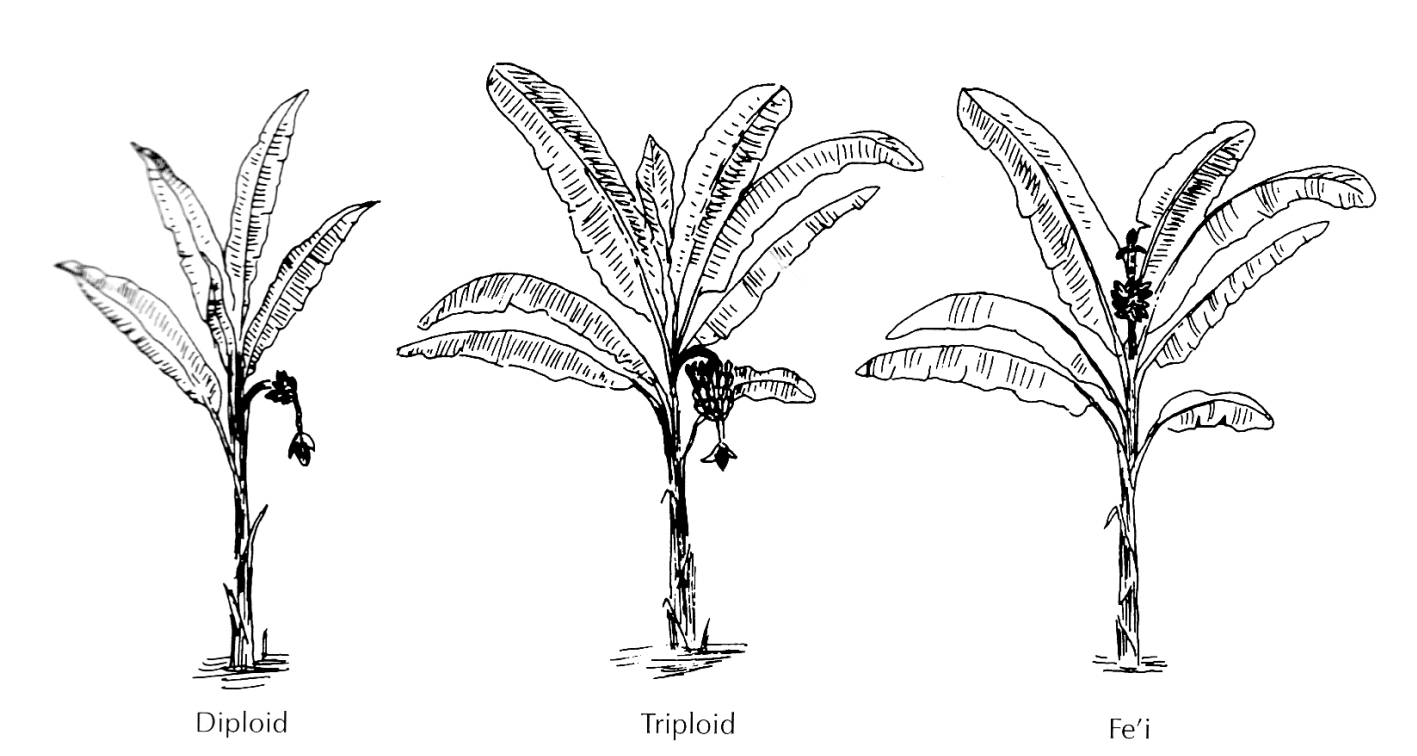
Trait	**PC 1**	**PC2**
Average length of fruit (cm)	**-0.57094**	-0.02500
Post green life of fruit (days	0.06716	**-0.69946**
Fruit weight (g)	**-0.55545**	-0.11733
Green life of fruit (days	-0.04817	**0.70344**
Width of the fruit (cm)	**-0.44867**	0.02411
Length/Width ratio for fruit	**-0.39666**	0.03084
Latent roots	2.931	1.621
Percentage of variation	48.8	27.1

Positions of scores of 90 accessions of banana entries for PC 1 and PC 2



Nsabimana and Van Staden, *2005*

General appearance of diploid and triploid cultivars in the Eumusa section of edible banana and Fe'I cultivar in the Autralimusa section



BOURKE, 1976

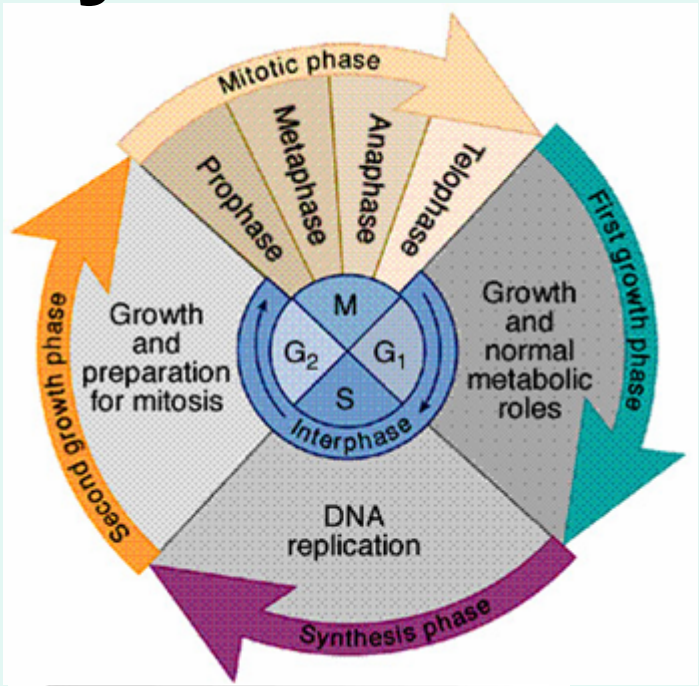
General appearance of diploid and triploid cultivars and Tetraploid

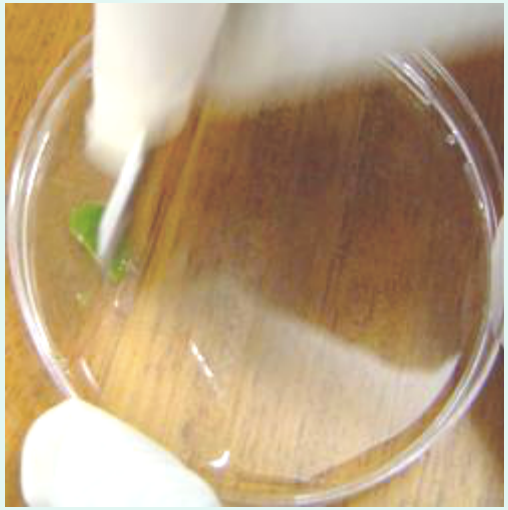
Diploid

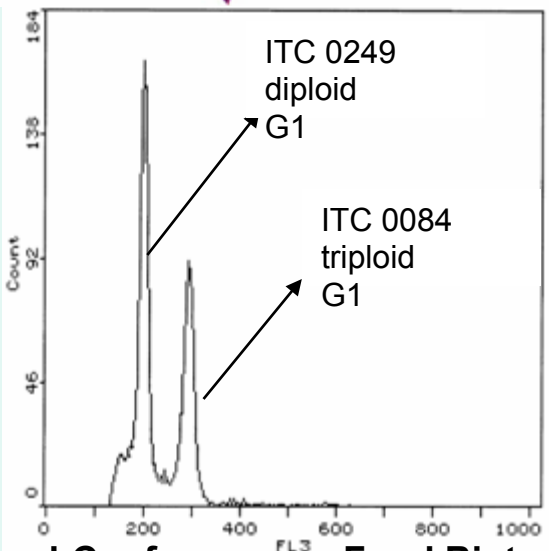
Triploid

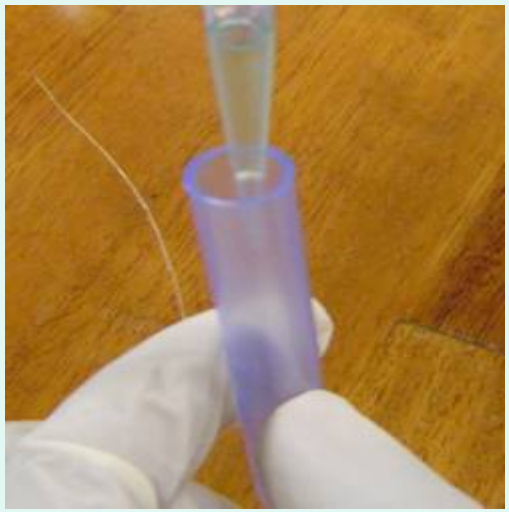
Tetraploid

Flow cytometric analysis

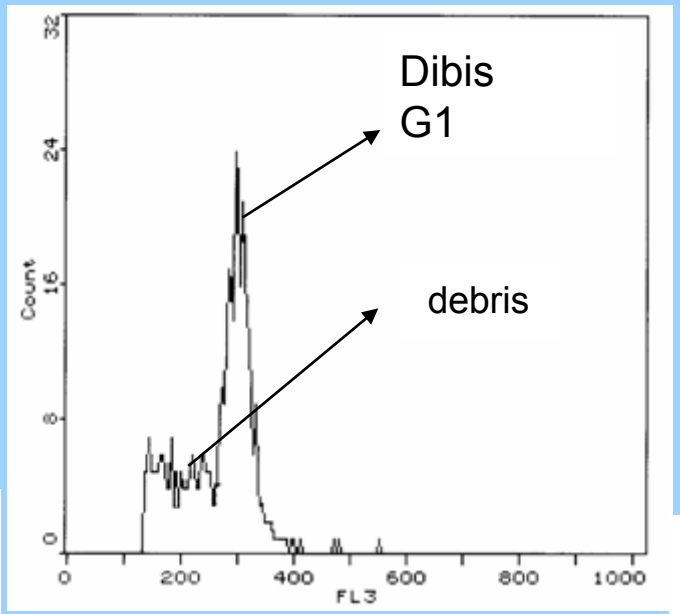


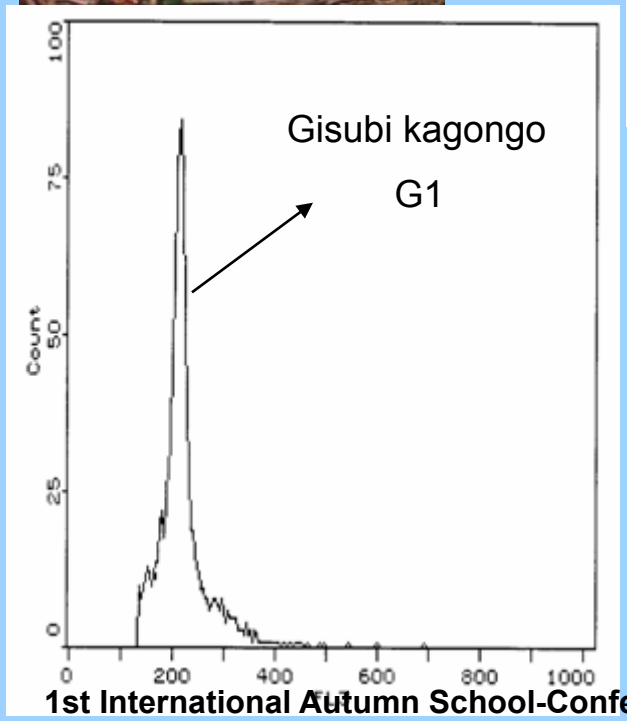


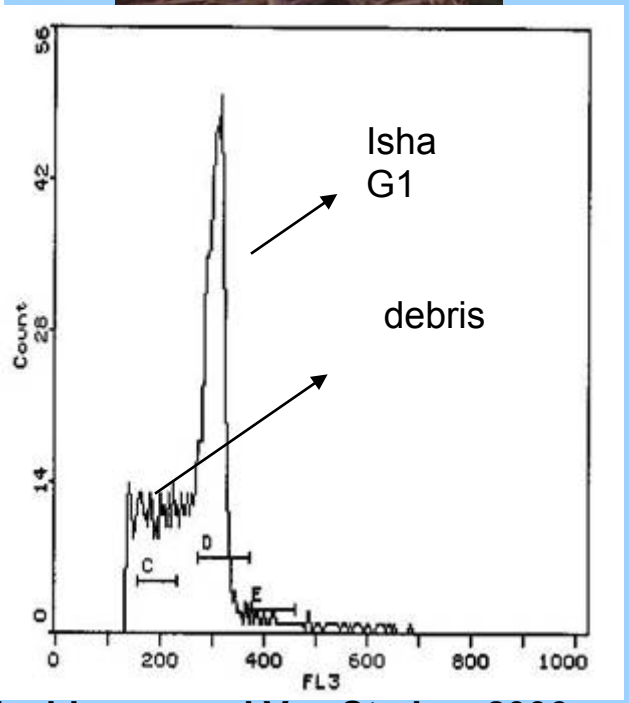




Assessment of ploidy level in banana germplasm collection at Rubona

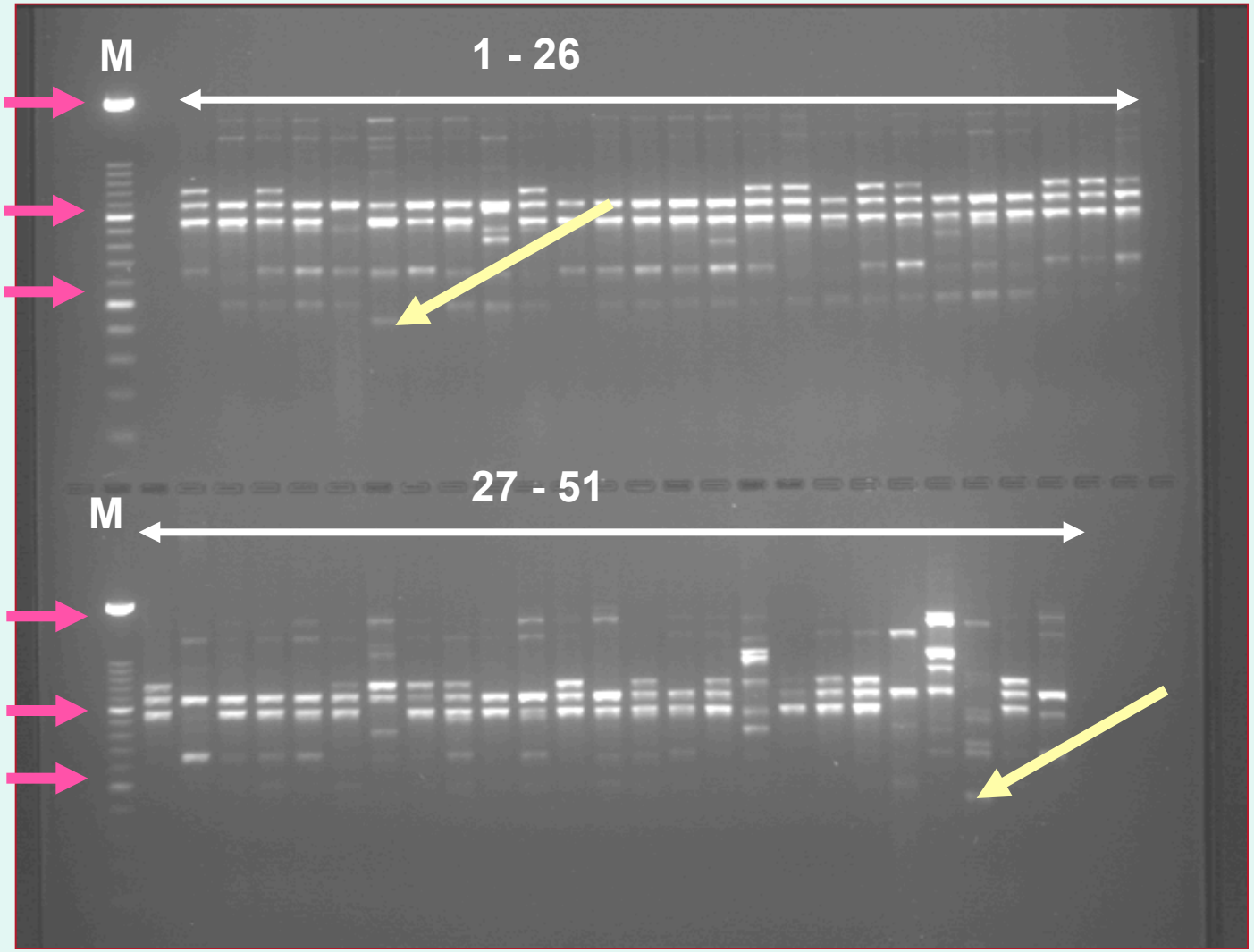






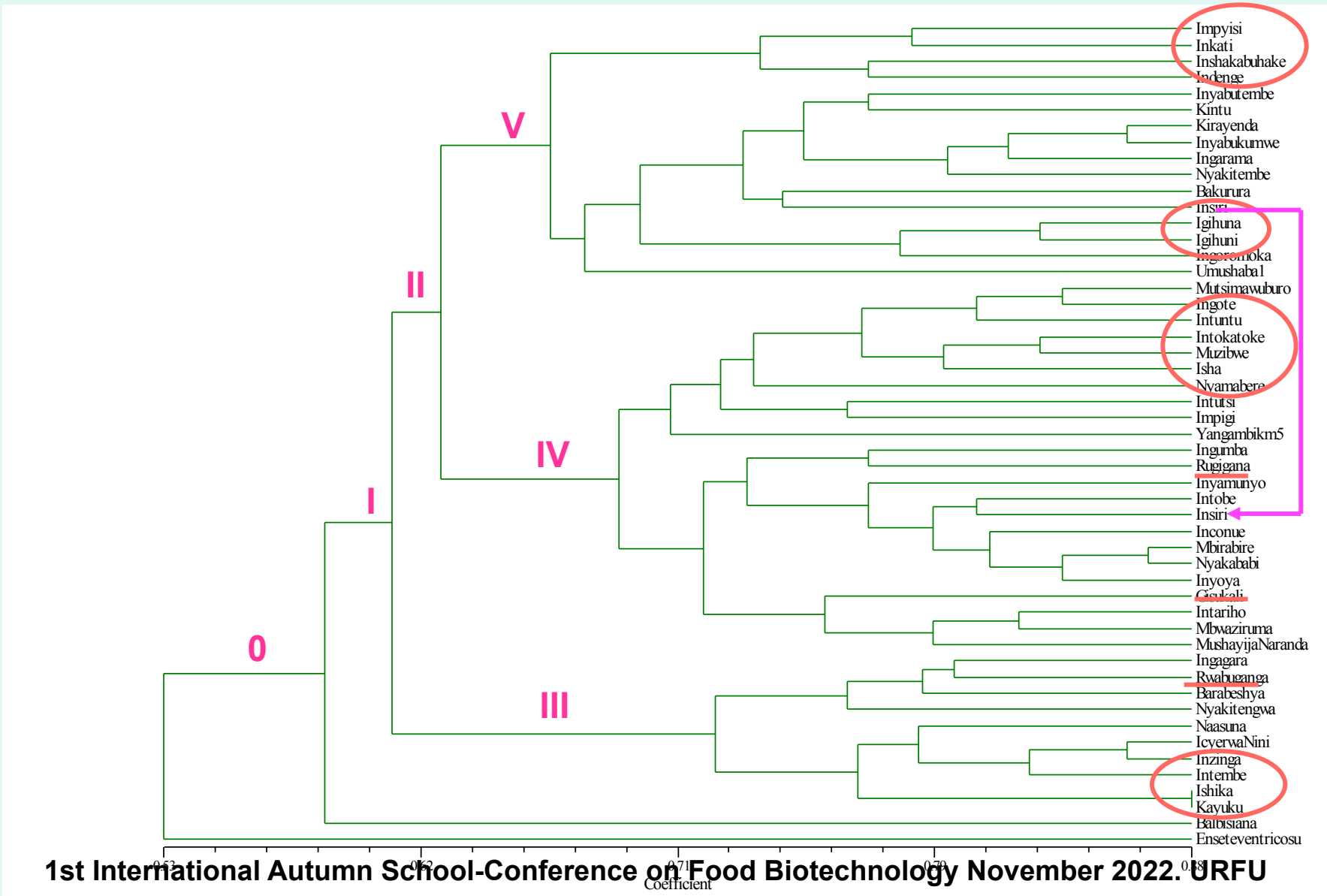
Nsabimana and Van Staden 2006

Use of Random Amplified Polymorphic DNA for genome determination of bananas



OPG17

Dendrogram of 50 accessions of bananas using RAPD markers of 15 primers.



Conclusions

- **Morphological characterization of banana germplasm collection at Rubona – Rwanda was done.**
- **All Highland bananas assessed were triploid, while some exotic bananas were found to be classified under wrong ploidy level.**
- **Using RAPD marker, all Highland bananas analyzed showed the presence of A genome.**
- **The combination of 15 primers showed a genetic diversity in Highland bananas.**