



# Assessment of local and morphological descriptors of local accessions of *Mangifera indica* L. in North Benin (West Africa)



Michée D. ADJACOU<sup>1\*</sup>, Thierry D. HOUEHANOU<sup>1</sup> ; Gérard N. GOUWAKINNOU<sup>1</sup>, Kathleen PRINZ<sup>2</sup>, Taffa MOUSSA<sup>1</sup>, Abdul-Raouf MAMA<sup>1</sup>, Armand K. NATTA<sup>1</sup>

<sup>1</sup>Laboratory of Ecology, Botany and Plant Biology (LEB), Faculty of Agronomy, University of Parakou. 03 BP: 125, Parakou

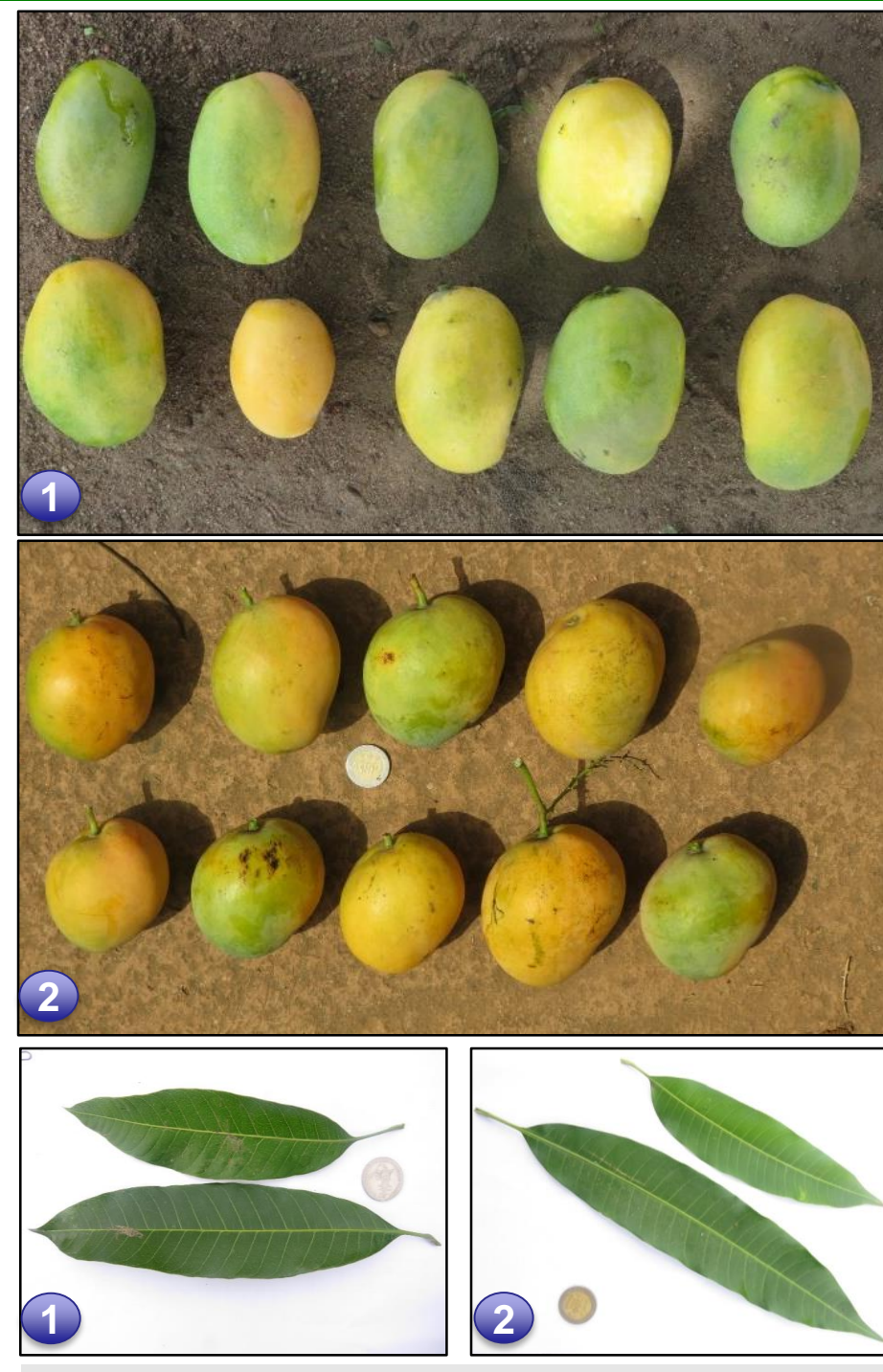
<sup>2</sup>Institute for Ecology and Evolution, Department for Systematic Botany with Hausknecht Herbarium and Botanical Garden, Friedrich-Schiller-University Jena, Philosophenweg 16, 07743 Jena, Germany

## Introduction

- The local mango tree (*Mangifera indica* L.) occupies an important place in the household consumption in West Africa.
- The characterization of this local fruit crop is neglected comparatively to improved varieties.
- Therefore the characterization of local accessions of *Mangifera indica* L. is necessary to guarantee a sustainable future breeding program and its diversity conservation.

Thus, this study was carried out in North Benin and aims to :

- identify local knowledge discriminating local accessions of *M. indica* and
- assess the morphological descriptors



## Materials and methods

- Semi-structured questionnaire
- 56 morphological characters (21 quantitative and 35 qualitative), 10 leaves and 10 healthy and undamaged fruits

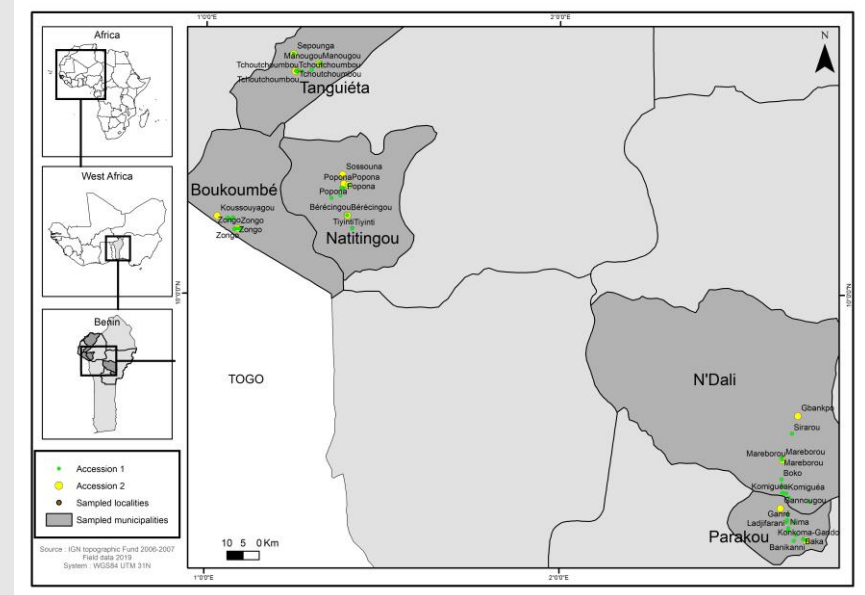


Fig. 1: Locations of the 65 samples of *Mangifera indica*

Statistical tests and software	Uses
Histograms	Distinctive features
Coefficient of variation	Comparison
Mann-Whitney U test	Means comparison
Fisher test	Relevance of qualitative variables
Spearman correlation coefficient	Character relationship
Descending hierarchical classification	Categorization
Principal Component Analysis	Projection of groups in plans
ANOVA (Turkey) and Khi-2	Significant parameter differences
R software version 3.6.1	Analysis

## Results

- The population distinguishes two accessions of local mangoes (fig. 2), (1 & 2)
- The statistical tests carried out revealed several differentiated features of the qualitative variables (tab. 2)

Tab. 2: Differentiating features of the qualitative variables morphological characteristics of the tree, fruit, leaf, skin, stone and seed

Morphological descriptor	p-value
Tree growth habit	p > 0.05
Foliage density	p > 0.05
Crown shape	p > 0.05
Ecology of the species	p > 0.05
Fruiting intensity	p > 0.05
Leaf margin	p < 0.01
Colour of fully developed leaf	p > 0.05
Leaf base shape	P < 0.05
Leaf blade shape	P < 0.001
Leaf apex shape	p > 0.05
Leaf texture	p > 0.05
Fruit stalk attachment	P < 0.001
Shape of fruit apex	p > 0.05
Fruit shape	P < 0.001
Depth of fruit stalk cavity	P < 0.001
Fruit neck prominence	p < 0.05
Skin colour of ripe fruit	P < 0.001
Fruit skin surface texture	p > 0.05
Pulp aroma	p < 0.01
Pulp juiciness	P < 0.001

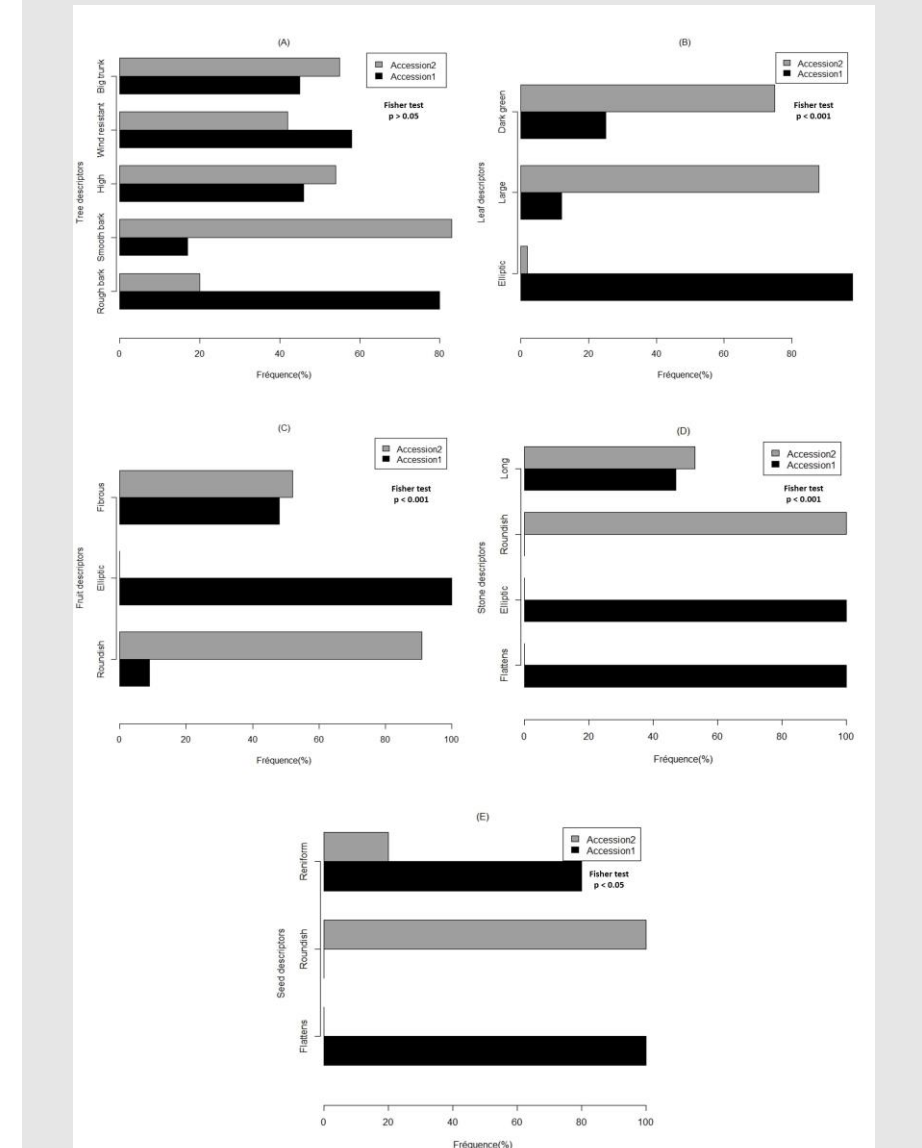


Fig. 2: Local knowledge of the population of morphological traits. Descriptors: tree (A), leaf (B), fruit (C), stone (D) and seed (E)

## Results

- The largest average values were generally observed on accession 2 (tab. 3)

Tab. 3: Average value (m) and coefficient of variation (CV) of the morphological characteristics of the tree, fruit, leaf, skin, stone and seed according to the two accessions

Morphological descriptor	Local accession 1	Local accession 2	p
	m ± cv (%)	m ± cv (%)	
Height of mature tree	11.46 ± 0.27	14.12 ± 0.30	P < 0.05
Trunk circumference	219.85 ± 0.36	240.87 ± 0.32	P > 0.05
Leaf blade width	5.79 ± 18.19	5.93 ± 29.09	P > 0.05
Leaf blade length	24.03 ± 20.47	25.07 ± 24.93	P > 0.05
Petiole length	4.10 ± 33.39	3.65 ± 36.71	P < 0.01
Diameter fruit	2.92 ± 11.23	3.34 ± 8.57	P < 0.001
Width fruit	5.59 ± 12.76	6.99 ± 66.79	P < 0.001
Length fruit	7.50 ± 12.89	8.04 ± 12.89	P < 0.001
Weight fruit	147.77 ± 31.97	192.95 ± 20.84	P < 0.001
Thickness skin	2.56 ± 24.16	2.58 ± 21.12	P > 0.05
Weight skin	39.4 ± 38.11	46.47 ± 28.65	P < 0.001
Pulp content	1.04 ± 29.1	1.21 ± 27.31	P < 0.001
Thickness stone	1.98 ± 13.61	2.03 ± 11.87	P < 0.01
Width stone	3.45 ± 11.35	3.90 ± 8.88	P < 0.001
Length stone	6.34 ± 12.42	6.62 ± 8.96	P < 0.001
Length of stone fibre	4.08 ± 31.62	3.05 ± 41.67	P < 0.001
Weight stone	31.88 ± 34.08	38.31 ± 25.63	P < 0.001
Width seed	2.63 ± 16.55	2.96 ± 13.04	P < 0.001
Thickness seed	1.63 ± 18.15	1.69 ± 16.93	P < 0.05
Length seed	5.29 ± 45.76	5.68 ± 10.37	P < 0.001
Weight seed	15.83 ± 38.21	19.81 ± 25.94	P < 0.001

## Conclusions

- The morphological characterisation of the two accessions converges globally with the local descriptors recognised by the population.
- The knowledge of these superior traits is fundamental to guide the sustainable management, future breeding and conservation of local *Mangifera indica* accessions in Benin.

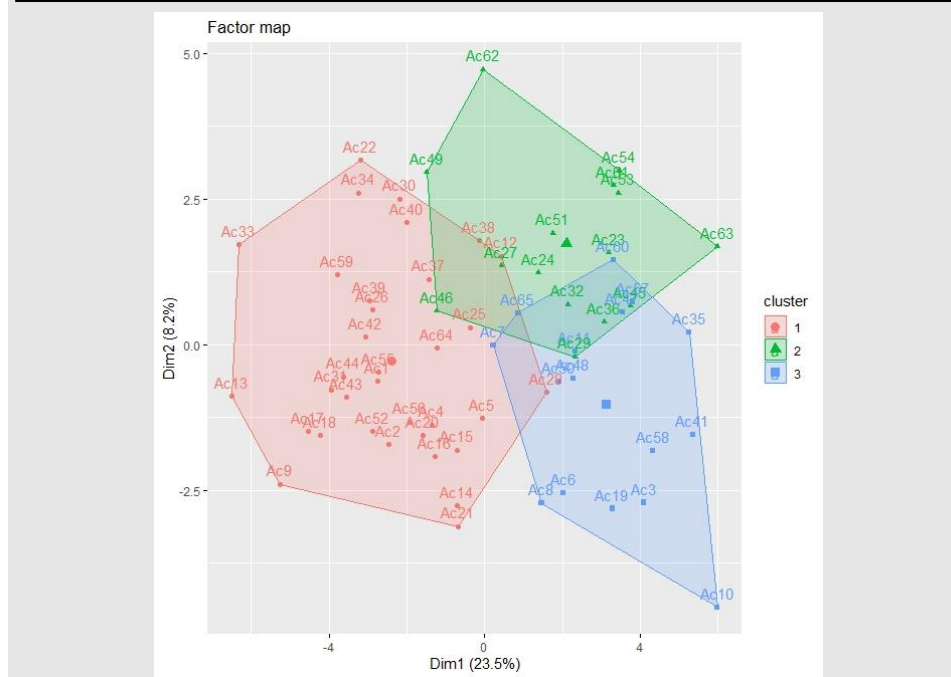


Fig. 3: Distribution of accessions in the factorial plane

