

# Minimal descriptors for *Dacryodes edulis* (G. Don.) H. J. Lam. in Mbalmayo ICRAF genebank



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## Why focus on *Dacryodes edulis*

- *Dacryodes edulis* has emerged as a tree species with considerable economic and nutritional value for people in West and Central Africa.
- It is the most-collected agroforestry tree product (AFTP) (quantity-wise) and the most commercialized AFTP in southern Cameroon. During its main production period it is a food (in addition to plain) the menu in several household.
- In 1999, 2,324 tones were sold for a total amount of about US\$ 1.5 million in nine big markets in Cameroon (Awono *et al.*, 2002). This quantity represented only about 14-23 % of total production in the national territory as Isseri and Temple (2000) estimated the 59 national production at 10,000 to 16,000 t.
- Currently, in local market in Yaounde, the price is comprised between 1,250 and 2,667 FCFA per kg



## Challenges and proposed solution

The survival of the species is threatened by habitat loss due to several drivers such as agricultural activities and urbanization. In view of protecting the resources for long term use, the World Agroforestry (ICRA) is conducting a breeding program in view of providing the best quality of planting material requested by users.

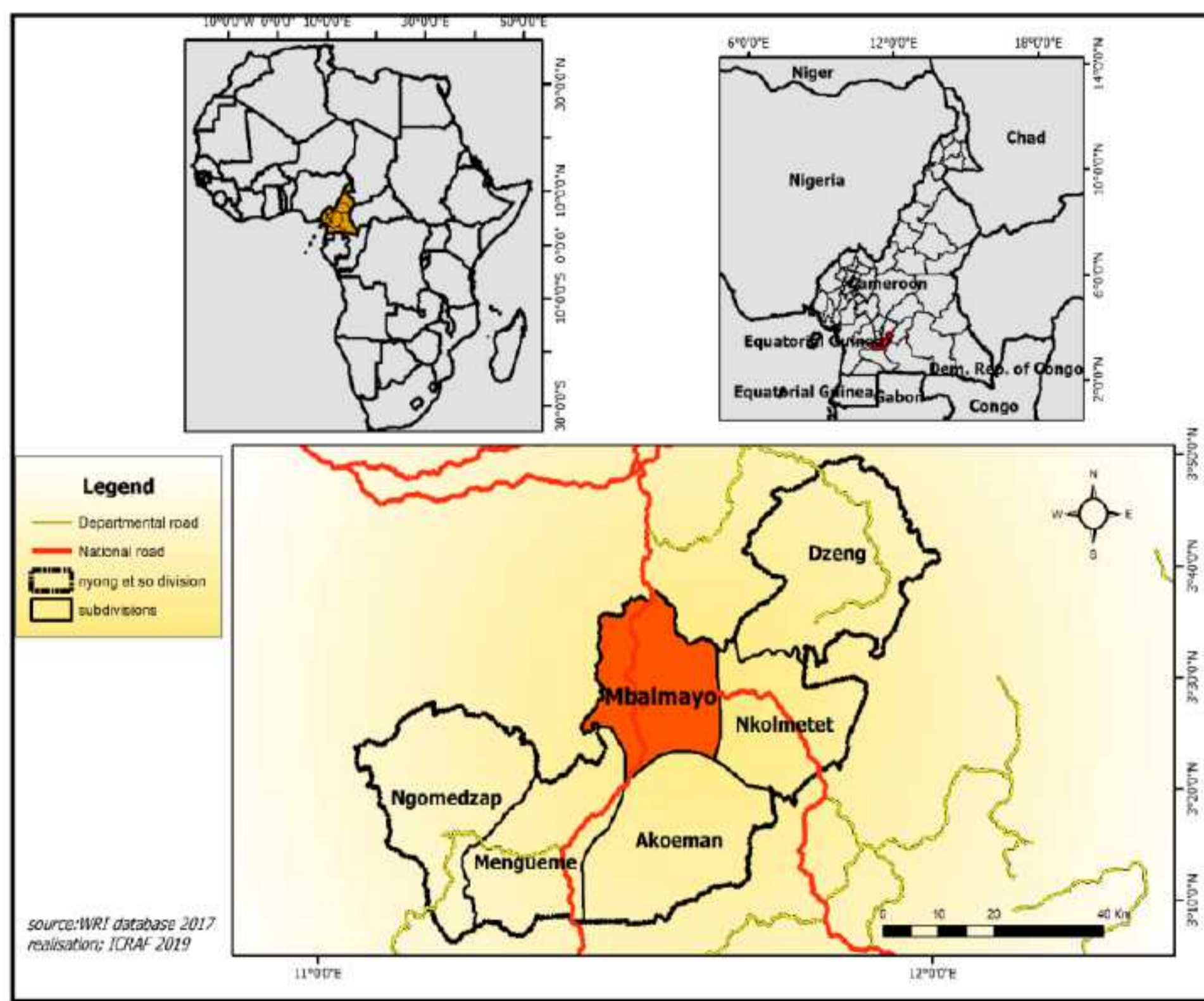
## Research objective

A genebank has been established by ICRAF, and its richness in term of genotype is not well understood. This study aims to conduct a descriptor of the species in that genebank as a preliminary for the breeding program.



## Methodology

Map of Cameroon showing Mbalmayo, the study site



## Data collection

- Fifty-one (51) morphological parameters (25 qualitative and 26 quantitative) (Kehlenbeck *et al.* 2015) were assessed.
- Many of them have been identified by Schreckenber *et al.* (2002) like highly important for farmers

Qualitative parameters	Quantitative parameters
Tree shape (TS)	Tree height (TH)
Trunk shape (StS)	Trunk diameter (DBH)
Bark texture (BT)	Crown diameter (CrDim)
Leaflet blade shape (IS)	Collar diameter (CoDim)
Fruit shape (FS)	Fruit pedicel length (FPL)
Young leave color (YLC)	Fruit length (FL)
Fruit color (FC)	Fruit diameter (FD)
Dry season leaves retention (DSLr)	Fruit weight (FrW)
Pulp color (FPC)	Pulp weight (PuW)
Seed shape (SS)	Pulp thickness (PT)
Tree growth habit (TGA)	Fruit number per tree (FNT)
Bark color (BC)	Seed number per fruit (SNF)
Leaflet apex shape (IAS)	Seed weight (SeedW)
Leaflet base shape (IBS)	Seed length (SL)
Leaflet margin (IM)	Seed width (SW)
Fruit beak type (FBT)	Leaflet petiole length (LPL)
Seed coat color (SEC)	Leaflet length (LPL)
Fruit apex shape (AS)	Leaflet width (LW)
Leaflet attitude in relation to branch (LA)	Leaflet width (LW)
Fruit maturity period (FMP)	Number of leaflets of mature leave (NIL)
Fruit pedicel insertion (FPI)	Germination rate (GR)
Fruit cross section outline (FSC)	Latency time (LT)
Flowering period	Germination speed (GS)
Fruiting period	Germination duration (GD)
Regularity in production	Germination speed (GS)
	Germination duration (GD)
	Pest and diseases attacks (Anthracnose)
	Cotyledon number per seed (CNS)

## Key results

- From results obtained and summarized in figures below, it can be said that the *D. edulis* genebank in Mbalmayo is highly diversified in term of the majority of parameters.
- Only ten traits have not shown diversity: Trunk shape (StS), Leaflet apex shape (IAS), Leaflet base shape (IBS), Leaflet margin (IM), Young leave color (YLC), Seed number per fruit (SNF), Cotyledon number per seed (CNS), Flowering period, Fruiting period and Regularity in production

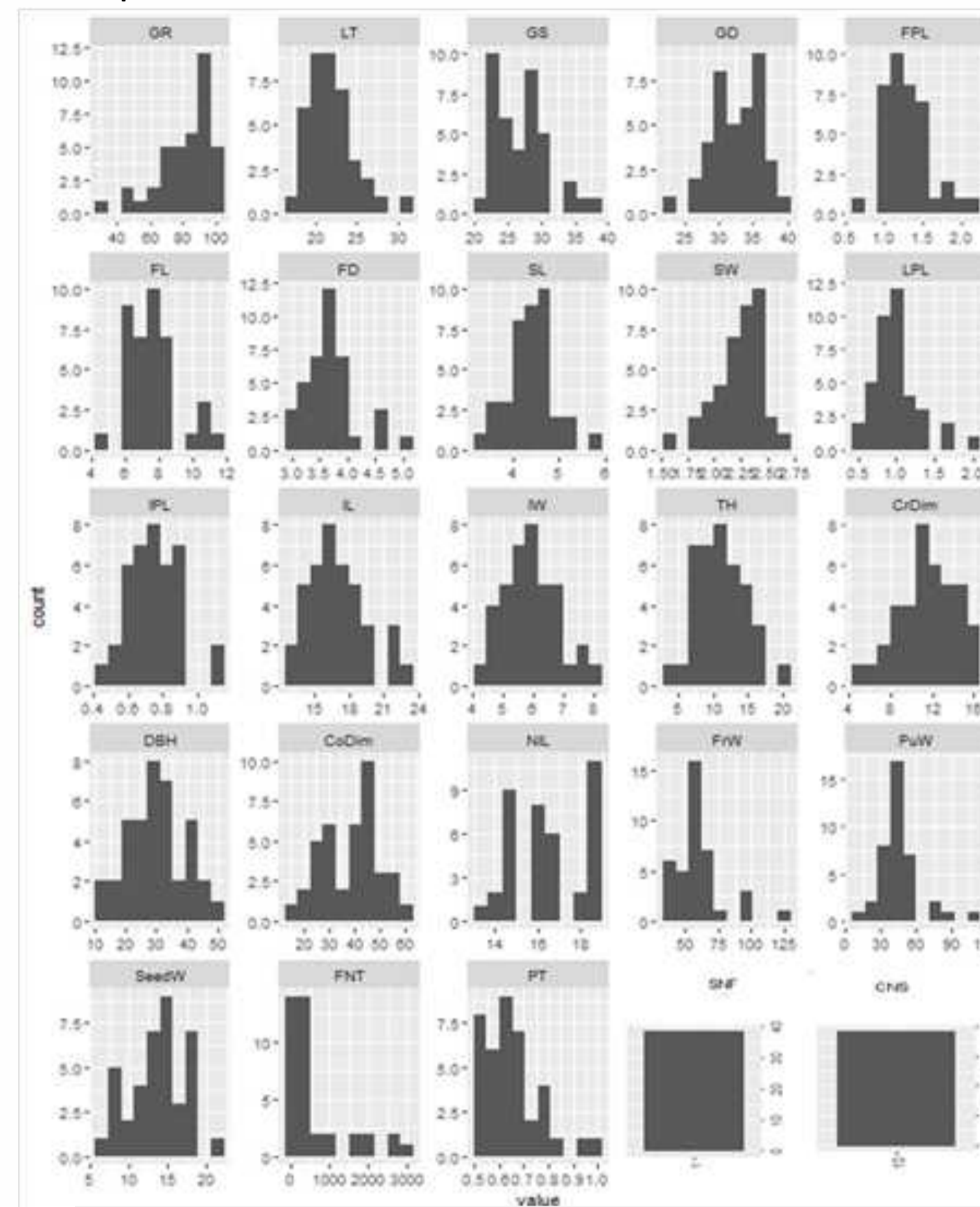


Figure: Variation in quantitative parameters within the ICRAF genebank in Mbalmayo Cameroon

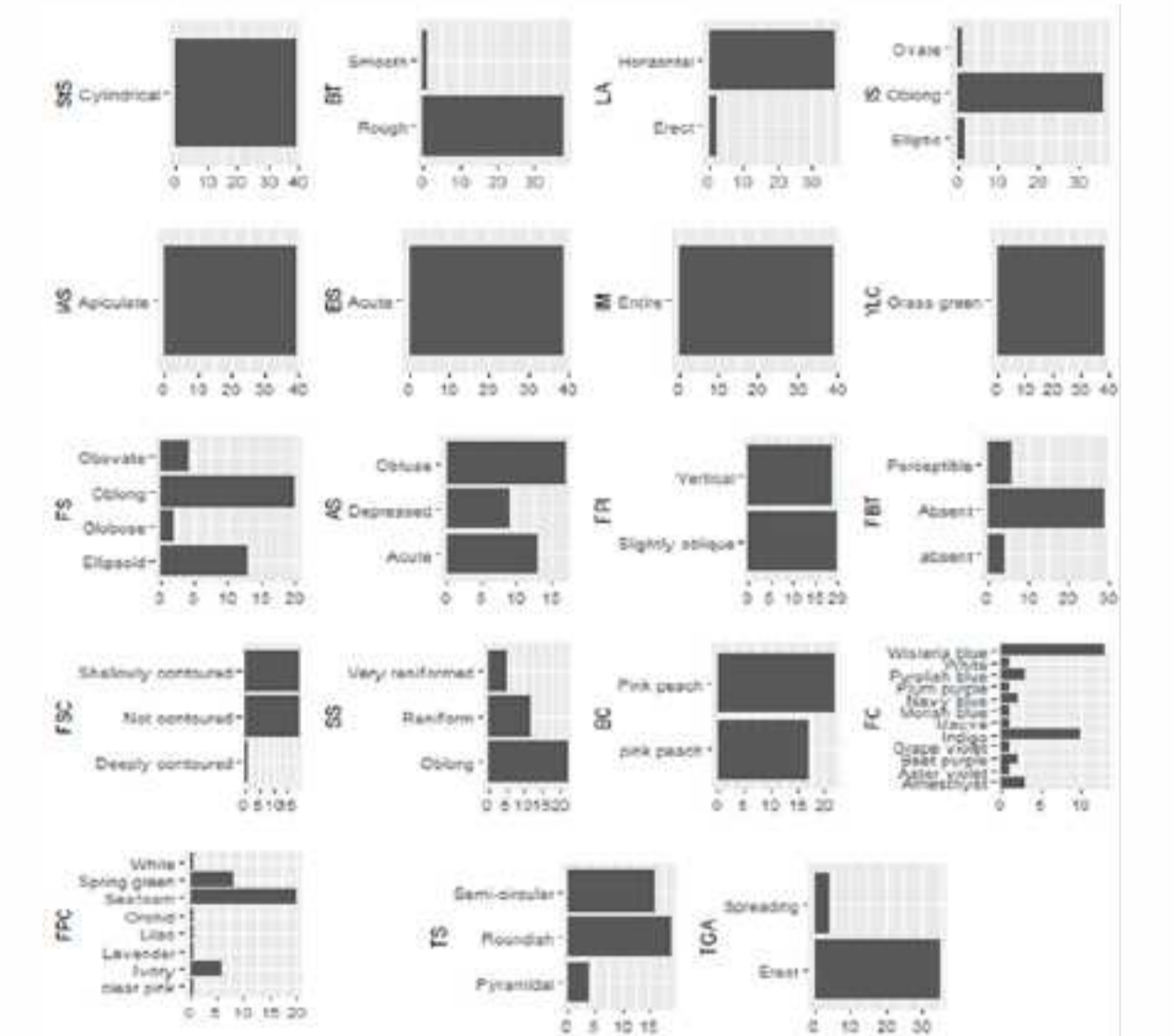
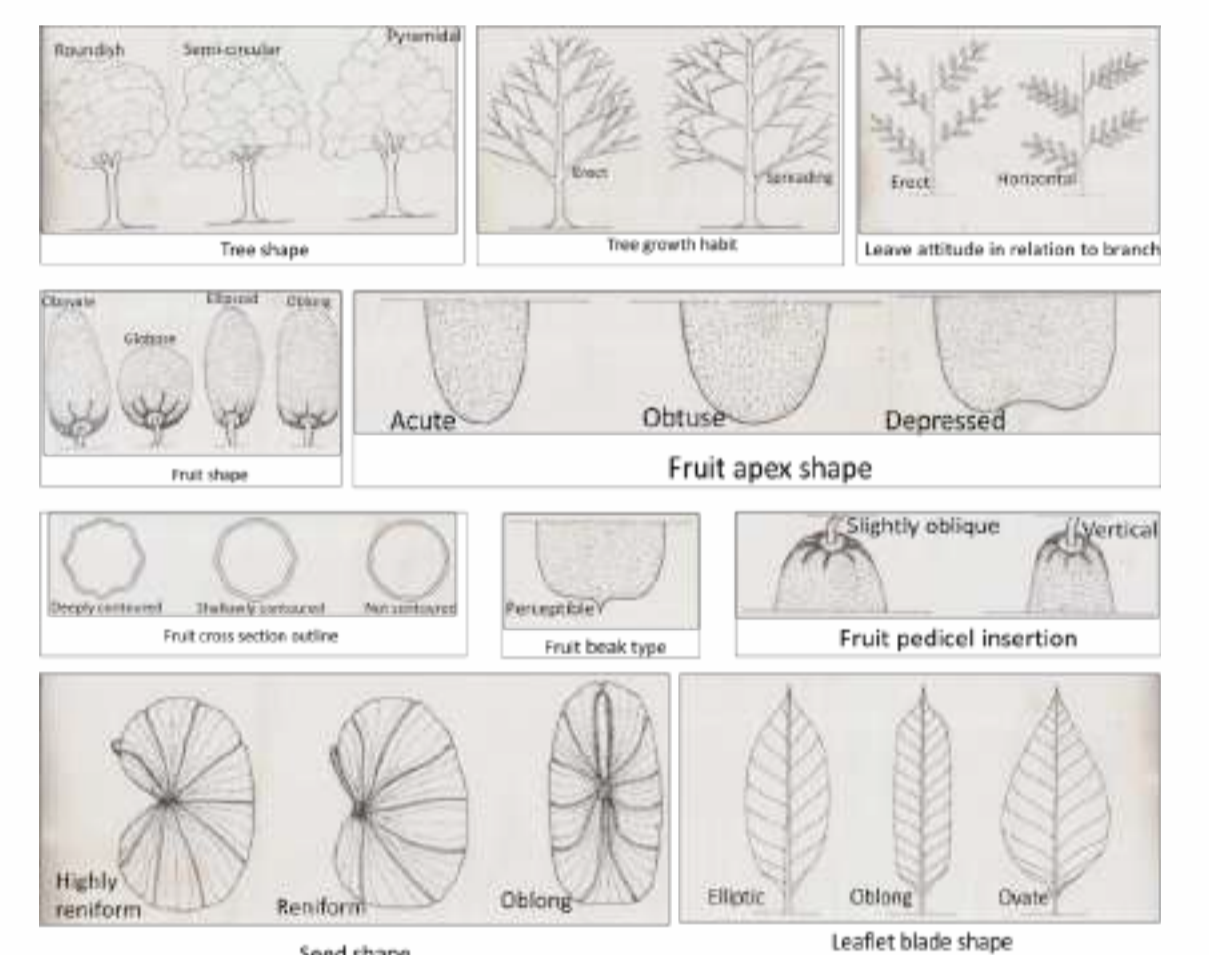


Figure: Variation in some qualitative parameters within the ICRAF genebank in Mbalmayo Cameroon



Morphological diversity within some organs of *D. edulis*

## Discussion

- This is the first study of descriptor of *D. edulis* in ICRAF's genebank in Mbalmayo Cameroon in view of improving the selection of this species.
- Tree selection is an important first step in any tree domestication program. The selection of individual trees provides high-quality germplasm in breeding populations (Leakey *et al.* 2012).
- It is an alternative of the former method using sequencers, which are not widely available in developing countries.
- In other term, it is more practicable in the tropics of Africa and has proven efficient in sampling first-generation breeding populations of virtually undomesticated species for the development of potential cultivars for fruit production (Leakey *et al.* 2012).
- According to Kengue (2002), there are somewhere trees with white color and off-season fruits that purchase price is usually four times the one of normal period. They have not found in ICRAF's collection. In this case, one of further task will be to organize the target collection (white color and off-season fruits traits) to enrich our genebank, assuming that the character is not really existing/recessive in the genebank.

## Conclusion

This study provides baseline information for the breeding program of *D. edulis*. However, there is a need to study genetic variation parameters to understand the genetic contribution to the observed phenotypic variation. In addition, it is worth implementing progeny tests to estimate realized heritability values and associated genetic gains together with genetic correlations in *D. edulis* tree.

## Reference

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