World Agroforestry

Food and Agriculture Organization of the United Nations

The International Treaty ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Key descriptors for *Dacryodes edulis* (Safou)

Key descriptors for

Dacryodes edulis

(Safou)

World Agroforestry (ICRAF) is a centre of science and development excellence that harnesses the benefits of trees for people and the environment.

Leveraging the world's largest repository of agroforestry science and information, we develop knowledge practices, from farmers' fields to the global sphere, to ensure food security and environmental sustainability.

ICRAF is the only institution that does globally significant agroforestry research in and for all of the developing tropics. Knowledge produced by ICRAF enables governments, development agencies and farmers to utilize the power of trees to make farming and livelihoods more environmentally, socially and economically sustainable at scales.

We are guided by the broad development challenges pursued by CGIAR, a global research partnership for a food-secure future, which include poverty reduction, increasing food and nutritional security, and improved natural resource systems and environmental services. ICRAF's work also addresses many of the issues being tackled by the Sustainable Development Goals (SDGs), specifically those that aim to eradicate hunger, reduce poverty, provide affordable and clean energy, protect life on land, and combat climate change.

ICRAF's Vision is an equitable world where all people have viable livelihoods supported by healthy and productive landscapes.

The Centre's mission is to harness the multiple benefits trees provide for agriculture, livelihoods, resilience, and the future of our planet, from farmers' fields through to continental scales.

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Cover Photo: *Dacryodes edulis* fruits.

Credit: ICRAF

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PREFACE

This Descriptor list consists of an initial minimum set of characterization and evaluation descriptors for *Dacryodes edulis* (G. Don) H.J. Lam. This strategic set aims at facilitating access to and utilization of this African indigenous fruit tree. It does not exclude the addition of other descriptors at a later date.

This work has been done jointly with the Agroforestry Centre and the Food and Agriculture Organization of the United Nations. The list was based on a preliminary List developed by World Agroforestry (ICRAF). In addition, internet searches were carried out looking for the most updated information on relevant characteristics and traits. The original List was subsequently integrated with evaluation traits. Special attention was given to the inclusion of descriptors relevant to biotic stresses of particular importance in the context of emerging adverse weather events which are expected to intensify under current and future climate challenges. Those included in this Key set have been chosen because of their cosmopolitan nature and global impact since they have wide geographic occurrence and cause significant economic damage.

The key set of access and utilization descriptors was defined through an online survey, in which 20 experts from seven countries participated. Survey results were subsequently validated in consultation with a Core Advisory Group (see 'Contributors') led by Alice Muchugi from ICRAF.

The strategic set of data standards is designed to facilitate access to and utilization of plant genetic resources for food and agriculture information. Together with passport information (Alercia *et al.* 2018, 2015), descriptors are critical to the effective sharing of characterization and evaluation data and to the efficient use of plant genetic resources for food and agriculture.

INTRODUCTION

Dacryodes edulis (G. Don) H.J. Lam**,** also known as safou, African pear, African plum, African palm, bush pear, bush butter tree, butterfruit and native pear, is an important multi-purpose tropical evergreen tree. It belongs to the Burseraceae family.

The geographical distribution extends from Angola, through Cameroon, Central African Republic, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, Nigeria, to Sierra Leone in the West, Uganda to the East, and to northern Zimbabwe. It is also cultivated in Malaysia.

This indigenous agroforestry fruit tree grows in the humid tropical forest. It is well adapted to variations in environmental factors such as soil type, humidity and temperature.

Safou produces edible fruits that are highly valued by local people. The fruits are rich in lipids, proteins, vitamins, fibres and minerals playing a significant role in nutrition, especially benefiting poor households. In addition to food security and health benefits, the tree is also used for medicinal purposes and as timber. Fruits are traded both locally and across regional borders.

This descriptor list, which follows the international standardized documentation system for the characterization and study of genetic resources as promoted by Bioversity International (Alercia A., 2011), is expected to support studies focussing on genetic and morphological diversity of *Dacryodes edulis*, conservation of its genetic resources, domestication and to increase production and use of its products.

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Recognition goes to the Crop Leader, Alice Muchugi, and members of the Core Advisory Groups for providing valuable scientific direction and to all the reviewers who participated in the survey for their advice.

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Particular thanks go to Alice Muchugi for her advice throughout the preparation of this publication.

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KEY SET OF CHARACTERIZATION AND EVALUATION DESCRIPTORS FOR *DACRYODES EDULIS* (SAFOU)

This is an initial, minimum set of Characterization and Evaluation descriptors for *Dacryodes edulis* (G. Don) H.J. Lam, that can be used to assist researchers to utilize accessions more easily. This is not intended to be an exhaustive descriptor list, but rather a key list of descriptors and traits that are relevant to describing, categorizing, and especially utilizing germplasm.

- Ideally, observations should be made on trees of the same age, unless otherwise stated.
- If possible, use colour codes from the Royal Horticultural Society (RHS) or from the Methuen Handbook of Colour (Third edition). If these are not available, use the numerical colour codes provided within colour descriptors below.
- For fruit descriptors, record the average measurement, or predominant colour/ shape of 10 ripe fruits randomly selected.

CHARACTERIZATION

1. Tree height [m]

Recorded in mature trees (only if replicated) from the ground level to the top of the tree.

2. Fruit skin colour

Observe 10 ripe fruits randomly selected and record the predominant colour.

1 Grey
2 Green
3 Yellow
4 Red
5 Brown
6 Blue
7 Violet
99 Other (specify in the **Notes** descriptor)

3. Fruit shape

Record the predominant shape using 10 fruits randomly selected.

1 Oblong
2 Ellipsoid
3 Globose
4 Pyriform
5 Reniform
6 Ovate
7 Obovate

4. Fruit length [cm]
Measured from the base to the tip of the fruit. Record the average length of 10 fruits randomly selected.

5. Fruit diameter [cm]
Record the average diameter of 10 fruits randomly selected at the widest point.

6. Total fruit weight [g]
Record the average weight of 10 fruits.

7. Fruit flesh colour
Observe 10 ripe fruits randomly selected and record the predominant colour.

1 White
2 Green
3 Violet
4 Pink
99 Other (specify in the **Notes** descriptor)

8. Fruit flesh texture
Recorded on ripe fruits.

1 Soft
2 Intermediate
3 Firm

9. Fruit flesh taste
Recorded on ripe fruits.

0 Tasteless
1 Bitter
2 Sour
3 Astringent
4 Sweet
99 Other (specify in the **Notes** descriptor)

10. Fruit flesh weight [g]
Record the average weight of 10 fruits randomly selected.

11. Fruit flesh thickness [cm]
Measure at the middle of the fruit.

12. Seed coat colour

1 Dark brown
2 Reddish black
99 Other (specify in the **Notes** descriptor)

13. 10-seed weight [g]
Record the average weight of 10 seeds.

EVALUATION

14. Regular bearer
0 No
1 Yes

15. Number of mature fruits per tree

16. Fruiting season
1 Early
2 Medium
3 Late

Fruit nutritional content

17. Ascorbic acid content (Vit C) [mg/100g^{-1} DW]

18. Crude fibre content [% DW]

19. Iron content [mg/100g^{-1} DW]

20. Crude lipid content [mg/100g^{-1} DW]

21. Oil content [%]

22. Crude protein content [% DW]

23. Pectin content [% DW]

24. Linoleic acid content [mg/100g^{-1} DW]

Biotic stresses

	Causal organism	**Common name**
25.	***Polyphagous fungi***	**Dieback**
26.	***Pseudonoorda edulis***	**Safou red borer caterpillar**

27. *Oligotrophus* sp.

28. *Anchon* sp.

29. NOTES

Specify any additional information here.

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