Key descriptors for *Irvingia* spp. (bush mango)
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(bush mango)
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.

The objectives of the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) are the conservation and sustainable use of all plant genetic resources for food and agriculture (PGRFA) and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity (CBD), for sustainable agriculture and food security.

The ITPGRFA text stresses the importance of in situ conservation and the need to collect and make publicly available related information. Particularly Article 5d which states that Contracting Parties shall “Promote in situ conservation of wild crop relatives and wild plants for food production, including in protected areas, by supporting, inter alia, the efforts of indigenous and local communities”.

Since 2015, the ITPGRFA has intensified its support to national institutions on the documentation and exchange of PGRFA data in the context of its Article 17 and the development of the Global Information System on PGRFA.
Required citation


Cover Photo: Irvingia spp. (bush mango) fruits

Credit: ©ICRAF/A. Tsobeng

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iv  *Irvingia* spp.
CONTENTS

Preface 1

Introduction 2

Acknowledgements 3

Contributors 4

Key access and utilization descriptors for Irvingia spp. (bush mango) genetic resources 5

Bibliography 9
Irvingia spp.
PREFACE

The ‘Key descriptors for Irvingia spp. (bush mango)’ consists of an initial minimum set of characterization and evaluation descriptors for this species. This strategic set aims at facilitating access to and utilization of these African indigenous fruit trees. It does not exclude the addition of other descriptors later.

This work has been done jointly with the World Agroforestry (ICRAF) and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture. The list was based on a preliminary List developed by World Agroforestry. 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 nutritional components and 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 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 14 different organizations/universities from eight countries participated. Survey results were subsequently validated in consultation with a Core Advisory Group (see ‘Contributors’) led by Alain Tsobeng 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. 2015, 2018), 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

*Irvingia* species, commonly known as bush mango, as well as in their local names namely, dikka, dikanut, dikabread tree, odika, ogbono, or iba-tree, are multipurpose fruit trees growing in Africa and Asia. They belong to the family Irvingiaceae.

The genus is composed of seven species, native to different regions. *Irvingia wombolu* and *Irvingia grandifolia* are native to Central Africa. *Irvingia gabonensis, Irvingia robur, Irvingia smithii* and *Irvingia tenuinucleata* are native to West and Central Africa, and *Irvingia malayana* is native to South-East Asia.

The *Irvingia* trees commonly grow in rainforests and humid zones in dry ground, except for *Irvingia smithii*, which always grows beside water on riverbanks in savannah regions, seasonally flooded and riverine forest, and of *Irvingia malayana*, which occurs also in deciduous dipterocarp forest and dry evergreen forest.

*Irvingia* trees have multiple uses. They bear edible mango-like fruits and are valued for their fat- and protein-rich nuts, in addition to Vitamin C, β-carotene and fibre contents. The bark and kernel have medicinal uses. Bush mango products are increasingly used in America and Europe as a weight-loss aid and as health supplement. Bush mungo oil is used in the cosmetics industry.

*Irvingia* trees have a great importance for livelihoods and income as bush mango provides income for all actors along the market chain from harvesters to consumers. Therefore, supporting studies of genetic and morphological diversity for conservation of genetic resources and domestication of *Irvingia* spp. are key priorities.
ACKNOWLEDGEMENTS

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KEY SET OF CHARACTERIZATION AND EVALUATION DESCRIPTORS FOR IRVINGIA SPP. (BUSH MANGO)

This is an initial, minimum set of Characterization and Evaluation descriptors for bush mango that are useful in assisting 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 of indigenous fruit trees.

- Ideally, observations should be made on trees of the same age, unless otherwise stated, growing as much as possible in the same environment.

- For fruit descriptors, record the average measurement, or predominant shape, or colour of 24 ripe fruits randomly selected.

CHARACTERIZATION

1. **Tree growth habit**
   - 1 Erect
   - 2 Semi erect
   - 3 Drooping

2. **Tree height [m]**
   From ground level to the top of the tree.

3. **Crown shape**
   - 1 Roundish
   - 2 Ellipsoid
   - 3 Semi-circular
   - 4 Pyramidal
   - 99 Other (specify in the Notes descriptor)

4. **Crown diameter [m]**
   Measured as the mean diameter using two directions [East-West, South-North].

5. **Trunk diameter [cm]**
   Record diameter at breast height.

6. **Dry-season leaf retention**
   - 0 No
   - 1 Yes
7. **Ripe fruit exocarp (skin) colour**
   Observed on ripe fruits.
   1   Green
   2   Yellow
   3   Orange
   4   Brownish
   5   Reddish

8. **Fruit shell thickness [mm]**
   Measured at the centre of the fruit.

9. **Fresh fruit mesocarp (flesh) colour**
   1   Green
   2   Yellow
   3   Orange

10. **Presence/ absence of brown pigments in the fresh mesocarp**
    0   Absent
    1   Present

11. **Fruit shape**
    Record the predominant shape of fruits.
    1   Oblong-cylindrical
    2   Oblong-irregular
    3   Ellipsoid
    4   Globose
    5   Oval
    99  Other (specify in the Notes descriptor)

12. **Fruit apex shape**
    1   Acute
    2   Obtuse
    3   Round
    4   Depressed

13. **Fruit diameter [cm]**
    Record the average diameter of 24 fruits randomly selected at the widest point.

14. **Fruit length [cm]**
    Measured from the base to the tip of the fruit. Record the average length of 24 fruits randomly selected.
15. **Fruit weight** [g FW]
   Record the average weight of 24 mature fruits randomly selected.

16. **Flesh weight** [g FW]
   Record the average weight of 24 mature fruits randomly selected.

17. **Flesh taste**
   0  Tasteless
   1  Very sweet
   2  Sweet
   3  Bitter
   4  Very bitter

18. **Flesh texture**
   1  Soft
   2  Juicy
   3  Fibrous

19. **Kernel width** [mm]

20. **Kernel weight** [g]
   Record the average weight of 24 kernels randomly selected.

21. **Seed length** [cm]
   Measured at the longest point. Record the average seed length of 10 seeds.

22. **Seed width** [cm]
   Measured at the widest point. Record the average seed width of 10 seeds.

23. **Seed cracking**
   3  Easy
   7  Hard

24. **Kernel drawability potential**
   The sliminess of the moistened kernels when ground up.
   3  Poor
   7  Good
25. **Number of fruits per tree (Yield) [kg/ha]**
   Record the number of only mature fruits on tree in view of estimating the yield.

26. **Regular bearer**
   0  None (Never fruited)
   1  Annual (fruited each year)
   2  Biennial (fruited every two years)

27. **Fruiting seasonality**
   3  Early
   5  Moderate
   7  Late

**Fruit nutritional content**

28. **Seed fibre content [%]**

29. **β-carotene content [mg 100/g]**

30. **Flesh protein content [%]**

31. **Flesh calcium content [mg 100/g]**

32. **Flesh Ascorbic acid content [mg 100/g]**

33. **Fatty acids content [%]**

34. **NOTES**
   Specify any additional information here.
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