

Minimum List of Descriptors for EAHBs

Developed by the MusaNet Taxonomic Advisory Group – September 2018

INTRODUCTION

This **Minimum List of Descriptors for East African Highland Bananas** was developed for the *MusaNet East and Southern African Regional Workshop on EAHB Characterization and Documentation* at NARO, Mbarara, Uganda in December 2016. It is a compilation of descriptors from the Minimum List of Descriptors for *Musa* plus several descriptors that are highly discriminating for EAHBs from the 1996 Descriptors for Banana book as identified by Deborah Karamura, Kodjo Tomekpe, the Expert Team of the Organization Committee of the workshop and the East African banana curators. For any question, remark or feedback on these guidelines, please contact Rachel Chase (r.chase@cgiar.org) or Nicolas Roux (n.roux@cgiar.org).

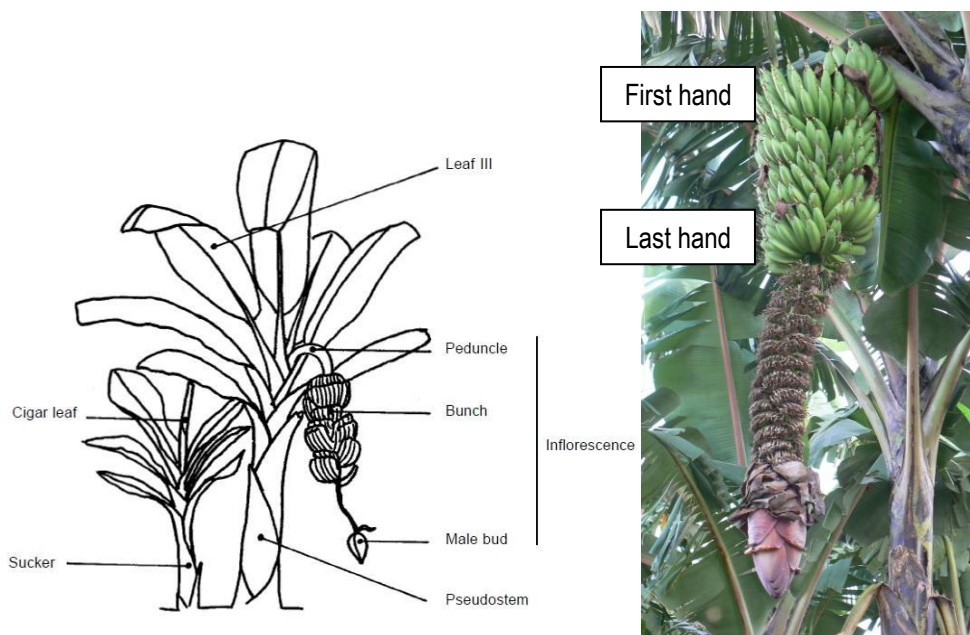
THE APPROPRIATE DEVELOPMENT STAGE FOR OBSERVATION

The best time to take photos and document

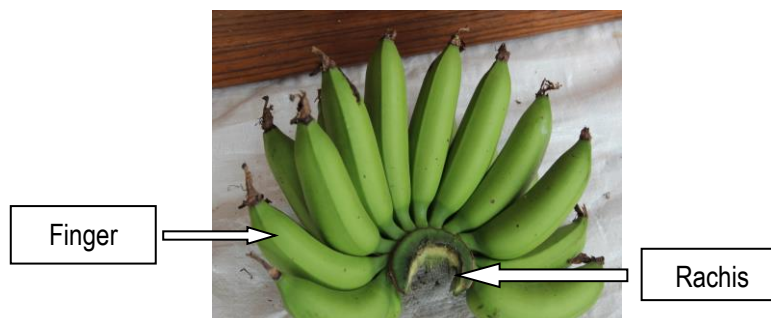
- Vegetative descriptors at shooting or within 15 days of shooting. During this time, maximum development of vegetative parts takes place.
- Bunch and fruit descriptors are when the fruit are green-ripe or yellowing (“harvest time”). This is separate from the instance of a single ripe fruit generally observed on the first or the second hand of the bunch. Also, do not confuse harvest time with ripe fruit affected by diseases, insect bites or birds.

For all **colour descriptors**, colour should be determined with the appropriate colour chart (A or B) and out of direct sunlight. The best time to observe colour descriptors is in the morning when the light is clearer than in the afternoon. For the **fruit descriptors** (6.7.1 - 6.7.7) observation must be done on several fruits in order to reflect the dominant case.

THE BANANA PLANT



The individual **fruits** also called “**fingers**” in the **bunch** (photo top-right) are arranged in clusters called “**hands**” along the **rachis**.



The photos in this document were taken by Deborah Karamura, Eldad Karamura, Svetlana Gaidashova, Jean-Pierre Horry, Jeff Daniells, Christophe Jenny and Emmanuel Fondi.

VEGETATIVE DESCRIPTORS (5 DESCRIPTORS)

6.2.1b Pseudostem height / girth ratio (cm) (Height recorded from the base of the pseudostem to the emerging point of the peduncle). Girth measured at lower levels of the pseudostem around 20 cm above the collar.

1. < 4.0
2. 4.1 - 5.1
3. > 5.1

6.2.3b Pigmentation (blotches) in the pseudostem. Should be recorded on the outermost fresh sheath at time of shooting.

- 1 None
- 2 Brown/rusty brown
- 3 Black
- 4 Other



1.



2.



3.

6.2.10b Suckers with tubular leaves

- 1 Suckers start with tubular leaves
- 2 Suckers don't have tubular leaves



1.



2.

6.2.11 Position of suckers. Observe the youngest sucker.

1. Far from parent plant (emerging >50 cm from parent plant)
2. Close to parent (vertical growth)

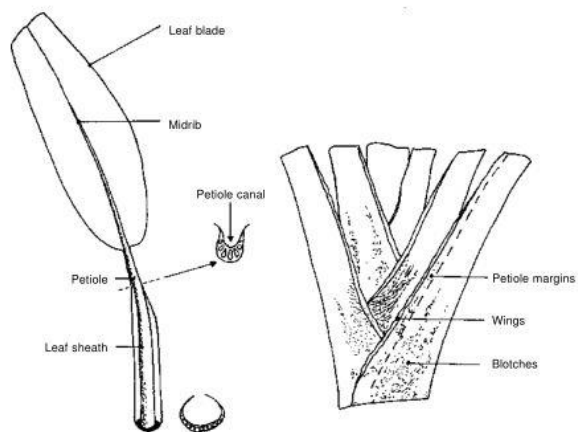


Figure 1. Petiole/midrib/leaf (from Champion 1963 (left), De Langhe 1961 (right)).

6.3.1b Blotches at the petiole base

Record the relative surface area covered by blotches. Look at several plants if possible to get an overall idea. Observe at flowering time.

1. No pigmentation
2. Sparse blotching (<20%)
3. Moderate blotching (20%-50%)
4. Extensive pigmentation (>50%)
5. Completely covered with blotches



6.3.19b Leaf tips

1. Not twisted
2. Twisted



1.

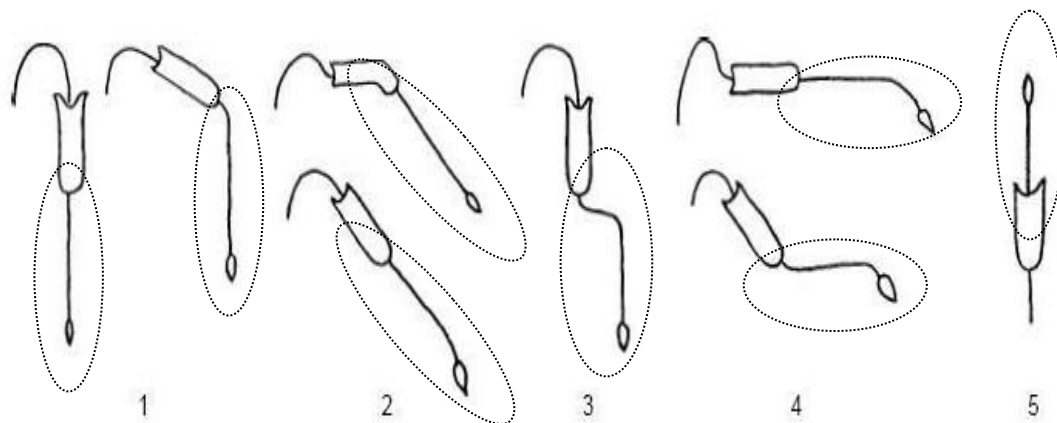
2.

FLORAL DESCRIPTORS (7 DESCRIPTORS)

6.4.12 Male rachis position

Observe only the part of the rachis between the last hand and the male bud.

1. Falling vertically
2. At an angle
3. With a curve
4. Horizontal or supra-horizontal
5. Erect



6.4.13b Male rachis appearance

1. Bare
2. Neutral flowers on one to few hands only near the bunch (rest of stalk is bare)
3. Male flowers/bracts above the male bud (rest of stalk is bare)
4. Neutral/male flowers and presence of withered bracts on the entire stalk
5. Neutral/male flowers on the whole stalk without persistent bracts (still firmly attached to the rachis)
6. Small bunch from neutral/hermaphrodite flowers just above the male bud (which gradually falls).
7. Some hermaphrodite flowers remaining in the centre of the rachis.
8. Other



1.



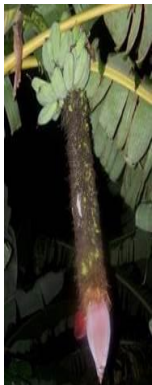
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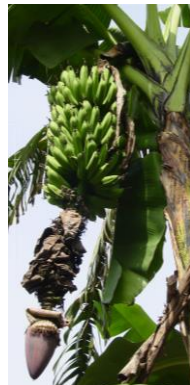
4.



5.



6.



7.

For the following descriptors, measure the values w, x, y.

“w” is the broadest width of the male bud. “x” is the length from the base of the male bud to the point of broadest width ‘w’; “y” is the total length of the male bud. As the figure shows, these parameters express the profile of the bud. Do not measure the dimensions along the bud but rather on a projection/outline of the bud (e.g. trace the outline of the bud on paper).

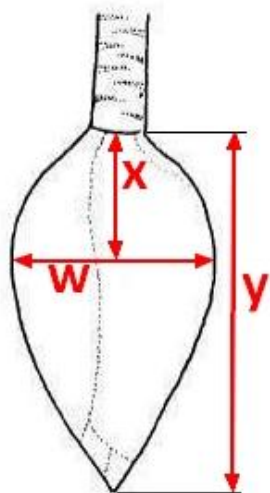


Figure 2. Male bud shape dimensions to be used in 6.4.15, 6.4.16, and 6.4.17

6.4.15 Male bud shape

Calculate the ratio w/y (see figure 2 above).

1. Skinny ($w/y \leq 0.45$)
2. Medium ($0.45 < w/y < 0.55$)
3. Fat ($w/y \geq 0.55$)

6.4.16 Male bud length (cm)

Measure the length (y) of male bud at harvest (see figure 2 above).

1. Short ($y \leq 20$ cm)
2. Medium ($20 \text{ cm} < y < 30$ cm)
3. Long ($y \geq 30$ cm)

6.4.17 Male bud shoulder

Calculate the ratio x/y (see figure 2 above).

1. High shouldered ($x/y \leq 0.28$)
2. Medium shouldered ($0.28 < x/y < 0.30$)
3. Low shouldered ($x/y \geq 0.30$)

6.5.2 Bract apex shape

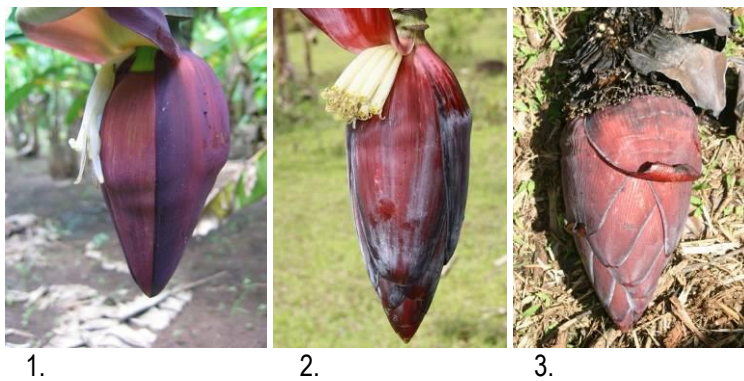
Refers to the first external unlifted bract. Flatten bracts to determine shape.

1. Pointed
2. Intermediate
3. Obtuse
4. Obtuse and split



6.5.3 Bract imbrication (Alignment of bracts at the apex of the male bud)

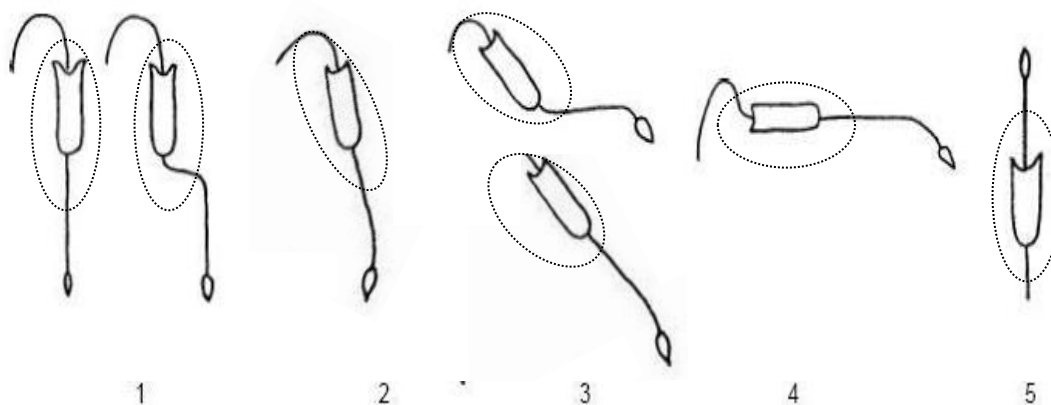
1. Convolute
2. Moderately imbricate
3. Highly imbricate



FRUIT DESCRIPTORS (6 DESCRIPTORS)

6.4.6 Bunch position (Angle between the axis of the bunch and the vertical)

1. Hanging vertically
2. Slightly angled
3. Hanging at a 45° angle
4. Horizontal
5. Erect



6.4.8b Bunch appearance

The bunch should still be on the plant.

1. Very Lax (one can easily place a hand horizontally between the hands of fruit)
2. Lax (one can easily place a hand obliquely between the hands of fruit)
3. Compact (one can place a finger, but not a hand, between the hands of fruit)
4. Very compact (one cannot place a finger between the hands of fruit)



1.



2.



3.



4.

6.7.1b Fruit position Recorded only on the fruits arranged symmetrically around the stalk. Observe the general appearance.

1. Curved towards stalk
2. Parallel to the stalk
3. Curved upward (obliquely, at a 45° angle upward)
4. Perpendicular to the stalk
5. Other



1.



2.



3.



4.

6.7.3b Fruit length /diameter ratio (cm) at maturity

Length measured as the internal arc of the fruit, without pedicel. Circumference measured around the middle of the fruit. Record on the inner fruit in the middle of the mid-hand of the bunch. If there is an even number of hands, there will be two middle hands. Count the middle hand that developed first.

1. ≤ 3.0
2. 3.1-4.0
3. > 4.0

6.7.6b Fruit apex

1. Pointed
2. Lengthily pointed (like plantain)
3. Blunt-tipped (plateau at tip)
4. Bottle-necked (wider under tip than number 2)
5. Rounded



1.



2.



3.



4.



5.

6.7.7b Remains of flower relicts at fruit apex. Observe at harvest before cutting the bunch as relicts may fall off.

1. Without flower relicts
2. Few flower relicts (<20% of the fruits with relicts)
3. Persistent flower relicts (>20% of the fruits with relicts)
4. Only base of the style persists



1.



2.



3.



4.

Glossary of terms

Apex – Bottom tip (of male bract in this case).

Bract - a leaf-like structure, usually different in form from the foliage leaves, associated with an inflorescence or flower.

Bunch – the descriptive term for all the fruits along the rachis. The individual fruit (also called fingers) are arranged in hands.

Cigar leaf - rolled leaf emerging from the centre of the pseudostem.

Clasping - Partly surrounding the stem.

Collar – the region of root emergence at the base of the pseudostem.

Convolute -- With one lamina enrolled in another lamina.

Distal – Away from the point of origin or attachment.

Edge –outside rim of the petiole

Hand – Arrangement of the fruit in a bunch, previously clusters of flowers.

Imbrication - Alignment of bracts at the apex of the male bud.

Male bud –The composite of male flowers and their bracts, in the form of a bud at the end of the growing male rachis.

Margin – area just below the edge of the petiole

Node - the place on a plant stem where a leaf is attached.

Rachis – the stem of the entire inflorescence from the first hand to the male bud.

Sheath – the part of the leaf clasping or enveloping the pseudostem.

Pedichel - the stem which supports one flower or fruit.

Peduncle - the stem that supports the inflorescence and attaches it to the pseudostem.

Petiole - the stem of a leaf.

Pseudostem - a false stem made of the rolled bases of leaves.

Citation: Taxonomic Advisory Group (TAG) 2017. Minimum Descriptor List for *East African Highland Bananas*. Bioversity International, Montpellier, France.