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UPOV

# INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

# DRAFT

## BANANA

UPOV Codes: MUSAA_ACU; MUSAA_PAR

*Musa acuminata* Colla; *Musa* x*paradisiaca* L.

## GUIDELINES

## FOR THE CONDUCT OF TESTS

## FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by experts from Brazil and France*

*to be considered by the*
*Technical Working Party for Fruit Crops*
*at its thirty-eighth session, to be held in Jeju, Republic of Korea, from July 9 to 13, 2007*

Alternative Names:*

| *Latin* | *English* | *French* | *German* | *Spanish* |
|---|---|---|---|---|
| *Musa acuminata* Colla, *Musa cavendishii* Lamb. | Banana, Cavendish banana, Chinese banana, Dwarf banana | Bananier, Bananier nain | Banane, Zwergbanane | Bananera, Banano, Platanera, Plátano |
| *Musa* x*paradisiaca* L., *M. acuminata* Colla × *M. balbisiana* Colla | Plantain, Pomme banana, Silk banana, Banana sucrier | | | |

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

### ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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## 1. Subject of these Test Guidelines

1.1 These Test Guidelines apply to all varieties of *Musa acuminata* Colla and *Musa* ×*paradisiaca* L. (*M. acuminata* Colla x *M. balbisiana* Colla) of the family *Musaceae*.

1.2 It is noted that cultivated bananas have been derived from wild species *Musa acuminata* (A) and *Musa balbisiana* (B) either alone or in combinations. The cultivated bananas are classified into botanical groups according to their genome combination. The main groups found in the edible bananas, natural varieties or hybrids, are AA, AB, AAA, AAB, ABB, AAAA, AAAB and AABB.

1.3 Each application should include a declaration of botanical group according to the genetic combination that could be checked if necessary.

## 2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of corm (whole), rhizome or vitroplant.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

20 corms, rhizomes or vitroplants.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

## 3. Method of Examination

### *3.1 Number of Growing Cycles*

The minimum duration of tests should normally be two independent growing cycles.

### *3.2 Testing Place*

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

*3.3 Conditions for Conducting the Examination*

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles.

3.3.3 All observations should be made on the second productive cycle or later in the plantation life.

*3.4 Test Design*

3.4.1 Each test should be designed to result in a total of at least {…} [plants]

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

*3.5 Number of Plants / Parts of Plants to be Examined*

Unless otherwise indicated, all observations should be made on 15 plants or parts taken from each of 10 plants. In the case of parts of plants, the number to be taken from each of the plants should be 2.

*3.6 Additional Tests*

Additional tests, for examining relevant characteristics, may be established.

## 4. Assessment of Distinctness, Uniformity and Stability

*4.1 Distinctness*

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

*4.2 Uniformity*

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 15 plants, one off-type is allowed.

*4.3 Stability*

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be tested, either by growing a further generation, or by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

## 5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics: (to review)

It is recommended that the competent authorities divide the varieties on the AAA group of *Musa acuminata* into subgroups and types which can be identified by the following characteristics:

1) Gros Michel

| | | |
|---|---|---|
| (a) | Fruit bunch: ratio length/width (characteristic 29) | large to review |
| (b) | Fruit: shape of apex (characteristic 43) | bottle-necked |
| (c) | Fruit: color of skin (characteristic 45) | deep yellow |

2) Cavendish

| | | |
|---|---|---|
| (a) | Fruit bunch: ratio length/width (characteristic 29) | large to review |
| (b) | Fruit: shape of apex (characteristic 43) | blunt |
| (c) | Fruit: color of skin (characteristic 45) | yellow-green to yellow |

3) Dwarf Cavendish

| | |
|---|---|
| Pseudostem: length (characteristic 3) | very short |

4) Giant Cavendish

| | |
|---|---|
| Pseudostem: length (characteristic 3) | short |

5) Robusta

| | |
|---|---|
| Pseudostem: length (characteristic 3) | medium |

6) Pisang Masak Hijau

| | |
|---|---|
| Pseudostem: length (characteristic 3) | long |

7) Red and Green Red

| | | |
|---|---|---|
| (a) | Fruit bunch: ratio length/width (characteristic 29) | large to review |
| (b) | Fruit: shape of apex (characteristic 430) | blunt |
| (c) | Fruit: color of skin (characteristic 45) | green or red |

Also, it is recommended that the competent authorities divide the triploid varieties of the AAB group (*Musa acuminata* x *M. Balbisiana*) into subgroups and types which can be identified by the following characteristics:

8) Prata or Pomme

| | | |
|---|---|---|
| (a) | Fruit: longitudinal ridges (characteristic 39) | slightly expressed |
| (b) | Fruit: length (characteristic 40) | medium |
| (c) | Fruit: shape of apex (characteristic 43) | pointed |
| (d) | Fruit: thickness of skin (characteristic 44) | medium |

9) Plantain Horn or Terra

| | | |
|---|---|---|
| (a) | Fruit:: longitudinal ridges (characteristic 39) | weakly expressed |
| (b) | Fruit: length (characteristic 40) | long |
| (c) | Fruit: shape of apex (characteristic 43) | pointed |
| (d) | Fruit: thickness of skin (characteristic 44) | thick |
| (e) | Fruit: color of pulp (characteristic 48) | orange |
| (f) | Fruit: consistency of pulp (characteristic 49) | firm |

10) Silk

| | | |
|---|---|---|
| (a) | Fruit: longitudinal ridges (characteristic 39) | absent |
| (b) | Fruit: length (characteristic 40) | very short (1) |
| (c) | Fruit: thickness of skin (characteristic 44) | thin |
| (d) | Fruit: color of pulp (characteristic 48) | white |
| (e) | Fruit: consistency of pulp (characteristic 49) | moderately soft |

11) Pacovan

| | | |
|---|---|---|
| (a) | Fruit: longitudinal ridges (characteristic 39) | strongly expressed |
| (b) | Fruit: length (characteristic 40) | medium |
| (c) | Fruit: shape of apex (characteristic 43) | pointed |
| (d) | Fruit: thickness of skin (characteristic 44) | thick |
| (e) | Fruit: color of pulp (characteristic 48) | dull white |
| (f) | Fruit: consistency of pulp (characteristic 49) | moderately soft |

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

## 6. Introduction to the Table of Characteristics

### *6.1 Categories of Characteristics*

#### 6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

#### 6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

### *6.2 States of Expression and Corresponding Notes*

States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

### *6.3 Types of Expression*

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

*6.4 Example Varieties*

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

*6.5 Legend*

(*) Asterisked characteristic – see Chapter 6.1.2

QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

(a)–(d) See Explanations on the Table of Characteristics in Chapter 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8.2

## 7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **1.** **(+)** | | **Level of ploidy** | **Brazil to provide an explanation of the method to count chromosomes and france of the method of cytometry.** | | | | |
| **QL** | | diploid | | | | Sucrier (AA), Pisong Mas | 2 |
| | | triploid | | | | Silk, Prata, Grande Nine | 3 |
| | | tetraploid | | | | Golden Beauty (AAAA), Ouro-da-Mata (AAAB) | 4 |
| **2.** **(+)** | **VG** | **Rhizome: number of suckers above ground** | | | | | |
| **QN** | | few | | | | Sucrier (Ouro) | 3 |
| | | medium | | | | Nanicão | 5 |
| | | many | | | | Prata Anã | 7 |
| **3.** **(*)** **(+)** | **VG/ MS** | **Pseudostem: length** | | | | | |
| **QN** | | very short | | | | Salta-do-Cacho, Fig Pomme Naine, Rajapuri | 1 |
| | | short | | | | Nanica, Dwarf Cavendish | 3 |
| | | medium | | | | Nanicão, Valery, Poyo Grand nain | 5 |
| | | long | | | | Prata comum, Locatan | 7 |
| | | very long | | | | Pacovan | 9 |

| | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|
| **4.** **(+)** | **Pseudostem: diameter** | | | | | |
| **QN** | small | | | | Yangambi Km 5 (Caipira), Ouro (Bocadillo) | 3 |
| | medium | | | | Nanicão, Valery, Willians | 5 |
| | large | | | | Prata Anã | 7 |
| **4.a** **(+)** | **Pseudostem: imbrications of leaf sheaths** | | | | | |
| | weak | | | | | 3 |
| | medium | | | | | 5 |
| | strong | | | | | 7 |
| **5.** **(+)** | **Pseudostem: shape** | | | | | |
| **PQ** | narrow conical | | | | Grand Nain | 1 |
| | conical | | | | Nanicão | 2 |
| | broad conical | | | | Mysore | 7 |

| | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|
| **6.** | **Pseudostem: color** | | | | | |
| **(+)** | | | | | | |
| **PQ** | greenish yellow | | | | Prata Anã | 2 |
| | light green | | | | | 3 |
| | medium green | | | | D'Angola | 4 |
| | dark green | | | | | 5 |
| | reddish green | | | | Pacovan | 6 |
| | red | | | | | 7 |
| | purple | | | | Gran Nain | 8 |
| **7.** **(*)** **(+)** | **Pseudostem: spots** | | | | | |
| **QL** | absent | | | | Bluggoe, Figo | 1 |
| | present | | | | Figue Pomme Nain, Caipira, Peti Nain | 9 |
| **8.** | **Pseudostem: color of spots** | | | | | |
| **PQ** | red | | | | Gran Nain, Thap Maeo | 2 |
| | medium purple | | | | Caipira | 3 |
| | dark purple | | | | Preciosa | 4 |
| **8.a** | **Pseudostem: size of spots** | | | | Gross Michel | |
| | small | | | | | 3 |
| | medium | | | | | 5 |
| | large | | | | Yangambi km 5 | 7 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **9.** | | **Pseudostem: density of spots** | | | | | |
| **QN** | | low | | | | Figue Pomme, Thap Maeo | 3 |
| | | medium | | | | Michel | 5 |
| | | high | | | | Petit nain, Nanicao | 7 |
| **10.** | | **Pseudostem: color of the inner side of sheath base** | | | | | |
| **PQ** | | yellowish green | | | | Sucrier (Ouro) | 1 |
| | | green | | | | D'Angola, Prata Anã | 2 |
| | | red | | | | Figue Rose Naine | 3 |
| | | purple | | | | Gran Nain | 4 |
| **11.** | | **Plant: compactness of crown** | ***caract 3*** | | | | |
| **QN** | **(a)** | loose | | | | Gran Nain | 3 |
| | | médium | | | | Prata Anã | 5 |
| | | compact | | | | Figo Anão | 7 |
| **12.** **(*)** **(+)** | | **Plant: growth habit** | ***caract 2*** | | | | |
| **PQ** | **(a)** | upright | | | | Branca | 1 |
| | | spreading | | | | Nanicão | 2 |
| | | drooping | | | | Silk (Maçã) | 3 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **13. (*) (+)** | | **Petiole: orientation of wings at base** | **Brazil will review for Korea – for France, to delete** | | | | |
| **PQ** | **(a)** | curved outwards | | | | | 1 |
| | | straight | | | | | 2 |
| | | curved inwards | | | | | 3 |
| | | curved inward | | | | | 4 |
| | | overlapping | | | | | 5 |
| **13.a** | | **Petiole: overlapping of winds at base** | | | | | |
| | | absent | | | | Brand Nain | 1 |
| | | present | | | | Bluggoe | 9 |
| **13.b (+)** | | **Petiole: width in cross section** | **to check by CIRAD** | | | | |
| | | narrow | | | | | 3 |
| | | medium | | | | | 2 |
| | | broad | | | | | 7 |
| **14.** | | **Petiole: length** | | | | | |
| **(+)** | | | | | | | |
| **QN** | **(a)** | short | | | | Nanica | 3 |
| | | medium | | | | Nanicão | 5 |
| | | long | | | | Silk (Maçã) | 7 |
| **15.** | | **Leaf blade: color of midrib on lower side** | | | | | |
| **PQ** | **(a)** | green | | | | Prata Anã | 1 |
| | | pink | | | | Yangambi Km 5 (Caipira) | 2 |
| | | purple | | | | Thap Maeo | 3 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **16. (*) (+)** | | **Leaf blade: shape of base** | | | | | |
| **PQ** | **(a)** | rounded | | | | Figo Anão | 1 |
| | | one rounded and one acute | | | | Silk (Maçã) | 2 |
| | | both sides acute | | | | Gran Nain | 3 |
| **17.** | | **Leaf blade: waxiness on lower side** | | | | | |
| **QN** | **(a)** | weak | | | | | 3 |
| | | medium | | | | | 5 |
| | | strong | | | | | 7 |
| **18.** | | **Leaf blade: length** | | | | | |
| **QN** | **(a)** | short | | | | Nanica | 3 |
| | | medium | | | | Nanicão | 5 |
| | | long | | | | Branca, Pacovan | 7 |
| **19.** | | **Leaf blade: width** | | | | | |
| **QN** | **(a)** | narrow | | | | | 3 |
| | | medium | | | | | 5 |
| | | broad | | | | | 7 |
| **20.** | | **Leaf blade: ratio length/width** | | | | | |
| **QN** | **(a)** | small | | | | | 3 |
| | | medium | | | | | 5 |
| | | large | | | | | 7 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **21.** | | **Leaf blade: shape of apex** | **Brazil will review for TWF/38 – for France, to delete** | | | | |
| **PQ** | **(a)** | acute | | | | | 1 |
| | | obtuse | | | | | 2 |
| | | rounded | | | | | 3 |
| **22.** | | **Leaf blade: glossiness of upper side** | **Brazil will review for TWF/38 – for France, to delete** | | | | |
| **QL** | **(a)** | absent | | | | Gran Nain, Prata | 1 |
| | | present | | | | Bluggoe | 9 |
| **23.** | | **Peduncle: length** | | | | | |
| **(+)** | | | | | | | |
| **QN** | **(b)** | short | | | | Sucrier (Ouro), Nanica | 3 |
| | | medium | | | | Pacovan, Gran Nain | 5 |
| | | long | | | | Silk (Maçã), São Domingos | 7 |
| **24.** | | **Peduncle: diameter** | | | | | |
| **(+)** | | | | | | | |
| **QN** | **(b)** | small | | | | Sucrier (Ouro) | 3 |
| | | médium | | | | Pacovan, Prata | 5 |
| | | large | | | | Gran Nain | 7 |
| **25.** | | **Peduncle: pubescence** | | | | | |
| **(+)** | | | | | | | |
| **QL** | **(b)** | absent | | | | Prata Anã | 1 |
| | | present | | | | Nanicão | 9 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **26.** | | **Peduncle: curvature** | | | | | |
| **(+)** | | | | | | | |
| **QN** | **(b)** | week | **To Brazil, example varieties are clear, not necessary figure** | | | Gran Nain | 3 |
| | | medium | | | | Figue Pomme | 5 |
| | | strong | | | | Yangambi Km 5 (Caipira) | 7 |
| **27.** | | **Bunch: length** | | | | | |
| **(+)** | | | | | | | |
| **PQ** | **(b)** | short | | | | Sucrier (Ouro) | 3 |
| | | medium | | | | Pacovan | 5 |
| | | long | | | | Gran Nain | 7 |
| **28.a** | | **Brunch: diameter** | | | | | |
| | | narrow | | | | Ouro | 3 |
| | | medium | | | | Nanicão | 5 |
| | | broad | | | | Gran Nain, D'Angola | 7 |
| **28.** | | **Bunch: shape** | **Brazil will prepare an illustration for 2006** | | | | |
| **QN** | **(b)** | cylindrical | | | | Gran Nain, Gros Michel, Terra | 1 |
| | | conical | | | | Prata Anã, Dwarf, Cavendish | 3 |
| **29.a** | | **Brunch: symmetry** | | | | | |
| | | asymmetric | | | | | 1 |
| | | symmetric | | | | | 2 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **29.** | | **Bunch: attitude of hands** | **Brazil will prepare an illustration for 2006. Janay** | | | | |
| | **(b)** | all turned up | | | | Terra | 1 |
| | | turned up and horizontal | | | | Nanicão | 2 |
| | | horizontal | | | | Pacovan, São Tomé | 3 |
| **30.** | | **Bunch: compactness** | | | | | |
| **QN** | **(b)** | loose | | | | Bluggoe | 3 |
| | | medium | | | | Nanicão | 5 |
| | | compact | | | | Thap Maeo | 7 |
| **31. (*)** | | **Bunch: number of hands** | | | | | |
| **QN** | **(b)** | few | | | | D'Angola | 3 |
| | | medium | | | | Prata comum | 5 |
| | | many | | | | Thap Maeo, Gran Nain | 7 |
| **32.** | | **Bunch: number of fruits per hand** | **To check example varieties as they are the same as char. 32** | | | | |
| **QN** | **(b)** | few | | | | D'Angola | 3 |
| | | medium | | | | Prata comum | 5 |
| | | many | | | | Thap Maeo, Gran Nain | 7 |
| **33. (*) (+)** | | **Rachis: attitude of male part** | | | | | |
| **PQ** | | curved with vertical end | | | | Gran Nain, Branca | 3 |
| | | curved with inclined end | | | | Prata | 4 |
| | | vertical | | | | | 3 |
| | | inclined | | | | | 4 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **34.** | | **Rachis prominence of scars** | | | | | |
| **QN** | **(c)** | weak | | | | Gia Hui (Prata Zulu), Sucrier (Ouro) | 3 |
| | | moderate | | | | Nanica | 5 |
| | | strong | | | | Ouro-da-Mata | 7 |
| **35.** | | **Rachis: persistence of the bracts** | | | | | |
| | **(c)** | absent or very week | | | | Silk (Maçã), Gran Nain | 1 |
| | | moderately persistent | | | | Prata | 2 |
| | | strongly persistent | | | | Prata Anã | 3 |
| **36.** | | **Rachis: Persistence of hermaphrodite flowers** | | | | | |
| **QL** | **(c)** | absent | | | | Silk (Maçã), Nanicão | 1 |
| | | present | | | | Terra | 2 |
| **37.** | | **Fruit: longitudinal curvature** | **To check?????** | | | | |
| **QN** | **(c)** | weak | | | | Bluggoe, Pacovan | 3 |
| | | medium | | | | Nanicão | 5 |
| | | strong | | | | Nanica | 7 |
| **38.a** | | **Fruit: position compared to the rachis or in relation to rachis** | **To check** | | | | |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **38.** **(+)** | | **Fruit: longitudinal ridges** | | | | | |
| | **(c)** | absent | | | | Sucrier (Ouro), Yangambi Km 5 (Caipira), Silk (Maçã) | 1 |
| | | weakly expressed | | | | Terra, Prata | 3 |
| | | strongly expressed | | | | Bluggoe, Terra, Pacovan | 5 |
| **39.** **(*)** **(+)** | | **Fruit: length** | | | | | |
| **QN** | **(d)** | short | | | | Sucrier, Silk, Figue Pomme | 3 |
| | | medium | | | | Nanicão | 5 |
| | | long | | | | Terra | 7 |
| **40.** **(*)** | | **Fruit: width (excluding sharp edges)** | | | | | |
| **QN** | **(d)** | narrow | | | | Sucrier (Ouro) | 3 |
| | | médium | | | | Gran Nain | 5 |
| | | broad | | | | Bluggoe, D'Angola | 7 |
| **41.** | | **Fruit: length of pedicel** | | | | | |
| **QN** | **(d)** | short | | | | Sucrier (Ouro), Yangambi Km 5 (Caipira) | 3 |
| | | medium | | | | Prata | 5 |
| | | long | | | | Terra, Figue Pomme | 7 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **42. (*) (+)** | | **Fruit: shape of apex** | **Draw of France** | | | | |
| **PQ** | **(d)** | rounded | | | | Prata Ponta Aparada, Sucrier (Ouro) | 3 |
| | | pointed | | | | Terra | 1 |
| | | bottle-necked | | | | Prata | 2 |
| | | truncate | | | | Gran Nain | 4 |
| **43.** | | **Fruit: thickness of skin (stage 6 for ripe fruit)** | | | | | |
| **QN** | **(d)** | thin | | | | Sucrier (Ouro), Silk (Maçã) | 3 |
| | | medium | | | | Nanica | 5 |
| | | thick | | | | Terra, Pacovan | 7 |
| **44. (*)** | | **Fruit: color of skin (before maturity)** | | | | | |
| **PQ** | **(d)** | light green | | | | São Tomé | 1 |
| | | mediume green | | | | | 2 |
| | | dark green | | | | | 3 |
| | | greenish yellow | | | | Cavendish | 2 |
| | | light yellow | | | | Silk (Maçã) | 3 |
| | | pink | | | | | 4 |
| | | medium yellow | | | | Prata comum | 4 |
| | | dark yellow | | | | Sucrier (Ouro) | 5 |
| | | red | | | | Caru Roxa | 5 |
| | | purple | | | | | 6 |
| | | brown | | | | | 7 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **45. (*)** | | **Fruit: color of skin (stage 6 for ripe fruit)** | | | | | |
| **PQ** | **(d)** | green | | | | São Tomé | 1 |
| | | greenish yellow | | | | Cavendish | 2 |
| | | yellow | | | | | 2 |
| | | light yellow | | | | Silk (Maçã) | 1 |
| | | medium yellow | | | | Prata comum | 4 |
| | | green yellow | | | | | 4 |
| | | dark yellow | | | | Sucrier (Ouro) | 3 |
| | | orange | | | | | ~~5~~ |
| | | red orange | | | | | 6 |
| | | reddish | | | | Caru Roxa | 7 |
| | | brown | | | | | 8 |
| | | black | | | | | 9 |
| **46.** | | **Fruit adherence (stage 6 for ripe fruit)** | | | | | |
| **QN** | **(d)** | weak | | | | Silk (Maçã) | 3 |
| | | medium | | | | Nanicao | 5 |
| | | strong | | | | Sucrier (Ouro), Yangambi Km 5 (Caipira) | 7 |
| **47.a** | | **Fruit: persistence of floral organs** | | | | | |
| | | absent | | | | Figue rose | 1 |
| | | present | | | | IDN 110, Yangambi km 5 | 9 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **47.** | | **Fruit: color of flesh (stage 6 for ripe fruit)** | | | | | |
| **PQ** | **(d)** | white | | | | Silk (Maçã) | 1 |
| | | off white | | | | Prata, Pacovan | 2 |
| | | cream | | | | Caru Roxa e Verde | 3 |
| | | yellow | | | | Nanicão | 4 |
| | | orange | | | | Terra | 5 |
| | | pinkish cream | | | | São Domingos | 6 |
| **48.** | | **Fruit: firmness of flesh (stage 6)** | | | | | |
| **QN** | **(c)** | soft | | | | Gran Nain, Silk (Maçã) | 1 |
| | | medium | | | | Prata, Pacovan | 3 |
| | | firm | | | | Terra | 5 |
| **49.a** | | **Male inflorescence: presence** | | | | | |
| | | absent | | | | | 1 |
| | | present | | | | | 9 |
| **49.** **(+)** | | **Male inflorescence: shape (in cross section)** | | | | | |
| **PQ** | | lanceolate | | | | | 1 |
| | | ovate | | | | Yangambi Km 5, Pacovan | 2 |
| | | triangular | | | | | 3 |
| | | rounded | | | | | 4 |

| | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|
| **50.** | **Male:inflorescence overlap of bracts** | Brazil will prepare an illustration for 2007 | | | | |
| **QN** | absent or very weak | | | | Prata Anã | 1 |
| | weak | | | | | 3 |
| | medium | | | | Pacovan | 5 |
| | strong | | | | Nanicão | 7 |
| | very strong | | | | | 9 |
| **52** | **Bract: color of the inner side** | | | | | |
| | whitish | | | | | 1 |
| | yellow | | | | | 2 |
| | yellow green | | | | | 3 |
| | green | | | | | |
| | pink | | | | | |
| | orange red | | | | | |
| | red | | | | | |
| | purple | | | | | |
| **53** | **Bract: yellow hue of the apex (inner side or upper side/to be check by France)** | | | | | |
| | absent | | | | | 1 |
| | present | | | | | 2 |
| **54** | **Male inflorescence: separate on of the bract( to be check by France)** | | | | | |
| | never | | | | Plantain Frech | |
| | | | | | Gros Michel | |
| | | | | | Figue Rose | |

| | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|
| **55** | **Male inflorescence: shape of apex of bract( to be check by France)** | | | | | |
| | acute | | | | Gros Michel | |
| | slightly acute | | | | | |
| | intermediate | | | | | |
| | obtuse | | | | Yangambi Km 5 | |
| | obtuse and ????? | | | | Figue Pomme | |

## 8. Explanations on the Table of Characteristics

### *8.1 Explanations covering several characteristics*

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Unless otherwise stated, all observations on the leaf should be made on the third leaf from the apex at the moment of inflorescence emerging of those fruit bunches which were originally marked for observation.

(b) All observations on the fruit bunch should be done at fruit maturity (harvest time) [on those bunches which were originally marked for flower observations]. (TG/123/3, 1989).

(c) All observations on inflorescence and flower should be made at the time of full flowering.

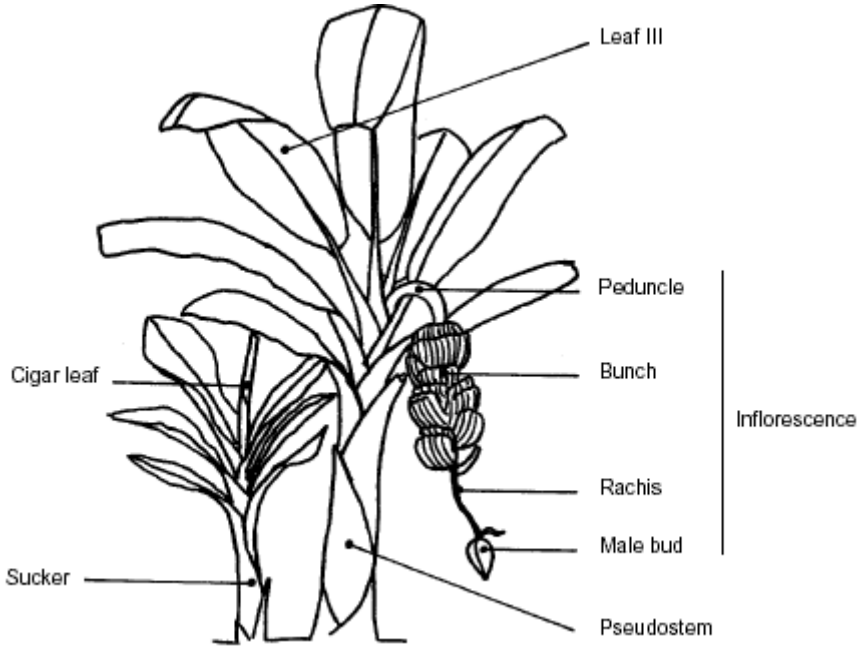
(d) All observations on the fruit should be made on the second hand, on a median standard fruit of the inner cluster.

### *8.2 Explanations for individual characteristics*

Ad. 1: Level of ploidy

See ad.12 (illustration) and consider:
1 = diploid
2 = triploid
3 = tetraploid.

Ad. 2: Rhizome: number of suckers
Ad. 3: Pseudostem: length
Ad. 4: Pseudostem: diameter




Ad. 2: Rhizome: number of suckers

Assessed from the beginning of the suckers emission until harvest.
Assessed (France suggest delete: from the beginning of the suckers emission until harvest) at harvest with visible suckers
Assessed at harvest time and only visible suckers above ground

Ad. 3: Pseudostem: length
The length of the pseudostem should be measured from the ground level to the crown of the peduncle, at the beginning of flowering.

Ad. 4: Pseudostem: diameter

The diameter of the pseudostem should be observed at the height of one meter from ground level, at the beginning of flowering.

France suggest:
The diameter of the pseudostem should be observed at the height of one meter from ground level at of flowering

Ad. 9: Pseudostem: density of spots

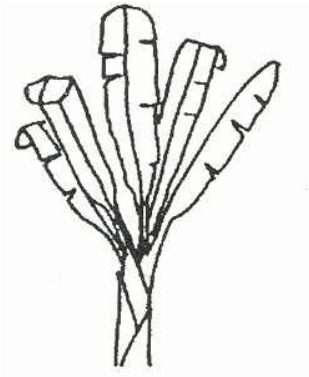
3
low

5
medium

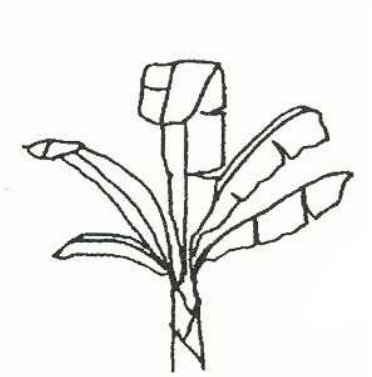
7
high

Ad. 2 Plant: Growth Habit

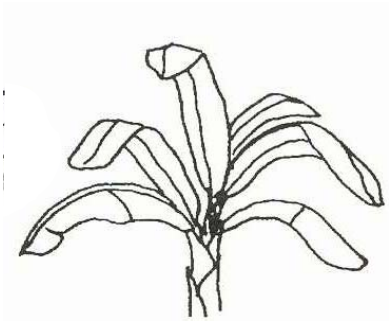
The growth habit should be observed at harvest time, at the moment of inflorescence emerging of those fruit bunches which were originally marked for observation.



1
upright



2
spreading



3
drooping

Ad. 25: Peduncle: diameter

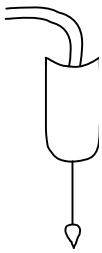
The diameter of the peduncle should be assessed in the middle point between the attachment point of the bunch and the first hand.

Ad. 26: Peduncle: pubescence

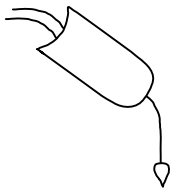
1
absent

9
present

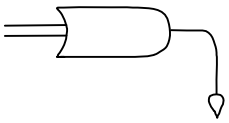
Ad. 27: Peduncle: curvature ????



3
week



5
medium

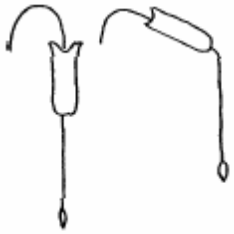


7
strong

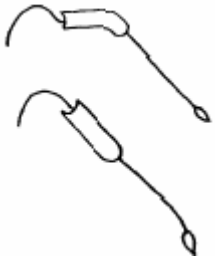
Ad. 28: Bunch: length

The length of the bunch should be measured from the attachment point of the first hand to the last hand.

Ad. 34: Rachis: attitude of male part
Assessed just before harvest time.

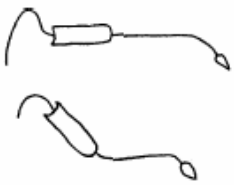


1
vertical ????

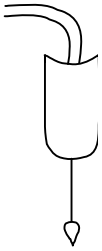


3
inclined

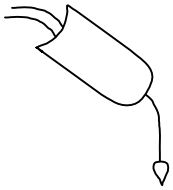
5
curved



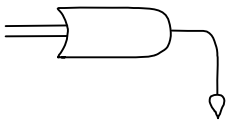
7
recurved or “s” shaped



1
parallel to pseudostem



3
intermediate



5
horizontal

Ad. 39: Fruit: Longitudinal ridges
To observe at the middle of the fruit

1
absent

2
weakly expressed

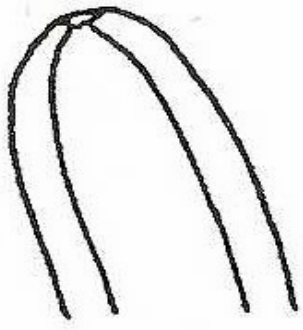
3
strongly expressed

Ad. 40: Fruit: length

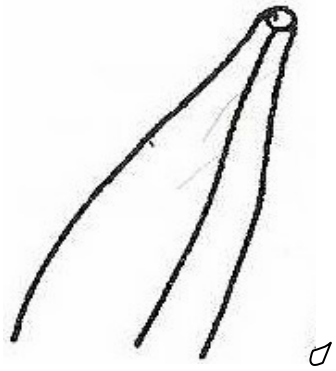
The length of the fruit should be determined on the outer (convex) side from where the fruit widens at the stalk end to the apical point.

Ad. 43: Fruit: shape of apex. ?????

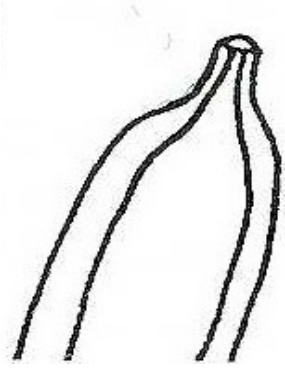
To observe from narrowest to widest



3
rounded



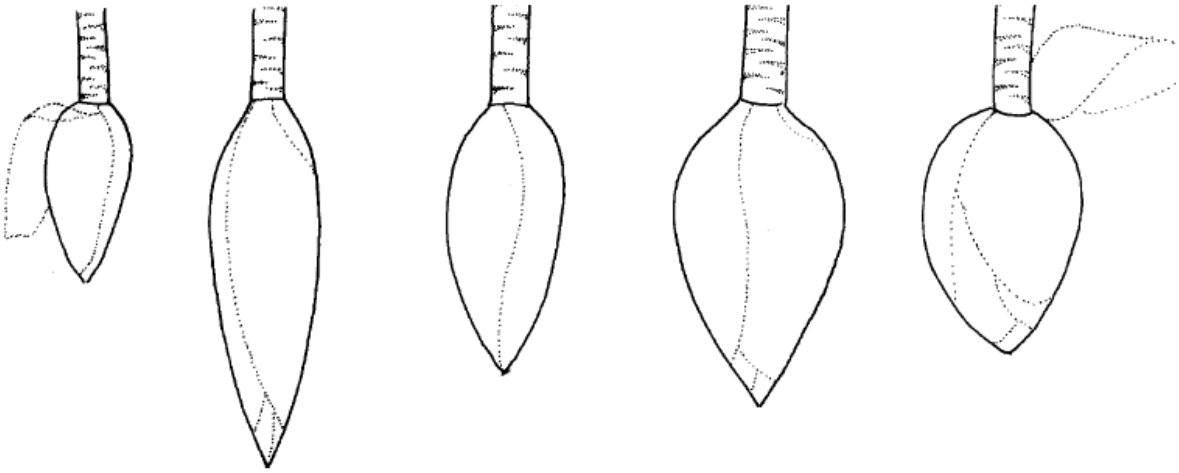
1
pointed



2
bottle-neck

And truncate????

Ad. 50: Male bud: shape



| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| slim | lanceolate | oval | wide oval (elliptic) | rounded |

## 9. Literature

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De Langhe, E., 1969: "Bananas, Outlines of perennial crop breeding in the tropics," Miscellaneous papers 4, Landbouwhogeschool, Wageningen, NL. pp. 53-78.

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Simmonds, N.W., 1966: "Bananas," 2nd ed., Longmans, Green, London, GB, pp. 44-128

Turner, D.W. and Hunt, N., 1984: "Growth, yield and leaf nutrient composition of 30 banana varieties in subtropical New South Wales," Dept. of Agriculture New South Wales, AU, Technical Bulletin 31, pp. 1-36

Stover, R.H., 1988: "Variation and Cultivar Nomenclature in Musa, AAA Group, Cavendish Subgroup," Fruits d'Outre-mer, Vol. 43, No. 6, pp. 353-357, FR

Silva, S.S.; Shepherd, K.; Dantas, J.L.L.; Souza, A.S.; Carneiro, M.S. Germoplasma. In: Alves, E.J. (org.). A cultura da banana. 2. ed., rev. - Brasília-DF: Embrapa-SPI / Cruz das Almas: Embrapa-CNPMF, 1999. p.61-84.

Descriptors for Banana [*Musa spp*](revised). IBPGR/ICRISAT, Rome, 1984.

10. Technical Questionnaire

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

| | |
|---|---|
| | Application date:<br>(not to be filled in by the applicant) |

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

| | | |
|---|---|---|
| 1.1.1 Botanical name | *Musa acuminata* Colla | ❑ |
| 1.1.2 Common name | Banana | |
| 1.1.3 Botanical group<br>(please complete e.g. AA, AAA) | | |
| 1.2.1 Botanical name | *Musa* ×*paradisiaca* L.<br>(*M. acuminata* Colla × *M. balbisiana* Colla) | ❑ |
| 1.2.2 Botanical group<br>(please complete e.g. AAB, ABB) | | |

2. Applicant

| | | | |
|---|---|---|---|
| Name | | | |
| Address | | | |
| Telephone No. | | Fax No. | |
| E-mail address | | | |
| Breeder (if different from applicant) | | | |

3. Proposed denomination and breeder's reference

| | |
|---|---|
| Proposed denomination (if available) | |
| Breeder's reference | |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]
(please state parent varieties)
(b) partially known cross [ ]
(please state known parent variety(ies))
(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of propagating the variety

[#] Aurhorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

| Characteristics | Example Varieties | Note |
|---|---|---|
| **TO ADD CHARACTERISTICS** | | |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

6. Similar varieties and differences from these varieties

*Please use the table, and space provided for comments, below to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.*

| Denomination(s) of variety(ies) similar to your candidate variety | Characteristic(s) in which your candidate variety differs from the similar variety(ies) | Describe the expression of the characteristic(s) for the **similar** variety(ies) | Describe the expression of the characteristic(s) for **your** candidate variety |
|---|---|---|---|
| *Example* | | *(example to be inserted)* | *(example to be inserted)* |
| *TO ADD EXAMPLES* | | | |
| | | | |
| | | | |

Comments:

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

[#]7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics, which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

A representative color photograph of the variety should accompany the Technical Questionnaire

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma) Yes [ ] No [ ]

(b) Chemical treatment (e.g. growth retardant, pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details for where you have indicated “yes”.

……

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name:

Signature

Date:

[End of document]