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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

Macadamia

UPOV Code: MACAD_INT; MACAD_TET

Macadamia integrifolia Maiden et Betche;
Macadamia tetraphylla L. Johns.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by (an) expert(s) from Australia

to be considered by the

Technical Working Party for Fruit Crops
at its forty-sixth session
to be held in Mpumalanga, South Africa
from 2015-08-24
to 2015-08-28

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Macadamia integrifolia Maiden et Betche	Macadamia, Queensland Nut	Macadamia	Macadamia	Macadamia
Macadamia tetraphylla L. Johns.	Macadamia, Queensland Nut	Macadamia	Macadamia	Macadamia

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

These Test Guidelines apply to all varieties of Macadamia integrifolia Maiden et Betche, Macadamia tetraphylla L. Johns..

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 grafted plants.

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

12 plants.

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

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

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

3.1.3 The growing cycle is considered to be the period ranging from the beginning of active vegetative growth or flowering, continuing through active vegetative growth or flowering and fruit development and concluding with the harvesting of fruit.

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.

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 10 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 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.

4.1.4 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 10 plants or parts taken from each of 10 plants and any other observations made on all plants in the test, disregarding any off-type plants. In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 2.

4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the second column of the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

“Visual” observation (V) is an observation made on the basis of the expert’s judgment. For the purposes of this document, “visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, “G” provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

All observations should be made on at least 3 year old trees.

4.2 Uniformity

4.2.1 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:

4.2.2 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 10 plants, 1 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 further examined by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the initial 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:

(a) Plant: growth habit (characteristic 1)
(b) Plant: height (characteristic 2)
(c) Plant: angle of primary branches (characteristic 3)
(d) Stem: texture of bark (characteristic 5)
(e) Leaf blade: shape (characteristic 10)
(f) Inflorescence: color (characteristic 22)
(g) Fruit: shape (in lateral view) (characteristic 24)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 “Examining Distinctness”.

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

6.2.1 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.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

State	Note
small	3
medium	5
large	7

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

State	Note
very small	1
very small to small	2
small	3
small to medium	4
medium	5
medium to large	6
large	7
large to very large	8
very large	9

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

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

MG, MS, VG, VS – see Chapter 4.1.5

(+) See Explanations on the Table of Characteristics in Chapter 8.

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

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*) QN VG **Plant: growth habit**					
erect				MRG-20	1
spreading					2
drooping				KRG-15	3
2. (*) QN MS VG **Plant: height**					
short					3
medium					5
Tall					7
3. (*) QN VG **Plant: angle of primary branches**					
acute					1
intermediate					2
obtuse					3
4. QN VG **Plant: density of foliage**	**Plante : densité du feuillage**	**Pflanze: Dichte des Laubes**	**Planta: densidad del follaje**		
sparse	lâche	locker	laxa		3
medium	moyenne	mittel	media		5
dense	dense	dicht	densa		7
5. (*) QN VG **Stem: texture of bark**	**Tige : texture de l'écorce**	**Trieb: Beschaffenheit der Rinde**	**Tallo: textura de la corteza**		
smooth	lisse	glatt	lisa		1
moderately rough	modérément grossière	mäßig rauh	moderadamente rugosa		2
very rough	très grossière	sehr rauh	muy rugosa		3

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. QN MS VG **Leaf: petiole**	**Feuille : pétiole**	**Blatt: Blattstiel**	**Hoja: peciolo**		
absent or very short				Kabere, MiniMaca	1
short				KMB-3, MRG-20, MRG-25	3
medium				EMB-1	5
long				KRG-15	7
7. QN MS VG **Petiole: length (varieties with petiole only)**					
short					3
medium					5
long					7
8. QN MS VG **Leaf blade: length**	**Limbe : longueur**	**Blattspreite: Länge**	**Limbo: longitud**		
short				MiniMaca	3
medium				Daleys Dwarf, KRG-15, MRG-20, MRG-25	5
long				Own Venture	7
9. QN MS VG **Leaf blade: width**	**Limbe : largeur**	**Blattspreite: Breite**	**Limbo: anchura**		
narrow				MiniMaca	3
medium				KRG-15, MRG-20, MRG-25	5
broad				Darrow	7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. (*) PQ VG **Leaf blade: shape**	**Limbe : forme**	**Blattspreite: Form**	**Limbo: forma**		
lanceolate					1
ovate					2
oblong					3
elliptic					4
oblanceolate					5
obovate					6
11. PQ VG **Leaf: shape of apex**	**Feuille : forme du sommet**	**Blatt: Form der Spitze**	**Hoja: forma del ápice**		
acute				KMB-3, KRG-15, Kabere	1
acuminate					2
apiculate				MiniMaca	3
obuse				Daleys Dwarf, EMB-1, MRG-20, MRG-25	4
12. PQ VG **Leaf blade: shape of base**	**Limbe : forme de la base**	**Blattspreite: Form der Basis**	**Limbo: forma de la base**		
attenuate					1
acute					2
cuneate(check?)					3
13. QN VG **Leaf blade: undulation of margin**	**Limbe: ondulation du bord**	**Blattspreite: Randwellung**	**Limbo: ondulación del borde**		
weak				Daleys Dwarf, EMB-1, MRG-25	1
medium				KMB-3, KRG-15, MRG-20	2
strong					3
very strong				MiniMaca	4

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14. QN VG **Leaf: incisions of margin**	**Feuille : incisions du bord**	**Blatt: Randeinschnitte**	**Hoja: incisiones del borde**		
shallow					3
medium					5
deep					7
15. (*) QN VG **Leaf margin: number of spines**					
absent or very few				Daleys Dwarf	1
few				MRG-20	3
medium				EMB-1, KRG-15	5
many				KMB-3, MiniMaca	7
very many				Kabere	9
16. PQ VG **Young leaf blade: color** RHS Colour Chart (indicate reference number)					
17. PQ VG **Young leaf blade: color**					
yellow green					1
light green				EMBU-1, KRG-15, MRG-20	2
medium green					3
brown				KMB-3	4
reddish					5
purple					6

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. QN VG **Mature leaf: intensity of green color on upper side**					
light					3
medium					5
dark					7
19. QN MS VG **Inflorescence: length**					
short					3
medium					5
long					7
20. QN VG **Inflorescence: density of flowers**					
sparse					1
medium					2
dense					3
21. QN VG **Inflorescence: attitude**					
semi erect					1
semi erect to horizontal					2
horizontal					3
semi drooping					4
drooping					5

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
22. (*) QL VG **Inflorescence: color**					
white				Daleys Dwarf, EMB-1, KRG-15, MRG-20, MRG-25	1
pink				KMB-3, MiniMaca	2
23. QN MS VG **Fruit: size**					
small					3
medium					5
large					7
24. (*) PQ VG **Fruit: shape (in lateral view)**	**Fruit : forme (en vue latérale)**	**Frucht: Form (in Seitenansicht)**	**Fruto: forma (en vista lateral)**		
ovate					1
oblate				MRG-20, MRG-25	2
circular				Daleys Dwarf, EMB-1, KMB-3, MiniMaca	3
obovate				Kabere	4
25. QN VG **Fruit: texture of surface**	**Fruit: texture de la surface**	**Frucht: Textur der Oberfläche**	**Fruto: textura de la superficie**		
smooth				Daleys Dwarf, EMB-1, Hidden Valley A38, KRG-15, MRG-25	1
smooth to slightly rough				MiniMaca	2
moderately rough				KMB-3, MRG-20	3
very rough					4

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26. QN MS VG **Fruit: thickness of shell**					
thin					3
medium					5
thick					7
27. QN VG **Fruit: conspicuousness of suture**	**Fruit : netteté de la suture**	**Frucht: Ausprägung der Naht**	**Fruto: visibilidad de la sutura**		
weak				KMB-3, Kabere, MRG-20	1
medium					2
strong				MiniMaca	3
28. QN MS VG **Kernel: size**	**Amande : taille**	**Kern: Größe**	**Almendra: tamaño**		
very small					1
small					3
medium					5
large					7
very large					9
29. PQ VG **Kernel: color**					
white					1
yellowish white					2
light brown					3
medium brown					4
dark brown					5

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30. QN VG (+) **Branch: predominant number of leaves per whorl**					
three				EMB-1, KRG-15, MRG-20, MRG-25	1
four				KMB-3	2
31. QN VG (+) **Leaf: conspicuousness of secondary veins**					
weak				EMBU-1, KRG-15	1
medium				KMB-3, MRG-20	2
strong				Kabere	3
32. QN MS VG **Fruit: size of apical point**					
small				EMB-1, MRG-20	3
medium				KMB-3, KRG-15, MRG-25	5
large				Kabere	7
33. QN VG **Fruit: thickness of pericarp**					
very thin				Kabere	1
thin				EMB-1, KMB-3, KRG-15	3
medium				MRG-20, MRG-25	5
thick					7
34. QL VG **Seed: micropyle**					
closed				KMB-3, KRG-15, MRG-20	1
open				Kabere	2

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35. QN MS VG **Kernel: length**					
short					3
medium					5
long					7
36. QN MS VG **Kernel: width**					
narrow					3
medium					5
broad					7

8. Explanations on the Table of Characteristics

8.1 Explanations for individual characteristics

Ad. 30: Branch: predominant number of leaves per whorl

Observed on mature tree

Ad. 31: Leaf: conspicuousness of secondary veins

Observed on fully developed leaf

9. Literature

10. Technical Questionnaire

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

	Application date: (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	Macadamia integrifolia Maiden et Betche	[ ]
1.1.2	Common Name	Macadamia, Queensland Nut	
1.2.1	Botanical Name	Macadamia tetraphylla L. Johns.	[ ]
1.2.2	Common Name	Macadamia, Queensland Nut	

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)

(……..……..…) x (……..……..…)
female parent male parent

(b) partially known cross [ ]
(please state known parent variety(ies))

(……..……..…) x (……..……..…)
female parent male parent

(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

4.2.1 Other [ ]

(please provide details)

.....
: :
: :
:.....:

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

6. Similar varieties and differences from these varieties

Please use the following table and box for comments 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			

Comments:

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

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.

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

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”.

.....

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]