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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

TARO

UPOV Code: COLOC_ESC, COLOC_GIG

Colocasia esculenta (L.) Schott,
Colocasia gigantea (Blume) Hook. f.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from Japan

to be considered by
the Technical Working Party for Vegetables at its forty-first session,
to be held in Nairobi, Kenya, from June 11 to 15, 2007

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Colocasia esculenta (L.) Schott	cocoyam, dasheen, eddo, elephant's-ear, kalo, madumbe, taro	colocasie		alcocaz, colocasia, malanga, tayoba
Colocasia gigantea (Blume) Hook. f.				

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 *Colocasia esculenta* (L.) Schott and *Colocasia gigantea* Hook.

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 cormel, within the weight range 35 to 40g.

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

30 cormels.

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 The recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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.

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 20 plants, which should be divided between 2 or more replicates.

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 20 plants or parts taken from each of 20 plants.

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

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 20 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 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:

(a) Plant: type (characteristic 2)
(b) Corm: corm and cormel arrangement (characteristic 5)
(c) Corm: shape (characteristic 7)
(d) Cormel: shape (characteristic 9)

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

MG, MS, VG, VS: See Chapter 3.3.2

(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

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1.	**VG**	**Sprout: anthocyanin coloration**					
QL		absent					1
		present				Serebesu	9
2. (*) (+)	**VG**	**Plant: type**					
QN	**(a)**	erect					1
		semi-erect				Ishikawa-wase	2
		spreading					3
3.	**VG/ MS**	**Plant: height**					
QN	**(a)**	short					1
		medium				Ishikawa-wase	2
		tall					3
4.	**VG/ MS**	**Plant: number of leaves from corm**					
QN	**(a)**	few					3
		medium				Ishikawa-wase	5
		many					7
5. (*) (+)	**VG/ MS**	**Corm: corm and cormel arrangement**					
PQ	**(c)**	clustered				Ishikawa-wase	1
		sparsely budding					2
		densely budding					3
		branched				Ishikawa-wase	4
		massive				Yatsugashira	5

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
6.	**VG**	**Corm: size**					
QN	**(c)**	small				Ishikawa-wase	3
		medium				Serebesu	5
		large					7
7. (*) (+)	**VG**	**Corm: shape**					
PQ	**(c)**	oblate					1
		globose				Serebesu	2
		spindle					3
		cylindrical					4
8.	**VG**	**Cormel: size**					
QN	**(c)**	small					3
		medium				Ishikawa-wase	5
		large				Serebesu	7
9. (*)	**VG**	**Cormel: shape**					
QL	**(c)**	globose				Ishikawa-wase	1
		obovate					2
		shrimp				Touno-imo	3
10.	**VG/ MS**	**Cormel: length**					
QN		short					3
		medium					5
		long					7
11.	**VG/ MS**	**Cormel: number of cormels**					
QN	**(c)**	few					3
		medium				Ishikawa-wase	5
		many				Dotare	7

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
12.	**VG/ MS**	**Cormel: size of secondary cormel**					
QN	**(c)**	small					3
		medium				Shikawa-wase	5
		large					7
13.	**VG**	**Cormel: shape of secondary cormel**					
(+)							
PQ	**(c)**	globose				Ishikawa-wase	1
		obovate					2
		shrimp				Touno-im	3
14.	**VG/ MS**	**Cormel: length of secondary cormel**					
QN		short					3
		medium					5
		long					7
15	**VG/ MS**	**Cormel: number of secondary cormel**					
QN	**(c)**	few					3
		medium				Ishikawa-wase	5
		many					7
16.	**VG**	**Cormel: surface fibrousness**					
QN	**(c)**	sparse					3
		medium				Egu-imo	5
		dense					7

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
17 (*) (+)	**VG**	**Leaf blade: attitude**					
PQ	**(a)**	horizontal					1
		oblique				Ishikawa-wase	2
		vertical					3
18. (+)	**VG/ MS**	**Leaf blade: length**					
QN	**(a)**	**short**					3
		medium				Ishikawa-wase	5
		long					7
19. (+)	**VG/ MS**	**Leaf blade: width**					
QN	**(a)**	narrow				Ishikawa-wase	3
		medium					5
		wide					7
20. (*) (+)	**VG**	**Leaf blade : ratio length/width**					
QN	**(a)**	small				Egu-imo	3
		medium					5
		large					7

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
21.	**VG**	**Leaf blade: intensity of green color**					
QN	**(a)**	light				Ishikawa-wase	3
		medium				Dotare	5
		dark				Serebesu	7
22. **(+)**	**VG/ MS**	**Leaf blade: depth of sinus**					
QN	**(a)**	shallow					3
		medium				Ishikawa-wase	5
		deep					7
23. **(+)**	**VG**	**Leaf blade: shape of apex**					
PQ	**(a)**	acute				Takenoko-imo	1
		obtuse				Ishikawa-wase	2
		round					3
24. **(+)**	**VG/ MS**	**Petiole: length**					
QN	**(a)**	short					3
		medium				Ishikawa-wase	5
		long					7
25. **(+)**	**VG/ MS**	**Petiole: thickness**					
QN	**(a)**	thin					3
		medium				Ishikawa-wase	5
		thick					7

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
26. (+)	**VG/ MS**	**Petiole: length of sheath**					
QN	**(a)**	short					3
		medium					5
		long				Ishikawa-wase	7
27.	**VG**	**Petiole: intensity of anthocyanin coloration in upper part**					
QN	**(a)**	absent or very weak				Hasu-imo	1
		weak					3
		medium				Touno-im	5
		strong				Serebesu	7
28.	**VG**	**Petiole: intensity of anthocyanin coloration in lower part**					
QN	**(a)**	absent or very weak				Hasu-imo	1
		weak				Ishikawa-wase	3
		medium				Touno-im	5
		strong					7
29.	**VG**	**Petiole: anthocyanin coloration in sheath**					
QL	**(a)**	absent					1
		present				Ishikawa-wase	9

Char No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
30.	**VG**	**Time of harvest**					
		early				Ishikawa-wase	3
		medium				Touno-im	5
		late				Takenoko-imo	7

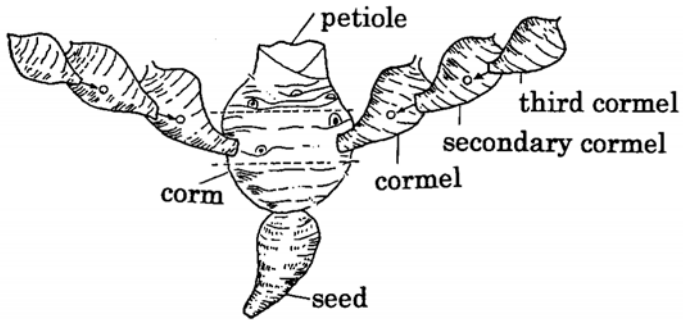
8. Explanations on the Table of Characteristics

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:

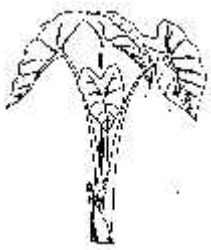
(a) Plant, stem, leaf blade, petiole: all observations should be made when the plant is fully developed in late summer.
(b) Bud: should be observed at sprouting.
(c) Corm: should be observed when the corm is fully developed in late autumn.
(d) Inflorescence: should be observed at flowering.

Ad. Corm, Cormel, Second Cormel

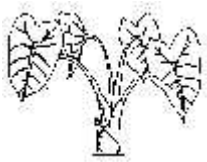


8.2 Explanations for individual characteristics

Ad. 2: Plant: type



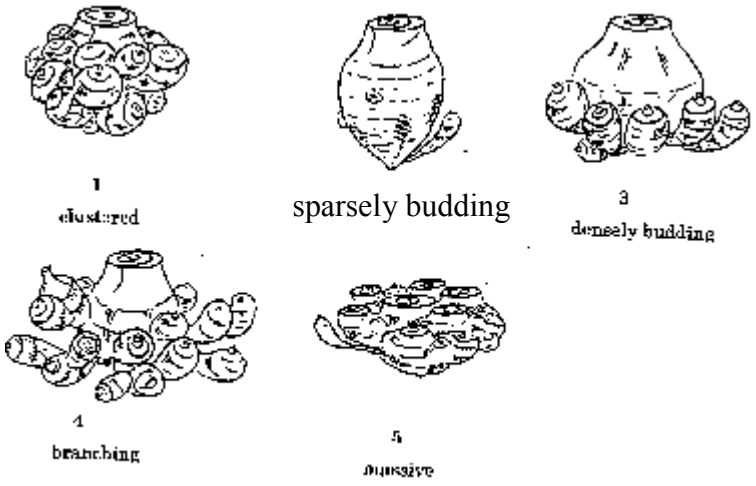
1
erect



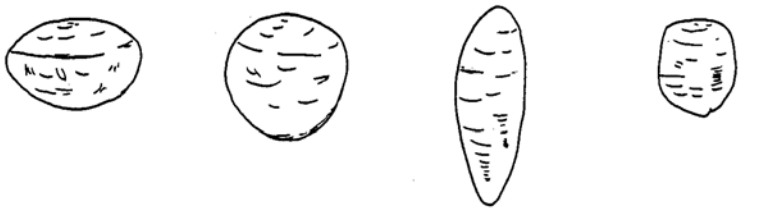
2
semi-erect

3
spreading

Ad. 5: Corm: corm and cormel arrangement



Ad.7. Corm: shape



1 oblate
2 globose
3 spindle
4 cylindrical

Ad.9,13. Cormel : shape, second cormel

1 globose
2 obovate
3 shrimp

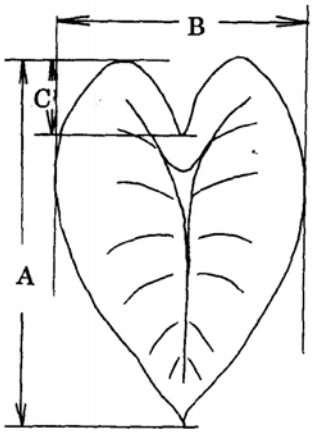
Ad.17. Leaf blade: attitude

1
horizontal

2
oblique

3
vertical

Ad.18,19,22. Leaf blade: length, width, depth of sinus



A:length

B: width

C: depth of sinus

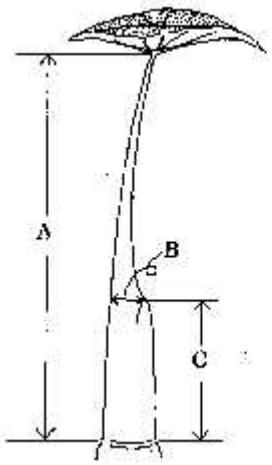
Ad.23. Leaf blade: shape of apex

1
acute

2
obtuse

3
round

Ad. 24: Petiole: length
Ad. 25: Petiole: thickness
Ad. 26: Petiole: length of sheath



A:length

B:thickness

C:length of sheath

9. Literature

Hotta, M., 1991: Colocasia L., The Grand Dictionary of Horticulture, Vol. 2. 360, Shougakkan, JP.

Larkom, J., 1991: Taro, Oriental Vegetables 122-123, Jon Murry, UK.

Ministry of Agriculture, Forestry & Fisheries, 1981: National Test Guideline for Satoimo

Phillips, R., Rix, M.: 1193, Taro, Vegetables 237, Pan Books, UK.

Hidaka, Y., 1988: Nigauri, Nogyo-Gijutu-Taikei-Vegatable Vol.10, 1-46, Nosangyoson-Bunka-Kyokai, JP.

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

In the case of hybrid varieties which are the subject of an application for plant breeders' rights, and where the parent lines are to be submitted as a part of the examination of the hybrid variety, this Technical Questionnaire should be completed for each of the parent lines, in addition to being completed for the hybrid variety.

1. Subject of the Technical Questionnaire

1.1.1 Botanical name	*Colocasia esculenta* (L.) Schott	
1.1.2 Common name	Taro	[ ]
1.2.1 Botanical name	*Colocasia gigantea* (Blume) Hook. f.	
1.2.2 Common name		[ ]

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	

Breeder (if different from applicant)

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

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)

[#] 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:

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) separation [ ]

(b) *in vitro* propagation [ ]

(c) other (state method) [ ]

4.2.2 Seed [ ]

4.2.3 Other [ ]
(please provide details)

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
5.1 (2)	**Plant: type**		
	erect		1[ ]
	semi-erect	Ishikawa-wase	2[ ]
	spreading		3[ ]
5.2 (5)	**Corm: corm and cormel arrangement**		
	clustered	Ishikawa-wase	1[ ]
	sparsely budding		2[ ]
	densely budding		3[ ]
	branched		4[ ]
	massive	Yatsugashira	5[ ]
5.3 (7)	**Corm: shape**		
	oblate		1[ ]
	globose	Serebesu	2[ ]
	spindle		3[ ]
	cylindrical		4[ ]
5.4 (9)	**Cormel: shape of cormel**		
	globose	Ishikawa-wase	1[ ]
	obovate		2[ ]
	shrimp	Touno-imo	3[ ]

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

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	*Cormel: shape*	*obovate*	*shrimp*

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.

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.

[#] 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:

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".

……

9.3 Has the plant material to be examined been tested for the presence of virus or other pathogens?

Yes [ ]

(please provide details as specified by the Authority)

No [ ]"

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]