TG/SWEETPOT(proj.2)
ORIGINAL: English
DATE: 2007-04-23

UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

SWEET POTATO

UPOV Code: IPOMO_BAT

Ipomoea batatas (L.) Lam.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from the Republic of Korea

to be considered by the
Technical Working Party for Agricultural Crops
at its thirty-sixth session, to be held in Budapest, from May 28 to June 1, 2007

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

Technical Working Party for Ornamental Plants and Forest Trees,
at its fortieth session, to be held in Kunming, China, from July 2 to 6, 2007

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Ipomoea batatas (L.) Lam	Sweet Potato	Patate	Batate	Batata, Patata dulce

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.]

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines

These Test Guidelines apply to all vegetatively propagated varieties of *Ipomoea batatas* (L.) Lam.

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 storage roots, within the medium size of the variety.

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

50 storage roots. In case of ornamentals?

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 a single growing cycle.

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 Type of observation

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 120 plants, which should be divided between three 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 30 plants or parts taken from each of 30 plants. . and in case of ornamentals?

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 0.1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 50 plants, 2 off-types are allowed. In case of ornamentals?

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 seed or 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 1)
(b) Leaf: shape (characteristic 9)
(c) Leaf: color (characteristic 12)
(d) Storage root: shape (characteristic 16)
(e) Storage root: main color of skin (largest surface area) (characteristic 21)
(f) Storage root: main color of flesh (characteristic 23)

In case of ornamentals?

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)-(c) 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. (*)	**VG**	**Plant: type**					
QN	**(b)**	erect				Sinchunmi	1
		semi-erect				Younmi	2
		spreading				Yulmi	3
2.	**MS**	**Vine: length of the main vines**					
QN	**(b)**	short				Sinchunmi	3
		medium				Yulmi	5
		long				Zami	7
3.	**MS**	**Vine: internode diameter**					
QN	**(a)**	very thin				Zami	1
		thin				Sinchunmi	3
		intermediate				Yulmi	5
		thick				Shinyulmi	7
		very thick				Chinmi	9
4.	**MS**	**Vine: internode length**					
QN	**(a)**	very short				Sinchunmi	1
		short				Younmi	3
		intermediate				Yulmi	5
		long				Shinhwangmi	7
		very long				Shinyulmi	9
5. (*)	**VG**	**Vine: anthocyanin coloration**					
PQ		absent or weak				Yulmi	1
		medium				Singeonmi	2
		strong				Hayanmi	3

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
6. **(*)** **(+)**	**VG**	**Vine: anthocyanin coloration of tip**					
PQ		absent or weak				Yulmi	1
		medium				Sinjami	2
		strong				Hayanmi	3
7. **(*)**	**VG**	**Vine: anthocyanin coloration of node**					
PQ		absent or weak				Yulmi	1
		medium					2
		strong				Hayanmi	3
8. **(*)**	**VS**	**Vine: pubescence of tip**					
QN		sparse				Yulmi	3
		medium					5
		dense				Zami	9
9. **(*)** **(+)**	**VG**	**Leaf: shape**					
PQ		round					1
		reniform (kidney shaped)					2
		cordate (heart shaped)				Yulmi	3
		triangular					4
		hastiform				Sinchunmi	5

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
10. (+)	**VG**	**Leaf: lobing or Leaf: depth of sinus**					
PQ		absent or very slight					1
		slight				Sinchunmi	2
		moderate					3
		deep					4
		very deep					5
11. (+)	**VG**	**Leaf: number of lobes**					
PQ		1 lobe					1
		3 lobes				Sinchumi	2
		5 lobes					3
		7 lobes					4
		9 lobes					5
12. (*)	**VG**	**Leaf (upper side): anthocyanin coloration**					
PQ		absent or weak				Yulmi	1
		medium				Hayanmi	2
		strong					3
13.	**VG**	**Leaf: green color**					
QL		yellow green					1
		green				Yulmi	2
		grey green				Hayanmi	3

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
14. (+)	**VG**	**Leaf: distribution of anthocyanin on abaxial leaf vein**					
QN		absent or very weak				Yulmi	1
		weak					3
		medium					5
		strong				Hayanmi	7
		very strong					9
15. (*)	**VG**	**Petiole: anthocyanin coloration and distribution**					
QL		green				Yulmi	1
		green with purple near leaf					2
		green with purple strip					3
		purple with green tint				Hayanmi	4
		purple					5
16. (+)	**VG/ MS**	**Petiole: length**					
QN		very short				Sinchunmi	1
		short					3
		medium				Yulmi	5
		long					7
		very long				Shinmi	9
17.	**VG**	**Storage root: ration width/length**					
PQ		small				Yulmi	1
		medium				Geonmi	2
		large					3

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
18. (*)	**VG**	**Storage root: lateral outline**					
PQ		round				Geomi	1
		oblong					2
		irregular				Shinyulmi	3
19.	**VG**	**Storage root: position of broadest part**					
PQ		at base					1
		in middle				Geonmi	2
		at top					3
20. (+)	**MS**	**Storage root: cortex thickness**					
QN	**(c)**	very thin					1
		thin				Yulmi	3
		medium					5
		thick				Shingeonmi	7
		very thick					9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
21. (*) (+)	**VG**	**Storage root: main color of skin (largest surface area)**					
PQ	**(c)**	white					1
		cream				Chinmi	2
		yellow					3
		orange					4
		brownish orange					5
		pink				Yulmi	6
		red				Shinhwangmi	7
		purple red					8
		brown				Zami	9
		light purple					10
		medium purple					11
22. (*)	**MS**	**Storage root: secondary color of skin**				Australia to arrange for example varieties	
23. (*)	**VG**	**Storage root: main color of flesh**					
QL		white				Hayanmi	1
		yellow				Yulmi	2
		orange				Juhwangmi	3
		purple				Borami	4
24.	**VG**	**Storage root: intensity of color (excluding white varieties)**					
QN		light					3
		medium					5
		dark				Gunmi	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
25.	**Storage root: secondary color of flesh**					
					Australia to arrange for example varieties	
New	Australia to arrange for information to be provided concerning flowering characteristics if these are necessary for idstinguishing varieties.					

8. Explanations on the Table of Characteristics

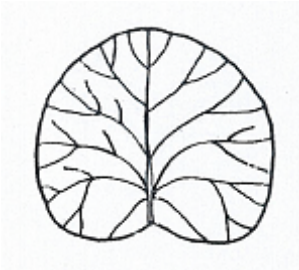
8.1 Explanations covering several characteristics

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

(a) Vine internodes and diameter should be checked with average expression of three internodes located in middle section of vine
(b) All the characteristics except storage roots should be made after 90 days from planting
(c) All the root storage characteristics should be made after harvest

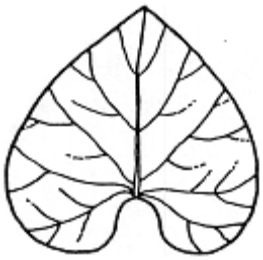
8.2 Explanations for individual characteristics

Ad. 9: Leaf: shape



1
round

2
reniform (kidney-shaped)



3
cordate (heart-shaped)

4
triangular

5
hastiform

Ad. 10: Leaf: lobing or Leaf: depth of sinus

1	2	3	4	5
absent or very slight	slight	moderate	deep	very deep

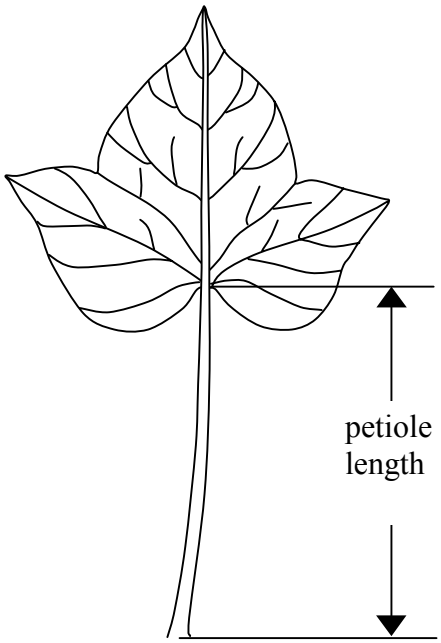
Ad. 11: Leaf: number of lobes

1	2	3	4	5
one lobe	three lobes	five lobes	seven lobes	nine lobes

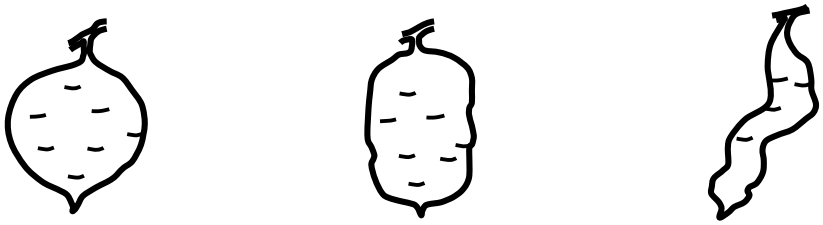
Ad. 14: Leaf: distribution of anthocyanin on abaxial leaf vein

3	5	7	9
weak	medium	strong	very strong

Ad. 16: Petiole length

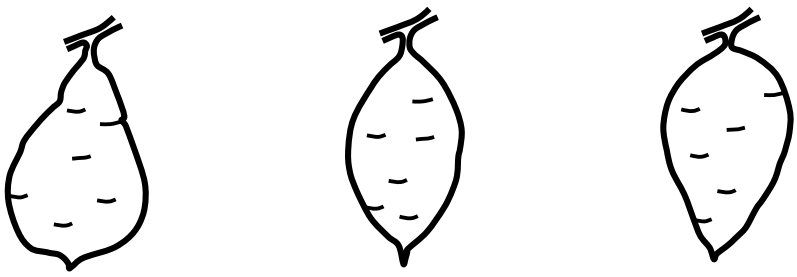


Ad. 18: Storage root: lateral outline



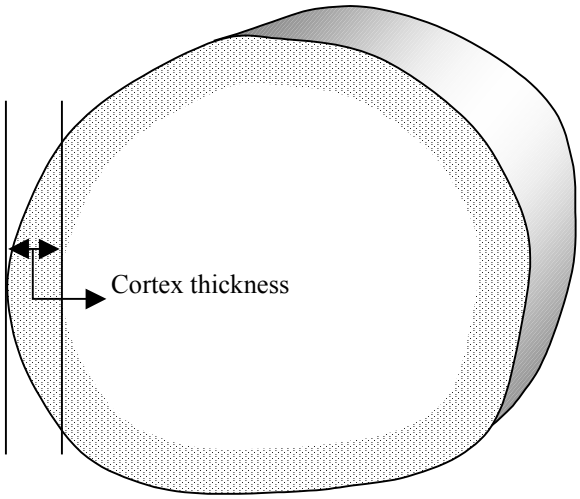
1	2	3
round	oblong	irregular

Ad. 19: Storage root: position of broadest part



1	2	3
at base	in middle	at top

Ad. 20: Storage root: cortex thickness



9. Literature

NSMO, 2000: Test Guideline for Sweetpotato. NSMO/RDA. KR. pp12.

Mokpo experiment station/RDA, 2002: Production and use of sweetpotato. Mokpo experiment station/RDA. KR. pp214

Zosimo Huaman, 1992: Morphologic Identification of Duplicates in Collections of *Ipomoea batatas*. CIP Research guide 36. CIP pp28.

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 Botanical name	*Ipomoea batatas* (L.) Lam.
1.2 Common name	Sweet Potato

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

4.2.1 Vegetative propagation

(a) cuttings [ ]

(b) *in vitro* propagation [ ]

(c) other (state method) [ ]

4.2.2 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:

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 (1)	**Plant: type**		
	erect	Sinchunmi	1 [ ]
	semi-erect	Younmi	2 [ ]
	spreading	Yulmi	3 [ ]
5.2 (5)	**Vine: anthocyanin coloration**		
	absent or weak	Yulmi	1 [ ]
	medium	Singeonmi	2 [ ]
	strong	Hayanmi	3 [ ]
5.3 (6)	**Vine: anthocyanin coloration of tip**		
	absent or weak	Yulmi	1 [ ]
	medium	Sinjami	2 [ ]
	strong	Hayanmi	3 [ ]
5.4 (7)	**Vine: anthocyanin coloration of node**		
	absent or weak	Yulmi	1 [ ]
	medium		2 [ ]
	strong	Hayanmi	3 [ ]
5.5 (8)	**Vine: pubescence of tip**		
	sparse	Yulmi	3 [ ]
	medium		5 [ ]
	dense	Zami	7 [ ]

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

5.6 (9)	**Leaf: shape**		
	round		1 [ ]
	reniform (kidney shaped)		2 [ ]
	cordate (heart shaped)	Yulmi	3 [ ]
	triangular		4 [ ]
	hastiform	Sinchunmi	5 [ ]
5.7 (12)	**Leaf: color**		
	yellow green		1 [ ]
	green	Yulmi	2 [ ]
	grey green		3 [ ]
	light purple	Hayanmi	4 [ ]
	purple		5 [ ]
5.7 (15)	**Petiole: anthocyanin coloration and distribution**		
	green	Yulmi	1 [ ]
	green with purple near leaf		2 [ ]
	green with purple strip		3 [ ]
	purple with green tint	Hayanmi	4 [ ]
	purple		5 [ ]
5.8 (18)	**Storage root: lateral outline**		
	round	Geonmi	1 [ ]
	oblong		2 [ ]
	irregular	Shinyulmi	3 [ ]

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

5.9 (21)	**Storage root: main color of skin**		
	white		1 [ ]
	cream	Chinmi	2 [ ]
	yellow		3 [ ]
	orange		4 [ ]
	brownish orange		5 [ ]
	pink	Yulmi	6 [ ]
	red	Shinhwangmi	7 [ ]
	purple red		8 [ ]
	brown		9 [ ]
	light purple		10 [ ]
	dark purple	Zami	11 [ ]
5.10 (23)	**Storage root: main color of flesh**		
	white	Hayanmi	1 [ ]
	yellow	Yulmi	2 [ ]
	orange	Juhwangmi	3 [ ]
	purple	Borami	4 [ ]

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	*Plant: type*	*semi-erect*	*spreading*

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

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”.

……

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]