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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

Cucurbita maxima* X *Cucurbita moschata
interspecific hybrids

UPOV Code: CUCUR_MMO

Cucurbita maxima Duch. X *Cucurbita moschata* Duch.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from France

to be considered by the

Technical Working Party for Vegetables
at its forty-eighth session, to be held in Paestum, Italy, from June 23 to 27, 2014

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Cucurbita maxima Duch. x *Cucurbita moschata* Duch.		*Cucurbita maxima* X *Cucurbita moschata*		

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.

Other associated UPOV documents:
TG/155: *Cucurbita maxima* Duch.
TG/234: *Cucurbita moschata* Duch.

* 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

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of interspecific hybrids of *Cucurbita maxima* (Duch) X *Cucurbita moschata* (Duch.

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 seeds.

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

200g – 1.500 seeds.

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant."

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

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 20 plants, which should be divided between at least 2 replicates.

3.4.2 When resistances characteristics are used for assessing distinctness, uniformity and stability, records must be taken under conditions of controlled infection and, unless otherwise specified, on at least 20 plants.

3.4.3 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.

Further guidance is provided in documents TGP/9 “Examining Distinctness” and TGP/8 “Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability”.

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.

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.

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% for hybrid varieties with an acceptance probability of at least 95 % should be applied. In the case of a sample size of 20 plants, the maximum number of off-types allowed would be 1 off-type.

4.2.3 An additional tolerance of off-types can be accepted for clear cases of plants obviously resulting from the selfing of a parent line in single-cross hybrids.

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 seed 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: length of main stem (characteristic 2)
(b) Leaf blade: development of lobes (characteristic 4)
(c) Fruit: shape in longitudinal section (characteristic 10)
(d) Fruit: profile at stem end (characteristic 14)
(e) Fruit: ground color of skin (characteristic 18)

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

(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**	**Seedling: shape of cotyledons**	**Plantule : forme des cotyledons**				
PQ	**(a)**	elliptic				Kazako	1
		broad elliptic				Azman, Strong Tosa	2
		obovate					3
2. **(+)**	**VG/ MS**	**Plant: length of main stem**	**Plante: longueur de la tige principale**				
QN	**(b)**	short	courte				3
		medium	moyenne			Testsukabuto AG 90	5
		long	longue			Zadok	7
3.	**VG**	**Leaf blade: size**	**Limbe : taille**				
QN	**(b)**	small	petite			Kazako	3
		medium	moyenne			Strong Tosa	5
		large	grande			Shintosa	7
4. **(+)**	**VG**	**Leaf blade: development of lobes**					
QN	**(b)**	absent to very weak					1
		weak					2
		medium					3
5.	**VG**	**Leaf blade: intensity of green color of upper side**	**Limbe: intensité de la couleur verte de la face supérieure**				
QN	**(b)**	light	faible				3
		medium	moyenne			Kazako	5
		dark	forte			Azman, Zadok	7
6.	**VG**	**Leaf blade: silver patches**	**Limbe: taches argentées**				
QN	**(b)**	absent to very weak				Strong Tosa	1
		weak				Zadok	2
		medium					3
7.	**VG/ MG**	**Petiole: length**	**Pétiole: longueur**				
QN	**(b)**	short	court				3
		medium	moyen			Azman	5
		long	long			Carnivor	7

		English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8.	**VG/ MG**	**Peduncle: length**	**Pédoncule: longueur**				
QN	**(c)**	short	court			Zadok	3
		medium	moyen			Kazako	5
		long	long			Strong Tosa	7
9.	**VG/ MG**	**Peduncle: diameter**					
QN	**(c)**	small				Kazako	3
		medium				Azman, Maciste, Shintiak	5
		large				Shintosa, Strong Tosa	7
10. **(+)**	**VG**	**Fruit: shape in longitudinal section**	**Fruit: forme en section longitudinale**				
PQ	**(c)**	oblate	ronde aplatie			Carnivor, Kazako, Kublai	1
		circular	ronde			Shintosa	2
		ovate	ovale			Flexifort	3
11.	**MG/ VG**	**Fruit: length**	**Fruit: longueur**				
QN	**(c)**	short	court			Shintosa	3
		medium	moyen			TZ148	5
		long	long			Flexifort	7
12. **(+)**	**MG/ VG**	**Fruit: diameter**	**Fruit: diamètre**				
QN	**(c)**	small	petit			Kazako, Shintosa	3
		medium	moyen			Flexifort	5
		large	grand			Zadok, TZ148	7
13.	**MG/ VG**	**Fruit: ratio length/diameter**	**Fruit: rapport longueur / diamètre maximal**				
QN	**(c)**	very low	très bas				1
		low	bas				3
		medium	moyen				5
		high	élevé				7
		very high	très élevé				9
14. **(+)**	**VG**	**Fruit: profile at stem end**	**Fruit : profil à la base**				
QN	**(c)**	raised	en relief			Extra, Flexifo	1
		flat	plan			Azman, Shintosa	2
		depressed	faiblement en creux			Kazako	3

		English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. **(+)**	**VG**	**Fruit: profile at blossom end**	**Fruit : profil au sommet**				
QN	**(c)**	depressed	déprimé			Azman, Kazako	1
		flat	plan			Carnivor, Ercole	2
		raised	protuberant			Flexifort	3
16.	**VG**	**Fruit: depth of grooves**	**Fruit: profondeur des cannelures**				
QN	**(c)**	shallow	peu profondes			Carnivor	3
		medium	moyennement profondes			Kazako, Kublai	5
		deep	profondes			Ercole	7
17.	**VG**	**Fruit: type of surface**					
QN	**(c)**	smooth				Kazako	1
		weakly rough				Zadok	2
		moderately rough				Azman, Carnivor, Strong Tosa	3
		strongly rough				Super Shintosa	4
18.	**VG**	**Fruit: ground color of skin**	**Fruit : couleur de fond de l'épiderme**				
QL	**(c)**	orange	orange			Kazako	2
		green	vert			Ercole, Extra, Shintosa, Zadok	3
19.	**VG**	**Fruit: intensity of ground color**	**Fruit : intensité de la couleur de fond de l'épiderme**				
QN	**(c)**	very light	très claire			Zadok	1
		light	claire				3
		medium	moyenne				5
		dark	foncée			Shintosa	7
		very dark	très foncée			Just	9
20.	**VG**	**Fruit: speckles**	**Fruit : tâches**				
QL	**(c)**	absent	absentes			Kazako	1
		present	presentes			Shintosa	9
21.	**VG**	**<u>Only speckled varieties:</u> Fruit: density of speckles**	**Seulement variétés à fruits tachetées: Fruit : densité des tâches**				
QN	**(c)**	sparse	éparse			Just	3
		medium	moyenne			Shintosa	5
		dense	dense			TZ148	7
22.	**VG**	**Fruit: main color of flesh**	**Fruit: couleur principale de la chair**				
PQ	**(c)**	yellow	jaune			Kazako	2
		orange	orange			Ercole, Extra, Shintosa	3

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) Observations should be made on cotyledons just before the the development of the first leaf.
(b) Observations should be made on fully developed leaves, after the beginning of flowering.
(c) Observations should be made on fully developed fruit at full development.

Synonymies in the denomination of example varieties:

Tetsukabuto =	**Shintosa** = Shintoza	Ferro F1= 64-02RZ
Former name of Shintosa Included in several catalogues: Takii Kaneko Nongwoo bio Intersemillas Fito …	Official denomination registrated under the previous law in Japan in 1951. **Denomination used in this test guideline**	Synomym of Shintosa

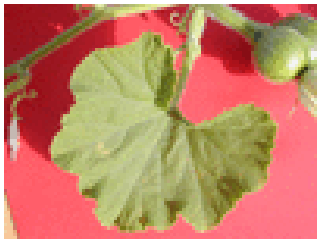
8.2 Explanations for individual characteristics

Ad. 2: Plant: length of main stem

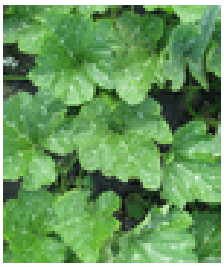
Plants tend to develop many branches. The length of the main stem is correlated to the volume of the plant, the surface covered by the plant in the field, the growth speed of the stems…
This characteristic could be assessed by relative comparisons between the plants of the same variety. When plants are regularly spaced, it is possible to identify a variety which grows fastest than another.

Ad. 4: Leaf blade: development of lobes

1
absent to very weak

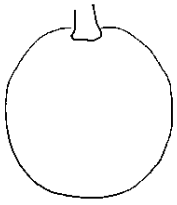
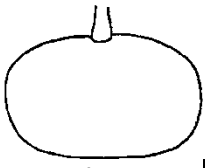


2
weak



3
medium

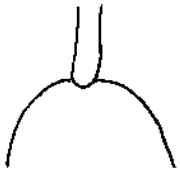
Ad. 10: Fruit: shape in longitudinal section

broad (compressed) ← width (ratio length/width) → narrow (elongated)	← broadest part →		
	(below middle)	at middle	(above middle)
		 3 ovate	
		 2 circular	
		 1 oblate	

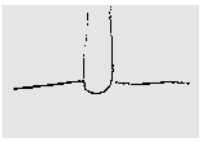
Ad. 12: Fruit: diameter

This assessment is based on the **widest part** of the fruit.

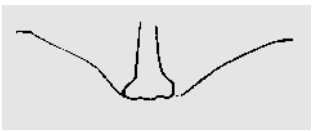
Ad. 14: Fruit: profile at stem end



1
raised



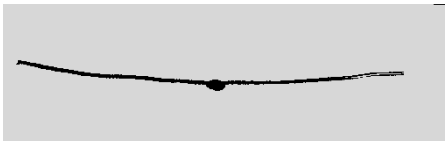
2
flat



3
depressed

Ad. 15: Fruit: profile at blossom end

1
depressed



2
flat

3
raised

Ad. 21: Only speckled varieties: Fruit: density of speckles

3
sparse

5
medium

7
dense

9. Literature

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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 Botanical name	*Cucurbita maxima* Duch. X *Cucurbita moschata* Duch.
1.2 Common name	*Cucurbita maxima* X *Cucurbita moschata*

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 (……..…….)
Species of female parent Species of male parent

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

(……..…….) x (……..…….)
Species of female parent Species of 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 (hybrid)

4.2.1 Seed-propagated varieties […]

4.2.2 Vegetatively propagated varieties [...]

4.2.3 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 (2)	**Plant: length of main stem**		
	very short		1 [ ]
	very short to short		2 [ ]
	short		3 [ ]
	short to medium		4 [ ]
	medium	Testsukabuto AG 90	5 [ ]
	medium to long		6 [ ]
	long	Zadok	7 [ ]
	long to very long		8 [ ]
	very long		9 [ ]
5.2 (4)	**Leaf blade: development of lobes**		
	absent to very weak		1 [ ]
	weak		2 [ ]
	medium		3 [ ]
5.3 (10)	**Fruit: shape in longitudinal section**		
	oblate	Carnivor, Kazako, Kublai	1 [ ]
	circular	Shintosa	2 [ ]
	ovate	Flexifort	3 [ ]
5.4 (14)	**Fruit: profile at stem end**		
	raised	Extra, Flexifo	1 [ ]
	flat	Azman, Shintosa	2 [ ]
	depressed	Kazako	3 [ ]
5.5 (23)	**Fruit: ground color of skin**		
	orange	Kazako	2 [ ]
	green	Ercole, Extra, Shintosa, Zadok	3 [ ]

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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	*Fruit: depth of grooves*	*shallow*	*medium*
To include			

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

Variety use

(a) vegetable [ ]
(b) rootstock [ ]
(c) other: (please provide details) [ ]

A representative color image of the fruit at full development 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”.

……

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

Applicant’s name

Signature Date