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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

CALENDULA

UPOV Code(s): CALEN

Calendula L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Japan

to be considered by the

Technical Working Party for Ornamental Plants and Forest Trees
at its forty-ninth session, to be held in Gimcheon City, Republic of Korea,
from 2016-06-13 to 2016-06-17

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Calendula L.	Calendula			

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 *Calendula* L.

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 or rooted cuttings.

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

seed-propagated varieties: sufficient seeds to produce 60 plants
vegetatively propagated varieties: 30 rooted cuttings

In the case of seed, 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 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 Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background. The color chart and version used should be specified in the variety description.

3.4 Test Design

Each test should be designed to result in a total of at least 60 plants for seed propagated varieties, or 30 plants for vegetatively propagated varieties.

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 or parts of plants to be Examined

In the case of seed-propagated varieties, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observation made on all plants in the test, disregarding any off-type plants.

In the case of vegetatively propagated varieties, 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 observation 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 The assessment of uniformity for seed-propagated varieties should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.2.3 The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction.

4.2.4 For the assessment of uniformity of vegetatively propagated varieties, 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-types are 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 seed or 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) Flower head: type (characteristic 16)
(c) Ray floret: main color of inner side (characteristic 25)
Gr.1: light yellow
Gr.2: yellow
Gr.3: yellowish orange
Gr.4: orange
Gr.5: reddish orange
(d) Disc: type (characteristic 30)
(e) Disc: color before anther dehiscence (characteristic 32)

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1 **2**	**3** **4**	**5** **6**	**7**			
	Name of characteristics in English	**Nom du caractère en français**	**Name des Merkmals auf Deutsch**	**Nombre del carácter en español**		
	states of expression	types d'expression	Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

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

6 (a)-(e) See Explanations on the Table of Characteristics in Chapter 8.1

7 Growth stage key 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.	**PQ VG**	**(+)**				
	Plant: growth habit					
	upright					1
	semi-upright					2
	horizontal					3
2.	**QN MG/MS/VG**	**(+)**				
	Plant: height					
	short					3
	medium					5
	tall					7
3.	**QN MG/MS/VG**					
	Plant: width					
	narrow					3
	medium					5
	broad					7
4.	**QN MG/MS/VG**					
	Stem: length					
	short					3
	medium					5
	long					7
5.	**QL VG**					
	Stem: anthocyanin coloration					
	absent					1
	present					9
6.	**QN MG/MS/VG**	**(+)**				
	Stem: length of internode					
	short					3
	medium					5
	long					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**QN MG/MS/VG**	**(+) (a)**				
	Leaf: length					
	short					3
	medium					5
	long					7
8.	**QN MG/MS/VG**	**(a)**				
	Leaf: width					
	narrow					3
	medium					5
	broad					7
9.	**PQ VG**	**(+) (a)**				
	Leaf: shape					
	spatulate				Nakayasu	1
	oblanceolate					2
	oblong					3
	ovate					4
10.	**PQ VG**	**(+) (a)**				
	Leaf: shape of apex					
	acute					1
	obtuse					2
	rounded					3
11.	**QN VG**	**(a)**				
	Leaf: intensity of green color on upper side					
	light					1
	medium					3
	dark					5
12.	**PQ VG**	**(+)**				
	Inflorescence: shape					
	conical					1
	flat					2
	concave					3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13.	**QL VG**					
	flower: position of main flower head					
	upper					1
	same					2
	lower					3
14.	**QN MG/MS/VG**					
	Peduncle: length					
	short					3
	medium					5
	long					7
15.	**QN MG/MS/VG**	**(+)**				
	Involucre: diameter					
	small					3
	medium					5
	large					7
16.	**PQ VG**	**(+)**	**(b)**			
	Flower head: type					
	single					1
	semi double					2
	double				Nakayasu	3
17.	**QN MG/MS/VG**					
	Flower head: number of flower heads					
	few					3
	medium				Nakayasu	5
	many					7
18.	**QN MG/MS/VG**		**(b)**			
	Flower head: diameter					
	small					3
	medium					5
	large					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.	**QN MG/MS/VG**	**(b)**				
	Flower head: number of ray florets					
	few					3
	medium					5
	many					7
20.	**PQ VG**	**(b)**				
	Flower head: attitude of basal part of outer ray florets					
	upward					1
	horizontal					2
	downward					3
21.	**QN MG/MS/VG**	**(c)**				
	Ray floret: length					
	short					3
	medium					5
	long					7
22.	**QN MG/MS/VG**	**(c)**				
	Ray floret: width					
	narrow					1
	medium					3
	broad					5
23.	**QN MS/VG**	**(c)**				
	Ray floret: ratio length/width					
	low					1
	medium					3
	high					5
24.	**PQ VG**	**(c)**				
	Ray floret: number of colors of inner side					
	one				Nakayasu	1
	two					2
	more than two					3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25.	**PQ** **VG**	**(+)** **(c), (d)**				
	Ray floret: main color of inner side					
	RHS Colour Chart (indicate reference number)					
26.	**PQ** **VG**	**(c), (d)**				
	Ray floret: secondary color of inner side					
	RHS Colour Chart (indicate reference number)					
27.	**PQ** **VG**	**(c)**				
	Ray floret: number of colors of outer side					
	one					1
	two					2
	more than two					3
28.	**PQ** **VG**	**(c), (d)**				
	Ray floret: main color of outer side					
	RHS Colour Chart (indicate reference number)					
29.	**PQ** **VG**	**(c), (d)**				
	Ray floret: secondary color of outer side					
	RHS Colour Chart (indicate reference number)					
30.	**QL** **VG**	**(+)** **(e)**				
	Disc: type					
	daisy					1
	anemone					2

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.	**QN MG/MS/VG**	**(e)**				
	Disc: diameter					
	small					3
	medium					5
	large					7
32.	**PQ VG**	**(e)**				
	Disc: color before anther dehiscence					
	green					1
	yellow					2
	orange					3
	brown					4
	reddish purple					5
	dark purple					6
33.	**QN VG**	**(+)**				
	Time of flowering					
	early					3
	medium					5
	late					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) Observation on the leaf should be made on typical leaves taken from the middle third of the stem.

(b) Observation on the flower head should made on the terminal flower head.

(c) Observation on the ray florets should made on the outermost rows of florets.

(d) The main color is the color with the largest area, the secondary color is the color with the second largest area.

(e) Observations on the disc should be made when the anthers in outer 3-4 rows of the disc floret have dehisced.

8.2 Explanations for individual characteristics

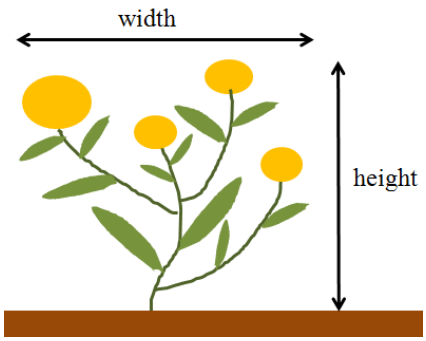
Ad. 1: Plant: growth habit

1
upright

2
semi-upright

3
horizontal

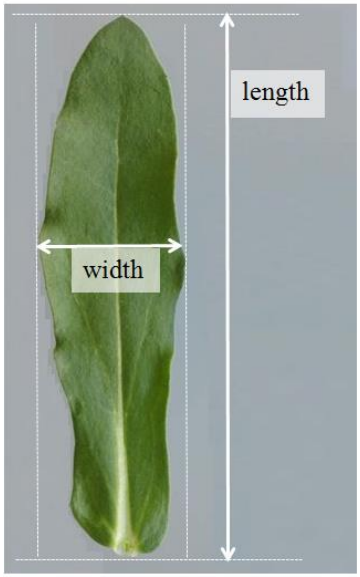
Ad. 2: Plant: height



Ad. 6: Stem: length of internode

Observations should be made on the middle of the longest stem.

Ad. 7: Leaf: length



Ad. 9: Leaf: shape

1
spatulate

2
oblanceolate

3
oblong

4
ovate

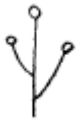
Ad. 10: Leaf: shape of apex

1
acute

2
obtuse

3
rounded

Ad. 12: Inflorescence: shape



1
conical

2
flat

3
concave

Ad. 15: Involucre: diameter

Ad. 16: Flower head: type

1
single

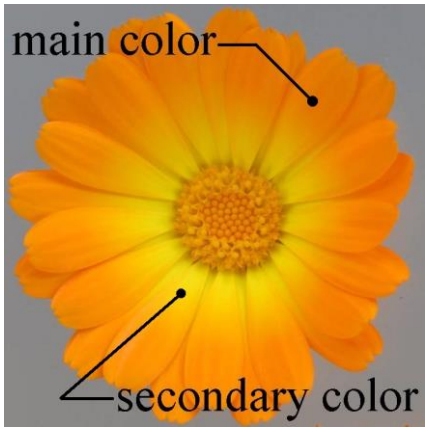
2
semi-double

3
double

1. single: flower heads with one row of ray florets.

2. semi double: flower heads with two or three rows of ray florets.
3. double: flower heads with four or more rows of ray florets.

Ad. 25: Ray floret: main color of inner side



The main color is the color with the largest area, the secondary color is the color with the second largest area.
The main color of inner side with the following groups:
Gr. 1: light yellow
Gr. 2: yellow
Gr. 3: yellow orange
Gr. 4: orange
Gr. 5: reddish orange

Ad. 30: Disc: type

1
daisy

2
anemone

Ad. 33: Time of flowering

Time of flowering is the time from planting seeds to the flowering of the terminal flower heads. This characteristics apply for only seed-propagating varieties.

8.3 Unless otherwise indicated below, all characteristics should be recorded at the time of full flowering. In single and semi double varieties this is when the outer two to three rows of
disc florets in the terminal flower head have dehisced; in double flowered varieties it is when the terminal flower head is fully open but before it starts to look tired.
Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

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	*Calendula* L.
1.1.2	Common name	Calendula
1.1.3	Species (please provide details)	

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)

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

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Self-pollination [ ]
(b) Cross-pollination [ ]
(i) Synthetic variety [ ]
(ii) Population [ ]
(c) Hybrid [ ]
(d) Other (please provide details) [ ]

4.2.2 Vegetative propagation

(a) Cuttings [ ]
(b) *In vitro* propagation [ ]
(c) Other (state method) [ ]

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	**Plant: growth habit**		
(1)			
	upright		1 [ ]
	semi-upright		2 [ ]
	horizontal		3 [ ]
5.2	**Plant: height**		
(2)			
	short		3 [ ]
	medium		5 [ ]
	tall		7 [ ]
5.3	**Flower head: type**		
(16)			
	single		1 [ ]
	semi double		2 [ ]
	double	Nakayasu	3 [ ]
5.4	**Flower head: diameter**		
(18)			
	small		3 [ ]
	medium		5 [ ]
	large		7 [ ]
5.5	**Ray floret: number of colors of inner side**		
(24)			
	one	Nakayasu	1 [ ]
	two		2 [ ]
	more than two		3 [ ]
5.6	**Ray floret: main color of inner side**		
(25)			
	light yellow		1 [ ]
	yellow		2 [ ]
	yellow orange		3 [ ]
	orange		4 [ ]
	reddish orange		5 [ ]

5.7 **(30)**	**Disc: type**	
	daisy	1 [ ]
	anemone	2 [ ]

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			

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

Authorities may allow certain of this information to be provided in a confidential section of 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.

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]