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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

Pepino

UPOV Code: SOLAN_MUR

Solanum muricatum Aiton [*]

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by (an) expert(s) from Japan

to be considered by the

Technical Working Party for Vegetables
at its forty-ninth session
to be held in Angers, France,
from 2015-06-15
to 2015-06-19

Alternative Names:[*]

Botanical name	*English*	*French*	*German*	*Spanish*
Solanum muricatum Aiton, Solanum muricatum L'Hér. ex Ait.	Melon-pear, Pepino	Poire-melon	Melonenbirne, Pepino	Pepino, Pepino dulce, Peramelón

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 Solanum muricatum Aiton.

These Test Guidelines apply to all vegetative propagated varieties of Solanum muricatum Aiton.

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 plants.

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

20 plants.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 Number of Growing Cycles

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

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

3.3 Conditions for Conducting the Examination

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 15 plants.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.1.4 Number of Plants / Parts of Plants to be Examined

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

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% and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 15 plants, 1 off-type is allowed.

4.3 Stability

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Fruit: shape in longitudinal section (characteristic 17)
(b) Fruit: ground color of fruit (characteristic 21)
Gr. 1: white
Gr. 2: light yellow
Gr. 3: yellow
Gr. 4: orange
(c) Fruit: size of stripes compared with fruit (characteristic 22)
(d) Fruit: color of flesh (characteristic 24)

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

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

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

State	Note
small	3
medium	5
large	7

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

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

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

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

(*)	Asterisked characteristic	– see Chapter 6.1.2
QL	Qualitative characteristic	– see Chapter 6.3
QN	Quantitative characteristic	– see Chapter 6.3
PQ	Pseudo-qualitative characteristic	– see Chapter 6.3
MG, MS, VG, VS		– see Chapter 4.1.5

(a)-(e) See Explanations on the Table of Characteristics in Chapter 8.

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

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

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. QN MS (a) **Plant: height**	**Plante: hauteur**	**Pflanze: Höhe**	**Planta: altura**		
short	basse	niedrig	baja		3
medium	moyenne	mittel	media	Gold No.1	5
tall	haute	hoch	alta		7
2. QN VG (a) **Stem: intensity of anthocyanin coloration**	**Tige: intensité de la pigmentation anthocyanique**	**Stiel: Intensität der Anthocyanfärbung**	**Tallo: intensidad de la pigmentación antociánica**		
absent or weak					1
medium				Gold No.1	2
strong					3
3. QL VG (a) **Stem: pubescence**	**Tige : pilosité**	**Stengel: Behaarung**	**Tallo: pubescencia**		
absent	absente	fehlend	ausente		1
present	présente	vorhanden	presente	Gold No.1	9
4. QL VG (a) **Leaf: type**	**Feuille: type**	**Blatt: Typ**	**Hoja: tipo**		
simple				Gold No.1	1
compound					2
5. QN MS (a) (d) **Leaf: length**	**Feuille: longueur**	**Blatt: Länge**	**Hoja: longitud**		
short	courte	kurz	corta		3
medium	moyenne	mittel	media	Gold No.1	5
long	longue	lang	larga		7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. QN MS (a) (d)					
Leaf: width	**Feuille: largeur**	**Blatt: Breite**	**Hoja: anchura**		
narrow	étroite	schmal	estrecha		3
medium	moyenne	mittel	media	Gold No.1	5
broad	large	breit	ancha		7
7. (*) PQ VG (+) (a)					
Leaf blade: shape	**Limbe: forme**	**Blattspreite: Form**	**Limbo: forma**		
lanceolate	lancéolé	lanzettlich	lanceolada		1
broad lanceolate				Gold No.1	2
elliptic					3
circular					4
8. QN VG (a)					
Leaf blade: intensity of green color	**Limbe: intensité de la couleur verte**	**Blattspreite: Intensität der Grünfärbung**	**Limbo: intensidad del color verde**		
light	claire	hell	clara		3
medium	moyenne	mittel	media		5
dark	foncée	dunkel	oscura	Gold No.1	7
9. QN VG (a)					
Inflorescence: number of flowers	**Inflorescence : nombre de fleurs**	**Blütenstand: Anzahl der Blüten**	**Inflorescencia: número de flores**		
one to five					1
six to ten				Gold No.1	2
more than ten					3

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. QN MS (+) (a) **Flower: diameter**	**Fleur : diamètre**	**Blüte: Durchmesser**	**Flor: diámetro**		
small	petit	klein	pequeño		3
medium	moyen	mittel	medio	Gold No.1	5
large	grand	groß	grande		7
11. (*) PQ VG (a) **Flower: main color of upper side**	**Fleur: couleur principale de la partie supérieure**	**Blüte: Hauptfarbe der Oberseite**	**Flor: color principal de la parte superior**		
white				Gold No.1	1
yellowish white					2
yellow					3
light purple					4
medium purple					5
dark purple					6
12. QN VG (a) **Flower: secondary color of upper side**					
white					1
yellowish white					2
yellow					3
light purple					4
medium purple				Gold No.1	5
dark purple					6

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. (*) PQ VG (b) **Fruit: ground color of skin of young fruit**					
white					1
light yellow					2
light green				Gold No.1	3
green					4
14. (*) QN MS (c) (e) **Fruit: length**	**Fruit: longueur**	**Frucht: Länge**	**Fruto: longitud**		
short					3
medium				Gold No.1	5
long					7
15. (*) QN MS (c) (e) **Fruit: maximum diameter**	**Fruit: diamètre maximum**	**Frucht: maximaler Durchmesser**	**Fruto: diámetro máximo**		
small					3
medium				Gold No.1	5
large					7
16. QN MS (c) **Fruit: ratio length/maximum diameter**	**Fruit: rapport longueur/diamètre maximum**	**Frucht: Verhältnis Länge/maximaler Durchmesser**	**Fruto: relación longitud/diámetro máximo**		
small					3
medium				Gold No.1	5
large					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17. (*) PQ VG (+) (c) **Fruit: shape in longitudinal section**	**Fruit: forme en section longitudinale**	**Frucht: Form im Längsschnitt**	**Fruto: forma en sección longitudinal**		
circular				Gold No.1	1
elliptic					2
rectangular					3
heart-shaped					4
obovate					5
18. QN VG (+) (c) **Fruit: depth of stalk cavity**	**Fruit: profondeur de la cavité du pédoncule**	**Frucht: Tiefe der Stielgrube**	**Fruto: profundidad de la cavidad peduncular**		
shallow				Gold No.1	3
medium					5
deep					7
19. PQ VG (+) (c) **Fruit: shape of apex**	**Fruit : forme du sommet**	**Frucht: Form der Spitze**	**Fruto: forma del ápice**		
depressed					1
flattened					2
rounded				Gold No.1	3
pointed					4
20. QN MS (c) **Fruit: calyx size compared with maximum diameter of fruit**					
small					3
medium				Gold No.1	5
large					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. (*) PQ VG (c) **Fruit: ground color of fruit** RHS Colour Chart (indicate reference number)					
22. (*) QN VG (+) (c) **Fruit: size of stripes compared with fruit**					
absent or very small					1
small				Gold No.1	3
medium					5
larage					7
23. (*) PQ VG (c) **Fruit: color of stripes** RHS Colour Chart (indicate reference number)					
24. (*) PQ VG (c)					
Fruit: color of flesh	**Fruit: couleur de la chair**	**Frucht: Farbe des Fruchtfleisches**	**Fruto: color de la pulpa**		
white	blanche	weiß	blanco		1
light yellow					2
medium yellow				Gold No.1	3
yellowish green					4
green					5
orange					6
25. QN VG (c)					
Fruit: firmness of flesh	**Fruit: fermeté de la chair**	**Frucht: Festigkeit des Fleisches**	**Fruto: firmeza de la pulpa**		
soft	molle	weich	blanda		3
medium	moyenne	mittel	media	Gold No.1	5
firm	ferme	fest	firme		7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26. QN MS (c) **Fruit: total soluble solids**	**Fruit: teneur en matières solubles**	**Frucht: Gesamt-gehalt an löslicher Trockensubstanz**	**Fruto: contenido total de sólidos solubles**		
low	faible	gering	bajo		3
medium	moyenne	mittel	medio	Gold No.1	5
high	forte	hoch	alto		7
27. (*) QN MS VG (+) (c) **Time of harvest**	**Époque de la récolte**	**Zeitpunkt der Ernte**	**Época de la cosecha**		
early	précoce	früh	temprana		3
medium	moyenne	mittel	media	Gold No.1	5
late	tardive	spät	tardía		7

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

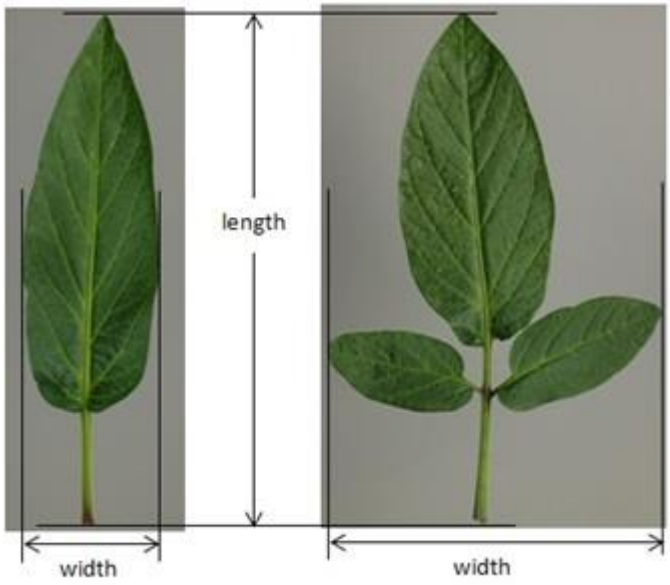
Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Observations on the plant, stems, leaves and flowers should be made on flowering of second inflorescence.

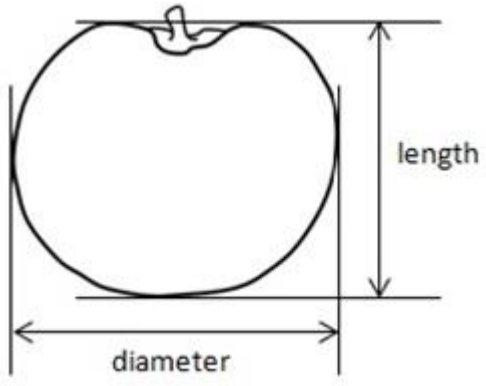
(b) Observations on the young fruits should be made on fruits just before stripes development.

(c) Observations on the fruits should be made on fruits at maturity.

(d) Ad. 5:Leaf: length
Ad. 6:Leaf: width



(e) Ad. 14: Fruit: length
Ad. 15: Fruit: maximum diameter



8.2 Explanations for individual characteristics

Ad. 7: Leaf blade: shape

In the case of varieties with the compound leaves, observation should be made on the terminal leaflet.

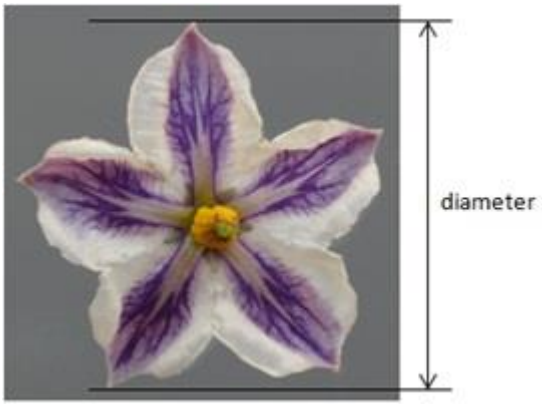
1 - lanceolate

2 - broad lanceolate

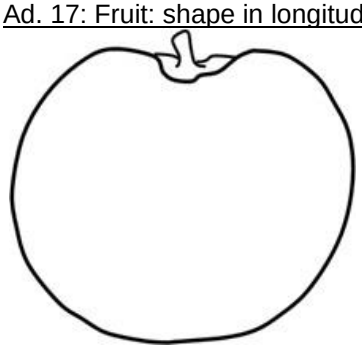
3 - elliptic

4 - circular

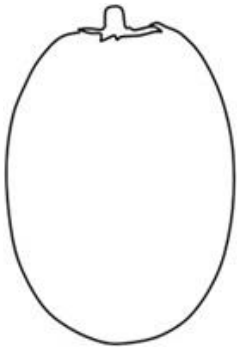
Ad. 10: Flower: diameter



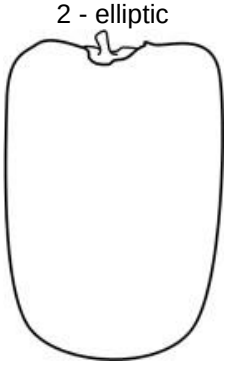
Ad. 17: Fruit: shape in longitudinal section



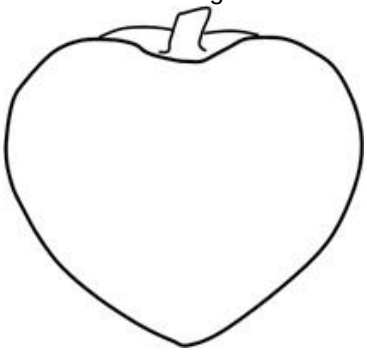
1 - circular



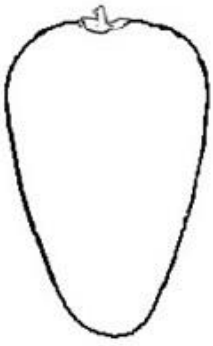
2 - elliptic



3 - rectangular

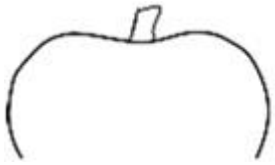


4 - heart-shaped



5 - obovate

Ad. 18: Fruit: depth of stalk cavity



3 - shallow

5 - medium

7 - deep

Ad. 19: Fruit: shape of apex

1 - depressed

2 - flattened

3 - rounded

4 - pointed

Ad. 22: Fruit: size of stripes compared with fruit

The ratio of stripes that occupies to the surface area of the fruit should be assessed.

1 - absent or very small

3 - small

5 - medium

7 - large

Ad. 27: Time of harvest

This characteristic is assessed by observing the days from flowering to harvesting matured fruit.

9. Literature

Ministry of Agriculture, Forestry & Fisheries of Japan., 2013: National Test Guideline for Pepino.

Bioversity., 2004: Descriptors for Pepino (Solanum muricanum). Bioversity International.

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	Solanum muricatum Aiton	
1.1.2	Common Name	Melon-pear, Pepino	
1.1.3			

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

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

4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]
(please state parent varieties)

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

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

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

(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) cuttings [ ]
(b) in vitro propagation [ ]
(c) Other (state method) [ ]

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

4.2.2 Other [ ]
(please provide details)

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

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (17)	**Fruit: shape in longitudinal section**		
	circular	Gold No.1	1[ ]
	elliptic		2[ ]
	rectangular		3[ ]
	heart-shaped		4[ ]
	obovate		5[ ]
5.2 (21)	**Fruit: ground color of fruit**		
	RHS Colour Chart (indicate reference number)		0[ ]
5.3 (22)	**Fruit: size of stripes compared with fruit**		
	absent or very small		1[ ]
	small	Gold No.1	3[ ]
	medium		5[ ]
	large		7[ ]
5.4 (24)	**Fruit: color of flesh**		
	white		1[ ]
	light yellow		2[ ]
	medium yellow	Gold No.1	3[ ]
	yellowish green		4[ ]
	green		5[ ]
	orange		6[ ]

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: shape in longitudinal section*	*circular*	*elliptic*

Comments:

7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

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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]