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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

CANNA

UPOV Code: CANNA

Canna L.

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 Ornamental Plants and Forest Trees
at its forty-third session, to be held in Cuernavaca, Morelos State, Mexico,
from September 20 to 24, 2010**Alternative Names:**

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Canna L.</i>	Canna, Indian Shot	Balisier, Canna	Blumenrohr	Achira, Platanillo

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 *Canna* 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 rhizomes or young plants which will flower within one year and display all characteristics of the variety.

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

8 young plants, or rhizomes.

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.

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 8 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, all observations for the purposes of distinctness should be made on 8 plants or parts taken from each of 8 plants, 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 8 plants, 1 off-type is allowed.

4.3 *Stability*

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

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

5. Grouping of Varieties and Organization of the Growing Trial

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

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

5.3 The following have been agreed as useful grouping characteristics:

- (a) Plant: height at beginning of flowering (characteristic 1)
- (b) Leaf blade: main color (characteristic 7) with the following groups:
 - Gr.1: yellowish white
 - Gr.2: yellow
 - Gr.3: yellow green
 - Gr.4: green
 - Gr.5: orange
 - Gr.6: orange brown
 - Gr.7: brown
 - Gr.8: purple
- (c) Leaf blade: secondary color (characteristic 8) with the following groups:
 - Gr.1: green
 - Gr.2: yellow green
 - Gr.3: yellowish white
 - Gr.4: yellow
 - Gr.5: orange
 - Gr.6: orange brown
 - Gr.7: brown
 - Gr.8: purple
- (d) Staminode: main color (characteristic 18) with the following groups:
 - Gr.1: yellowish white
 - Gr.2: yellow
 - Gr.3: orange
 - Gr.4: pink
 - Gr.5: red

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)-{ x } 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. (* (+)	Plant: height at beginning of flowering	Plante: hauteur au début de la floraison				
QN	short	basse			Tafraout	3
	medium	moyenne			Oiseau de feu	5
	tall	haute			Liberté	7
2.	Plant: growth habit	Plante: port				
QN	upright	dressé			Liberté	1
	upright to semi upright	dressé à demi dressé	NZ proposal: to delete			2
	semi upright	demi dressé			Pretoria, Prince Charmant	3
3. (*	Leaf blade: length	Limbe foliaire : longueur				
QN	short	courte			Lolita, Turcano	3
	medium	moyenne			Oiseau d'or	5
	long	longue			Liberté	7
4. (*	Leaf blade: width	Limbe foliaire : largeur				
QN	narrow	étroite			Caballero	3
	medium	moyenne			Oiseau de feu	5
	broad	large			Liberté	7
5. (*	Leaf blade:glossiness	Limbe foliaire : brillance				
QN	weak	faible			Strasbourg	1
	medium	moyenne			Oiseau D'Or	2
	strong	forte			Russian Red	3

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
6. (*)	Leaf: color of veins	Feuille : couleur des nervures				
PQ	light green	vert clair			Oiseau D'or	1
	yellow	jaune			Panach	2
	orange	orange			Andalucia	3
	red	rouge			Phasion	4
	purple	pourpre			Liberté	5
7. (+) (*) PQ	Leaf blade: main color	Limbe foliaire : couleur principale				
	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)				
8. (+) (*)	Leaf blade: secondary color	Limbe foliaire : couleur secondaire				
PQ	none	aucune			Oiseau d'or	1
	white	blanche			Stuttgart	2
	purple	pourpre			Cleopatre	3
9. (+) (*)	Leaf blade: pattern of secondary color	Limbe foliaire: distribution de la couleur secondaire	FR and NZ have not seen 2,3,4			
PQ	along veins and diffused	le long des veines et diffuse			Liberté	1
	diffused	diffuse				2
	marginal					3
	blotched					4
	marbled	marbrée			Stuttgart	5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
10.	Inflorescence: position in relation to foliage	Inflorescence : position par rapport au feuillage				
QN	(a) at same level	au même niveau			Flamèche	1
	moderately above	légèrement au dessus			Félix Ragot	2
	strongly above	nettement au dessus			Liberté	3
11.	Inflorescence: length (excluding peduncle)	Inflorescence : longueur en (excluant le pédoncule)				
QN	(a) short	courte			Flamèche	3
	medium	moyenne			Roi Soleil	5
	long	longue			Marabout	7
12. (+) (*)	Inflorescence: arrangement of staminodes	Inflorescence : position des staminodes				
QN	(a) free	libre			Perkéo	1
	moderately overlapping	modérément recouvrant			Mactro	2
	strongly overlapping	fortement recouvrant			Peau Rouge	3
13. (+) (*)	Staminode: type	Staminode : type				
QL	(a) single	simple			Plantagenet	1
	double	double				2

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
14. (* (*)	Staminode: length (excluding first flower)	Staminode : longueur (en excluant la première fleur)		FR : if we don't have example varieties can we delete?		
QN	(a) short medium long	court moyen long				
15. (* (*)	Staminode: width(excluding first flower)	Staminode : largeur(en excluant la première fleur)				
QN	(a) narrow medium large	étroit moyen large			Fiesta Angèle Martin Prince Charmant	3 5 7
16. (* (+)	Staminode: reflexing	Staminode: courbure				
QN	(a) weak medium strong	faible moyenne forte			Angèle Martin Peau rouge	1 2 3
17. (* (*) QN	Staminode: undulation	Staminode: ondulation				
	absent or weak medium strong				Mactro Alberich	1 2 3
18. (+ (*)	Staminode: main color	Staminode : couleur principale				
PQ	(a) yellowish white yellow orange pink red	blanc jaunâtre jaune orange rose rouge			Niagara Félix Ragot Liberté Carmen Roi Soleil	1 2 3 4 5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
19. (*)	Staminode: color of flush	Staminode: couleur de la zone irisée				
PQ (a)	none	Aucune			Roi Soleil	1
	yellowish white	blanc jaunâtre				2
	yellow	Jaune				3
	yellow orange	jaune orange				4
	red	Rouge			Talisman	5
20. (*)	Staminode: color of stripes	Staminode: couleur des stries				
PQ (a)	none	aucune			Roi Soleil	1
	yellowish white	blanc jaunâtre				2
	yellow	jaune				3
	yellow orange	jaune orange				4
	red	rouge				5
21. (*)	Staminode: color of blotch	Staminode: couleur des taches				
PQ (a)	none	aucune			Roi Soleil	1
	yellowish white	blanc jaunâtre				2
	yellow	jaune				3
	yellow orange	jaune orange				4
	red	rouge			Dollar	5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
22. (*)	Staminode: color of marginal zone	Staminode: couleur de la bordure				
PQ (a)	none	aucune			Roi Soleil	1
	yellowish white	blanc jaunâtre				2
	yellow	jaune			Lolita, Lucifer, Reine Charlotte	3
	yellow orange	jaune orange			Mactro	4
	orange	orange				5
	pink	rose				6
	orange red	rouge orangé				7
	red	rouge				8
23. (+)	Time of beginning of flowering	Époque de début de floraison				
	early	précoce			Corial	3
	medium	moyenne			Roi Soleil	5
	late	tardive			Liberté	7

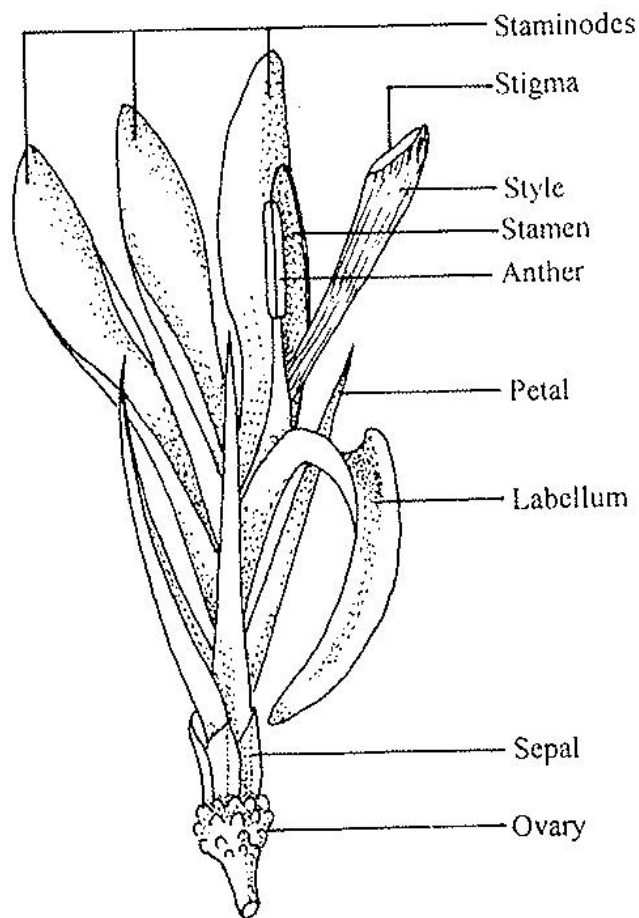
8. Explanations on the Table of Characteristics

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) : all observations on the staminode should be made on an open flower

General terminology/Terminologie générale



Flower of *Canna indica*

8.2 *Explanations for individual characteristics*

Ad. 1: Plant: height at beginning of flowering

Plant height includes the inflorescence (the flower spike) and is determined at the beginning of flowering.



Ad. 7: Leaf blade: main color

Main color is the color with largest surface area.

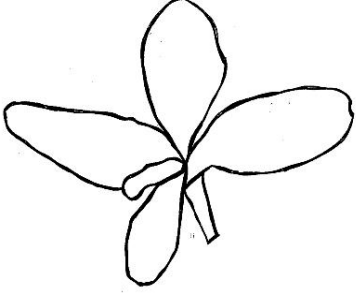
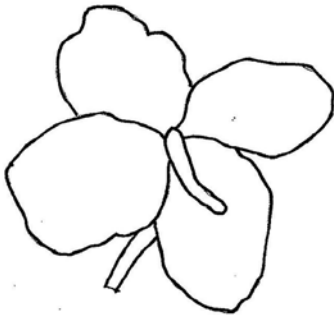
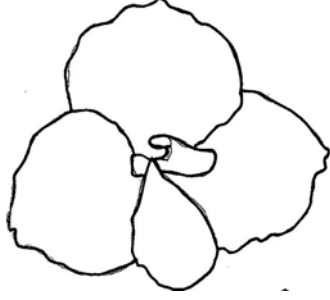
Ad. 8: Leaf blade: secondary color

Secondary color is the color with the second largest surface area excluding the color of the veins.

Ad. 9: Leaf blade: pattern of secondary color

				
1	2	3	4	5
along veins and diffused	diffused	marginal	blotched	marbled

Ad. 12: Inflorescence : arrangement of staminodes

		
1	2	3
free	moderately overlapping	strongly overlapping

Ad. 13: Staminode: type

FR proposal

single: when the number of sepals is ≤ 4

double: when the number of sepals is > 4

Ad. 16: Staminode: reflexing



1
weak



2
medium



3
strong

Ad. 18: Staminode: main color:

Main color is the color with the largest surface area.

Ad. 23: Time of beginning of flowering

When the first flower appears on all the plants observed

NZ: When the first flower fully opens on 50% of all the plants observed.

9. Literature

Cooke, I., 2001: Gardeners Guide to Growing Cannas. Timber Press. 160 pp.

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 Genus		
1.1.1 Botanical name	<input type="text" value="Canna L."/>	
1.1.2 Common name	<input type="text" value="Canna"/>	
1.2 Species (please complete)	<input type="text"/>	
2. Applicant		
Name	<input type="text"/>	
Address	<input type="text"/>	
Telephone No.	<input type="text"/>	
Fax No.	<input type="text"/>	
E-mail address	<input type="text"/>	
Breeder (if different from applicant)	<input type="text"/>	
3. Proposed denomination and breeder's reference		
Proposed denomination (if available)	<input type="text"/>	
Breeder's reference	<input type="text"/>	

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

TECHNICAL QUESTIONNAIRE

Page {x} of {y}

Reference Number:

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 Seed

4.2.3 Other
(please provide details)

--

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:	
<p>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).</p>			
Characteristics	Example Varieties	Note	
<p>5.1 Plant: total height at beginning of flowering</p>			
(1)			
very short		1[]	
very short to short		2[]	
short	Tarfraout	3[]	
short to medium		4[]	
medium	Oiseau de feu	5[]	
medium to tall		6[]	
tall	Liberté	7[]	
tall to very tall		8[]	
very tall		9[]	
<p>5.2 Leaf blade: main color</p>			
(7)			
RHS Colour Chart (indicate reference number)			
<p>5.2 Leaf blade: main color</p>			
(7)			
yellowish white		1[]	
yellow		2[]	
yellow green	Pretoria	3[]	
green	Oiseau d'or	4[]	
orange		5[]	
orange brown		6[]	
brown		7[]	
purple	Liberté	8[]	

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics		Example Varieties	Note
5.3 Leaf blade: secondary color			
(8)			
green		Oiseau d'or	1[]
yellow green			2[]
yellowish white		Stuttgart	3[]
yellow		Panach	4[]
orange		Andaloucia	5[]
orange brown			6[]
brown			7[]
purple		Liberté	8[]
5.4 Staminode: main color			
(18)			
yellowish white		Niagara	1[]
yellow		Félix Ragot	2[]
orange		Liberté	3[]
pink		Carmen	4[]
red		Roi Soleil	5[]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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
<i>Example</i>	<i>Staminode : main color</i>	<i>yellowish white</i>	<i>yellow</i>

Comments:

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

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