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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

TEA

UPOV Code(s):

CMLIA_SIN

Camellia sinensis (L.) Kuntze

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Kenya
to be considered by the
Technical Working Party for Agricultural Crops
at its forty-seventh session, to be held in Naivasha, Kenya,
from 2018-05-21 to 2018-05-25

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Camellia sinensis (L.) Kuntze , *Thea sinensis* L.	Tea	Théier	Tee, Teestrauch	Te, Té

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 *Camellia sinensis* (L.) Kuntze

These Test Guidelines may also be relevant for other species in *Camellia* L. Sect. *Thea* (L.) Dyer.

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 one-year-old rooted cuttings.

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

20 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

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.

To assess distinctness of hybrids, the parent lines and the formula may be used according to the following recommendations:

(i) description of parent lines according to the Test Guidelines;

(ii) check of the originality of the parent lines in comparison with the variety collection, based on the characteristics in Chapter 7, in order to identify similar parent lines;

(iii) check of the originality of the hybrid formula in relation to the hybrids in the variety collection, taking into account the most similar lines; and

(iv) assessment of the distinctness at the hybrid level for varieties with a similar formula.

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 or 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 of plants taken from each of 10 plants and any other observations made on all plants in the test, disregarding any off-type plants.

In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 10.

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 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 These Test Guidelines have been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation, the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

4.2.3 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 10 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) Plant: type (characteristic 2)
(b) Plant: growth habit (characteristic 3)
(c) Leaf blade: shape (characteristic 15)
(d) Flower: density of pubescence of ovary (characteristic 29)

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)-(c) See Explanations on the Table of Characteristics in Chapter 8.1

7 Not applicable

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 VG**	**(+)**				
		Plant: vigor					
		weak				TRFCA SFS150	3
		medium				TRFFK 306	5
		strong				TRFK 371/8	7
2.	**(*)**	**QN VG**					
		Plant: type					
		shrub				TRFK 6/8	1
		semi-arbor				AHP S15/10	3
		arbor				TRFCA SF S150	5
3.	**(*)**	**QN VG**					
		Plant: growth habit					
		upright				TRFK 301/3	1
		semi-upright				AHP S15/10	3
		spreading				TRFK 371/8	5
4.		**QN VG**					
		Plant: density of branches					
		sparse				AHP SC31/37	3
		medium				TRFK 91/1	5
		dense				TRFK 371/8	7
5.		**QL VG**					
		Plant: Branch zigzagging					
		absent					1
		present					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6.		**QN MS**	**(+) (a)**				
		Young shoot: time of beginning of 'one and a bud' stage					
		early					3
		medium					5
		late					7
7.		**PQ VG**	**(a)**				
		Young shoot: color of second leaf at 'two and a bud stage'					
		whitish					1
		yellow green				TRFK 6/8	2
		light green				TRFK 301/3	3
		medium green					4
		purple green				TRFK 306	5
		brown					6
8.	**(*)**	**QL VG**	**(a)**				
		Young shoot: pubescence of bud					
		absent				TRFK 91/1	1
		present				AHP S15/10	9
9.		**QN VG**	**(a)**				
		Young shoot: density pubescence of bud					
		sparse				TRFK 31/8	3
		medium				TRFK 704/2	5
		dense				AHP S15/10	7
10.		**QL VG**	**(a)**				
		Young shoot: anthocyanin coloration at base of petiole					
		absent				TRFK 31/8	1
		present					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11.	**(*)**	**QN** **MS/VG**	**(a)**				
		Young shoot: length of 'three and a bud'					
		short				K-PURPLE	3
		medium				TRFK 704/2	5
		long				TRFK 371/8	7
12.	**(*)**	**QN** **VG**	**(b)**				
		Leaf blade: attitude					
		upwards				TRFK 31/8	1
		outwards				TRFK 6/8	3
		downwards				TRFK 371/8	5
13.	**(*)**	**QN** **MS/VG**	**(b)**				
		Leaf blade: length					
		short				K-PURPLE	3
		medium				AHP SC31/37	5
		long				TRFK 371/8	7
14.	**(*)**	**QN** **MS/VG**	**(b)**				
		Leaf blade: width					
		narrow				K-PURPLE	3
		medium				AHP SC31/37	5
		broad				TRFK 371/8	7
15.	**(*)**	**QN** **VG**	**(b)**				
		Leaf blade: shape					
		very narrow elliptic				TRFK 31/8	1
		narrow elliptic				TRFK 704/2	2
		medium elliptic				AHP S15/10	3
		broad elliptic				Camellia japonica	4
16.		**QN** **VG**	**(b)**				
		Leaf blade: intensity of green color					
		light				EPK TN14-3	3
		medium					5
		dark					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17.	**QN VG**	**(b)**				
	Leaf blade: intensity of purple color					
	light					3
	medium					5
	dark					7
18.	**QN VG**	**(b)**				
	Leaf blade: shape in cross section					
	folded upwards				TRFK 6/8	1
	flat					2
	recurved					3
19.	**QN VG**	**(b)**				
	Leaf blade: texture of upper surface					
	smooth or weakly rugose				TRFK 6/8	1
	moderately rugose				EPK TN14-3	2
	strongly rugose				AHP SC31/37	3
20.	**PQ VG**	**(b)**				
	Leaf blade: shape of apex					
	obtuse					1
	acute				TRFCA SF S150	2
	acuminate				AHP S15/10	3
21.	**QN VG**	**(b)**				
	Leaf blade: undulation of margin					
	absent or weak				TRFCA SF S150	1
	medium				TRFK 301/3	3
	strong				TRFK 303/577	5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
22.		**QN**	**VG**		**(b)**				
		Leaf blade: serration of margin							
		absent or very weak						TRFFK 306	1
		weak						TRFK 31/8	3
		medium						AHP S15/10	5
		strong						TRFK 597/1	7
		very strong						TRFK 301/5	9
23.		**PQ**	**VG**		**(b)**				
		Leaf blade: shape of base							
		acute						AHP SC31/37	1
		obtuse						TRFK 704/2	2
		truncate						Camellia japonica	3
24.		**QN**	**MG**	**(+)**	**(c)**				
		Flower: time of full flowering							
		early							3
		medium							5
		late							7
25.		**QN**	**MS/VG**		**(c)**				
		Flower: length of pedicel							
		short							3
		medium							5
		long							7
26.	**(*)**	**QL**	**VG**		**(c)**				
		Flower: pubescence on outer side of sepal							
		absent							1
		present							9
27.	**(*)**	**QL**	**VG**		**(c)**				
		Flower: anthocyanin coloration on outer side of sepal							
		absent						TRFK 6/8	1
		present						TRFK 306	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.	**(*)**	**QN MS**	**(c)**				
		Flower: diameter					
		small					3
		medium					5
		large					7
29.	**(*)**	**QN VG**	**(c)**				
		Flower: density of pubescence of ovary					
		sparse				TRFK 31/8	3
		medium				AHP S15/10	5
		dense				TRFK 6/8	7
30.		**PQ VG**	**(c)**				
		Flower: color of inner petals					
		greenish				AHP S15/10	1
		white				TRFK 306	2
		pink					3
31.	**(*)**	**QL VG**	**(c)**				
		Flower: pubescence of ovary					
		absent				Camellia japonica	1
		present				TRFK 6/8	9
32.	**(*)**	**QN VG**	**(c)**				
		Flower: length of style					
		short					3
		medium					5
		long					7
33.		**QN VG**	**(c)**				
		Flower: position of style splitting					
		low				EPK TN14-3	3
		medium				TRFK 306	5
		high				TRFK 6/8	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
34.	**(*)**	**QN VG**	**(c)**				
		Flower: position of stigma relative to stamens					
		below				TRFK 6/8	1
		same level				K-PURPLE	3
		above				EPK C12	5
35.		**QN VG**	**(+)**				
		Fermentation ability					
		absent or very weak				TRFK 12/2	1
		weak				AHP S15/10	3
		medium				EPK TN14-3	5
		strong				TRFK 303/577	7
		very strong				TRFK 6/8	9
36.		**QN MG**	**(+)**				
		Caffeine content					
		absent or very low				TRFK 597/1	1
		low				TRFK 6/8	2
		medium				TRFK 7/3	3
		high				TRFK 301/4	4
		very high				TRFK 12/12	5

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

(a) Observations on the young shoot should be made at tipping stage.

(b) Observations on the leaf blade should be on the third fully developed leaf from previous plucking.

(c) Observations on the flower should be made on fully developed flowers at the blooming stage.

8.2 Explanations for individual characteristics

Ad. 1: Plant: vigor

The vigor of the plant should be considered as the overall abundance of vegetative growth.

Ad. 6: Young shoot: time of beginning of 'one and a bud' stage

The time of beginning of ‘one and a bud’ stage is the time at which 30 percent of plants have buds at the ‘one and a bud’ stage.

Ad. 24: Flower: time of full flowering

The full flowering time is the time of about 50 percent flowers in blooming.

Ad. 35: Fermentation ability

Determined by chloroform test. Inserting the ‘two and a bud’ young shoots onto a plate in an airtight container containing 1.5-2.0 cm depth chloroform, and then record the time of the shoots turning brown.

Ad. 36: Caffeine content

The measurement of caffeine content should be made using the “two and a bud” samples harvested from the first flush of the year. After harvesting, the shoots should be dried immediately by 120-125°C hot air and storage at room temperature till they are analyzed.Method ISO 10727:1995 ‘Tea and instant tea in solid form -- Determination of caffeine content -- Method using high-performance liquid chromatography’should be used.

absent or very low	≤0.5%
low	0.6-2.0%
medium	2.1-3.5%
high	3.6-5.0%
very high	>5.0%

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	*Camellia sinensis* (L.) Kuntze
1.2	Common name	Tea

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 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 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 (1)	**Plant: vigor**		
	weak	TRFCA SFS150	3 [ ]
	medium	TRFFK 306	5 [ ]
	strong	TRFK 371/8	7 [ ]

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.

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

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]