



TG/249/1

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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

<p>COFFEE</p> <p>UPOV Codes: COFFE_ARA; COFFE_CAN; COFFE_ACA</p> <p><i>Coffea arabica</i> L.; <i>C. canephora</i> Pierre ex A. Froehner; <i>C. arabica</i> × <i>C. canephora</i> hybrids</p>

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Coffea arabica</i> L.	Coffee	Caféier	Kaffee	Cafeto
<i>Coffea canephora</i> Pierre ex A. Froehner	Coffee	Caféier	Kaffee	Cafeto

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 *Coffea arabica* L. (Arabica type), *Coffea canephora* Pierre ex A. Froehner (Robusta type) and hybrids between *C. arabica* L. and *C. canephora* 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

- (a) six-month- to one-year-old plants on their own roots;
- (b) scions grafted on a rootstock to be specified by the competent authority;
- (c) budwood to produce grafted plants;
- (d) cuttings to produce plants on their own roots; or
- (e) seed

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

Vegetatively propagated varieties: 8 one-year-old plants, or budwood or cuttings
sufficient to produce 8 plants
Seed-propagated varieties: 50 seeds.

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.

3.1.2 The growing cycle is considered to be the duration of a single growing season, beginning with vegetative growth, followed by flowering and fruit harvest.

3.2 *Testing Place*

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

3.3 *Conditions for Conducting the Examination*

The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination. In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles.

3.4 *Test Design*

3.4.1 For seed-propagated varieties: each test should be designed to result in a total of at least 20 plants.

3.4.2 For vegetatively propagated varieties: each test should be designed to result in a total of at least 5 plants.

3.5 *Number of Plants / Parts of Plants to be Examined*

Unless otherwise indicated, all observations should be made on 5 plants or parts taken from each of 5 plants for vegetatively propagated varieties and 20 plants or parts taken from each of 20 plants for seed-propagated varieties.

3.6 *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.

4.2 *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 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 5 plants, no 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 tested, either by growing a further generation, or by testing a new seed or 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 (characteristic 2)
- (b) Fruit: color (characteristic 16).

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

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*

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.

6.3 *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

(a)–(d) 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

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. (* (+)	Plant: shape	Plante: forme	Pflanze: Form	Planta: forma		
PQ	(a) conical	conique	kegelförmig	cónica	Acaia, Laurina	1
	ellipsoid	ellipsoïde	ellipsoid	elipsoide	Blue Mountain, Granica, Pluma Hidalgo, Tipica	2
	cylindrical	cylindrique	zylindrisch	cilíndrica	Catuaí	3
2. (* (+)	Plant: height	Plante: hauteur	Pflanze: Höhe	Planta: altura		
QN	(a) very short	très courte	sehr niedrig	muy corta	San Ramón, Vila Lobos	1
	short	courte	niedrig	corta	Caturra, IAPAR 59	3
	medium	moyenne	mittel	media	Catuaí, Rubi, Topázio	5
	tall	haute	hoch	larga	Bourbon	7
	very tall	très haute	sehr hoch	muy larga	Acaia, Mundo Novo	9
3. (+)	Plant: diameter of canopy	Plante: diamètre du bouquet foliaire	Pflanze: Durchmesser des Laubes	Planta: diámetro de la cobertura foliar		
QN	(a) very small	très petit	sehr klein	muy pequeño	Vila Lobos	1
	small	petit	klein	pequeño	IAPAR 59	3
	medium	moyen	mittel	medio	Catuaí, Rubi, Topázio	5
	large	grand	groß	grande	Obatã	7
	very large	très grand	sehr groß	muy grande	Mundo Novo IAC 388-17	9
4. (* (+)	Plagiotropic primary branch: length of internode	Branche primaire plagiotrope : longueur de l'entre-nœud	Plagiotroper Zweig erster Ordnung: Länge des Internodiums	Rama primaria plagiotropa: longitud del entrenudo		
QN	short	courte	kurz	corta	Caturra, IAPAR 59, Típica	3
	medium	moyenne	mittel	media	Catuaí, Rubi, Topázio	5
	long	longue	lang	larga	Mundo Novo	7

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
5.	Plagiotropic primary branch: intensity of ramification	Branche primaire plagiotrope : intensité de la ramification	Plagiotroper Zweig erster Ordnung: Stärke der Verzweigung	Rama primaria plagiotropa: intensidad de la ramificación		
QN	very weak	très faible	sehr gering	muy débil	Bourbon	1
	weak	faible	gering	débil	Acaia	3
	medium	moyenne	mittel	media	Mundo Novo	5
	strong	forte	stark	fuerte	Catuaí, Rubi, Topázio	7
	very strong	très forte	sehr stark	muy fuerte	San Ramón	9
6.	Leaf: length	Feuille: longueur	Blatt: Länge	Hoja: longitud		
QN (b)	very short	très courte	sehr kurz	muy corta	Laurina	1
	short	courte	kurz	corta	Bourbon, San Ramón	3
	medium	moyenne	mittel	media	Caturra, Mundo Novo	5
	long	longue	lang	larga	Obatã	7
	very long	très longue	sehr lang	muy large	Maragogipe	9
7.	Leaf: width	Feuille: largeur	Blatt: Breite	Hoja: anchura		
QN (b)	very narrow	très étroite	sehr schmal	muy estrecha	Laurina	1
	narrow	étroite	schmal	estrecha	Bourbon	3
	medium	moyenne	mittel	media	Caturra, Mundo Novo	5
	broad	large	breit	ancha	Obatã	7
	very broad	très large	sehr breit	muy ancha	Maragogipe	9
8.	Leaf: shape	Feuille: forme	Blatt: Form	Hoja: forma		
(+)						
PQ (b)	lanceolate	lancéolée	lanzettlich	lanceolada		1
	ovate	ovale	eiförmig	oval	Maragogipe	2
	elliptic	elliptique	elliptisch	elíptica	San Ramón, Típica	3

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
9.	Young leaf: anthocyanin coloration	Jeune rameau: pigmentation anthocyanique	Junges Blatt: Anthocyanfärbung	Hoja joven: pigmentación antociánica		
QN (b)	absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Catuaí, Caturra, Mundo Novo IAC 376-4	1
	medium	moyenne	mittel	media	Mundo Novo IAC 379-19	2
	strong	forte	stark	fuerte	Purpuracens	3
10.	Leaf: undulation of margin	Feuille: ondulation du bord	Blatt: Wellung des Randes	Hoja externa: ondulación del borde		
QN (b)	very weak	très faible	sehr gering	muy débil		1
	weak	faible	gering	débil	Laurina	3
	medium	moyenne	mittel	media	Catuaí, Caturra, Mundo Novo	5
	strong	forte	stark	fuerte	Típica	7
11.	Leaf: depth of secondary veins	Feuille : profondeur des nervures secondaires	Blatt: Tiefe der Adern zweiter Ordnung	Hoja: profundidad de los nervios secundarios		
QN (b)	shallow	peu profond	flach	poco profunda	Laurina	3
	medium	moyen	mittel	media	Catuaí, Mundo Novo	5
	deep	profond	tief	profunda		7
12.	Leaf: domatia	Feuille : domaties	Blatt: Domatia	Hoja: domacios		
(+)						
QL (b)	absent	absentes	fehlend	ausentes		1
	present	présentes	vorhanden	presentes	Típica	9
13. (* (+)	Inflorescence: number of flowers	Inflorescence: nombre de fleurs	Blütenstand: Anzahl Blüten	Inflorescencia: número de flores		
QN	few	faible	gering	bajo	Típica	3
	medium	moyen	mittel	medio	Bourbon, Caturra	5
	many	élevé	groß	alto	Catuaí, Rubi, Topázio	7

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
14.	Fruit: size	Fruit: taille	Frucht: Größe	Fruto: tamaño		
QN (c)	very small	très petite	sehr klein	muy pequeño	Ibairi	1
	small	petite	klein	pequeño	Bourbon Rojo, Bourbon Salvadoreño, Bourbon Amarelo	3
	medium	moyenne	mittel	medio	Caturra Amarelo, Caturra Rojo, Catuai Vermelho, Catuai Amarelo, Granica, Mundo Novo	5
	large	grande	groß	grande	Acaia, Colômbia, Costa Rica, Pluma Hidalgo	7
	very large	très grande	sehr groß	muy grande	Maracatu, Maragogipe, Pacamara,	9
15. (*) (+)	Fruit: shape	Fruit: forme	Frucht: Form	Fruto: forma		
PQ (c)	elliptic	elliptique	elliptisch	elíptica	Laurina IAC 870	1
	circular	circulaire	kreisförmig	circular	Ibairi	2
	oblong	oblong	rechteckig	oblonga	Mundo Novo	3
16. (*)	Fruit: color	Fruit: couleur	Frucht: Farbe	Fruto: color		
PQ (c)	yellow	jaune	gelb	amarillo	Bourbon Amarelo, Caturra Amarelo, Topázio	1
	orange	orange	orange	naranja		2
	light red	rouge clair	hellrot	rojo claro	Mundo Novo, Oro Azteca, Rubi	3
17.	Fruit: adherence to branch	Fruit: adhérence à la ramification	Frucht: Anhaften am Zweig	Fruto: adherencia a la rama		
QN (c)	weak	faible	gering	débil	Mundo Novo	1
	medium	moyenne	mittel	media	Catuaí	2
	strong	forte	stark	fuerte	Icatu Amarelo IAC 29-44	3

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
18. (+)	Fruit: dry weight of 100 fruits	Fruit: poids sec de 100 fruits	Frucht: Trocken-gewicht von 100 Früchten	Fruto: peso seco de 100 frutos		
QN (c) (d)	low	petit	niedrig	pequeño	Ibairi	3
	medium	moyen	mittel	medio	Catuái	5
	high	grand	hoch	grande	Maragogipe	7
19. (* (+)	Seed: length	Pépin: longueur	Samen: Länge	Semilla: longitud		
QN (d) (e)	very short	très courte	sehr kurz	muy corta	Ibairi	1
	short	courte	kurz	corta	Bourbon	3
	medium	moyenne	mittel	media	Catuái, Caturra, Mundo Novo	5
	long	longue	lang	larga	Acaia, Típica	7
	very long	très longue	sehr lang	muy larga	Maragogipe	9
20. (+)	Seed: width	Pépin: largeur	Samen: Breite	Semilla: anchura		
QN (d) (e)	narrow	étroite	schmal	estrecha	Acaia	3
	medium	moyenne	mittel	media	Mundo Novo	5
	broad	large	breit	ancha	Catuái	7
21. (+)	Seed: length/width ratio	Pépin: rapport longueur/largeur	Samen: Verhältnis Länge/Breite	Semilla: relación longitud/anchura		
QN (d) (e)	small	petit	klein	pequeña	Ibairi	3
	medium	moyen	mittel	media	Bourbon, Típica	5
	large	grand	groß	grande	Laurina, Maragogipe	7

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
22.	Seed: thickness	Pépin: épaisseur	Samen: Dicke	Semilla: grosor		
(+)						
QN	(d) thin	fin	dünn	delgada	Ibairi	3
	(e) medium	moyen	mittel	media	Mundo Novo	5
	thick	épais	dick	gruesa	Maragogipe	7
23.	Seed: weight of 100 seeds	Pépin: poids de 100 grains	Samen: Gewicht von 100 Samen	Semilla: peso de 100 semillas		
(+)						
QN	very low	très petit	sehr niedrig	muy pequeño	Ibairi	1
	low	petit	niedrig	pequeño	Laurina	3
	medium	moyen	mittel	medio	Catuái	5
	high	grand	hoch	grande	Acaia	7
	very high	très grand	sehr hoch	muy grande	Maragogipe	9
24.	Period between flowering and harvesting	Période entre floraison et récolte	Zeitraum zwischen Blüte und Ernte	Período entre floración y cosecha		
(*)						
(+)						
QN	very short	très courte	sehr kurz	muy corto	IAPAR 59	1
	short	courte	kurz	corto	Bourbon	3
	medium	moyenne	mittel	medio	Mundo Novo	5
	long	longue	lang	largo	Catuái	7
	very long	très longue	sehr lang	muy largo	Obatã	9
25.	Seed: caffeine content	Teneur en caféine	Koffeingehalt	Contenido de cafeína		
(+)						
QN	low	faible	gering	bajo	Laurina	1
	medium	moyenne	mittel	mediano	Catuái, Mundo Novo	2
	high	élevée	hoch	alto		3

Char. No.	English	français	Deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
26.	Seed: sucrose content	Pépin : teneur en saccharose	Samen: Saccharosegehalt	Semilla: contenido de sacarosa:		
(+)						
QN	low	faible	gering	bajo		1
	medium	moyenne	mittel	medio		2
	high	élevée	hoch	alto		3
27.	Seed: total chlorogenic acid content	Pépin : teneur totale en acide chlorogénique	Samen: Gesamtgehalt an Chlorogensäure	Semilla: contenido total de ácido clorogénico:		
(+)						
QN	low	faible	gering	bajo		1
	medium	moyenne	mittel	medio		2
	high	élevée	hoch	alto		3

8. Explanations on the Table of Characteristics

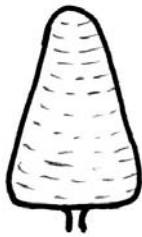
8.1 *Explanations covering several characteristics*

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

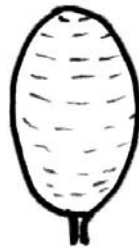
- (a) After the second yield from the third harvest on, assessed on one main stem.
- (b) Observations should be made in summer on fully developed leaves from the middle third of a well-developed current season shoot.
- (c) Observations should be made at the time of harvest on ripe fruits unless otherwise stated.
- (d) To be observed on non-floating fruits only.
- (e) To be measured from a sample of 20 seeds.

8.2 *Explanations for individual characteristics*

Ad. 1: Plant: shape



1
conical



2
ellipsoid



3
cylindrical

Ad. 3: Plant: diameter of canopy

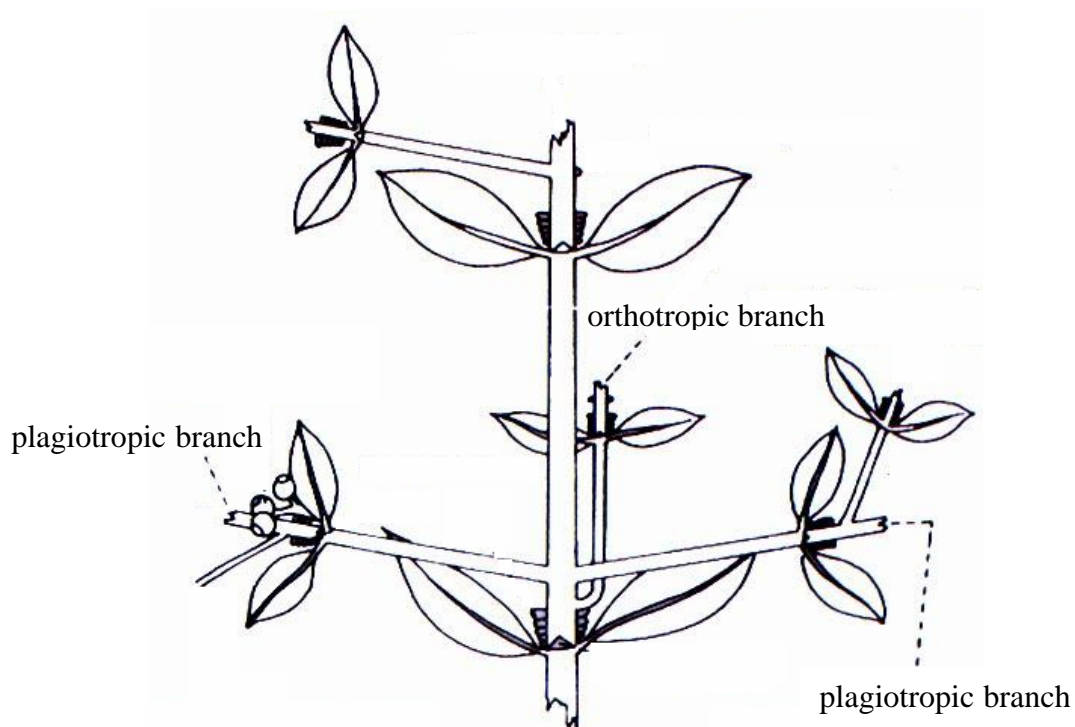
The observation should correspond to the maximum diameter.

Ad. 4: Plagiotropic primary branch: length of internode

The length of the internodes should be observed in the middle third of the branch.

Plagiotropic: mode of growth of lateral branches, growing horizontally away from the leading shoot and maintaining a different morphology

Orthotropic: mode of growth of vertical branches or leading shoots, where lateral (plagiotropic) branches may have different morphology



Ad. 8: Leaf: shape



1

lanceolate



2

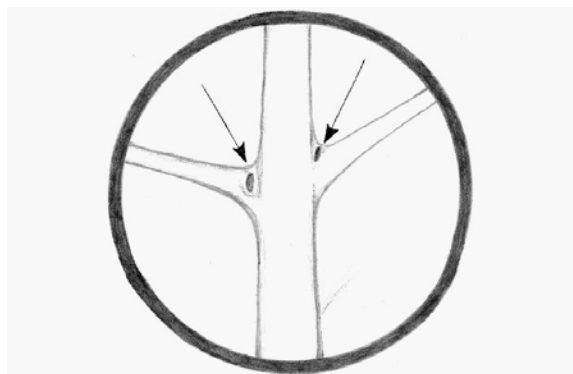
ovate



3

elliptic

Ad. 12: Leaf: domatia

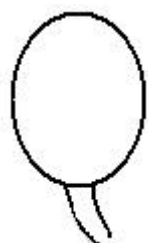


Leaf domatia are small raised structures found on the lower surface of the leaves, partly enclosed by leaf tissue or hairs, located in the axils of the veins of *Coffea arabica* L., *C. canephora* and other plants of *Rubiaceae* family.

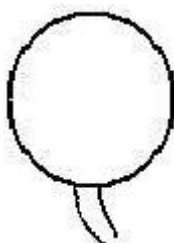
Ad. 13: Inflorescence: number of flowers

The number of flowers per axil should be observed on the middle third of the plant on the flower bud, before anthesis.

Ad. 15: Fruit: shape



1
elliptic



2
circular



3
oblong

Ad. 18: Fruit: dry weight of 100 fruits

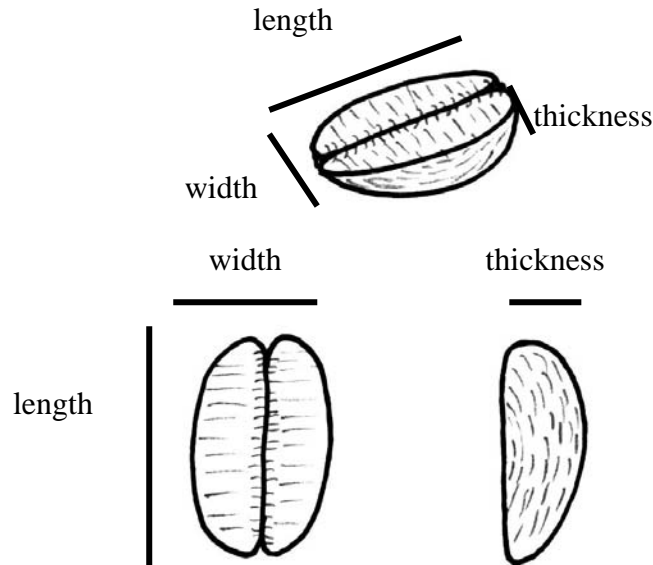
Only non-floating fruits at 12% of moisture content should be used for the observation of this characteristic.

Ad. 19: Seed length

Ad. 20: Seed width

Ad. 21: Seed length/width ratio

Ad. 22: Seed thickness



Ad. 22: Seed: thickness

The measurement should be made on flat-type seeds.

Ad. 23: Seed: weight of 100 seeds

Only non-floating fruits and flat-type seeds, excluding pea-berry seeds, should be observed. The seeds should be at 12% moisture.

Ad. 24: Period between flowering and harvesting

The time of flowering is when the greatest number of flowers are at anthesis (the main flush). The time of harvesting is when 50% of the berries from the main flush have reached mature color.

Ad. 25: Seed: caffeine content

Ad. 26: Seed: sucrose content

Ad. 27: Seed: total chlorogenic acid content

The following methods should be used:

- Caffeine content and total chlorogenic acid content:

Clifford, M.N.; Ohiokpehai, O.; Menezes, H. C., 1985: 11th International Scientific Colloquium on Coffee-ASIC. Vol. 1, pp. 252-262.

- Sucrose content:

Rogers, W. J.; Michaux, S., Bastin, M.; Bucheli, P., 1999: Changes to the content of sugars, sugar alcohols, myo-inositol, carboxylic acids and inorganic anions in developing grains from different varieties of Robusta (*Coffea canephora*) and Arabica (*Coffea arabica*) coffees. Plant Science, 149: 115-123.

The states of expression are determined as follows:

Varieties of <i>Coffea arabica</i>		% of dry weight		
	Characteristic	low	medium	high
Char. 25	Caffeine content	<0,9	0,9-1,2	>1,2
Char. 26	Sucrose content	<7,0	7,0-9,0	>9,0
Char. 27	Total Chlorogenic Acid content	<4,5	4,5-6,5	>6,5

Varieties of <i>Coffea canephora</i>		% of dry weight		
	Characteristic	low	medium	high
Char. 25	Caffeine content	<1,8	1,8-2,5	>2,5
Char. 26	Sucrose content	<4,5	4,5-7,0	>7,0
Char. 27	Total Chlorogenic Acid content	<7,0	7,0-8,0	>8,0

9. Literature

Analysis of Carbohydrates by High Performance Anion Exchange, Chromatography with Pulsed Amperometric Detection (HPAE-PAD). Technical Note n° 20 edited by Dionex. 1993 Dionex Corporation. 1228 Titan Way, P.O Box 3603. Sunnyvale, CA 94088-3603.

Carvalho, A., Medina Filho, H.P., Fazuoli, L.C., Guerreiro Filho, O., Lima, M.M.A., 1991: Aspectos genéticos do cafeeiro. Revista Brasileira de Genética, BR, v. 14, n.1, pp. 135-183.

Carvalho, A., 1958: Advances in coffee production technology. Recent advances in our knowledge of coffee trees. 2 - Genetics Coffee and Tea Industries and the Flavor Field, BR, v. 81, pp. 30-36.

Clifford, M.N.; Ohiokpehai, O.; Menezes, H. C., 1985: 11th International Scientific Colloquium on Coffee-ASIC. Vol. 1, pp. 252-262.

Fazuoli, L.C., Silvarolla, M.B., Camargo, C.E. de O., Pommer, C.V., Chiavegato, E.J., Dall'orto, F.A. C., Nagai, H., Godoy, I.J., Veiga, R.F. de A., 1994: Descritores mínimos para o registro institucional de cultivares: Café. Campinas: Instituto Agrônômico, Documentos IAC 46, BR.

Krug, C.A., Carvalho, A., 1951: The genetics of *Coffea*. Advances in Genetics, 4:127-158.

Krug, C.A., Mendes, J.E.T.&Carvalho, A., 1939: Taxonomia de *Coffea arabica* L. Descrição das variedades e formas encontradas no Estado de São Paulo. Campinas, Instituto Agrônômico, Boletim técnico 62, 57 pp.

Mondolot L., La Fisca P., Buatois B., Talansier E., de Kochko A., Campa C., 2006: Evolution in caffeoylquinic acid content and histolocalization during *Coffea canephora* leaf development. Ann. Bot, London, GB, 98(1):33-40.

Rena, A.B., Maestri, M., 1984: Fisiologia do cafeeiro. In: Rena, A.B., Malavolta, E., Yamada, T. (Ed.). Cultura do cafeeiro: fatores que afetam a produtividade. Piracicaba: Potafs, pp. 3-85.

Rogers, W. J.; Michaux, S., Bastin, M.; Bucheli, P., 1999: Changes to the content of sugars, sugar alcohols, myo-inositol, carboxylic acids and inorganic anions in developing grains from different varieties of Robusta (*Coffea canephora*) and Arabica (*Coffea arabica*) coffees. Plant Science, 149: 115-123.

Zamarripa Colmanero, A., Escamilla Prado, E., 2002: Variedades de café en México, origen, características y perspectivas. Centro Nacional de Investigación para el Desarrollo de Regiones Cafetaleras-Centro Regional Universitario Oriente (CRUO). Universidad Autónoma Chapingo. Huatusco, Veracruz, MX, 39 p.

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	<input type="text" value="Coffea arabica L."/>	<input type="checkbox"/>
1.1.2 Common name	<input type="text" value="Arabica Type Coffee"/>	
<hr/>		
1.2.1 Botanical name	<input type="text" value="Coffea canephora Pierre ex A. Froehner"/>	<input type="checkbox"/>
1.2.2 Common name	<input type="text" value="Robusta Type Coffee"/>	
<hr/>		
1.3.1 Botanical name	<input type="text" value="Coffea arabica × C. canephora"/>	<input type="checkbox"/>
1.3.2 Common name	<input type="text" value="Interspecific Hybrid"/>	
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"/>	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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3. Proposed denomination and breeder's reference

Proposed denomination
(if available)

Breeder's reference

#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)
- (b) partially known cross []
(please state known parent variety(ies))
- (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 of the variety

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:
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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: shape (1)		
conical	Acaia, Laurina	1[]
ellipsoid	Blue Mountain, Granica, Pluma Hidalgo, Tipica	2[]
cylindrical	Catuaí	3[]
5.2 Plant: height (2)		
very short	San Ramón, Vila Lobos	1[]
short	IAPAR 59, Caturra	3[]
medium	Catuaí, Rubi, Topázio	5[]
tall	Bourbon	7[]
very tall	Acaia, Mundo Novo	9[]
5.3 Fruit: color (16)		
yellow	Bourbon Amarelo, Caturra Amarelo, Topázio	1[]
orange		2[]
light red	Mundo Novo, Oro Azteca, Rubi	3[]
5.4 Period between flowering and harvesting (24)		
very short	IAPAR 59	1[]
short	Bourbon	3[]
medium	Mundo Novo	5[]
long	Catuaí	7[]
very long	Obatã	9[]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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6. Similar varieties and differences from these varieties

Please use the table, and space provided for comments, below 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>Plant: diameter of canopy</i>	<i>small</i>	<i>medium</i>

Comments:

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

8. Authorization for release

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

Yes [] No []

(b) Has such authorization been obtained?

Yes [] No []

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

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

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