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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

CASTOR BEAN

UPOV Code(s):

RICIN_COM

Ricinus communis L.

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GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from South Africa
to be considered by the
Technical Committee at its fifty-fourth session
to be held in Geneva October 29 and 30, 2018

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Ricinus communis L.	Castor bean, Palmi-christi	Ricin	Palma Christi, Rizinus, Wunderbaum	Higuerilla, Ricino

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 *Ricinus communis* 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 seed.

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

500 seeds

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority.

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 two independent growing cycles should be in the form of two separate plantings.

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 The optimum stage of development for the assessment of each characteristic is indicated by a number in the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 40 plants, which should be divided between at least 2 replicates.

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 or Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts of plants taken from each of 20 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 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 seed-propogated 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 The assessment of uniformity should be according to the recommendations for cross-pollinated varieties in the General Introduction.

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

4.2.5 For the assessment of uniformity of inbred line varieties, a population standard of 5% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 40 plants, 4 off-types are allowed.

4.3 Stability

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

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed 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) Leaf blade: color of veins (characteristic 19)
(b) Plant: type of inflorescence (characteristic 21)
(c) Inflorescence: shape (characteristic 24)
(d) Capsule: dehiscence (characteristic 32)
(e) Seed: main color (characteristic 37)

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

7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3

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**		**15**			
		Hypocotyl: anthocyanin coloration	**Hypocotyle : pigmentation anthocyanique**	**Hypocotyl: Anthocyanfärbung**	**Hipocótilo: pigmentación antociánica**		
		absent or weak	nulle ou faible	fehlend oder gering	ausente o débil	Tamar	1
		medium	moyenne	mittel	media		2
		strong	forte	stark	fuerte	Shira	3
2.	**(*)**	**QN VG**	**(a)**	**55**			
		Immature leaf: anthocyanin coloration	**Feuille non adulte : pigmentation anthocyanique**	**Unreifes Blatt: Anthocyanfärbung**	**Hoja inmadura: pigmentación antociánica**		
		absent or very weak	nulle ou très faible	fehlend oder sehr schwach	ausente o muy débil	Dalia	1
		weak	faible	gering	débil	Galit, Tamar	3
		medium	moyenne	mittel	media		5
		strong	forte	stark	fuerte	Limor	7
		very strong	très forte	sehr stark	muy fuerte		9
3.		**QL VG**	**(a)**	**55**			
		Immature leaf: waxiness on upper side	**Feuille non adulte : pruine de la face supérieure**	**Unreifes Blatt: Wachsschicht auf der Oberseite**	**Hoja inmadura: cerosidad del haz**		
		absent	absente	fehlend	ausente	Kika, Kizzy, Suzan, Shira	1
		present	présente	vorhanden	presente	IAC 2028	9
4.		**QN MG**	**(+)**	**61**			
		Time of beginning of flowering	**Époque de début de floraison**	**Zeitpunkt des Blühbeginns**	**Época de inicio de la floración**		
		early	précoce	früh	temprana		3
		medium	moyenne	mittel	media	Galit	5
		late	tardive	spät	tardía	Tamar	7
5.	**(*)**	**QN MG/MS**	**(+)**	**61-69**			
		Plant: height	**Plante : hauteur**	**Pflanze: Höhe**	**Planta: altura**		
		short	basse	niedrig	baja	Tamar	3
		medium	moyenne	mittel	media	Reyna	5
		tall	haute	hoch	alta	Galit	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6.		**QN MS**		**61-69**			
		Main stem: number of internodes	**Tige principale : nombre d'entre-nœuds**	**Haupttrieb: Anzahl Internodien**	**Tallo principal: número de entrenudos**		
		few	petit	wenige	bajo	Kika, Shira, Tamar	3
		medium	moyen	mittel	medio		5
		many	grand	viele	alto		7
7.		**QN MS/VG**	**(b)**	**61-69**			
		Main stem: length of internode	**Tige principale : longueur de l'entrenœud**	**Haupttrieb: Länge der Internodien**	**Tallo principal: longitud del entrenudo**		
		very short	très court	sehr kurz	muy corto		1
		short	court	kurz	corto	Tamar	3
		medium	moyen	mittel	medio		5
		long	long	lang	largo	Galit	7
		very long	très long	sehr lang	muy largo		9
8.	**(*)**	**QN MS/VG**	**(+) (c)**	**61-69**			
		Petiole: length	**Pétiole : longueur**	**Blattstiel: Länge**	**Pecíolo: longitud**		
		short	court	kurz	corto	IBEA 17	1
		medium	moyen	mittel	medio	Tamar	2
		long	long	lang	largo	Galit	3
9.	**(*)**	**QN VG**	**(c)**	**61-69**			
		Petiole: waxiness	**Pétiole : pruine**	**Blattstiel: Wachsschicht**	**Pecíolo: cerosidad**		
		absent or weak	absente ou faible	fehlend oder gering	ausente o débil	16-OAX, Limor	1
		medium	moyenne	mittel	media	IBEA 240	2
		strong	forte	stark	fuerte	La Verde	3
10.	**(*)**	**QN VG**	**(+) (c)**	**61-69**			
		Petiole: anthocyanin coloration	**Pétiole : pigmentation anthocyanique**	**Blattstiel: Anthocyanfärbung**	**Pecíolo: pigmentación antociánica**		
		absent or very weak	nulle ou très faible	fehlend oder sehr schwach	ausente o muy débil	Dalia	1
		weak	faible	schwach	débil	Galit	3
		medium	moyenne	mittel	media	Tamar	5
		strong	forte	stark	fuerte	Limor	7
		very strong	très forte	sehr stark	muy fuerte		9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11.	**(*)**	**QN MS/VG**	**(+) (c)**	**61-69**			
		Leaf blade: length	**Limbe : longueur**	**Blattspreite: Länge**	**Limbo: longitud**		
		very short	très court	sehr kurz	muy corto		1
		short	court	kurz	corto	IBEA 330	3
		medium	moyen	mittel	medio	Tamar	5
		long	long	lang	largo	Galit	7
		very long	très long	sehr lang	muy largo		9
12.	**(*)**	**QN MS/VG**	**(+) (c)**	**61-69**			
		Leaf blade: width	**Limbe : largeur**	**Blattspreite: Breite**	**Limbo: anchura**		
		very narrow	très étroit	sehr schmal	muy estrecho	Colima	1
		narrow	étroit	schmal	estrecho	IBEA 330	3
		medium	moyen	mittel	medio	IBEA 205	5
		broad	large	breit	ancho	Galit, Tamar	7
		very broad	très large	sehr breit	muy ancho	La Roja	9
13.	**(*)**	**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: depth of sinus	**Limbe : profondeur du sinus**	**Blattspreite: Tiefe der Ausbuchtung**	**Limbo: profundidad de los senos**		
		shallow	peu profond	flach	poco profundos	HM 1	1
		medium	moyen	mittel	medios	Galit, Tamar	3
		deep	profond	tief	profundos	Reyna	5
14.		**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: undulation	**Limbe : ondulation**	**Blattspreite: Wellung**	**Limbo: ondulación**		
		absent or weak	nulle ou faible	fehlend oder gering	ausente o poco marcada	Galit	1
		medium	moyenne	mittel	media	Tamar	2
		strong	forte	stark	marcada		3
15.		**QN VG**	**(c)**	**61-69**			
		Leaf blade: blistering	**Limbe : cloqûre**	**Blattspreite: Blasigkeit**	**Limbo: abullonado**		
		absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Galit	1
		medium	moyenne	mittel	medio		2
		strong	forte	stark	fuerte	Tamar	3
16.	**(*)**	**QN VG**	**(c)**	**61-69**			
		Leaf blade: dentation	**Limbe : dentelure**	**Blattspreite: Zähnung**	**Limbo: dentado**		
		fine	fine	fein	fino	Galit	1
		medium	moyenne	mittel	medio	Tamar	2
		coarse	grossière	grob	grueso	Reyna	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17.		**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: ratio length/width of terminal lobe	**Limbe : rapport longueur/largeur du lobe terminal**	**Blattspreite: Verhältnis Länge/Breite des terminalen Lappens**	**Limbo: relación longitud/anchura del lóbulo terminal**		
		low	bas	klein	baja		1
		medium	moyen	mittel	media	Tamar	2
		high	élevé	groß	alta	Galit	3
18.	**(*)**	**PQ VG**	**(+) (c), (d)**	**61-69**			
		Leaf blade: color	**Limbe : couleur**	**Blattspreite: Farbe**	**Limbo: color**		
		light green	vert clair	hellgrün	verde claro	IBEA 303	1
		medium green	vert moyen	mittelgrün	verde medio	Galit	2
		dark green	vert foncé	dunkelgrün	verde oscuro	Tamar	3
		purple green	vert-pourpre	purpurgrün	verde púrpura	IBEA 209	4
		green purple	pourpre-vert	grünpurpurn	púrpura verdoso	IBEA 249	5
		purple	pourpre	purpurn	púrpura	IBEA 350	6
19.	**(*)**	**PQ VG**	**(+) (c), (d)**	**61-69**			
		Leaf blade: color of veins	**Limbe : couleur des nervures**	**Blattspreite: Farbe der Adern**	**Limbo: color de la nervadura**		
		green	vert	grün	verde	Dalia	1
		yellow	jaune	gelb	amarillo	Lagos	2
		orange	orange	orange	naranja	Shira	3
		red	rouge	rot	rojo	Limor	4
20.		**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: anthocyanin coloration along veins	**Limbe : pigmentation anthocyanique le long des nervures**	**Blattspreite: Anthocyanfärbung entlang der Adern**	**Limbo: pigmentación antociánica a lo largo de los nervios**		
		absent or very weak	nulle ou très faible	fehlend oder sehr schwach	ausente o muy débil	Dalia	1
		weak	faible	schwach	débil	Galit	3
		medium	moyenne	mittel	media	Tamar	5
		strong	forte	stark	fuerte	IBEA 350	7
		very strong	très forte	sehr stark	muy fuerte		9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21.	**(*)**	**QL VG**	**(+) (e)**	**65**			
		Plant: type of inflorescence	**Plante : type d'inflorescence**	**Pflanze: Typ des Blütenstandes**	**Planta: tipo de inflorescencia**		
		non-synoecious	non-synoïque	nicht synözisch	no sinoica		1
		synoecious	synoïque	synözisch	sinoica		2
		gynomonoecious	gynomonoïque	gynomonözisch	ginomonoica		3
22.		**QN VG**	**(e)**	**65**			
		Inflorescence: position in relation to foliage	**Inflorescence : position par rapport au feuillage**	**Blütenstand: Position im Verhältnis zum Laub**	**Inflorescencia: posición en relación con el follaje**		
		above	au-dessus	oberhalb	por encima		1
		same level	au même niveau	auf gleicher Höhe	al mismo nivel		2
		below	en dessous	unterhalb	por debajo	Galit, Tamar	3
23.		**QN MG/MS**	**(+) (e)**	**65**			
		Inflorescence: length	**Inflorescence : longueur**	**Blütenstand: Länge**	**Inflorescencia: longitud**		
		very short	très courte	sehr kurz	muy corta		1
		short	courte	kurz	corta		3
		medium	moyenne	mittel	media		5
		long	longue	lang	larga		7
		very long	très longue	sehr lang	muy larga		9
24.	**(*)**	**PQ VG**	**(+) (e)**	**65**			
		Inflorescence: shape	**Inflorescence : forme**	**Blütenstand: Form**	**Inflorescencia: forma**		
		conical	conique	kegelförmig	cónica	IBEA 184	1
		globose	globuleuse	kugelförmig	globosa	IBEA 180	2
		ellipsoid	ellipsoïde	ellipsoid	elipsoidal	Lagos	3
		cylindrical	cylindrique	zylindrisch	cilíndrica	Kizzy, Kika	4
		obconical	obconique	verkehrt kegelförmig	obcónica	Suzan	5
25.	**(*)**	**PQ VG**	**(+) (e)**	**65**			
		Female flower: color of stigma	**Fleur femelle : couleur du stigmate**	**Weibliche Blüte: Farbe der Narbe**	**Flor femenina: color del estigma**		
		yellowish	jaunâtre	gelblich	amarillento	Rincon	1
		orange	orange	orange	naranja	IBEA 385	2
		pink	rose	rosa	rosa	Galit	3
		reddish	rougeâtre	rötlich	rojizo	Tamar	4

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26.		**QN VG**	**(e)**	**78**			
		Infructescence: density of capsules	**Infructescence : densité des capsules**	**Fruchtstand: Dichte der Kapseln**	**Infrutescencia: densidad de cápsulas**		
		sparse	faible	locker	laxa	Destripasola	1
		medium	moyenne	mittel	media	Galit, Tamar	2
		dense	forte	dicht	densa	IBEA 120	3
27.		**QN MS/VG**	**(+)**	**78**			
		Capsule: length of pedicel	**Capsule : longueur du pédicelle**	**Kapsel: Länge des Blütenstiels**	**Cápsula: longitud del pedicelo**		
		short	court	kurz	corto	Destripasola	1
		medium	moyen	mittel	medio	Galit, Tamar	2
		long	long	lang	largo	IBEA 120	3
28.	**(*)**	**QN VG**	**(f)**	**78**			
		Capsule: size	**Capsule : taille**	**Kapsel: Größe**	**Cápsula: tamaño**		
		small	petite	klein	pequeña	Lagos	1
		medium	moyenne	mittel	media	Galit, Tamar	2
		large	grande	groß	grande	Pelona	3
29.	**(*)**	**PQ VG**	**(f)**	**78**			
		Capsule: color	**Capsule : couleur**	**Kapsel: Farbe**	**Cápsula: color**		
		green	vert	grün	verde	IBEA 27	1
		yellow green	vert-jaune	gelbgrün	verde amarillento	IBEA 196	2
		reddish green	vert rougeâtre	rötlichgrün	verde rojizo	Limor	3
		blue green	vert-bleu	blaugrün	verde azulado	Galit, Tamar	4
		orange	orange	orange	naranja	IBEA 385	5
		pink	rose	rosa	rosa	IBEA 197	6
		purple	pourpre	purpurn	púrpura	IBEA 350	7
30.	**(*)**	**QN VG**	**(f)**	**78**			
		Capsule: spines	**Capsule : épines**	**Kapsel: Stacheln**	**Cápsula: espinas**		
		absent or short	absentes ou courtes	fehlend oder kurz	ausentes o cortas	Pelona	1
		short to medium	courtes à moyennes	kurz bis mittel	cortas a medias	IBEA 120	2
		medium	moyennes	mittel	medias	Galit, Tamar	3
		medium to long	moyennes à longues	mittel bis lang	medias a largas		4
		long	longues	lang	largas	Durango	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.		**QN VG**	**(f)**	**78**			
		Capsule: density of spines	**Capsule : densité des épines**	**Kapsel: Dichte der Stacheln**	**Cápsula: densidad de espinas**		
		sparse	faible	locker	laxa	Lagos	1
		medium	moyenne	mittel	media	Ceniza	2
		dense	forte	dicht	densa	Destripasola	3
32.	**(*)**	**QL VG**	**(f)**	**78-99**			
		Capsule: dehiscence	**Capsule : déhiscence**	**Kapsel: Pollenstäuben**	**Cápsula: dehiscencia**		
		absent	absente	fehlend	ausente	Durango	1
		present	présente	vorhanden	presente	Destripasola	9
33.		**QL VG**		**95**			
		Capsule: abscission	**Capsule : abscission**	**Kapsel: Abtrennung**	**Cápsula: abscisión**		
		absent	absente	fehlend	ausente	Cedaso	1
		present	présente	vorhanden	presente	Durango	9
34.	**(*)**	**QN MS/VG**		**99**			
		Seed: length	**Graine : longueur**	**Samen: Länge**	**Semilla: longitud**		
		short	courte	kurz	corta	Cedaso	1
		medium	moyenne	mittel	media	Lagos	3
		long	longue	lang	larga	La Negra	5
35.	**(*)**	**QN MS/VG**		**99**			
		Seed: width	**Graine : largeur**	**Samen: Breite**	**Semilla: anchura**		
		narrow	étroite	schmal	estrecha	Cedaso	1
		medium	moyenne	mittel	media	Lagos	3
		broad	large	breit	ancha	La Negra	5
36.		**QN MS/VG**	**(+)**	**99**			
		Seed: ratio length/width	**Graine : rapport longueur/largeur**	**Samen: Verhältnis Länge/Breite**	**Semilla: relación longitud/anchura**		
		low	bas	klein	baja		3
		medium	moyen	mittel	media		5
		high	élevé	groß	alta		7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
37.	**(*)**	**PQ VG**	**(d)**	**99**			
		Seed: main color	**Graine : couleur principale**	**Samen: Hauptfarbe**	**Semilla: color principal**		
		white	blanc	weiß	blanco	IBEA 298	1
		light brown	marron clair	hellbraun	marrón claro	IBEA 352	2
		medium brown	marron moyen	mittelbraun	marrón medio	IBEA 95	3
		dark brown	marron foncé	dunkelbraun	marrón oscuro	IBEA 155	4
		reddish brown	brun rougeâtre	rötlichbraun	marrón rojizo	La Roja	5
		light grey	gris clair	hellgrau	gris claro	Puesto	6
		dark grey	gris foncé	dunkelgrau	gris oscuro	IBEA 401	7
		black	noir	schwarz	negro	La Negra	8
38.		**PQ VG**	**(d)**	**99**			
		Seed: secondary color	**Graine : couleur secondaire**	**Samen: Sekundärfarbe**	**Semilla: color secundario**		
		none	aucune	keine	ninguno	La Negra	1
		white	blanc	weiß	blanco	IBEA 007	2
		medium brown	marron moyen	mittelbraun	marrón medio	IBEA 004	3
		dark brown	marron foncé	dunkelbraun	marrón oscuro	IBEA 009	4
39.	**(*)**	**QN VG**	**(+)**	**99**			
		Seed: caruncle	**Graine : caroncule**	**Samen: Karunkel**	**Semilla: carúncula**		
		absent or small	absente ou petite	fehlend oder klein	ausente o pequeña	Rincon	1
		medium	moyenne	mittel	media	IBEA 203	3
		large	grande	groß	grande	IBEA 98	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 should be made on leaves that have just finished unfolding.

(b) Observations should be made on the internode directly above the first attached leaf from the bottom of the plant.

(c) Observations should be made on a mature leaf from the middle third of the plant.

(d) The main color is the color with the largest surface area. In cases where the areas of the main and secondary color are too similar to reliably decide which color has the largest surface area, the darker color is considered to be the main color.

(e) Observations should be made on the terminal inflorescence/infructescence.

(f) Observations should be made on mature capsules.

8.2 Explanations for individual characteristics

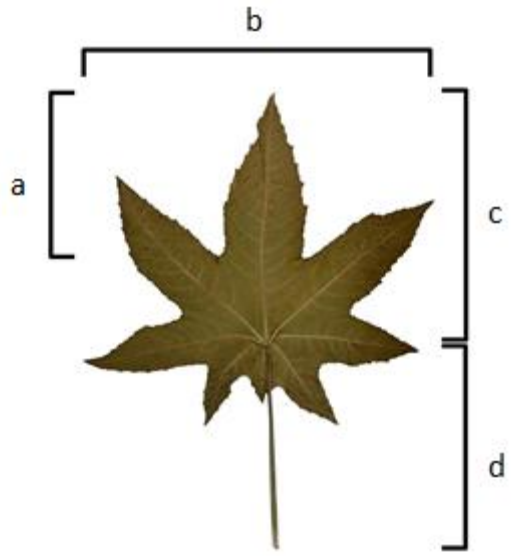
Ad. 4: Time of beginning of flowering

The time of beginning of flowering is when 50% of the plants have at least one open female flower.

Ad. 5: Plant: height

Observations should be made including the inflorescence.

Ad. 8: Petiole: length



a = Depth of sinus
b = Leaf blade: width
c = Leaf blade: length
d = Petiole: length

Ad. 10: Petiole: anthocyanin coloration

To be observed after wax has been removed by softly rubbing with fingers.

Ad. 11: Leaf blade: length

See Ad. 8

Ad. 12: Leaf blade: width

See Ad. 8

Ad. 13: Leaf blade: depth of sinus

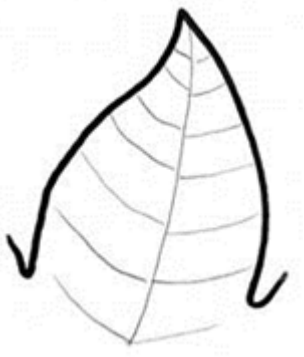
See Ad. 8

Ad. 14: Leaf blade: undulation

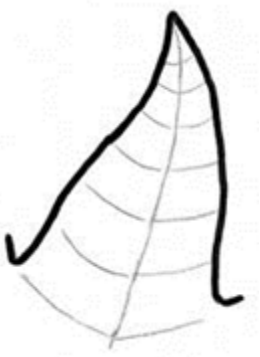
1
absent or weak

3
strong

Ad. 17: Leaf blade: ratio length/width of terminal lobe



1
low



2
medium

3
high

Ad. 18: Leaf blade: color

To be observed on the upper/adaxial side of the leaf blade.

Ad. 19: Leaf blade: color of veins

To be observed on the lower/abaxial side of the leaf blade.

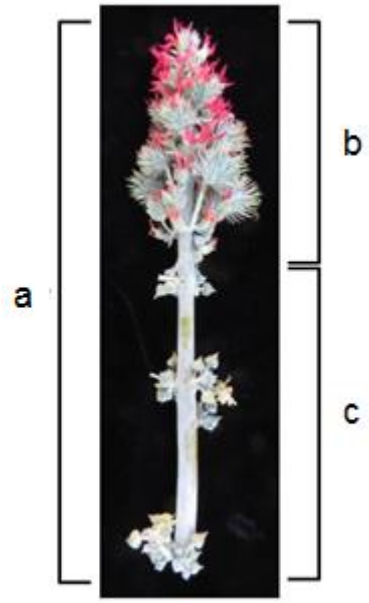
Ad. 20: Leaf blade: anthocyanin coloration along veins

To be observed on the lower/abaxial side of the leaf blade.

Ad. 21: Plant: type of inflorescence

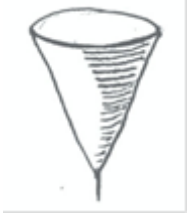
non-synoecious: A plant with female and male flowers in separate inflorescences.
synoecious: A plant with female and male flowers in the same inflorescence.
gynomonoecious: A plant where female and hermaphrodite flowers occur separately on the same plant.

Ad. 23: Inflorescence: length



a = Inflorescence length
b = Female flowers / fruit
c = Male flowers

Ad. 24: Inflorescence: shape

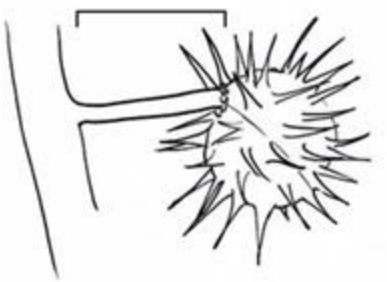
width (ratio length/width)	← broadest part →		
	below middle	at middle	above middle
narrow (high)		 4 cylindrical	
medium (medium)	 1 conical	 3 ellipsoid	 5 obconical
broad (low)		 2 globose	

Ad. 25: Female flower: color of stigma

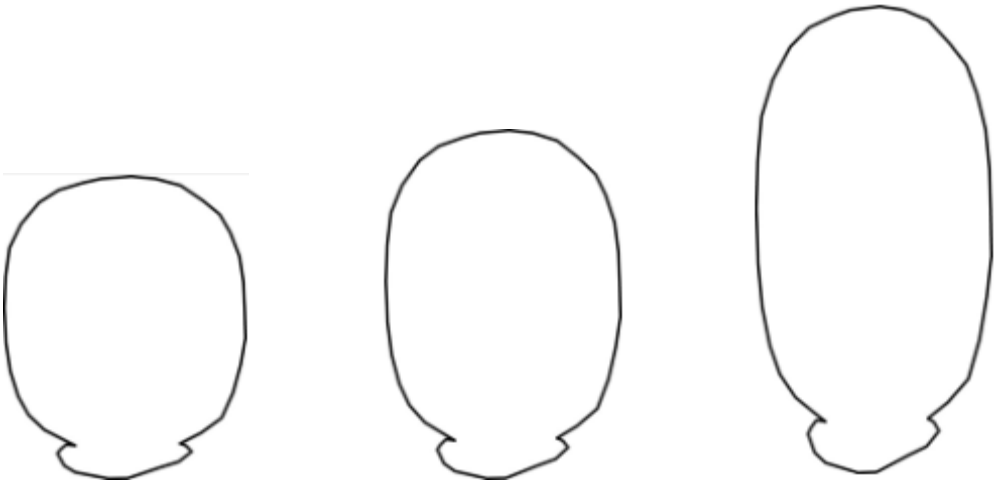
To be observed before pollination occurs.

Ad. 27: Capsule: length of pedicel

Observations should be made on mature capsules from the middle third of the infructescence.



Ad. 36: Seed: ratio length/width



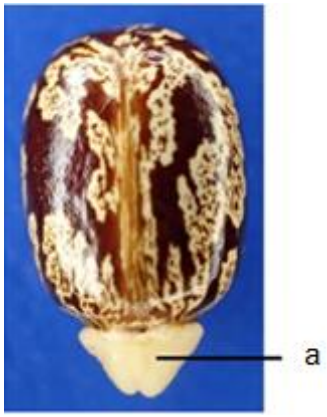
3
low

5
medium

7
high

Ad. 39: Seed: caruncle

The caruncle is a spongelike growth on the hilum of the seed.



a = caruncle

8.3 Growth stages

Growth stage	Code	Description
1. Emergence	15	Cotyledons completely unfolded
5. Inflorescence Emergence	55	First flower bud visible
6. Flowering	61	Beginning of flowering
	65	Full flowering
	69	End of flowering
7. Development of fruit	78	80% of fruits mature
9. Senescence	95	50% of fruits are dry
	99	Harvested product

9. Literature

Goytia Jiménez, M.A., Gallegos Goytia, R., Gallegos Cortes, R., Barrales Dominguez, S., Zarate Baños, R., Macias Castillo, U.A., Jiménez Roque, E., Benigno Cruz, P., Vázquez Rosales, J., Garcia Gracida, O., Méndez Fuentes, E.I., Nolasco Juan, U., 2015: Paquete tecnológico para la producción de Higuerilla (*Ricinus communis* L.) en Valles Centrales de Oaxaca. Universidad Autónoma Chapingo. Texcoco, MX, p. 120.

Goytia Jiménez, M.A., Gallegos Goytia, R., Sánchez Hernández, R.F., Ramirez, M.E., 2013: Manual Gráfico para la Descripción Varietal de la Higuerilla (*Ricinus communis* L.). Universidad Autónoma Chapingo. Texcoco, MX, p. 78.

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Henderson, M., Anderson, J.G., 1966: Common Weeds in South Africa. Botanical Survey, Memoir No. 37, Botanical Research Institute. ZA, pp. 206 to 207.

Kellerman, T.S., Coetzer, J.A.W., Naude, T.W., 1988: Plant Poisonings and Mycotoxicoses of Livestock in Southern Africa. Oxford University Press. Cape Town, ZA, pp. 144 to 145.

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Thiselton-Dyer, W.T., 1925: XXXII. Ricinus, Linn. Flora Capensis, Volume V, Section 2. L. Reeve & Co. Ltd. Covent Garden, UK, p. 487.

Van Wyk, B-E., Van Heerden, F., Van Oudtshoorn, B., 2002: Poisonous plants of South Africa. Briza Publications. Pretoria, ZA, p. 180.

Watt, J.M., Breyer-Brandwijk, M.G., 1962: The Medicinal and Poisonous Plants of Southern and Eastern Africa. E. & S. Livingstone Ltd. Edinburgh & London, UK, pp. 428 to 435.

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	*Ricinus communis* L.
1.2	Common name	Castor bean, Palmi-christi

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

4.1.3 Mutation [ ]
(please state parent variety)

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 Seed-propagated varieties

(a) Cross-pollination [ ]
(b) Hybrid [ ]
(c) Other (please provide details) [ ]

4.2.2 Other [ ]
(Please provide details)

In the case of hybrid varieties the production scheme for the hybrid should be provided on a separate sheet. This should provide details of all the parent lines required for propagating the hybrid e.g.

Single Hybrid

(……..……..…) x (……..……..…)

female parent male parent

Three-Way Hybrid

(……..……..…) x (……..……..…)

female parent male parent

(……..……..…) x (……..……..…)

single hybrid used as female parent male parent

and should identify in particular:

(a) any male sterile lines

(b) maintenance system of male sterile lines.

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 (19)	**Leaf blade: color of veins**		
	green	Dalia	1 [ ]
	yellow	Lagos	2 [ ]
	orange	Shira	3 [ ]
	red	Limor	4 [ ]
5.2 (21)	**Plant: type of inflorescence**		
	non-synoecious		1 [ ]
	synoecious		2 [ ]
	gynomonoecious		3 [ ]
5.3 (24)	**Inflorescence: shape**		
	conical	IBEA 184	1 [ ]
	globose	IBEA 180	2 [ ]
	ellipsoid	Lagos	3 [ ]
	cylindrical	Kika, Kizzy	4 [ ]
	obconical	Suzan	5 [ ]
5.4 (32)	**Capsule: dehiscence**		
	absent	Durango	1 [ ]
	present	Destripasola	9 [ ]
5.5 (37)	**Seed: main color**		
	white	IBEA 298	1 [ ]
	light brown	IBEA 352	2 [ ]
	medium brown	IBEA 95	3 [ ]
	dark brown	IBEA 155	4 [ ]
	reddish brown	La Roja	5 [ ]
	light grey	Puesto	6 [ ]
	dark grey	IBEA 401	7 [ ]
	black	La Negra	8 [ ]

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	*Leaf blade: undulation*	*absent or weak*	*medium*

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”.

.....

9.3 Has the plant material to be examined been tested for the presence of virus or other pathogens?

Yes [ ]

(please provide details as specified by the Authority)

No [ ]

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]