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TG/RICIN(proj.3)
ORIGINAL: English
DATE: 2017-05-05

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

CASTOR BEAN

UPOV Code(s): RICIN_COM

Ricinus communis L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from South Africa
to be considered by the
Technical Working Party for Agricultural Crops
at its forty-sixth session, to be held in Hanover, Germany,
from 2017-06-19 to 2017-06-23

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Ricinus communis L.	Castorbean, 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 second column of the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

3.3.3 Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background. The color chart and version used should be specified in the variety description.

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 second column of the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

“Visual” observation (V) is an observation made on the basis of the expert’s judgment. For the purposes of this document, “visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

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

4.2.2 The assessment of uniformity should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.2.3 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.

4.2.4 For the assessment of uniformity of in-bred 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) Plant: height (characteristic 4)
(b) Petiole: length (characteristic 9)
(c) Petiole: waxiness (characteristic 11)
(d) Petiole: intensity of anthocyanin coloration (characteristic 13)
(e) Leaf blade: main color of veins (characteristic 22)
(f) Plant: type of inflorescence (characteristic 25)
(g) Inflorescence: shape (characteristic 28)
(h) Capsule: spines (characteristic 36)
(i) Capsule: dehiscence (characteristic 39)
(j) Seed: number of colors (characteristic 44)
(k) Seed: main color (characteristic 45)

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

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

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QL**	**VG**			**15**			
		Hypocotyl: anthocyanin coloration							
		absent						Tamar	1
		present						Shira, IAC 2028, Kika	9
2.	**(*)**	**QN**	**VG**		**(a)**	**55**			
		Immature leaf: intensity of anthocyanin coloration							
		absent or very weak						Dalia	1
		weak						Tamar, Galit	3
		medium							5
		strong						Limor	7
		very strong							9
3.		**QL**	**VG**		**(a)**	**55**			
		Immature leaf: waxiness on upper side							
		absent						Shira, Kika, Kizzy, Suzan	1
		present						IAC 2028	9
4.	**(*)**	**QN**	**MG/MS**	**(+)**		**61-69**			
		Plant: height							
		very short							1
		short						Tamar	3
		medium							5
		tall						Galit	7
		very tall							9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.	**QN MG/MS**		**61-69**			
	Plant: width					
	very narrow					1
	narrow					2
	medium				Tamar	3
	broad				Galit	4
	very broad					5
6.	**QN MS**		**61-69**			
	Main stem: number of internodes					
	few				Tamar, Shira, Kika	3
	medium					5
	many				IAC 2028	7
7.	**QN MS/VG**	**(b)**	**61-69**			
	Main stem: length of internode					
	very short					1
	short				Tamar	3
	medium					5
	long				Galit	7
	very long					9
8.	**QN MS/VG**	**(b)**	**61-69**			
	Main stem: width of internode					
	narrow					1
	medium				Tamar, Galit	3
	broad					5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9.	**(*)**	**QN MS/VG**	**(+) (c)**	**61-69**			
		Petiole: length					
		short				IBEA 17	1
		medium				Tamar	2
		long				Galit	3
10.		**QN MS/VG**	**(+) (c)**	**61-69**			
		Petiole: width					
		narrow					1
		medium				Galit	2
		broad				Tamar	3
11.	**(*)**	**QL VG**	**(c)**	**61-69**			
		Petiole: waxiness					
		absent				Limor	1
		present				Tamar, Galit	9
12.		**QN VG**	**(c)**	**61-69**			
		Petiole: degree of waxiness					
		weak				16-OAX	1
		medium				IBEA 240	2
		strong				La Verde	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13.	**(*)**	**QN**	**VG**	**(+)**	**(c)**	**61-69**			
		Petiole: intensity of anthocyanin coloration							
		absent or very weak						Dalia	1
		weak						Galit	3
		medium						Tamar	5
		strong						Limor	7
		very strong							9
14.	**(*)**	**QN**	**MS/VG**	**(+)**	**(c)**	**61-69**			
		Leaf blade: length							
		very short							1
		short						IBEA 330	3
		medium						Tamar	5
		long						Galit	7
		very long							9
15.	**(*)**	**QN**	**MS/VG**	**(+)**	**(c)**	**61-69**			
		Leaf blade: width							
		very narrow						Colima	1
		narrow						IBEA 330	3
		medium						IBEA 205	5
		broad						Tamar, Galit	7
		very broad						La Roja	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16.	**(*)**	**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: depth of sinus					
		shallow				HM 1	1
		medium				Tamar, Galit	3
		deep				Reyna	5
17.		**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: undulation					
		absent or weak				Galit	1
		medium				Tamar	2
		strong					3
18.		**QN VG**	**(c)**	**61-69**			
		Leaf blade: blistering					
		absent or weak				Galit	1
		medium					2
		strong				Tamar	3
19.	**(*)**	**QN VG**	**(c)**	**61-69**			
		Leaf blade: dentation					
		fine				Galit	1
		medium				Tamar	2
		coarse					3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20.		**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: ratio length/width of terminal lobe					
		low					1
		medium				Tamar	2
		high				Galit	3
21.	**(*)**	**PQ VG**	**(+) (c), (d)**	**61-69**			
		Leaf blade: main color					
		light green				IBEA 303	1
		medium green				Galit	2
		dark green				Tamar	3
		purple green				IBEA 209	4
		green purple				IBEA 249	5
		purple				IBEA 350	6
22.	**(*)**	**PQ VG**	**(+) (c), (d)**	**61-69**			
		Leaf blade: main color of veins					
		whitish					1
		green				Dalia	2
		yellow				Lagos	3
		orange				Shira	4
		red				Limor	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.		**QN VG**	**(+) (c)**	**61-69**			
		Leaf blade: intensity of anthocyanin coloration along veins					
		absent or very weak				Dalia	1
		weak				Galit	3
		medium				Tamar	5
		strong				IBEA 350	7
		very strong					9
24.	**(*)**	**QN MG**	**(+)**	**61**			
		Time of beginning of flowering					
		very early					1
		early					3
		medium				Galit	5
		late				Tamar	7
		very late					9
25.	**(*)**	**PQ VG**	**(e)**	**65**			
		Plant: type of inflorescence					
		female and male flowers on separate inflorescences				Durango	1
		female and male flowers on the same inflorescence				IBEA 385	2
		female and hermaphrodite flowers on the same inflorescence				IBEA 328	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26.		**QN VG**	**(e)**	**65**			
		Inflorescence: position in relation to foliage					
		above					1
		same level					2
		below				Tamar, Galit	3
27.		**QN MG/MS**	**(+) (e)**	**65**			
		Inflorescence: length					
		very short					1
		short				Suzan	3
		medium				Tamar, Kika	5
		long				Shira, IAC 2028	7
		very long					9
28.	**(*)**	**PQ VG**	**(+) (e)**	**65**			
		Inflorescence: shape					
		conical				IBEA 184	1
		globose				IBEA 180	2
		ellipsoid				Lagos	3
		cylindrical				Kika, Kizzy	4
		obconical				Suzan	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29.	**(*)**	**QN VG**	**(+) (e)**	**65**			
		Inflorescence: density of male flowers					
		absent or very sparse				Dalia	1
		sparse					2
		medium					3
		dense					4
		very dense					5
30.		**QN VG**	**(e)**	**65**			
		Anther: intensity of yellow color					
		light					1
		medium				Tamar, Galit	2
		dark					3
31.	**(*)**	**PQ VG**	**(e)**	**65**			
		Female flower: color of stigma before pollination					
		yellowish				Rincon	1
		orange				IBEA 385	2
		pink				Galit	3
		reddish				Tamar	4
32.		**QN VG**	**(e)**	**78**			
		Infructescence: density of capsules					
		sparse				Destripasola	1
		medium				Tamar, Galit	2
		dense				IBEA 120	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33.		**QN MS/VG**	**(+) (f)**	**78**			
		Capsule: length of pedicel					
		short				Destripasola	1
		medium				Tamar, Galit	2
		long				IBEA 120	3
34.	**(*)**	**QN VG**	**(f)**	**78**			
		Capsule: size					
		small				Lagos	1
		medium				Tamar, Galit	2
		large				Pelona	3
35.	**(*)**	**PQ VG**	**(d), (f)**	**78**			
		Capsule: main color					
		green				IBEA 27	1
		yellow green				IBEA 196	2
		reddish green				Limor	3
		blue green				Tamar, Galit	4
		orange				IBEA 385	5
		pink				IBEA 197	6
		purple				IBEA 350	7
36.	**(*)**	**QL VG**	**(f)**	**78**			
		Capsule: spines					
		absent				Pelona	1
		present				Galit	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
37.	**(*)**	**QN VG**	**(f)**	**78**			
		Capsule: length of spines					
		short				IBEA 120	1
		medium				Tamar, Galit	2
		long				Durango	3
38.		**QN VG**	**(f)**	**78**			
		Capsule: density of spines					
		sparse				Lagos	1
		medium				Ceniza	2
		dense				Destripasola	3
39.	**(*)**	**QL VG**	**(f)**	**78-99**			
		Capsule: dehiscence					
		absent				Durango	1
		present				Destripasola	9
40.		**QL VG**		**99**			
		Capsule: abscission					
		absent				Cedaso	1
		present				Durango	9
41.	**(*)**	**QN MS/VG**		**99**			
		Seed: length					
		short				Cedaso	1
		medium				Lagos	3
		long				La Negra	5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
42.	**(*)**	**QN**	**MS/VG**			**99**			
		Seed: width							
		narrow						Cedaso	1
		medium						Lagos	3
		broad						La Negra	5
43.	**(*)**	**QN**	**MS/VG**			**99**			
		Seed: ratio length/width							
		low						Cedaso	3
		medium						Lagos	5
		high						La Negra	7
44.	**(*)**	**QL**	**VG**			**99**			
		Seed: number of colors							
		one						La Negra	1
		more than one						Galit	2
45.	**(*)**	**PQ**	**VG**		**(d)**	**99**			
		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							8

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
46.		**PQ**	**VG**		**(d)**	**99**			
		Seed: secondary color							
		white						IBEA 007	1
		medium brown						IBEA 004	2
		dark brown						IBEA 009	3
47.	**(*)**	**QN**	**VG**	**(+)**		**99**			
		Seed: size of caruncle							
		absent or small						Rincon	1
		medium						IBEA 203	3
		large						IBEA 98	5

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

(a) Observations on the immature leaves should be made on young leaves that have just finished unfolding.

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

(c) Observations on the leaf and leaf parts 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 on the inflorescence and infructescence should be made on the terminal inflorescence/infructescence.

(f) Observations on the capsule should be made on mature capsules.

8.2 Explanations for individual characteristics

Ad. 4: Plant: height

Including the inflorescence.

Ad. 9: Petiole: length

Ad. 10: Petiole: width

To be observed at the middle third of the petiole.

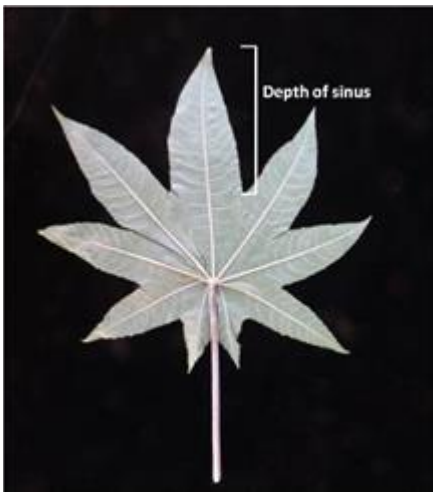
Ad. 13: Petiole: intensity of anthocyanin coloration

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

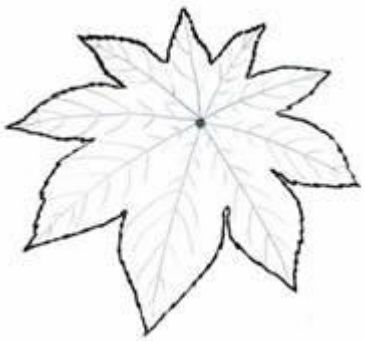
Ad. 14: Leaf blade: length

Ad. 15: Leaf blade: width

Ad. 16: Leaf blade: depth of sinus



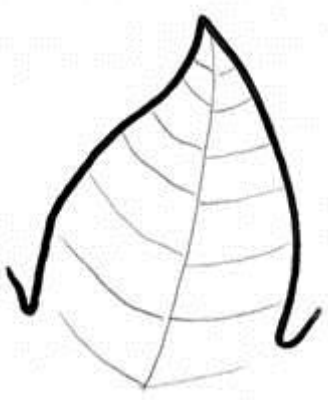
Ad. 17: Leaf blade: undulation



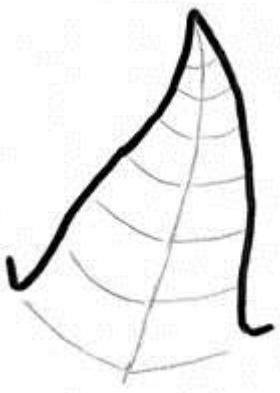
absent or weak
1

strong
3

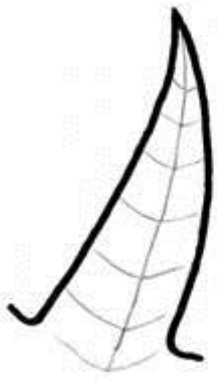
Ad. 20: Leaf blade: ratio length/width of terminal lobe



low
1



medium
2



high
3

Ad. 21: Leaf blade: main color

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

Ad. 22: Leaf blade: main color of veins

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

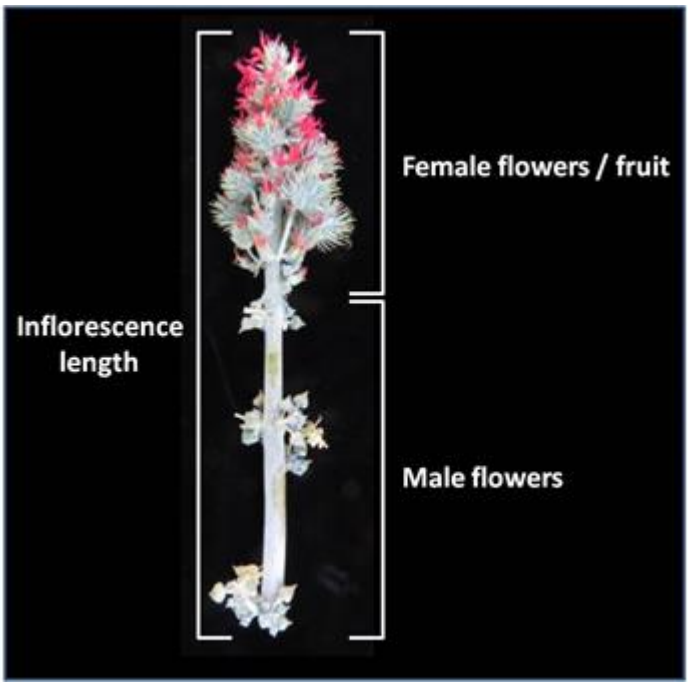
Ad. 23: Leaf blade: intensity of anthocyanin coloration along veins

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

Ad. 24: 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. 27: Inflorescence: length



Ad. 28: Inflorescence: shape

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

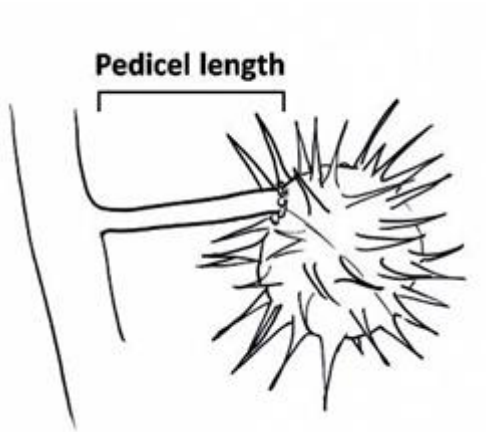
Ad. 29: Inflorescence: density of male flowers

absent or very sparse
1

medium
3

dense
4

Ad. 33: Capsule: length of pedicel



Ad. 47: Seed: size of caruncle

The caruncle is a spongelike growth on the seed.

8.3

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	99	Harvested product

9. Literature

Goytia J, M.A., Gallegos G, R. Gallegos C, R., Barrales D, S., Zarate B, R., Macias C, U.A., Jiménez R, E., Benigno C, P., Vázquez R, J., Garcia G, O., Méndez F, E.I., Nolasco J, 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 J, M.A., Gallegos G, R. Sánchez H, 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.

Goytia J, M.A., Ramirez, M.E., Gallegos G, R., Ruíz T, J.D., Carballo C, A., 2014: Guía técnica para la descripción varietal de higuerilla (*Ricinus communis* L.). Sagarpa & Snics. Tlalnepantla, MX, p. 29.

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.

Purseglove, J.W., 1968: Tropical Crops. Dicotyledons 1. Longmans, Green & Co. Ltd. London, UK, pp. 180 to 185.

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	Castorbean, 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 Mutation [ ]

(please state parent variety)

4.1.3 Discovery and development [ ]

(please state where and when discovered and how developed)

4.1.4 Other [ ]

(please provide details)

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

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

4.2 Method of propagating the variety

4.2.1 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 (4)	**Plant: height**		
	very short		1 [ ]
	short	Tamar	3 [ ]
	medium		5 [ ]
	tall	Galit	7 [ ]
	very tall		9 [ ]
5.2 (9)	**Petiole: length**		
	short	IBEA 17	1 [ ]
	medium	Tamar	2 [ ]
	long	Galit	3 [ ]
5.3 (11)	**Petiole: waxiness**		
	absent	Limor	1 [ ]
	present	Galit, Tamar	9 [ ]
5.4 (13)	**Petiole: intensity of anthocyanin coloration**		
	absent or very weak	Dalia	1 [ ]
	weak	Galit	3 [ ]
	medium	Tamar	5 [ ]
	strong	Limor	7 [ ]
	very strong		9 [ ]
5.5 (22)	**Leaf blade: main color of veins**		
	whitish		1 [ ]
	green	Dalia	2 [ ]
	yellow	Lagos	3 [ ]
	orange	Shira	4 [ ]
	red	Limor	5 [ ]

	Characteristics	Example Varieties	Note
5.6 (25)	**Plant: type of inflorescence**		
	female and male flowers on separate inflorescences	Durango	1 [ ]
	female and male flowers on the same inflorescence	IBEA 385	2 [ ]
	female and hermaphrodite flowers on the same inflorescence	IBEA 328	3 [ ]
5.7 (28)	**Inflorescence: shape**		
	conical	IBEA 184	1 [ ]
	globose	IBEA 180	2 [ ]
	ellipsoid	Lagos	3 [ ]
	cylindrical	Kika, Kizzy	4 [ ]
	obconical	Suzan	5 [ ]
5.8 (36)	**Capsule: spines**		
	absent	Pelona	1 [ ]
	present	Galit	9 [ ]
5.9 (39)	**Capsule: dehiscence**		
	absent	Durango	1 [ ]
	present	Destripasola	9 [ ]
5.10 (44)	**Seed: number of colors**		
	one	La Negra	1 [ ]
	more than one	Galit	2 [ ]
5.11 (45)	**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		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*	*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]