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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

CACTUS PEAR

Opuntia spp.

[*]

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

to be considered by the
Technical Working Party for Fruit Crops at its thirty-fourth session,
to be held in Niagara Falls, Canada, from September 29 to October 3, 2003

Alternative Names:[*]

Latin	*English*	*French*	*German*	*Spanish*
Opuntia spp.	Cactus pear, Prickly pear	Figuier de Barbarie	Feigenkaktus	Tuna

ASSOCIATED DOCUMENTS

These guidelines should be read in conjunction with document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (hereinafter referred to as 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 *Opuntia* spp. (Cactaceae).

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 three-year-old plants or, if accepted by the competent authority, branches including three successive cladodes.

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

8 three-year old plants, or if accepted by the competent authority,

10 branches that include three successive cladodes each,
sufficient to propagate 8 plants.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease. It should preferably not be obtained from *in vitro* propagation. If it has been produced by *in vitro* propagation this fact has to be stated by the applicant.

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 Duration of Tests

The minimum duration of tests should normally be two independent growing cycles.

3.2 Testing Place

The tests should normally be conducted at one place. If any characteristics of the variety, which are relevant for the examination of DUS, cannot be observed at that place, the variety may be tested at an additional place.

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 Each test should be designed to result in a total of, at least 8 plants.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations on single plants should be made on 6 plants or 2 parts taken from each of 6 plants. In particular, observation on fruit characteristics should be made on 20 fruits.

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 minimum duration of tests recommended in section 3.1 reflects, in general, the need to ensure that any differences in a characteristic are sufficiently consistent.

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 For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 8 plants, one off-type is allowed.

4.3 Stability

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

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

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness is 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) Cladode: color of areoles (characteristic 14)

(b) Fruit: thickness of peel (characteristic 44)

(c) Fruit: size of fully developed seeds (characteristic 54)

(d) Flowering habit (characteristic 59)

(e) Time of harvest maturity (characteristic 60)

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

5.5 The cactus pears can be separated in two groups as follows:

Group 1

Cactus pear (*Opuntia amyclaea* Tenore, *O. ficus-indica* (L.) Mill., *O. streptacantha* Lemaire, *O. megacantha* Salm-Dyck, *O. duranguensis* Britton et Rose, *O. lasyacantha* Pfeiffer, *O. robusta* Wendland, *O. hyptiacantha* Weber).

Flowering once a year, the fruit is persistent from 1 to 2 months. Fruits with medium thickness peel, occupying 1/4 to 1/2 of the total thickness of the fruit. The seeds are distributed throughout the flesh, which is sweet and less juicy than Group 2.

Group 2

Xoconostles (*Opuntia joconostle* Weber, *O. matudae* Sheinvar, *O. oligacantha* Shienvar, *O. leucotrica* DC, *O. heliabravoana* Sheinvar, *O. spinulifera* Sheinvar).

Flowering twice a year. Fruits with thick peel derived from the receptacle of wide flowers, seeds concentrated in the central part of the flesh. Juicy and acid flesh. Persistence of fruit up to 6 or 8 months.

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 Section 6.1.2

(QL) Qualitative characteristic – see Section 6.3
(QN) Quantitative characteristic – see Section 6.3
(PQ) Pseudo-Qualitative characteristic – see Section 6.3

(a)–(e) See Explanations on the Table of Characteristics in Chapter 8, Section 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8, Section 8.2

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. **(+)**		**Plant: growth habit**			**Planta: hábito de crecimiento**		
PQ		upright			erguido	Cardona, Roja	1
		spreading			extendido	Chapeada, Cristalina	2
		decumbent			decumbente	Pabellón, Rojo Pelón	3
		drooping			colgante	Sanjuanera	4
2.		**Plant: height**			**Planta: altura**		
QN		short			baja	Tapona de Mayo	3
		medium			mediana	Cristalina	5
		tall			alta	Reyna, Rubí Reyna	7
3.		**Plant: width**			**Planta: anchura**		
QN		narrow			estrecha	Pabellón	3
		medium			media	Cristalina	5
		broad			ancha	Rubí Reyna	7
4.		**Cladode: length**			**Cladodio: longitud**		
(+)							
QN	**(a)**	short			corta	Pabellón, Pico Chulo	3
		medium			media	Chapeada, Cristalina	5
		long			largo	Copena Z-1, Montesa, Reyna	7
5.		**Cladode: width**			**Cladodio: anchura**		
(+)							
QN	**(a)**	narrow			estrecha	Rubí Reyna, Sanjuanera	3
		medium			media	Copena T-5, Montesa	5
		broad			ancha	Naranjón Legítimo, Mango, Tapón	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6.		**Cladode: length/width ratio**			**Cladodio: relación largo/ancho**		
QN	**(a)**	small			pequeña	Tapón	3
		medium			media	Copena T-5, Reyna	5
		large			grande	Copena F-1	7
7. **(*)** **(+)**		**Cladode: shape**			**Cladodio: forma**		
PQ	**(a)**	lanceolate			lanceolado	Copena F-1, Tlaconopal	1
		oblong			oblongo	Ixtapa	2
		elliptic			elíptico	Milpa Alta	3
		circular			circular	Tapón	4
		rhombic			rómbico	Atlixco, Trompa de Cochino	5
		narrow obovate			estrecho obovado	Rubí Reyna	6
		obovate			obovado	Fafayuca	7
8. **(*)**		**Cladode: thickness**			**Cladodio: grosor**		
QN	**(a)**	thin			delgado	Copena T-2, Rubí Reyna, Sanjuanera	3
		medium			medio	Montesa	5
		thick			grueso	Pabellón, Rojo Pelón, Tapón	7
9.		**Cladode: color**			**Cladodio: color**		
PQ	**(a)**	yellow green			verde amarillo	Cristalina, Reyna, Rojo Pelón	1
		light green			verde claro	Milpa Alta	2
		medium green			verde medio	Blanca Pepina	3
		dark green			verde oscuro	Morado Jalpa, Roja San Martín	4
		bluish green			verde azulado	Tapón de Mayo	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10.		**Cladode: waxiness**			**Cladodio: superficie cerosa**		
QN	**(a)**	very weak			muy débil	Tlaconopal	1
		weak			débil	Copena T-5	2
		strong			fuerte	Copo de Nieve	3
11.		**Cladode: pubescence of the surface**			**Cladodio: pubescencia de la superficie**		
QL	**(a)**	absent			ausente	Milpa Alta	1
		present			presente	Cuaresmeño, Valterrilla	9
12.		**Cladode: undulation of margin**			**Cladodio: ondulación del margen**		
QL	**(a)**	absent			ausente	Reyna	1
		present			presente	Bola de Masa, Oreja de Elefante	9
13.		**Cladode: number of areoles in central row**			**Cladodio: número de areólas en la hilera central**		
QN	**(a)**	few			pocas	Rojo Pelón, Tapón	3
	(b)	medium			media	Fafayuca, Mango, Rubí Reyna	5
		many			muchas	Cardona, Charola, Reyna	7
14. **(*)**		**Cladode: color of areoles**			**Cladodio: color de las areólas**		
PQ	**(a)**	grey			gris	Milpa Alta, Reyna	1
	(b)	yellow brown			amarillo marrón	Burrona	2
		brown			marrón	Chaveña	3
		black			negro	Cardona	4

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. **(*)**		**Cladode: number of spines per areole**			**Cladodio: número de espinas por areóla**		
QN	**(a)**	absent or very few			ausentes	Pabellón, Rojo Pelón	1
	(b)	few			pocas	Naranjón Legítimo	3
		medium			media	Chapeado, Cristalina	5
		many			abundantes	Sanjuanera	7
		very many			muy abundantes	Cuaresmeño, Duraznillo	9
16.		**Cladode: main color of spines**			**Cladodio: color principal de la espina**		
PQ	**(a)**	grey			gris	Cardona	1
	(b)	white			blanco	Reyna	2
		yellow			amarillo	Duraznillo, Tapón	3
		brown			marrón	Rosa de Castilla, San Pedreña	4
17.		**Cladode: number of colors on spine**			**Cladodio: número de colores en la espina**		
QL	**(a)**	one			uno	Alfajayucan, Rosa de Castilla, Tapón	1
	(b)	two			dos	Cardona, Chapeado, Cristalina	2
18.		**Cladode: length of longest spine**			**Cladodio: longitud de la espina más larga**		
QN	**(a)**	short			corta	Cristalina	3
	(b)	medium			media	Montesa, Pico Chulo	5
		long			larga	Reyna, Sanjuanera	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19. **(+)**		**Cladode: attitude of central spine**			**Cladodio: postura de la espina central**		
QN	**(a)**	erect			erecta	Fafayuca	1
	(b)	semi-erect			semi-erecta	Tuna Morada II	2
		horizontal			horizontal	Cardona	3
20. **(+)**		**Cladode: surface of spines**			**Cladodio: superficie de espinas**		
QL	**(a)**	smooth			lisa	Amarillo	1
	(b)	longitudinal grooved			estrías longitudinales	Reyna	2
		prickled			puado	Tapón	3
21.		**Cladode: consistency of central spine**			**Cladodio: consistencia de la espina central**		
QL	**(a)**	flexible			flexible	Cristalina	1
	(b)	rigid			rígida	Reyna	2
		brittle			quebradiza	Burrona	3
22. **(+)**		**Cladode: curvature of central spine**			**Cladodio: curvatura de la espina central**		
	(a)	absent			ausente	Burra, Sanjuanera	1
	(b)	present			presente	Cardón de Castilla	9
23. **(+)**		**Cladode: twisting of central spine**			**Cladodio: torcedura de espina central**		
QL	**(a)**	absent			ausente	Burra, Burrona	1
	(b)	present			presente	Rubí Reyna, Sanjuanera	9
24.		**Cladode: shape of central spine**			**Cladodio: forma de la espina central**		
PQ	**(a)**	acicular			aciculares	Burra, Cuaresmeño	1
	(b)	cylindrical			cilíndrica	Montesa	2

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25.		**Cladode: shape of central spine in cross section**			**Cladodio: forma de la espina central en la sección transversal**		
PQ	**(a)**	elliptic			elíptica	Amarilla	1
	(b)	circular			circular	Montesa	2
		triangular			triangular	Pachón	3
26. **(*)**		**Cladode: presence of glochides**			**Cladodio: presencia de glóquidas**		
QN	**(a)**	absent or very few			ausentes o muy pocas	Blanca San José, Rojo Pelón	3
	(b)	few			pocas	Reyna	5
		many			abundantes	Montesa, Tuna Mantequilla	7
27.		**Cladode: color of glochides**			**Cladodio: color de glóquidas**		
PQ	**(a)**	yellow			amarillas	Amarilla, Tapón	1
	(b)	brown			marrón	Cristalina, Reyna, Rojo Pelón	2
28.		**Cladode: number of flowers**			**Cladodio: número de flores**		
QN	**(a)**	few			pocos	Esmeralda, Tapón de Mayo	3
		medium			medio	Cristalina	5
		many			muchos	Reyna	7
29.		**Flower: length**			**Flor: longitud**		
(+)							
QN	**(c)**	short			corta	Cardona, Memelo	3
		medium			media	Pico Chulo, Reyna	5
		long			larga	Cristalina, Montesa	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30. **(*)**		**Flower: color of perianth**			**Flor: color del perianto**		
PQ	**(c)**	greenish yellow			amarillo verdoso	Cardona, Duraznillo	1
		yellow			amarillo	Tapón Macho	2
		brownish yellow			amarillo café	Rojo Pelón	3
		orange			anaranjado	Chapeada, Reyna	4
		red			rojo	Roja San Martín, Tuna Rosa	5
31. **(*)** **(+)**		**Flower: color of style**			**Flor: color del estilo**		
PQ	**(c)**	green			verde	Duraznillo	1
		white			blanco	Montesa, Tapón	2
		yellow			amarillo	Cardona	3
		pink			rosa	Morada, Pico Chulo	4
		red			rojo	Pabellón, Rojo Pelón	5
32. **(+)**		**Flower: number of stigma lobes**			**Flor: número de lóbulos del estigma**		
QN	**(c)**	few			pocos	Colorada, Sanjuanera	3
		medium			media	Cristalina, Pabellón	5
		many			muchos	Memelo, Rubí Reyna	7
33. **(+)**		**Flower: color of stigma lobe**			**Flor: color de lóbulo del estigma**		
PQ	**(c)**	yellow			amarillos	Morada Jalpa	1
		green			verdes	Cristalina, Reyna	2

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
34. **(*)**		**Fruit: length**			**Fruto: longitud**		
QN	**(d)**	short			corto	Cardona, Cuaresmeño Tapona de Mayo	3
		medium			mediano	Reyna, Fafayuca Rojo Pelón	5
		long			largo	Burrona, Cristalina, Montesa	7
35. **(*)**		**Fruit: maximum diameter**			**Fruto: diámetro máximo**		
QN	**(d)**	narrow			estrecha	Cambray, Memelo Rubí Reyna	3
		medium			media	Solferino, Reyna Rojo Pelón	5
		broad			ancha	Burrona, Cristalina, Tapona de Mayo	7
36.		**Fruit: ratio length/maximum diameter**			**Fruto: relación longitud/diámetro máximo**		
QN	**(d)**	small			pequeño	Tapón de Mayo, Rojo Papas Burrona, Reyna	3
	(e)	medium			mediano	Burrona, Concha de Oro Blanca de Castilla, Rojo Pelón	5
		large			grande	Amarilla Plátano, Montesa, Rubí Reyna	7
37. **(+)**		**Fruit: shape**			**Fruto: forma**		
PQ	**(d)**	oblong			oblongo	Copena 17, Torreoja	1
		narrow ellipsoid			elipsoide angosto	Rubí Reyna	2
		ellipsoid			elipsoide	Reyna	3
		spheroid			esferoide	Cardona	4
		obloid			obloide	Tapón de Mayo	5
		obovoid			obovoide	Roja Jalpa	6

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38.		**Fruit: density of areoles**			**Fruto: densidad de areólas**		
QN	**(b)**	sparse			poca	Cristalina, Rojo Jalpa Tapón de Mayo	3
	(d)	medium			media	Montesa, Reyna Cristalina	5
		dense			densa	Torreoja, Rojo Lirio Rubí Reyna	7
39. **(*)**		**Fruit: number of glochides**			**Fruto: número de glóquidas**		
QN	**(b)**	few			pocas	Tapón de Mayo	3
	(d)	medium			media	Cristalina	5
		many			muchas	Montesa, Reyna, Rubí Reyna	7
40. **(*)**		**Fruit: color of glochides**			**Fruto: color de glóquidas**		
PQ	**(b)**	yellow			amarillo	Blanca San José, Camueso, Tuna Mansa	1
	(d)	brown			marrón	Amarrilla, Pico Chulo, San Nicolás	2
41. **(+)**		**Fruit: length of stalk**			**Fruto: longitud del pedúnculo**		
QN	**(d)**	short			corto	Solferino, Amarillo Pátano Copena T-5, Reyna	3
		medium			medio	Montesa, Pico Chulo	5
		long			largo	Cristalina Sanjuanera	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
42. **(+)**		**Fruit: depression of receptacle scar**			**Fruto: depresión de la cicatriz del receptáculo**		
QN	**(d)**	very slightly depressed			muy ligera depresión	Reyna, Torreoja Rojo Pelón	3
		slightly depressed			ligera depresión	Memelo, Amarilla Pico Chulo	5
		strongly depressed			fuerte depresión	Chapeada, Roja San Martín, Rubí Reyna	7
43.		**Fruit: diameter of receptacle scar**			**Fruto: diámetro de la cicatriz del receptáculo**		
QN	**(d)**	small			pequeña	Copena 2, Tuna Rosa Montesa, Rubí Reyna	3
		medium			media	Amarillo Plátano, Cambray Cristalina, Pico Chulo	5
		large			grande	Cristalina, Pico Chulo, Tapón de Mayo	7
44.		**Fruit: thickness of peel**			**Fruto: grosor de cáscara**		
QN	**(d)**	thin			delgada	Amarilla San José Montesa, Reyna	3
	(e)	medium			mediana	Cristalina, Rojo Pelón, Rojo Lirio, Tapón de Mayo	5
		thick			gruesa	Caidilla Legítima Burrona, Fafayuca, Mango	7
45.		**Fruit: weight of peel**			**Fruto: peso de cáscara**		
QN	**(d)**	light			ligero	Roja Suanjuanera, Tuna Rosa Reyna	3
		medium			mediano	Chapeada, Natalia Cristalina, Montesa	5
		heavy			pesado	Torreoja, Montesa Burrona, Chapeada	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
46.		**Fruit: weight of flesh**			**Fruto: peso de la pulpa**		
QN	**(d)**	very light			muy ligero	Cuaresmeño, Cambray Duraznillo	1
		light			ligero	Morada, Zarca Charola	3
		medium			mediano	Solferino, Fafayuca Chapeado, Pico Chulo	5
		heavy			pesado	Montesa, Rojo Pelón Amarillo Montesa, Naranjón Legítimo	7
		very heavy			muy pesado	Burrona, Cristalina	9
47.		**Fruit: ratio of weight of flesh/peel**			**Fruto: relación peso de pulpa/cáscara**		
QN	**(d)**	small			pequeño	Cardona, Trompa de Cochino Cascarón	3
		medium			mediano	Gavia, Tapona Chapeada, Fafayuca	5
		large			grande	Rojo Pelón, Blanca San José Cristalina, Reyna	7
48.		**Fruit: evenness of color surfaces**			**Fruto: uniformidad del color de la superficie**		
QL	**(d)**	even			parejo	Burrona, Cristalina	1
		uneven			disparejo	Chapeado	2

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
49. (*)		**Fruit: main color of peel**			**Fruto: color principal de la cáscara**		
PQ	**(d)**	white			blanca	Blanca Platanillo	1
		light green			verde claro	Gavia	2
		medium green			verde medio	Esmeralda	3
		dark green			verde obscuro	Burrona, Reyna	4
		yellow			amarilla	Amarilla Plátano	5
		orange			naranja	Montesa, Naranjón, Pico Chulo	6
		pink			rosa	Memelo	7
		medium red			rojo medio	Rojo Pelón, Rubí Reyna	8
		dark red			rojo obscuro	Cardona	9
		purple			púrpura	Morada Jalpa, Roja San Martín, Tapón	10
50. (*)		**Fruit: color of flesh**			**Fruto: color de pulpa**		
PQ	**(d)**	light green			verde claro	Cristalina, Esmeralda, Reyna	1
		medium green			verde medio	Burrona	2
		yellow			amarillo	Montesa	3
		orange			naranja	Pico Chulo	4
		pink			rosa	Meloncillo Rosa, Memelo	5
		red			rojo	Rojo Pelón, Rubí Reyna	6
		purple			púrpura	Liria, Morada Jalpa, Roja San Martín	7
51.		**Fruit: firmness of flesh**			**Fruto: firmeza de pulpa**		
QN	**(d)**	soft			suave	Memelo	3
		medium			media	Cristalina	5
		firm			firme	Fafayuca	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
52.		**Fruit: juiciness of flesh**			**Fruto: jugosidad de la pulpa**		
QN	**(d)**	low			baja	Amarilla Plátano, Memelo	3
		medium			media	Reyna	5
		high			alta	Burrona, Cristalina, Fafayuca	7
53. **(*)**		**Fruit: number of fully developed seeds**			**Fruto: número de semillas completamente desarrolladas**		
QN	**(d)**	few			pocas	Roja Sanjuanera Cardón, Charola, Montesa	3
		medium			media	Fafayuca, Solferino Copena T-5, Cristalina, Reyna	5
		many			muchas	Tapón de Mayo, Cristalina Burrona	7
54. **(*)**		**Fruit: size of fully developed seeds**			**Fruto: tamaño de semillas completamente desarrolladas**		
QN	**(d)**	small			pequeña	Cardona, Cascarona, Curesmeño	3
		medium			media	Pico Chulo, Reyna	5
		large			grande	Blanca San José, Burrona, Chapeada	7
55. **(*)**		**Fruit: presence of abortive seeds**			**Fruto: presencia de semillas abortivas**		
QN	**(d)**	few			pocas	Amarilla Plátano, Montesa Burrona, Cardona, Tapón	3
		medium			media	Chapeada, Cristalina, Burrona Pico Chulo	5
		many			muchas	Blanca Caldera Charola, Reyna	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
56.		**Fruit: total soluble solids**			**Fruto: sólidos totales solubles**		
QN	**(d)**	low			bajo	Duraznilla Burrona, Tapón	3
	(e)	medium			medio	Burrona, Amarillo Plátano Cristalina, Pico Chulo, Rojo Pelón	5
		high			alto	Fafayuca, Rojo Pelón, Copena L-12 Reyna	7
57.		**Fruit: acidity**			**Fruto: acidez**		
QN	**(d)**	low			baja	Blanca Larga	3
	(e)	medium			media	Fafayuca	5
		high			alta	Blanca de Castilla	7
58. **(*)**		**Time of beginning of flowering**			**Tiempo en el comienzo de la floración**		
QN		early			temprano	Sanjuanera, Tapón	3
		medium			medio	Pico Chulo, Reyna, Rojo Pelón	5
		late			tardío	Burrona, Charola, Cristalina	7
59. **(*)**		**Flowering habit**			**Hábito de floración**		
QL		once flowering			una floración	Cristalina, Reyna, Rojo Pelón	1
		twice flowering			doble floración	Cuaresmeño	2

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
60.	**Time of harvest maturity**			**Tiempo de madurez de cosecha**		
QN	very early			muy temprana	Tapón de Mayo	1
	early			temprana	Tapón	3
	medium			media	Pico Chulo, Montesa, Reyna	5
	late			tardía	Burrona, Esmeralda, Fafayuca	7
	very late			muy tardía	Charola, Chaveña	9
61.	**Duration of harvesting period of fruit**			**Duración del período de cosecha de fruta**		
QN	short			corto	Chapeada, Torreoja	3
	medium			medio	Pico Chulo, Reyna	5
	long			largo	Burrona	7

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

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

(a) Cladodes: Unless otherwise stated all observations on the cladode should be made on mature cladodes, one to two years old.

(b) Areoles, spines and glochides: Unless otherwise stated, all observations on the areole, spine and glochide should be made on intact fruits with the help of a stereoscopic microscope.

(c) Flower: Unless otherwise stated all observations on the flower should be made at the peak of flowering time. All observations on flower should be made at the 1st day of opening.

(d) Fruit: All observations on the fruit should be made on 20 intact fruits which are fully mature for consumption.

(e) Fruit diameter/thickness of peel/acidity/total soluble solids: The observations of fruit diameter, thickness of peel, acidity and total soluble solids should be made in the middle part of the fruit. For total soluble solids the middle part of the fruit must be used with the help of a refractometer.

8.2 Explanations for individual characteristics

Ad. 1: Plant: growth habit

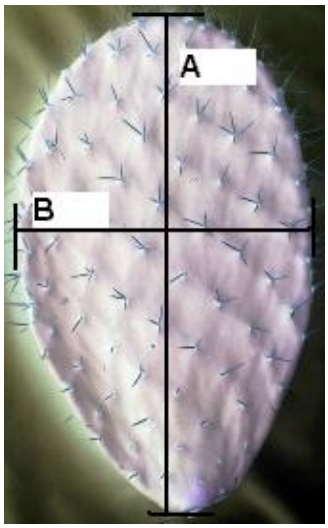
1
upright

2
spreading

3
decumbent

4
drooping

Ad. 4: Cladode: length
Ad. 5: Cladode: width



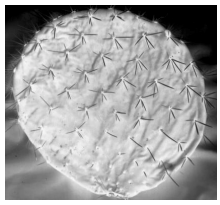
A= length
B= width

Ad. 7: Cladode: shape

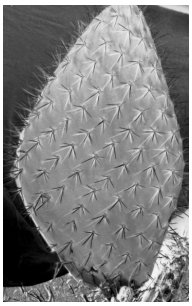
1
lanceolate

2
oblong

3
elliptic



4
circular

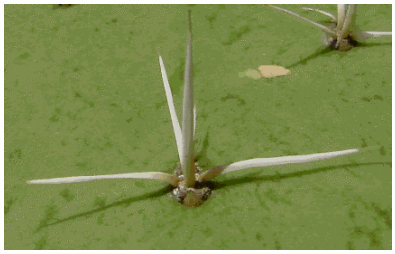


5
rhombic

6
narrow obovate

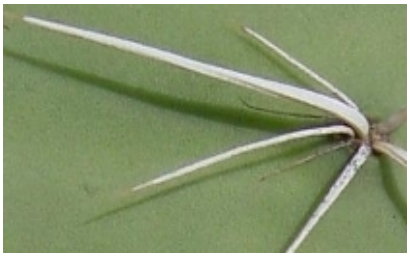
7
obovate

Ad. 19: Cladode: attitude of the central spine



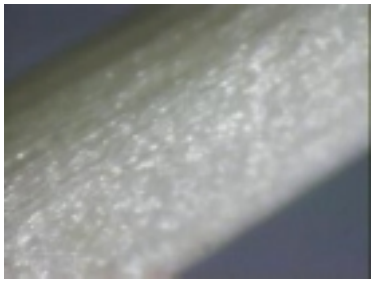
1
erect

2
semi-erect



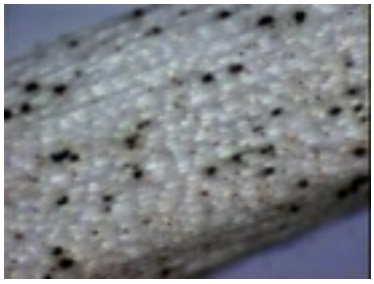
3
horizontal

Ad. 20: Cladode: surface of spines



1
smooth

2
longitudinal grooves



3
prickled

Ad. 22: Cladode: curvature of central spine

1
absent

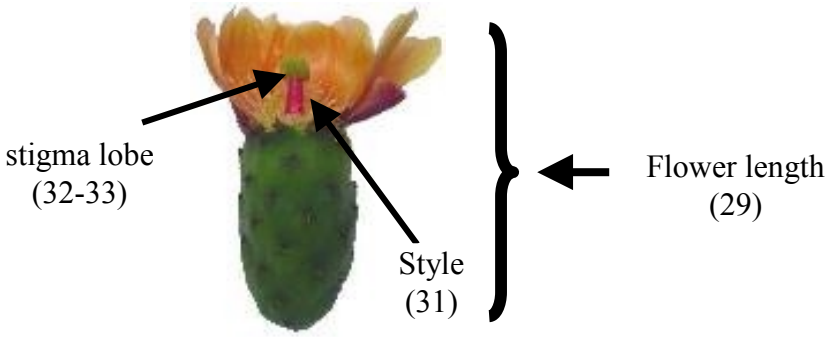
9
present

Ad. 23: Cladode: twisting of central spine

1
absent

9
present

Ad. 29: Flower: length
Ad. 31: Flower: color of style
Ad. 32: Flower: number of stigma lobe
Ad. 33: Flower: color of stigma lobe



Ad. 37: Fruit: shape

1
oblong

2
narrow ellipsoid

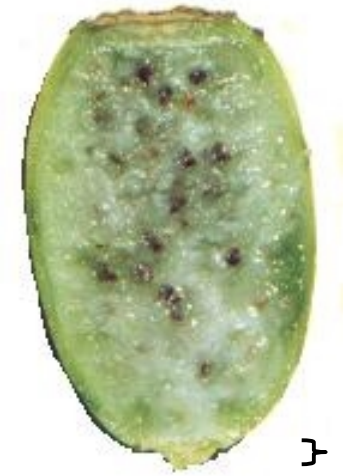
3
ellipsoid

4
spheroid

5
obloid

6
obovoid

Ad. 41: Fruit: length of stalk



3
short

5
medium

7
long

Ad. 42: Fruit: depression of receptacle scar

3
very slightly
depressed

5
slightly
depressed

7
strongly
depressed

SYNONYMS OF THE EXAMPLE VARIETIES

Example Varieties	Synomym(s)
Reyna	Alfajayucan, Tuna Blanca, Taxa-kähä
Montesa	Amarrilla Montesa, Monteza, Amarilla Huesona, Miquihuana
Esmeralda	Copena XXA
Fafayuca	Fafayuco, Octubreña
Tapón de Mayo	Mayera
Torreoja	Torrioja, Frida, Frieda, Copena XXXA
Milpa Alta	Tuna Morada
Pico Chulo	Naranjona, Apastillada, Copo de Oro
Amarilla Plátano	Milpa Alta Amarilla
Tuna Mansa	Blanca

9. Literature

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10. Technical Questionnaire

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

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 *Latin Name*	*Opuntia* spp.
1.2 Common Name	CACTUS PEAR

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)
(b) partially known cross [ ]
(please state known parent variety(ies))
(c) totally unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery [ ]
(please state where, when and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of Propagating the Variety

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 (7)	**Cladode: shape**		
	lanceolate	Copena F-1, Tlaconopal	1[ ]
	oblong	Ixtapa	2[ ]
	elliptic	Milpa Alta	3[ ]
	circular	Tapón	4[ ]
	rhombic	Atlixco, Trompa de Cochino	5[ ]
	narrow obovate	Rubí Reyna	6[ ]
	obovate	Fafayuca	7[ ]

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

	Characteristics	Example Varieties	Note
5.2 (14)	**Cladode: color of areoles**		
	grey	Milpa Alta, Reyna	1[ ]
	yellow brown	Burrona	2[ ]
	brown	Chaveña	4[ ]
	black	Cardona	5[ ]
5.3 (15)	**Cladode: number of spines per areole**		
	absent or very few	Pabellón, Rojo Pelón	1[ ]
	few	Naranjón Legítimo	3[ ]
	medium	Chapeado, Cristalina	5[ ]
	many	Sanjuanera	7[ ]
	very many	Cuaresmeño, Duraznillo	9[ ]
5.4 (26)	**Cladode: presence of glochides**		
	absent or very few	Blanca San José, Rojo Pelón	3[ ]
	few	Reyna	5[ ]
	many	Montesa, Tuna Mantequilla	7[ ]
5.5 (30)	**Flower: color of perianth**		
	greenish yellow	Cardona, Duraznillo	1[ ]
	yellow	Tapón Macho	2[ ]
	brownish yellow	Rojo Pelón	3[ ]
	orange	Chapeada, Reyna	4[ ]
	red	Roja San Martín, Tuna Rosa	5[ ]

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

	Characteristics	Example Varieties	Note
5.6 (31)	**Flower: color of style**		
	green	Duraznillo	1[ ]
	white	Montesa, Tapón	2[ ]
	yellow	Cardona	3[ ]
	pink	Morada, Pico Chulo	4[ ]
	red	Pabellón, Rojo Pelón	5[ ]
5.7 (34)	**Fruit: length**		
	short	Cardona, Cuaresmeño Tapona de Mayo	3[ ]
	medium	Reyna, Fafayuca Rojo Pelón	5[ ]
	long	Burrona, Cristalina, Montesa	7[ ]
5.8 (35)	**Fruit: maximum diameter**		
	narrow	Cambray, Memelo Rubí Reyna	3[ ]
	medium	Solferino, Reyna Rojo Pelón	5[ ]
	broad	Burrona, Cristalina, Tapona de Mayo	7[ ]
5.9 (39)	**Fruit: number of glochides**		
	few	Tapón de Mayo	1[ ]
	medium	Cristalina	2[ ]
	many	Montesa, Reyna, Rubí Reyna	3[ ]
5.10 (40)	**Fruit: color of glochides**		
	yellow	Blanca San José, Camueso, Tuna Mansa	1[ ]
	brown	Amarrilla, Pico Chulo, San Nicolás	2[ ]

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

	Characteristics	Example Varieties	Note
5.11 (49)	**Fruit: main color of peel**		
	white	Blanca Platanillo	1[ ]
	light green	Gavia	2[ ]
	medium green	Esmeralda	3[ ]
	dark green	Burrona, Reyna	4[ ]
	yellow	Amarilla Plátano	5[ ]
	orange	Montesa, Naranjón, Pico Chulo	6[ ]
	pink	Memelo	7[ ]
	medium red	Cardona, Rojo Pelón, Rubí Reyna	8[ ]
	dark red	Cardona	9[ ]
	purple	Morada Jalpa, Roja San Martín, Tapón	10[ ]
5.12 (50)	**Fruit: color of flesh**		
	light green	Cristalina, Esmeralda, Reyna	1[ ]
	médium green	Burrona	2[ ]
	yellow	Montesa	3[ ]
	orange	Picho Chulo	4[ ]
	pink	Meloncillo Rosa, Memelo	5[ ]
	red	Rojo Pelón, Rubí Reyna	6[ ]
	purple	Liria, Morada Jalpa, Roja San Martín	7[ ]
5.13 (53)	**Fruit: number of fully developed seeds**		
	few	Roja Sanjuanera Cardón, Charola, Montesa	3[ ]
	medium	Fafayuca, Solferino Copena T-5, Cristalina, Reyna	5[ ]
	many	Tapón de Mayo, Cristalina Burrona	7[ ]

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

	Characteristics	Example Varieties	Note
5.14 (54)	**Fruit: size of fully developed seeds**		
	small	Cardona, Cascarona, Curesmeño	3[ ]
	medium	Pico Chulo, Reyna	5[ ]
	large	Blanca San José, Burrona, Chapeada	7[ ]
5.15 (55)	**Fruit: presence of abortive seeds**		
	few	Amarilla Plátano, Montesa Burrona, Cardona, Tapón	3[ ]
	medium	Chapeada, Cristalina, Burrona Pico Chulo	5[ ]
	many	Blanca Caldera Charola, Reyna	7[ ]
5.16 (58)	**Time of beginning of flowering**		
	early	Sanjuanera, Tapón	3[ ]
	medium	Pelón Rojo, Pico Chulo, Reyna	5[ ]
	late	Burrona, Charola, Cristalina	7[ ]
5.17 (59)	**Flowering habit**		
	once flowering	Cristalina, Reyna, Rojo Pelón	1[ ]
	twice flowering	Cuaresmeño	2[ ]

6. Similar varieties and differences from these varieties

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)	*Fruit: length*	*e.g. note 3*	*note 7*
		e.g. short	*long*
		e.g. 54 cm	*94 cm*

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 Special conditions for the examination of the variety

7.2.1 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

7.2.2 If yes, please give details:

7.3 Other information

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.

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

9. Information on plant material to be examined.

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 or pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details of 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]