



TG/142/5(proj.5)
ORIGINAL: English
DATE: 2013-02-18

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

WATERMELON

UPOV Code: CTRLS_LAN

(*Citrullus lanatus* (Thunb.) Matsum. et Nakai)

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from the Netherlands

to be considered by the

*Technical Committee at its forty-ninth session,
to be held in Geneva from March 18 to 20, 2013*

Alternative Names:^{*}

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Citrullus lanatus</i> (Thunb.) Matsum. et Nakai, <i>Citrullus vulgaris</i> Schrad.	Watermelon	Melon d'eau, Pastèque	Wassermelone	Sandía

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.]

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
1. SUBJECT OF THESE TEST GUIDELINES	3
2. MATERIAL REQUIRED.....	3
3. METHOD OF EXAMINATION	3
3.1 NUMBER OF GROWING CYCLES	3
3.2 TESTING PLACE	3
3.3 CONDITIONS FOR CONDUCTING THE EXAMINATION	3
3.4 TEST DESIGN	3
3.5 ADDITIONAL TESTS.....	3
4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY	4
4.1 DISTINCTNESS	4
4.2 UNIFORMITY	5
4.3 STABILITY.....	5
5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL.....	5
6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS	6
6.1 CATEGORIES OF CHARACTERISTICS	6
6.2 STATES OF EXPRESSION AND CORRESPONDING NOTES	6
6.3 TYPES OF EXPRESSION	6
6.4 EXAMPLE VARIETIES	6
6.5 LEGEND	7
7. TABLE OF CHARACTERISTICS/TABLEAU DES CARACTÈRES/MERKMALSTABELLE/TABLA DE CARACTERES	8
8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS.....	16
8.1 EXPLANATIONS COVERING SEVERAL CHARACTERISTICS.....	16
8.2 EXPLANATIONS FOR INDIVIDUAL CHARACTERISTICS	16
9. LITERATURE	29
10. TECHNICAL QUESTIONNAIRE.....	31

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Citrullus lanatus* (Thunb.) Matsum. et Nakai.

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:

1,200 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*

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

3.2 *Testing Place*

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

3.3 *Conditions for Conducting the Examination*

The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 20 plants which should be divided between at least two 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.

3.4.3 For pollination and fruit set of triploid varieties it is needed to interplant with diploid varieties in a trial lay out so that the diploid pollenizers will be close to the triploid plants. The minimum percentage of diploid plants should not be less than 30%. When pollinators (e.g. bees, bumblebees) are used a slightly lower percentage of pollenizer may be required.

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 / Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 10 plants or parts taken from each of 10 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:

(a) *Cross-pollinated varieties*

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

(b) *Hybrid varieties and inbred lines*

4.2.3 For the assessment of uniformity of hybrids and inbred lines, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 20 plants, 2 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) Ploidy (characteristic 1)
- (b) Fruit: weight (characteristic 11)
- (c) Fruit: shape in longitudinal section (characteristic 12)
- (d) Fruit: ground color of skin (characteristic 16)
- (e) Fruit: width of stripes (characteristic 19)
- (f) Fruit: margin of stripes (characteristic 22)
- (g) Fruit: main color of flesh (characteristic 28)
- (h) Only diploid and tetraploid varieties: Seed: length (characteristic 31)
- (i) Only diploid and tetraploid varieties: Seed: ground color of testa (characteristic 33)

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*

- | | | |
|----------------|-----------------------------------|---------------------|
| (*) | Asterisked characteristic | – see Chapter 6.1.2 |
| QL | Qualitative characteristic | – see Chapter 6.3 |
| QN | Quantitative characteristic | – see Chapter 6.3 |
| PQ | Pseudo-qualitative characteristic | – see Chapter 6.3 |
| MG, MS, VG, VS | | – see Chapter 4.1.5 |
- (a)–(d) See Explanations on the Table of Characteristics in Chapter 8.1.
- (+) See Explanations on the Table of Characteristics in Chapter 8.2.

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. VG	Ploidy	Ploïdie	Ploidie	Ploidía		
(*)						
(+)						
QL	diploid	diploïde	diploid	diploide	SP 4, Sugar Baby, Yamato 3	2
	triploid	triploïde	triploid	triploide	Boston, TRIX 313	3
	tetraploid	tétraploïde	tetraploid	tetraploide		4
2. MS/ VG	Cotyledon: size	Cotylédon : taille	Keimblatt: Größe	Cotiledón: tamaño		
QN	(a) small	petit	klein	pequeño	Crimson Glory, Kanro, Rapid	3
	medium	moyen	mittel	medio	Crisby, Granit, Panni, Yamato 3	5
	large	grand	groß	grande	Farao, Kurobe, Royal flesh hybrid	7
3. VG	Cotyledon: shape	Cotylédon : forme	Keimblatt: Form	Cotiledón: forma		
(+)						
QN	(a) narrow elliptic	elliptique étroit	schmal elliptisch	elíptica estrecha	Kahô	1
	medium elliptic	elliptique moyen	mittel elliptisch	elíptica media	Crimson Sweet, Farao, Napsugár, Yamato 3,	2
	broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Kanro	3
4. VG	Cotyledon: intensity of green color	Cotylédon : intensité de la couleur verte	Keimblatt: Intensität der grünen Farbe	Cotiledón: intensidad del color verde		
QN	(a) light	faible	hell	claro	À graine rouge à confire à chair verte, Shin Kurobe 7	1
	medium	moyenne	mittel	medio	Jenny, Yamato 3	3
	dark	forte	dunkel	oscuro	Boston, Kahô, SP 4	5
5. VG	Leaf blade: size	Limbe : taille	Blattspreite: Größe	Limbo: tamaño		
QN	(b) small	petite	klein	pequeño	SP 1, SP 4	1
	medium	moyenne	mittel	medio	Sugar Baby	3
	large	grande	groß	grande	Topgun	5
6. VG/ MS	Leaf blade: ratio length/width	Limbe : rapport longueur/largeur	Blattspreite: Verhältnis Länge/Breite	Limbo: relación longitud/anchura		
(+)						
QN	(b) low	bas	klein	bajo	Kanro	1
	medium	moyen	mittel	medio	Sugar Baby, Yamato 3	2
	high	élevé	groß	alto	Kurobe	3
7. VG	Leaf blade: color	Limbe : couleur	Blattspreite: Farbe	Limbo: color		
PQ	(b) yellowish green	vert jaune	gelblichgrün	verde amarillento	Baby Fun, Okan	1
	green	vert	grün	verde	Crimson Sweet, Yamato 3	2
	greyish green	vert grisâtre	gräulichgrün	verde grisáceo	Sugar Baby	3
	bluish green	vert bleuâtre	bläulichgrün	verde azulado	SP 4	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8. (*)(+)	VG	Leaf blade: degree of lobing	Limbe : degré de la découpeure du bord	Blattspreite: Stärke der Lappung	Limbo: grado de lobulado	
QN	(b)	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Sunshade 1
		weak	faible	gering	débil	Estrella, Karistan 3
		medium	moyenne	mittel	medio	Crimson Sweet, Crisby 5
		strong	forte	stark	fuerte	Cadanz 7
		very strong	très forte	sehr stark	muy fuerte	SP 1 9
9. (*)(+)	VG	Leaf blade: blistering	Limbe : clôqure	Blattspreite: Blasigkeit	Limbo: abullonado	
QN	(b)	weak	faible	gering	débil	Tabata, Estel 1
		medium	moyenne	mittel	medio	Yamato 3 2
		strong	forte	stark	fuerte	Klondike Striped II, Sakura 3
10. (*)(+)	VG	Leaf blade: color of veins	Limbe : couleur des nervures	Blattspreite: Farbe der Adern	Limbo: color de los nervios	
QL	(b)	green	vert	grün	verde	Asahiyamato 1
		yellow	jaune	gelb	amarillo	Taiyô 2
11. (*)(+)	MG/MS	Fruit: weight	Fruit : poids	Frucht: Gewicht	Fruto: peso	
QN	(c)	very low	très petit	sehr gering	muy pequeño	Monaco, New Hampshire Midget 1
		very low to low	très petit à petit	sehr gering bis gering	muy pequeño a pequeño	Mini, Petite Perfection 2
		low	petit	gering	pequeño	Angela 3
		low to medium	petit à moyen	gering bis mittel	pequeño a medio	Pasion, Sugar Baby 4
		medium	moyen	mittel	medio	Boston 5
		medium to high	moyen à grand	mittel bis hoch	medio a grande	Crimson Sweet, Panonnia 6
		high	grand	hoch	grande	Fabiola 7
		high to very high	grand à très grand	hoch bis sehr hoch	grande a muy grande	Jubilee 8
		very high	très grand	sehr hoch	muy grande	Carolina Cross, Cobb's Gem, Florida Giant 9
12. (*)(+)	VG	Fruit: shape in longitudinal section	Fruit : forme en section longitudinale	Frucht: Form im Längsschnitt	Fruto: forma en sección longitudinal	
QN	(c)	circular	circulaire	kreisförmig	circular	Camilla, Kanro 1
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Fumin, Gray Belle, Yellow Baby, Zorba 2
		medium elliptic	elliptique moyen	mittel elliptisch	elíptica media	Congo, Kurobe, Picnic 3
		narrow elliptic	elliptique étroit	schmal elliptisch	elíptica estrecha	All Sweet, Charleston Gray 4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. VG (+)	Fruit: depression at base	Fruit : dépression à la base	Frucht: Vertiefung an der Basis	Fruto: depresión de la base		
QN (c)	absent or very shallow	absente ou très peu profonde	fehlend oder sehr flach	ausente o muy poco profunda		1
	shallow	peu profonde	flach	poco profunda	Kahô, Yellow Baby	2
	medium	moyenne	mittel	media	Triple Sweet, Yamato 3	3
	deep	profonde	tief	profunda	À graine rouge à confire à chair verte, Kanro	4
	very deep	très profonde	sehr tief	muy profunda		5
14. VG (+)	Fruit: shape of apical part	Fruit : forme de la partie apicale	Frucht: Form des apikalen Teils	Fruto: forma de la zona apical		
PQ (c)	truncate	tronquée	abgestumpft	truncada	Cream Sinka, Kanro	1
	truncate to rounded	tronquée à arrondie	abgestumpft bis abgerundet	truncada a redondeada		2
	rounded	arrondie	abgerundet	redondeada	Glory, Sugar Baby, Toro, Yamato 3	3
	rounded to conical	arrondie à conique	abgerundet bis kegelförmig	redondeada a cónica		4
	acute	aigüe	spitz	aguda	Kahô	5
15. VG (+)	Fruit: depression at apex	Fruit : cuvette pistillaire	Frucht: Vertiefung an der Spitze	Fruto: depresión del ápice		
QN (c)	absent or very shallow	absente ou très peu profonde	fehlend oder sehr flach	ausente o muy poco profunda		1
	shallow	peu profonde	flach	poco profunda	Burpee Hybrid, Kahô, Valdoria	2
	medium	moyenne	mittel	media	Asahi Miyako, Fumin	3
	deep	profonde	tief	profunda	Cobb's Gem	4
	very deep	très profonde	sehr tief	muy profunda		5
16. VG (*) (+)	Fruit: ground color of skin	Fruit : couleur de fond de l'épiderme	Frucht: Grundfarbe der Schale	Fruto: color de fondo de la epidermis		
PQ (c)	yellow	jaune	gelb	amarillo	Taiyô	1
	very light green	vert très clair	sehr hellgrün	verde muy claro	Ipanema	2
	very light green to light green	vert très clair à vert clair	sehr hellgrün bis hellgrün	verde muy claro a verde claro	Napsugar	3
	light green	vert clair	hellgrün	verde claro	Tigre	4
	light green to medium green	vert clair à vert moyen	hellgrün bis mittelgrün	verde claro a verde medio	Pepsin	5
	medium green	vert moyen	mittelgrün	verde medio	Ovation, Talete	6
	medium green to dark green	vert moyen à vert foncé	mittelgrün bis dunkelgrün	verde medio a verde oscuro	Odem, Resistant, Sweet Marvel	7
	dark green	vert foncé	dunkelgrün	verde oscuro	Sugar Baby	8
	dark green to very dark green	vert foncé à vert très foncé	dunkelgrün bis sehr dunkelgrün	verde oscuro a verde muy oscuro	Augusta, Rocio	9
	very dark green	vert très foncé	sehr dunkelgrün	verde muy oscuro		10

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17. VG (+)	Fruit: conspicuousness of veining	Fruit : netteté de la veinure	Frucht: Ausprägung der Aderung	Fruto: visibilidad de la nervadura		
QN (c)	inconspicuous or very weakly conspicuous	absente ou très peu nette	undeutlich oder sehr schwach	no visible o muy poco visible	Napsugar	1
	weak	faible	schwach	débil		2
	medium	moyenne	mittel	media	Crimson Sweet	3
	strong	forte	stark	fuerte	Trix Palomar	4
	very strong	très forte	sehr stark	muy fuerte		5
18. VG (*) (+)	Fruit: pattern of stripes	Fruit : répartition des stries	Frucht: Muster der Streifen	Fruto: distribución de las rayas		
PQ (c)	only one colored	unicolore seulement	nur einfarbig	de un solo color	Congo	1
	one colored and veins	unicolore et nervures	einfarbig und geadert	de un color y con nervios	Trix Palomar	2
	one colored, veins and marbled	unicolore, nervures et marbré	einfarbig, geadert und marmoriert	de un color, con nervios y jaspeadas	Boston	3
	one colored and marbled	unicolore et marbré	einfarbig und marmoriert	de un color y jaspeadas	Jenny	4
	two colored, veins and marbled	bicolore, nervures et marbré	zweifarbige, geadert und marmoriert	de dos colores, con nervios y jaspeadas	Crisby	5
	only veins	nervures seulement	nur geadert	sólo con nervios		6
19. VG (*) (+)	Fruit: width of stripes	Fruit : largeur des stries	Frucht: Breite der Streifen	Fruto: anchura de las rayas		
QN (c)	very narrow	très étroites	sehr schmal	muy estrechas	SP 4, Tiny Orchid	1
	narrow	étroites	schmal	estrechas	Boston	3
	medium	moyennes	mittel	medias	Crimson Sweet	5
	broad	larges	breit	anchas	Sangria	7
	very broad	très larges	sehr breit	muy anchas	All Sweet	9
20. VG (+)	Fruit: main color of stripes	Fruit : couleur principale des stries	Frucht: Hauptfarbe der Streifen	Fruto: color principal de las rayas		
PQ (c)	yellow	jaune	gelb	amarillo		1
	very light green	vert très clair	sehr hellgrün	verde muy claro		2
	light green	vert clair	hellgrün	verde claro		3
	medium green	vert moyen	mittelgrün	verde medio		4
	dark green	vert foncé	dunkelgrün	verde oscuro		5
	very dark green	vert très foncé	sehr dunkelgrün	verde muy oscuro		6

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. VG (*) (+)	Fruit: conspicuousness of stripes	Fruit : netteté des stries	Frucht: Ausprägung der Streifen	Fruto: visibilidad de las rayas		
QN (c)	inconspicuous or very weakly conspicuous	absente ou très peu nette	undeutlich oder sehr schwach	no visibles o muy poco visibles	Augusta	1
	weak	faible	schwach	débil	Odem	2
	medium	moyenne	mittel	media	Trix Palomar	3
	strong	forte	stark	fuerte	Jenny	4
	very strong	très forte	sehr stark	muy fuerte	A graine rouge à confire à chair verte	5
22. VG (*) (+)	Fruit: margin of stripes	Fruit : bord des stries	Frucht: Rand der Streifen	Fruto: borde de las rayas		
QN (c)	diffuse	diffus	diffus	difuso	Crimson Glory, Crisby	1
	medium	moyen	mittel	medio	Crimson Sweet	2
	sharp	net	klar abgegrenzt	definido	Jenny, Jubilee	3
23. VG (+)	Fruit: size of insertion of peduncle	Fruit : taille de l'insertion du pédoncule	Frucht: Größe des Stielansatzes	Fruto: tamaño de la inserción del pedúnculo		
QN (c)	small	petite	klein	pequeño	Charleston Gray, Sugar Bush	3
	medium	moyenne	mittel	medio	Fumin, Picnic	5
	large	grande	groß	grande	Dixie Queen, Kanro	7
24. VG (+)	Fruit: size of pistil scar	Fruit : taille de l'attache pistillaire	Frucht: Größe der Griffelnarbe	Fruto: tamaño de la cicatriz del pistilo		
QN (c)	small	petite	klein	pequeña	Charleston Gray, Daisen	3
	medium	moyenne	mittel	media	Yamato 3	5
	large	grande	groß	grande	Kanro, Trix Palomar	7
25. VG (+)	Fruit: grooving	Fruit : cannelure	Frucht: Riefung	Fruto: acanalado		
QN (c)	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Sugar Baby	1
	weak	faible	gering	débil	Augusta, Kanro, Rapid	2
	medium	moyenne	mittel	medio	Asahi Miyako Hybrid, Bego	3
	strong	forte	stark	fuerte	Marsowszky, Napsugár, Panni	4
26. VG (+)	Fruit: waxy layer	Fruit : couche cireuse	Frucht: Wachsschicht	Fruto: capa cerosa		
QN (c)	absent or very weak	absent ou très faible	fehlend oder sehr schwach	ausente o muy débil	Betica	1
	medium	moyen	mittel	media	Sugar Baby	3
	very strong	très fort	sehr stark	muy fuerte	Red Star, Romanza	5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27. VG/MS (*) (+)	Fruit: thickness of pericarp	Fruit : épaisseur du péricarpe	Frucht: Dicke des Perikarps	Fruto: espesor del pericarpio		
QN (c)	very thin	très mince	sehr dünn	muy delgado	Bibo, Tiny Orchid, Luciano	1
	thin	mince	dünn	delgado	À graine rouge à confire à chair verte, Beni-kodama, Jenny, Kahô, Kassai	3
	medium	moyen	mittel	medio	Pannonia, Sugar Baby, Sugar Belle, Yamato 3	5
	thick	épais	dick	grueso	Charleston Gray, Crimson Sweet, Kurobe, Triple Sweet, Sunrise	7
	very thick	très épais	sehr dick	muy grueso	Coles Early, Kholodok	9
28. VS (*) (+)	Fruit: main color of flesh	Fruit : couleur principale de la chair	Frucht: Hauptfarbe des Fleisches	Fruto: color principal de la pulpa		
PQ (c)	white	blanche	weiß	blanco	SP 4, SP 1, Yamato Cream 3	1
	yellow	jaune	gelb	amarillo	Napsugár, Yamato Cream 1	2
	orange	orange	orange	nararanja	Kahô, Tendersweet	3
	pink	rose	pink	rosa	Sadul	4
	pinkish red	rouge rosâtre	rosarot	rojo rosado	Bingo, Crimson Sweet	5
	red	rouge	rot	rojo	Asahi Miyako Hybrid, Sugar Baby, Topgun	6
	dark red	rouge foncé	dunkelrot	rojo oscuro	Dixie Lee	7
29. VG	<u>Only triploid varieties:</u> Seed coat: size	<u>Variétés triploïdes</u> <u>seulement</u> : Tégument : taille	<u>Nur triploide Sorten:</u> Samenschale: Größe	<u>Sólo variedades triploides:</u> Tegumento de la semilla: tamaño		
QN (d)	small	petit	klein	pequeño	Petite Perfection	2
	medium	moyenn	mittel	medio	Boston, Valdoria, Sweet Sun	3
	large	grand	groß	grande	Ortal, Tigre, Pasion	4
30. VG	<u>Only diploid and tetraploid varieties:</u> Fruit: number of seeds	<u>Variétés diploïdes et tétraploïdes</u> <u>seulement</u> : Fruit : nombre de graines	<u>Nur diploide und tetraploide Sorten:</u> Frucht: Anzahl der Samen	<u>Sólo variedades diploides y tetraploides:</u> Fruto: número de semillas		
QN (d)	none or few	nul ou petit	fehlend oder gering	ausente o bajo	Tanenashi Kôyô	1
	medium	moyen	mittel	medio	Miyako 3	2
	many	grand	groß	alto	Fumin	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31. VG/ MS (*)	<u>Only diploid and tetraploid varieties:</u> Seed: length	<u>Variétés diploïdes et tétraploïdes</u> <u>seulement</u> : Graine : longueur	<u>Nur diploide und tetraploide Sorten:</u> Samen: Länge	<u>Sólo variedades diploides y tetraploides:</u> Semilla: longitud		
QN (d)	very short	très courte	sehr kurz	muy corta	Kudam	1
	short	courte	kurz	corta	Pannonia, Tabata	3
	medium	moyenne	mittel	media	Sugar Baby	5
	long	longue	lang	larga	Charleston Gray, Kurobe	7
	very long	très longue	sehr lang	muy larga	Malali, Wanli	9
32. (+)	<u>Only diploid and tetraploid varieties:</u> Seed: ratio length/width	<u>Variétés diploïdes et tétraploïdes</u> <u>seulement</u> : Graine : rapport longueur/largeur	<u>Nur diploide und tetraploide Sorten:</u> Samen: Verhältnis Länge/Breite	<u>Sólo variedades diploides y tetraploides:</u> Semilla: relación longitud/anchura		
	very low	très bas	sehr klein	muy baja	Wanli	1
	low	bas	klein	baja	Klondike	2
	medium	moyen	mittel	media	Early Star	3
	high	élevé	groß	alta	Nubia	4
	very high	très élevé	sehr groß	muy alta	Green Citron	5
33. VG (*) (+)	<u>Only diploid and tetraploid varieties:</u> Seed: ground color of testa	<u>Variétés diploïdes et tétraploïdes</u> <u>seulement</u> : Graine : couleur de fond du tégument	<u>Nur diploide und tetraploide Sorten:</u> Samen: Grundfarbe der Samenschale	<u>Sólo variedades diploides y tetraploides:</u> Semilla: color de fondo de la testa		
PQ (d)	white	blanc	weiß	blanco	Sanpaku	1
	cream	crème	cremefarben	crema	Kurobe	2
	green	vert	grün	verde	A confire allongée à graine verte, Green Citron	3
	red	rouge	rot	rojo	A graine rouge à confire à chair verte, Red Citron	4
	red brown	brun rouge	rotbraun	marrón rojizo	Kahô	5
	brown	brun	braun	marrón	Otome, Sugar Baby	6
	black	noir	schwarz	negro	Yamato Cream	7
34. VG (*) (+)	<u>Only diploid and tetraploid varieties:</u> Seed: over color of testa	<u>Variétés diploïdes et tétraploïdes</u> <u>seulement</u> : Graine : lavis du tégument	<u>Nur diploide und tetraploide Sorten:</u> Samen: Deckfarbe der Samenschale	<u>Sólo variedades diploides y tetraploides:</u> Semilla: color superior de la testa		
QL (d)	absent	absent	fehlend	ausente	Kahô	1
	present	présent	vorhanden	presente	Charleston Gray	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota	
35.	VG	<u>Only diploid and tetraploid varieties:</u>	<u>Variétés diploïdes et tétraploïdes</u>	<u>Nur diploide und tetraploide Sorten:</u>	<u>Sólo variedades diploides y tetraploides:</u>		
(+)	Seed: area of over color in relation to that of ground color	seulement : Graine : surface du lavis par rapport à celle de la couleur de fond	Samen: Anteil der Deckfarbe im Vergleich zur Grundfarbe	Semilla: área del color superior en relación con el del color de fondo			
QN	(d)	very small	très petite	sehr klein	muy pequeña	Estela roja	1
		small	petite	klein	pequeña	Sugar Baby	3
		medium	moyenne	mittel	media	Crimson Sweet	5
		large	grande	groß	grande	Furia	7
		very large	très grande	sehr groß	muy grande	Starlich	9
36.	VG	<u>Only diploid and tetraploid varieties:</u>	<u>Variétés diploïdes et tétraploïdes</u>	<u>Nur diploide und tetraploide Sorten:</u>	<u>Sólo variedades diploides y tetraploides:</u>		
(+)	Seed: patches at hilum	seulement : Graine : taches sur le hile	Samen: Flecken am Nabel	Semilla: manchas en el hilo			
QN	(d)	absent or very weak	absentes ou très faibles	fehlend oder sehr schwach	ausentes o muy débil	Daisen, Kahô	1
		medium	moyennes	mittel	media	Kurobe, Rattle Snake, Yamato 3	2
		strong	fortes	stark	fuerte		3
37.	VG	Time of female flowering	Époque de floraison femelle	Zeitpunkt der weiblichen Blüte	Época de la floración femenina		
(+)							
QN		early	précoce	früh	temprana	Tiny Orchid	3
		medium	moyenne	mittel	media	Sugar Baby, Yamato 3	5
		late	tardive	spät	tardía	Kurobe	7
38.	VG	Resistance to <i>Fusarium oxysporum</i> f.sp. <i>niveum</i>	Résistance au <i>Fusarium oxysporum</i> f.sp. <i>niveum</i>	Resistenz gegen <i>Fusarium oxysporum</i> f.sp. <i>niveum</i>	Resistencia a <i>Fusarium oxysporum</i> f. sp. <i>niveum</i>		
(+)							
38.1		Race 0	Pathotype 0	Pathotyp 0	Raza 0		
QL		absent	absente	fehlend	ausente	Kahô, Sugar Baby	1
		present	présente	vorhanden	presente	Calhoun Gray, Charleston Gray	9
38.2		Race 1	Pathotype 1	Pathotyp 1	Raza 1		
QL		absent	absente	fehlend	ausente	Charleston Gray, Kahô, Sugar Baby	1
		present	présente	vorhanden	presente	Calhoun Gray	9
38.3		Race 2	Pathotype 2	Pathotyp 2	Raza 2		
QL		absent	absente	fehlend	ausente	Calhoun Gray, Kahô	1
		present	présente	vorhanden	presente	PI 296341-FR	9
39.	VG	Resistance to <i>Colletotrichum orbiculare</i>	Résistance au <i>Colletotrichum orbiculare</i>	Resistenz gegen <i>Colletotrichum orbiculare</i>	Resistencia a <i>Colletotrichum orbiculare</i>		
(+)							
39.1		Race 1	Pathotype 1	Pathotyp 1	Raza 1		
QL		absent	absente	fehlend	ausente	Black Diamond, Calhoun Gray, Kahô	1
		present	présente	vorhanden	presente	Charleston Gray, Congo, Jubilee	9

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) Cotyledon: Observations on the cotyledon should be observed when the cotyledons are fully developed and before the development of the first leaf: the surface is flat and the attitude is horizontal.



- (b) Leaf blade: Observations on the leaf blade should be made on fully developed leaves on the main vine, from the 10th to the 15th leaf, during fruit set, before the fruits are developed.
- (c) Fruit: Observations on the fruit should be made on first well developed, mature fruits.
- (d) Seed: Observations on the seed should be recorded on fully developed, mature seeds harvested from the fruit.

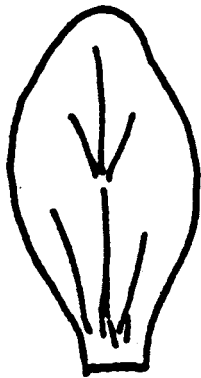
8.2 *Explanations for individual characteristics*

Ad. 1: Ploidy

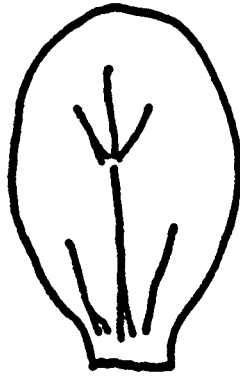
Ploidy level may be detected by several methods:

- a. by counting chromosomes of cells under the microscope;
- b. by counting the number chloroplasts of stomatal guard cells using a leaf peel under the microscope;
- c. by flow cytometry.
- d. Triploid varieties show a whitish seed coat without embryo.

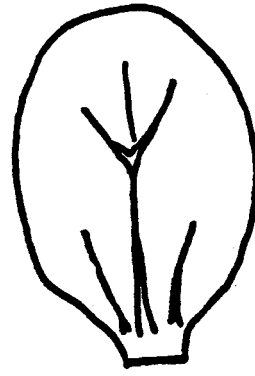
Ad. 3: Cotyledon: shape



1
narrow elliptic



2
medium elliptic

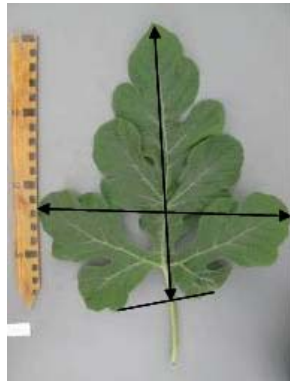


3
broad elliptic

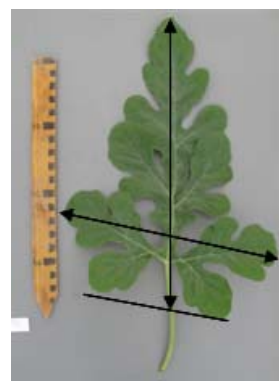
Ad. 6: Leaf blade: ratio length/width



1
low



2
medium



3
high

Ad. 8: Leaf blade: degree of lobing



3
weak



5
medium



7
strong

Ad. 9: Leaf blade: blistering

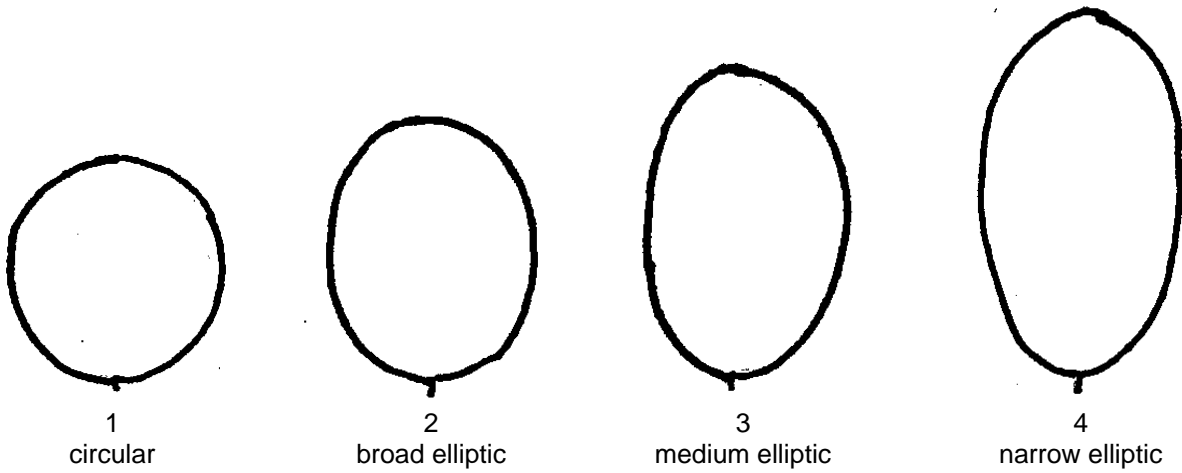


1
weak

2
medium

3
strong

Ad. 12: Fruit: shape in longitudinal section



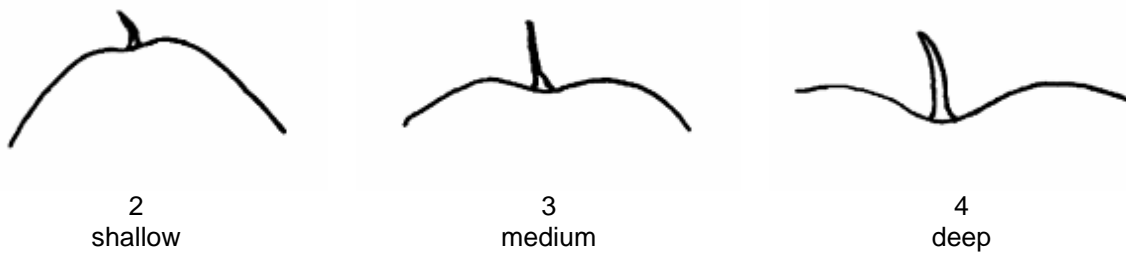
1
circular

2
broad elliptic

3
medium elliptic

4
narrow elliptic

Ad. 13: Fruit: depression at base

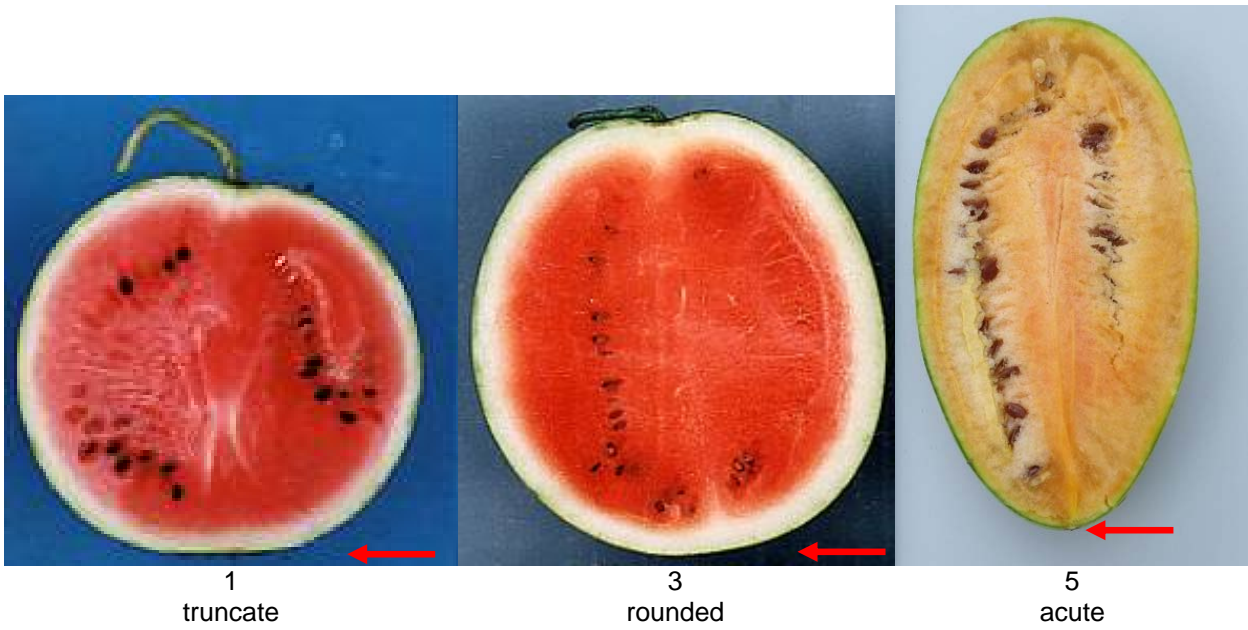


2
shallow

3
medium

4
deep

Ad. 14: Fruit: shape of apical part



Ad. 15: Fruit: depression at apex



Ad. 16: Fruit: ground color of skin

The ground color is the lightest color of the skin. In case of striped fruits, the darker color of the skin concerns the stripes.

Ad. 17: Fruit: conspicuousness of veining



1
inconspicuous or very weakly conspicuous



2
weak



3
medium



4
strong

Ad. 18: Fruit: pattern of stripes



1
only one colored



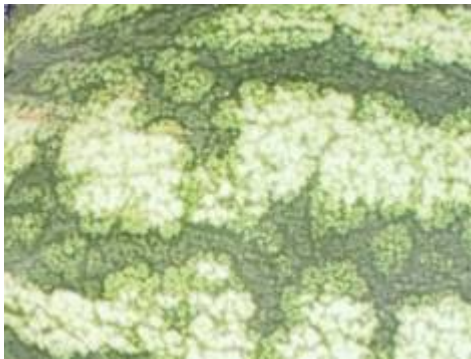
2
one colored and veins



3
one colored, veins and marbled



4
one colored and marbled



5
two colored, veins and marbled



6
only veins

Ad. 19: Fruit: width of stripes

The ground color is the lightest color of the skin. In case of striped fruits, the darker color of the skin concerns the stripes.



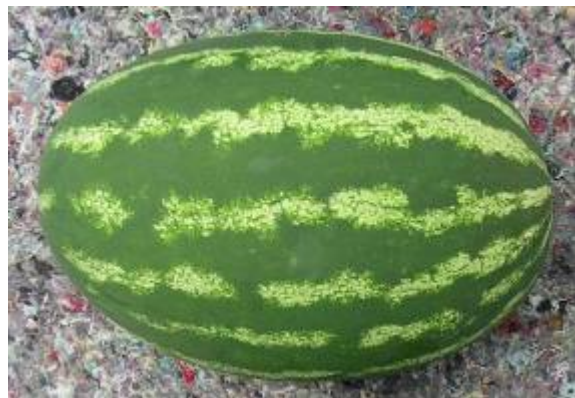
1
very narrow



3
narrow



5
medium



7
broad



9
very broad

Ad. 20: Fruit: main color of stripes

The color of the stripes is darker than the ground color of the skin. In case the stripes have more than one color the one with the largest total surface area is the main color. In cases where the areas of the main and secondary color are too similar to reliably decide which color has the largest area, the darkest color is considered to be the main color.

Ad. 21: Fruit: conspicuousness of stripes



1
inconspicuous or very weakly conspicuous



2
weak



3
medium



4
strong



5
very strong

Ad. 22: Fruit: margin of stripes



1
diffuse



2
medium



3
sharp

Ad. 23: Fruit: size of insertion of peduncle

The size of the insertion of the peduncle is absolute and not relative to fruit size.

Ad. 24: Fruit: size of pistil scar

The size of the pistil scar is absolute and not relative to fruit size.

Ad. 25: Fruit: grooving



1
absent or very weak



3
medium

Ad. 26: Fruit: waxy layer



1
absent or very weak



3
medium



5
very strong

Ad. 27: Fruit: thickness of pericarp

The thickness of pericarp is absolute and not relative to fruit size.



1
very thin



3
thin



5
medium



7
thick



9
very thick

Ad. 28: Fruit: main color of flesh

The main color of the flesh should be observed at fruits cut in longitudinal section. In case the flesh has two colors, the one with the largest total surface area is the main color. In cases where the areas of the main and secondary color are too similar to reliably decide which color has the largest area, the darkest color is considered to be the main color.

Ad. 32: Only diploid and tetraploid varieties: Seed: ratio length/width



1
very low



3
medium



5
very high

Ad. 33: Only diploid and tetraploid varieties: Seed: ground color of testa

The ground color is the first color of the testa to appear during the development of the seed. The over color is the color that develops over time upon the ground color, and appears as black spots.



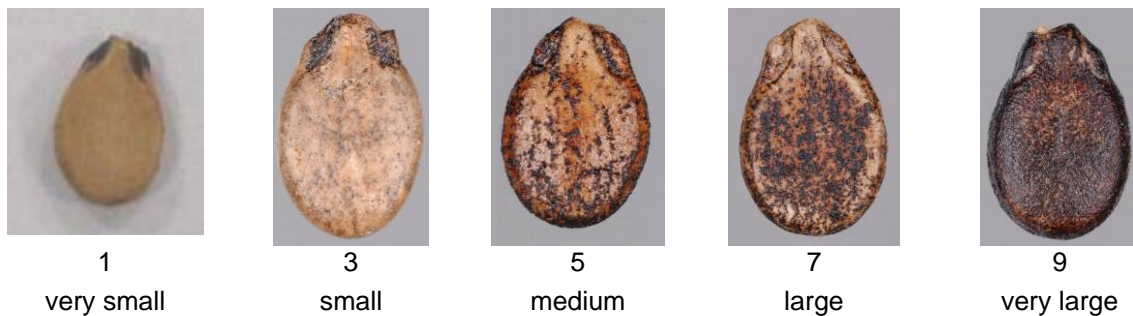
Ad. 34: Only diploid and tetraploid varieties: Seed: over color of testa

The ground color is the first color of the testa to appear during the development of the seed. The over color is the color that develops over time upon the ground color, and appears as black spots.



Ad. 35: Only diploid and tetraploid varieties: Seed: area of over color in relation to that of ground color

The ground color is the first color of the testa to appear during the development of the seed. The over color is the color that develops over time upon the ground color, and appears as black spots.



Ad. 36: Only diploid and tetraploid varieties: Seed: patches at hilum



Ad. 37: Time of female flowering

50% of plants with at least one female flower.

Ad. 38: Resistance to *Fusarium oxysporum* f. sp. *niveum*

1. Pathogen *Fusarium oxysporum* f. sp. *niveum*
2. Quarantine status no
3. Host species watermelon (*Citrullus lanatus*)
4. Source of inoculum..... Naktuinbouw
5. Isolate Fon: 0, 1, 2
6. Establishment isolate identity differentials
7. Establishment pathogenicity..... susceptible varieties
8. Multiplication inoculums..... PDA or PSA; renew from frozen stock annually
9. Format of the test
- 9.1 Number of plants per genotype. 20
- 9.2 Number of replicates 2
- 9.3 Control varieties..... differentials

	Fon: 0	Fon: 1	Fon: 2
Black Diamond, Kahô	S	S	S
Charleston Gray	R	S	S
Calhoun Gray	R	R	S
P.I. 296341-FR	R	R	R
- 9.4 Test design include at least the two most informative differential varieties
- 9.5 Test facility..... glasshouse or climate room
- 9.6 Temperature..... day 25°C, night 15°C
- 9.7 Light..... > 12 hours
- 9.9 Special measures apply liquid fertilizer once a week
10. Inoculation
- 10.1 Preparation inoculum Czapek Dox or PS (potato and sugar); aerated liquid culture at 28°C; filter through double muslin
- 10.2 Quantification inoculum count 1.3×10^7 spores per ml, dilute if necessary
- 10.3 Plant stage at inoculation 2nd to 3rd leaf just expanding
- 10.4 Inoculation method soaking of roots and of hypocotyl axis for one minute in inoculum solution. After inoculation, transplantation of plantlets in steam-sterilized soil or perlite.
- 10.5 First observation 7 days after inoculation
- 10.6 Second observation..... 14 days after inoculation
- 10.7 End of test 21 days after inoculation
11. Observations
- 11.1 Method..... visual, external
- 11.2 Observation scale lesions equal to or more than 2 mm in size
- 11.3 Validation of test standard varieties
12. Interpretation of data in terms of UPOV characteristic states
 - [1] lesions equal to or more than 2 mm in size
 - [9] without external symptoms
13. Critical control points

Resistant plants show no or little delayed growth but no internal or external symptoms. Vascular browning is the most reliable diagnostic symptom. Plants with external symptoms should have vascular browning, otherwise the symptom may be caused by *Pythium*.

Ad. 39: Resistance to *Colletotrichum orbiculare*

1. Pathogen *Colletotrichum orbiculare* (anthracnose)
2. Quarantine status no
3. Host species *Citrullus lanatus* (watermelon)
4. Source of inoculum..... Academic research
5. Isolate Co: 1
6. Establishment isolate identity on differentials
7. Establishment pathogenicity..... on susceptible varieties
8. Multiplication inoculum
- 8.1 Multiplication medium PSA, renew from frozen stock annually
- 9.1 Number of plants per genotype. 20
- 9.2 Number of replicates 2
- 9.3 Control varieties..... differentials: Calhoun Gray susceptible,
Charleston Gray resistant
- 9.4 Test design..... including at least the most informative differentials
- 9.5 Test facility..... glasshouse or climate room
- 9.6 Temperature..... day 25°C, night 16°C
- 9.7 Light..... >12 hours
- 9.9 Special measures..... inoculated plants should be placed in a dark and humid chamber
at 25°C with 100% relative humidity for 48 hours before being
moved to the greenhouse.
10. Inoculation
- 10.1 Preparation inoculum shaking culture in P.D. (Potato and Dextrose) liquid medium for 7 to
10 days at 28°C. Filter the medium through double muslin cloth.
- 10.2 Quantification inoculum 1.5×10^4 spores per ml
- 10.3 Plant stage at inoculation 2nd or 3rd leaf just expanding
- 10.4 Inoculation method spraying of inoculum on leaf and stem
- 10.5 First observation 7 days
- 10.7 End of test 10 days
11. Observations
- 11.1 Method..... Visual
- 11.2 Observation scale lesions equal to or more than 2 mm in size
lesions may coalesce and kill the leaf back to the petiole.
- 11.3 Validation of test..... on standard varieties
12. Interpretation of data in terms of UPOV characteristic states
[1] lesions equal to or more than 2 mm in size
[9] lesions absent or less than 2 mm in size
13. Critical control points
Lesions that stay small and tend towards necrosis indicate resistance. Complete absence of symptoms
indicates a low disease pressure or high resistance.

9. Literature

- Corell, J.C., Morelock, T. E. and McNew, R.E., 1993: Reexamination of races of the cucurbit anthracnose pathogen *Colletotrichum orbiculare*. *Phytopathology* 83: pp. 1190-1198
- Crall, J.M., 1959: Effect of Seed Source on Watermelon Maturity, *Proc. Amer. Soc. Hort. Sci.* 74, pp. 555-557
- Crall, J.M., Montelaro, J., 1972: *Fusarium* Wilt Resistance in Jubilee Watermelon, *Proc. Fra. State Hoet. Soc.* 85, pp 102-105
- Cucurbit Genetics Cooperative, Cucurbit Gene List Committee, 1987: Gene List for Watermelon, *Cucurbit Gent.Coop. Rpt.* 10, pp. 106-110
- Cucurbit Genetics Cooperative, 2007: Gene List for Watermelon
- Elmstrom, G.W., Hopkins, D.L., 1981: Resistance of Watermelon Cultivars to *Fusarium* Wilt, *Plant Disease* 65(10), pp. 825-827
- Grubben, G.J.H., Denton, O.A. (Editors), 2004: *Plant Resources of Tropical Africa 2: Vegetables*, Prota Foundation, Wageningen pp. 185-191
- Gusmini, G., Wehner, T.C., 2005: Genes determining rind pattern inheritance in watermelon: a review, *HortScience* 40: pp. 1928-1930
- Gusmini, G., and Wehner, T. C., 2006: Qualitative inheritance of rind pattern and flesh color in watermelon, *J. Hered.* 97: pp. 177-185
- Kanda, T., 1951: Triploid Watermelons, *Proc. Am. Soc. Hortic. Sci.* 58, pp. 217-230
- Kensler, T.R., Barham, W.S., 1958: The Inheritance of Seed Size in Watermelon, *Proc. Amer. Soc. Hort. Sci.* 71, pp. 480-484
- Martyn, R.D., McLaughlin, R.J., 1983: Susceptibility of Summer Squash to the Watermelon Wilt Pathogen (*Fusarium oxysporum* f. sp. *niveum*), *Plant Disease* 67(3), pp. 263-266
- Martyn, R.D., Netzer, D., 1991: Resistance to Race 0, 1 and 2 of *Fusarium* Wilt of Watermelon in *Citrullus* sp., PI-296341-FR
- Maynard, D.N., Xingping Zhang, Jannick, J., 2007: Watermelons: New Choices, New Trends, *Chronica Horticulturae* 47(4), pp. 26-29
- McCuiston, F. and Wehner, Todd C., 2010: Seedless Watermelon Breeding: Tetraploid Production, Unpublished, NC State University
- Mizyno, S., Pratt, H.K., 1973: Relations of Respiration and Ethylene Production to Maturity in the Watermelon, *J. Amer. Soc. Hort. Sci.* 98(6), pp. 614-617
- Mohr, H.C., 1963: Utilization of the Genetic Character for Short-internode in Improvement of the Watermelon, *J. Amer. Soc. Hort. Sci.* 82, pp. 454-459
- Ochatt, S.J.: Flow Cytometry, (ploidy determination, cell cycle analysis, DNA content per nucleus), *Medicago truncatula* handbook version November 2006; INRA France
- Pool, C.F., Porter, D.R., 1933: Pollen Germination and Development in Watermelon, *Proc. Amer. Soc. Hort. Sci.* 30, pp. 526-530
- Pool, C.F., Grimball, P.C., Porter, D.R., 1941: Inheritance of Seed Characters in Watermelon, *Jour. Agr. Res.* 66, pp. 433-456

Prusky, D., Freeman, S., Dickman M.B., eds., 2000. *Colletotrichum*: Host specificity, Pathology and Host-pathogen interactions. APS, St. Paul, Chapter 21 Host-pathogen interaction and variability of *Colletotrichum lindemuthianum*. Wasilwa L.A.

Siemonsma, J.S., Piluek, K. (ed.), 1993: Plant resources of South East Asia No.8: Vegetables, Wageningen Pudoc, pp. 144-148

Shinohara, S., 1984: Vegetable Seed Production Technology of Japan Elucidated with Respective Variety Development Histories, Particulars, Volume 1. Shinohara's Authorized Agricultural Consulting Engineer Office, Tokyo, Japan, pp. 318-339

Shomotsuma, M., Jines, C.M., 1972: Effect of Ethephon and Daylight on Sex Expression of Muskmelon and Watermelon, Hort. Sci. 7, pp. 73-75

Wasilwa, L.A., Correll J.C., Morelock T.E., and McNew R.E. 1993: Reexamination of races of the cucurbit anthracnose pathogen *Colletotrichum orbiculare*. Phytopathology 83: pp. 1190-1198.

Wehner, T.C., 2008: Overview of the Genes of Watermelon, Proc. Cucurbitaceae 2008, EUCARPIA meeting, (ed. M. Pitrat) pp. 79-89

Wehner, T.C., 2008: Watermelon In: J. Prohens and F. Nuez (eds.) Handbook of Plant Breeding; Vegetables I: Asteraceae, Brassicaceae, Chenopodiaceae, and Cucurbitaceae. Springer Science+Business LLC, New York, NY, 426 p.17, pp. 381-418

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	<input type="text" value="Citrullus lanatus (Thunb.) Matsum. et Nakai"/>	
1.2 Common name	<input type="text" value="Watermelon"/>	
2. Applicant		
Name	<input type="text"/>	
Address	<input type="text"/>	
Telephone No.	<input type="text"/>	
Fax No.	<input type="text"/>	
E-mail address	<input type="text"/>	
Breeder (if different from applicant)	<input type="text"/>	
3. Proposed denomination and breeder's reference		
Proposed denomination (if available)	<input type="text"/>	
Breeder's reference	<input type="text"/>	

#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

- (i) Inbred line
- (ii) Hybrid
- (iii) Open-pollinated variety
- (iv) Other (provide details)

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.

4.2 Method of propagating the variety

Seed-propagated varieties

- | | | |
|-----|--------------------------|-----|
| (a) | Self-pollination | [] |
| (b) | Cross-pollination | |
| | (i) population | [] |
| | (ii) synthetic variety | [] |
| (c) | Hybrid | [] |
| (d) | Other | [] |
| | (please provide details) | |

--

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

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

Characteristics	Example Varieties	Note
5.1 Ploidy (1)		
diploid	SP 4, Sugar Baby, Yamato 3	2[]
triploid	Boston, TRIX 313	3[]
tetraploid		4[]
5.2 Fruit: weight (11)		
very low	Monaco, New Hampshire Midget	1[]
very low to low	Mini, Petite Perfection	2[]
low	Angela	3[]
low to medium	Pasion, Sugar Baby	4[]
medium	Boston	5[]
medium to high	Crimson Sweet, Panonnia	6[]
high	Fabiola	7[]
high to very high	Jubilee	8[]
very high	Carolina Cross, Cobb's Gem, Florida Giant	9[]
5.3 Fruit: shape in longitudinal section (12)		
circular	Camilla, Kanro	1[]
broad elliptic	Fumin, Gray Belle, Yellow Baby, Zorba	2[]
medium elliptic	Congo, Kurobe, Picnic	3[]
narrow elliptic	All Sweet, Charleston Gray	4[]

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

Characteristics	Example Varieties	Note
5.4 Fruit: ground color of skin (16)		
yellow	Taiyō	1[]
very light green	Ipanema	2[]
very light green to light green	Napsugar	3[]
light green	Tigre	4[]
light green to medium green	Pepsin	5[]
medium green	Ovation, Talete	6[]
medium green to dark green	Odem, Resistant, Sweet Marvel	7[]
dark green	Sugar Baby	8[]
dark green to very dark green	Augusta, Rocio	9[]
very dark green		10[]
5.5 Fruit: width of stripes (19)		
very narrow	SP 4, Tiny Orchid	1[]
very narrow to narrow		2[]
narrow	Boston	3[]
narrow to medium		4[]
medium	Crimson Sweet	5[]
medium to broad		6[]
broad	Sangria	7[]
broad to very broad		8[]
very broad	All Sweet	9[]
5.6 Fruit: margin of stripes (22)		
diffuse	Crimson Glory, Crisby	1[]
medium	Crimson Sweet	2[]
sharp	Jenny, Jubilee	3[]

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

Characteristics	Example Varieties	Note
5.7 (28) Fruit: main color of flesh		
white	SP 4, SP 1, Yamato Cream 3	1[]
yellow	Napsugár, Yamato Cream 1	2[]
orange	Kahô, Tendersweet	3[]
pink	Sadul	4[]
pinkish red	Bingo, Crimson Sweet	5[]
red	Asahi Miyako Hybrid, Sugar Baby, Topgun	6[]
dark red	Dixie Lee	7[]
5.8 (31) <u>Only diploid and tetraploid varieties:</u> Seed: length		
very short	Kudam	1[]
very short to short		2[]
short	Pannonia, Tabata	3[]
short to medium		4[]
medium	Sugar Baby	5[]
medium to long		6[]
long	Charleston Gray, Kurobe	7[]
long to very long		8[]
very long	Malali, Wanli	9[]
5.9 (33) <u>Only diploid and tetraploid varieties:</u> Seed: ground color of testa		
white	Sanpaku	1[]
cream	Kurobe	2[]
green	A confire allongée à graine verte, Green Citron	3[]
red	A graine rouge à confire à chair verte, Red Citron	4[]
red brown	Kahô	5[]
brown	Otome, Sugar Baby	6[]
black	Yamato Cream	7[]

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

6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the similar variety(ies)	Describe the expression of the characteristic(s) for your candidate variety
<i>Example</i>	<i>Fruit: width of stripes</i>	<i>narrow</i>	<i>medium</i>
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

A representative color image of the variety should accompany the Technical Questionnaire.

8. Authorization for release

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

Yes [] No []

(b) Has such authorization been obtained?

Yes [] No []

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

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

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

9. Information on plant material to be examined or submitted for examination.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

- | | | |
|---|---------|--------|
| (a) Microorganisms (e.g. virus, bacteria, phytoplasma) | Yes [] | No [] |
| (b) Chemical treatment (e.g. growth retardant, pesticide) | Yes [] | No [] |
| (c) Tissue culture | Yes [] | No [] |
| (d) Other factors | Yes [] | No [] |

Please provide details for where you have indicated "yes".

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature

Date

[End of document]