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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

CARROT

(*Daucus carota* L.)

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GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

to be considered by the Technical Committee at its fortieth session,
to be held in Geneva, Switzerland, from March 29 to 31, 2004

Alternative Names:*

Latin	*English*	*French*	*German*	*Spanish*
Daucus carota L.	Carrot	Carotte	Möhre	Zanahoria

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 *Daucus carota* L.

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of seed.

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

25 g or 30,000 seeds.

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

2.5 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.6 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.

3.3.1 Type of observation – visual or measurement

The recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 200 plants, which should be divided between two or more replicates.

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

3.5 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations on single plants should be made on 60 plants or parts taken from each of 60 plants and any other observations made on all plants in the test.

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

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:

4.2.1 Cross-pollinated varieties

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

4.2.2 Single cross hybrids and inbred lines

For the assessment of uniformity of single cross 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 200 plants, 7 off-types are allowed.

4.2.3 Hybrids

The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction. In the case of single cross hybrids, the uniformity standards are set out in Section 4.2.2.

4.3 Stability

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

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

4.3.3 Where appropriate, or in cases of doubt, the stability of a hybrid variety may, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity and stability of its parent lines

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) Leaf: length (including petiole) (characteristic 3)
(b) Root: length (characteristic 7)
(c) Root: width (characteristic 8)
(d) Root: shape in longitudinal section (characteristic 10)
(e) Root: tip when fully developed (characteristic 12)
(f) Root: external color (characteristic 13)
(g) Root: time of coloration of tip in longitudinal section (characteristic 28)

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

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

(*) Asterisked characteristic – see 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

MG Single measurement of a group of plants or parts of plants – see Section 3.3.1
MS Measurement of a number of individual plants or parts of plants – see Section 3.3.1
VG Visual assessment by a single observation of a group of plants or parts of plants – see Section 3.3.1
VS Visual assessment by observation of individual plants or parts of plants – see Section 3.3.1

(a) – (b) 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. **(+)**	**VG**	**Foliage: width of crown**	**Feuillage: largeur de la couronne**	**Laub: Breite des Blattansatzes**	**Follaje: anchura del cuello**		
QN	**(a)**	narrow	étroite	schmal	estrecho	Amsterdam 2	3
		medium	moyenne	mittel	medio	Nantaise améliorée 2, Rothild	5
		broad	large	breit	ancho	Chantenay à cœur rouge 2	7
2.	**VG**	**Leaf: attitude**	**Feuille: port**	**Blatt: Stellung**	**Hoja: porte**		
QN	**(a)**	erect	dressé	aufrecht	erecto	Touchon	1
		semi-erect	demi- dressé	halbaufrecht	semierecto	Nantaise améliorée 2	3
		prostrate	étalé	liegend	postrado		5
3. **(*)**	**VG/ MS**	**Leaf: length (including petiole)**	**Feuille: longueur (pétiole compris)**	**Blatt: Länge (einschließlich Stiel)**	**Hoja: longitud (incluido el peciolo)**		
QN	**(a)**	very short	très courte	sehr kurz	muy corta	Mokum, Mignon	1
		short	courte	kurz	corta	Amsterdam 2, Amsterdam 3	3
		medium	moyenne	mittel	media	Juwarot, Nantaise améliorée 2	5
		long	longue	lang	larga	Chantenay, Chantenay à cœur rouge 2	7
		very long	très longue	sehr lang	muy large	De Colmar à cœur rouge 2, Rothild	9
4. **(*)**	**VG**	**Leaf: division**	**Feuille: division**	**Blatt: Fiederung**	**Hoja: división**		
QN	**(a)**	fine	fine	fein	fina	Amsterdam 2, Amsterdam 3	3
		medium	moyenne	mittel	mediana	Nantaise améliorée 2, Nantaise améliorée 3	5
		coarse	grossière	grob	grosera	Hytop	7

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
5. (*)	**VG**	**Leaf: intensity of green color**	**Feuille: intensité de la couleur verte**	**Blatt: Intensität der Grünfärbung**	**Hoja: intensidad del color verde**		
QN	**(a)**	light	claire	hell	claro	Adelaide, Leonor	3
		medium	moyenne	mittel	medio	Amsterdam 2, Amsterdam 3	5
		dark	foncée	dunkel	oscuro	Rothild	7
6. (*)	**VG**	**Leaf: anthocyanin coloration of petiole**	**Feuille: pigmentation anthocyanique du pétiole**	**Blatt: Anthocyan-färbung des Blattstiels**	**Hoja: pigmentación antociánica del pecíolo**		
QL	**(a)**	absent	absente	fehlend	ausente	Amsterdam 2	1
		present	présente	vorhanden	presente	Tarenco	9
7. (*)	**VG/ MS**	**Root: length**	**Racine: longueur**	**Rübe: Länge**	**Raíz: longitud**		
QN	**(b)**	very short	très courte	sehr kurz	muy corta	Parijse Markt 2, Parijse Markt 3	1
		short	courte	kurz	corta	Chantenay	3
		medium	moyenne	mittel	media	Nantaise améliorée 2, Nantaise améliorée 3	5
		long	longue	lang	larga	Berlikumer 2, Berlikumer 3	7
		very long	très longue	sehr lang	muy large	Lange Stompe Winter	9
8. (*)	**VG/ MS**	**Root: width**	**Racine: largeur**	**Rübe: Breite**	**Raíz: anchura**		
QN	**(b)**	narrow	étroite	schmal	estrecha	Amsterdam 2, Amsterdam 3	3
		medium	moyenne	mittel	media	Nantaise améliorée 2, Nantaise améliorée 3	5
		broad	large	breit	ancha	De Colmar à cœur rouge 2, Parijse Markt 2, Parijse Markt 3	7

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
9. (*)	**VG/ MS**	**Root: ratio length/ width**	**Racine: rapport longueur/largeur**	**Rübe: Verhältnis Länge/Breite**	**Raíz: relación longitud y anchura**		
QN	**(b)**	very small	très petit	sehr klein	muy pequeña	Parijse Markt 2, Parijse Markt 3, Parmex	1
		small	petit	klein	pequeña	Courte améliorée à forcer	3
		medium	moyen	mittel	media	Chantenay	5
		large	grand	groß	grande	Nantaise améliorée 2, Nantaise améliorée 3	7
		very large	très grand	sehr groß	muy grande	Amsterdam 2	9
10. (*) (+)	**VG**	**Root: shape in longitudinal section**	**Racine: forme en section longi-tudinale**	**Rübe: Form im Längsschnitt**	**Raíz: forma en sección longitudinal**		
PQ	**(b)**	circular	arrondie	kreisförmig	circular	Parijse Markt 2, Parijse Markt 3	1
		obovate	obovale	verkehrt eiförmig	oboval		2
		obtriangular	obtriangulaire	verkehrt dreieckig	obtriangular	Chantenay, De Colmar à cœur rouge 2	3
		narrow obtriangular	obtriangulaire étroite	schmal verkehrt dreieckig	obtriángular estrecha	Imperator, De Colmar à cœur rouge 3	4
		narrow obtriangular to narrow oblong	obtriangulaire étroite à rectangulaire étroite	schmal verkehrt dreieckig bis schmal rechteckig	obtriángular estrecha a oblonga estrecha	Maestro	5
		narrow oblong	rectangulaire étroite	schmal rechteckig	oblonga estrecha	Amsterdam 2, Berlikumer 2, Berlikumer 3, Nantaise améliorée 5, Touchon	6
11. (*) (+)	**VG**	**Root: shape of shoulder**	**Racine: forme de l'épaulement**	**Rübe: Form des Kopfes**	**Raíz: forma del hombro**		
PQ	**(b)**	flat	plat	flach	plana	De Colmar à cœur rouge 2	1
		flat to rounded	plat à arrondi	flach bis abgerundet	plana a redondeada	Parijse Markt 2	2
		rounded	arrondi	abgerundet	redondeada		3
		rounded to conical	arrondi à conique	abgerundet bis kegelförmig	redondeada a cónica		4
		conical	conique	kegelförmig	cónica	Touchon	5

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
12. (*)	**VG**	**Root: tip (when fully developed)**	**Racine: extrémité (à plein développement)**	**Rübe: Ende (bei voller Entwicklung)**	**Raíz: extremo (en su pleno desarrollo)**		
PQ	**(b)**	blunt	arrondie	stumpf	romo	Berlikumer 3	1
		slightly pointed	légèrement pointue	leicht spitz	ligeramente puntiagudo	Mello Yello	2
		strongly pointed	fortement pointue	sehr spitz	muy puntiagudo	Allred, Orbit	3
13. (*)	**VG**	**Root: external color**	**Racine: couleur externe**	**Rübe: äußere Farbe**	**Raíz: color externo**		
PQ	**(b)**	white	blanche	weiß	blanco	White Satin	1
		yellow	jaune	gelb	amarillo	Mello Yello	2
		orange	orange	orange	naranja	Bingo, Tancar, Goliath, Karotan, Pinocchio	3
		pinkish red	rouge rosâtre	rosarot	rojo rosado	Nutri-red	4
		red	rouge	rot	rojo	Pulsor	5
		purple	pourpre	purpur	púrpura	Purple Haze	6
14.	**VG**	**Root: intensity of external color**	**Racine: intensité de la couleur externe**	**Rübe: Intensität der äußeren Farbe**	**Raíz: intensidad el color externo**		
QN	**(b)**	light	claire	hell	claro	Mello Yello, Bingo, Tancar	3
		medium	moyenne	mittel	medio	Nutri-red, Goliath	5
		dark	foncée	dunkel	oscuro	Purple Haze, Karotan, Pinocchio	7
15.	**VG**	**Root: anthocyanin coloration of skin of shoulder**	**Racine: pigmentation anthocyanique de la peau du collet**	**Rübe: Antho-cyanfärbung der Haut des Kopfes**	**Raíz: pigmentación antociánica de la epidermis del hombro**		
QL	**(b)**	absent	absente	fehlend	ausente	Trevor	1
		present	présente	vorhanden	presente	Touchon	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
16. (*) (+)	**VG**	**Root: extent of green color of skin of shoulder**	**Racine: extension de la coloration verte de la peau du collet**	**Rübe: Ausdehnung der Grünfärbung der Haut des Kopfes**	**Raíz: extensión del color verde de la epidermis del hombro**		
QN	**(b)**	absent or very small	nulle ou très petite	fehlend oder sehr gering	ausente o muy pequeño	Karotan	1
		small	petite	gering	pequeño	Scarla	3
		medium	moyenne	mittel	medio	De Colmar à cœur rouge 2	5
		large	grande	groß	grande	Touchon	7
		very large	très grande	sehr groß	muy grande	Lange Stompe Winter	9
17.	**VG**	**Root: ridging of surface**	**Racine: annelure de la surface**	**Rübe: Ringelung der Oberfläche**	**Raíz: anillado de la superficie**		
QN	**(b)**	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Favor, Sytan	1
		weak	faible	gering	débil	Major	3
		medium	moyenne	mittel	medio	Chantenay	5
		strong	forte	stark	fuerte	De Colmar à cœur rouge 2	7
		very strong	très forte	sehr stark	muy fuerte		9
18. (*)	**VG**	**Root: diameter of core relative to total diameter**	**Racine: diamètre du cœur par rapport au diamètre total**	**Rübe: Durch-messer des Herzens im Verhältnis zum gesamten Durch-messer**	**Raíz: diámetro del corazón en relación con el diámetro total**		
QN	**(b)**	very small	très petit	sehr klein	muy pequeño	Amsterdam 2, Amsterdam 3, Tourino	1
		small	petit	klein	pequeño	Nantaise améliorée 2, Nantaise améliorée 3	3
		medium	moyen	mittel	medio	Berlikumer 2, Berlikumer 3	5
		large	grand	groß	grande	De Colmar à cœur rouge 2	7
		very large	très grand	sehr groß	muy grande	Giganta	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
19. (*)	**VG**	**Root: color of core**	**Racine: couleur du cœur**	**Rübe: Farbe des Herzens**	**Raíz: color del corazón**		
PQ	**(b)**	white	blanc	weiß	blanco	White Satin	1
		yellow	jaune	gelb	amarillo	Jaune de Lobberich, Pariser Markt	2
		orange	orange	orange	naranja	Nantaise améliorée 2, Nantaise améliorée 3	3
		pinkish red	rouge rosâtre	rosarot	rojo rosado	Nutri-red	4
		red	rouge	rot	rojo		5
20.	**VG**	**Root: intensity of color of core**	**Racine: intensité de la couleur du cœur**	**Rübe: Intensität der Farbe des Herzens**	**Raíz: intensidad del color del corazón**		
QN	**(b)**	light	claire	hell	claro		3
		medium	moyenne	mittel	medio		5
		dark	foncée	dunkel	oscuro		7
21. (*)	**VG**	**Root: color of cortex**	**Racine: couleur du cortex**	**Rübe: Farbe der Rinde**	**Raíz: color de la corteza**		
PQ	**(b)**	white	blanc	weiß	blanco	White Satin	1
		yellow	jaune	gelb	amarillo	Mellow Yello	2
		orange	orange	orange	naranja	Allred, Carlo	3
		pinkish red	rouge rosâtre	rosarot	rojo rosado	Nutri-red	4
		red	rouge	rot	rojo		5
22.	**VG**	**Root: intensity of color of cortex**	**Racine: intensité de la couleur du cortex**	**Rübe: Intensität der Farbe der Rinde**	**Raíz: intensidad del color de la corteza**		
QN	**(b)**	light	claire	hell	claro		3
		medium	moyenne	mittel	medio		5
		dark	foncée	dunkel	oscuro		7

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
23.	**VG**	**Root: color of core compared to color of cortex**	**Racine: couleur du cœur par rapport à la couleur du cortex**	**Rübe: Farbe des Herzens im Verhältnis zur Rinde**	**Raíz: color del corazón en relación con la corteza**		
QN	**(b)**	lighter	plus claire	heller	más claro		1
		same	même couleur	gleichfarbig	mismo color		2
		darker	plus foncée	dunkler	más oscuro		3
24. (*)	**VG**	**Root: extent of green coloration of interior (in longitudinal section)**	**Racine: extension de la coloration verte à l'intérieur (en section longitudinale)**	**Rübe: Ausdehnung der Grünfärbung im Inneren (im Längsschnitt)**	**Raíz: extensión del color verde del interior (en sección longitudinal)**		
QN	**(b)**	absent or very small	nulle ou très petite	fehlend oder sehr klein	ausente o muy pequeña	Major	1
		small	petite	klein	pequeño	Meaux	3
		medium	moyenne	mittel	medio	Chantenay à cœur rouge 2, De Colmar à cœur rouge 3	5
		large	grande	groß	grande	Touchon	7
		very large	très grande	sehr groß	muy grande	Muscade	9
25.	**VG**	**Root: protrusion above soil**	**Racine: partie hors terre**	**Rübe: Sitz über dem Boden**	**Raíz: parte fuera del suelo**		
QN	**(b)**	absent or very slight	nulle ou très faible	fehlend oder sehr gering	ausente o muy pequeña	Karotan, Parijse Markt 3	1
		slight	faible	gering	pequeña	Amsterdam 2, Amsterdam 3, Nantaise améliorée 2, Nantaise améliorée 3	3
		medium	moyenne	mittel	media	Tancar, Toudo	5
		much	importante	hoch	grande	Lange Stompe Winter, Touchon	7
		very much	très importante	sehr hoch	muy grande	Blanche à collet vert hors terre	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
26.	**MS**	**Root: weight**	**Racine: poids**	**Rübe: Gewicht**	**Raíz: peso**		
QN	**(b)**	small	faible	gering	pequeño	Amsterdam 2	3
		medium	moyen	mittel	medio	Nantaise améliorée 2, Nantaise améliorée 3	5
		high	élevé	hoch	grande	Giganta	7
27. (+)	**VG**	**Varieties with blunt tip only: Root: time of development of rounded tip**	**Variétés avec extrémité arrondie seulement: Racine: époque de boutage**	**Nur Sorten mit stumpfem Ende: Rübe: Zeitpunkt der Bildung eines runden Endes**	**Solo variedades con extremo romo: Raíz: época de desarrollo del extremo redondeado**		
QN	**(b)**	early	précoce	früh	temprana	Touchon	3
		medium	moyenne	mittel	media	Tiana, Nantaise améliorée 2, Nantaise améliorée 3	5
		late	tardive	spät	tardía	Bureau, Tancar, Nantaise améliorée 7	7
28. **(*)** **(+)**	**VG**	**Root: time of coloration of tip in longitudinal section**	**Racine: époque de coloration de l'extrémité en section longitudinale**	**Rübe: Zeitpunkt der Färbung der Spitze im Längsschnitt**	**Raíz: época de coloración del extremo en sección longitudinal**		
QN	**(b)**	very early	très précoce	sehr früh	muy temprana	Parijse Markt 3	1
		early	précoce	früh	temprana	Amsterdam 2, Amsterdam 3	3
		medium	moyenne	mittel	media	Nantaise améliorée 2, Nantaise améliorée 3	5
		late	tardive	spät	tardía	De Colmar à cœur rouge 2, Touchon	7
		very late	très tardive	sehr spät	muy tardía	Goliath	9
29.	**VG**	**Plant: tendency to bolting**	**Plante: tendance à la montaison**	**Pflanze: Neigung zum Schossen**	**Planta: tendencia a la subida a flor**		
QN		weak	faible	gering	débil	Molene, Tancar	3
		medium	moyenne	mittel	media	Nantaise améliorée 2, Nantaise améliorée 3	5
		strong	forte	stark	fuerte	Touchon	7

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
30.	**VG**	**Plant: height of primary umbel at time of its flowering**	**Plante: hauteur de l'ombelle primaire à l'époque de sa floraison**	**Pflanze: Höhe der ersten Dolde zum Zeitpunkt seiner Blüte**	**Planta: altura de la umbela primaria en la época de floración**		
QN		short	basse	niedrig	baja		3
		medium	moyenne	mittel	media		5
		tall	haute	hoch	alta		7
31.	**VS**	**Plants: proportion of male sterile plants**	**Plantes: proportion de plantes mâles stériles**	**Pflanzen: Anteil männlich steriler Pflanzen**	**Plantas: proporción de plantas androestériles**		
QN		absent or very low	nulle ou très faible	fehlend oder sehr gering	ausente o muy baja	Nantaise améliorée 2, Touchon	1
		low	faible	gering	baja		3
		medium	moyenne	mittel	media	Nanco, Tino	5
		high	forte	hoch	alta	Nandor, Tancar	7
		very high	très forte	sehr hoch	muy alta		9
32.	**VS**	**Plant: type of male sterility**	**Plante: type de stérilité mâle**	**Pflanze: Typ der männlichen Sterilität**	**Planta: tipo de línea androestéril**		
QL		brown anther	anthère brune	braune Antheren	antera: marrón	Nanco	1
		petaloid anther	anthère pétaloïde	petaloide Antheren	antera petaloide	Tino	2

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

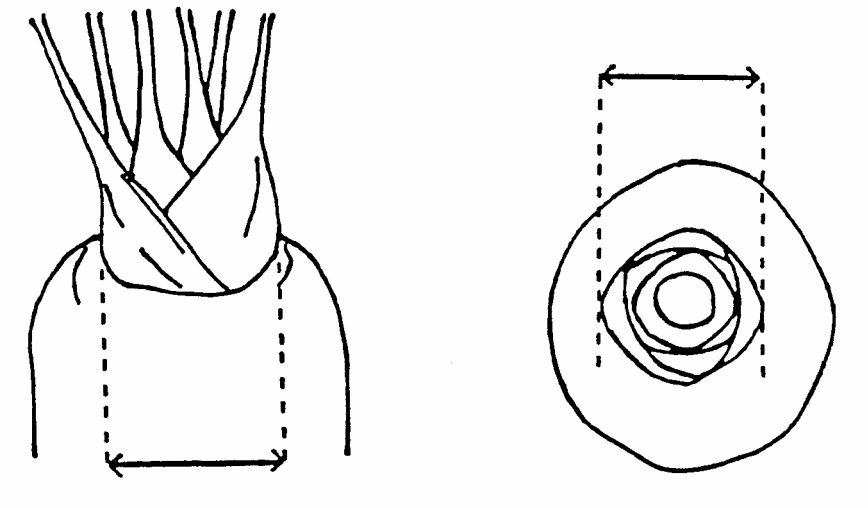
Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Foliage and leaf: All observations on the foliage and the leaf should be made at the time of full development of the foliage.

(b) Root: All observations on the root should be made when the root is fully developed.

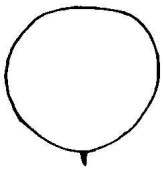
8.2 Explanations for individual characteristics

Ad. 1: Foliage: width of crown

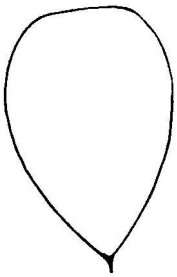


lateral vertical

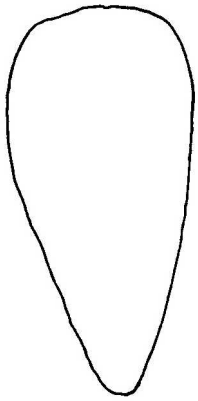
Ad. 10: Root: shape in longitudinal section



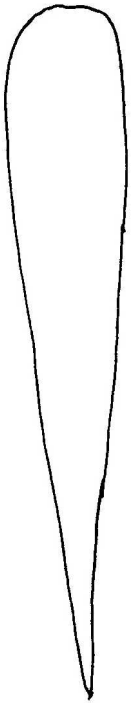
1
circular



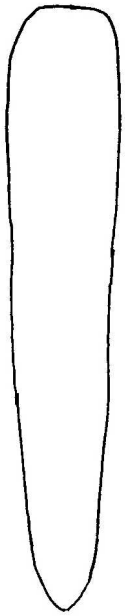
2
obovate



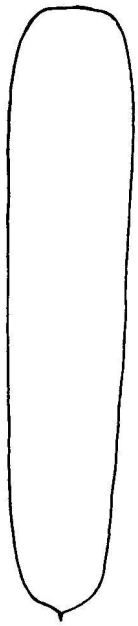
3
obtriangular



4
narrow obtriangular

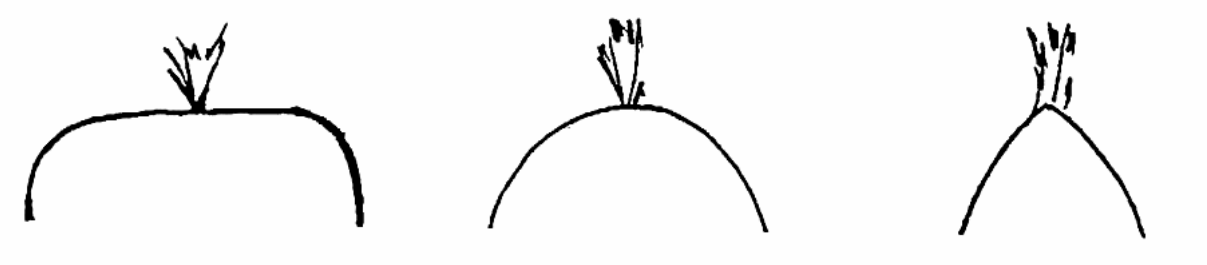


5
narrow obtriangular to narrow oblong



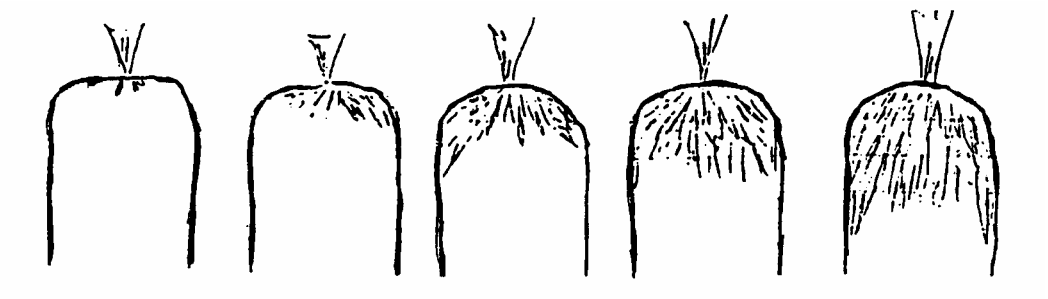
6
narrow oblong

Ad. 11: Root: shape of shoulder



1	3	5
flat	rounded	conical

Ad. 16: Root: extent of green color of skin of shoulder



1	3	5	7	9
absent or very small	small	medium	large	very large

Ad. 27: Varieties with blunt tip only: Root: time of development of rounded tip
Ad. 28: Root: time of coloration of tip in longitudinal section

The earliness of carrot varieties can be judged according to two criteria, characteristic 27, time of development of "rounded tip" for the varieties with a blunt tip at maturity and characteristic 28, time of coloration of the tip in longitudinal section.

Three weeks before the normal maturity date of the varieties (where the variety 'Touchon' has a blunt tip): pull up of part of the test roots in order to judge the shape of the tip, characteristic 27 (early: blunt tip: variety 'Touchon,' medium: varieties 'Tiana,' 'Nantaise améliorée 2,' 'Nantaise améliorée 3,' late: pointed tip: varieties 'Bureau,' 'Tancar,' 'Nantaise améliorée 7').

Following longitudinal cutting of the roots: examination of the coloration of the tip, characteristic 28 (early: colored tip: varieties 'Amsterdam 2,' 'Amsterdam 3,' late: whitish tip: varieties 'De Colmar à coeur rouge 2,' 'Touchon').

A good example is the variety 'Touchon' which is early for characteristic 27 and late for characteristic 28.

9. Literature

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Small, E., 1978: "A Numerical Taxonomic Analysis of the Daucus Carota Complex," Canadian Journal of Botany, 56(3), 248-276

Welch, J.E. & Grimball, E.L., 1947: "Male Sterility in the Carrot," Science, 106, 594

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

In the case of hybrid varieties which are the subject of an application for plant breeders' rights, and where the parent lines are to be submitted as a part of the examination of the hybrid variety, this Technical Questionnaire should be completed for each of the parent lines, in addition to being completed for the hybrid variety.

1. Subject of the Technical Questionnaire

1.1 *Latin Name*	*Daucus carota* L.
1.2 Common Name	Carrot

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) 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

4.2.1 Seed-propagated varieties

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

4.2.2 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 (3)	**Leaf: length (including petiole)**		
	very short	Mokum, Mignon	1[ ]
	short	Amsterdam 2, Amsterdam 3	3[ ]
	medium	Juwarot, Nantaise améliorée 2	5[ ]
	long	Chantenay, Chantenay à cœur rouge 2	7[ ]
	very long	De Colmar à cœur rouge 2, Rothild	9[ ]
5.2 (5)	**Leaf: intensity of green color**		
	light	Adelaide, Leonor	3[ ]
	medium	Amsterdam 2, Amsterdam 3	5[ ]
	dark	Rothild	7[ ]
5.3 (7)	**Root: length**		
	very short	Parijse Markt 2, Parijse Markt 3	1[ ]
	short	Chantenay	3[ ]
	medium	Nantaise améliorée 2, Nantaise améliorée 3	5[ ]
	long	Berlikumer 2, Berlikumer 3	7[ ]
	very long	Lange Stompe Winter	9[ ]

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

	Characteristics	Example Varieties	Note
5.4 (8)	**Root: width**		
	narrow	Amsterdam 2, Amsterdam 3	3[ ]
	medium	Nantaise améliorée 2, Nantaise améliorée 3	5[ ]
	broad	De Colmar à cœur rouge 2, Parijse Markt 2, Parijse Markt 3	7[ ]
5.5 (10)	**Root: shape in longitudinal section**		
	circular	Parijse Markt 2, Parijse Markt 3	1[ ]
	obovate		2[ ]
	obtriangular	Chantenay, De Colmar à cœur rouge 2	3[ ]
	narrow obtriangular	Imperator, De Colmar à cœur rouge 3	4[ ]
	narrow obtriangular to narrow oblong	Maestro	5[ ]
	narrow oblong	Amsterdam 2, Berlikumer 2, Berlikumer 3, Nantaise améliorée 5, Touchon	6[ ]
5.6 (11)	**Root: shape of shoulder**		
	flat	De Colmar à cœur rouge 2	1[ ]
	flat to rounded	Parijse Markt 2	2[ ]
	rounded		3[ ]
	rounded to conical		4[ ]
	conical	Touchon	5[ ]
5.7 (12)	**Root: tip (when fully developed)**		
	blunt	Berlikumer 3	1[ ]
	slightly pointed	Mello Yello	2[ ]
	strongly pointed	Allred, Orbit	3[ ]

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

	Characteristics	Example Varieties	Note
5.8 (13)	**Root: external color**		
	white	White Satin	1[ ]
	yellow	Mello Yello	2[ ]
	orange	Bingo, Tancar, Goliath, Karotan, Pinocchio	3[ ]
	pinkish red	Nutri-red	4[ ]
	red	Pulsor	5[ ]
	purple	Purple Haze	6[ ]
5.9 (14)	**Root: intensity of external color**		
	light	Mello Yello, Bingo, Tancar	3[ ]
	medium	Nutri-red, Goliath	5[ ]
	dark	Purple Haze, Karotan, Pinocchio	7[ ]
5.10 (19)	**Root: color of core**		
	white	White Satin	1[ ]
	yellow	Jaune de Lobberich, Pariser Markt	2[ ]
	orange	Nantaise améliorée 2, Nantaise améliorée 3	3[ ]
	pinkish red	Nutri-red	4[ ]
	red		5[ ]

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

5.11 (28) Root: time of coloration of tip in longitudinal section

very early	Parijse Markt 3	1[ ]
early	Amsterdam 2, Amsterdam 3	3[ ]
medium	Nantaise améliorée 2, Nantaise améliorée 3	5[ ]
late	De Colmar à cœur rouge 2, Touchon	7[ ]
very late	Goliath	9[ ]

6. Similar varieties and differences from these varieties

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

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Root: external color*	*orange*	*pinkish red*

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 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]