E

TG/37/10

UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

UNION INTERNATIONALE POUR LA PROTECTION DES OBTENTIONS VÉGÉTALES

INTERNATIONALER VERBAND ZUM SCHUTZ VON PFLANZEN-ZÜCHTUNGEN

UNIÓN INTERNACIONAL PARA LA PROTECCIÓN DE LAS OBTENCIONES VEGETALES

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

TURNIP

(*Brassica rapa* L.
var. *rapa* L.)

GENEVA
2001

* * * * * * *

TG/37/10
ORIGINAL: English
DATE: 2001-04-04

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

UNION INTERNATIONALE POUR LA PROTECTION DES OBTENTIONS VÉGÉTALES

INTERNATIONALER VERBAND ZUM SCHUTZ VON PFLANZEN-ZÜCHTUNGEN

UNIÓN INTERNACIONAL PARA LA PROTECCIÓN DE LAS OBTENCIONES VEGETALES

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

TURNIP

(*Brassica rapa* L. var. *rapa* L.)

These Guidelines should be read in conjunction with document TG/1/2, which contains explanatory notes on the general principles on which the Guidelines have been established.

TABLE OF CONTENTS PAGE

I. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Brassica rapa* L. var. *rapa* L. with swollen roots.

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the seed required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. The minimum quantity of seed to be supplied by the applicant in one or several samples should be:

50 g.

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing seed in the country in which the application is made. The germination capacity should be as high as possible.

2. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

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

2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

3. The tests should be carried out under conditions ensuring normal growth. The size of the plots should be such that plants or parts of plants may be removed for measurement and counting without prejudice to the observations which must be made up to the end of the growing period. As a minimum, each test should include a total of 60 plants which should be divided between two or more replicates. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions.

4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. Unless otherwise indicated, all observations determined by measurement, weighing or counting should be made on 40 plants or parts taken from each of 40 plants.

2. For the assessment of uniformity of open-pollinated and hybrid varieties relative uniformity standards should be applied.

3. Unless otherwise indicated, all observations on the foliage should be made on fully developed leaves which show no sign of senescence.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

2. It is recommended that the competent authorities use the following characteristics for grouping varieties:

(a) Ploidy (characteristic 1)
(b) Leaf: type (characteristic 5)
(c) Root: color of skin above soil (characteristic 18)
(d) Root: color of flesh (characteristic 21)
(e) Root: shape in longitudinal section (characteristic 24).

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Table of Characteristics should be used.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of the different characteristics.

3. Legend:

(*) Characteristics that should be used on all varieties in every growing cycle over which the examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

(+) See Explanations on the Table of Characteristics in Chapter VIII.

[1)] The optimum stage of development (growth key) for the assessment of each characteristic is indicated by a number in the second column. The stages of development (growth key) denoted by each number are described at the end of Chapter VIII.

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

	Stage [1] Stade [1] Stadium [1] Estadio [1]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	00	**Ploidy**	**Ploïdie**	**Ploidie**	**Ploidía**		
		diploid	diploïde	diploid	diploide	Milan White	2
		tetraploid	tétraploïde	tetraploid	tetraploide	Taronda	4
2.	100-130	**Leaf: attitude**	**Feuille: port**	**Blatt: Stellung**	**Hoja: porte**		
		erect	dressé	aufrecht	erecto	Samson	1
		semi-erect	demi-dressé	halbaufrecht	semierecto	Agressa	3
		horizontal	horizontal	waagerecht	horizontal	Teltower Kleine	5
3. (+)	100-130	**Leaf: reflexing of top**	**Feuille: enroulement du sommet**	**Blatt: Umbiegen der Spitze**	**Hoja: curvatura del ápice**		
		absent or very weak	nul ou très faible	fehlend oder sehr gering	ausente o muy débil		1
		weak	faible	gering	débil	Tigra	3
		medium	moyen	mittel	media		5
		strong	fort	stark	fuerte	Noir long	7
		very strong	très fort	sehr stark	muy fuerte		9
4. (*)	100-130	**Leaf: green color**	**Feuille: couleur verte**	**Blatt: Grünfärbung**	**Hoja: color verde**		
		very light	très claire	sehr hell	muy claro		1
		light	claire	hell	claro	Leielander	3
		medium	moyenne	mittel	medio	Bency	5
		dark	foncée	dunkel	oscuro	Frisia	7
		very dark	très foncée	sehr dunkel	muy oscuro	Aberdeen Green Top Yellow	9
5. (*) (+)	100-130	**Leaf: type**	**Feuille: type**	**Blatt: Lappung**	**Hoja: tipo**		
		entire	entière	fehlend	entera	Polybra	1
		lobed	lobée	vorhanden	lobulada	Samson	2

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. **(+)**	100-130	**Lobed-leaf varieties only: Leaf: number of lobes**	**Uniquement variétés à feuilles lobées: Feuille: nombre de lobes**	**Nur bei gelappten Sorten: Blatt: Anzahl Lappen**	**Sólo para variedades de hoja lobulada: Hoja: número de lóbulos**		
		few	petit	gering	bajo	Tokyo Top	3
		medium	moyen	mittel	medio	De Montesson	5
		many	grand	groß	alto	Aberdeen Green Top Yellow	7
7. **(+)**	100-130	**Entire-leaf varieties only: Leaf: depth of incisions of blade base**	**Uniquement variétés à feuilles entières: Feuille: profondeur des incisions à la base du limbe**	**Nur bei nicht gelappten Sorten: Blatt: Tiefe der Einschnitte der Blattspreitenbasis**	**Sólo para variedades de hoja entera: Hoja: profundidad de las incisiones en la base del limbo**		
		very shallow	très peu profondes	sehr gering	muy poco profundas	Alander	1
		shallow	peu profondes	gering	poco profundas	Milan White	3
		medium	moyennes	mittel	medias	Teutonengold	5
		deep	profondes	tief	profundas	Tokyo Market	7
		very deep	très profondes	sehr tief	muy profundas	Polybra	9
8.	100-130	**Leaf: undulation of margin**	**Feuille: ondulation du bord**	**Blatt: Wellung des Randes**	**Hoja: ondulación del borde**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Tokyo Cross	1
		weak	faible	gering	débil	Tokyo Top	3
		medium	moyenne	mittel	media	Frisia	5
		strong	forte	stark	fuerte	Cylon	7
		very strong	très forte	sehr stark	muy fuerte	Imperial Green Globe	9
9. **(+)**	100-130	**Leaf: dentation of margin**	**Feuille: denture du bord**	**Blatt: Zähnung des Randes**	**Hoja: dentado del borde**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil		1
		weak	faible	gering	débil	Milan White	3
		medium	moyenne	mittel	medio	Polybra	5
		strong	forte	stark	fuerte	Taronda	7
		very strong	très forte	sehr stark	muy fuerte	Appin	9

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. **(*)** **(+)**	100-130	**Leaf: length**	**Feuille: longueur**	**Blatt: Länge**	**Hoja: longitud**		
		short	courte	kurz	corta	Milan White Forcing	3
		medium	moyenne	mittel	media	Tokyo Cross	5
		long	longue	lang	larga	Tyfon	7
11. **(+)**	100-130	**Leaf: width**	**Feuille: largeur**	**Blatt: Breite**	**Hoja: anchura**		
		narrow	étroite	schmal	estrecha	De Milan rouge extra hâtif à chassis	3
		medium	moyenne	mittel	media	Maschinella	5
		broad	large	breit	ancha	Tyfon	7
12.	100-130	**Lobed-leaf varieties only: Leaf: length of terminal lobe**	**Uniquement variétés à feuilles lobées: Feuille: longueur du lobe terminal**	**Nur bei gelappten Sorten: Blatt: Länge des Endlappens**	**Sólo para variedades de hoja lobulada: Hoja: longitud del lóbulo terminal**		
		short	court	kurz	pequeña	Platte Witte Mei	3
		medium	moyen	mittel	media	Snowball	5
		long	long	lang	grande	Tyfon	7
13.	100-130	**Lobed-leaf varieties only: Leaf: width of terminal lobe**	**Uniquement variétés à feuilles lobées: Feuille: largeur du lobe terminal**	**Nur bei gelappten Sorten: Blatt: Breite des Endlappens**	**Sólo para variedades de hoja lobulada: Hoja: anchura del lóbulo terminal**		
		narrow	étroit	schmal	estrecha	Platte Witte Mei	3
		medium	moyen	mittel	media	Civasto R	5
		broad	large	breit	ancha	Massif	7

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14.	100-130	**Leaf: hairiness of upper side**	**Feuille: pilosité de la face supérieure**	**Blatt: Behaarung der Oberseite**	**Hoja: vellosidad del haz**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Appin	1
		weak	faible	gering	débil	Teutongold, Tokyo Market	3
		medium	moyenne	mittel	media	De Milan rouge extra hâtif à chassis	5
		strong	forte	stark	fuerte	Blanc dur d'hiver, Blanc plat hâtif à feuille entière	7
		very strong	très forte	sehr stark	muy fuerte	Hampshire Hardy, Green Round	9
15.	100-130	**Leaf: anthocyanin coloration**	**Feuille: pigmentation anthocyanique**	**Blatt: Anthocyanfärbung**	**Hoja: pigmentación antociánica**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Leielander	1
		weak	faible	gering	débil	Bency	3
		medium	moyenne	mittel	media	The Bruce	5
		strong	forte	stark	fuerte	Scarlet Ball	7
		very strong	très forte	sehr stark	muy fuerte	Tsutsui	9
16. **(*)** **(+)**	260-290	**Root: position in soil**	**Racine: position dans le sol**	**Rübe: Sitz im Boden**	**Raiz: posición dentro del suelo**		
		very shallow	très peu profonde	sehr flach	muy poco profunda	Milan White Forcing	1
		shallow	peu profonde	flach	poco profunda	Oasis	3
		medium	moyenne	mittel	media	Agressa	5
		deep	profonde	tief	profunda	Noir long	7
		very deep	très profonde	sehr tief	muy profunda	Teltower Kleine	9
17. **(*)**	280	**Root: thick cork layer around skin**	**Racine: couche subéreuse sur l'épiderme**	**Rübe: Dicke Korkschicht auf der Haut**	**Raíz: capa suberosa sobre la piel**		
		absent	absente	fehlend	ausente	Bency	1
		present	présente	vorhanden	presente	Noir long	9

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. (*)	240-260	**Root: color of skin above soil**	**Racine: couleur de l'épiderme de la partie hors du sol**	**Rübe: Farbe der Haut oberhalb des Bodens**	**Raíz: color de la epidermis fuera del suelo**		
		white	blanc	weiß	blanco	Tokyo Cross	1
		green	vert	grün	verde	Leielander	2
		yellow	jaune	gelb	amarillo	Topaz	3
		orange	orange	orange	naranja	Golden Ball	4
		bronze	bronze	bronze	bronce	Grandessa	5
		scarlet	écarlate	scharlachrot	escarlata	Scarlet Ball	6
		reddish purple	pourpre rougeâtre	rötlichviolett	púrpura rojizo	Bency	7
		bluish purple	pourpre bleuâtre	bläulichviolett	púrpura azulado	The Bruce	8
19.	240-260	**Root: intensity of coloration of skin above soil**	**Racine: intensité de la couleur de l'épiderme de la partie hors du sol**	**Rübe: Intensität der Farbe der Haut oberhalb des Bodens**	**Raíz: intensidad del color de la piel fuera del suelo**		
		light	claire	hell	claro		3
		medium	moyenne	mittel	medio		5
		dark	foncée	dunkel	oscuro		7
20.	240-260	**Root: colour of skin below ground**	**Racine: couleur de l'épiderme de la partie enterrée**	**Rübe: Farbe der Haut in der Erde**	**Raíz: color de la epidermis dentro del suelo**		
		white	blanc	weiß	blanco	Taronda	1
		yellow	jaune	gelb	amarillo	Teutonengold	2
		red	rouge	rot	rojo	Scarlet Ball	3
		purple	pourpre	purpur	púrpura	Tsutsui	4
21. (*)	240-280	**Root: color of flesh**	**Racine: couleur de la chair**	**Rübe: Farbe des Fleisches**	**Raíz: color de la pulpa**		
		white	blanche	weiß	blanco	Agressa	1
		yellow	jaune	gelb	amarillo	Teutonengold	2

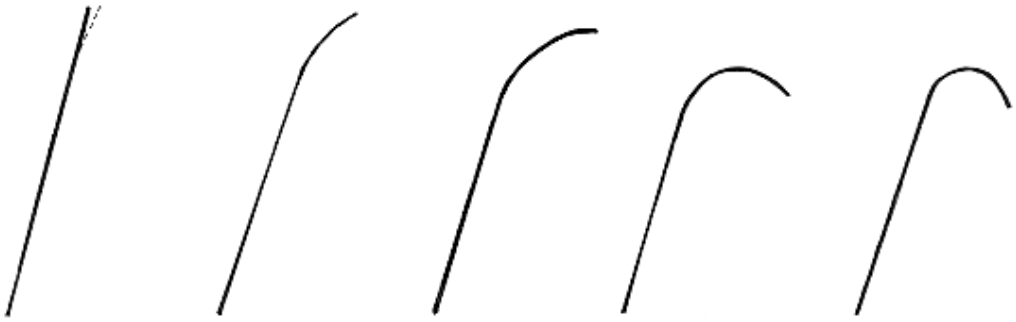
	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
22.	240-280	**Root: intensity of yellow color of flesh**	**Racine: intensité de la couleur jaune de la chair**	**Rübe: Intensität der Gelbfärbung des Fleisches**	**Raíz: intensidad del color amarillo de la pulpa**		
		light	claire	hell	claro	Findlay	3
		medium	moyenne	mittel	medio	Teutonengold	5
		dark	foncée	dunkel	oscuro	Petrowski	7
23.	240-280	**Root: anthocyanin coloration of flesh**	**Racine: pigmentation anthocyanique de la chair**	**Rübe: Anthocyanfärbung des Fleisches**	**Raíz: pigmentación antociánica de la pulpa**		
		absent	absente	fehlend	ausente	Marteau	1
		present	présente	vorhanden	presente	Scarlet Ball, Tsutsui	9
24. **(*)** **(+)**	260-280	**Root: shape in longitudinal section**	**Racine: forme en section longitudinale**	**Rübe: Form im Längsschnitt**	**Raíz: forma en sección longitudinal**		
		transverse narrow elliptic	elliptique transversale étroite	quer schmal elliptisch	elíptica estrecha transversal	Platte Witte Mei	1
		transverse elliptic	elliptique transversale	quer elliptisch	elíptica transversal	Milan White	2
		circular	circulaire	rund	circular	Rondo	3
		obovate	obovale	verkehrt eiförmig	oboval	Alwi	4
		square	droite	quadratisch	cuadrada	Champion Green Top, Yellow	5
		broad oblong	oblongue large	breit rechteckig	oblonga ancha	Rekord	6
		narrow oblong	oblongue étroite	schmal rechteckig	oblonga estrecha	Long d'Alsace	7
		obtriangular	obtriangulaire	verkehrt dreieckig	obtriangular	Sirius	8
25. **(*)**	260-280	**Root: length**	**Racine: longueur**	**Rübe: Länge**	**Raíz: longitud**		
		very short	très courte	sehr kurz	muy corta	Milan White	1
		short	courte	kurz	corta	The Wallace	3
		medium	moyenne	mittel	media	Dynamo	5
		long	longue	lang	larga	Taronda	7
		very long	très longue	sehr lang	muy larga	Alander	9

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26. **(*)**	260-280	**Root: diameter (at widest point)**	**Racine: diamètre (de la partie la plus large)**	**Rübe: Durch-messer (an der breitesten Stelle)**	**Raíz: diámetro (en la parte más ancha)**		
		small	étroit	klein	pequeña	Hakutaka	3
		medium	moyen	mittel	media	Rondo	5
		large	large	groß	grande	Massif	7
27. **(*)** **(+)**	260-280	**Root: position of widest point**	**Racine: position relative de la partie la plus large**	**Rübe: Position der breitesten Stelle**	**Raíz: posición de la parte más ancha**		
		above middle	au-dessus du milieu	oberhalb der Mitte	encima de la mitad	Marteau	1
		at middle	au centre	in der Mitte	en la mitad	Taronda	2
		below middle	dans la partie basse	unterhalb der Mitte	debajo de la mitad	Blanc dur d'hiver	3
28.	260-280	**Root: curvature of main axis**	**Racine: courbure de l'axe principal**	**Rübe: Biegung der Hauptachse**	**Raíz: curvatura del eje principal**		
		absent	absente	fehlend	ausente	Taronda	1
		present	présente	vorhanden	presente	De Croissy	9
29. **(*)** **(+)**	260-280	**Root: shape of top**	**Racine: forme du collet**	**Rübe: Form des Kopfes**	**Raíz: forma del cuello**		
		strongly indented	fortement déprimé	stark eingesenkt	muy hundido		1
		indented	déprimé	eingesenkt	hundido	Milan White Forcing	3
		flat	plat	eben	plano	Milan White	5
		raised	protubérant	vorgewölbt	prominente	Taronda	7
		strongly raised	fortement protubérant	stark vorgewölbt	muy prominente	Agressa	9
30. **(*)** **(+)**	260-280	**Root: shape of base**	**Racine: forme de la base**	**Rübe: Form der Basis**	**Raíz: forma de la base**		
		indented	déprimée	eingesenkt	hundida	Milan White Forcing	1
		truncate	tronquée	gerade	truncada	Milan White	3
		rounded	arrondie	abgerundet	redondeada	Frisia	5
		obtuse	obtuse	stumpf	obtusa	Sirius	7
		pointed	pointue	spitz	puntiaguda	Noir long	9

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.	220-260	**Root: time of harvest maturity**	**Racine: époque de maturité de la récolte**	**Rübe: Zeitpunkt der Erntereife**	**Raíz: época de madurez para la cosecha**		
		early	précoce	früh	precoz	Oasis	3
		medium	moyenne	mittel	media	Jaune Tankard	5
		late	tardive	spät	tardía	Aberdeen Green Top Yellow	7

VIII. Explanations on the Table of Characteristics

Ad. 3: Leaf: reflexing of top



1	3	5	7	9
absent or very weak	weak	medium	strong	very strong

Ad. 5: Leaf: type

1	2
entire	lobed

Assessment of leaf lobing should be undertaken on several leaves of the plant.

Plants with absent lobes have usually obovate and spatulate shaped leaves. These have continuous lamina tissue to the base of the leaf, no terminal lobe and may be strongly incised.

Ad. 6: Lobed-leaf varieties only: Leaf: number of lobes

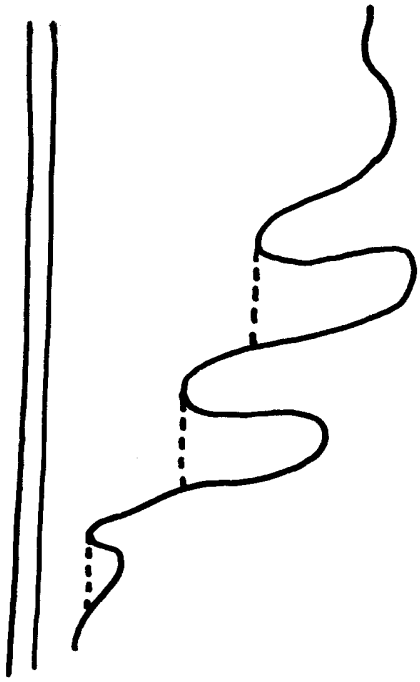


Figure 1

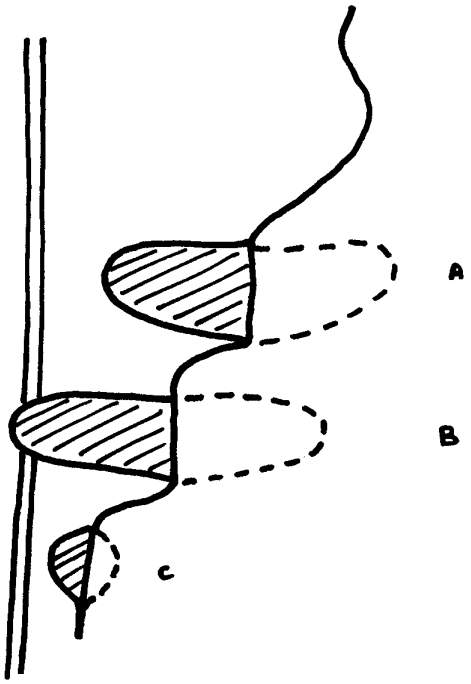


Figure 2

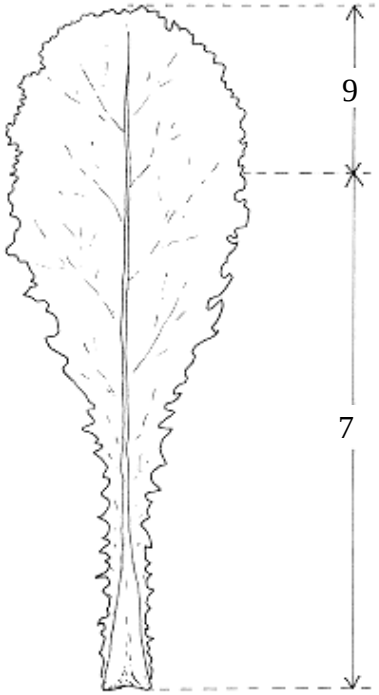
To determine whether part of the leaf is a lobe, fold that part along a line parallel to the midrib as indicated by the dotted line in figure 1. The fold starts at the base of the shorter side.

If the folded tissue meets the midrib, it is a lobe (figure 2).
A lobe must have a minimum length of 1 cm.

A is not a lobe as it does not meet the midrib when folded
B is a lobe as it meets the midrib when folded
C is too small to be a lobe as it is less than 1 cm in length and does not meet the midrib when folded.

Ad. 7: Entire-leaf varieties only: Leaf: depth of incisions of blade base

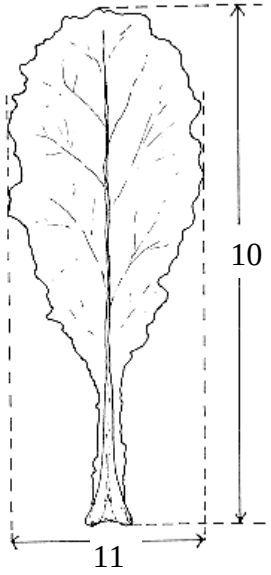
Ad. 9: Leaf: dentation of margin

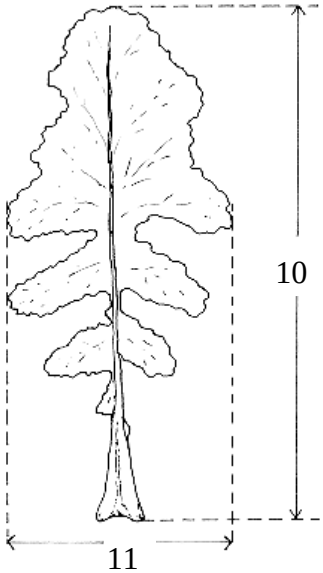


part on which the dentation should be recorded (characteristic 9)

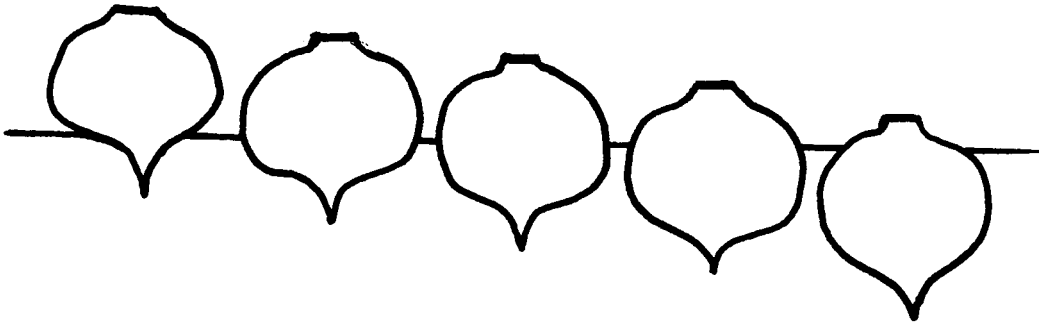
part on which the incisions of base of the blade should be recorded (characteristic 7)

Ad. 10, 11: Leaf: length (10), width (11)



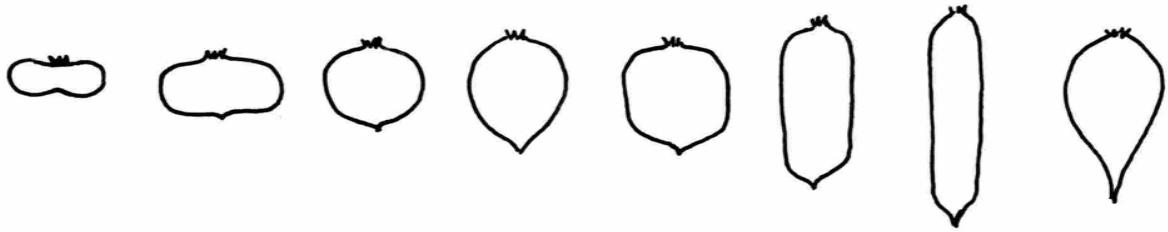


Ad. 16: Root: position in soil



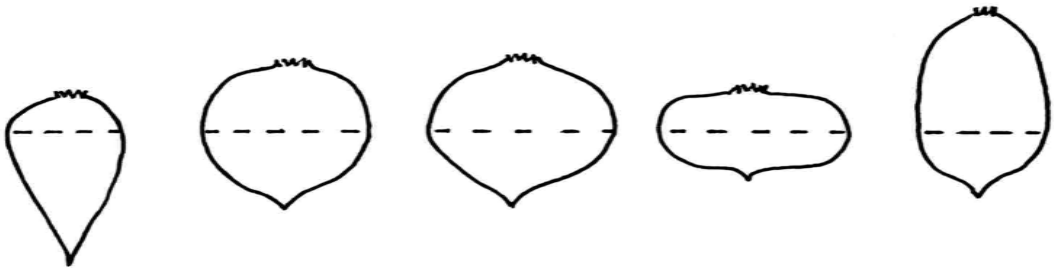
1	3	5	7	9
very shallow	shallow	medium	deep	very deep

Ad. 24: Root: Shape in longitudinal section



1	2	3	4	5	6	7	8
transverse narrow elliptic	transverse elliptic	circular	obovate	square	broad oblong	narrow oblong	obtriangular

Ad. 27: Root: position of widest point

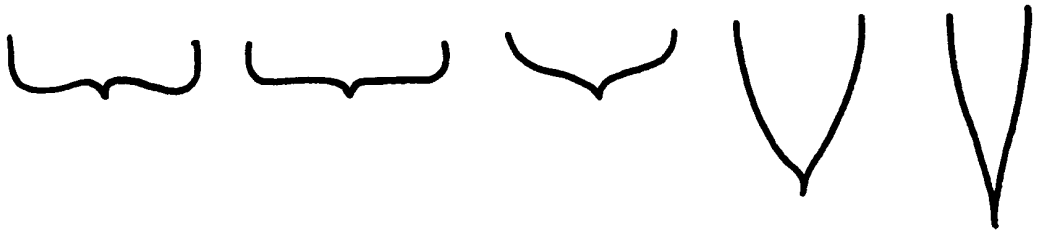


3	5	5	5	7
above middle	at middle	at middle	at middle	below middle

Ad. 29: Root: shape of top

3	5	7	9
indented	flat	raised	strongly raised

Ad. 30: Root: shape of base



1	3	5	7	9
indented	truncate	rounded	obtuse	pointed

Key to Growth Stages

00	Dry seed	
1-10	Germination and emergence through soil	
	Seedling growth	
12	Elongation of emerging shoot	
15	Elongation and opening of cotyledons	
20	Cotyledons fully opened	
30	Cotyledons fully opened and full development of first true leaf	
40	Second leaf fully developed	
50	Third leaf fully developed and initial senescence of cotyledons	
60	Fourth leaf fully developed and partial senescence of cotyledons	
70	Fifth leaf fully developed and advanced senescence/drop of cotyledons	
	Leaf development	
80	Sixth leaf fully developed	
90	Seventh leaf fully developed;	initial senescence of first true leaf in early cultivars
100	Eighth leaf fully developed;	30 % senescence of first true leaf
110	Ninth leaf fully developed;	60% senescence of first true leaf
120	Tenth leaf fully developed;	complete senescence and drop of first true leaf
130	Eleventh leaf fully developed.	
	Root development	
200	Slight swelling of the root at ground level	
220	Development of a small swollen root above ground level	
240	Swollen root increasing in size but not fully developed	
260	Root fully developed with no cork on skin	
270	Root fully developed with 40% cork development on skin	
280	Root fully developed with 80 - 100% cork development	
290	Root flesh becoming pithy and fibrous	
300	Root flesh pithy and fibrous	
	Flowering and seed production on main stem	
310	Initial formation and elongation of the flowering stem	
330	Elongation of the flowering stem with clear space between leaves	
350	First bud formation and further elongation of stem	
360	Terminal inflorescence in bud	
370	Terminal inflorescence with first open flower	
380	Terminal inflorescence partially flowering	
400	Terminal inflorescence fully flowering	
420	Development of siliqua with elongation of flowering stem	
430	Lowest fully developed siliqua green	
450	Lowest fully developed siliqua senescing and going brown	
475	Lowest fully developed siliqua dry with seed beginning to dry	
500	Lowest fully developed siliqua dry with mature dry seed	

IX. Literature

Aoba, T., 1970: Inheritance of Seed Coat Color in Turnip, Jap. Journ. Breeding 20 (3): 173-197.

Baltjes, H. J., Klein Geltink, D. J. A., Nienhuis, K. H. and Luesink, B., 1985: Linking Distinctness and Description of Varieties, Journal National Institute Agricultural Botany. 17. p. 9-19.

Green, F. N. and Winfield, P. J., 1984: The Development of Distinctness, Uniformity and Stability tests for Turnip, Turnip Rape and Swede in the United Kingdom. Procedures of Better Brassicas '84 Conference. St. Andrews. Eds. W. H. Macfarlane Smith, T. Hodgkin and A. B. Wills. 96-107. Scottish Crop Research Institute, Dundee.

Kajanus, B., 1913: Über die Vererbungsweise gewisser Merkmale der Beta- und Brassica-Rüben. II Brassica. Zeitschrift für Pflanzenzüchtung, Band I (4): 419-466.

Klein Geltink, D. J. A., 1983: Inheritance of Leaf Shape in Turnip (*Brassica rapa* L. partim) and Rape (*Brassica napus* L.). Euphytica 32 (2): 361-365.

McMaster Davey, V., 1931: Color Inheritance in Swedes and Turnips and its Bearing on the Identification of Commercial Stocks. Nat. Journ. Agric. XIV (3): 1-13.

X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)

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

1. Species	*Brassica rapa* L. var. *rapa* L. TURNIP
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

4. Information on origin, maintenance and reproduction of the variety

4.1 Origin and breeding method

(a) Open-pollinated variety [ ]

(b) Single hybrid [ ]

(c) Three-way hybrid [ ]

(d) Other (indicate type) [ ]

.....

4.2 Other information

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

	Characteristics	Example Varieties	Note
5.1 (1)	**Ploidy**		
	diploid	Milan White	2[ ]
	tetraploid	Taronda	4[ ]
5.2 (4)	**Leaf: green color**		
	very light		1[ ]
	light	Leielander	3[ ]
	medium	Bency	5[ ]
	dark	Frisia	7[ ]
	very dark	Aberdeen Green Top Yellow	9[ ]
5.3 (5)	**Leaf: type**		
	entire	Polybra	1[ ]
	lobed	Samson	2[ ]
5.4 (10)	**Leaf: length**		
	short	Milan White Forcing	3[ ]
	medium	Tokyo Cross	5[ ]
	long	Tyfon	7[ ]
5.5 (16)	**Root: position in soil**		
	very shallow	Milan White Forcing	1[ ]
	shallow	Oasis	3[ ]
	medium	Agressa	5[ ]
	deep	Noir long	7[ ]
	very deep	Teltower Kleine	9[ ]

	Characteristics	Example Varieties	Note
5.6 (17)	**Root: thick cork layer around skin**		
	absent	Bency	1[ ]
	present	Noir long	9[ ]
5.7 (18)	**Root: color of skin above soil**		
	white	Tokyo Cross	1[ ]
	green	Leielander	2[ ]
	yellow	Topaz	3[ ]
	orange	Golden Ball	4[ ]
	bronze	Grandessa	5[ ]
	scarlet	Scarlet Ball	6[ ]
	reddish purple	Bency	7[ ]
	bluish purple	The Bruce	8[ ]
5.8 (21)	**Root: color of flesh**		
	white	Agressa	1[ ]
	yellow	Teutonengold	2[ ]
5.9 (24)	**Root: shape in longitudinal section**		
	transverse narrow elliptic	Platte Witte Mei	1[ ]
	transverse elliptic	Milan White	2[ ]
	circular	Rondo	3[ ]
	obovate	Alwi	4[ ]
	square	Champion Green Top Yellow	5[ ]
	broad oblong	Rekord	6[ ]
	narrow oblong	Long d'Alsace	7[ ]
	obtriangular	Sirius	8[ ]

	Characteristics	Example Varieties	Note
5.10 (25)	**Root: length**		
	very short	Milan White	1[ ]
	short	The Wallace	3[ ]
	medium	Dynamo	5[ ]
	long	Taronda	7[ ]
	very long	Alander	9[ ]
5.11 (26)	**Root: diameter (at widest point)**		
	small	Hakutaka	3[ ]
	medium	Rondo	5[ ]
	large	Massif	7[ ]
5.12 (27)	**Root: position of widest point**		
	above middle	Marteau	3[ ]
	at middle	Taronda	5[ ]
	below middle	Blanc dur d'hiver	7[ ]
5.13 (29)	**Root: shape of top**		
	strongly indented		1[ ]
	indented	Milan White Forcing	3[ ]
	flat	Milan White	5[ ]
	raised	Taronda	7[ ]
	strongly raised	Agressa	9[ ]
5.14 (30)	**Root: shape of base**		
	indented	Milan White Forcing	1[ ]
	truncate	Milan White	3[ ]
	rounded	Frisia	5[ ]
	obtuse	Sirius	7[ ]
	pointed	Noir long	9[ ]

6. Similar varieties and differences between these varieties

Denomination of similar variety	Characteristic in which the similar variety is different [o)]	State of expression of similar variety	State of expression of candidate variety

o) In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 Main use:

– Root Vegetable [ ]
– Stubble or Forage Turnip [ ]

7.3 Time of Sowing

– Spring sown [ ]
– Summer sown [ ]
– Autumn sown [ ]

7.4 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 that question is yes, please attach a copy of such an authorization.

[End of document]