



TG/89/6

INTERNATIONAL UNION
FOR THE PROTECTION
OF NEW VARIETIES OF
PLANTS

UNION INTERNATIONALE
POUR LA PROTECTION
DES OBTENTIONS
VÉGÉTALES

INTERNATIONALER
VERBANDZUMSCHUTZ
VON PFLANZEN -
ZÜCHTUNGEN

UNIÓN INTERNACIONAL
PARA LA PROTECCIÓN
DE LAS OBTENCIONES
VEGETALES

GUIDELINES
FOR THE CONDUCT OF TESTS
FOR DISTINCTNESS, UNIFORMITY AND STABILITY

SWEDE, RUTABAGA

*(Brassic napus L. var.
napobrassica (L.) Rchb.)*

GENEVA
2001

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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.

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I. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Brassica napus* L. var. *napobrassica* (L.) Rchb.

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the plant material 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:

50g.

2. 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.

3. 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. 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 leaves should be made on the largest fully developed (non-senescent) leaf.
4. Assessment of leaf color should be made on leaves before powdery mildew infection is established.
5. Observations on root skin color should be made before cork development obscures the skin.

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 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) Leaf: type (characteristic 3)
 - (b) Root: anthocyanin coloration of skin above soil (characteristic 13)
 - (c) Root: intensity of anthocyanin coloration of skin above soil (characteristics 14.1 and 14.2)
 - (d) Pseudostem: anthocyanin coloration between leaf scars (characteristic 20)
 - (e) Root: color of flesh (characteristic 21).

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/Tablă de caractere

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. 100-150 (*)	Leaf: green color	Feuille: couleur verte	Blatt: Grünfärbung	Hoja: color verde		
	light	claire	hell	claro	Airlie	3
	medium	moyenne	mittel	medio	Marian	5
	dark	foncée	dunkel	oscuro	Joan	7
2. 100-150	Leaf: intensity of waxiness	Feuille: intensité de lauglaucence	Blatt: Intensität der Bereifung	Hoja: intensidad de lacerosidad		
	weak	faible	gering	débil	Seefelder	3
	medium	moyenne	mittel	media		5
	strong	forte	stark	fuerte	Heinkenborsteler	7
3. 80-150 (*) (+)	Leaf: type	Feuille: type	Blatt: Lappung	Hoja: tipo		
	entire	entière	fehlend	uniforme	Niko	1
	lobed	lobée	vorhanden	lobulada	Jaune à Collet Rouge, Magres	2
4. 100-150 (+)	Only lobed -leaf varieties: Leaf: number of lobes	Seulement variétés à feuilles lobées : Feuille: nombre de lobes	Nur bei Sorten mit gelapptem Blatt : Blatt: Anzahl Lappen	Sólo para variedades de hoja lobulada: Hoja: número de lóbulos		
	few	petit	gering	bajo	Wilhelmsburger	3
	medium	moyen	mittel	medio	Ruta Otofte	5
	many	grand	groß	alto	Marian	7
5. 100-150 (*) (+)	Only lobed -leaf varieties: Leaf: length of terminal lobe	Seulement variétés à feuilles lobées : Feuille: longueur du lobe terminal	Nur bei Sorten mit gelapptem Blatt : Blatt: Länge des Endlappens	Sólo para variedades de hoja lobulada: Hoja: longitud del lóbulo terminal		
	short	court	kurz	corto	Laurentian	3
	medium	moyen	mittel	medio	Sator Otofte	5
	long	long	lang	largo	Kenmore	7

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedadesejemplo	Note/ Nota
6. (*) (+)	100-150 Only lobed -leaf varieties: Leaf: width of terminal lobe	Seulement variétés à feuilles lobées : Feuille: largeur du lobe terminal	Nur bei Sorten mit gelapptem Blatt: Blatt: Breites Endlappens	Sólo para variedades de hoja lobulada: Hoja: anchura del lóbulo terminal		
	narrow	étroit	schmal	estrecho	Laurentian	3
	medium	moyen	mittel	medio	Sator Otofte	5
	broad	large	breit	ancho	Kenmore	7
7. (*) (+)	100-150 Leaf: length	Feuille: longueur	Blatt: Länge	Hoja: longitud		
	short	courte	kurz	corta	Excelsior	3
	medium	moyenne	mittel	media	Ruta Otofte	5
	long	longue	lang	larga	Teviotdale	7
8. (*) (+)	100-150 Leaf: width	Feuille: largeur	Blatt: Breite	Hoja: anchura		
	narrow	étroite	schmal	estrecha	Dryden	3
	medium	moyenne	mittel	media	Ruta Otofte	5
	broad	large	breit	ancha	Kenmore	7
9.	100-150 Leaf: undulation of margin	Feuille: ondulation du bord	Blatt: Wellung des Randes	Hoja: ondulación del borde		
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausenteo muy débil	Helena, Lizzy	1
	weak	faible	gering	débil		3
	medium	moyenne	mittel	media	Champion	5
	strong	forte	stark	fuerte		7
	very strong	très forte	sehr stark	muy fuerte	Magres	9

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. 100-150 (*) (+)	Petiole:attitude	Pétiole:port	Blattstiel:Haltung	Pecíolo: porte		
	erect	dressé	aufrecht	erecto		1
	semi-erect	demi-dressé	halbaufrecht	semierecto	RutaOtofte	3
	horizontal	horizontal	waagrecht	horizontal	Brora,Helena	5
11. 100-150	Petiole:thickness	Pétiole:épaisseur	Blattstiel:Dicke	Pecíolo: grosor		
	thin	mince	dünn	delgado	Vogesa	3
	medium	moyen	mittel	medio	Marian	5
	thick	épais	dick	grueso	Heinkenborsteler	7
12. 240-270 (*) (+)	Root:predominant color of skin above soil	Racine:couleur prédominante de l'épiderme de la partie hors terre	Rübe:überwiegende Farbe der Haut oberhalb des Bodens	Raíz:color predominante de la epidermis fuera de la tierra		
	green	vert	grün	verde	Jaune à Collet Verte, Melfort, Seefelder	1
	bronze	bronze	bronze	bronce	Harrietfield	2
	reddishpurple	violette	rötlichpurpur	púrpura rojizo	Angus, Jaune à Collet Rouge, Kenmore	3
13. 240-270 (*)	Root:anthocyanin coloration of skin above soil	Racine: pigmentation anthocyanique de l'épiderme de la partie hors terre	Rübe:Anthocyan-färbung der Haut oberhalb des Bodens	Raíz:pigmentación antocianica de la epidermis fuera de la tierra		
	absent	absente	fehlend	ausente	Seefelder	1
	present	présente	vorhanden	presente	Jaune à Collet Rouge, RutaOtofte	9

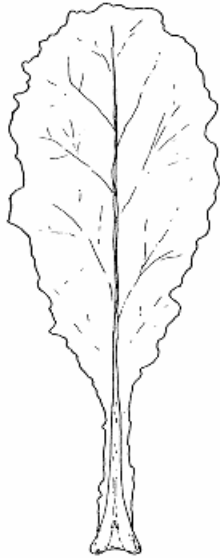
Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14.1	250-270	<u>Only varieties with green or bronze skin color</u>: Root: intensity of anthocyanin coloration of skin above soil	<u>Seulement variétés à épiderme vert ou bronze</u>: Racine: intensité de pigmentation anthocyanique de l'épiderme de la partie hors terre	<u>Nur Sorten mit grüner oder bronzefarbener Haut</u>: Rübe: Intensität der Anthocyanfärbung der Haut oberhalb des Bodens	<u>Sólo variedades con epidermis de color verde o bronceado</u> : Raíz: intensidad de la pigmentación antocianica de la epidermis fuera de la tierra	
(*)						
(+)						
	weak	faible	gering	débil	Melfort	3
	medium	moyenne	mittel	media	Angus	5
	strong	forte	stark	fuerte	Kenmore	7
14.2	250-270	<u>Only varieties with reddish purple skin color</u>: Root: intensity of anthocyanin coloration of skin above soil	<u>Nur Sorten mit rötlich purpurfarbener Haut</u>: Rübe: Intensität der Anthocyanfärbung der Haut oberhalb des Bodens	<u>Sólo variedades con epidermis de color púrpura o rojo</u> : Raíz: intensidad de la pigmentación antocianica de la epidermis fuera de la tierra		
(*)						
	weak	faible	gering	débil	Champion	3
	medium	moyenne	mittel	media	Doon Major	5
	strong	forte	stark	fuerte	Ruby	7
15.	250-270	Racine: couleur prédominante de l'épiderme de la partie enterrée	Rübe: überwiegende Farbe der Haut im Boden	Raíz: color predominante de la epidermis dentro de la tierra		
	white	blanc	weiß	blanco	Niko	1
	yellow	jaune	gelb	amarillo	Jaune à Collet Verte , Mella	2
	orange-pink	rose orangé	orange rosa	rosa anaranjado	Jaune à Collet Rouge	3
	reddish	rougeâtre	rötlich	rojizo	Marian	4

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedadesejemplo	Note/ Nota
16. 260-299 (* (+)	Root:shapein longitudinalsection	Racine: formeen section longitudinale	Rübe:Formim Längsschnitt	Raíz:formaen secciónlongitudinal		
	transverseelliptic	elliptiquetransverse	querelliptisch	elípticatransversal	Acme,Seefeldler	1
	circular	arrondie	kreisförmig	circular	JauneàColletVerte, Ruby	2
	obovate	obovale	verkehrteiförmig	oboval	Kenmore	3
	square	carrée	quadratisch	cuadrada	DoonMajor	4
	oblong	rectangulaire	rechteckig	oblonga	BlancHorsTerre	5
17. 260-290 (* (+)	Root:length	Racine:longueur	Rübe:Länge	Raíz:longitud		
	short	courte	kurz	corta	SatorOtofte	3
	medium	moyenne	mittel	media	Airlie,Ruby	5
	long	longue	lang	larga	AubignyGreenTop	7
18. 260-290 (* (+)	Root:diameter	Racine:diamètre	Rübe:Durchmesser	Raíz:diámetro		
	small	petit	klein	pequeño	Laurentian	3
	medium	moyen	mittel	medio	RutaOtofte, SatorOtoft e	5
	large	grand	groß	grande	Kenmore	7
19. 260-299 (* (+)	Pseudostem:length	Faussetige: longueur	Pseudostamm: Länge	Pseudotallo: longitud		
	short	courte	kurz	corto	Helena,Melfort	3
	medium	moyenne	mittel	medio	RutaOtofte, SatorOtofte	5
	long	longue	lang	largo	Vittoria	7

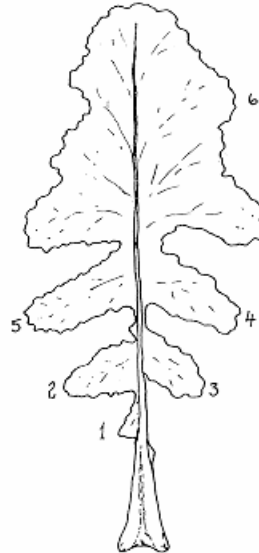
Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedadesejemplo	Note/ Nota
20. 260-299 (*)	Pseudostem: anthocyanin colorationbetween leafscars	Faussetige: pigmentation anthocyanique entrelescicatrices pétiolaires	Pseudostamm: Anthocyanfärbung zwischen Blattnarben	Pseudotallo: pigmentación antociánicaentre loscicatrices foliares		
	absentorpartial	absenteoupartielle	fehlendoder teilweisevorhanden	ausenteoparcial	Melfort,Merrick, Seefelder	1
	solid	pleine	einheitlich vorhanden	plena	Champion,Magres	2
21. 260-280 (*)	Root: colorofflesh	Racine:couleurde lachair	Rübe:Farbedes Fleisches	Raíz:colordela pulpa		
	white	blanche	weiß	blanco	BlancHorsTerre, Merrick	1
	yellow	jaune	gelb	amarillo	JauneàColletRouge, Magres	2
22. 260-280	Root:intensityof yellowcolo rofflesh	Racine:intensitéde lacouleurjaunede lachair	Rübe:Intensität derGelbfärbung desFleisches	Raíz:intensidaddel coloramarillodela pulpa		
	light	claire	hell	claro	DoonMajor	3
	medium	moyenne	mittel	medio	Magres	5
	dark	foncée	dunkel	oscuro		7
23. 270-280 (+)	Root:drymatter content	Racine:teneuren matièresèche	Rübe:Trocken - substanzegehalt	Raíz:contenidode materiaseca		
	low	faible	niedrig	bajo	DoonMajor	3
	medium	moyenne	mittel	medio	Magres,SatorOtofte	5
	high	forte	hoch	alto	Dryden	7

VIII. ExplanationsontheTableofCharacteristics

Ad.3:Leaf:type



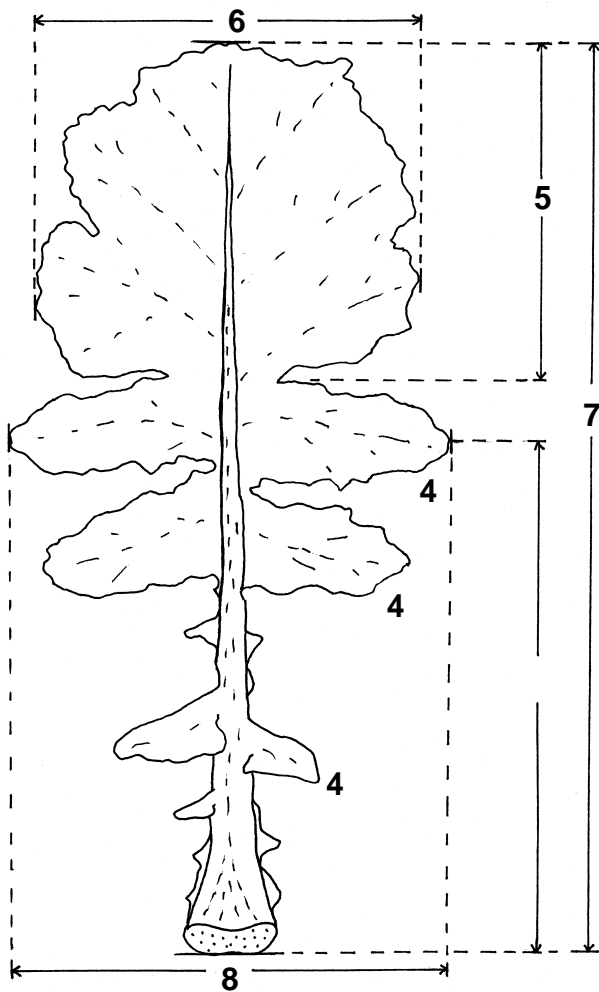
1
entire



2
lobed

Partsoftheleafbladeareconsideredaslobesiftheirlengthisatleastequivalenttothewidth of theleaf petioleattheirpointofattachmentandiftheuppernotechofthebladehasatleast halftthelengthofthelobeitself.

Ad.4 -8:Leafcharacteristics



4. Leaf: number of lobes
 (To be recorded on one side of the midrib only and excluding terminal lobe)

A lobe is defined as leaf tissue more than 2 cm in length which is cut on both sides to at least half the distance towards the midrib.

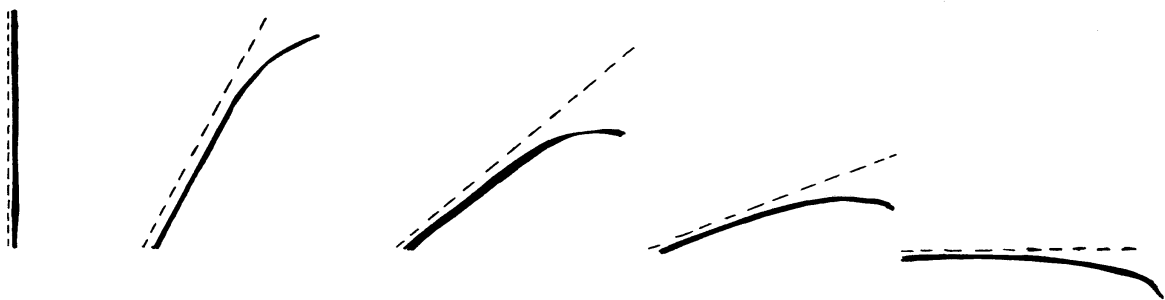
5. Leaf: length of terminal lobe

6. Leaf: width of terminal lobe

7. Leaf: length

8. Leaf: width

Ad.10:Petiole:attitude



1
erect

2
erect to semi-erect

3
semi-erect

4
semi-erect to horizontal

5
horizontal

The petiole attitude should be assessed along the dotted line, ignoring any reflexing at the leaf tip.

Ad.12:Root:predominantcolorofskinabovesoil

The characteristic describes the predominant color of the skin above soil over the whole root. Very slight localized expression of anthocyanin coloration should be ignored on green skinned roots.

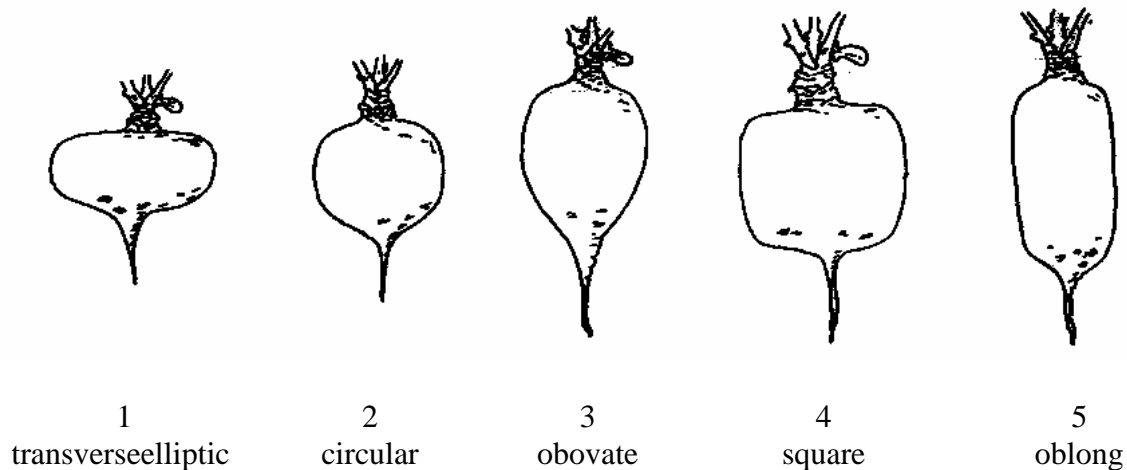
Ad.14.1: Root: intensity of anthocyanin coloration of skin above soil (Green or bronze skinned varieties only)

The expression of the root skin color in Swede would appear to be as simple observation with three clear states of expression: green, purple or bronze.

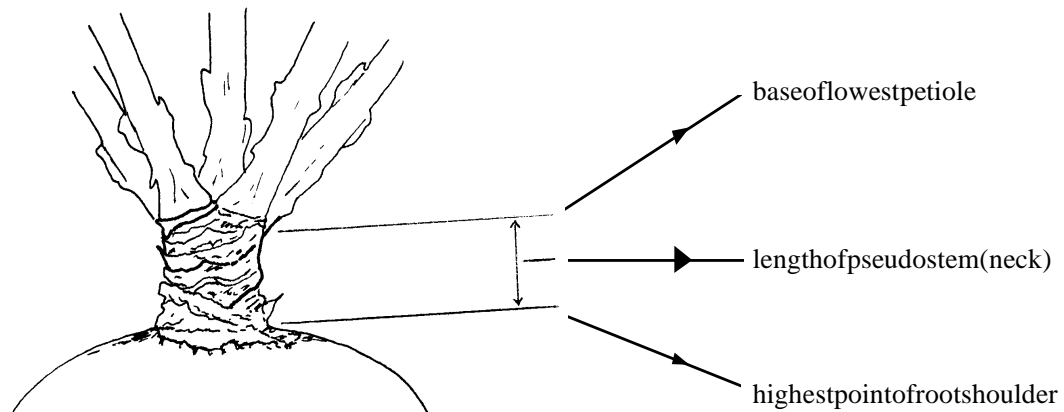
On closer examination some green skinned varieties have light anthocyanin, uniformly expressed, and should be classified as bronze skinned roots.

This characteristic should be recorded before the start of root cork development.

Ad.16:Root:shape in longitudinal section



Ad.19:Pseudostem:length



Ad.23:Root:drymattercontent

For all varieties, the dry matter of the root should be recorded when early varieties are mature but before roots senescence makes the flesh pithy.

One core, approximately 15 mm in diameter, is sampled diagonally (45 degrees) through the root entering at the root shoulder. A core sampled diagonally is more representative of the root than a vertical or horizontal core. Roots are sampled randomly from each plot in each replication; malformed or damaged roots are excluded from the sample. The cores are placed in a polythene bag and sealed and labelled with the plot number. If there is any delay between sampling and weighing the cores, storage in a fridge will keep cores in good condition for up to 24 hours.

2 cm are cut off each end of the fifteen cores to remove the root skin and to reduce the hard tissue under the skin surface. The trimmed cores are weighed as a bulk and placed in a drying oven in trays with a mesh base to allow circulation of hot air.

The oven temperature is set at 60 °C with 85% recirculated air. The temperature should not be set too high, otherwise caramelisation of the tissue will affect the dry matter content. The cores are left in the drying oven for at least 48 hours. The cores should be allowed to cool for one hour after removal from the oven; dry cool cores should snap when bent. The fifteen dry cores are weighed as a bulk. Both wet and dry weights should be measured in grams to two decimal places.

The difference between the wet and dry core weight indicates the amount of water lost in the drying process. The dry matter percentage is calculated by using the formula

$$\frac{\text{Dry Weight}}{\text{Wet Weight}} \times 100$$

Key to growth stages

00 Dry seed

0-10 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.
- 140
- 150 Few leaf scars becoming exposed on root 'neck'
- 160
- 170
- 180 Many leaf scars exposed on root 'neck'

Root development

- 200 Slight swelling of the root at ground level
- 220 Development of a small swollen root above ground level
- 240 Swollen root medium
- 260 Root fully developed with no cork 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
- 299 Root flesh fibrous and pithy

IX. Literature

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X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)
<p>TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p>	
1. Species	<p><i>Brassic napus</i> L. var. <i>napobrassica</i> (L.) Rchb. SWEDE, RU TABAGA</p>
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

<p>4. Information on origin, maintenance and reproduction of the variety</p> <p>4.1 Variety Type</p> <p>(a) Open-pollinated variety <input type="checkbox"/></p> <p>(b) Other (please indicate) <input type="checkbox"/></p> <p>.....</p> <p>4.2 Other information</p>			
<p>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).</p>			
Characteristics	Example Varieties	Note	
<p>5.1 Leaf: type (3)</p> <p>entire</p> <p>lobed</p>	<p>Niko</p> <p>Jaune à Collet Rouge, Magres</p>	<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p>	
<p>5.2 Root: predominant color of skin above soil (12)</p> <p>green</p> <p>bronze</p> <p>reddish purple</p>	<p>Jaune à Collet Vert, Melfort, Seefelder</p> <p>Harrietfield</p> <p>Angus, Jaune à Collet Rouge, Kenmore</p>	<p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/></p> <p>3 <input type="checkbox"/></p>	
<p>5.3 Root: anthocyanin coloration of skin above soil (13)</p> <p>absent</p> <p>present</p>	<p>Seefelder</p> <p>Jaune à Collet Rouge, Ruta Otofte</p>	<p>1 <input type="checkbox"/></p> <p>9 <input type="checkbox"/></p>	

Characteristics	Example Varieties	Note
5.4.1 <u>Only varieties with green or bronze skin color</u> : (14.1) Root: intensity of anthocyanin coloration of skin above soil		
weak	Melfort	3[]
medium	Angus	5[]
strong	Kenmore	7[]
5.4.2 <u>Only varieties with reddish purple skin color</u> : (14.2) Root: intensity of anthocyanin coloration of skin above soil		
weak	Champion	3[]
medium	DoonMajor	5[]
strong	Ruby	7[]
5.5 Root: shape in longitudinal section (16)		
transverse elliptic	Acme, Seefelder	1[]
circular	Jaune à Collet Verte , Ruby	2[]
obovate	Kenmore	3[]
square	DoonMajor	4[]
oblong	Blanc Hors Terre	5[]
5.6 Pseudostem: length (19)		
short	Helena, Melfort	3[]
medium	Ruta Otofte, Sator Otofte	5[]
long	Vittoria	7[]
5.7 Pseudostem: anthocyanin coloration between leaf scars (20)		
absent or very weak	Melfort, Merrick, Seefelder	1[]
entire	Champion, Magres	2[]
5.8 Root: color of flesh (21)		
white	Blanc Hors Terre, Merrick	1[]
yellow	Jaune à Collet Rouge, Magres	2[]

6. Similar varieties and differences from 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
<p>^{o)} In the case of identical states of expressions of both varieties, please indicate the size of the difference.</p>			
7. Additional information which may help to distinguish the variety			
7.1 Resistances to pests and diseases			
7.2 Main use:			
-Agricultural/fodder			
-Vegetable	-Fresh	<input type="checkbox"/>	
	-Processing	<input type="checkbox"/>	
	-Others (please specify)	<input type="checkbox"/>	
7.3 Dry matter content (characteristic 27):			
	-low	<input type="checkbox"/>	
	-medium	<input type="checkbox"/>	
	-high	<input type="checkbox"/>	
7.4 Other information			

8. Authorizationforrelease

- (a) Does the variety require prior authorization for release under legislation concerningtheprotectionoftheenvironment,humanandanimalhealth?

Yes No

- (b) Hassuchauthorizationbeenobtained?

Yes No

Iftheanswertothatquestionisyes,pleaseattachacopyofsuchanauthorization.

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