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E

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

DRAFT

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

SWEDE, RUTABAGA

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

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:

500 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. Each test should include a total of 120 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, weighting or counting should be made on 60 plants or parts taken from each of 60 plants.

2. Unless otherwise indicated, all observations on the leaves should be made on the largest fully grown (non-senescent) leaf.

3. Assessment of leaf color should be made on leaves before powdery mildew infection is established.
4. 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 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) Leaf: lobing (characteristic 3)
 - (b) Root: anthocyanin coloration of skin above soil level (characteristic 17)
 - (c) Root: intensity of anthocyanin coloration of skin above soil (characteristics 18.1 and 18.2)
 - (d) Pseudostem: anthocyanin coloration between leaf scars (characteristic 24)
 - (e) Root: color of flesh (characteristic 25)

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 period 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.

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

	Stage Stade Stadium Estado	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	media	Marian	5
		dark	foncée	dunkel	oscuro	Joan	7
2.	100-150	Leaf: waxiness	Feuillage: glaucescence	Blatt: Wachsschicht	Hoja: cerosidad		
		weak	faible	gering	débil	Seefelder	3
		medium	moyenne	mittel	media		5
		strong	forte	stark	fuerte	Heinkenborsteler	7
3. (* (+)	80-150	Leaf: lobing	Feuille: découpure	Blatt: Lappung	Hoja: lobulado		
		absent	nulle	fehlend	ausente	Niko	1
		present	présente	vorhanden	presente	Magres, Jaune à Collet Rouge	9
4. (+)	100-150	Leaf: number of major lobes	Feuille: nombre de grands lobes	Blatt: Anzahl Hauptlappen	Hoja: número de los lóbulos grandes		
		few	petit	gering	bajo	Wilhelmsburger	3
		medium	moyen	mittel	media	Ruta Otofte	5
		many	grand	groß	alto	Marian	7
5. (* (+)	100-150	Leaf: length of terminal lobe	Feuille: longueur du lobe terminal	Blatt: Länge des Endlappens	Hoja: longitud del lóbulo terminal		
		short	court	kurz	corta	Laurentian	3
		medium	moyen	mittel	media	Sator Otofte	5
		long	long	lang	larga	Kenmore	7

	Stage Stade Stadium Estado	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. (* (+)	100-150	Leaf: width of terminal lobe	Feuille: largeur du lobe terminal	Blatt: Breite des Endlappens	Hoja: anchura del lóbulo terminal		
		narrow	étroite	schmal	estrecha	Laurentian	3
		medium	moyenne	mittel	media	Sator Otofte	5
		broad	large	breit	ancha	Kenmore	7
7. (* (+)	100-150	Leaf: length (including petiole)	Feuille: longueur (pétiole inclus)	Blatt: Länge (einschließlich Stiel)	Hoja: longitud (incluyendo peciolo)		
		short	courte	kurz	corta	Excelsior	3
		medium	moyen	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: distance from widest point to base	Feuille: distance du point le plus large à la base	Blatt: Abstand zwischen der größten Breite und der Basis	Hoja: distancia del punto más ancho a la base		
		short	courte	kurz	corta	Laurentian	3
		medium	moyenne	mittel	media	Magres, Ruby	5
		long	longue	lang	larga	Balmoral	7
10. (+)	100-150	Leaf: number of minor lobes between major lobes	Feuille: nombre de petits lobes entre les grands lobes	Blatt: Anzahl Nebenlappen zwischen den Hauptlappen	Hoja: número de lóbulos pequeños entre los lóbulos grandes		
		few	petit	gering	bajo	Grünkopfige Gelbe Wilhelmsburger	3
		medium	moyen	mittel	medio	Ruta Otofte	5
		many	grand	groß	alto	Gry	7

Stage Stade Stadium Estado	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11.	Leaf blade: depth of incisions of margin	Limbe: profondeur des découpures du bord	Blattspreite: Tiefe der Randeinschnitte	Limbo: profundidad de las incisiones del borde		
	shallow	peu profonde	flach	poco profundas	Joan	3
	medium	moyenne	mittel	medio	Champion	5
	deep	profonde	tief	profundas	Sator Otofte	7
12.	Leaf: undulation of margin	Feuille: ondulation du bord	Blatt: Wellung des Randes	Hoja: ondulación del borde		
100-150	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Helena, Lizzy	1
	weak	faible	gering	débil		3
	medium	moyenne	mittel	medias	Champion	5
	strong	forte	stark	fuerte		7
	very strong	très forte	sehr stark	muy fuerte	Magres	9
13. (+)	Petiole: number of minor lobes (below lowest major lobe)	Pétiole: nombre de petits lobes (sous le plus bas des grands lobes)	Blattstiel: Anzahl Nebenlappen (unterhalb des untersten Hauptlappen)	Pecíolo: número de lóbulos pequeños (por debajo del lóbulo mayor inferior)		
100-150	few	petit	gering	bajo	Wilhelmsburger	3
	medium	moyen	mittel	medio	Doon Major	5
	many	grand	groß	alto	Merrick	7
14. (* (+)	Petiole: attitude	Pétiole: port	Blattstiel: Haltung	Pecíolo: porte		
100-150	erect	dressé	aufrecht	erecto		1
	semi-erect	demi-dressé	halbaufrecht	semierecto	Ruta Otofte	3
	horizontal	horizontal	waagrecht	horizontal	Brora, Helena	5
15.	Petiole: thickness	Pétiole: épaisseur	Blattstiel: Dicke	Pecíolo: grosor		
100-150	thin	mince	dünn	delgado	Vogesa	3
	medium	moyen	mittel	medio	Marian	5
	thick	épais	dick	grueso	Heinkenborsteler	7

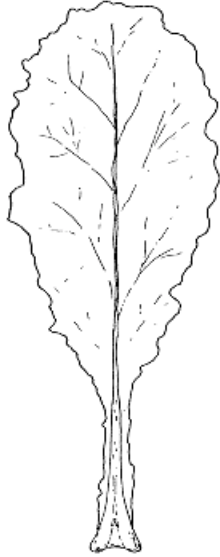
	Stage Stade Stadium Estado	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16. (* (+)	240-270	Root: predominant color of skin above soil	Racine: couleur prédominante de l'épiderme de la partie hors terre	Rübe: überwiegende Farbe der Haut oberhalb des Erdbodens	Raíz: color predominante de la epidermis sobre el suelo		
		green	vert	grün	verde	Jaune à Collet Verte, Melfort, Seefelder	1
		bronze	bronze	bronze	bronce	Harrietfield	2
		reddish purple	violet-rougeâtre	rötlich purpur	púrpura rojizo	Angus, Jaune à Collet Rouge, Kenmore	3
17. (* (+)	240-270	Root: anthocyanin coloration of skin above soil	Racine: pigmentation anthocyanique de l'épiderme de la partie hors terre	Rübe: Anthocyanfärbung oberhalb des Erdbodens	Raíz: pigmentación antociánica de la epidermis sobre el suelo		
		absent	absente	fehlend	ausente	Seefelder	1
		present	présente	vorhanden	presente	Jaune à Collet Rouge, Ruta Otofte	9
18.1 (* (+)	250-270	<u>Varieties with bronze skin color:</u> Root: intensity of anthocyanin coloration of skin above soil	<u>Variétés à épiderme couleur bronze:</u> Racine: intensité de pigmentation anthocyanique de l'épiderme de la partie hors terre	<u>Nur bronze-farbene Sorten:</u> Rübe: Stärke der Anthocyanfärbung der Haut oberhalb des Erdbodens	<u>Variedades con epidermis de color bronceado:</u> Raíz intensidad de la pigmentación antociánica de la epidermis sobre el suelo		
		weak	faible	gering	débil	Melfort	3
		medium	moyenne	mittel	medio	Angus	5
		strong	forte	stark	fuerte	Kenmore	7
18.2 (* (+)	250-270	<u>Varieties with reddish purple skin color:</u> Root: intensity of anthocyanin coloration of skin above soil	<u>Variétés à épiderme violet-rougeâtre:</u> Racine: intensité de pigmentation anthocyanique de l'épiderme de la partie hors terre	<u>Nur rötlich purpurfarbene Sorten:</u> Rübe: Stärke der Anthocyanfärbung der Haut oberhalb des Erdbodens	<u>Variedades con epidermis de color púrpura rojizo:</u> Raíz: intensidad de la pigmentación antociánica de la epidermis sobre el suelo		
		weak	faible	gering	débil	Champion	3
		medium	moyenne	mittel	medio	Doon Major	5
		strong	forte	stark	fuerte	Ruby	7

Stage Stade Stadium Estado	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota	
19.	250-270	Root: predominant color of skin below soil level	Racine: couleur prédominante de l'épiderme de la partie sous terre	Rübe: überwiegende Farbe der Haut im Erdboden	Raíz: color predominante de la epidermis debajo del suelo		
		white	blanc	weiß	blanco	Niko	1
		yellow	jaune	gelb	amarillo	Jaune à Collet Verte, Mella	2
		orange-pink	rose orange	orangerosa	rosa anaranjado	Jaune à Collet Rouge	3
		reddish	rougeâtre	rötlich	rojizo	Marian	4
20. (+)	260-299	Root: shape in longitudinal section	Racine: forme en section longitudinale	Rübe: Form im Längsschnitt	Raíz: forma en sección longitudinal		
		transvers elliptic	elliptique transverse	quer elliptisch	elíptica transversal	Acme, Seefelder	1
		circular	circulaire	kreisförmig	circular	Jaune à Collet Verte, Ruby	2
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Kenmore	3
		obovate	obovale	verkehrt eiförmig	oboval	Doon Major	4
		narrow elliptic	elliptique étroite	schmal elliptisch	eléptica estrecha	Blanc Hors Terre	5
21. (*)	260-290	Root: length	Racine: longueur	Rübe: Länge	Raíz: longitud		
		short	courte	kurz	corta	Sator Otofte	3
		medium	moyenne	mittel	media	Airlie, Ruby	5
		long	longue	lang	larga	Aubigny Green Top	7
22. (*)	260-290	Root: diameter	Racine: diamètre	Rübe: Durchmesser	Raíz: diámetro		
		small	étroit	klein	pequeño	Laurentian	3
		medium	moyen	mittel	medio	Ruta Otofte, Sator Otofte	5
		large	large	groß	grande	Kenmore	7

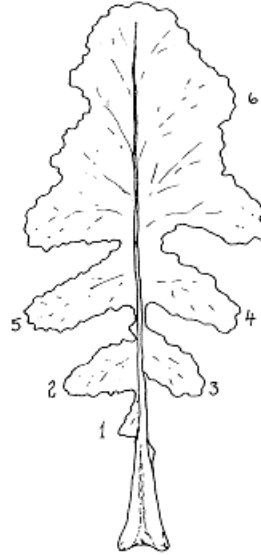
	Stage Stade Stadium Estado	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23. (* (+)	260-299	Pseudostem: length	Fausse tige: lon- gueur	Pseudostamm: Länge	Pseudotallo: longi- tud		
		short	courte	kurz	corta	Melfort, Helena	3
		medium	moyenne	mittel	media	Ruta Otofte, Sator Otofte	5
		long	longue	lang	larga	Vittoria	7
24. (* (+)	260-299	Pseudostem: an- thocyanin colora- tion between leaf scars	Fausse tige: pig- mentation antho- cyanique entre les cicatrices pé- tiolaires	Pseudostamm: Anthocyanfär- bung zwischen Blattnarben	Pseudotallo: pig- mentación anto- ciánica entre los cicatrices foliares		
		absent or very weak	nulle ou très faible	fehlend oder teil- weise vorhanden	ausente o muy débil	Melfort, Merrick, Seafelder	1
		entire	répartie diffuse	auf der gesamten Blattfläche vor- handen	en la totalidad	Champion, Magres	2
25. (*	260-280	Root: color of flesh	Racine: couleur de la chair	Rübe: Farbe des Fleisches	Raíz: color de la pulpa		
		white	blanc	weiß	blanco	Blanc Hors Terre, Merrick	1
		yellow	jaune	gelb	amarillo	Jaune à Collet Rouge, Magres	2
26.	260-280	Root: intensity of yellow color of flesh	Racine: intensité de la couleur jaune de la chair	Rübe: Intensität der Gelbfärbung des Fleisches	Raíz: intensidad de la color amarillo de la pulpa		
		light	claire	hell	claro	Doon Major	3
		medium	moyenne	mittel	media	Magres	5
		dark	foncée	dunkel	oscuro		7
27. (+)	270-280	Root: dry matter content	Racine: teneur en matière sèche	Rübe: Trocken- substanzgehalt	Raíz: contenido de materia cesa		
		low	faible	niedrig	pequeña	Doon Major	3
		medium	moyenne	mittel	media	Sator Otofte, Magres	5
		high	élevée	hoch	grande	Dryden	7

III. Explanations on the Table of Characteristics

Ad. 3: Leaf: lobing



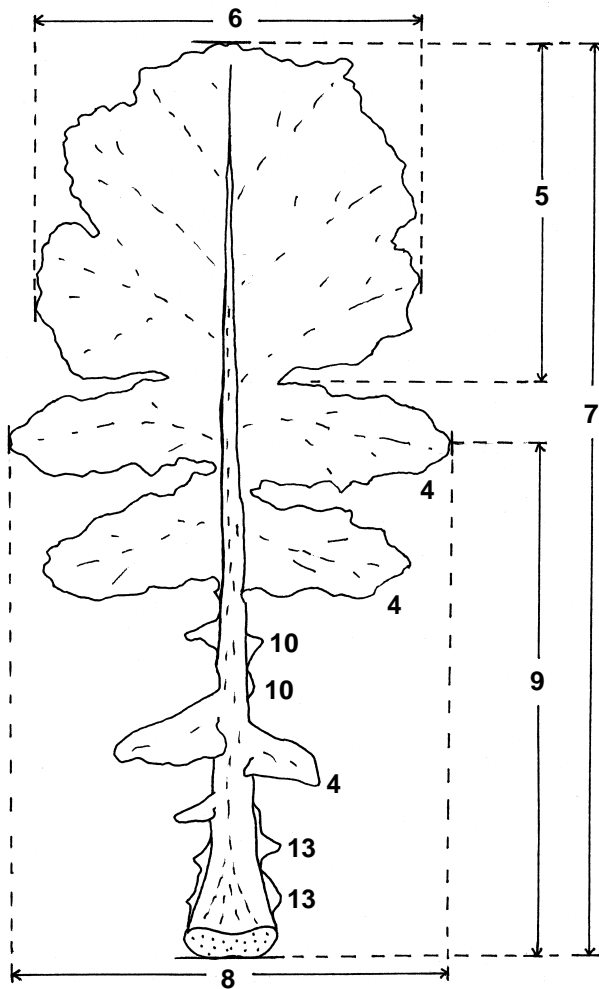
1
absent



9
present

Parts of the leaf blade are considered as lobes if their length is at least equivalent to the width of the leaf petiole at their point of attachment and if the upper notch of the blade has at least half the length of the lobe itself.

Ad. 4-10, 13: Leaf characteristics



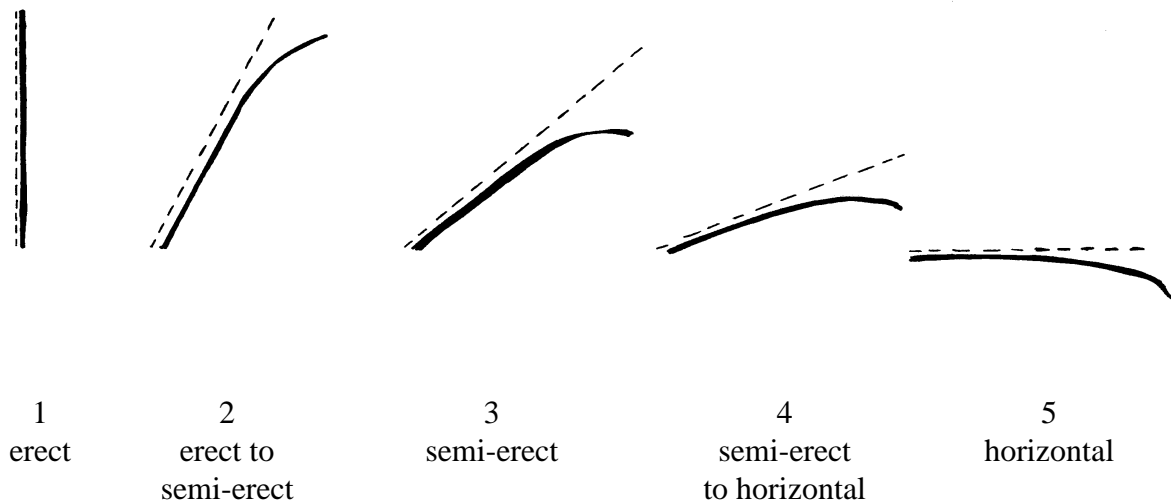
4. Leaf: number of major lobes
 (To be recorded on one side of the midrib only and excluding terminal lobe)

A major 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: total length of longest green leaf (including petiole)
8. Leaf: width
 (the widest point may be on the terminal lobe)
9. Leaf: distance from widest point to base
10. Leaf: number of minor lobes between major lobes
13. Petiole: number of minor lobes
 (below lowest major lobe)

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

Ad. 14: Petiole: attitude



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

Ad. 16. Root: predominant color of skin above soil

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

Bronze skin color is defined as chlorophyll expression with partial, but clear, expression of anthocyanin.

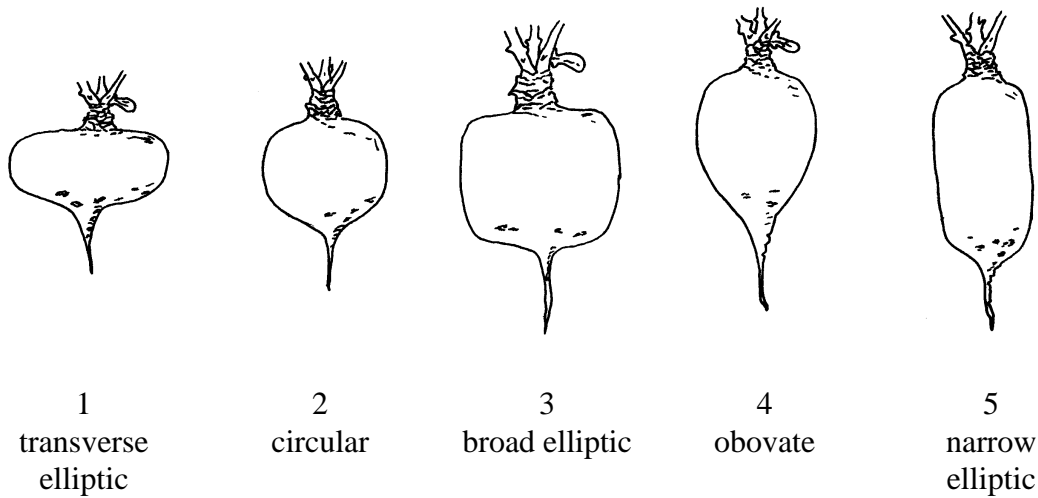
Ad. 18.1 Root: intensity of anthocyanin coloration of skin above soil
(Green or Bronze skinned varieties only)

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

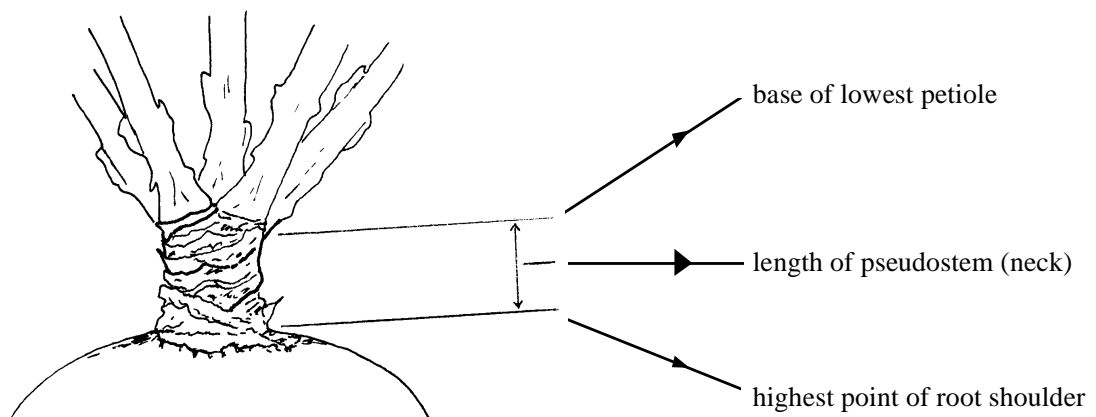
On closer examination some green skinned varieties have very slight anthocyanin expression and should be classified as bronze skinned.

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

Ad. 20: Root: shape in longitudinal section



Ad. 23: Pseudostem: length



Ad. 17 and 24: Root: anthocyanin coloration of skin above soil (17) and Pseudostem: anthocyanin coloration between leaf scars

These two characteristics combined are used for the correct skin color classification as follows:

Pseudostem (neck) surface between leaf scars green and root skin color green	Green skinned Group
Pseudostem (neck) surface between leaf scars green and root skin color with small expression of anthocyanin	Bronze skinned Group
Pseudostem (neck) surface between leaf scars green mottled with purple and root skin color with small or extensive expression of anthocyanin	Bronze skinned Group
Pseudostem (neck) surface between leaf scars entirely purple with anthocyanin expressed on root skin	Purple skinned Group

Ad. 27: Root: dry matter content

Dry matter content of root should not be observed when roots of early maturing varieties are fully developed and mature.

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 an delay between sampling and weighing the cores, storage in a fridge will keep cores in good condition for up to 24 hours.

2 cms are cut off each end of the fifteen cores to remove the root skin and to reduce the harder 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 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 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 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
- 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>Brassica napus</i> L. var. <i>napobrassica</i> (L.) Rchb. SWEDE, RUTABAGA</p>
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

4. Information on origin, maintenance and reproduction of the variety			
4.1 Variety Type			
(a)	Open-polluted variety	[]	
(b)	Other	[]	
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	Leaf: lobing		
(3)			
	absent	Niko	1[]
	present	Magres, Jaune à Collet Rouge	9[]
5.2	Root: predominant color of skin above soil		
(16)			
	green	Melfort, Jaune à Collet Vert, Seefelder	1[]
	bronze	Harrietfield	2[]
	reddish purple	Angus, Jaune à Collet Rouge, Kenmore	3[]
5.3	Root: anthocyanin coloration of skin above soil level		
(17)			
	absent	Seefelder	1[]
	present	Jaune à Collet Rouge, Ruta Otofte	9[]

Characteristics	Example Varieties	Note
5.4.1 Varieties with bronze skin color only		
(18.1) Root: intensity of anthocyanin coloration of skin above soil		
weak	Melfort	3[]
medium	Angus	5[]
strong	Kenmore	7[]
5.4.2 Varieties with reddish purple skin color only		
(18.2) Root: intensity of anthocyanin coloration of skin above soil		
weak	Champion	3[]
medium	Doon Major	5[]
strong	Ruby	7[]
5.5 Root: shape in longitudinal section		
(20)		
transverse elliptic	Acme, Seefelder	1[]
circular	Jaune à Collet Vert, Ruby	2[]
broad elliptic	Kenmore	3[]
obovate	Doon Major	4[]
narrow elliptic	Blanc Hors Terre	5[]
5.6 Pseudostem: length		
(23)		
short	Melfort, Helena	3[]
medium	Ruta Otofte, Sator Otofte	5[]
long	Vittoria	7[]
5.7 Pseudostem: anthocyanin coloration between leaf scars		
(24)		
absent or very weak	Melfort, Merrick, Seefelder	1[]
entire	Champion, Magres	2[]
5.8 Root: color of flesh		
(25)		
white	Blanc Hors Terre, Merrick	1[]
yellow	Jaune à Collet Rouge, Magres	2[]

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.

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