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WORKING PAPER ON TEST GUIDELINES FOR TURNIP
(*Brassica rapa* L. var. *rapa* L.)

Document prepared by experts from the United Kingdom

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I. Subject of these Guidelines

These Test Guidelines apply to all varieties of Turnip (*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 sample should be:

100g

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 similar growing periods.

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 2 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. All observations determined by measurement or counting should be made on 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: lobing (characteristic 5)
- (c) Root: skin color (characteristic)
- (d) Root: color of flesh (characteristic 23)
- (e) Root: shape (characteristic 26)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the four UPOV working languages in the Table of Characteristics should be used. Additional information on the characteristics can be found in the Annex to this document.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic.

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 preceding characteristics or regional environmental conditions render this impossible.

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

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

VII. Table of Characteristics/Tableau des caracteres/Merkmalstabelle

	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) 1.	Ploidy	00	diploid	diploïde	diploid	Jobe	2
	Ploïdie		tetraploid	tétraploïde	tetraploid	Taronda	4
	Ploidie						
2.	Leaf: attitude	100 - 130	erect	dressé	aufrecht		1
	Feuille: port		semi-erect	demi-dresse	halbaufrecht		3
	Blatt: Stellung		horizontal	horizontal	waagrecht		5
3. (+)	Leaf: reflexion of top	100 - 130	absent or very weak	nul ou très faible	fehlend oder sehr gering		1
	Feuille: enroulement du sommet		weak	faible	gering	Tigra	3
	Blatt: Umbiegen der Spitze		medium	moyen	mittel	Jobe	5
			strong	fort	stark	Noir long	7
			very strong	très fort	sehr stark		9
(*) 4.	Leaf: intensity of green color	100 - 130	very light	très pâle	sehr blass		1
	Feuille: couleur verte		light	pâle	blass	Leielander	3
	Blatt: Grünfärbung		medium	moyenne	mittel	Bency	5
			dark	foncée	dunkel	Frisia	7
			very dark	très foncée	sehr dunkel	Mizuna	9
(*) 5. (+)	Leaf: type	100 - 130	spatulate				1
	Feuille: Blatt:		lobed			Jobe	9

	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
6. (+)	Leaf: number of lobes (fully developed lobed leaf)	100 - 130	few	faible	gering	Beninabana	3
	Feuille: nombre de lobes (feuille complètement développée)		medium	moyen	mittel	De Montesson,	5
	Blatt: Anzahl Lappen (vollentwickeltes Blatt)		many	élevé	gross		7
7. (+)	Leaf: incisions of blade base (varieties with spatulate leaves)	100 - 130	absent or very weak			Tendergreen	1
			weak			Milan White	3
			medium	moyenne	mittel	Teutonengold	5
			strong	forte	stark	Tokyo Market	7
			very strong	très forte	sehr stark	Polybra	9
8.	Leaf: undulation of margin Feuille: ondulation due bord Blatt: Wellung des Randes	100 - 130	absent or very weak	nulle ou très faible	fehlend oder sehr gering	Tendergreen	1
			weak	faible	gering	Tokyo Top	3
			medium	moyenne	mittel	Tigra	5
			strong	forte	stark		7
			very strong	tres forte	sehr stark	Shogoin	9
9. (+)	Leaf: dentation of margin Feuille: denture du bord Blatt: Zähnung des Randes	100 - 130	absent or very weak	nulle ou très faible	fehlend oder sehr gering	Tendergreen	1
			weak	faible	gering	Milan White	3
			medium	moyenne	mittel	Arca	5
			strong	forte	stark	Taronda	7
			very strong	très forte	sehr stark	Mizuna	9
(*) (+)	10. Leaf: length Feuille: longueur Blatt: Länge	100 - 130	short	courte	kurz	Market Express	3
			medium	moyenne	mittel	Tokyo Cross	5
			long	longue	lang	Jobe	7

	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(+) 11.	Leaf: width	100 - 130	narrow	étroite	schmal	De Milan rouge extra hâtif à chassis	3
	Feuille: largeur (au point le plus large)		medium	moyenne	mittel	Maschinella	5
	Blatt: Breite (an breitesten Stelle)		broad	large	breit	Tyfon	7
12.	Leaf: distance from widest point to base	100 - 130	short				3
			medium				5
			long				7
13.	Leaf: length of terminal lobe (for lobed leaved varieties)	100 - 130	short				3
			medium				5
			long				7
14	Leaf: width of terminal lobe (for lobed leaved varieties)	100 - 130	narrow				3
			medium				5
			broad				7
15.	Leaf: hairiness of upper side	100 - 130	absent or very weak	absente ou très faible	fehlend oder sehr gering	Appin	1
	Feuille: pilosité de la		weak	faible	gering	Houtlander, Teutonengold, Tokyo Market	3
	Blatt: Behaarung der Oberseite		medium	moyenne	mittel	De Milan rouge extra hâtif à chassis	5
			strong	forte	stark	Blanc dur d'hiver, Blanc plat hâtif à feuille entière,	7
			very strong	très forte	sehr stark	Hampshire Hardy Green Round	9

	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
16.	Leaf: anthocyanin coloration	100 - 130	absent or very weak	nulle ou très faible	fehlend oder sehr gering	Leielander	1
	Feuille: pigmentation anthocyanique		weak	faible	gering	Bency	3
	Blatt: Anthocyanfärbung		medium	moyenne	mittel	The Bruce	5
			strong	forte	stark	Scarlet Ball	7
			very strong	très forte	sehr stark	Hinonakabu	9
(*) (+)	17. Root: position in soil	260 - 290	very shallow	très peu enterrée	sehr flach		1
	Racine: position dans le sol		shallow	peu enterrée	flach	Milan White Forcing	3
			medium	moyenne	mittel		5
	Rübe: Sitz im Boden		deep	enterée	tief	Noir long	7
			very deep	très enterrée	sehr tief		9
(*)	18. Root: cork layer around skin	280	thin			Jobe	1
			thick			Noir long	2
(*)	19. Root: color of skin above soil	240 - 260	white				1
			green				2
			yellow				3
			orange				4
			bronze				5
			scarlet				6
			reddish purple				7
			bluish purple				8
	20. Root: intensity of coloration of skin at top	240 -260	weak	faible	gering		3
	Racine: intensité de la couleur de l'épiderme due collet		medium	moyenne	mittel		5
	Rübe: Intensität der Farbe der Haut des oberen Teiles		strong	forte	stark		7

	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
21.	Root: colour of skin below ground	240 -260	white	blanche	weiss	Taronda	1
			yellow	jaune	gelb	Teutonengold	2
	Racine: couleur de l'épiderme de la partie enterrée		red	rouge	rot	Scarlet Ball	3
	Rübe: Farbe der Haut in der Erde		purple	pourpre	purpur	Nozawana	4
(*) 22.	Root: color of flesh	240 -280	white	blanche	weiss	Arca	1
	Racine: couleur de la chair		yellow	jaune	gelb	Teutonengold	2
	Rübe: Farbe des Fleisches						
23.	Root: intensity of yellow color of flesh	240 -280	weak	faible	gering	Findlay	3
			medium	moyenne	mittel	Teutonengold	5
	Racine: intensité de la couleur jaune de la chair		strong	forte	stark	Golden Perfection	7
	Rübe: Intensität der gelben Farbe des Fleisches						
24.	Root: anthocyanin coloration of flesh	240 -280	absent	absente	fehlend	Hilversumse	1
			present	présente	vorhanden	Scarlet Ball	9
	Racine: pigmentation anthocyanique de la chair						
	Rübe: Anthocyanfärbung des Fleisches						
(*) 25.	Root: shape	260 - 280	flat			Milan White	1
	(+) Racine: forme générale		flat globe				2
	Rübe: allgemeine Form		globe	ronde	rund	Arca	3
			box globe				4
			long globe			Champion Green Top Yellow	5
			tankard			Bortfelder, Rekord	6
			long tankard			Long D'Alsace	7

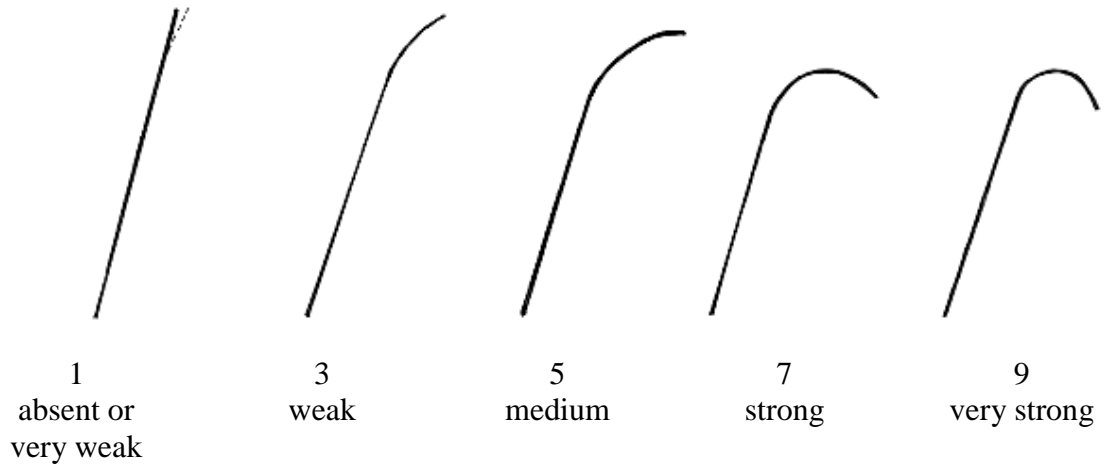
	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 26.	Root: length	260 - 280	very short	très courte	sehr kurz	Milan White	1
	Racine: longueur		short	courte	kurz	Snowball	3
	Rübe: Länge		medium	moyenne	mittel	Frisia	5
			long	longue	lang	De Croissy	7
			very long	très longue	sehr lang	Hinonakabu	9
(*) 27.	Root: width	260 - 280	narrow	étroite	schmal	Tendergreen	3
			medium	moyenne	mittel	Houtlander	5
	Racine: largeur (de la partie la plus large)		broad	large	breit	De Milan rouge extra hatif a chasis	7
	Rübe: Breite (an breitester Stelle)						
(*) (+)	Root: position of widest point	260 - 280	above middle			Hilversumse	3
			at middle			Taronda	5
	Racine: position relative de la partie la plus large		below middle			Blanc dur d'hiver	7
	Rübe: Position der breitesten Stelle						
29.	Root: curvature of main axis	260 - 280	absent	absente	fehlend	Taronda	1
			present	présente	vorhanden	De Croissy	9
	Racine: courbure de l'axe principal						
	Rübe: Biegung der Hauptachse						
(*) (+)	Root: shape of crown	260 - 280	strongly indented	fortement déprimé	stark eingesenkt		1
	Racine: forme du niveau du collet		indented	déprimé	eingesenkt	Milan White Forcing	3
	Rübe: Form des oberen Teils		level	plan	eben	Milan White	5
			raised	protruberant	vorgewölbt	Taronda	7
			strongly raised	fortement protrubérant	stark vorgewölbt	Oonaga, Tokyo	9

	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) (+)	31. Root: shape of base	260 - 280	strongly indented	fortement déprimée	stark eingesenkt		1
	Racine: forme de la base		indented	déprimée	eingesenkt	Milan White Forcing	2
	Rübe: Form der Basis		truncate	tronguée	stumpf	Milan White	3
			round	arrondie	rund	Frisia	4
			pointed	pointue	spitz	Noir long	5
32	Root: speed of formation	220 - 260		very slow			1
				slow			3
				medium			5
				fast			7
				very fast			9
33.	Plant: height at first flowering	370	low				3
	Plante: hauteur a l'apparition des boutons floraux		medium	moyenne	mittel		5
	Pflanze: Höhe zum Zeitpunkt des Erscheinens der Blütenknospen		high				7
34.	Time of flowering in year of sowing for early <u>spring</u> sown trials	370	very early	très précoce	sehr früh	Beninabana	1
			early	précoce	früh	Blanc dur d'hiver	3
	Epogue de floraison l'année due semis dans les essais		medium	moyenne	mittel	Bency	5
	semes au <u>printemps</u>		late	tardive	spät	Tokyo Market	7
	Zeitpunkt der Blüte im Aussaatjahr bei <u>Frühjahrsaussaat</u>		very late	très tardive	sehr spät		9
35.	Flower: color of petal	370 - 400	lemon-yellow	jaune-citron	zitronengelb	Arca	1
	Fleur: couleur des pétales		orange-yellow	jaune-orange	orangengelb	Teutonengold	2
	Blüte: Farbe des Blütenblatts						

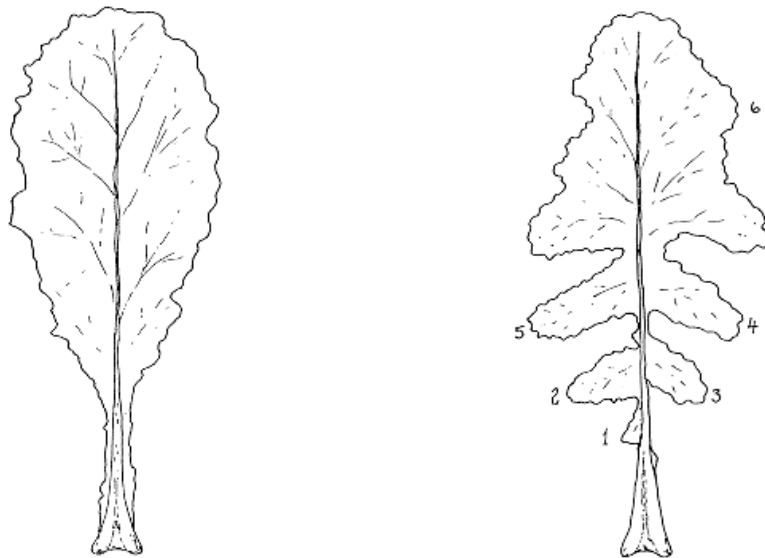
	Characteristics Caractères Merkmale	Stage 1) Stade 1) Stadium 1)	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
36.	Flower: length of petal	370 - 400	short	courts	kurz		3
	Fleur: longueur des pétales		medium	moyens	mittel		5
	Blüte: Länge des Blütenblatts		long	longs	lang		7
37.	Flower: width of petal	370 - 400	narrow	étroits	schmal		3
	Fleur: largeur des pétales		medium	moyens	mittel	Vollenda	5
	Blüte: Breite des Blütenblatts		broad	larges	breit		7
38.	Plant: height after flowering	450 - 500	short				3
			medium				5
			tall				7
39.	Siliqua: length of beak	450 - 500	short				3
			medium				5
			long				7
40.	Siliqua length of peduncle	450 - 500	short				3
			medium				5
			long				7
41.	Siliqua: length (excluding beak and peduncle)	450 - 500	short				3
			medium				5
			long				7
42.	Seed: color (of ripe seeds)	00	pale brown			Scarlet Ball	1
	Graine: couleur (sur graine mûre)		dark brown or black		Taronda	2	
	Samen: Farbe (am reifen Samen)						

VIII. Explanations on the Table of Characteristics

Ad. 3 Leaf: reflexion of top



Ad. 5 + 6 Leaf: lobing and number of lobes

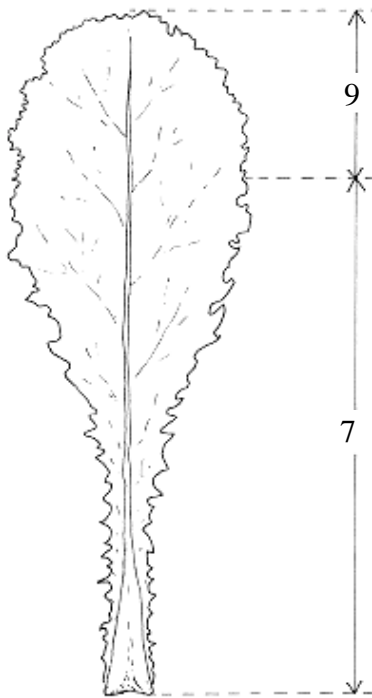


spatulate

lobed

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.

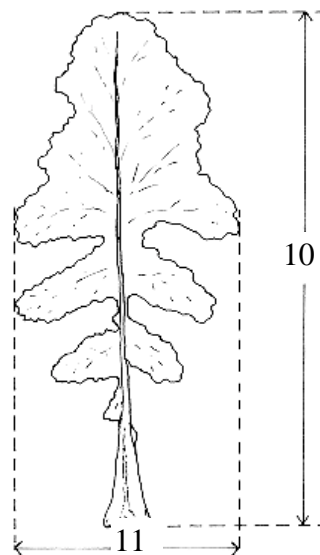
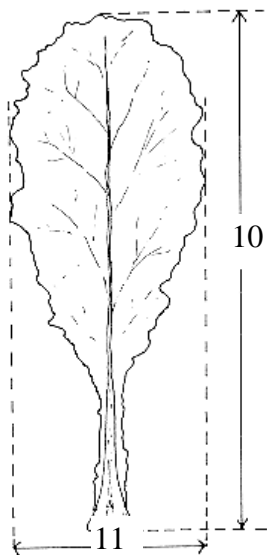
Ad. 7 + 9 Leaf: incisions of blade base (varieties with entire leaves only (7))
Leaf: dentation of margin (9)



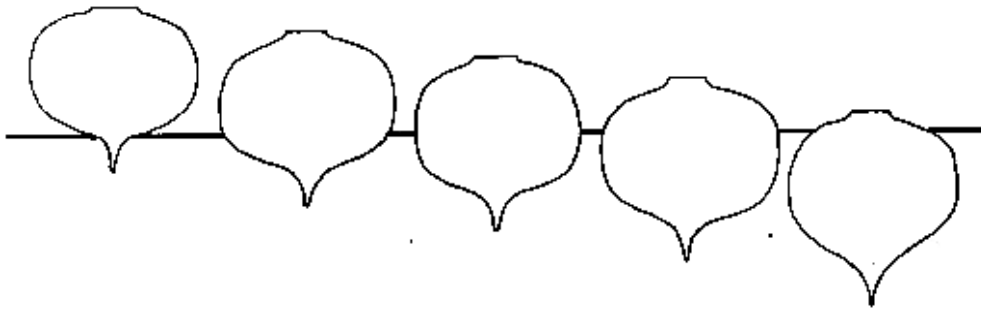
part on which the dentation should be recorded
(characteristic 9)

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

Ad. 10 + 11 Leaf: length (10) and width (11)

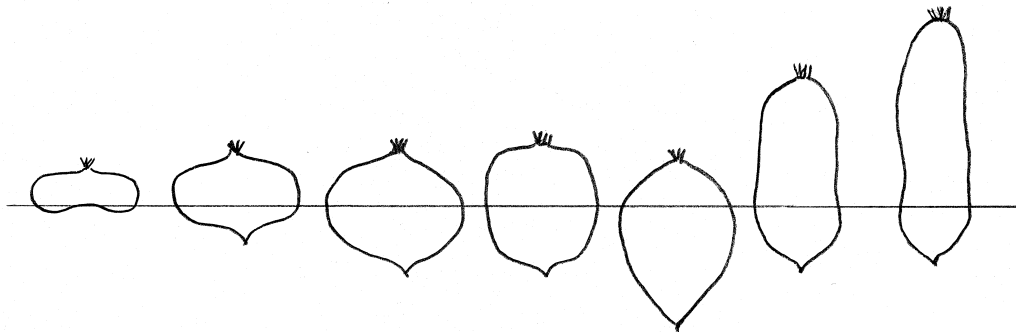


Ad. 17 Root: position in soil



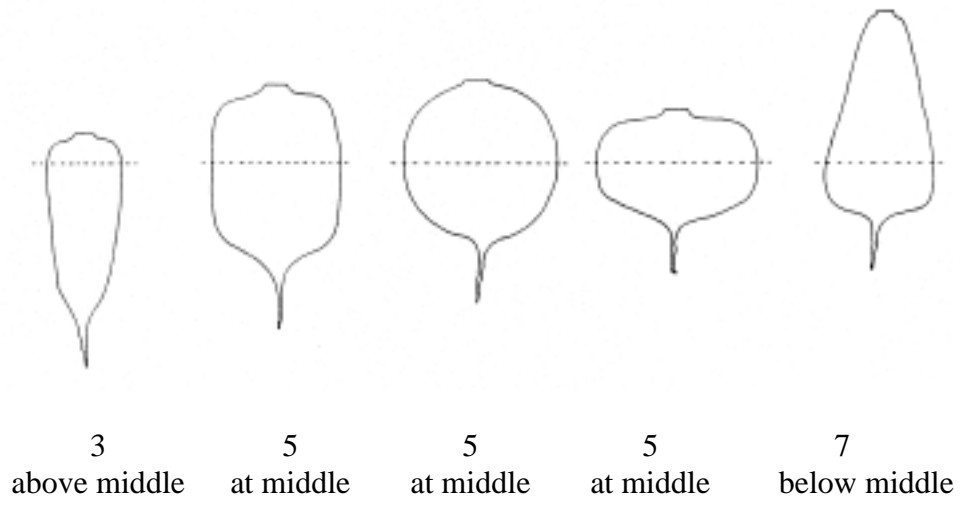
1 very shallow 3 shallow 5 medium 7 deep 9 very deep

Ad. 25. Root: shape

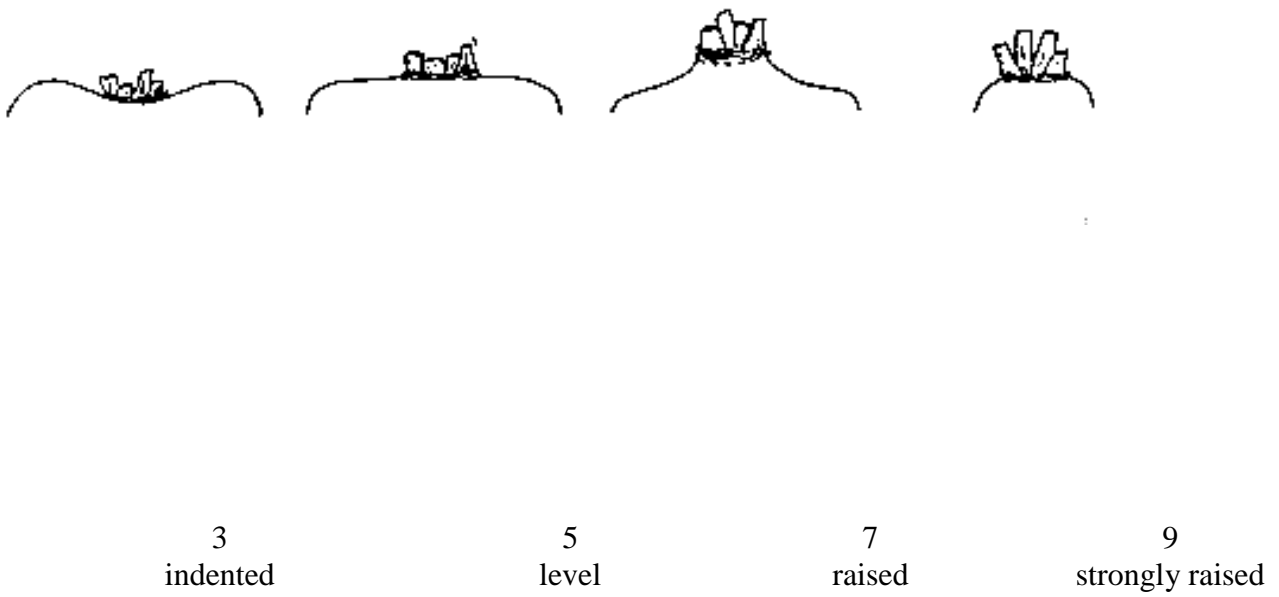


1 transverse elliptic 2 oblate 3 circular 4 broad elliptic 5 obovate 6 tankard 7 long tankard

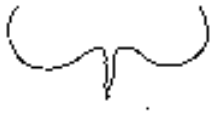
Ad. 28 Root: position of widest point



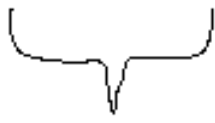
Ad. 30 Root: shape of crown



Ad. 31 Root: shape of base



2
indented



3
truncate



4
round



5
pointed

KEY FOR GROWTH STAGES

00	<u>Dry seed</u>	
1- 10	Germination and emergence through soil	
	<u>Seedling growth</u>	
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	
	<u>Leaf development</u>	
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.	
	<u>Root development</u>	
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	
	<u>Flowering and seed production on main stem</u>	
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

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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
(Varieties which form a significantly swollen root in spring sown trials)

2. Applicant (Name and address)

3. Proposed denomination or breeder's reference

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

4.1 Variety Type

(i) Open-pollinated variety []

(ii) Single Hybrid []

(iii) Three-way hybrid []

(iv) Other []

4.2 Other information

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

Characteristics		English	français	deutsch	Example Varieties	Note
5.1 (*) 1.	Ploidy	diploid	diploïde	diploid		2[]
	Ploïdie	tetraploid	tétraploïde	tetraploid		4[]
5.2 (*) 4.	Leaf: intensity of green color	very light	très pâle	sehr blass		1[]
		light	pâle	blass		3[]
	Fruille: couleur verte	medium	moyenne	mittel		5[]
		dark	foncée	dunkel		7[]
	Blatt: Grünfärbung	very dark	très foncée	sehr dunkel		9[]
5.3 (*) 5. (+)	Leaf: type	spatulate				1[]
	Feuille: l	lobed				2[]
5.4 (*) 10. (+)	Leaf: length (blade and petiole)	short	courte	kurz		3[]
	Feuille: longueur (limbe et pétiole)	medium	moyenne	mittel		5[]
	Blatt: Länge (Spreite und Stiel)	long	longue	lang		7[]
5.5 (*) 17. (*)	Root: position in soil	very shallow	très peu enterrée	sehr flach		1[]
	Racine: position dans le sol	shallow	peu enterrée	flach		3[]
	Rübe: Sitz im Boden	medium	moyenne	mittel		5[]
		deep	enterée	tief		7[]
	very deep	très enterrée	sehr tief		9[]	
5.6 (*) 18.	Root: cork layer around skin	thin			Jobe	1[]
	Racine: zone liégeuse sur la peau	thick			Noir long	2[]
	Rübe: Korkzone auf der Haut					
5.7 (*) 19.	Root: color of skin above soil	white				1[]
		green				2[]
		yellow				3[]
		orange				4[]
		bronze				5[]
		scarlet				6[]
		reddish purple				7[]
		bluish purple				7[]

Characteristics		English	français	deutsch	Example Varieties	Note
5.8	Root: color of flesh	white	blanche	weiss		1[]
(*) 22.	Racine: couleur de la chair Rübe: Farbe des Fleisches	yellow	jaune	gelb		2[]
5.9	Root: general shape	flat				1[]
(*) 25.	Racine: forme générale Rübe: allgemeine Form	flat globe				2[]
		globe				3[]
		box globe				4[]
		long globe				5[]
		tankard				6[]
		long tankard				7[]
5.10	Root: length	very short	très courte	sehr kurz	Milan White	1[]
(*) 26	Racine: longueur Rübe: Länge	short	courte	kurz		3[]
		medium	moyenne	mittel		5[]
		long	longue	lang		7[]
		very long	très longue	sehr lang		9[]
5.11	Root: width	narrow	étroite	schmal		3[]
(*) 27.	Racine: largeur (de la partie la plus large) Rübe: Breite (an breitester Stelle)	medium	moyenne	mittel		5[]
		broad	large	breit		7[]
5.12	Root: position of widest point	above middle	basse	niedrig		3[]
(*) 29.	Racine: position relative de la partie la plus large Rübe: Position der breitesten Stelle	middle	moyenne	mittel		5[]
(+)		below middle	haute	hoch		7[]
5.13	Root: shape of crown	strongly indented	fortement déprimé	stark eingesenkt		1[]
(*) 30	Racine: forme du niveau du collet Rübe: Form des oberen Teils	indented	déprimé	eingesenkt		3[]
		level	plan	eben		5[]
		raised	protruberant	vorgewölbt		7[]
		strongly raised	fortement protrubérant	stark vorgewölbt		9[]
5.14	Root: shape of base	strongly indented	fortement déprimée	stark eingesenkt		1[]
(*) 31	Racine: forme de la base Rübe: Form der Basis	indented	déprimée	eingesenkt		2[]
(+)		truncate	trouguee	stumpf		3[]
		round	arrondie	rund		4[]
		pointed	pointue	spitz		5[]

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
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^o In the case of identical states of expression 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

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

7.3 Time of Sowing

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

7.4 Other information

8. Authorisation for release

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

Yes [] No []

(b) Has such authorisation been obtained?

Yes [] No []

If the answer to that question is 'yes', please attach a copy of such authorisation.

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