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## INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

### TURNIP

UPOV Code(s): BRASS\_RAP\_RAP

*Brassica rapa* L. var. *rapa*

### GUIDELINES

#### FOR THE CONDUCT OF TESTS

#### FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by experts from France  
 to be considered by the  
 Technical Working Party for Vegetables  
 at its fifty-fifth session, to be held in Antalya, Turkey,  
 from 2021-05-03 to 2021-05-07*

*Disclaimer: this document does not represent UPOV policies or guidance*

Alternative names:\*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Brassica rapa</i> L. var. <i>rapa</i>	Turnip	Navet	Herbstrübe, Mairübe	Nabo

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

### ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

Other associated UPOV documents: TG/185 Turnip rape

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1. Subject of these Test Guidelines

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

2. Material Required

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

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

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

20 g or 10,000 seeds

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant.

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

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 *Number of Growing Cycles*

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

3.1.2 The two independent growing cycles should be in the form of two separate plantings.

3.1.3 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

3.2 *Testing Place*

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 "Examining Distinctness".

3.3 *Conditions for Conducting the Examination*

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The optimum stage of development for the assessment of each characteristic is indicated by a number in the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

### 3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 60 plants, which should be divided between at least 2 replicates.

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

### 3.5 *Additional Tests*

Additional tests, for examining relevant characteristics, may be established.

## 4. Assessment of Distinctness, Uniformity and Stability

### 4.1 *Distinctness*

#### 4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

#### 4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

#### 4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

#### 4.1.4 Number of Plants or Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 40 plants or parts of plants taken from each of 40 plants and any other observations made on all plants in the test, disregarding any off-type plants.

#### 4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the Table of Characteristics (see document TGP/9 "Examining Distinctness", Section 4 "Observation of characteristics"):

MG: single measurement of a group of plants or parts of plants

MS: measurement of a number of individual plants or parts of plants

VG: visual assessment by a single observation of a group of plants or parts of plants

VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

“Visual” observation (V) is an observation made on the basis of the expert’s judgment. For the purposes of this document, “visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, “G” provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

#### 4.2 *Uniformity*

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 These Test Guidelines have been developed for the examination of seed-propagated varieties. For varieties with other types of propagation, the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

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

4.2.4 The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction.

#### 4.3 *Stability*

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

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

5. Grouping of Varieties and Organization of the Growing Trial
- 5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.
- 5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.
- 5.3 The following have been agreed as useful grouping characteristics:
  - (a) Ploidy (characteristic 1)
  - (b) Petiole: intensity of anthocyanin coloration (characteristic 2)
  - (c) Leaf: number of lobes (characteristic 6)
  - (d) Root: degree of swelling (characteristic 15)
  - (e) Only varieties with Root: degree of swelling: medium or strong: Root: color of skin above soil (characteristic 16)
  - (f) Only varieties with Root: degree of swelling: medium or strong: Root: color of skin below soil (characteristic 18)
  - (g) Only varieties with Root: degree of swelling: medium or strong: Root: color of flesh (characteristic 19)
  - (h) Only varieties with Root: degree of swelling: medium or strong: Root: shape in longitudinal section (characteristic 22)
- 5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 "Examining Distinctness".
6. Introduction to the Table of Characteristics
- 6.1 *Categories of Characteristics*
- 6.1.1 Standard Test Guidelines Characteristics

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

Asterisked characteristics (denoted by \*) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.
- 6.2 *States of Expression and Corresponding Notes*
- 6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.
- 6.2.2 All relevant states of expression are presented in the characteristic.
- 6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 "Development of Test Guidelines".

### 6.3 *Types of Expression*

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

### 6.4 *Example Varieties*

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

The type is indicated in brackets after the name of the example variety as follows:

- (A): swelling root absent or weak
- (S): swelling root medium or strong

### 6.5 *Legend*

		English	français	deutsch	español	Example Varieties Exemples Be ejemplo	Note
1	2	3	4	5	6	7	
		Name of characteristics in English	Nom du caractère en français	Name des Merkmals auf Deutsch	Nombre del carácter en español		
		states of expression	types d'expression	Ausprägungsstufen	tipos de expresión		

- |   |   |   |                     |
|---|---|---|---------------------|
| 1 | Characteristic number                                   |   |                     |
| 2 | (*)   | Asterisked characteristic                                       | – see Chapter 6.1.2 |
| 3 | Type of expression                                      |   |                     |
|   | QL  | Qualitative characteristic                                      | – see Chapter 6.3   |
|   | QN  | Quantitative characteristic                                     | – see Chapter 6.3   |
|   | PQ  | Pseudo-qualitative characteristic                               | – see Chapter 6.3   |
| 4 | Method of observation (and type of plot, if applicable) |   |                     |
|   | MG, MS, VG, VS  |   | – see Chapter 4.1.5 |
| 5 | (+)   | See Explanations on the Table of Characteristics in Chapter 8.2 |                     |
| 6 | (a)-(c)   | See Explanations on the Table of Characteristics in Chapter 8.1 |                     |
| 7 | Growth stage key  | See Explanations on the Table of Characteristics in Chapter 8.3 |                     |

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>1. (*)</b>	<b>QL VG/VS</b>	<b>(+)</b>			<b>00-60</b>	
	<b>Ploidy</b>					
	diploid				Milan White (S)	2
	tetraploid				Taronda (S)	4
<b>2. (*)</b>	<b>QN VG</b>	<b>(+)</b>			<b>100-130</b>	
	<b>Petiole: intensity of anthocyanin coloration</b>					
	absent or very weak				Delilah (S), Long d'Alsace (S)	1
	weak				Kranjska Podolgovata (S), Simax (A)	2
	medium				Samson (S)	3
	strong					4
	very strong				Scarlet Queen Red Stem (S)	5
<b>3.</b>	<b>QN VG</b>	<b>(+)</b>	<b>(a)</b>		<b>100-130</b>	
	<b>Leaf: attitude</b>					
	erect				Hinona (A), Samson (S)	1
	erect to semi-erect					2
	semi-erect				Agressa (S), Noir long (S)	3
	semi-erect to prostrate					4
	prostrate				Goldana (S), Richelieu (S), Teltower Kleine (S)	5
<b>4.</b>	<b>QN VG</b>	<b>(+)</b>	<b>(a)</b>		<b>100-130</b>	
	<b>Leaf: degree of recurving of the apex</b>					
	absent or very weak				Milan White Forcing (S)	1
	absent or very weak to weak					2
	weak				Declic (S), Fuku Komachi (S)	3
	weak to medium					4
	medium				Delilah (S)	5
	medium to strong					6
	strong				Simax (A)	7
	strong to very strong					8
	very strong					9



	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>5. (*)</b>	<b>QN</b>	<b>VG</b>	<b>(a)</b>	<b>100-130</b>			
	<b>Leaf: intensity of green color</b>						
	very light						1
	very light to light						2
	light					Rondo (S)	3
	light to medium						4
	medium					Civasto R (S)	5
	medium to dark						6
	dark					Simax (A), Tokyo Top (S)	7
	dark to very dark						8
	very dark					Richelieu (S)	9
<b>6. (*)</b>	<b>QN</b>	<b>MS/VG</b>	<b>(a), (b)</b>	<b>100-130</b>			
	<b>Leaf: number of lobes</b>						
	absent or very few					Declic (S), Polybra (S), Simax (A)	1
	absent or very few to few						2
	few					Tokyo Cross (S)	3
	few to medium						4
	medium					Blanc globe à collet violet (S), Richelieu (S)	5
	medium to many						6
	many					Civasto R (S)	7
	many to very many						8
	very many						9
<b>7.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(a), (b)</b>	<b>100-130</b>		
	<b>Only varieties with Leaf: number of lobes: absent or very few: Leaf: depth of the incisions of margin at basal part</b>						
	absent or very shallow					Declic (S)	1
	absent or very shallow to shallow						2
	shallow					Agressa (S), Taronda (S)	3
	shallow to medium						4
	medium					De Nancy à feuille entière (S)	5
	medium to deep						6
	deep					Simax (A)	7
	deep to very deep						8
	very deep					Polybra (S)	9

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>8.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(a)</b>	<b>100-130</b>			
	<b>Leaf: undulation of margin</b>							
	absent or very weak						Tokyo Cross (S)	1
	absent or very weak to weak							2
	weak						Simax (A), Tokyo Top (S)	3
	weak to medium							4
	medium						Rouge plat hâtif à feuille entière (S)	5
	medium to strong							6
	strong						Falko (S)	7
	strong to very strong							8
	very strong						Rondo (S)	9
<b>9.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>(a)</b>	<b>100-130</b>			
	<b>Leaf: dentation of margin of upper part of the leaf</b>							
	absent or very weak						De Milan à forcer à collet rose (S)	1
	absent or very weak to weak							2
	weak						Milan White (S)	3
	weak to medium							4
	medium						Polybra (S)	5
	medium to strong							6
	strong						Greleiro Senhora Conceição (A), Taronda (S)	7
	strong to very strong							8
	very strong						Appin (S)	9

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>10</b>	<b>(*)</b>	<b>QN</b>	<b>MS/VG</b>	<b>(a), (b)</b>	<b>100-130</b>		
		<b>Leaf: length</b>					
		very short				De Milan à forcer à collet rose (S)	1
		very short to short					2
		short				Milan White (S), Richelieu (S)	3
		short to medium					4
		medium				Blanc globe à collet violet (S), Tokyo Cross (S)	5
		medium to long					6
		long				Greiro Senhora Conceição (A)	7
		long to very long					8
		very long				Simax (A)	9
<b>11</b>		<b>QN</b>	<b>MS/VG</b>	<b>(a), (b)</b>	<b>100-130</b>		
		<b>Leaf: width</b>					
		very narrow					1
		very narrow to narrow					2
		narrow				De Milan à forcer à collet rose (S), Milan White Forcing (S)	3
		narrow to medium					4
		medium				Appin (S), Tokyo Cross (S)	5
		medium to broad					6
		broad				Simax (A)	7
		broad to very broad					8
		very broad				Greiro Senhora Conceição (A)	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>12</b>	<b>QN</b>	<b>MS/VG</b>	<b>(a), (b)</b>	<b>100-130</b>		
	<b>Leaf: length of terminal lobe</b>					
	very short					1
	very short to short					2
	short				Richelieu (S)	3
	short to medium					4
	medium				Blanc globe à collet violet (S), Snowball (S)	5
	medium to long					6
	long				D'Auvergne hâtive (S), Jaune boule d'or (S)	7
	long to very long					8
	very long					9
<b>13</b>	<b>QN</b>	<b>MS/VG</b>	<b>(a), (b)</b>	<b>100-130</b>		
	<b>Leaf: width of terminal lobe</b>					
	very narrow					1
	very narrow to narrow					2
	narrow				Richelieu (S)	3
	narrow to medium					4
	medium				Blanc globe à collet violet (S), Jaune boule d'or (S)	5
	medium to broad					6
	broad				Long d'Alsace (S)	7
	broad to very broad					8
	very broad					9

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>14</b>	<b>QN</b>	<b>VG</b>	<b>(a)</b>	<b>100-130</b>			
	<b>Leaf: hairiness of upper side</b>						
	absent or very weak					Appin (S), Rondo (S)	1
	absent or very weak to weak						2
	weak					Tokyo Market (S)	3
	weak to medium						4
	medium					De Milan à forcer à collet rose (S)	5
	medium to strong						6
	strong					Blanc dur d'hiver (S), Rouge plat hâtif à feuille entière (S)	7
	strong to very strong						8
	very strong						9
<b>15</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>240-260</b>		
	<b>Root: degree of swelling</b>						
	absent or weak					Grelas de Santiago (A), Simax (A)	1
	medium					Globo blanco de Lugo (S)	2
	strong					Polybra (S), Tokyo Market (S)	3
<b>16</b>	<b>(*)</b>	<b>PQ</b>	<b>VG</b>	<b>240-260</b>			
	<b><u>Only varieties with</u> Root: degree of swelling: medium or strong: Root: color of skin above soil</b>						
	white					Tokyo Cross (S)	1
	green					Rondo (S)	2
	yellow-orange					Jaune boule d'or (S)	3
	red					Scarlet Queen Red Stem (S)	4
	reddish purple					Falko (S)	5
	bluish purple					Blanc globe à collet violet (S)	6
	black					Noir long (S)	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17	QN VG		240-260			
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: intensity of color of skin <u>above</u> soil</b>					
	light				Blanc globe à collet violet (S), Massif (S)	1
	medium				Declic (S), Jaune boule d'or (S)	2
	dark				Clovis (S), Hector (S)	3
18 (*)	PQ VG		240-260			
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: color of skin <u>below</u> soil</b>					
	white				Milan White Forcing (S), Natsu Komachi (S), Taronda (S)	1
	yellow				Goldana (S), Jaune boule d'or (S)	2
	red				Scarlet Queen Red Stem (S)	3
	purple					4
	black				Noir long (S)	5
19 (*)	QL VG		240-280			
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: color of flesh</b>					
	white				Noir long (S), Scarlet Queen Red Stem (S), Taronda (S)	1
	yellow				Goldana (S), Jaune boule d'or (S)	2
20	QL VG		240-280			
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: anthocyanin coloration of flesh</b>					
	absent				Marteau (S)	1
	present				Scarlet Queen Red Stem (S)	9

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>21</b>	<b>(*)</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>260-290</b>		
		<b>Only varieties with Root: degree of swelling: medium or strong: Root: position in soil</b>					
			very shallow			Declic (S), Milan White Forcing (S)	1
			very shallow to shallow				2
			shallow			Oasis (S)	3
			shallow to medium				4
			medium			Agressa (S)	5
			medium to deep				6
			deep			Jaune boule d'or (S), Noir long (S)	7
			deep to very deep				8
			very deep			Teltower Kleine (S)	9
<b>22</b>	<b>(*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>260-280</b>		
		<b>Only varieties with Root: degree of swelling: medium or strong: Root: shape in longitudinal section</b>					
			narrow oblate			Platte Witte Mei (S)	1
			oblate			Milan White (S)	2
			circular			Rondo (S)	3
			ovate			Marteau (S)	4
			oblong			Delilah (S)	5
			narrow oblong			Long d'Alsace (S)	6
			obovate				7
			broad obovate			Aberdeen Green Top Yellow (S)	8
			triangular			De Montesson (S)	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23 (*)	QN MS/VG					
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: length</b>					
	very short				Milan White (S)	1
	very short to short					2
	short				Clovis (S), Declic (S)	3
	short to medium					4
	medium				Dynamo (S)	5
	medium to long					6
	long				Taronda (S)	7
	long to very long					8
	very long				Kranjska Podolgovata (S)	9
24	QL VG	(+)				
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: curvature of vertical axis</b>					
	absent				Taronda (S)	1
	present				De Croissy (S)	9
25 (*)	QN VG					
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: position of broadest part</b>					
	above middle				Marteau (S)	1
	at middle				Jaune boule d'or (S)	2
	below middle				Blanc dur d'hiver (S)	3
26 (*)	QN MS/VG					
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: diameter at broadest part</b>					
	very small					1
	very small to small					2
	small	petit	klein	pequeño	Hakutaka (S)	3
	small to medium					4
	medium	moyen	mittel	medio	Rondo (S)	5
	medium to large					6
	large	grand	groß	grande	Massif (S)	7
	large to very large					8
	very large					9



	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27 (*)	QN	VG	(+)	(c)	260-280			
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: shape of collar</b>							
	strongly depressed						De Milan à forcer à collet rose (S)	1
	strongly depressed to moderately depressed							2
	moderately depressed						Milan White Forcing (S)	3
	moderately depresses to flat							4
	flat						Milan White (S)	5
	flat to moderately raised							6
	moderately raised						Taronda (S)	7
	moderately raised to strongly raised							8
	strongly raised						Agressa (S)	9
28 (*)	PQ	VG	(+)	(c)	260-280			
	<b>Only varieties with Root: degree of swelling: medium or strong: Root: shape of apex</b>							
	narrow acute						Noir long (S)	1
	broad acute						Kranjska Podolgovata (S)	2
	rounded						Civasto R (S)	3
	truncate						Milan White (S)	4
	depressed						Milan White Forcing (S)	5
29	QN	MG/VG			260			
	<b>Only varieties with Root: degree of swelling: medium or strong: time of harvest maturity</b>							
	very early							1
	very early to early							2
	early						Oasis (S)	3
	early to medium							4
	medium						Civasto R (S)	5
	medium to late							6
	late						Aberdeen Green Top Yellow (S)	7
	late to very late							8
	very late							9

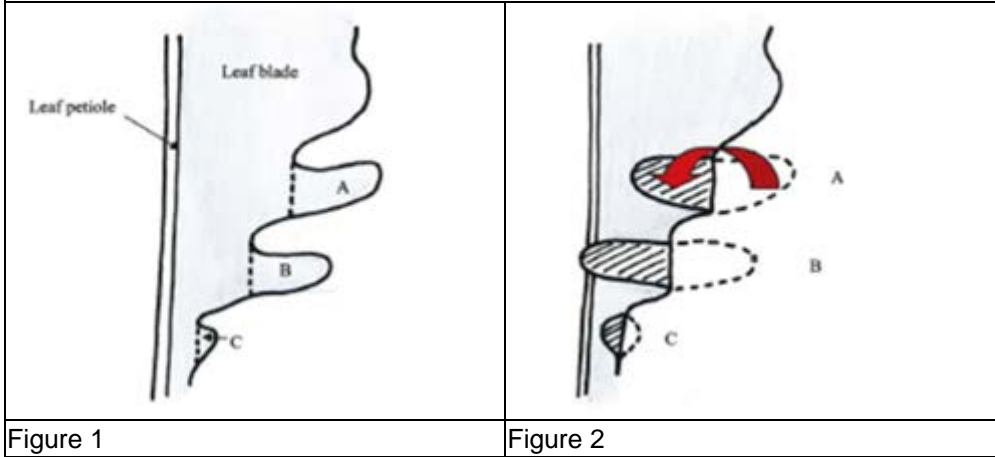
	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>30</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>310</b>		
	<b>Plant: number of sprouts</b>					
	very few				Taronda (S)	1
	very few to few					2
	few				Largo de Alsacia (S)	3
	few to medium					4
	medium				São Cosme (S)	5
	medium to many					6
	many				Globo blanco de Lugo (S)	7
	many to very many					8
	very many				Grelos de Santiago (A)	9
<b>31</b>	<b>QN</b>	<b>MG/VG</b>		<b>370</b>		
	<b>Time of flowering</b>					
	very early				Greleiro Temporão (A)	1
	very early to early					2
	early				Grelos de Santiago (A), Tyfon (S)	3
	early to medium					4
	medium				Globo blanco de Lugo (S), Marteau (S)	5
	medium to late					6
	late				Bola de nieve (S), Jaune boule d'or (S)	7
	late to very late					8
	very late				Platte Witte Mei (S)	9
<b>32</b>	<b>QN</b>	<b>VG</b>		<b>370-400</b>		
	<b>Petal: intensity of yellow color</b>					
	light				Taronda (S)	1
	medium					2
	dark				Jaune boule d'or (S)	3

8. Explanations on the Table of Characteristics

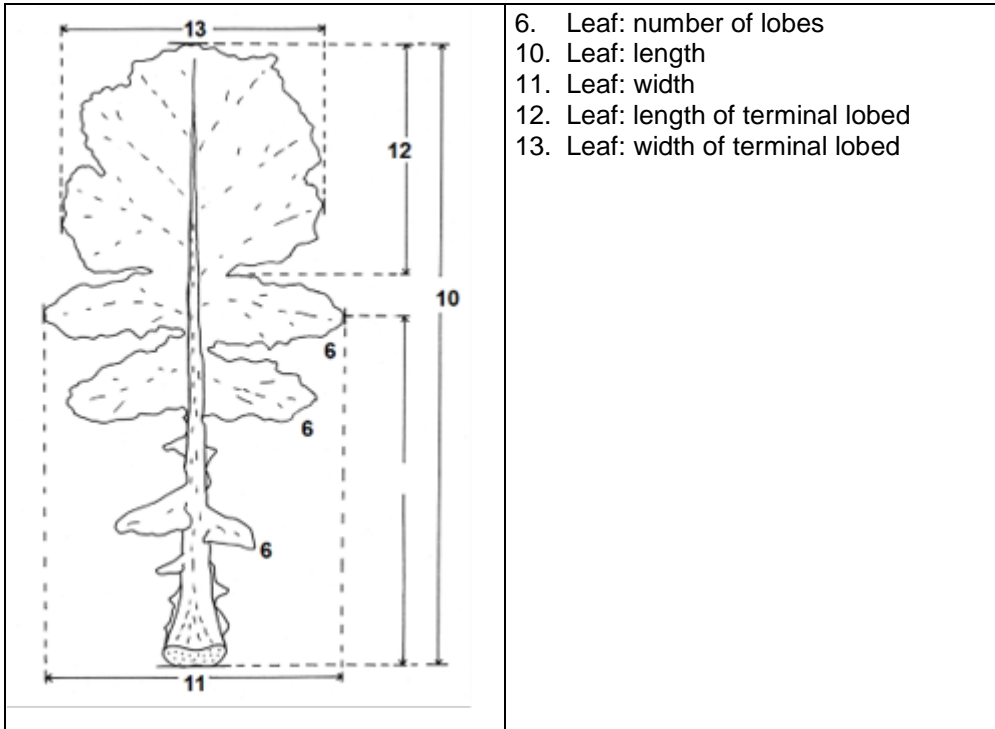
8.1 *Explanations covering several characteristics*

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

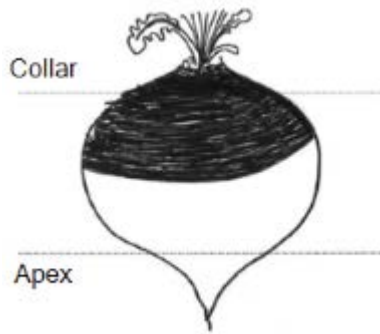
- (a) Observations should be made on the largest fully developed leaf.
- (b) Parts of the leaf blade are considered to be lobes if:
  1. They have a minimum length of 1 cm and
  2. When folded back to the midrib as shown in Figs 1 and 2, the folded tissue meets the midrib



- 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



(c)



## 8.2 Explanations for individual characteristics

### Ad. 1: Ploidy

The ploidy status of the plant can be checked by different methods :

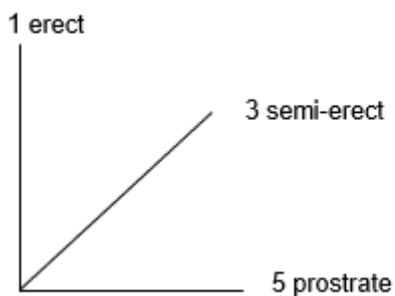
- determination of the number of chromosomes of the non-thickened root meristem (which is the most reliable method),
- examination of the stomata on the lower side of the cotyledon (tetraploid varieties have more and longer stomata than diploid varieties),
- examination of the chloroplasts of the guard cells on the lower side of the cotyledon (the guard cells of tetraploid varieties are bigger and contain more chloroplasts (> 20) than those of diploid varieties (> 10).
- Flow cytometry (DNA quantification method).

Observations should be made on 20 plants/seeds.

### Ad. 2: Petiole: intensity of anthocyanin coloration

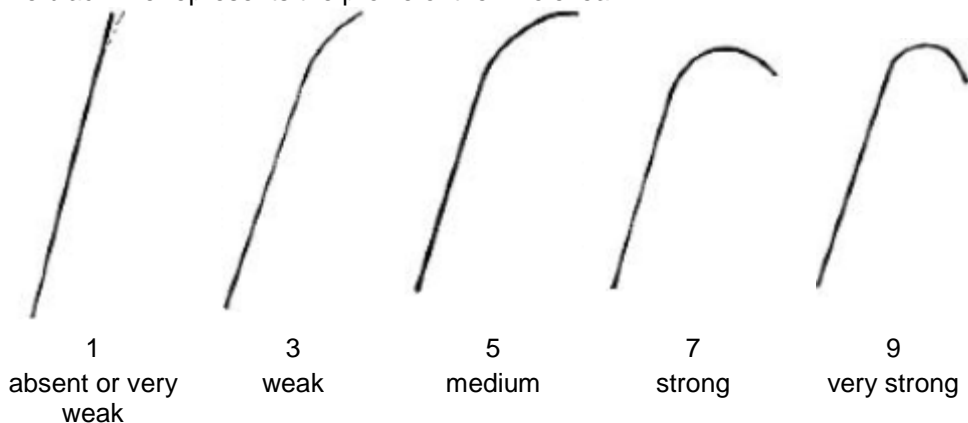
Observations should be made on the basal part of the lower side of the leaf.

### Ad. 3: Leaf: attitude



### Ad. 4: Leaf: degree of recurving of the apex

The black line represents the profile of the whole leaf.



Ad. 7: Only varieties with Leaf: number of lobes: absent or very few: Leaf: depth of the incisions of margin at basal part



1  
absent or very shallow



3  
shallow



5  
medium



7  
deep



9  
very deep

Ad. 8: Leaf: undulation of margin



1  
absent or very weak



3  
weak



5  
medium



7  
strong



9  
very strong

Ad. 9: Leaf: dentation of margin of upper part of the leaf



1  
absent or very weak



3  
weak



5  
medium



7  
strong



9  
very strong

Ad. 15: Root: degree of swelling

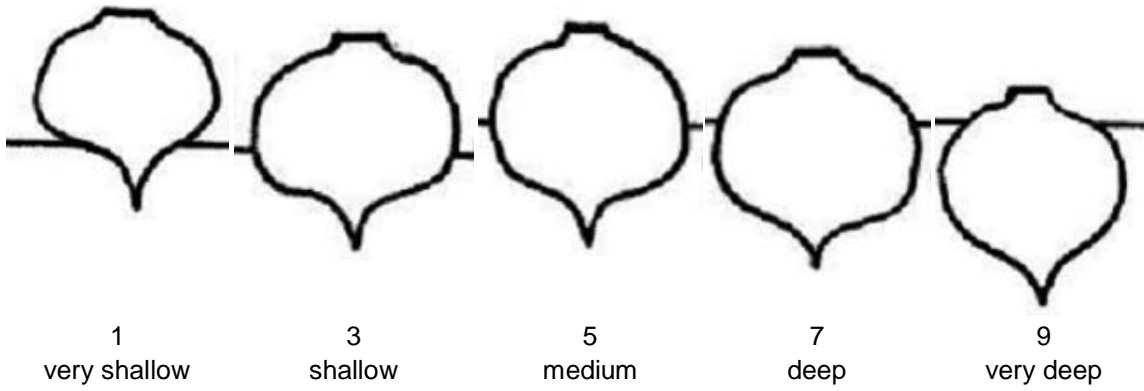
To define the degree of swelling, the weight ratio (weight of leaves / weight of root) can be used.

Weight ratio  $< 2$ : strong swelling










$2 \leq$  Weight ratio  $\leq 10$ : medium swelling

Weight ratio  $> 10$ : absent or weak swelling

Ad. 21: Only varieties with Root: degree of swelling: medium or strong: Root: position in soil



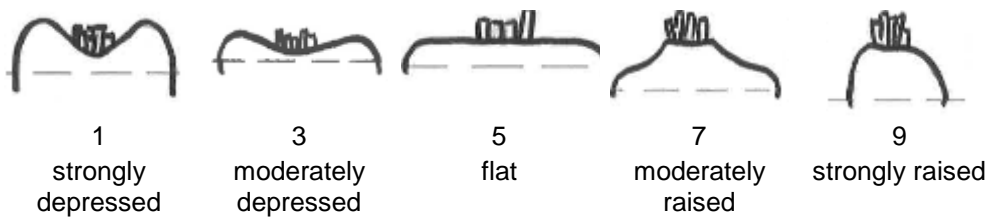
Ad. 22: Only varieties with Root: degree of swelling: medium or strong: Root: shape in longitudinal section

		← broadest part →			
		below middle	at middle	above middle	
width (ratio length/width) → narrow (high)     ← broad (low)	 6 narrow oblong				
	 5 oblong				
	 4 Ovate	 3 circular	 7 obovate	 8 broad obovate	 9 Triangular
	 2 Oblate				
	 1 Narrow oblate				

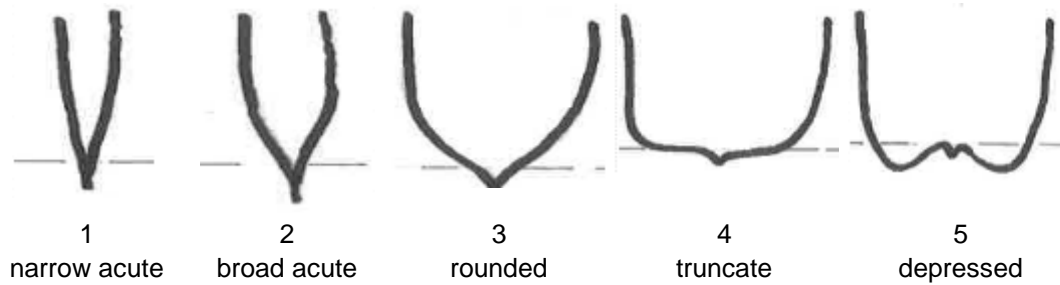
Ad. 24: Only varieties with Root: degree of swelling: medium or strong: Root: curvature of vertical axis



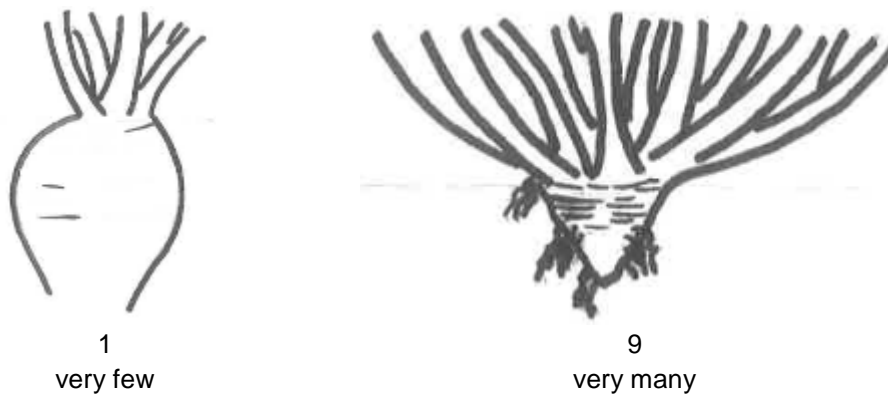
Ad. 27: Only varieties with Root: degree of swelling: medium or strong: Root: shape of collar



Ad. 28: Only varieties with Root: degree of swelling: medium or strong: Root: shape of apex



Ad. 30: Plant: number of sprouts





### 8.3 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

9. Literature

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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.

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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.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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	Application date: (not to be filled in by the applicant)
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TECHNICAL QUESTIONNAIRE  
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name

1.2 Common name

2. Applicant

Name

Address

Telephone No.

Fax No.

E-mail address

Breeder (if different from applicant)

3. Proposed denomination and breeder's reference

Proposed denomination  
(if available)

Breeder's reference

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]

(b) partially known cross [ ]

(c) unknown cross [ ]

4.1.2 Mutation [ ]  
(please state parent variety)

4.1.3 Discovery and development [ ]  
(please state where and when discovered and how developed)

4.1.4 Other [ ]  
(Please provide details)

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

- (a) Cross-pollination
- (b) Hybrid
- (c) Other (please provide details)

4.2.2 Other   
(Please provide details)

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

Characteristics	Example Varieties	Note
<b>5.1 Ploidy (1)</b>		
diploid	Milan White (S)	2 [ ]
tetraploid	Taronda (S)	4 [ ]
<b>5.2 Petiole: intensity of anthocyanin coloration (2)</b>		
absent or very weak	Delilah (S), Long d'Alsace (S)	1 [ ]
weak	Kranjska Podolgovata (S), Simax (A)	2 [ ]
medium	Samson (S)	3 [ ]
strong		4 [ ]
very strong	Scarlet Queen Red Stem (S)	5 [ ]
<b>5.3 Leaf: number of lobes (6)</b>		
absent or very few	Declic (S), Polybra (S), Simax (A)	1 [ ]
absnt or very few to few		2 [ ]
few	Tokyo Cross (S)	3 [ ]
few to medium		4 [ ]
medium	Blanc globe à collet violet (S), Richelieu (S)	5 [ ]
medium to many		6 [ ]
many	Civasto R (S)	7 [ ]
many to very many		8 [ ]
very many		9 [ ]
<b>5.4 Root: degree of swelling (15)</b>		
absent or weak	Grelos de Santiago (A), Simax (A)	1 [ ]
medium	Globo blanco de Lugo (S)	2 [ ]
strong	Polybra (S), Tokyo Market (S)	3 [ ]

Characteristics	Example Varieties	Note
<b>5.5 (16)</b> <u>Only varieties with Root: degree of swelling: medium or strong: Root: color of skin above soil</u>		
white	Tokyo Cross (S)	1 [ ]
green	Rondo (S)	2 [ ]
yellow-orange	Jaune boule d'or (S)	3 [ ]
red	Scarlet Queen Red Stem (S)	4 [ ]
reddish purple	Falko (S)	5 [ ]
bluish purple	Blanc globe à collet violet (S)	6 [ ]
black	Noir long (S)	7 [ ]
<b>5.6 (18)</b> <u>Only varieties with Root: degree of swelling: medium or strong: Root: color of skin below soil</u>		
white	Milan White Forcing (S), Natsu Komachi (S), Taronda (S)	1 [ ]
yellow	Goldana (S), Jaune boule d'or (S)	2 [ ]
red	Scarlet Queen Red Stem (S)	3 [ ]
purple		4 [ ]
black	Noir long (S)	5 [ ]
<b>5.7 (19)</b> <u>Only varieties with Root: degree of swelling: medium or strong: Root: color of flesh</u>		
white	Noir long (S), Scarlet Queen Red Stem (S), Taronda (S)	1 [ ]
yellow	Goldana (S), Jaune boule d'or (S)	2 [ ]
<b>5.8 (22)</b> <u>Only varieties with Root: degree of swelling: medium or strong: Root: shape in longitudinal section</u>		
narrow oblate	Platte Witte Mei (S)	1 [ ]
oblate	Milan White (S)	2 [ ]
circular	Rondo (S)	3 [ ]
ovate	Marteau (S)	4 [ ]
oblong	Delilah (S)	5 [ ]
narrow oblong	Long d'Alsace (S)	6 [ ]
obovate		7 [ ]
broad obovate	Aberdeen Green Top Yellow (S)	8 [ ]
triangular	De Montesson (S)	9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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6. Similar varieties and differences from these varieties

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

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the <b>similar</b> variety(ies)	Describe the expression of the characteristic(s) for <b>your</b> candidate variety
<i>Example</i>	<i>Leaf: type</i>	<i>entire</i>	<i>lobed</i>
Comments:			



TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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#7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes  No

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes  No

(If yes, please provide details)

7.3 Other information

**Main use:**

- Root vegetable
- Leaf and stem consumption
- Stubble or Forage Turnip

**Time of sowing:**

- Spring sown
- Summer sown
- Autumn sown

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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8. Authorization for release

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

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

- |   |         |        |
|---|---------|--------|
| (a) Microorganisms (e.g. virus, bacteria, phytoplasma)    | Yes [ ] | No [ ] |
| (b) Chemical treatment (e.g. growth retardant, pesticide) | Yes [ ] | No [ ] |
| (c) Tissue culture  | Yes [ ] | No [ ] |
| (d) Other factors   | Yes [ ] | No [ ] |

Please provide details for where you have indicated "yes".

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature

Date

[End of document]