



TG/150/4(proj.1)

ORIGINAL: English

DATE: 2023-04-07

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

Geneva

DRAFT

## FODDER BEET

UPOV Code(s): BETAA\_VUL\_GVA

*Beta vulgaris* L.

## 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 Agricultural Crops  
at its fifty-second session, to be held virtually  
from 2023-05-22 to 2023-05-26*

*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>Beta vulgaris</i> L.	Fodder beet	Betterave fourragère	Runkelrübe	Remolacha forrajera

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.

\* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website ([www.upov.int](http://www.upov.int)), for the latest information.]

TABLE OF CONTENTS	PAGE
1. SUBJECT OF THESE TEST GUIDELINES.....	<a href="#">3</a>
2. MATERIAL REQUIRED.....	<a href="#">3</a>
3. METHOD OF EXAMINATION.....	<a href="#">3</a>
3.1 Number of Growing Cycles.....	<a href="#">3</a>
3.2 Testing Place.....	<a href="#">3</a>
3.3 Conditions for Conducting the Examination.....	<a href="#">3</a>
3.4 Test Design.....	<a href="#">4</a>
3.5 Additional Tests.....	<a href="#">4</a>
4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY.....	<a href="#">4</a>
4.1 Distinctness.....	<a href="#">4</a>
4.2 Uniformity.....	<a href="#">5</a>
4.3 Stability.....	<a href="#">5</a>
5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL.....	<a href="#">6</a>
6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS.....	<a href="#">6</a>
6.1 Categories of Characteristics.....	<a href="#">6</a>
6.2 States of Expression and Corresponding Notes.....	<a href="#">6</a>
6.3 Types of Expression.....	<a href="#">6</a>
6.4 Example Varieties.....	<a href="#">6</a>
6.5 Legend.....	<a href="#">7</a>
7. TABLE OF CHARACTERISTICS/TABLEAU DES CARACTÈRES/MERKMALSTABELLE/TABLA DE CARACTERES.....	<a href="#">8</a>
8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS.....	<a href="#">19</a>
8.1 Explanations for individual characteristics.....	<a href="#">20</a>
9. LITERATURE.....	<a href="#">23</a>
10. TECHNICAL QUESTIONNAIRE.....	<a href="#">24</a>

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Beta vulgaris* L.

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 seeds.

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

1 Kg.

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 200 plants, which should be divided between at least 2 replicates.

3.4.2 For characteristics '1-germity, 2-ploidy and 3-color of hypocotyl', 100 plants should be observed.

### 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 60 plants or parts of plants taken from each of 60 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 cross-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.
- 4.2.5 For the assessment of uniformity in a sample of 200 plants, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 200 plants, 7 off-types are allowed.

## 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) Germity (characteristic 1)
  - (b) Ploidy (characteristic 2)
  - (c) Root: color below ground (characteristic 23)
- 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.

## 6.5 Legend

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
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 8.1

6 Not applicable

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</b>	<b>VS</b>	<b>(+)</b>	<b>10-20</b>			
	<b>Germity</b>						
	monogerm					Krake	1
	partly monogerm/ partly multigerm						2
	multigerm					Capax	3
<b>2. (*)</b>	<b>QL</b>	<b>VS</b>	<b>(+)</b>	<b>10-20</b>			
	<b>Ploidy</b>						
	diploid					Krake	2
	triploid					Hugin	3
	tetraploid					Rubra	4
	polyploid					Polyfourra	5
<b>3. (*)</b>	<b>PQ</b>	<b>VS</b>	<b>(+)</b>	<b>10-20</b>			
	<b>Hypocotyl: color</b>						
	white					Delicia	1
	green					Ketil	2
	yellow						3
	orange						4
	pink					Vernon	5
	red					Ilbo	6
	red purple					Monofix, purpurrot	7
<b>4.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>25-40</b>			
	<b>Leaf: attitude</b>						
	erect					Trestel	1
	erect to semi-erect						2
	semi-erect					Tetra Rouge	3
	semi-erect to intermediate						4
	intermediate					Apollo	5
	intermediate to semi-prostrate						6
	semi-prostrate						7
	semi-prostrate to prostrate						8
	prostrate						9



	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>5. (*)</b>	<b>QN</b>	<b>VG</b>	<b>40-45</b>			
	<b>Leaf: blistering</b>					
	very weak					1
	very weak to weak					2
	weak					3
	weak to medium					4
	medium					5
	medium to strong					6
	strong					7
	strong to very strong					8
	very strong					9
<b>6.</b>	<b>QN</b>	<b>VG</b>	<b>40-45</b>			
	<b>Leaf: glossiness</b>					
	absent or very weak					1
	very weak to weak					2
	weak					3
	weak to medium					4
	medium					5
	medium to strong					6
	strong					7
	strong to very strong					8
	very strong					9
<b>7.</b>	<b>QN</b>	<b>VG</b>	<b>40-45</b>			
	<b>Leaf: undulation of margin</b>					
	absent or very weak					1
	very weak to weak					2
	weak					3
	weak to medium					4
	medium					5
	medium to strong					6
	strong					7
	strong to very strong					8
	very strong					9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>8.</b>	<b>QN</b>	<b>VG</b>				
			<b>40-45</b>			
	<b>Leaf blade: intensity of green color</b>					
	very weak					1
	very weak to weak					2
	weak				Gaia	3
	weak to medium					4
	medium				Troya	5
	medium to strong					6
	strong				Delicia	7
	strong to very strong					8
	very strong					9
<b>9.</b>	<b>PQ</b>	<b>VG</b>				
			<b>40-45</b>			
	<b>Leaf blade: color of veins</b>					
	white				Monovigor	1
	green				Monorosa	2
	yellow					3
	orange					4
	red					5
<b>10. (*)</b>	<b>QN</b>	<b>MS/VG</b>	<b>(+)</b>			
			<b>40-45</b>			
	<b>Leaf: length</b>					
	very short					1
	very short to short					2
	short				Delicia	3
	short to medium					4
	medium				Kyros	5
	medium to long					6
	long				Vermon	7
	long to very long					8
	very long					9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>11.</b>	<b>QN</b>	<b>MS/VG</b>	<b>40-45</b>			
	<b>Leaf: width</b>					
	very narrow					1
	very narrow to narrow					2
	narrow				Trestel	3
	narrow to medium					4
	medium				Ketil	5
	medium to broad					6
	broad				Apollo	7
	broad to very broad					8
	very broad					9
<b>12.</b>	<b>QN</b>	<b>MS/VG</b>	<b>40-45</b>			
	<b>Leaf blade: width compared to length</b>					
	very narrow					1
	very narrow to narrow					2
	narrow				Trestel	3
	narrow to medium					4
	medium				Ketil	5
	medium to broad					6
	broad				Delicia	7
	broad to very broad					8
	very broad					9
<b>13.</b>	<b>PQ</b>	<b>VG</b>	<b>40-45</b>			
	<b>Leaf blade: shape of tip</b>					
	pointed				Trestel	1
	slightly rounded					2
	blunt				Kyros	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>14.</b>	<b>QN</b>	<b>MS/VG</b>	<b>40-45</b>			
	<b>Petiole: length</b>					
	very short					1
	very short to short					2
	short				Monofix	3
	short to medium					4
	medium				Amigo	5
	medium to long					6
	long				Vermon	7
	long to very long					8
	very long					9
<b>15.</b>	<b>QN</b>	<b>VG</b>	<b>40-45</b>			
	<b>Petiole: color of base</b>					
	whitish green				Hugin	1
	yellow to orange				Gaia	2
	red				Geante Rouge	3
<b>16.</b>	<b>QN</b>	<b>MG/VG</b>	<b>40-45</b>			
	<b>Plant: natural height</b>					
	very short					1
	very short to short					2
	short					3
	short to medium					4
	medium					5
	medium to tall					6
	tall					7
	tall to very tall					8
	very tall					9
<b>17. (*)</b>	<b>PQ</b>	<b>VG</b>	<b>(+)</b>	<b>50</b>		
	<b>Root: shape</b>					
	spheroidal					1
	ovoid				Capac	3
	conical				Trestel	5
	cylindro-conical				Monro	7
	cylindrical				Peramono	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>18.</b>	<b>QN</b>	<b>MS/VG</b>	<b>50</b>			
	<b>Root: length</b>					
	very short					1
	very short to short					2
	short				Krake	3
	short to medium					4
	medium				Hugin	5
	medium to long					6
	long				Monoval	7
	long to very long					8
	very long					9
<b>19.</b>	<b>QN</b>	<b>MS/VG</b>	<b>50</b>			
	<b>Root: width</b>					
	very narrow					1
	very narrow to narrow					2
	narrow				Nestor	3
	narrow to medium					4
	medium				Kyros	5
	medium to broad					6
	broad				Vermon	7
	broad to very broad					8
	very broad					9
<b>20.</b>	<b>QN</b>	<b>MS/VG</b>	<b>50</b>			
	<b>Root: length compared to width</b>					
	very short					1
	very short to short					2
	short				Trestel	3
	short to medium					4
	medium				Monovigor	5
	medium to long					6
	long				Monoval	7
	long to very long					8
	very long					9

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21.	QN	VG		50			
	<b>Root: position in soil</b>						
	very shallow						1
	very shallow to shallow						2
	shallow					Eckdorot	3
	shallow to medium						4
	medium					Peroba	5
	medium to deep						6
	deep					Trestel	7
	deep to very deep						8
	very deep						9
22.	QN	VG		50			
	<b>Root: color above ground</b>						
	white						1
	green					Monoval	2
	yellow					Kyros	3
	orange					Monovigor	4
	red					Monofix	5
	red purple						6
23. (*)	QN	VG		50			
	<b>Root: color below ground</b>						
	white					Monoval	1
	white to yellow						2
	yellow					Kyros	3
	yellow-orange					Monriac	4
	orange					Monoborris	5
	orange red					Monofix	6
	red					Peramono	7
	light pink					Trestel	8
	pink					Ilbo	9
	red purple					Tetra Rouge	10

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
<b>24.</b>	<b>QN</b>	<b>MS</b>		<b>50</b>		
	<b>Root: dry matter content</b>					
	very low				Capax	1
	very low to low					2
	low				Peramono	3
	low to medium					4
	medium				Monoval	5
	medium to high					6
	high				Amigo	7
	high to very high					8
	very high					9
<b>25.</b>	<b>QN</b>	<b>VG</b>	<b>(+)</b>	<b>50</b>		
	<b><i>Possible new characteristic (under evaluation) Root: saccharine furrow</i></b>					
	absent or weak					1
	weak to medium					2
	medium					3
	medium to strong					4
	strong					5

## 8.1 *Explanations for individual characteristics*

### Ad. 1: Germity

Germity should be observed on 100 seeds.

The attribution of notes for state of expressions is as follows:

Note 1 = monogerm with equal or more than 95% of monogerm seeds

Note 2 = partly monogerm/partly multigerm with less than 95% and more than 15% monogerm seeds

Note 3 = multigerm with equal or less than 15% monogerm seeds

Distinctness is achieved with two notes difference

### Ad. 2: Ploidy

Ploidy should be assessed by cytological observation of 100 plants. It is defined as follows:

2 - Diploid: at least 85% of the plants are diploids

3 - Triploid: at least 75% of the plants are triploids

4 - Tetraploid: at least 85% of the plants are tetraploids

5 - Polyploid: A mixture of diploids, triploids and tetraploids in percentages different to those mentioned above.

Polyploidy should not be regarded as a lack of uniformity but for polyploid varieties this characteristic should not be used to establish distinctness.

### Ad. 3: Hypocotyl: color

The color should be assessed on at least 100 seedlings, grown in the greenhouse, when plants are about 5 cm high. The occurrence of more than one color should not be regarded as a lack of uniformity but for varieties with more than one color this characteristic should not be used to establish distinctness.

### Ad. 4: Leaf: attitude

Observations should be made from the angle formed by the petiole and the vertical axis through the root.

### Ad. 10: Leaf: length

Observation should be made on the largest, fully expanded leaf including the petiole.



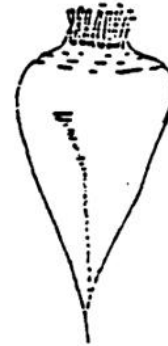
Ad. 17: Root: shape



1 spheroidal



3 ovoid



5 conical



7 cylindrocylindrical



9 cylindrical

Ad. 25: Possible new characteristic (under evaluation) Root: saccharine furrow



1  
absent or weak



2  
weak to medium



3  
medium



4  
medium to strong



5  
strong

8.2 *Growth stage of Beta vulgaris L. adopted to the BBCH (Meier U., 1993) scale*

Code Description

Principal growth stage 0: Germination

- 00 Dry seed
- 01 Imbibition – seed begins to take up water
- 03 End of seed imbibition – seed coat opened (pellet cracked)
- 05 Radicle emerged from seed
- 07 Shoot emerged from seed (pellet)
- 09 Emergence - shoot emerges at the soil surface

Principal growth stage 1: Leaf development (youth stage)

- 10 Cotyledons horizontally unfolded ; 1st leaf of pin-head-size
- 11 1st pair of leaves visible, of pea-size
- 12 2 leaves (first pair) unfolded
- 14 4 leaves (second pair) unfolded
- 15 5 leaves unfolded
- So on to...
- 19 9 and more leaves unfolded

Principal growth stage 3: Rosette growth (crop cover)

- 30 Beginning of crop cover formation - leaf contact of 10 % of plants in adjacent rows
- 33 Contact of 30 % of plants in adjacent rows
- 39 Crop cover complete - contact of more than 90 % of plants in adjacent rows

Principal growth stage 4: Development of harvestable vegetative plant parts- Beet-root

- 49 Beet-root has reached harvestable size

Principal growth stage 5: Development of inflorescence/flower buds (2nd year of growth)

...

9. Literature

- Meier, U.; L. Bachmann; H. Buhtz; H. Hack; R. Klose; B. Marlander; E. Weber (1993). "Phänologische Entwicklungsstadien der Beta-Rüben (*Beta vulgaris* L. ssp.). Codierung und Beschreibung nach der erweiterten BBCH-Skala (mit Abbildungen)". *Nachrichtenbl. Deut. Pflanzenschutzd.* 45: 37–41.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
		Application date: (not to be filled in by the applicant)
TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights		
1. Subject of the Technical Questionnaire		
1.1	Botanical name	<input type="text" value="Beta vulgaris L."/>
1.2	Common name	<input type="text" value="Fodder beet"/>
2. Applicant		
	Name	<input type="text"/>
	Address	<input type="text"/>
	Telephone No.	<input type="text"/>
	Fax No.	<input type="text"/>
	E-mail address	<input type="text"/>
	Breeder (if different from applicant)	<input type="text"/>
3. Proposed denomination and breeder's reference		
	Proposed denomination (if available)	<input type="text"/>
	Breeder's reference	<input type="text"/>

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

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)

# Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

4.2.2 Other [ ]  
(Please provide details)

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

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 Germity (1)</b>		
monogerm	Krake	1 [ ]
partly monogerm/ partly multigerm		2 [ ]
multigerm	Capax	3 [ ]
<b>5.2 Ploidy (2)</b>		
diploid	Krake	2 [ ]
triploid	Hugin	3 [ ]
tetraploid	Rubra	4 [ ]
polyploid	Polyfourra	5 [ ]
<b>5.3 Hypocotyl: color (3)</b>		
white	Delicia	1 [ ]
green	Ketil	2 [ ]
yellow		3 [ ]
orange		4 [ ]
pink	Vermon	5 [ ]
red	Ilbo	6 [ ]
red purple	Monofix, purpurrot	7 [ ]
<b>5.4 Root: color below ground (23)</b>		
white	Monoval	1 [ ]
white to yellow		2 [ ]
yellow	Kyros	3 [ ]
yellow-orange	Monriac	4 [ ]
orange	Monoborris	5 [ ]
orange red	Monofix	6 [ ]
red	Peramono	7 [ ]
light pink	Trestel	8 [ ]
pink	Ilbo	9 [ ]
red purple	Tetra Rouge	10 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

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>Root: shape</i>	<i>cylindrical</i>	<i>conical</i>
Comments:			



TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

#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

Resistance to pests and diseases

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

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 <input type="checkbox"/>	No <input type="checkbox"/>
(b) Chemical treatment (e.g. growth retardant, pesticide)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
(c) Tissue culture	Yes <input type="checkbox"/>	No <input type="checkbox"/>
(d) Other factors	Yes <input type="checkbox"/>	No <input type="checkbox"/>

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]