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| **TG/150/4(proj.1)** |
| **ORIGINAL:** English |
| **DATE:** 2023-04-07 |

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| **INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS** |
|  | Geneva  |  |
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|   |
| **FODDER BEET** |
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| UPOV Code(s): BETAA\_VUL\_GVA |

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| *Beta vulgaris* L. |

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

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| --- |
| *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* |

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 |
| *Disclaimer: this document does not represent UPOV policies or guidance* |
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| Alternative names:\* |

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 |
| *Botanical name* | *English* | *French* | *German* | *Spanish* |
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| --- |
| *Beta vulgaris* L. |

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| --- |
| Fodder beet |

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|  |
| --- |
| Betterave fourragère |

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|  |
| --- |
| Runkelrübe |

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| Remolacha forrajera |

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| 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. |
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| **ASSOCIATED DOCUMENTS** |
| These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents. |
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| 1. | Subject of these Test Guidelines |
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| These Test Guidelines apply to all varieties of *Beta vulgaris* L. |

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| 2. | Material Required |
|  |   |
| 2.1 |

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| 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. |

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| 2.2 |

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| The material is to be supplied in the form of seeds. |

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| 2.3 |

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

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| 1 Kg. |

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|  |   |
|  | 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 |

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

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| 2.5 |

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| 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. |

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| 3. | Method of Examination |
|  |   |
| *3.1* | *Number of Growing Cycles* |
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| 3.1.1 |

 | The minimum duration of tests should normally be two independent growing cycles. |
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| 3.1.2 |

 | The two independent growing cycles should be in the form of two separate plantings. |
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| 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* |
|  |   |
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| 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. |
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| *3.4* | *Test Design* |
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| 3.4.1 |

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| Each test should be designed to result in a total of at least 200 plants, which should be divided between at least 2 replicates. |

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| 3.4.2 |

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

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*3.5* | *Additional Tests* |
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|  | Additional tests, for examining relevant characteristics, may be established. |

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| 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. |
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| 4.1.4 |

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| Number of Plants or Parts of Plants to be Examined |

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| 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. |

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| 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”): |
|  |   |
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| 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 plantsVS: visual assessment by observation of individual plants or parts of plants |

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

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| 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. |

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|  |   |
|  | 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:  |
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| 4.2.2 |

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| 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. |

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| 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 |

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| 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. |

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| *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.  |

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| 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. |
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| 5.3 | The following have been agreed as useful grouping characteristics: |
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| (a) |

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| --- |
| Germity (characteristic 1) |

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| --- |
| (b) |

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| --- |
| Ploidy (characteristic 2) |

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| --- |
| (c) |

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| Root: color below ground (characteristic 23) |

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| 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”. |

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| 6. | Introduction to the Table of Characteristics |
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| *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. |

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| *6.5* | *Legend* |
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|  |  | English | français | deutsch | español | Example VarietiesExemplesBeispielssortenVariedades ejemplo | Note/Nota |
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| **2** |

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| **3** |

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| **4** |

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| **5** |

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| **6** |

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| **7** |

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| **Name of characteristics in English** |

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| **Nom du caractère en français** |

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| **Name des Merkmals auf Deutsch** |

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| --- |
| **Nombre del carácter en español** |

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|  |
| --- |
| states of expression |

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| --- |
| types d’expression |

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| Ausprägungsstufen |

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| tipos de expresión |

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| 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 |
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| See Explanations on the Table of Characteristics in Chapter 8.1 |

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| Not applicable |

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| Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3 |

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

|  |  | English | français | deutsch | español | Example VarietiesExemplesBeispielssortenVariedades ejemplo | Note/Nota |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1.** | **(\*)** | **QL** | **VS** | **(+)** |  | **10-20** |
|  |  |

|  |
| --- |
| **Germity** |

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 |  |  |
|  |  | monogerm |  |  |  | Krake | 1 |
|  |  | partly monogerm/ partly multigerm |  |  |  |  | 2 |
|  |  | multigerm |  |  |  | Capax | 3 |
| **2.** | **(\*)** | **QL** | **VS** | **(+)** |  | **10-20** |
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| **Ploidy** |

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 |  |  |
|  |  | diploid |  |  |  | Krake | 2 |
|  |  | triploid |  |  |  | Hugin | 3 |
|  |  | tetraploid |  |  |  | Rubra | 4 |
|  |  | polyploid |  |  |  | Polyfourra | 5 |
| **3.** | **(\*)** | **PQ** | **VS** | **(+)** |  | **10-20** |
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| **Hypocotyl: color** |

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 |  |  |
|  |  | white |  |  |  | Delicia | 1 |
|  |  | green |  |  |  | Ketil | 2 |
|  |  | yellow |  |  |  |  | 3 |
|  |  | orange |  |  |  |  | 4 |
|  |  | pink |  |  |  | Vermon | 5 |
|  |  | red |  |  |  | Ilbo | 6 |
|  |  | red purple |  |  |  | Monofix, purpurrot | 7 |
| **4.** |  | **QN** | **VG** | **(+)** |  | **25-40** |
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| **Leaf: attitude** |

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|  |  | 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 |
| **5.** | **(\*)** | **QN** | **VG** |  |  | **40-45** |
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| **Leaf: blistering** |

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|  |  | 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 |
| **6.** |  | **QN** | **VG** |  |  | **40-45** |
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| **Leaf: glossiness** |

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|  |  | 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 |
| **7.** |  | **QN** | **VG** |  |  | **40-45** |
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| **Leaf: undulation of margin** |

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|  |  | 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 |
| **8.** |  | **QN** | **VG** |  |  | **40-45** |
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| **Leaf blade: intensity of green color** |

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|  |  | 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 |
| **9.** |  | **PQ** | **VG** |  |  | **40-45** |
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| **Leaf blade: color of veins** |

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|  |  | white |  |  |  | Monovigor | 1 |
|  |  | green |  |  |  | Monorosa | 2 |
|  |  | yellow |  |  |  |  | 3 |
|  |  | orange |  |  |  |  | 4 |
|  |  | red |  |  |  |  | 5 |
| **10.** | **(\*)** | **QN** | **MS/VG** | **(+)** |  | **40-45** |
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| **Leaf: length** |

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|  |  | 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 |
| **11.** |  | **QN** | **MS/VG** |  |  | **40-45** |
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| **Leaf: width** |

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|  |  | 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 |
| **12.** |  | **QN** | **MS/VG** |  |  | **40-45** |
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| **Leaf blade: width compared to length** |

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|  |  | 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 |
| **13.** |  | **PQ** | **VG** |  |  | **40-45** |
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| **Leaf blade: shape of tip** |

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|  |  | pointed |  |  |  | Trestel | 1 |
|  |  | slightly rounded |  |  |  |  | 2 |
|  |  | blunt |  |  |  | Kyros | 3 |
| **14.** |  | **QN** | **MS/VG** |  |  | **40-45** |
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| **Petiole: length** |

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|  |  | 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 |
| **15.** |  | **QN** | **VG** |  |  | **40-45** |
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| **Petiole: color of base** |

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|  |  | whitish green |  |  |  | Hugin | 1 |
|  |  | yellow to orange |  |  |  | Gaia | 2 |
|  |  | red |  |  |  | Geante Rouge | 3 |
| **16.** |  | **QN** | **MG/VG** |  |  | **40-45** |
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| **Plant: natural height** |

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|  |  | 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 |
| **17.** | **(\*)** | **PQ** | **VG** | **(+)** |  | **50** |
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| **Root: shape** |

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|  |  | spheroidal |  |  |  |  | 1 |
|  |  | ovoid |  |  |  | Capac | 3 |
|  |  | conical |  |  |  | Trestel | 5 |
|  |  | cylindro-conical |  |  |  | Monro | 7 |
|  |  | cylindrical |  |  |  | Peramono | 9 |
| **18.** |  | **QN** | **MS/VG** |  |  | **50** |
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| **Root: length** |

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|  |  | 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 |
| **19.** |  | **QN** | **MS/VG** |  |  | **50** |
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| **Root: width** |

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|  |  | 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 |
| **20.** |  | **QN** | **MS/VG** |  |  | **50** |
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| **Root: length compared to width** |

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|  |  | 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 |
| **21.** |  | **QN** | **VG** |  |  | **50** |
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| **Root: position in soil** |

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|  |  | 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** |
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| **Root: color above ground** |

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 |  |  |
|  |  | white |  |  |  |  | 1 |
|  |  | green |  |  |  | Monoval | 2 |
|  |  | yellow |  |  |  | Kyros | 3 |
|  |  | orange |  |  |  | Monovigor | 4 |
|  |  | red |  |  |  | Monofix | 5 |
|  |  | red purple |  |  |  |  | 6 |
| **23.** | **(\*)** | **QN** | **VG** |  |  | **50** |
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| **Root: color below ground** |

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|  |  | 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 |
| **24.** |  | **QN** | **MS** |  |  | **50** |
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| **Root: dry matter content** |

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|  |  | 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 |
| **25.** |  | **QN** | **VG** | **(+)** |  | **50** |
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| ***Possible new characteristic (under evaluation)*Root: saccharine furrow** |

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|  |  | absent or weak |  |  |  |  | 1 |
|  |  | weak to medium |  |  |  |  | 2 |
|  |  | medium |  |  |  |  | 3 |
|  |  | medium to strong |  |  |  |  | 4 |
|  |  | strong |  |  |  |  | 5 |

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| *8.1* |

 | *Explanations for individual characteristics* |
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| Ad. 1: GermityGermity 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 seedsNote 2 = partly monogerm/partly multigerm with less then 95% and more then 15% monogerm seeds Note 3 = multigerm with equal or less than 15% monogerm seedsDistinctness is achieved with two notes difference |

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| Ad. 2: PloidyPloidy should be assessed by cytological observation of 100 plants.  It is defined as follows: 2 - Diploid:  at least 85% of the plants are diploids3 - Triploid:  at least 75% of the plants are triploids4 - Tetraploid:  at least 85% of the plants are tetraploids5 - 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.  |

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| Ad. 3: Hypocotyl: colorThe 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. |

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| Ad. 4: Leaf: attitudeObservations should be made from the angle formed by the petiole and the vertical axis through the root.  |

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| Ad. 10: Leaf: lengthObservation should be made on the largest, fully expanded leaf including the petiole. |

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| Ad. 17: Root: shapewordml://76.png |

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

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| wordml://77.png | wordml://78.png | wordml://79.png |
| 1 | 2 | 3 |
| absent or weak | weak to medium | medium |

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| wordml://80.png | wordml://81.png |
| 4 | 5 |
| medium to strong | strong  |

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| *Growth stage of Beta vulgaris L. adopted to the BBCH (Meier U., 1993) scale*Code    DescriptionPrincipal growth stage 0: Germination00        Dry seed01        Imbibition – seed begins to take up water03        End of seed imbibition – seed coat opened (pellet cracked)05        Radicle emerged from seed07        Shoot emerged from seed (pellet)09        Emergence - shoot emerges at the soil surfacePrincipal growth stage 1: Leaf development (youth stage)10        Cotyledons horizontally unfolded ; 1st leaf of pin-head-size11        1st pair of leaves visible, of pea-size12        2 leaves (first pair) unfolded14        4 leaves (second pair) unfolded15        5 leaves unfolded            So on to…19        9 and more leaves unfoldedPrincipal growth stage 3: Rosette growth (crop cover)30        Beginning of crop cover formation - leaf contact of 10 % of plants in adjacent rows33        Contact of 30 % of plants in adjacent rows39        Crop cover complete - contact of more than 90 % of plants in adjacent rowsPrincipal growth stage 4: Development of harvestable vegetative plant parts-  Beet-root49         Beet-root has reached harvestable sizePrincipal growth stage 5: Development of inflorescence/flower buds (2nd year of growth)... |

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| 9. | Literature |

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

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| 10. | Technical Questionnaire |

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

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| --- | --- |
|  | Application date:(not to be filled in by the applicant) |
| TECHNICAL QUESTIONNAIREto be completed in connection with an application for plant breeders' rights |

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| --- | --- | --- | --- | --- |
|  |  |   |  |  |
| 1. | Subject of the Technical Questionnaire |
|  |  |  |   |  |
|  |

|  |
| --- |
| 1.1 |

 | Botanical name |

|  |
| --- |
| *Beta vulgaris* L. |

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| --- |
|  |

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|  |   |  |   |  |
|  |

|  |
| --- |
| 1.2 |

 | Common name |

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| --- |
| Fodder beet |

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|  |  |   |  |  |
| 2. | Applicant |
|  |  |  |   |  |
|  | Name |  |  |
|  |  |  |   |  |
|  | Address |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |   |  |
|  | Telephone No. |  |  |
|  |  |  |   |  |
|  | Fax No. |  |  |
|  |  |  |   |  |
|  | E-mail address |  |  |
|  |  |  |   |  |
|  | Breeder (if different from |  |  |
|  | applicant) |  |  |
|  |  |  |   |  |

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| --- | --- | --- | --- | --- |
|  |  |  |   |  |
| 3. | Proposed denomination and breeder's reference |
|  |  |  |   |  |
|  | Proposed denomination |  |  |
|  | (if available) |  |  |
|  |  |  |   |  |
|  | Breeder's reference |  |  |
|  |  |  |   |  |

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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  |

 |  |
|  |  |
|

|  |
| --- |
| 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) | [ ] |
|  |      |
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| --- | --- | --- |
|  |  |   |
|  | 4.2 | Method of propagating the variety |
|  |

|  |  |  |
| --- | --- | --- |
|

|  |
| --- |
| 4.2.1 |

 |

|  |
| --- |
| Seed-propagated varieties |

 |  |
|  |   |  |
|  |  |  |
|  |   |  |
|

|  |
| --- |
| 4.2.2 |

 | Other(Please provide details) | [ ] |
|  |   |  |
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|  |   |  |

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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 |
| --- | --- | --- | --- |
|  |  |  |  |
|

|  |
| --- |
| **5.1** |

|  |
| --- |
| **(1)** |

 |

|  |
| --- |
| **Germity** |

 |  |  |
|  |

|  |
| --- |
| monogerm |

 |

|  |
| --- |
| Krake |

 |

|  |
| --- |
| 1 [   ] |

 |
|  |

|  |
| --- |
| partly monogerm/ partly multigerm |

 |

|  |
| --- |
|  |

 |

|  |
| --- |
| 2 [   ] |

 |
|  |

|  |
| --- |
| multigerm |

 |

|  |
| --- |
| Capax |

 |

|  |
| --- |
| 3 [   ] |

 |
|  |  |  |  |
|  |  |  |  |
|

|  |
| --- |
| **5.2** |

|  |
| --- |
| **(2)** |

 |

|  |
| --- |
| **Ploidy** |

 |  |  |
|  |

|  |
| --- |
| diploid |

 |

|  |
| --- |
| Krake |

 |

|  |
| --- |
| 2 [   ] |

 |
|  |

|  |
| --- |
| triploid |

 |

|  |
| --- |
| Hugin |

 |

|  |
| --- |
| 3 [   ] |

 |
|  |

|  |
| --- |
| tetraploid |

 |

|  |
| --- |
| Rubra |

 |

|  |
| --- |
| 4 [   ] |

 |
|  |

|  |
| --- |
| polyploid |

 |

|  |
| --- |
| Polyfourra |

 |

|  |
| --- |
| 5 [   ] |

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|  |  |  |  |
|  |  |  |  |
|

|  |
| --- |
| **5.3** |

|  |
| --- |
| **(3)** |

 |

|  |
| --- |
| **Hypocotyl: color** |

 |  |  |
|  |

|  |
| --- |
| white |

 |

|  |
| --- |
| Delicia |

 |

|  |
| --- |
| 1 [   ] |

 |
|  |

|  |
| --- |
| green |

 |

|  |
| --- |
| Ketil |

 |

|  |
| --- |
| 2 [   ] |

 |
|  |

|  |
| --- |
| yellow |

 |

|  |
| --- |
|  |

 |

|  |
| --- |
| 3 [   ] |

 |
|  |

|  |
| --- |
| orange |

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|  |
| --- |
|  |

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|  |
| --- |
| 4 [   ] |

 |
|  |

|  |
| --- |
| pink |

 |

|  |
| --- |
| Vermon |

 |

|  |
| --- |
| 5 [   ] |

 |
|  |

|  |
| --- |
| red |

 |

|  |
| --- |
| Ilbo |

 |

|  |
| --- |
| 6 [   ] |

 |
|  |

|  |
| --- |
| red purple |

 |

|  |
| --- |
| Monofix, purpurrot |

 |

|  |
| --- |
| 7 [   ] |

 |
|  |  |  |  |
|  |  |  |  |
|

|  |
| --- |
| **5.4** |

|  |
| --- |
| **(23)** |

 |

|  |
| --- |
| **Root: color below ground** |

 |  |  |
|  |

|  |
| --- |
| 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 [   ] |

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|  |  |  |  |
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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.*   |

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|

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|

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| --- |
| 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 **similar** variety(ies) |

 |

|  |
| --- |
| Describe the expression of the characteristic(s) for **your** candidate variety |

 |

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| --- | --- | --- | --- | --- | --- | --- |
| *Example* |

|  |
| --- |
| *Root: shape* |

 |

|  |
| --- |
| *cylindrical* |

 |

|  |
| --- |
| *conical* |

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|     |   |   |   |
|   |   |   |   |
|   |   |   |   |

 |
|  | Comments:    |

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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 |
|

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| --- |
| Resistance to pests and diseases  |

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|  |  |   |  |  |

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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. |
|  |  |  |   |  |  |

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| --- | --- |
|

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| --- |
| 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. |
|   |
|

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| --- |
| 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”. |  |
|  |   |  |

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| --- | --- |
| 10. | I hereby declare that, to the best of my knowledge, the information provided in this form is correct: |
|  |  |   |  |  |  |
|  |  |   |  |
|  | Applicant’s name |  |
|  |  |   |  |  |  |
|  |  Signature |  | Date |  |  |
|  |  |  |
|  |  |
|  |  |   |  |  |  |

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[End of document]