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|  | | A green and yellow logo  AI-generated content may be incorrect. | | |  | | --- | | **TG/151/5 Rev. 2(proj.1)** | | **ORIGINAL:** English | | **DATE:** 2025-07-31 | | |
| **INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS** | | | | | |
|  | | Geneva | |  | |
|  | |  | |  | |
|  | | |  | | --- | |  | | DRAFT | |  | | |  | |
|  | | |  | | --- | |  | | **BROCCOLI** | |  | | |  | | --- | |  | | |  | | --- | | UPOV Code(s):  BRASS\_OLE\_GBC | | |  | | |  | | |  |  | | --- | --- | | |  | | --- | | *Brassica oleracea* L. var. *italica* Plenck | | | |  | | | |  | | --- | | \* | | |
|  | |  | |  | |
| |  | | --- | | **GUIDELINES** | |  | | **FOR THE CONDUCT OF TESTS** | |  | | **FOR DISTINCTNESS, UNIFORMITY AND STABILITY**  prepared by an expert from the Netherlands (Kingdom of the)  to be considered by the  Technical Committee at its sixty-first session,  to be held Geneva from 2025-10-20 to 2025-10-21  Disclaimer: this document does not represent UPOV policies or guidance  This document contains the following changes proposed by the Technical Working Party for Vegetables (TWV), at its fifty-ninth session[[1]](#footnote-1), presented in grey highlight:   1. Addition of characteristics “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3” at the end of the Table of Characteristics; 2. Addition of explanation “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3”; 3. Addition of characteristics “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3” to TQ 5. with option “not tested”. | | | | | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | |  | | --- | | Alternative names:\* | | | | | | | *Botanical name* | *English* | *French* | *German* | *Spanish* | | |  | | --- | | *Brassica oleracea* L. var. *italica* Plenck, *Brassica oleracea* subvar. *cymosa* Duchesne, *Brassica oleracea* var. *cymosa* (Duchesne) DC. | | |  | | --- | | Broccoli, Calabrese, Sprouting Broccoli, Winter broccoli | | |  | | --- | | Brocoli, Chou brocoli | | |  | | --- | | Brokkoli | | |  | | --- | | Brécol, Brócoli, Bróculi | | | | | | | |
|  | |  | |  | |
| 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/45/7 Cauliflower | | | | | | | | |

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| --- | --- |
| 1. | Subject of these Test Guidelines |
|  |  |
| 1.1 | |  | | --- | | These Test Guidelines apply to all varieties of *Brassica oleracea* L. var. *italica* Plenck. | |
|  |  |
| 1.2 | |  | | --- | | The botanical difference between broccoli and cauliflower is that broccoli produces heads bearing clusters of developed flower buds, whereas cauliflower produces curds consisting of a tightly-packed mass of undifferentiated tissue which in an advanced stage will develop into flower buds. | |

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| --- | --- |
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| 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 5,000 seeds | |
|  |  |
|  | The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. |
|  |  |
| 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. | |

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| --- | --- |
| 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. |
|  |  |
| *3.2* | *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 reference in the Table of Characteristics. The stages of development denoted by each reference are described in Chapter 8.4. |
|  |  |
| *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. |

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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. |
|  |  |
| 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 cross-pollinated 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 | |  | | --- | | For the assessment of uniformity of inbred lines and hybrid varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants, 2 off-types are allowed. In addition, for hybrids, a population standard of 3% and an acceptance probability of at least 95% should be applied for inbred plants obviously resulting from the selfing of a parent line.  In the case of a sample size of 60 plants, 4 inbred plants 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. |

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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. |
|  |  |
| 5.3 | The following have been agreed as useful grouping characteristics: |
|  | |  |  |  | | --- | --- | --- | |  |  |  | | |  | | --- | | (a) | |  | |  | | --- | | Only Calabrese type varieties: Head: level of main head in relation to plant height (characteristic 13) | | | |  | | --- | | (b) | |  | |  | | --- | | Head: color (characteristic 17) | | | |  | | --- | | (c) | |  | |  | | --- | | Time of harvest maturity (characteristic 23) | | | |  | | --- | | (d) | |  | |  | | --- | | Male sterility (characteristic 24) | | | |  |  | | --- | --- | | |  | | --- | | Firstly, the collection should be divided according to the two growth types in 8.3: Explanations covering several characteristics: Calabrese type and Sprouting type. In case of doubt to which growth type a variety belongs, it should be tested in both growth types. | | | | | |
|  |  |
| 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 |
|  |  |
| *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 | In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows: |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | | *State* | *Note* | | small | 3 | | medium | 5 | | large | 7 | |
|  | However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate: |
|  | |  |  | | --- | --- | | *State* | *Note* | | very small | 1 | | very small to small | 2 | | small | 3 | | small to medium | 4 | | medium | 5 | | medium to large | 6 | | large | 7 | | large to very large | 8 | | very large | 9 | |
|  |  |
| 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* |
|  |  |
| |  |  | 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 8.2 | | | | |  |  |  |  | | 6 | |  | | --- | | (a) | | |  |  | | --- | --- | | |  | | --- | | See Explanations on the Table of Characteristics in Chapter 8.1 | | | | |  |  |  |  | | 7 | |  | | --- | | Growth stage key See Explanations on the Table of Characteristics in Chapter 8.4 | | | | |  |  | | | | (s) | summer and autumn varieties | | | |  |  | | | | (o) | overwintering varieties | | | | |

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

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1.** | **(\*)** | **QN** | **MG/VG** |  |  | **1** | | | |
|  |  | |  | | --- | | **Plant: height** | | | |  | | --- | | **Plante : hauteur** | | | |  | | --- | | **Pflanze: Höhe** | | |  | | --- | | **Planta: altura** | |  |  |
|  |  | very short | | très basse | | sehr niedrig | muy baja |  | 1 |
|  |  | short | | basse | | niedrig | baja | Chronos (s), Packman (s) | 3 |
|  |  | medium | | moyenne | | mittel | media | Capitano (s), Forester (s), Jeremy (s), Monty (s) | 5 |
|  |  | tall | | haute | | hoch | alta | Heraklion (s),  Poseidon (s) | 7 |
|  |  | very tall | | très haute | | sehr hoch | muy alta | Blaze (s), Burbank (o) | 9 |
| **2.** |  | **QN** | **VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf: attitude** | | | |  | | --- | | **Feuille : port** | | | |  | | --- | | **Blatt: Haltung** | | |  | | --- | | **Hoja: porte** | |  |  |
|  |  | erect | | dressé | | aufrecht | erecto | Poseidon (s) | 1 |
|  |  | semi-erect | | demi-dressé | | halbaufrecht | semierecto | Arcadia (s), Capitano (s), Chronos (s) | 3 |
|  |  | horizontal | | horizontal | | waagerecht | horizontal | Ember (o), Monflor (s) | 5 |
| **3.** | **(\*)** | **QN** | **MS/VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf: length** | | | |  | | --- | | **Feuille : longueur** | | | |  | | --- | | **Blatt: Länge** | | |  | | --- | | **Hoja: longitud** | |  |  |
|  |  | short | | courte | | kurz | corta | Emperor (s),  Getti e foglie (s),  Kanga (s), Kechua (s) | 3 |
|  |  | medium | | moyenne | | mittel | media | Cresta (o) | 5 |
|  |  | long | | longue | | lang | larga | Cardinal (o),  Monclano (s),  Monrello (s) | 7 |
| **4.** |  | **QN** | **MS/VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf: width** | | | |  | | --- | | **Feuille : largeur** | | | |  | | --- | | **Blatt: Breite** | | |  | | --- | | **Hoja: anchura** | |  |  |
|  |  | very narrow | | très étroite | | sehr schmal | muy estrecha |  | 1 |
|  |  | narrow | | étroite | | schmal | estrecha | Arcadia (s) | 3 |
|  |  | medium | | moyenne | | mittel | media | Cresta (o), Green Belt (s), Marathon (s) | 5 |
|  |  | broad | | large | | breit | ancha | Cardinal (o), Red Fire (o), Monrello (s) | 7 |

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **5.** | **(\*)** | **QN** | **VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf: number of lobes** | | | |  | | --- | | **Feuille : nombre de lobes** | | | |  | | --- | | **Blatt: Anzahl der Lappen** | | |  | | --- | | **Hoja: número de lóbulos** | |  |  |
|  |  | absent or very few | | nul ou très petit | | fehlend oder sehr wenige | nulo o muy bajo | Violet Queen (s) | 1 |
|  |  | few | | petit | | wenige | bajo | Early White Sprouting (o), Koros (s) | 3 |
|  |  | medium | | moyen | | mittel | medio | Chronos (s), Tinman (s) | 5 |
|  |  | many | | grand | | viele | alto | Burbank (o), Red Fire (o) | 7 |
|  |  | very many | | très grand | | sehr viele | muy alto | Bordeaux (s) | 9 |
| **6.** | **(\*)** | **PQ** | **VG** |  | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf blade: color** | | | |  | | --- | | **Limbe : couleur** | | | |  | | --- | | **Blattspreite: Farbe** | | |  | | --- | | **Limbo: color** | |  |  |
|  |  | green | | vert | | grün | verde | Claret (o), Inspiration (s) | 1 |
|  |  | grey green | | vert gris | | graugrün | verde grisáceo | Capitano (s) | 2 |
|  |  | blue green | | vert bleu | | blaugrün | verde azulado | Bordeaux (s), Ironman (s) | 3 |
| **7.** |  | **QN** | **VG** |  | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf blade: intensity of color** | | | |  | | --- | | **Limbe : intensité de la couleur** | | | |  | | --- | | **Blattspreite: Intensität der Farbe** | | |  | | --- | | **Limbo: intensidad del color** | |  |  |
|  |  | light | | claire | | hell | claro |  | 3 |
|  |  | medium | | moyenne | | mittel | medio |  | 5 |
|  |  | dark | | foncée | | dunkel | oscuro |  | 7 |
| **8.** | **(\*)** | **QN** | **VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf blade: undulation of margin** | | | |  | | --- | | **Limbe : ondulation du bord** | | | |  | | --- | | **Blattspreite: Wellung des Randes** | | |  | | --- | | **Limbo: ondulación del borde** | |  |  |
|  |  | absent or very weak | | nulle ou très faible | | fehlend oder sehr gering | ausente o muy débil |  | 1 |
|  |  | weak | | faible | | gering | débil | Kanga (s) | 3 |
|  |  | medium | | moyenne | | mittel | media | Marathon (s) | 5 |
|  |  | strong | | forte | | stark | fuerte | Blaze (s) | 7 |
|  |  | very strong | | très forte | | sehr stark | muy fuerte | Bonarda (o), Claret (o), Rudolph (s) | 9 |
| **9.** |  | **QN** | **VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf blade: dentation of margin** | | | |  | | --- | | **Limbe : dentelure du bord** | | | |  | | --- | | **Blattspreite: Zähnung des Randes** | | |  | | --- | | **Limbo: dentado del borde** | |  |  |
|  |  | weak | | faible | | gering | débil | Violet Queen (s) | 3 |
|  |  | medium | | moyenne | | mittel | medio | Cresta (o) | 5 |
|  |  | strong | | forte | | stark | fuerte | Claret (o) | 7 |

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **10.** |  | **QN** | **VG** |  | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Leaf blade: blistering** | | | |  | | --- | | **Limbe : cloqûre** | | | |  | | --- | | **Blattspreite: Blasigkeit** | | |  | | --- | | **Limbo: abullonado** | |  |  |
|  |  | absent or very weak | | nulle ou très faible | | fehlend oder sehr gering | ausente o muy débil | Capitano (s) | 1 |
|  |  | weak | | faible | | gering | débil | Blaze (s) | 3 |
|  |  | medium | | moyenne | | mittel | medio | Cumbal (s),  Red Arrow (o) | 5 |
|  |  | strong | | forte | | stark | fuerte | Bonarda (o), Cardinal (o) | 7 |
|  |  | very strong | | très forte | | sehr stark | muy fuerte |  | 9 |
| **11.** |  | **QN** | **VG** |  | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Petiole: anthocyanin  coloration** | | | |  | | --- | | **Pétiole : pigmentation anthocyanique** | | | |  | | --- | | **Blattstiel: Anthocyanfärbung** | | |  | | --- | | **Pecíolo: pigmentación antociánica** | |  |  |
|  |  | absent or very weak | | absente ou très faible | | fehlend oder sehr gering | ausente o muy débil | Capitano (s), Jeremy (s), Kanga (s) | 1 |
|  |  | medium | | moyenne | | mittel | medio | Early Purple Sprouting (o), Monarda (s) | 3 |
|  |  | very strong | | très forte | | sehr stark | muy fuerte | Mendocino (o),  Red Fire (o) | 5 |
| **12.** |  | **QN** | **MS/VG** | **(+)** | **(a)** | **1** | | | |
|  |  | |  | | --- | | **Petiole: length** | | | |  | | --- | | **Pétiole : longueur** | | | |  | | --- | | **Blattstiel: Länge** | | |  | | --- | | **Pecíolo: longitud** | |  |  |
|  |  | very short | | très court | | sehr kurz | muy corto | Violet Queen (s) | 1 |
|  |  | short | | court | | kurz | corto | Kanga (s) | 3 |
|  |  | medium | | moyen | | mittel | medio | Ramoso Calabrese (s) | 5 |
|  |  | long | | long | | lang | largo | Groene Calabrese (s), Monflor (s) | 7 |
|  |  | very long | | très long | | sehr lang | muy largo |  | 9 |
| **13.** | **(\*)** | **QN** | **VG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Only Calabrese type varieties: Head: level of main head in relation to plant height** | | | |  | | --- | | **Seulement les variétés de type calabrais: Pomme : niveau de la pomme principale par rapport à la hauteur de la plante** | | | |  | | --- | | **Nur Sorten des Calabrese-Typs: Kopf: Höhe des Hauptkopfs im Verhältnis zur Höhe der Pflanze** | | |  | | --- | | **Solo variedades de tipo Calabrese: Cabeza: nivel de la cabeza principal en relación con la altura de la planta** | |  |  |
|  |  | low | | bas | | niedrig | bajo | Marathon (s) | 1 |
|  |  | medium | | moyen | | mittel | medio |  | 2 |
|  |  | high | | haut | | hoch | alto | Sibsey (s), SV0097BL (s) | 3 |

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **14.** |  | **QN** | **MS/VG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Only Calabrese type varieties: Head: length of branching at base of main head** | | | |  | | --- | | **Seulement les variétés de type calabrais : Pomme : longueur des ramifications à la base de la pomme principale** | | | |  | | --- | | **Nur Sorten des Calabrese-Typs: Länge der Verzweigungen an der Basis des Hauptkopfes** | | |  | | --- | | **Solo variedades de tipo Calabrese: Cabeza: longitud de las ramificaciones de la cabeza principal** | |  |  |
|  |  | very short | | très courtes | | sehr kurz | muy cortas | Violet Queen (s) | 1 |
|  |  | short | | courtes | | kurz | cortas | Chronos (s), Kanga (s) | 3 |
|  |  | medium | | moyennes | | mittel | medias | Lord (s) | 5 |
|  |  | long | | longues | | lang | largas | Monflor (s) | 7 |
|  |  | very long | | très longues | | sehr lang | muy largas |  | 9 |
| **15.** | **(\*)** | **QN** | **MS/VG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Head: diameter** | | | |  | | --- | | **Pomme : diamètre** | | | |  | | --- | | **Kopf: Durchmesser** | | |  | | --- | | **Cabeza: diámetro** | |  |  |
|  |  | very small | | très petit | | sehr klein | muy pequeño | Broccolo di Natale (o),  Early Purple Sprouting (o), Getti e foglie (s) | 1 |
|  |  | small | | petit | | klein | pequeño |  | 3 |
|  |  | medium | | moyen | | mittel | medio | Marathon (s) | 5 |
|  |  | large | | grand | | groß | grande | Packman (s) | 7 |
|  |  | very large | | très grand | | sehr groß | muy grande | Violet Queen (s) | 9 |
| **16.** | **(\*)** | **QN** | **VG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Only Calabrese type varieties: Head: shape in longitudinal section** | | | |  | | --- | | **Seulement les variétés de type calabrais : Pomme : forme en section longitudinale** | | | |  | | --- | | **Nur Sorten des Calabrese-Typs: Kopf: Form in Längsschnitt** | | |  | | --- | | **Solo variedades de tipo Calabrese: Cabeza: forma en sección longitudinal** | |  |  |
|  |  | circular | | circulaire | | rund | circular | Forester (s) | 1 |
|  |  | transverse broad elliptic | | elliptique transverse large | | quer breit elliptisch | elíptica transversal ancha |  | 2 |
|  |  | transverse medium elliptic | | elliptique transverse moyenne | | quer mittel elliptisch | elíptica transversal mediana | Sibsey (s) | 3 |
|  |  | transverse narrow elliptic | | elliptique transverse étroite | | quer schmal elliptisch | elíptica transversal estrecha | Calabria (s) | 4 |

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **17.** | **(\*)** | **PQ** | **VG** |  |  | **2** | | | |
|  |  | |  | | --- | | **Head: color** | | | |  | | --- | | **Pomme : couleur** | | | |  | | --- | | **Kopf: Farbe** | | |  | | --- | | **Cabeza: color** | |  |  |
|  |  | whitish | | blanchâtre | | weißlich | blanquecino | Burbank (o), Cresta (o),  Early White Sprouting (o) | 1 |
|  |  | green | | vert | | grün | verde | Forester (s) | 2 |
|  |  | grey green | | vert gris | | graugrün | verde grisáceo | Marathon (s) | 3 |
|  |  | blue green | | vert bleu | | blaugrün | verde azulado | Ironman (s), Tirreno (s) | 4 |
|  |  | violet | | violet | | violett | violeta | Bordeaux (s),  Early Purple Sprouting (o) | 5 |
| **18.** |  | **QN** | **VG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Head: intensity of color** | | | |  | | --- | | **Pomme : intensité de la couleur** | | | |  | | --- | | **Kopf: Intensität der Farbe** | | |  | | --- | | **Cabeza: intensidad del color** | |  |  |
|  |  | light | | claire | | hell | claro |  | 3 |
|  |  | medium | | moyenne | | mittel | medio |  | 5 |
|  |  | dark | | foncée | | dunkel | oscuro |  | 7 |
| **19.** |  | **QN** | **VG** |  |  | **2** | | | |
|  |  | |  | | --- | | **Only varieties with Head: color: whitish, green, grey green or blue green: Head: intensity of anthocyanin coloration** | | | |  | | --- | | **Seulement les variétés avec Pomme : couleur : crème, vert, vert gris ou vert bleu : Pomme : intensité de la pigmentation anthocyanique** | | | |  | | --- | | **Nur Sorten mit Kopf: Farbe: weißlich, grün, graugrün oder blaugrün: Kopf: Intensität der Anthocyanfärbung** | | |  | | --- | | **Solo variedades con Cabeza: color: blanquecino, verde, verde grisáceo o verde azulado: Cabeza: intensidad de la pigmentación antociánica** | |  |  |
|  |  | absent or very weak | | nulle ou très faible | | fehlend oder sehr gering | ausente o muy débil | Early White Sprouting (o) | 1 |
|  |  | weak | | faible | | gering | débil |  | 2 |
|  |  | medium | | moyenne | | mittel | media | Steel (s) | 3 |
|  |  | strong | | forte | | stark | fuerte |  | 4 |
| **20.** |  | **QN** | **VG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Only Calabrese type varieties: Head: knobbling** | | | |  | | --- | | **Seulement les variétés de type calabrais : Pomme : protubérance** | | | |  | | --- | | **Nur Sorten des Calabrese-Typs: Kopf: Höckerbildung** | | |  | | --- | | **Solo variedades de tipo Calabres: Cabeza: protuberancias** | |  |  |
|  |  | weak | | faible | | gering | poco prominentes | Sibsey (s) | 3 |
|  |  | medium | | moyenne | | mittel | moderadamente prominentes | Cumbal (s), Ironman (s), Marathon (s) | 5 |
|  |  | strong | | forte | | stark | muy prominentes | Monflor (s) | 7 |

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
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| **21.** |  | **QN** | **VG** |  |  | **2** | | | |
|  |  | |  | | --- | | **Head:  diameter of flower bud** | | | |  | | --- | | **Pomme : diamètre du bouton floral** | | | |  | | --- | | **Kopf: Durchmesser der Blütenknospe** | | |  | | --- | | **Cabeza: diámetro del botón floral** | |  |  |
|  |  | very small | | très petite | | sehr klein | muy pequeño |  | 1 |
|  |  | small | | petite | | klein | pequeño | SV0097BL (s) | 3 |
|  |  | medium | | moyenne | | mittel | medio | Kechua (s) | 5 |
|  |  | large | | grande | | groß | grande | Calabria (s), Kanga (s) | 7 |
|  |  | very large | | très grande | | sehr groß | muy grande |  | 9 |
| **22.** |  | **QN** | **VG** |  |  | **2** | | | |
|  |  | |  | | --- | | **Only Calabrese type varieties: Plant: development of secondary heads** | | | |  | | --- | | **Seulement les variétés de type calabrais : Pomme : développement des pommes secondaires** | | | |  | | --- | | **Nur Sorten des Calabrese-Typs: Pflanze: Entwicklung von sekundären Köpfen** | | |  | | --- | | **Solo variedades de tipo Calabres: Planta: prominencia de las cabezas secundarias** | |  |  |
|  |  | absent or very weak | | nulle ou très faible | | fehlend oder sehr gering | ausentes o muy poco prominentes | Lord (s), Montop (s) | 1 |
|  |  | weak | | faible | | gering | poco prominentes | Chronos (s) | 3 |
|  |  | medium | | moyenne | | mittel | moderadamente prominentes | Giotto (s) | 5 |
|  |  | strong | | forte | | stark | muy prominentes | Cresta (o) | 7 |
| **23.** | **(\*)** | **QN** | **MG** | **(+)** |  | **2** | | | |
|  |  | |  | | --- | | **Time of harvest maturity** | | | |  | | --- | | **Époque de maturité de récolte** | | | |  | | --- | | **Zeitpunkt der Erntereife** | | |  | | --- | | **Época de madurez para la cosecha** | |  |  |
|  |  | very early | | très précoce | | sehr früh | muy temprana | Sibsey (s) | 1 |
|  |  | early | | précoce | | früh | temprana | Monflor (s), Red Fire (o) | 3 |
|  |  | medium | | moyenne | | mittel | media | Tinman (s),  Mendocino (o) | 5 |
|  |  | late | | tardive | | spät | tardía | Marathon (s), Burbank (o) | 7 |
|  |  | very late | | très tardive | | sehr spät | muy tardía | Hallmark (s) | 9 |
| **24.** | **(\*)** | **QL** | **MS/VS** | **(+)** |  | **3** | | | |
|  |  | |  | | --- | | **Male sterility** | | | |  | | --- | | **Stérilité mâle** | | | |  | | --- | | **Männliche Sterilität** | | |  | | --- | | **Androesterilidad** | |  |  |
|  |  | absent | | absente | | fehlend | ausente | Marathon (s) | 1 |
|  |  | present | | présente | | vorhanden | presente | Chevalier (s),  Parthenon (s) | 9 |

|  |  | English | français | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
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| **25.** |  | **PQ** | **VG** |  |  | **3** | | | |
|  |  | |  | | --- | | **Flower: color** | | | |  | | --- | | **Fleur : couleur** | | | |  | | --- | | **Blüte: Farbe** | | |  | | --- | | **Flor: color** | |  |  |
|  |  | white | | blanc | | weiß | blanco |  | 1 |
|  |  | whitish | | crème | | weißlich | blanquecino |  | 2 |
|  |  | light yellow | | jaune clair | | hellgelb | amarillo claro | Serydan (s) | 3 |
|  |  | medium yellow | | jaune moyen | | mittelgelb | amarillo medio | Monflor (s) | 4 |
|  |  | dark yellow | | jaune foncé | | dunkelgelb | amarillo oscuro | Alletta (s), Sibsey (s) | 5 |
| **26.** |  | **QL** | **VS** | **(+)** |  |  | | | |
|  |  | |  | | --- | | **Resistance to *Plasmodiophora brassicae* (Pb)** **– Race Pb: 0** | | | |  | | --- | | **Résistance à *Plasmodiophora brassicae* (Pb)** **– Race Pb: 0** | | | |  | | --- | | **Resistenz gegen** ***Plasmodiophora brassicae* (Pb)** **– Pathotyp Pb: 0** | | |  | | --- | | **Resistencia a** ***Plasmodiophora brassicae* (Pb)** **– Raza Pb: 0** | |  |  |
|  |  | absent | | absente | | fehlend | ausente | Marathon | 1 |
|  |  | present | | présente | | vorhanden | presente | Monclano | 9 |
| **27.** | |  | **QL** | **VS** | **(+)** |  |  | | | |
|  | |  | |  | | --- | | **Resistance to *Plasmodiophora brassicae* (Pb)** **– Race Pb: 1** | | | |  | | --- | | **Résistance à *Plasmodiophora brassicae* (Pb)** **– Race Pb: 1** | | | |  | | --- | | **Resistenz gegen** ***Plasmodiophora brassicae* (Pb)** **– Pathotyp Pb: 1** | | |  | | --- | | **Resistencia a** ***Plasmodiophora brassicae* (Pb)** **– Raza Pb: 1** | |  |  |
|  | |  | absent | | absente | | fehlend | ausente | Marathon | 1 |
|  | |  | present | | présente | | vorhanden | presente | Monclano | 9 |
| **28.** | |  | **QL** | **VS** | **(+)** |  |  | | | |
|  | |  | |  | | --- | | **Resistance to *Plasmodiophora brassicae* (Pb)** **– Race Pb: 2** | | | |  | | --- | | **Résistance à *Plasmodiophora brassicae* (Pb)** **– Race Pb: 2** | | | |  | | --- | | **Resistenz gegen** ***Plasmodiophora brassicae* (Pb)** **– Pathotyp Pb: 2** | | |  | | --- | | **Resistencia a** ***Plasmodiophora brassicae* (Pb)** **– Raza Pb: 2** | |  |  |
|  | |  | absent | | absente | | fehlend | ausente | Marathon, Monclano | 1 |
|  | |  | present | | présente | | vorhanden | presente |  | 9 |
| **29.** | |  | **QL** | **VS** | **(+)** |  |  | | | |
|  | |  | |  | | --- | | **Resistance to *Plasmodiophora brassicae* (Pb)** **– Race Pb: 3** | | | |  | | --- | | **Résistance à *Plasmodiophora brassicae* (Pb)** **– Race Pb: 3** | | | |  | | --- | | **Resistenz gegen** ***Plasmodiophora brassicae* (Pb)** **– Pathotyp Pb: 3** | | |  | | --- | | **Resistencia a** ***Plasmodiophora brassicae* (Pb)** **– Raza Pb: 3** | |  |  |
|  | |  | absent | | absente | | fehlend | ausente | Marathon | 1 |
|  | |  | present | | présente | | vorhanden | presente | Monclano | 9 |

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| |  |  | | --- | --- | | 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 fully developed leaves in the middle third of the plant. | | |
| |  | | --- | |  | |

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| |  |  |  | | --- | --- | --- | | |  | | --- | | *8.2* | | *Explanations for individual characteristics* | |  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Ad. 2: Leaf: attitude   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | |  | | 1 | | erect | | |  | | --- | |  | | 3 | | semi-erect | | |  | | --- | |  | | 5 | | horizontal | | | | | |

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| |  |  | | --- | --- | | |  | | --- | | Ad. 3: Leaf: length    a = Leaf: length (characteristic 3)  b = Leaf: width (characteristic 4)  c = Petiole: length (characteristic 12) | | | |  | | --- | | Ad. 4: Leaf: width  See Ad. 3 | | |

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Ad. 26 to 29: Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3

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| 1. | Pathogen | *Plasmodiophora brassicae* |
| 2. | Quarantine status | no |
| 3. | Host species | *Brassica oleracea* |
| 4. | Source of inoculum | Naktuinbouw[[3]](#footnote-3) (NL) |
| 5. | Isolate | Race Pb: 0, Pb: 1, Pb: 2 and Pb: 3 |
| 6. | Establishment isolate identity | with genetically defined differentials from Naktuinbouw (NL)  The most recent table is available through ISF at  <https://www.worldseed.org/our-work/plant-health/differential-hosts/> |
| 7. | Establishment pathogenicity | symptoms on susceptible *Brassica oleracea spp.* |
| 8. | Multiplication inoculum |  |
| 8.1 | Multiplication medium | Plant roots |
| 8.2 | Multiplication variety | Susceptible variety Bartolo (WC), Granaat (CC)[[4]](#footnote-4) |
| 8.3 | Plant stage at inoculation | Seedling, 1 week after sowing |
| 8.4 | Inoculation medium | Water |
| 8.5 | Inoculation method | 2 ml spore suspension (107 sp/ml)  Pipette to the base of each seedling. |
| 8.6 | Harvest of inoculum | Harvest roots 6-8 weeks after inoculation |
| 8.7 | Check of harvested inoculum | Microscopic count |
| 8.8 | Shelf life/viability inoculum | Frozen 3 years, room temperature 1-2 days |
| 9. | Format of the test |  |
| 9.1 | Number of plants per genotype | 20 plants |
| 9.2 | Number of replicates | 2 replicates (2 x 10) |
| 9.3 | Control varieties | Susceptible: Bartolo (WC)4  Resistant to race Pb: 0 051632 Bejo (WC), Clapton (CF),  Lodero (RC)  Resistant to race Pb: 1 Clapton (CF), Lodero (RC)  Resistant to race Pb: 2 Lodero (RC)  Resistant to race Pb: 3 051632 Bejo (WC) |
| 9.5 | Test facility | Glasshouse or climatic room |
| 9.6 | Temperature | 20-22°C |
| 9.7 | Light | Natural, extended to 16 h if needed |
| 9.9 | Special measures | A moderate amount of water is required to prevent rotting.  Keep the soil saturated in the first week. During plant growth the soil should not  be too dry to lower the soil temperature. |
| 9.8 | Season | Not in winter, not in too warm conditions if test performed in greenhouse |
| 10. | Inoculation |  |
| 10.1 | Preparation inoculum | Symptomatic roots are homogenized ca. 1 min in a blender.  Dilute clubs 1:4 with demineralized water. Blender the mix for less  than 1 minute. (Beware: longer blendering may cause overheating of  the suspension) |
| 10.2 | Quantification inoculum | count spores; adjust to 107 spores per ml |
| 10.3 | Plant stage at inoculation | 1 week old seedlings |
| 10.4 | Inoculation method | Pipette 1 ml on both sides at the base of each seedling, totalling 2 ml per plant. |
| 10.7 | Observation, evaluation and end of test | 6 weeks after inoculation (destructive) |
| 11. | Observations |  |
| 11.1 | Method | Visual: observation of severe galling and growth retardation  Destructive: observation on a 0-3 scale for galling |
| 11.2 | Observation scale | class 0 = no swellings or a few small spheroid galls  class 1 = very slight swelling, usually confined to the lateral roots  class 2 = moderate swelling on lateral and/or tap roots or  slight swelling of the main root and browning and ultimately death of all the lateral roots  class 3 = severe swelling on lateral and/or tap roots |
| 11.3 | Validation of test | Validation on controls. Expected response of controls:  Susceptible control:  -most plants in classes 2 and 3  Resistant control:  -most plants in classes 0 and 1 |
| 12. | Interpretation of data in terms of UPOV characteristic states | [1] absent: distribution of plants in the classes comparable with susceptible control  [9] present: distribution of plants in the classes comparable with resistant control |
| 13. | Critical control points | Clubroot is a zoosporic pathogen. Keep isolates spatially well-separated. |

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| Afbeelding met ginseng, pythium  Automatisch gegenereerde beschrijving | | | | |
| 0 = no galling | 1 = a few small galls | 2 = moderate galling | 2 = slight swelling of the main root, no lateral roots | 3 = severe galling |

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| *8.4* | *Growth stages*  1 = just before harvest maturity  2 = at harvest maturity  3 = at full flowering |

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| |  |  | | --- | --- | | 10. | Technical Questionnaire | |
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| |  |  | | --- | --- | |  | 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 | |  | | --- | | *Brassica oleracea* L. var. *italica* Plenck | | |  | | --- | |  | | |  |  |  |  |  | |  | |  | | --- | | 1.2 | | Common name | |  | | --- | | Broccoli, Calabrese, Sprouting Broccoli, Winter broccoli | |  | |  |  |  | |  | | --- | |  | |  | |  |  |  |  |  | |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | | 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 | |  |  | |  |  |  |  |  | |

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | 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 | |  | | |  | | --- | | (a) | | |  | | --- | | controlled cross  (please state parent varieties) | | [ ] | | |  | | --- | | (b) | | |  | | --- | | partially known cross  (please state known parent variety(ies)) | | [ ] | | |  | | --- | | (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) | [ ] | |  |  | | |  |  | | | | | | |

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| |  |  |  | | --- | --- | --- | |  |  |  | |  | 4.2 | Method of propagating the variety | |  | |  |  |  | | --- | --- | --- | | |  | | --- | | 4.2.1 | | |  | | --- | | Seed-propagated varieties | |  | | |  | | --- | | (a) | | |  | | --- | | Self-pollination | | [ ] | | |  | | --- | | (b) | | |  | | --- | | Cross-pollination | | [ ] | | |  | | --- | | (i) | | |  | | --- | | Synthetic variety | | [ ] | | |  | | --- | | (ii) | | |  | | --- | | Population | | [ ] | | |  | | --- | | (c) | | |  | | --- | | Hybrid | | [ ] | | |  | | --- | | (d) | | |  | | --- | | Three-way hybrid | | [ ] | | |  | | --- | | (e) | | |  | | --- | | Other (please provide details) | | [ ] | |  |  |  | | |  | | --- | | 4.2.2 | | Other (Please provide details) | [ ] | |  |  |  | |  |  |  | |  |  |  | | | |  | |  |  | | --- | --- | | |  | | --- | |  | | | | |

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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 |
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| |  | | --- | | **5.1** |  |  | | --- | | **(1)** | | |  | | --- | | **Plant: height** | |  |  |
|  | |  | | --- | | very short | | |  | | --- | |  | | |  | | --- | | 1 [   ] | |
|  | |  | | --- | | very short to short | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | |  | | --- | | short | | |  | | --- | | Chronos (s), Packman (s) | | |  | | --- | | 3 [   ] | |
|  | |  | | --- | | short to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | |  | | --- | | medium | | |  | | --- | | Capitano (s), Forester (s), Jeremy (s), Monty (s) | | |  | | --- | | 5 [   ] | |
|  | |  | | --- | | medium to tall | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | |  | | --- | | tall | | |  | | --- | | Heraklion (s), Poseidon (s) | | |  | | --- | | 7 [   ] | |
|  | |  | | --- | | tall to very tall | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | |  | | --- | | very tall | | |  | | --- | | Blaze (s), Burbank (o) | | |  | | --- | | 9 [   ] | |
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| |  | | --- | | **5.2** |  |  | | --- | | **(5)** | | |  | | --- | | **Leaf: number of lobes** | |  |  |
|  | |  | | --- | | absent or very few | | |  | | --- | | Violet Queen (s) | | |  | | --- | | 1 [   ] | |
|  | |  | | --- | | very few to few | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | |  | | --- | | few | | |  | | --- | | Early White Sprouting (o), Koros (s) | | |  | | --- | | 3 [   ] | |
|  | |  | | --- | | few to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | |  | | --- | | medium | | |  | | --- | | Chronos (s), Tinman (s) | | |  | | --- | | 5 [   ] | |
|  | |  | | --- | | medium to many | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | |  | | --- | | many | | |  | | --- | | Burbank (o), Red Fire (o) | | |  | | --- | | 7 [   ] | |
|  | |  | | --- | | many to very many | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | |  | | --- | | very many | | |  | | --- | | Bordeaux (s) | | |  | | --- | | 9 [   ] | |
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| |  | | --- | | **5.3** |  |  | | --- | | **(6)** | | |  | | --- | | **Leaf blade: color** | |  |  |
|  | |  | | --- | | green | | |  | | --- | | Claret (o), Inspiration (s) | | |  | | --- | | 1 [   ] | |
|  | |  | | --- | | grey green | | |  | | --- | | Capitano (s) | | |  | | --- | | 2 [   ] | |
|  | |  | | --- | | blue green | | |  | | --- | | Bordeaux (s), Ironman (s) | | |  | | --- | | 3 [   ] | |
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|  | | Characteristics | Example Varieties | Note |
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| |  | | --- | | **5.4** |  |  | | --- | | **(8)** | | | |  | | --- | | **Leaf blade: undulation of margin** | |  |  |
|  | | |  | | --- | | absent or very weak | | |  | | --- | |  | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | very weak to weak | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | weak | | |  | | --- | | Kanga (s) | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | weak to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | | |  | | --- | | medium | | |  | | --- | | Marathon (s) | | |  | | --- | | 5 [   ] | |
|  | | |  | | --- | | medium to strong | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | | |  | | --- | | strong | | |  | | --- | | Blaze (s) | | |  | | --- | | 7 [   ] | |
|  | | |  | | --- | | strong to very strong | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | | |  | | --- | | very strong | | |  | | --- | | Bonarda (o), Claret (o), Rudolph (s) | | |  | | --- | | 9 [   ] | |
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|  | |  |  |  |
| |  | | --- | | **5.5** |  |  | | --- | | **(13)** | | | |  | | --- | | **Only Calabrese type varieties: Head: level of main head in relation to plant height** | |  |  |
|  | | |  | | --- | | low | | |  | | --- | | Marathon (s) | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | medium | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | high | | |  | | --- | | Sibsey (s), SV0097BL (s) | | |  | | --- | | 3 [   ] | |
|  | |  |  |  |
|  | |  |  |  |
| |  | | --- | | **5.6** |  |  | | --- | | **(15)** | | | |  | | --- | | **Head: diameter** | |  |  |
|  | | |  | | --- | | very small | | |  | | --- | | Broccolo di Natale (o),  Early Purple Sprouting (o), Getti e foglie (s) | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | very small to small | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | small | | |  | | --- | |  | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | small to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | | |  | | --- | | medium | | |  | | --- | | Marathon (s) | | |  | | --- | | 5 [   ] | |
|  | | |  | | --- | | medium to large | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | | |  | | --- | | large | | |  | | --- | | Packman (s) | | |  | | --- | | 7 [   ] | |
|  | | |  | | --- | | large to very large | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | | |  | | --- | | very large | | |  | | --- | | Violet Queen (s) | | |  | | --- | | 9 [   ] | |
|  | |  |  |  |
|  | |  |  |  |
| |  | | --- | | **5.7** |  |  | | --- | | **(16)** | | | |  | | --- | | **Only Calabrese type varieties: Head: shape in longitudinal section** | |  |  |
|  | | |  | | --- | | circular | | |  | | --- | | Forester (s) | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | transverse broad elliptic | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | transverse medium elliptic | | |  | | --- | | Sibsey (s) | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | transverse narrow elliptic | | |  | | --- | | Calabria (s) | | |  | | --- | | 4 [   ] | |
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|  | | | | |
|  | | Characteristics | Example Varieties | Note |
|  | |  |  |  |
| |  | | --- | | **5.8** |  |  | | --- | | **(17)** | | | |  | | --- | | **Head: color** | |  |  |
|  | | |  | | --- | | whitish | | |  | | --- | | Burbank (o), Cresta (o),  Early White Sprouting (o) | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | green | | |  | | --- | | Forester (s) | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | grey green | | |  | | --- | | Marathon (s) | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | blue green | | |  | | --- | | Ironman (s), Tirreno (s) | | |  | | --- | | 4 [   ] | |
|  | | |  | | --- | | violet | | |  | | --- | | Bordeaux (s), Early Purple Sprouting (o) | | |  | | --- | | 5 [   ] | |
|  | |  |  |  |
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| |  | | --- | | **5.9** |  |  | | --- | | **(23)** | | | |  | | --- | | **Time of harvest maturity** | |  |  |
|  | | |  | | --- | | very early | | Sibsey (s) | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | very early to early | |  | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | early | | Monflor (s), Red Fire (o) | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | early to medium | |  | |  | | --- | | 4 [   ] | |
|  | | |  | | --- | | medium | | Tinman (s), Mendocino (o) | |  | | --- | | 5 [   ] | |
|  | | |  | | --- | | medium to late | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | | |  | | --- | | late | | Marathon (s), Burbank (o)   |  | | --- | |  | | |  | | --- | | 7 [   ] | |
|  | | |  | | --- | | late to very late | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | | |  | | --- | | very late | | Hallmark (s)   |  | | --- | |  | | |  | | --- | | 9 [   ] | |
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|  | |  |  |  |
| |  | | --- | | **5.10** |  |  | | --- | | **(24)** | | | |  | | --- | | **Male sterility** | |  |  |
|  | | |  | | --- | | absent | | |  | | --- | | Marathon (s) | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | present | | |  | | --- | | Chevalier (s), Parthenon (s) | | |  | | --- | | 9 [   ] | |
| **5.11 (26)** | | |  | | --- | | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 0** | |  |  |
|  | | absent | Marathon | |  | | --- | | 1 [   ] | |
|  | | present | Monclano | |  | | --- | | 9 [   ] | |
|  | | not tested |  | [   ] |
| **5.12 (27)** | | |  | | --- | | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 1** | |  |  |
|  | | absent | Marathon | |  | | --- | | 1 [   ] | |
|  | | present | Monclano | |  | | --- | | 9 [   ] | |
|  | | not tested |  | [   ] |
| **5.13 (28)** | | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 2** |  |  |
|  | | absent | Marathon, Monclano | |  | | --- | | 1 [   ] | |
|  | | present |  | |  | | --- | | 9 [   ] | |
|  | | not tested |  | [   ] |
| **5.14 (29)** | | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 3** |  |  |
|  | | absent | Marathon | |  | | --- | | 1 [   ] | |
|  | | present | Monclano | |  | | --- | | 9 [   ] | |
|  | | not tested |  | [   ] |
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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 **similar** variety(ies) | | |  | | --- | | Describe the expression of the characteristic(s) for **your** candidate variety | | | | | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *Example* | |  | | --- | | *Plant: height* | | |  | | --- | | *medium to tall* | | |  | | --- | | *very tall* | | |  |  |  |  | |  |  |  |  | |  |  |  |  | | | |  | 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 | | | | | |  |  |  |  |  | | --- | --- | --- | --- | --- | | 7.3.1 Growth type   |  |  | | --- | --- | | 1. | Calabrese type            [  ] | | 2. | Sprouting type             [  ] | | | | | | | |  |  |  |  |  | |

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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 |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  |  |  | |
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1. held by electronic means, from May 5 to 8, 2025. [↑](#footnote-ref-1)
2. The description of the method to test male sterility for *Brassica* (CMS marker) is covered by a trade secret.  The owner of the trade secret, Syngenta Seeds B.V., has given its consent for the use of the CMS marker solely for the purposes of examination of Distinctness, Uniformity and Stability (DUS) and for the development of variety descriptions by UPOV and authorities of UPOV members. Syngenta Seeds B.V. declares that neither UPOV, nor authorities of UPOV members that use the CMS marker for the above purposes will be held accountable for possible (mis)use of the CMS marker by third parties. Please contact Naktuinbouw, Netherlands, to obtain the method and information on the CMS marker for the purposes mentioned above. [↑](#footnote-ref-2)
3. Naktuinbouw: [resistentie@naktuinbouw.nl](mailto:resistentie@naktuinbouw.nl) [↑](#footnote-ref-3)
4. WC=White cabbage, CC=Chinese cabbage, RC=Red cabbage, CF=Cauliflower [↑](#footnote-ref-4)