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|  | A green and yellow logo  AI-generated content may be incorrect. | **E**  **TG/54/7 Rev. 3(proj.1)**  **ORIGINAL:** English  DATE: 2025-07-31 |
| **INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS** | | |
| GENEVA | | |

**DRAFT**

|  |  |  |
| --- | --- | --- |
|  | **BRUSSELS SPROUT**  (*Brassica oleracea* L. var.  *gemmifera* DC.) | [[1]](#footnote-1)\* |

**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[[2]](#footnote-2), 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:\*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Latin* | *English* | *French* | *German* | *Spanish* |
| *Brassica oleracea* L.var*. gemmifera* DC*.* | Brussels sprout | Chou de Bruxelles | Rosenkohl | Col de Bruselas |

**ASSOCIATED DOCUMENTS**

These guidelines should be read in conjunction with document TG/1/3, “General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants” (hereinafter referred to as the “General Introduction”) and its associated “TGP” documents.

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines 4

2. Material Required 4

3. Method of Examination 4

3.1 Duration of Tests 4

3.2 Testing Place 4

3.3 Conditions for Conducting the Examination 4

3.4 Test Design 5

3.5 Number of Plants / Parts of Plants to be Examined 5

3.6 Additional Tests 5

4. Assessment of Distinctness, Uniformity and Stability 5

4.1 Distinctness 5

4.2 Uniformity 6

4.3 Stability 6

5. Grouping of Varieties and Organization of the Growing Trial 6

6. Introduction to the Table of Characteristics 7

6.1 Categories of Characteristics 7

6.2 States of Expression and Corresponding Notes 7

6.3 Types of Expression 7

6.4 Example Varieties 7

6.5 Legend 7

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres 8

8. Explanations on the Table of Characteristics 13

9. Literature 17

10. Technical Questionnaire 18

# Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Brassica oleracea* L. var. *gemmifera*DC.

# Material Required

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

2.2 The material is to be supplied in the form of seeds or plants.

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

for seed-propagated varieties: 20 g or at least 5,000 seeds;

for vegetatively propagated varieties: 60 plants.

2.4 In the case of seed, the seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority.

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

2.6 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.

# Method of Examination

## 3.1 Duration of Tests

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

## 3.2 Testing Place

The tests should normally be conducted at one place. If any characteristics of the variety, which are relevant for the examination of DUS, cannot be observed at that place, the variety may be tested at an additional place.

## 3.3 Conditions for Conducting the Examination

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.

3.3.1 Type of observation

The recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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

## 3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 40 plants, which should be divided between two or more 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 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observations made on all plants in the test.

## 3.6 Additional Tests

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

# 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 minimum duration of tests recommended in Section 3.1 reflects, in general, the need to ensure that any differences in a characteristic are sufficiently consistent.

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.

## 4.2 Uniformity

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:

4.2.1 Cross-pollinated varieties

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

4.2.2 Vegetatively propagated varieties, single cross hybrids and self-pollinated varieties (inbred lines)

For the assessment of uniformity of vegetatively propagated varieties, single cross hybrids and self-pollinated varieties (inbred lines), a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 40 plants, 2 off-types are allowed.

4.2.3 Hybrids

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. In the case of single cross hybrids, the uniformity standards are set out in Section 4.2.2.

## 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 tested, either by growing a further generation, or by testing a new seed or plant stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

4.3.3 The stability of a hybrid variety may, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity and stability of its parent lines.

# 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 is 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:

1. Plant: height (characteristic 1)
2. Leaf blade: color (characteristic 5)
3. Leaf blade: intensity of color (characteristic 6)
4. Leaf blade: cupping (characteristic 8)
5. Time of harvest maturity (characteristic 19)
6. Male sterility (characteristic 21).

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

# 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

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.

## 6.3 Types of Expression

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

## 6.4 Example Varieties

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

## 6.5 Legend

(\*) Asterisked characteristic – see Section 6.1.2

QL Qualitative characteristic – see Section 6.3

QN Quantitative characteristic – see Section 6.3

PQ Pseudo-qualitative characteristic – see Section 6.3

MG Single measurement of a group of plants or parts of plants – see Section 3.3.1

MS Measurement of a number of individual plants or parts of plants – see Section 3.3.1

VG Visual assessment by a single observation of a group of plants or parts of plants – see Section 3.3.1

VS Visual assessment by observation of individual plants or parts of plants – see Section 3.3.1

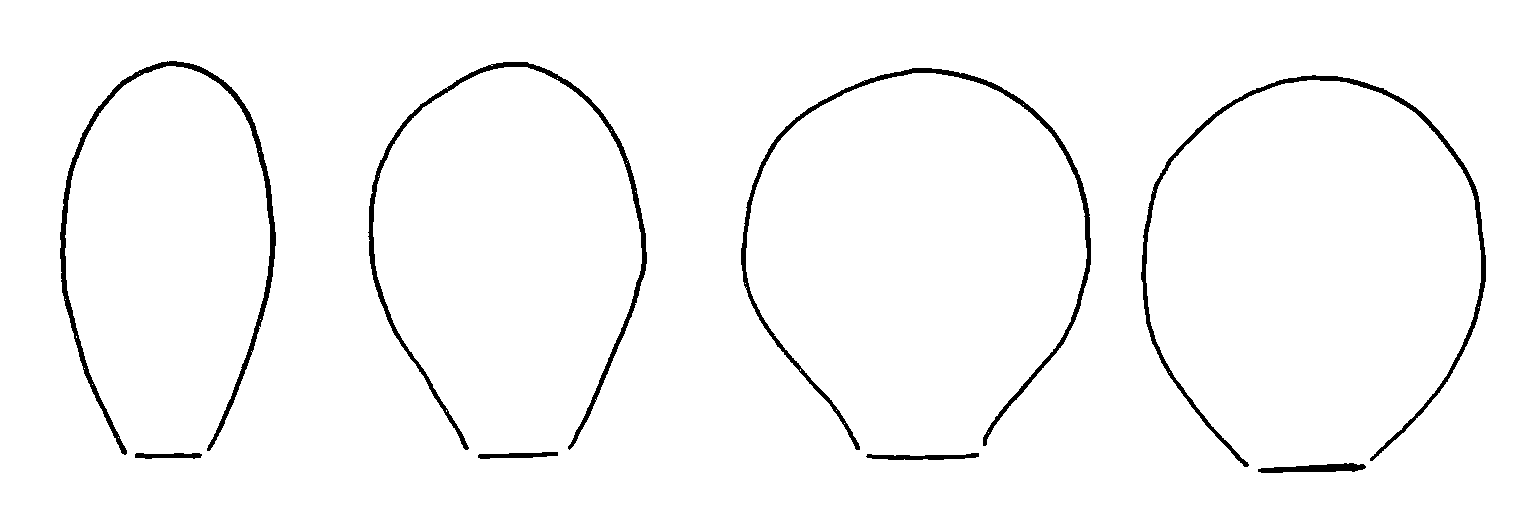
(+) See Explanations on the Table of Characteristics in Chapter 8

# Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

|  |  | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1. (\*)** | **VG/MG** | **Plant: height** | **Plante: hauteur** | **Pflanze: Höhe** | **Planta: altura** |  |  |
| **QN** |  | short | basse | niedrig | baja | Jade Cross | 3 |
|  |  | medium | moyenne | mittel | media | Cascade | 5 |
|  |  | tall | haute | hoch | alta | Bridge | 7 |
| 2. | VG | Plant: tendency to form a head | Plante: tendance à former une tête | Pflanze: Neigung zur Kopfbildung | Planta: tendencia a formar un repollo |  |  |
| **QN** |  | absent or very weak | nulle ou très faible | fehlend oder sehr gering | ausente o muy débil | Masterline | 1 |
|  |  | weak | faible | gering | débil | Cyrus | 3 |
|  |  | medium | moyenne | mittel | media | Bridge | 5 |
|  |  | strong | forte | stark | fuerte | Cor | 7 |
|  |  | very strong | très forte | sehr stark | muy fuerte | Oliver | 9 |
| **3. (\*)** | **VG** | **Leaf blade: size** | **Limbe: taille** | **Blattspreite: Größe** | **Limbo: tamaño** |  |  |
| **QN** |  | small | petit | klein | pequeño | Angus | 3 |
|  |  | medium | moyen | mittel | mediano | Peer Gynt | 5 |
|  |  | large | grand | groß | grande | Braveheart | 7 |
| **4.** | **VG** | **Leaf blade: length** | **Limbe: longueur** | **Blattspreite: Länge** | **Limbo: longitud** |  |  |
| **QN** |  | short | court | kurz | corto | Prince Marvel | 3 |
|  |  | medium | moyen | mittel | medio | Cascade | 5 |
|  |  | long | long | lang | largo | Braveheart | 7 |
| **5. (\*)** | **VG** | **Leaf blade: color** | **Limbe: couleur** | **Blattspreite: Farbe** | **Limbo: color** |  |  |
| **PQ** |  | green | vert | grün | verde | Masterline | 1 |
|  |  | blue green | vert-bleu | blaugrün | verde azulado | Angus | 2 |
|  |  | purple | pourpre | purpur | púrpura | Rubine | 3 |
| 6. (\*) | VG | Leaf blade: intensity of color | Limbe: intensité de la couleur | Blattspreite: Intensität der Farbe | Limbo: intensidad del color |  |  |
| **QN** |  | light | claire | hell | claro | Origus, Prince Marvel | 3 |
|  |  | medium | moyenne | mittel | medio | Angus, Boxer | 5 |
|  |  | dark | foncée | dunkel | oscuro | Estate, Placido, Rubine | 7 |
| **7.** | **VG** | **Leaf blade: waxiness** | **Limbe: glaucescence** | **Blattspreite: Wachsschicht** | **Limbo: cerosidad** |  |  |
| **QN** |  | weak | faible | gering | débil | Evesham Special | 3 |
|  |  | medium | moyenne | mittel | media | Peer Gynt | 5 |
|  |  | strong | forte | stark | fuerte | Cavalier | 7 |
| **8. (\*)** | **VG** | **Leaf blade: cupping** | **Limbe: courbure** | **Blattspreite: Wölbung** | **Limbo: acopado** |  |  |
| **QN** |  | moderately convex | modérément convexe | mäßig konvex | moderadamente convexo |  | 3 |
|  |  | plane | plane | flach | plano | Braveheart | 5 |
|  |  | moderately concave | modérément concave | mäßig konkav | moderadamente cóncavo | Estate | 7 |
|  |  | strongly concave | fortement concave | stark konkav | muy cóncavo | Explorer | 9 |
| 9. | VG | Leaf blade: blistering | Limbe: cloqûre | Blattspreite: Blasigkeit | Limbo: abullonado |  |  |
| **QN** |  | weak | faible | gering | débil | Cavalier | 3 |
|  |  | medium | moyenne | mittel | medio | Masterline | 5 |
|  |  | strong | forte | stark | fuerte | Breeze | 7 |
| **10.** | **VG** | **Leaf blade: reflexing of margin** | **Limbe: enroulement du bord** | **Blattspreite: Randbiegung** | **Limbo: curvatura del margen** |  |  |
| **QL** |  | absent | absent | fehlend | ausente | Lunet, Masterline | 1 |
|  |  | present | présent | vorhanden | presente | Breeze, Odessa | 9 |
| **11. (\*)** | **VG** | **Petiole: attitude** | **Pétiole: port** | Blattstiel: Haltung | Pecíolo: porte |  |  |
| **QN** |  | semi erect | demi-dressé | halbaufrecht | semierecto | Montgomery | 3 |
|  |  | horizontal | horizontal | waagerecht | horizontal | Angus | 5 |
|  |  | semi pendulous | demi-retombant | halbhängend | semi-colgante | Odessa | 7 |
| 12. | VG | Petiole: length compared to blade | Pétiole: longueur par rapport au limbe | Blattstiel: Länge im Verhältnis zur Blattspreite | Pecíolo: longitud en relación con el limbo |  |  |
| **QN** |  | moderately shorter | modérément plus court | mäßig kürzer | moderadamente más corto | Braveheart | 3 |
|  |  | equal | égal | gleich lang | igual | Masterline | 5 |
|  |  | moderately longer | modérément plus long | mäßig länger | moderadamente más largo | Odessa | 7 |
| **13.** | VG | Petiole: anthocyanin coloration | Pétiole: pigmentation anthocyanique | Blattstiel: Anthocyanfärbung | Pecíolo: pigmentación antociánica |  |  |
| **QN** |  | absent or very weak | nulle ou très faible | fehlend oder sehr gering | ausente o muy débil | Revenge | 1 |
|  |  | weak | faible | gering | débil | Breeze | 3 |
|  |  | medium | moyenne | mittel | media | Odessa | 5 |
|  |  | strong | forte | stark | fuerte | Prince Marvel | 7 |
|  |  | very strong | très forte | sehr stark | muy fuerte | Rasalon | 9 |
| 14.  (+) | VG | Sprout: shape in longitudinal section | Bourgeon: forme en section longitudinale | Knospe: Form im Längsschnitt | Yema: forma en sección longitudinal |  |  |
| **PQ** |  | narrow obovate | obovale étroite | schmal verkehrt eiförmig | oboval estrecha | Explorer | 1 |
|  |  | obovate | obovale | verkehrt eiförmig | oboval |  | 2 |
|  |  | broad obovate | obovale large | breit verkehrt eiförmig | oboval ancha | Odessa | 3 |
|  |  | circular | circulaire | kreisförmig | circular | Braveheart | 4 |
| **15.** | **VG** | **Sprout: color** | **Bourgeon: couleur** | **Knospe: Farbe** | **Yema: color** |  |  |
| **PQ** |  | green | vert | grün | verde | Estate | 1 |
|  |  | blue green | vert-bleu | blaugrün | verde azulado | Cascade | 2 |
|  |  | purple | pourpre | purpur | púrpura | Rubine | 3 |
| 16. | VG | Sprout: intensity of color | Bourgeon: intensité de la couleur | Knospe: Intensität der Farbe | Yema: intensidad del color |  |  |
| **QN** |  | light | claire | hell | claro | Prince Marvel | 3 |
|  |  | medium | moyenne | mittel | medio | Estate | 5 |
|  |  | dark | foncée | dunkel | oscuro | Placido, Rubine | 7 |
| 17. | VG | Sprout: density at harvest maturity | Bourgeon: densité à maturité de récolte | Knospe: Dichte bei Erntereife | Yema: densidad en la madurez para la cosecha |  |  |
| **QN** |  | loose | lâche | locker | laxa | Steffiline | 3 |
|  |  | medium | moyenne | mittel | media | Angus | 5 |
|  |  | dense | dense | dicht | densa | Prelent | 7 |
| **18.** | **VG** | **Stem: spacing of sprouts** | Tige: espacement entre les bourgeons | Sproß: Abstand zwischen den Knospen | Tallo: espaciado entre las yemas |  |  |
| **QN** |  | narrow | faible | gering | estrecho | Estate, Prelent | 3 |
|  |  | medium | moyen | mittel | medio | Cavalier, Cor | 5 |
|  |  | wide | large | groß | ancho | Silverline | 7 |
| **19. (\*)** | **VG** | **Time of harvest maturity** | **Époque de maturité de récolte** | **Zeitpunkt der Erntereife** | **Época de madurez para la cosecha** |  |  |
| **QN** |  | very early | très précoce | sehr früh | muy temprana | Lancer, Oliver | 1 |
|  |  | early | précoce | früh | temprana | Masterline, Peer Gynt | 3 |
|  |  | medium | moyenne | mittel | media | Lunet, Odessa | 5 |
|  |  | late | tardive | spät | tardía | Braveheart, Bridge | 7 |
|  |  | very late | très tardive | sehr spät | muy tardía | Ulysses | 9 |
| 20.  (+) | VG | Stem: profile of sprout column | Tige: profil de la partie avec des bourgeons | Sproß: Profil einschließlich der Knospen | Tallo: perfil de la parte con las yemas |  |  |
| **QN** |  | conical | conique | kegelförmig | cónica | Falstaff | 1 |
|  |  | conical to cylindrical | cónique à cylindrique | kegelförmig bis zylindrisch | cónica à cilíndrica | Regent, Setterline | 2 |
|  |  | cylindrical | cylindrique | zylindrisch | cilíndrica | Angus, Braveheart | 3 |
| **21.  (+)** | **VS/ MS** | **Male sterility** | **Stérilité mâle** | **Männliche Sterilität** | **Androesterilidad** |  |  |
| **QL** |  | absent | absente | fehlend | ausente | Attis, Pontus | 1 |
|  |  | present | présente | vorhanden | presente | Abacus, Platinus | 9 |
| **22.  (+)** | **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** |  |  |
| **QL** |  | absent | absente | fehlend | ausente | Abacus | 1 |
|  |  | present | présente | vorhanden | presente | Cryptus | 9 |
| **23.  (+)** | **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** |  |  |
| **QL** |  | absent | absente | fehlend | ausente | Abacus | 1 |
|  |  | present | présente | vorhanden | presente | Cryptus | 9 |
| **24.  (+)** | **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** |  |  |
| **QL** |  | absent | absente | fehlend | ausente | Abacus, Cryptus | 1 |
|  |  | present | présente | vorhanden | presente |  | 9 |
| **25.  (+)** | **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** |  |  |
| **QL** |  | absent | absente | fehlend | ausente | Abacus | 1 |
|  |  | present | présente | vorhanden | presente | Cryptus | 9 |

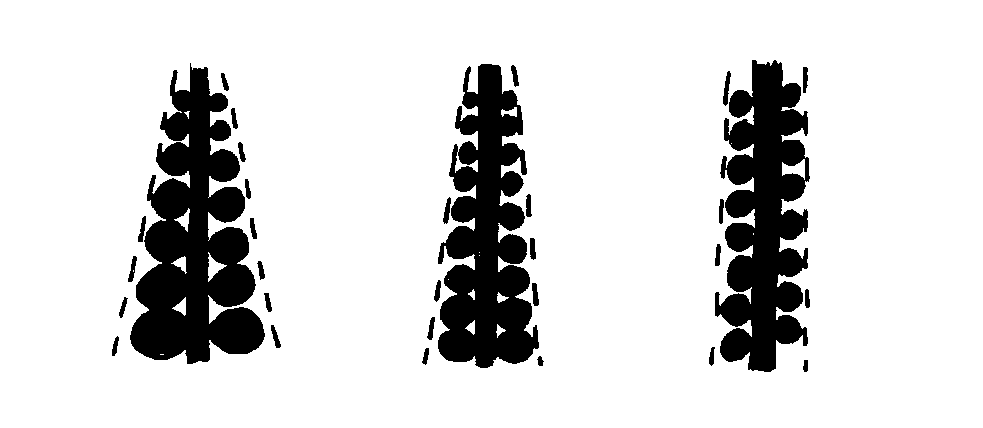
# Explanations on the Table of Characteristics

Ad. 14: Sprout: shape in longitudinal section



|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |
| narrow obovate | obovate | broad obovate | circular |

Ad. 20: Stem: profile of sprout column



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 |  |
|  | conical | conical to cylindrical | cylindrical |  |

Ad. 21: Male sterility

To be tested in a field trial and/or in a DNA marker test[[3]](#footnote-3).

In the case of a field trial, the type of observation is VS.  In the case of a DNA marker test, the type of observation is MS.

Field trial:

Observations should be made on fully opened flowers. Tapping or shaking the flowering stem will release pollen, which, if present, can be observed on dark colored paper or card. The absence of pollen production is an indication of male sterility. The presence of pollen production is an indication of male fertility.

|  |  |
| --- | --- |
| wordml://129.png | wordml://130.png |
| male fertile (pollen present) | male sterile (pollen absent) |

DNA marker test:

If the cytoplasmic male sterility (CMS) marker is absent, the variety is expected to have male fertile flowers. If the CMS marker is present, the variety is expected to have male sterile flowers.

In cases where the DNA marker test result does not confirm the declaration in the TQ, a field trial should be performed to observe whether the variety has male fertile or male sterile flowers due to another mechanism.

Ad. 22 to 25: Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3

|  |  |  |
| --- | --- | --- |
| 1. | Pathogen | *Plasmodiophora brassicae* |
| 2. | Quarantine status | no |
| 3. | Host species | *Brassica oleracea* |
| 4. | Source of inoculum | Naktuinbouw[[4]](#footnote-4) (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)[[5]](#footnote-5) |
| 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. |

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

# Literature

Tsunoda, S. Hinata, K. and Gomez-Campo, C. 1990: “Brassica Crops and Wild Allies - Biology and Breeding.” Japan Scientific Societies Press, Tokyo, Japan

# Technical Questionnaire

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | | Page {x} of {y} | Reference Number: | |
|  | |  |  | |
|  | |  | Application date: | |
|  | |  | (not to be filled in by the applicant) | |
| TECHNICAL QUESTIONNAIRE  to be completed in connection with an application for plant breeders’ rights  In the case of hybrid varieties which are the subject of an application for plant breeders’ rights, and where the parent lines are to be submitted as a part of the examination of the hybrid variety, this Technical Questionnaire should be completed for each of the parent lines, in addition to being completed for the hybrid variety. | | | | |
|  |  | | |  |
| 1. Subject of the Technical Questionnaire | | | | |
|  |  | | |  |
| 1.1 *Latin Name* | *Brassica oleracea* L. var. *gemmifera* DC. | | |  |
|  |  | | |  |
| 1.2 Common Name | Brussels Sprout | | |  |
|  |  | | |  |
|  |  | | |  |
| 2. Applicant | | | | |
|  |  | | |  |
| Name |  | | |  |
|  |  | | |  |
| Address |  | | |  |
|  |  | | |  |
| Telephone No. |  | | |  |
|  |  | | |  |
| Fax No. |  | | |  |
|  |  | | |  |
| E-mail address |  | | |  |
|  |  | | |  |
| Breeder (if different from applicant) | | | |  |
|  |  | | |  |
|  |  | | |  |
|  |  | | |  |
| 3. Proposed denomination and breeder’s reference | | | | |
|  |  | | |  |
| Proposed denomination |  | | |  |
| (if available) |  | | |  |
| Breeder’s reference |  | | |  |
|  |  | | |  |

|  |  |  |
| --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|  |  |  |
| 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)  4.2 Method of propagating the variety  4.2.1 Seed-propagated varieties  (a) Self-pollination [ ]  (b) Cross-pollination  (i) population [ ]  (ii) synthetic variety [ ]  (c) Hybrid [ ]  (d) Other [ ]  (please provide details)  4.2.2 Vegetatively propagated varieties [ ]  4.2.3 Other [ ]  (please provide details) | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | | Page {x} of {y} | Reference Number: | | |
|  | |  |  | | |
| 5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds). | | | | | |
|  | Characteristics | | | Example Varieties | Note |
| **5.1 (1)** | **Plant: height** | | |  |  |
|  | short | | | Jade Cross | 3[ ] |
|  | medium | | | Cascade | 5[ ] |
|  | tall | | | Bridge | 7[ ] |
| **5.2 (5)** | **Leaf blade: color** | | |  |  |
|  | green | | | Masterline | 1[ ] |
|  | blue green | | | Angus | 2[ ] |
|  | purple | | | Rubine | 3[ ] |
| **5.3 (6)** | **Leaf blade: intensity of color** | | |  |  |
|  | light | | | Origus, Prince Marvel | 3[ ] |
|  | medium | | | Angus, Boxer | 5[ ] |
|  | dark | | | Estate, Placido, Rubine | 7[ ] |
| **5.4 (8)** | **Leaf blade: cupping** | | |  |  |
|  | moderately convex | | |  | 3[ ] |
|  | plane | | | Braveheart | 5[ ] |
|  | moderately concave | | | Estate | 7[ ] |
|  | strongly concave | | | Explorer | 9[ ] |

| TECHNICAL QUESTIONNAIRE | | | Page {x} of {y} | | Reference Number: | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | |  | |  | | | |
|  | Characteristics | | | | | Example Varieties | | Note |
| **5.5 (19)** | Time of harvest maturity | | | | |  | |  |
|  | very early | | | | | Lancer, Oliver | | 1[ ] |
|  | early | | | | | Masterline, Peer Gynt | | 3[ ] |
|  | medium | | | | | Lunet, Odessa | | 5[ ] |
|  | late | | | | | Bridge, Braveheart | | 7[ ] |
|  | very late | | | | | Ulysses | | 9[ ] |
| **5.6 (21)** | **Male sterility** | | | | |  | |  |
|  | absent | | | | | Attis, Pontus | | 1[ ] |
|  | present | | | | | Abacus, Platinus | | 9[ ] |
| **5.7 (22)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 0** | | | | |  | |  |
|  | absent | | | | | Abacus | | |  | | --- | | 1 [   ] | |
|  | present | | | | | Cryptus | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | |  | | [   ] |
| **5.8 (23)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 1** | | | | |  | |  |
|  | absent | | | | | Abacus | | |  | | --- | | 1 [   ] | |
|  | present | | | | | Cryptus | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | |  | | [   ] |
| **5.9 (24)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 2** | | | | |  | |  |
|  | absent | | | | | Abacus, Cryptus | | |  | | --- | | 1 [   ] | |
|  | present | | | | |  | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | |  | | [   ] |
| **5.10 (25)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 3** | | | | |  | |  |
|  | absent | | | | | Abacus | | |  | | --- | | 1 [   ] | |
|  | present | | | | | Cryptus | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | |  | | [   ] |
| 6. Similar varieties and differences from these varieties  *Please use the table, and space provided for comments, below 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 | | *short* | | | *medium* | |
|  | |  | |  | | |  | |
|  | |  | |  | | |  | |
|  | |  | |  | | |  | |
| Comments: | | | | | | | | |

|  |  |  |
| --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|  |  |  |
| 7. Additional information which may help in the examination of the variety  7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?  Yes [ ] No [ ]  (If yes, please provide details)  7.2 Special conditions for the examination of the variety  7.2.1 Are there any special conditions for growing the variety or conducting the examination?  Yes [ ] No [ ]  7.2.2 If yes, please give details:  7.3 Other information | | |
| 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. | | |

|  |  |  |
| --- | --- | --- |
| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|  |  |  |
| 9. Information on plant material to be examined.  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 or pesticide) Yes [ ] No [ ]  (c) Tissue culture Yes [ ] No [ ]  (d) Other factors Yes [ ] No [ ]  Please provide details of where you have indicated “yes”:  …………………………………………………………… | | |
| 10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:  Applicant’s name  Signature Date | | |

[End of document]

1. \* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.] [↑](#footnote-ref-1)
2. held by electronic means, from May 5 to 8, 2025. [↑](#footnote-ref-2)
3. 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-3)
4. Naktuinbouw: [resistentie@naktuinbouw.nl](mailto:resistentie@naktuinbouw.nl) [↑](#footnote-ref-4)
5. WC=White cabbage, CC=Chinese cabbage, RC=Red cabbage, CF=Cauliflower [↑](#footnote-ref-5)