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| **INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS** | | |
| GENEVA | | |

**DRAFT**

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|  | **CAULIFLOWER**  UPOV Code: BRASS\_OLE\_GBB  *Brassica oleracea* L. convar *botrytis* (L.) Alef*.* var*. botrytis* L. | [[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. Revision of characteristic 28 “Male sterility”;
2. Revision of explanation Ad. 28 “Male sterility”;
3. Addition of characteristics “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3” at the end of the Table of Characteristics;
4. Addition of explanation “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3”;
5. Addition of characteristics “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3” to TQ 5. with option “not tested” and “Male sterility”;
6. Revision of the Technical Questionnaire, Section TQ 7.3 “Other information”.

Alternative Names:\*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Botanical name* | *English* | *French* | *German* | *Spanish* |
| *Brassica oleracea* L*.* convar. *botrytis* (L.)Alef. var*. botrytis, Brassica caulifloria* Lizg. | Cauliflower | Chou-fleur | Blumenkohl | Coliflor |

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.

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines 4

2. Material Required 4

3. Method of Examination 4

3.1 Number of Growing Cycles 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 8

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres 9

8. Explanations on the Table of Characteristics 18

8.1 Explanations covering several characteristics 18

8.2 Explanations for individual characteristics 18

9. Literature 27

10. Technical Questionnaire 28

# Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Brassica oleracea* L. convar. *botrytis* (L.) Alef. var. *botrytis*. L.

# 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:

5,000 seeds or 10 g.

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.

# Method of Examination

## 3.1 Number of Growing Cycles

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

## 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 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 60 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 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.

## 4.2 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 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.

4.2.3 Single cross hybrids and inbred lines

For the assessment of uniformity of single cross hybrids and 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 60 plants, 2 off-types are allowed. In addition, for single cross 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 tested, either by growing a further generation, or by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

4.3.3 Where appropriate, or in cases of doubt, 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 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) Seedling: anthocyanin coloration of hypocotyl (characteristic 1)

(b) Curd: color (characteristic 21)

(c) Flower: color (characteristic 25)

(d) Earliness in spring planting (characteristic 26)

(e) Earliness in summer planting (characteristic 27)

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 Chapter 6.1.2

QL Qualitative characteristic – see Chapter 6.3

QN Quantitative characteristic – see Chapter 6.3

PQ Pseudo-qualitative characteristic – see Chapter 6.3

MG, MS, VG, VS See Chapter 3.3.2

(a) – (b) See Explanations on the Table of Characteristics in Chapter 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8.2

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

|  |  | English | français | deutsch | español | | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **l. (\*)** | **VG** | **Seedling: anthocyanin coloration of hypocotyl** | **Plantule : pigmentation anthocyanique de l’hypocotyle** | **Keimpflanze: Anthocyanfärbung des Hypokotyls** | **Plántula: pigmentación antociánica del hipocotilo** | |  |  |
| **QL** |  | absent | absente | fehlend | ausente | | Brio | 1 |
|  |  | present | présente | vorhanden | presente | | Ciren, Dominant | 9 |
| **2.** | **VG/MG** | **Plant: height (at time of harvest)** | **Plante : hauteur  (à la récolte)** | **Pflanze: Höhe (bei Erntereife)** | **Planta: altura (en la época de la cosecha)** | |  |  |
| **QN** | **(a)** | very short | très basse | sehr niedrig | muy baja | |  | 1 |
|  |  | short | basse | niedrig | baja | | Luxor, Opaal | 3 |
|  |  | medium | moyenne | mittel | media | | Fastman, Mexico | 5 |
|  |  | tall | haute | hoch | alta | | Neven, Sirente | 7 |
|  |  | very tall | très haute | sehr hoch | muy alta | | Calisa, Paradiso | 9 |
| 3. | VG/MG | Stem: length (up to insertion of first leaf) | Pied : longueur (jusqu’à l’insertion de la première feuille) | Strunk: Länge (bis zum Ansatz des ersten Blattes) | Tallo: longitud (hasta la inserción de la primera hoja) | |  |  |
| **QN** | **(a)** | short | court | kurz | corta | | Mexico, Opaal | 3 |
|  |  | medium | moyen | mittel | media | | Fanch, Nautilus | 5 |
|  |  | long | long | lang | larga | | Neven, Paradiso | 7 |
| **4. (\*) (+)** | **VG** | **Leaf: attitude** | **Feuille : port** | **Blatt: Haltung** | **Hoja: porte** | |  |  |
| **QN** | **(a)** | erect | dressé | aufrecht | erecto | | Igloo, Paradiso | 1 |
|  |  | semi-erect | demi-dressé | halbaufrecht | semierecto | | Erfurter Zweg,  Fastman | 3 |
|  |  | horizontal | horizontal | waagerecht | horizontal | | Isabel, Opaal | 5 |
| 5. (\*) | VG/MS | Leaf: length | Feuille : longueur | Blatt: Länge | Hoja: longitud | |  |  |
| **QN** | **(a)** | very short | très courte | sehr kurz | muy corta | |  | 1 |
|  |  | short | courte | kurz | corta | | Nagano, Opaal | 3 |
|  |  | medium | moyenne | mittel | media | | Aviso, Fanch | 5 |
|  |  | long | longue | lang | larga | Géant de Naples tardif, Snow March, Memphis | | 7 |
|  |  | very long | très longue | sehr lang | muy larga | Magnifico, Paradiso | | 9 |
| 6. (\*) | VG/MS | Leaf: width | Feuille : largeur | Blatt: Breite | Hoja: anchura |  | |  |
| **QN** | **(a)** | very narrow | très étroite | sehr schmal | muy estrecha | Alverda,  Géant de Naples tardif | | 1 |
|  |  | narrow | étroite | schmal | estrecha | Andes, Capvert | | 3 |
|  |  | medium | moyenne | mittel | media | Broden, Lindon | | 5 |
|  |  | broad | large | breit | ancha | Memphis, Vogue | | 7 |
|  |  | very broad | très large | sehr breit | muy ancha | Torens | | 9 |
| 7. (\*) | VG | Leaf: ratio width/length | Feuille : rapport largeur/longueur | Blatt: Verhältnis Länge/Breite | Hoja: relación anchura/longitud |  | |  |
| **QN** | **(a)** | small | petit | klein | pequeña | Akita,  Géant de Naples tardif | | 3 |
|  |  | medium | moyen | mittel | media | Astell, Buren | | 5 |
|  |  | large | grand | groß | grande | Arbon, Lazio | | 7 |
| 8.  (+) | VG | Leaf: lobing | Feuille : découpure du bord | Blatt: Lappung | Hoja: lobulado |  | |  |
| **QL** | **(a)** | absent | absente | fehlend | ausente | Idol | | 1 |
|  |  | present | présente | vorhanden | presente | Atao, Minaret, Romanesco ottobrino | | 9 |
| 9. | VG | Leaf: color (with wax if present) | Feuille : couleur (avec la pruine éventuellement) | Blatt: Farbe (mit Wachs, sofern vorhanden) | Hoja: color (incluida la cerocidad, si está presente) |  | |  |
| **PQ** | **(a)** | green | verte | grün | verde | Baltimore, Belot, Lecerf | | 1 |
|  |  | grey green | vert gris | graugrün | verde grisáceo | Calisa, Delira,  Géant de Naples tardif | | 2 |
|  |  | blue green | vert bleu | blaugrün | verde azulado | Arbon, Barrier Reef, Ciren | | 3 |
| 10. (\*) | VG | Leaf: intensity of color (as for 9) | Feuille : intensité de la couleur (comme pour 9) | Blatt: Intensität der Farbe (wie unter 9) | Hoja: intensidad del color (como en el 9) |  | |  |
| **QN** | **(a)** | light | claire | hell | clara | Baltimore, Ciren | | 3 |
|  |  | medium | moyenne | mittel | media | Barrier Reef, Belot, Calisa | | 5 |
|  |  | dark | foncée | dunkel | oscura | Arbon, Lecerf | | 7 |
| 11. | VG | Leaf: twisting of tip | Feuille : torsion du sommet | Blatt: Drehung der Spitze | Hoja: torsión de la punta |  | |  |
| **QN** | **(a)** | absent or very weak | absente ou très faible | fehlend oder sehr gering | ausente o muy débil | Akita, Alverda | | 1 |
|  |  | weak | faible | gering | débil | Belot, Di Jesi | | 3 |
|  |  | medium | moyenne | mittel | media | Barca, Imola | | 5 |
|  |  | strong | forte | stark | fuerte | Oceano, Sernio | | 7 |
|  |  | very strong | très forte | sehr stark | muy fuerte |  | | 9 |
| 12. | VG | Leaf: shape in cross-section | Feuille : forme en section transversale | Blatt: Form im Querschnitt | Hoja: forma en sección transversal |  | |  |
| **QN** | **(a)** | concave | concave | konkav | cóncava | Bruce,  Géant de Naples tardif | | 1 |
|  |  | flat | plane | eben | plana | Akita, Emeraude | | 2 |
|  |  | convex | convexe | konvex | convexa | Cortes, Fanch | | 3 |
| 13. | VG | Leaf: blistering | Feuille : cloqûre | Blatt: Blasigkeit | Hoja: abullonado |  | |  |
| **QN** | **(a)** | absent or very weak | nulle ou très faible | fehlend oder sehr gering | ausente o muy débil | Akita, Lecerf | | 1 |
|  |  | weak | faible | gering | débil | Alpen, Opaal | | 3 |
|  |  | medium | moyenne | mittel | medio | Montano, Nautilus, Sergeant | | 5 |
|  |  | strong | forte | stark | fuerte | Sernio, Siria | | 7 |
|  |  | very strong | très forte | sehr stark | muy fuerte |  | | 9 |
| 14.  (+) | VG | Leaf: crimping near main vein | Feuille : plissement à proximité de la nervure principale | Blatt: Kräuselung nahe der Hauptader | Hoja: ondulado cerca del nervio principal |  | |  |
| **QN** | **(a)** | absent or very weak | nul ou très faible | fehlend oder sehr gering | ausente o muy débil | Avelek, Fangio | | 1 |
|  |  | weak | faible | gering | débil | Balmoral, Flanca | | 3 |
|  |  | medium | moyen | mittel | medio | Mexico, Vinson | | 5 |
|  |  | strong | fort | stark | fuerte | Akito, Sernio | | 7 |
|  |  | very strong | très fort | sehr stark | muy fuerte | Izoar, Minioc | | 9 |
| 15. | VG | Leaf: undulation of margin | Feuille : ondulation du bord | Blatt: Randwellung | Hoja: ondulación del borde |  | |  |
| **QN** | **(a)** | absent or very weak | absente ou très faible | fehlend oder sehr gering | ausente o muy débil | Étoile 23,  Géant de Naples | | 1 |
|  |  | weak | faible | gering | débil | Akita, Beluga | | 3 |
|  |  | medium | moyenne | mittel | media | Admirable,  Alice Springs | | 5 |
|  |  | strong | forte | stark | fuerte | Purdy, Siria | | 7 |
|  |  | very strong | très forte | sehr stark | muy fuerte | Celebrity | | 9 |
| 16. (\*) | VG | Curd: covering by inner leaves | Pomme : couverture par les feuilles internes | Blume: Deckung durch innere Blätter | Cabeza: cobertura de las hojas internas |  | |  |
| **QN** | **(b)** | not covered | pas couverte | nicht bedeckt | descubierto | Capvert, Opaal | | 1 |
|  |  | partly covered | partiellement couverte | teilweise bedeckt | parcialmente cubierto | Celesta, Eskimo | | 2 |
|  |  | fully covered | complètement couverte | vollständig bedeckt | completamente cubierto | Amistad, Charif | | 3 |
| 17. (\*) (+) | MS | Curd: height | Pomme : hauteur | Blume: Höhe | Cabeza: altura |  | |  |
| **QN** | **(b)** | short | basse | niedrig | baja | Lecerf, Mechelse 2 | | 3 |
|  |  | medium | moyenne | mittel | media | Kernis, Tetris | | 5 |
|  |  | tall | haute | hoch | alta | Amistad, Gitano | | 7 |
| 18. (\*) | MS | Curd: diameter | Pomme : diamètre | Blume: Durchmesser | Cabeza: diámetro |  | |  |
| **QN** | **(b)** | small | petit | klein | pequeño | Alverda, Lumina | | 3 |
|  |  | medium | moyen | mittel | medio | Barrier Reef, Malaga | | 5 |
|  |  | large | grand | groß | grande | Fremont, Novia, Plessi | | 7 |
| 19. (\*) (+) | VG | Curd: shape in longitudinal section | Pomme : forme en section longitudinale | Blume: Form im Längsschnitt | Cabeza: forma en sección longitudinal |  | |  |
| **PQ** | **(b)** | circular | circulaire | rund | circular | Gipsy Moth, Linero | | 1 |
|  |  | transverse broad elliptic | elliptique transverse large | breit quer elliptisch | elíptica transversal amplia | Aviron, Melody | | 2 |
|  |  | transverse medium elliptic | elliptique transverse moyenne | mittel quer elliptisch | elíptica transversal media | Akita, Celesta | | 3 |
|  |  | transverse narrow elliptic | elliptique transverse étroite | schmal quer elliptisch | elíptica transversal estrecha | Erfurter, Lecerf | | 4 |
|  |  | triangular | triangulaire | dreieckig | triangular | Minaret,  Romanesco ottobrino | | 5 |
| 20. (\*) (+) |  | Excluding varieties with curd shape: triangular: Curd: doming | Variétés à pomme triangulaire exclues : Pomme : courbure du sommet | Außer Sorten mit dreieckiger Blume: Blume: Wölbung | Excluidas las variedades de la cabeza triangular: Cabeza: abovedado |  | |  |
|  | **(b)** | weak | faible | gering | débil | Burgh, Lecerf | | 3 |
|  |  | medium | moyenne | mittel | medio | Akita,  Géant de Naples tardif | | 5 |
|  |  | strong | forte | stark | fuerte | Belot, White Rock | | 7 |
| 21. (\*) | VG | Curd: color | Pomme : couleur | Blume: Farbe | Cabeza: color |  | |  |
| **PQ** | **(b)** | whitish | blanchâtre | weißlich | blanquecino | Astell, Iceberg | | 1 |
|  |  | yellow | jaune | gelb | amarillo | Di Jesi | | 2 |
|  |  | orange | orange | orange | naranja | Cheddar, Sunset | | 3 |
|  |  | green | verte | grün | verde | Alverda, Amfora, Minaret | | 4 |
|  |  | violet | violette | violett | violeta | Graffiti | | 5 |
| 22.  (+) | VG | Curd: knobbling | Pomme : relief | Blume: Höckerbildung | Cabeza: protuberancias |  | |  |
| **QN** | **(b)** | very fine | très fin | sehr fein | muy finas |  | | 1 |
|  |  | fine | fin | fein | finas | Nautilus, Opaal | | 3 |
|  |  | medium | moyen | mittel | medias | Corvilia, Nedeleg | | 5 |
|  |  | coarse | grossier | grob | gruesas | Niagara | | 7 |
|  |  | very coarse | très grossier | sehr grob | muy gruesas | Minaret, Navona | | 9 |
| 23.  (+) | VG | Curd: texture | Pomme : granulation | Blume: Körnung | Cabeza: textura |  | |  |
| **QN** | **(b)** | fine | fine | fein | fina | Boris, Erfurter | | 3 |
|  |  | medium | moyenne | mittel | media | Beluga, Galiote | | 5 |
|  |  | coarse | grossière | grob | gruesa | Géant de Naples tardif, Niagara | | 7 |
| 24. | VG | Curd: anthocyanin coloration after harvest maturity | Pomme : pigmentation anthocyanique après maturité de récolte | Blume: Anthocyanfärbung nach der Erntereife | Cabeza: coloración antociánica después de la madurez para la cosecha |  | |  |
| **QL** |  | absent | absente | fehlend | ausente | Evita, Mantis | | 1 |
|  |  | present | présente | vorhanden | presente | Flanca, Planita | | 9 |
| 25. (\*) (+) | VG/MS | Flower: color | Fleur : couleur | Blüte: Farbe | Flor: color |  | |  |
| **QL** |  | white | blanc | weiß | blanco | Bruce, Ecrin | | 1 |
|  |  | yellow | jaune | gelb | amarillo | Flora Blanca, Lecerf | | 2 |
| 26. (\*) (+) | MS | Earliness in spring planting | Précocité du repiquage au printemps | Frühzeitigkeit bei Frühjahrspflanzung | Precocidad en la plantación de primavera |  | |  |
| **QN** |  | very early | très hâtive | sehr früh | muy precoz |  | | 1 |
|  |  | very early to early | très hâtive à hâtive | sehr früh bis früh | muy precoz a precoz |  | | 2 |
|  |  | early | hâtive | früh | precoz |  | | 3 |
|  |  | early to medium | hâtive à moyenne | früh bis mittel | precoz media |  | | 4 |
|  |  | medium | moyenne | mittel | media |  | | 5 |
|  |  | medium to late | moyenne à tardive | mittel bis spät | media a tardía |  | | 6 |
|  |  | late | tardive | spät | tardía |  | | 7 |
|  |  | late to very late | tardive à très tardive | spät bis sehr spät | tardía a muy tardía |  | | 8 |
|  |  | very late | très tardive | sehr spät | muy tardía |  | | 9 |
| 27. (\*) (+) | MS | Earliness in summer planting | Précocité du repiquage en été | Frühzeitigkeit bei Sommerpflanzung | Precocidad en la plantación de verano |  | |  |
| **QN** |  | very early autumn type | type automne : très hâtive | sehr früher Herbsttyp | tipo muy precoz de otoño |  | | 1 |
|  |  | very early to early autumn type | type automne : très hâtive à hâtive | sehr früher bis früher Herbsttyp | tipo muy precoz a precoz de otoño |  | | 2 |
|  |  | early autumn type | type automne : hâtive | früher Herbsttyp | tipo precoz de otoño |  | | 3 |
|  |  | early to medium autumn type | type automne : hâtive à moyenne | früher bis mittlerer Herbsttyp | tipo precoz a medio de otoño |  | | 4 |
|  |  | medium autumn type | type automne : moyenne | mittlerer Herbsttyp | tipo medio de otoño |  | | 5 |
|  |  | medium to late autumn type | type automne : moyenne à tardive | mittlerer bis später Herbsttyp | tipo medio a tardío de otoño |  | | 6 |
|  |  | late autumn type | type automne : tardive | später Herbsttyp | tipo tardío de otoño |  | | 7 |
|  |  | late to very late autumn type | type automne : tardive à très tardive | später bis sehr später Herbsttyp | tipo tardío a muy tardío de otoño |  | | 8 |
|  |  | very late autumn type | type automne : très tardive | sehr später Herbsttyp | tipo muy tardío de otoño |  | | 9 |
|  |  | very early winter type | type hiver : très hâtive | sehr früher Wintertyp | tipo muy precoz de invierno |  | | 10 |
|  |  | very early to early winter type | type hiver : très hâtive à hâtive | sehr früher bis früher Wintertyp | tipo muy precoz a precoz de invierno |  | | 11 |
|  |  | early winter type | type hiver : hâtive | früher Wintertyp | tipo precoz de invierno |  | | 12 |
|  |  | early to medium winter type | type hiver : hâtive à moyenne | früher bis mittlerer Wintertyp | tipo precoz a medio de invierno |  | | 13 |
|  |  | medium winter type | type hiver : moyenne | mittlerer Wintertyp | tipo medio de invierno |  | | 14 |
|  |  | medium to late winter type | type hiver : moyenne à tardive | mittlerer bis später Wintertyp | tipo medio a tardío de invierno |  | | 15 |
|  |  | late winter type | type hiver : tardive | später Wintertyp | tipo tardío de invierno |  | | 16 |
|  |  | late to very late winter type | type hiver : tardive à très tardive | später bis sehr später Wintertyp | tipo tardío a muy tardío de invierno |  | | 17 |
|  |  | very late winter type | type hiver : tardive | sehr später Wintertyp | tipo muy tardío de invierno |  | | 18 |
| 28. (\*) (+) | MS/VS | Male sterility | Stérilité mâle | Männliche Sterilität | Androesterilidad |  | |  |
| **QN** |  | absent | absente | fehlend | ausente | Alpha 2, Flora Blanca | | 1 |
|  |  | partially present | partiellement présente | partiell vorhanden | parcialmente presente | Dunvez, Odegwen | | 2 |
|  |  | totally present | totalement présente | vollständig vorhanden | totalmente presente | Aviron, Bodilis | | 3 |
| **29.  (+)** | **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 | Freedom | | 1 |
|  |  | present | présente | vorhanden | presente | Clapton | | 9 |
| **30.  (+)** | **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 | Freedom | | 1 |
|  |  | present | présente | vorhanden | presente | Clapton | | 9 |
| **31.  (+)** | **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 | Clapton, Freedom | | 1 |
|  |  | present | présente | vorhanden | presente |  | | 9 |
| **32.  (+)** | **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 | Freedom | | 1 |
|  |  | present | présente | vorhanden | presente | Clapton | | 9 |

# Explanations on the Table of Characteristics

## 8.1 Explanations covering several characteristics

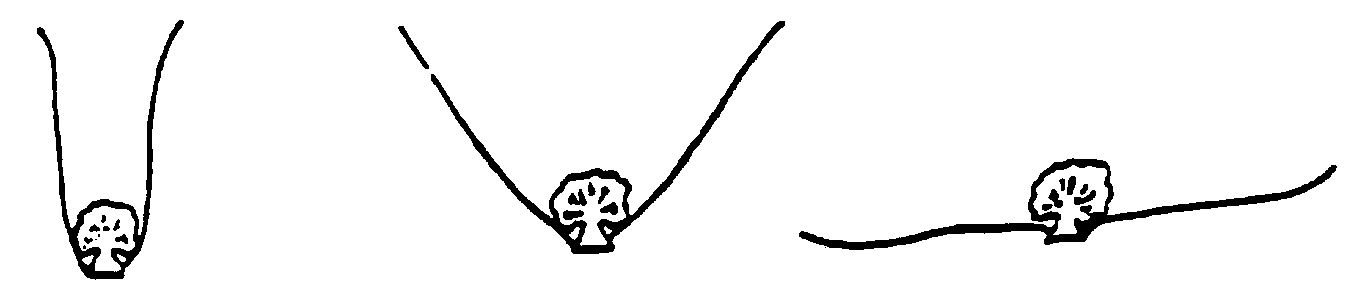
Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Foliage and leaf: Observations on the foliage and the leaf which should be made at the time of full development of the foliage, before curd formation.

(b) Curd: Observations on the curd which should be made when the curd is fully developed (at harvest maturity).

## 8.2 Explanations for individual characteristics

Ad. 4: Leaf: attitude



|  |  |  |
| --- | --- | --- |
| 1 | 5 | 9 |
| erect | semi-erect | horizontal |

###### Ad. 8: Leaf: lobing



|  |  |
| --- | --- |
| 1 | 9 |
| absent | present |

Ad. 14: Leaf: crimping near main vein



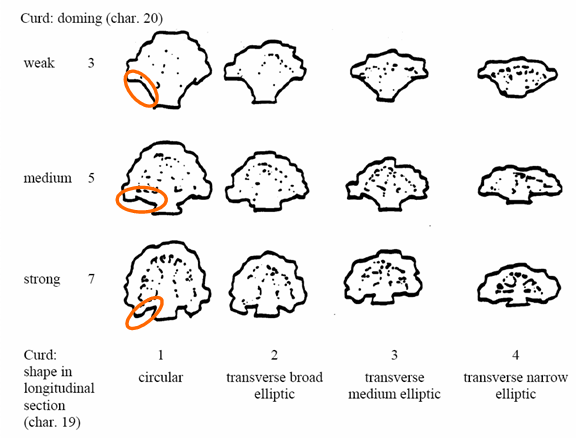
|  |  |  |
| --- | --- | --- |
| 1 | 5 | 9 |
| absent or very weak | medium | very strong |

Ad. 17: Curd: height

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 3 | 5 | 7 |
| short | medium | tall |

Ad. 19: Curd: shape in longitudinal section

Ad. 20: Excluding varieties with curd shape: triangular: Curd: doming



|  |  |
| --- | --- |
|  |  |
|  | 5  triangular |

Ad. 22: Curd:  knobbling

|  |  |  |  |
| --- | --- | --- | --- |
| lateral view |  | | |
|  | 3 | 5 | 7 |
|  | fine | medium | coarse |

Ad. 23: Curd:  texture

The texture is “fine” when the surface of the curd is very smooth and is “coarse” when the surface of the curd is granular.

Ad 25: Flower: color

To be tested in a field and/or in a DNA marker test.

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

Field trial:

Observation of color of flowers.

|  |  |
| --- | --- |
| Afbeelding met plant, bloem, overdekt, wit  Automatisch gegenereerde beschrijving | |
| 1 | 2 |
| white | yellow |

DNA marker test:

The markers are linked to the gene CCD4. The functional allele causes white petal color. Functional loss of this gene leads to yellow petal color*.* The markers corresponding with the functional or nonfunctional allele are based on 3 SNP markers located at position ~1296bp in the gene (Han et al. 2019).

The marker test can be performed in multiplexwith the marker test for male sterility (Ad. 28).

The presence of the functional or nonfunctional CCD4 alleles can be detected by the described co-dominant markers.

|  |  |  |
| --- | --- | --- |
| 1. | Characteristic | Flower: color |
| 2. | Functional gene | Functional CCD4 gene: white  Nonfunctional CCD4 gene: yellow |
| 3.1 | Primers | Tm of the primers is ~57°C  Forward Primer:  ‘5-CTGGATTCAACATCATTCACG CT-3’  Reverse Primer:  ‘5-CGGTGACGAGATCGATCTTCA-3’ |
| 3.2 | Probes | White Probe: ‘5-Fluorophore-ATCGCTCCAAATATTATGT-Quencer-3’  Yellow Probe: ‘5-Fluorophore-GCTCCGAACGTTATGT-Quencer-3’ |
|  |  | The probes are MGB probes (Applied biosystems) or XS probes (Biolegio). The Tm of the probes must be ordered at 67°C.  Fluorophores can be modified according to compatibility with the filters on the real-time PCR machine. |
| 4. | Format of the test |  |
| 4.1 | Number of plants per genotype | at least 20 plants |
| 4.2 | Control varieties | Homozygous allele for functional CCD4 gene (white petal color) present: Ecrin  Heterozygous functional allele and nonfunctional allele of the CCD4 gene present (variety is white): Bruce  Homozygous allele for nonfunctional CCD4 gene (yellow petal color) present: Magnifico |
| 6. | PCR conditions  (mastermix dependent) | 1. Initial denaturation step 10 min 95 °C  2. 40 cycles 15 sec 95 °C and 1 min 60°C. Every cycle ends with a plate reading. |
| 8. | Interpretation of test results |  |
|  | White (1): | Probe for functional allele (white petal color) is homozygous present, the variety has white flowers.  Both probes for both alleles are present (heterozygous), the variety has white flowers. |
|  | Yellow (2) | Probe for nonfunctional allele (yellow petal color) is homozygous present, the variety has yellow 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 white or yellow flowers due to another mechanism. |

Ad. 26: Earliness in spring planting

Ad. 27: Earliness in summer planting

In cauliflower, earliness is strongly influenced by the temperature and the season of growing. Nevertheless, at the same place and for the same growing season, earliness is an important characteristic for the assessment of distinctness of varieties. For those reasons, no example varieties are provided in the Test Guidelines and the variety description should always state the place and the season of growing.

Ad. 28: 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.

Absent: all plants with male fertile flowers

Partially present: 50% of the plants with male fertile flowers and 50% plants with male sterile flowers

Totally present: all plants with male sterile flowers

State “partially present” is linked to hybrids produced with a motherline which is heterozygous for genic male sterility (GMS), such hybrids segregate in a ratio 1:1 for male sterility. If the segregation occurs in the predicted manner, the hybrid should be classified as partially present (state 2).

|  |  |
| --- | --- |
| wordml://101.png | wordml://102.png |
|  |  |
| male fertile (pollen present) | male sterile (pollen absent) |

DNA marker test and/or field trial:

Varieties declared male fertile (state 1) or total male sterile (state 3) in the TQ, can be examined in a field trial or in a DNA marker test.

Varieties with partial male sterility (state 2) and vegetatively propagated, total male sterile lines (state 3) cannot be examined in a DNA marker test but must be observed in a field trial.

It should be noted that lines exist which are male sterile due to the homozygous recessive monogenic male sterility (GMS) gene. These lines are used for the production of hybrids which then will be male fertile. However when a heterozygous mother line is used, the produced hybrids will be partially male sterile (state 2). Due to their nature these lines have to be propagated vegetatively. They are male sterile but do not have the DNA marker for the presence of cytoplasmic male sterility (CMS). So vegetatively propagated male sterile lines cannot be examined in a DNA marker test but must be observed in a field trial.

In cases where only a DNA marker test is allowed (state 1 and state 3 seed-propagated varieties) and the CMS maker appears to be absent, the variety is expected to have male fertile flowers. In cases where the CMS marker is present, the variety is expected to have male sterile flowers. All varieties declared partially sterile (state 2) and vegetatively propagated lines declared total male sterile (state 3) should be tested in a field trial.

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 or is segregating due to another mechanism.

The marker test can be performed in multiplex with the marker test for flower color (Ad. 25).

Ad. 29 to 32: 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

Fengqing Han, Huilin Cui, Bin Zhang, Xiaoping Liu, Limei Yang, Mu Zhuang, Honghao Lv, Zhansheng Li, Yong Wang, Zhiyuan Fang, Jianghua Song and Yangyong Zhang, 2019: Map-based cloning and characterization of BoCCD4, a gene responsible for white/yellow petal color in *B. oleracea* BMC Genomics. 20:242

Fujime, Y., 1983: Studies on Thermal Conditions of Curd Formation and Development in Cauliflower and Broccoli, with Special Reference to Abnormal Curd Development. Memoires of Faculty of Agriculture, Kagawa University, No. 40, February 1983, pp. 1-123, JP.

Gray, A.R., 1989: Taxonomy and Evolution of Broccoli and Cauliflower. Baileya 23 (1), pp. 28-46.

Nieuwhof, M., 1969: Cole Crops. World Crops Books: Leonard Hill, London, GB.

Sadik, S., 1962: Morphology of the curd of cauliflower. Amer. Bot. 49, pp. 290-297.

Tsunoda, S., Hinata, K., and Gomez-Campo, C., 1980: Brassica Crops and Wild Allies. Biology and Breeding, Japan Scientific Societies Press, Tokyo, JP.

Wiebe, H.J., 1972/73: Wirkung von Temperatur und Licht auf Wachstum und Entwicklung von Blumenkohl. Gartenbauwissenschaft 37, pp. 165-178, 37, pp. 293-303, 37, pp. 455-469, 38, pp. 263-279, 38, pp. 433-440.

Wiebe, H.J., 1975: The Morphological development of cauliflower and broccoli cultivars depending on temperature. Sci. Hort. 3, pp. 95-101.

Wiebe, H.J., 1981: Influence of transplant characteristics and growing conditions on curd size (buttoning) of cauliflower. Acta Hort. 122, pp. 99-105.

# 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 Botanical Name | | | *Brassica oleracea* L*.* convar. *botrytis* (L.)Alef*.* var. *botrytis* L. | | | | | |  | |
|  | | |  | | | | | |  | |
| 1.2 Common Name | | | Cauliflower | | | | | |  | |
|  | | |  | | | | | |  | |
|  | | |  | | | | | |  | |
| 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 | | |  | | | | | |  | |
|  | | |  | | | | | |  | |
| [[6]](#footnote-6)#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 Other [ ]  (please provide details) | | | | | | | | | | |
| 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)** | Seedling: anthocyanin coloration of hypocotyl | | | | | |  | | |  |
|  | absent | | | | | | Brio | | | 1[ ] |
|  | present | | | | | | Ciren, Dominant | | | 9[ ] |
| **5.2 (10)** | Leaf: intensity of color (with wax if present) | | | | | |  | | |  |
|  | light | | | | | | Baltimore, Ciren | | | 3[ ] |
|  | medium | | | | | | Barrier Reef, Belot, Calisa | | | 5[ ] |
|  | dark | | | | | | Arbon, Lecerf | | | 7[ ] |
| **5.3 (21)** | Curd: color | | | | | |  | | |  |
|  | whitish | | | | | | Astell, Iceberg | | | 1[ ] |
|  | yellow | | | | | | Di Jesi | | | 2[ ] |
|  | orange | | | | | | Cheddar, Sunset | | | 3[ ] |
|  | green | | | | | | Alverda, Amfora, Minaret | | | 4[ ] |
|  | violet | | | | | | Graffiti | | | 5[ ] |
| **5.4 (25)** | Flower: color | | | | | |  | | |  |
|  | white | | | | | | Bruce, Ecrin | | | 1[ ] |
|  | yellow | | | | | | Flora Blanca, Lecerf | | | 2[ ] |
|  | Characteristics | | | | | | Example Varieties | | | Note |
| **5.5 (26)** | Earliness in spring planting | | | | | |  | | |  |
|  | very early | | | | | |  | | | 1[ ] |
|  | very early to early | | | | | |  | | | 2[ ] |
|  | early | | | | | |  | | | 3[ ] |
|  | early to medium | | | | | |  | | | 4[ ] |
|  | medium | | | | | |  | | | 5[ ] |
|  | medium to late | | | | | |  | | | 6[ ] |
|  | late | | | | | |  | | | 7[ ] |
|  | late to very late | | | | | |  | | | 8[ ] |
|  | very late | | | | | |  | | | 9[ ] |
|  | Characteristics | | | | | | Example Varieties | | | Note |
| **5.6 (27)** | Earliness in summer planting | | | | | |  | | |  |
|  | very early autumn type | | | | | |  | | | 1[ ] |
|  | very early to early autumn type | | | | | |  | | | 2[ ] |
|  | early autumn type | | | | | |  | | | 3[ ] |
|  | early to medium autumn type | | | | | |  | | | 4[ ] |
|  | medium autumn type | | | | | |  | | | 5[ ] |
|  | medium to late autumn type | | | | | |  | | | 6[ ] |
|  | late autumn type | | | | | |  | | | 7[ ] |
|  | late to very late autumn type | | | | | |  | | | 8[ ] |
|  | very late autumn type | | | | | |  | | | 9[ ] |
|  | very early winter type | | | | | |  | | | 10[ ] |
|  | very early to early winter type | | | | | |  | | | 11[ ] |
|  | early winter type | | | | | |  | | | 12[ ] |
|  | early to medium winter type | | | | | |  | | | 13[ ] |
|  | medium winter type | | | | | |  | | | 14[ ] |
|  | medium to late winter type | | | | | |  | | | 15[ ] |
|  | late winter type | | | | | |  | | | 16[ ] |
|  | late to very late winter type | | | | | |  | | | 17[ ] |
|  | very late winter type | | | | | |  | | | 18[ ] |
| **5.7 (28)** | **Male sterility** | | | | | |  | | |  |
|  | absent | | | | | | Alpha 2, Flora Blanca | | | 1[ ] |
|  | partially present | | | | | | Dunvez, Odegwen | | | 2[ ] |
|  | totally present | | | | | | Aviron, Bodilis | | | 3[ ] |
|  | Characteristics | | | | | | Example Varieties | | | Note |
| **5.8 (29)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 0** | | | | | |  | | |  |
|  | absent | | | | | | Freedom | | | |  | | --- | | 1 [   ] | |
|  | present | | | | | | Clapton | | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | | |  | | | [   ] |
| **5.9 (30)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 1** | | | | | |  | | |  |
|  | absent | | | | | | Freedom | | | |  | | --- | | 1 [   ] | |
|  | present | | | | | | Clapton | | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | | |  | | | [   ] |
| **5.10 (31)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 2** | | | | | |  | | |  |
|  | absent | | | | | | Clapton, Freedom | | | |  | | --- | | 1 [   ] | |
|  | present | | | | | |  | | | |  | | --- | | 9 [   ] | |
|  | not tested | | | | | |  | | | [   ] |
| **5.11 (32)** | **Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 3** | | | | | |  | | |  |
|  | absent | | | | | | Freedom | | | |  | | --- | | 1 [   ] | |
|  | present | | | | | | Clapton | | | |  | | --- | | 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* | | *Curd: color* | | | *yellow* | | | *orange* | | |
|  | |  | | |  | | |  | | |
|  | |  | | |  | | |  | | |
|  | |  | | |  | | |  | | |
| Comments: | | | | | | | | | | |
| [[7]](#footnote-7)#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. Method of propagation of the variety:  (i) seed-propagated [ ]  (ii) vegetatively propagated [ ]    In case of varieties with note 2 (“partially present”), please indicate:  7.3.2. Parental background of hybrids:  (i) seed-propagated parents [ ]  (ii) one or more vegetatively propagated parents [ ] | | | | | | | | | | |
| 8. Authorization for release  (a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?  Yes [ ] No [ ]  (b) Has such authorization been obtained?  Yes [ ] No [ ]  If the answer to (b) is yes, please attach a copy of the authorization. | | | | | | | | | | |
| 9. Information on plant material to be examined or submitted for examination  9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.  9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:  (a) Microorganisms (e.g. virus, bacteria, phytoplasma) Yes [ ] No [ ]  (b) Chemical treatment (e.g. growth retardant, pesticide) Yes [ ] No [ ]  (c) Tissue culture Yes [ ] No [ ]  (d) Other factors Yes [ ] No [ ]  Please provide details for where you have indicated “yes”.  …………………………………………………………… | | | | | | | | | | |
| 10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:  Applicant’s name  Signature Date | | | | | | | | | | |

[End of document]

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)
6. # Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire. [↑](#footnote-ref-6)
7. # Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire. [↑](#footnote-ref-7)