



INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

CABBAGE

(*Brassica oleracea* L.:
Brassica (White Cabbage Group);
Brassica (Savoy Cabbage Group);
Brassica (Red Cabbage Group))

*

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 session¹, presented in grey highlight:

- (a) Addition of characteristics “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3” at the end of the Table of Characteristics;
- (b) Addition of explanation “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3”;
- (c) Addition of characteristics “Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3” to TQ 5. with option “not tested”.

* 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.]

¹ held by electronic means, from May 5 to 8, 2025.

Alternative Names:*

<i>Latin</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Brassica</i> (White Cabbage Group)	Cabbage, White Cabbage	Chou cabus	Weißkohl	Col repollo lisa
<i>Brassica</i> (Savoy cabbage Group)	Savoy Cabbage	Chou de Milan	Wirsing	Col de Milan
<i>Brassica</i> (Red Cabbage Group)	Red Cabbage	Chou rouge	Rotkohl	Lomba

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.

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Brassica oleracea* L.: *Brassica* (White Cabbage Group) {formerly *Brassica oleracea* var. *alba* DC.}; *Brassica* (Savoy Cabbage Group) {formerly *Brassica oleracea* var. *sabauda* DC.}; and *Brassica* (Red Cabbage Group) {formerly *Brassica oleracea* var. *rubra* DC.}; including all hybrids between *Brassica oleracea* var. *alba* DC., *Brassica oleracea* var. *sabauda* DC. and *Brassica oleracea* var. *rubra* DC., as these hybrids are now included in *Brassica* (White Cabbage Group), *Brassica* (Savoy Cabbage Group) and *Brassica* (Red Cabbage Group).

2. Material Required

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

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

3. 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.

4. Assessment of Distinctness, Uniformity and Stability

4.1 *Distinctness*

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.1.2 Consistent Differences

The 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.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness 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:

- (a) Outer leaf: color (with wax) (characteristic 11)
- (b) Head: shape in longitudinal section (characteristic 17)
- (c) Head: diameter (characteristic 20)
- (d) Head: density (characteristic 30)
- (e) Time of harvest maturity (characteristic 33)

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

6. Introduction to the Table of Characteristics

6.1 *Categories of Characteristics*

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 *States of Expression and Corresponding Notes*

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*

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

6.4.2 Example varieties are followed by an indication of the botanical types to which they belong. Thus, White cabbage types are indicated by (W), Red cabbage types indicated by (R), and Savoy cabbage types indicated by (S).

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

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

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1.1	VG	<u>White cabbage</u>	<u>Variétés de chou</u>	<u>Nur Weißkohl-</u>	<u>Solo variedades</u>	
(*)		<u>varieties only:</u> Plant: height	<u>cabus seulement:</u> Plante: hauteur	<u>sorten: Pflanze: Höhe</u>	<u>de col repollo</u>	
					<u>lisa: Planta: altura</u>	
QN	very short	très basse	sehr niedrig	muy baja		1
	short	basse	niedrig	baja	Gouden Akker (W), Minicole (W)	3
	medium	moyenne	mittel	media	Marnier Lagerweiss (W), Strukton (W)	5
	tall	haute	hoch	alta	Amager hochstrunkig (W), Thurner (W), Zerlina (W)	7
	very tall	très haute	sehr hoch	muy alta	Filderkraut (W)	9
1.2	VG	<u>Red cabbage varieties</u>	<u>Variétés de chou</u>	<u>Nur Rotkohlsorten:</u>	<u>Solo variedades</u>	
(*)		<u>only:</u> Plant: height	<u>rouge seulement:</u> Plante: hauteur	<u>Pflanze: Höhe</u>	<u>de lombarda:</u>	
					<u>Planta: altura</u>	
QN	very short	très basse	sehr niedrig	muy baja	Langedijker Allervroegste (R), Primero (R)	1
	short	basse	niedrig	baja	Marnier Frührotkohl (R), Ruby Ball (R)	3
	medium	moyenne	mittel	media	Allrot (R), Roxy (R)	5
	tall	haute	hoch	alta	Langedijker Bewaar 3 (R), Langedijker Herfst (R), Rovita (R)	7
	very tall	très haute	sehr hoch	muy alta		9
1.3	VG	<u>Savoy cabbage</u>	<u>Variétés de chou de</u>	<u>Nur Wirsingsorten:</u>	<u>Solo variedades</u>	
(*)		<u>varieties only:</u> Plant: height	<u>Milan seulement:</u> Plante: hauteur	<u>Pflanze: Höhe</u>	<u>de col de Milán:</u>	
					<u>Planta: altura</u>	
QN	very short	très basse	sehr niedrig	muy baja		1
	short	basse	niedrig	baja	Fitis (S), Vorbote 2 (S)	3
	medium	moyenne	mittel	media	Marnier Grünkopf (S)	5
	tall	haute	hoch	alta	Hammer (S), Roi de l'hiver 2 (S)	7
	very tall	très haute	sehr hoch	muy alta	Bloemendaalse Gele (S)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
2.1	VG	<u>White cabbage varieties only:</u> Plant: maximum diameter (including outer leaves)	<u>Variétés de chou cabus seulement:</u> Plante: diamètre maximal (y compris les feuilles externes)	<u>Nur Weißkohl-sorten:</u> Pflanze: maximaler Durchmesser (einschließlich Umblätter)	<u>Solo variedades de col repollo lisa:</u> Planta: diámetro máximo (incluidas las hojas exteriores)	
QN	small	petit	klein	pequeño	Wiam (W), Minicole (W)	3
	medium	moyen	mittel	medio	Marner Augustkohl (W), Minicole (W)	5
	large	grand	groß	grande	Roem van Enkhuizen 2 (W), Robuster (W)	7
2.2	VG	<u>Red cabbage varieties only:</u> Plant: maximum diameter (as for 2.1)	<u>Variétés de chou rouge seulement:</u> Plante: diamètre maximal (comme pour 2.1)	<u>Nur Rotkohlsorten:</u> Pflanze: maximaler Durchmesser (wie unter 2.1)	<u>Solo variedades de lombarda:</u> Planta: diámetro máximo (como para 2.1)	
QN	small	petit	klein	pequeño	Frührot (R), Primero (R)	3
	medium	moyen	mittel	medio	Allrot (R), Ruby Ball (R)	5
	large	grand	groß	grande	Marner Septemberrot (R), Rovita (R)	7
2.3	VG	<u>Savoy cabbage varieties only:</u> Plant: maximum diameter (as for 2.1)	<u>Variétés de chou de Milan seulement:</u> Plante: diamètre maximal (comme pour 2.1)	<u>Nur Wirsingsorten:</u> Pflanze: maximaler Durchmesser (wie unter 2.1)	<u>Solo variedades de col de Milán:</u> Planta: diámetro máximo (como para 2.1)	
QN	small	petit	klein	pequeño	Vorbote 2 (S)	3
	medium	moyen	mittel	medio	Marner Grünkopf (S)	5
	large	grand	groß	grande	Hammer (S)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
3.	VG/ Plant: length of outer MS stem	Plante: longueur du pied	Pflanze: Länge des Außenstrunks	Planta: longitud del tallo externo		
QN	short	court	kurz	corta	Braunsweiger (W), Minicole (W); Vorox (R); Spivoy (S)	3
	medium	moyen	mittel	media	Bartolo (W), September (W); Langedijker Bewaar (R); Belvoy (S)	5
	long	long	lang	larga	Amager hochstrunkig (W), Robuster (W); Pampa (S)	7
4.	VG Plant: attitude of outer leaves (*)	Plante: port des feuilles externes	Pflanze: Stellung der Umblätter	Planta: porte de las hojas externas		
QN	erect	dressé	aufrecht	erecto	Filderkraut (W), Slawdena (W)	1
	semi-erect	demi-dressé	halbaufrecht	semierecto	Braunschweiger (W)	3
	prostrate	étalé	liegend	postrado	Christmas Drumhead (W), Spring Hero (W)	5
5.1	VG <u>White cabbage varieties only</u>: Outer leaf: size (*)	<u>Variétés de chou cabus seulement</u>: Feuille externe: taille	<u>Nur Weißkohl-sorten</u>: Umblatt: Größe	<u>Solo variedades de col repollo lisa</u>: Hoja externa: tamaño		
QN	small	petite	klein	pequeña	Golden Cross (W)	3
	medium	moyenne	mittel	mediana	Braunschweiger (W), Märner Lagerweiss (W), Atria (W)	5
	large	grande	groß	grande	Turner (W), Robustor (W)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
5.2	VG	<u>Red cabbage varieties only</u>: Outer leaf: size	<u>Variétés de chou rouge seulement</u>: Feuille externe: taille	<u>Nur Rotkohlsorten</u>: Umblatt: Größe	<u>Solo variedades de lombarda</u>: Hoja externa: tamaño	
QN	small	petite	klein	pequeña	Langedijker Allervroegste (R), Primero (R)	3
	medium	moyenne	mittel	mediana	Langedijker Vroege (R), Ruby Ball (R)	5
	large	grande	groß	grande	Marner Lagerrot (R), Langedijker Herfst (R), Rovita (R)	7
5.3	VG	<u>Savoy cabbage varieties only</u>: Outer leaf: size	<u>Variétés de chou de Milan seulement</u>: Feuille externe: taille	<u>Nur Wirsingsorten</u>: Umblatt: Größe	<u>Solo variedades de col de Milán</u>: Hoja externa: tamaño	
QN	small	petite	klein	pequeña	Promasa (S)	3
	medium	moyenne	mittel	mediana	Belvoy (S)	5
	large	grande	groß	grande	Vertus 3 (S)	7
6.	VG	Outer leaf: shape of blade	Feuille externe: forme du limbe	Umblatt: Form der Spreite	Hoja externa: forma del limbo	
(+)						
PQ	elliptic	elliptique	elliptisch	elíptica	Filderkraut (W)	1
	broad ovate	ovale large	breit eiförmig	ovalada ancha	September (W)	2
	circular	arrondi	kreisförmig	redonda	Wiam (W)	3
	transverse broad elliptic	elliptique transverse large	quer breit elliptisch	elíptica transversal ancha	Rookie (R)	4
	obovate	obovale	verkehrt eiförmig	obovada	Marksman (W)	5
7.	VG	Outer leaf: profile of upper side of blade	Feuille externe: profil de la face supérieure du limbe	Umblatt: Profil der Spreitenoberseite	Hoja externa: perfil del haz del limbo	
QN	concave	concave	konkav	cóncavo	Slawdena (W); Celsa (S)	1
	plane	plan	eben	plano	Golden Cross (W); Allrot (R)	2
	convex	convexe	konvex	convexo	Comparsa (S)	3

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
8.1	VG	<u>White and Red</u>	<u>Variétés de chou</u>	<u>Nur Weiß- und</u>	<u>Solo variedades</u>	
(*)	<u>cabbage varieties</u>	<u>cabus et de chou</u>	<u>Rotkohlsorten:</u>	<u>de col repollo lisa</u>		
	<u>only: Outer leaf:</u>	<u>rouge seulement:</u>	<u>Umblatt: Stärke der</u>	<u>y lombarda:</u>		
	<u>degree of blistering</u>	<u>Feuille externe:</u>	<u>Blasigkeit</u>	<u>Hoja externa:</u>		
		<u>degré de cloûre</u>		<u>intensidad del</u>		
				<u>abullonado</u>		
QN	absent or very weak	nul ou très faible	fehlend oder sehr gering	ausente o muy débil	Slawdena (W); Rookie (R)	1
	moderate	moyen	mittel	moderado	Fieldrocket (W); Langedijker Herfst (R)	2
	strong	fort	stark	fuerte	Roem van Enkhuizen 3 (W); Kissendrup (R)	3
8.2	VG	<u>Savoy cabbage</u>	<u>Variétés de chou de</u>	<u>Nur Wirsingsorten:</u>	<u>Solo variedades</u>	
(*)	<u>varieties only: Outer</u>	<u>Milan seulement:</u>	<u>Umblatt: Stärke der</u>	<u>de col de Milán:</u>		
	<u>leaf: degree of</u>	<u>Feuille externe:</u>	<u>Blasigkeit</u>	<u>Hoja externa:</u>		
	<u>blistering</u>	<u>degré de cloûre</u>		<u>intensidad del</u>		
				<u>abullonado</u>		
QN	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	De Pointoise 2 (S)	1
	weak	faible	gering	débil	Celsa (S)	3
	medium	moyenne	mittel	medio	Savoy King (S)	5
	strong	forte	stark	fuerte	Hammer (S)	7
	very strong	très forte	sehr stark	muy fuerte	Novusa (S), Roi de l'hiver 2 (S)	9
9.1	VG	<u>White and red</u>	<u>Variétés de chou</u>	<u>Nur Weißkohl- und</u>	<u>Solo variedades</u>	
(*)	<u>cabbage varieties</u>	<u>cabus et chou rouge</u>	<u>Rotkohlsorten:</u>	<u>de col repollo lisa</u>		
	<u>only: Outer leaf: size</u>	<u>seulement: Feuille</u>	<u>Umblatt: Größe der</u>	<u>y lombarda:</u>		
	<u>of blisters</u>	<u>externe: taille des</u>	<u>Blasen</u>	<u>Hoja externa:</u>		
		<u>cloûres</u>		<u>tamaño de las</u>		
				<u>vejigas</u>		
QN	small	petites	klein	pequeñas	Hispi (W); Allrot (R)	3
	medium	moyennes	mittel	medias	Roem van Enkhuizen 2 (W); Kissendrup (R)	5
	large	grandes	groß	grandes	Jason (W)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
9.2	VG	<u>Savoy cabbage varieties only</u>: Outer leaf: size of blisters	<u>Variétés de chou de Milan seulement</u>: Feuille externe: taille des cloûres	<u>Nur Wirsingsorten</u>: Umblatt: Größe der Blasen	<u>Solo variedades de col de Milán</u>: Hoja externa: tamaño de las vejigas	
Q	small	petites	klein	pequeñas	Roi de l'hiver 2 (S)	3
	medium	moyennes	mittel	medias	Hammer (S)	5
	large	grandes	groß	grandes	Vertus 2 (S)	7
10.	VG	<u>Savoy cabbage varieties only</u>: Outer leaf: crimping	<u>Variétés de chou de Milan seulement</u>: Feuille externe: frisure	<u>Nur Wirsingsorten</u>: Umblatt: Kräuselung	<u>Solo variedades de col de Milán</u>: Hoja externa: ondulado	
(*)	weak	faible	gering	débil	Dauerwirsing (S)	3
(+)	medium	moyenne	mittel	medio	Savoy King (S)	5
	strong	forte	stark	fuerte	Hammer (S)	7
11.	VG	Outer leaf: color (with wax)	Feuille externe: couleur (avec pruine)	Umblatt: Farbe (mit Wachsschicht)	Hoja externa: color (con pruina)	
(*)						
(+)						
P	yellow green	vert-jaune	gelbgrün	verde amarillento	April (W)	1
Q	green	verte	grün	verde	Hammer (S)	2
	grey green	vert-gris	graugrün	verde grisáceo	Bison (W), Gloria (W); Roi de l'hiver 2 (S)	3
	blue green	vert-bleu	blaugrün	verde azulado	Market Pride (W)	4
	violet	violette	violett	violeta	Langedijker Bewaar 2 (R)	5
12.	VG	Outer leaf: intensity of color	Feuille externe: intensité de la couleur	Umblatt: Intensität der Farbe	Hoja externa: intensidad del color	
Q	light	claire	hell	claro	Gouden Akker (W); Rebus (R); Bloemendaalse Gele (S)	3
	medium	moyenne	mittel	medio	Cabri (W); Redsky (R); Kilosa (S)	5
	dark	foncée	dunkel	oscuro	Excel (W); Integro (R); Norma (S)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
13. VG	<u>Red cabbage varieties only: Outer leaf: green flush</u>	<u>Variétés de chou rouge seulement: Feuille externe: teinte verte diffuse</u>	<u>Nur Rotkohlsorten: Umblatt: grüner Anflug</u>	<u>Solo variedades de lombarda: Hoja externa: traza verde</u>		
QL	absent	absente	fehlend	ausente	Kissendrup (R), Autoro (R)	1
	present	présente	vorhanden	presente	Roxy (R), Kempero (R)	9
14. VG	Outer leaf: waxiness	Feuille externe: pruine	Umblatt: Wachsschicht	Hoja externa: pruina		
QN	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	First of June (W)	1
	weak	faible	gering	débil	Derby Day (W), Octoking (W)	3
	medium	moyenne	mittel	media	Wiam (W); Celtic (S)	5
	strong	forte	stark	fuerte	Turner (W), Bison (W)	7
	very strong	très forte	sehr stark	muy fuerte	Rivera (W); Indaro (R)	9
15. VG	Outer leaf: undulation of margin	Feuille externe: ondulation du bord	Umblatt: Wellung des Randes	Hoja externa: ondulación del borde		
QN	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Minicole (W)	1
	weak	faible	gering	débil	Holsteiner platter (W)	3
	medium	moyenne	mittel	media	Saturn (W); Dacato (S)	5
	strong	forte	stark	fuerte	Snovoy (S)	7
	very strong	très forte	sehr stark	muy fuerte	Roxy (R)	9
16. VG	Outer leaf: reflexion of margin	Feuille externe: réflexion du bord du limbe	Umblatt: Biegung des Randes	Hoja externa: curvado del margen		
QL	absent	absente	fehlend	ausente	Slawdena (W)	1
	present	présente	vorhanden	presente	Rinda (W)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
17. (*)(+)	VG Head: shape in longitudinal section	Pomme: forme en section longitudinale	Kopf: Form im Längsschnitt	Repollo: forma en sección longitudinal		
PQ	transverse narrow elliptic	elliptique transverse étroite	quer schmal elliptisch	elíptica transversal estrecha	Braunschweiger (W)	1
	transverse elliptic	arrondie aplatie	quer elliptisch	elíptica transversal	Centurion (W), Conquistador (W); De Pointoise 2 (S)	2
	circular	circulaire	kreisförmig	circular	Octoking (W), Roem van Enkhuizen 2 (W)	3
	broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Langedijker Herfst (R)	4
	broad obovate	obovale large	breit verkehrt eiförmig	obovada ancha	Langedijker Bewaar (W)	5
	broad ovate	ovale large	breit eiförmig	ovalada ancha	Cape Horn (W)	6
	angular ovate	ovale à sommet pointu	spitz eiförmig	ovalada aguda	Filderkraut (W), Hispi (W)	7
18. (+)	VG Head: shape of base in longitudinal section	Pomme: forme de la base en section longitudinale	Kopf: Form der Basis im Längsschnitt	Repollo: forma de la base en sección longitudinal		
PQ	rounded	arrondie	abgerundet	redondeada		1
	flat	plane	gerade	plana		2
	arched	arquée	eingesenkt	arqueada		3
19. (*)(+)	VG/MS Head: length	Pomme: longueur	Kopf: Länge	Repollo: longitud		
QN	short	courte	kurz	corto	Marner Allfrüh (W); Vorbote 2 (S)	3
	medium	moyenne	mittel	medio	Belvoy (S), Pampa (S)	5
	long	longue	lang	larga	Offenham 3 (W)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
20. VG/ MS (*)	Head: diameter	Pomme: diamètre	Kopf: Durchmesser	Repollo: diámetro		
QN	small	petit	klein	pequeño	Marner Allfrüh (W); Vorbote 2 (S)	3
	medium	moyen	mittel	medio	Celsa (S), Pampa (S)	5
	large	grand	groß	grande	Braunschweiger (W), Quintal d'Alsace (W)	7
21. VG	Head: position of maximum diameter	Pomme: position du diamètre maximal	Kopf: Position des maximalen Durchmessers	Repollo: posición del diámetro máximo		
QN	towards top	vers le sommet	zur Spitze hin	hacia la parte superior	Slawdena (W)	1
	at middle	au milieu	in der Mitte	en el medio	Derby Day (W), Gouden Akker (W)	2
	towards base	vers la base	zur Basis hin	hacia la base	Hispi (W)	3
22. VG (+)	Head: cover	Pomme: couverture	Kopf: Schluss	Repollo: cobertura		
QN	not covered	pas couverte	nicht gedeckt	no cubierto	Late Putjes (S)	1
	partially covered	partiellement couverte	teilweise gedeckt	parcialmente cubierto	Holsteiner platter (W)	2
	covered	couverte	gedeckt	cubierto	Langedijker Bewaar 2 (R)	3
23. VG (*)	<u>Savoy cabbage varieties only:</u> Head: blistering of cover leaf	<u>Variétés de chou de Milan seulement:</u> Pomme: cloqûre de la feuille de couverture	<u>Nur Wirsingsorten:</u> Kopf: Blasigkeit des Deckblattes	<u>Solo variedades de col de Milán:</u> Repollo: abullonado de la hoja de cobertura		
QN	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	De Pointoise 2 (S)	1
	weak	faible	gering	débil	Celtic (S)	3
	medium	moyenne	mittel	medio	Julius (S)	5
	strong	forte	stark	fuerte	Hammer (S)	7
	very strong	très forte	sehr stark	muy fuerte	Roi de l'hiver 2 (S)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
24. VG	Head: reflexion of margin of cover leaf	Pomme: courbure du bord de la feuille de couverture	Kopf: Randbiegung des Deckblattes	Repollo: concavidad de la hoja de cobertura		
QL	absent	absente	fehlend	ausente	Morgan (W), Apex (W)	1
	present	présente	vorhanden	presente	Orbit (W)	9
25. VG (*) (+)	Head: color of cover leaf	Pomme: couleur de la feuille de couverture	Kopf: Farbe des Deckblattes	Repollo: color de la hoja de cobertura		
PQ	yellow green	vert-jaune	gelbgrün	verde amarillento	April (W), Octoking (W)	1
	green	verte	grün	verde	Hammer (S)	2
	grey green	vert-gris	graugrün	verde grisáceo	Roi de l'hiver 2 (S)	3
	blue green	vert-bleu	blaugrün	verde azulado		4
	violet	violette	violett	violeta	Kissendrup (R)	5
26. VG	Head: intensity of color of cover leaf	Pomme: intensité de la couleur de la feuille de couverture	Kopf: Intensität der Farbe des Deckblattes	Repollo: intensidad del color de la hoja de cobertura		
QN	light	claire	hell	claro		3
	medium	moyenne	mittel	medio		5
	dark	foncée	dunkel	oscuro		7
27. VG	<u>White cabbage and Savoy cabbage varieties only:</u> Head: anthocyanin coloration of cover leaf	<u>Variétés de chou cabus et chou de Milan seulement:</u> Pomme: pigmentation anthocyanique de la feuille de couverture	<u>Nur Weißkohl- und Wirsingsorten:</u> Kopf: Anthocyanfärbung des Deckblattes	<u>Solo variedades de col repollo lisa y col de Milán:</u> Repollo: pigmentación antociánica de la hoja de cobertura		
QN	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Hammer (S)	1
	weak	faible	gering	débil	Slawdena (W)	3
	medium	moyenne	mittel	media	De Pointoise 2 (S)	5
	strong	forte	stark	fuerte	Marabel (S)	7
	very strong	très forte	sehr stark	muy fuerte		9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
28. VG (*)	Head: internal color	Pomme: couleur interne	Kopf: Innenfarbe	Repollo: color interno		
PQ	whitish	blanchâtre	weißlich	blanquecino	Slawdena (W)	1
	yellowish	jaunâtre	gelblich	amarillento	Langedijker Bewaargele (S)	2
	greenish	verdâtre	grünlich	verdoso		3
	violet	violette	violett	violeta	Langedijker Herfst (R)	4
29. VG	<u>Red Cabbage varieties only:</u> Head: intensity of internal color	<u>Variétés de chou rouge seulement:</u> Pomme: intensité de la couleur interne	<u>Nur Rotkohlsorten:</u> Kopf: Intensität der Innenfarbe	<u>Solo variedades de lombarda:</u> Repollo: intensidad del color interno		
QN	light	claire	hell	claro		3
	medium	moyenne	mittel	medio		5
	dark	foncée	dunkel	oscuro		7
30. VG (*) (+)	Head: density	Pomme: densité	Kopf: Dichte	Repollo: densidad		
QN	very loose	très lâche	sehr locker	muy laxo	Mignon (W)	1
	loose	lâche	locker	laxo	Hornspi (W)	3
	medium	moyenne	mittel	medio	Dacato (S), Spivoy (S)	5
	dense	dense	dicht	denso	Pampa (S)	7
	very dense	très dense	sehr dicht	muy denso	Slawdena (W)	9
31. VG (+)	Head: internal structure	Pomme: structure interne	Kopf: Innenstruktur	Repollo: estructura interna		
QN	fine	fine	fein	fina	Slawdena (W), Quintal d'Alsace (W)	3
	medium	moyenne	mittel	media	Langedijker Herfst (R)	5
	coarse	grossière	grob	rugosa	Roem van Enkhuizen 2 (W), Filderkraut (W)	7

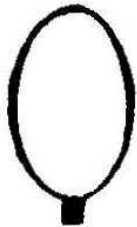
	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
32. (*)(+)	VG Head: relative length of interior stem compared to length of head	Pomme: longueur du trognon par rapport à la longueur de la pomme	Kopf: Länge des Innenstrunkes im Verhältnis zur Länge des Kopfes	Repollo: longitud del tallo interno en relación con la longitud del repollo		
QN	short	court	kurz	corta	Erdeno (W)	3
	medium	moyen	mittel	media	Slawdena (W)	5
	long	long	lang	larga	Braunschweiger (W); Belvoy (S)	7
33.1 (*)	VG <u>White cabbage varieties only</u>: Time of harvest maturity	<u>Variétés de chou cabus seulement</u>: Époque de maturité de récolte	<u>Nur Weißkohl-sorten</u>: Zeitpunkt der Erntereife	<u>Solo variedades de col repollo lisa</u>: Época de madurez para la cosecha		
QN	very early	très précoce	sehr früh	muy temprana	Golden Cross (W)	1
	early	précoce	früh	temprana	Green Express (W), Hijula (W)	3
	medium	moyenne	mittel	media	Roem van Enkhuizen 2 (W)	5
	late	tardive	spät	tardía	Holsteiner platter (W), Märner Lagerweiss (W), Strukton (W)	7
	very late	très tardive	sehr spät	muy tardía	Bartolo (W)	9
33.2 (*)	VG <u>Red cabbage varieties only</u>: Time of harvest maturity	<u>Variétés de chou rouge seulement</u>: Époque de maturité de récolte	<u>Nur Rotkohlsorten</u>: Zeitpunkt der Erntereife	<u>Solo variedades de lombarda</u>: Época de madurez para la cosecha		
QN	early	précoce	früh	temprana	Langedijker Vroege (R), Normiro (R), Ruby Ball (R)	3
	medium	moyenne	mittel	media	Langedijker Herfst (R), Märner Septemberrot (R), Autoro (R)	5
	late	tardive	spät	tardía	Langedijker Bewaar 2 (R), Märner Lagerrot (R), Huzaro (R)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
33.3	VG	<u>Savoy cabbage</u>	<u>Variétés de chou de</u>	<u>Nur Wirsingsorten:</u>	<u>Solo variedades</u>	
(*)	<u>varieties only: Time of</u>	<u>Milan seulement:</u>	<u>Zeitpunkt der</u>	<u>de col de Milán:</u>	<u>de col de Milán:</u>	
	harvest maturity	Époque de maturité	Erntereife	madurez para la	cosecha	
QN	very early	très précoce	sehr früh	muy temprana	Spivoy (S)	1
	early	précoce	früh	temprana	Walasa (S)	3
	medium	moyenne	mittel	media	Belvoy (S)	5
	late	tardive	spät	tardía	Hammer (S)	7
	very late	très tardive	sehr spät	muy tardía	Alexander's No.1 (S)	9
34.	VG	Time of bursting of	Zeitpunkt des	Época de		
	head after maturity	l'éclatement de la	Platzens des Kopfes	apertura del		
		pomme après	nach der Reife	repollo después		
		maturité		de la madurez		
QN	early	précoce	früh	precoz	Winnigstadt (W); Primero (R); Curosa (S)	3
	medium	moyenne	mittel	media	Excel (W); Pluton (R), Ruby Ball (R); Emerald (S)	5
	late	tardive	spät	tardía	Quisto (W); Induro (R); Ermosa (S)	7
35.	VS/	Stérilité mâle	Männliche Sterilität	Androesterilidad		
(*)	MS					
(+)						
QL	absent	absente	fehlend	ausente	Winnigstadt (W); Pluton (R); Belvoy (S)	1
	present	présente	vorhanden	presente	Unifor (W); Roderick (R); Emerald (S)	9
36.	VS	Résistance à la	Resistenz gegen	Resistencia a la		
(+)	Resistance to race 1 of	race 1 de <i>Fusarium</i>	Pathotyp 1 von	raza 1 del		
	<i>Fusarium oxysporum</i>	<i>oxysporum</i> f. sp.	<i>Fusarium</i>	<i>Fusarium</i>		
	f. sp. <i>conglutinans</i>	<i>conglutinans</i>	<i>oxysporum</i> f. sp.	<i>oxysporum</i> f. sp.		
			<i>conglutinans</i>	<i>conglutinans</i>		
QL	absent	absente	fehlend	ausente	Roem van Enkhuizen 2 (W)	1
	present	présente	vorhanden	presente	Delight YR (W), Gloria (W)	9

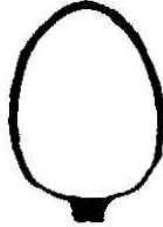
	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
37.	VS	Résistance à	Resistenz gegen	Resistencia a		
(+)	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>		
	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)		
	– Race Pb: 0	– Race Pb: 0	– Pathotyp Pb: 0	– Raza Pb: 0		
QL	absent	absente	fehlend	ausente	Passat	1
	present	présente	vorhanden	presente	Kilaton	9
38.	VS	Résistance à	Resistenz gegen	Resistencia a		
(+)	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>		
	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)		
	– Race Pb: 1	– Race Pb: 1	– Pathotyp Pb: 1	– Raza Pb: 1		
QL	absent	absente	fehlend	ausente	Passat	1
	present	présente	vorhanden	presente	Kilaton	9
39.	VS	Résistance à	Resistenz gegen	Resistencia a		
(+)	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>		
	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)		
	– Race Pb: 2	– Race Pb: 2	– Pathotyp Pb: 2	– Raza Pb: 2		
QL	absent	absente	fehlend	ausente	Kilaton, Passat	1
	present	présente	vorhanden	presente		9
40.	VS	Résistance à	Resistenz gegen	Resistencia a		
(+)	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>	<i>Plasmodiophora</i>		
	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)	<i>brassicae</i> (Pb)		
	– Race Pb: 3	– Race Pb: 3	– Pathotyp Pb: 3	– Raza Pb: 3		
QL	absent	absente	fehlend	ausente	Passat	1
	present	présente	vorhanden	presente	Kilaton	9

8. Explanations on the Table of Characteristics

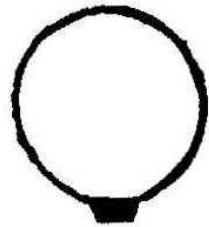
Ad. 6: Outer leaf: shape of blade



1
elliptic



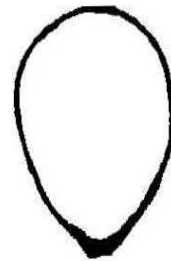
2
broad ovate



3
circular



4
transverse broad elliptic



5
obovate

The leaf should be flattened as much as possible.

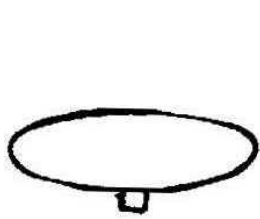
Ad. 10: Savoy cabbage varieties only: Outer leaf: crimping

Crimping is the undulation of the leaf blade tissue between the secondary veins.

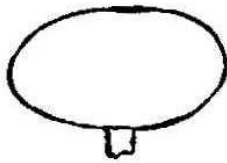
Ad. 11 and 25: Outer leaf: color (with wax); Head: color of cover leaf

States 1 to 4 apply to white and Savoy cabbage only and state 5, violet, is only to be used for Red cabbage varieties.

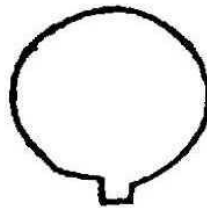
Ad. 17: Head: shape in longitudinal section



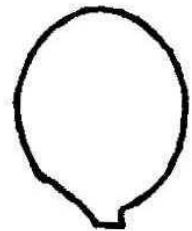
1
transverse
narrow elliptic



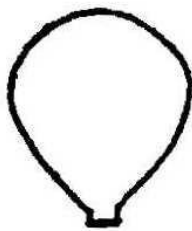
2
transverse elliptic



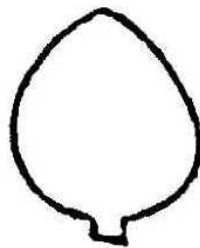
3
circular



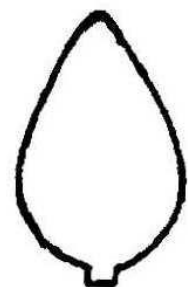
4
broad elliptic



5
broad obovate

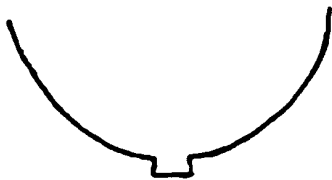


6
broad ovate



7
angular ovate

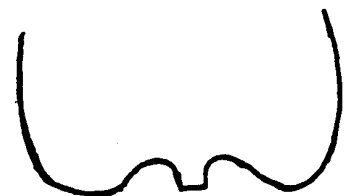
Ad. 18: Head: shape of base in longitudinal section



1
rounded

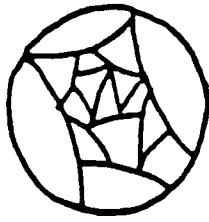


2
flat

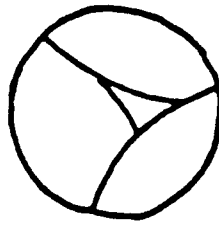


3
arched

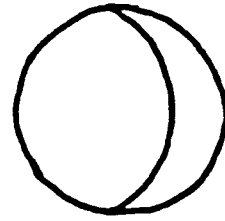
Ad. 22: Head: cover



1
not covered

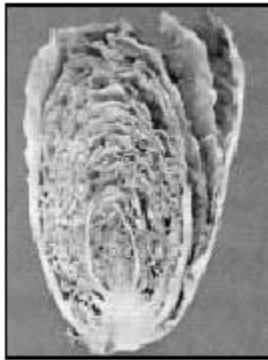


2
partially covered

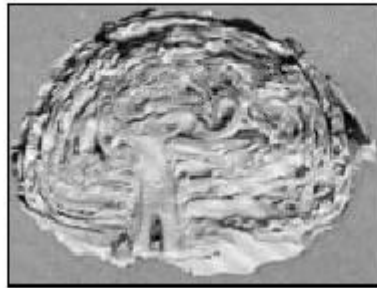


3
covered

Ad. 30: Head: density



1
very loose



3
loose



5
medium



1
dense

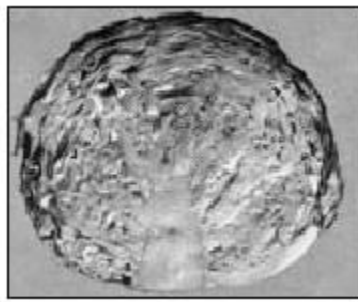


9
very dense

Ad. 31: Head: internal structure



3
fine



5
medium



7
coarse

Ad. 32: Head: relative length of interior stem compared to length of head

short (Note 3) =	relative length of interior stem approximately 1/8 compared to length of head;
medium (Note 5) =	relative length of interior stem approximately 1/4 compared to length of head;
long (Note 7) =	relative length of interior stem approximately 1/2 compared to length of head.

Ad. 35: Male sterility

To be tested in a field trial and/or in a DNA marker test².

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.



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.

² The description of the method to test male sterility for *Brassica* (CMS marker) is covered by a trade secret. The owner of the trade secret, Syngenta Seeds B.V., has given its consent for the use of the CMS marker solely for the purposes of examination of Distinctness, Uniformity and Stability (DUS) and for the development of variety descriptions by UPOV and authorities of UPOV members. Syngenta Seeds B.V. declares that neither UPOV, nor authorities of UPOV members that use the CMS marker for the above purposes will be held accountable for possible (mis)use of the CMS marker by third parties. Please contact Naktuinbouw, Netherlands, to obtain the method and information on the CMS marker for the purposes mentioned above.

Ad. 36: Resistance to race 1 of *Fusarium oxysporum* f. sp. *conglutinans*

Records must be taken under conditions of controlled infection.

Maintenance of races

Maintenance:	agar medium at 20°C
Multiplication:	multiplication by transferring portions of the agar medium to liquid. This broth must be shaken continuously.

Conducting the test

Growth stage of plants:	young plants, approximately two weeks after sowing
Temperature:	approximately 25°C
Light:	normal greenhouse conditions
Growing method:	seed sown in peat soil at temperatures of 12-14°C during day time and 10-12°C during night time
Method of inoculation:	the young plants are lifted out of the soil and their roots soaked for 5 minutes in a suspension of spores and parts of mycelia. The young plants are then replanted.
Duration of test:	
- from sowing to inoculation:	2 weeks
- from inoculation to reading:	the first record of symptoms is made 7 days after inoculation, and the final reading taken 18 days after inoculation
Number of plants tested:	30
Remarks:	The disease might be a quarantine-disease in some countries. Race 1 of <i>Fusarium oxysporum</i> f. sp. <i>conglutinans</i> is common; other races occur only very rarely.

Ad. 37 to 40: Resistance to *Plasmodiophora brassicae* (Pb) – Races 0 to 3

1.	Pathogen	<i>Plasmodiophora brassicae</i>
2.	Quarantine status	no
3.	Host species	<i>Brassica oleracea</i>
4.	Source of inoculum	Naktuinbouw ³ (NL)
5.	Isolate	Race Pb: 0, Pb: 1, Pb: 2 and Pb: 3
6.	Establishment isolate identity	with genetically defined differentials from Naktuinbouw (NL) The most recent table is available through ISF at https://www.worldseed.org/our-work/plant-health/differential-hosts/
7.	Establishment pathogenicity	symptoms on susceptible <i>Brassica oleracea</i> spp.
8.	Multiplication inoculum	
8.1	Multiplication medium	Plant roots
8.2	Multiplication variety	Susceptible variety Bartolo (WC), Granaat (CC) ⁴
8.3	Plant stage at inoculation	Seedling, 1 week after sowing
8.4	Inoculation medium	Water
8.5	Inoculation method	2 ml spore suspension (10 ⁷ 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.

³ Naktuinbouw: resistentie@naktuinbouw.nl

⁴ WC=White cabbage, CC=Chinese cabbage, RC=Red cabbage, CF=Cauliflower

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 blending may cause overheating of the suspension)
10.2	Quantification inoculum	count spores; adjust to 10^7 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.



0 = no galling



1 = a few small galls



2 = moderate galling



2 = slight swelling of the main root, no lateral roots



3 = severe galling

9. Literature

Higgins, J., Sparks, T.H., Evans, J.L. and Law, J.R., 1986: "Crop Identification of Some Brassica oleracea Cultivars," Acta Horticulturae, 182, pp. 285-291

Jensma, J.R., 1956: "Cabbage Varieties," Instituut voor de veredeling van tuinbouwgewassen, Wageningen, NL

Nieuwhof, 1969: "Cole Crops: Botany, Cultivation and Utilization," London, Leonard Hill, GB

Siemonsma and Piluk, 1993: "Plant Resources of South-East Asia 8, Vegetables," Prosea 8

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

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:																												
		Application date: (not to be filled in by the applicant)																												
TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights 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 <table><tr><td>1.1.1</td><td>Latin Name</td><td><i>Brassica</i></td><td></td></tr><tr><td>1.1.2</td><td>Common Name</td><td>WHITE CABBAGE</td><td>[]</td></tr><tr><td>1.2.1</td><td>Latin Name</td><td><i>Brassica</i></td><td></td></tr><tr><td>1.2.2</td><td>Common Name</td><td>SAVOY CABBAGE</td><td>[]</td></tr><tr><td>1.3.1</td><td>Latin Name</td><td><i>Brassica</i></td><td></td></tr><tr><td>1.3.2</td><td>Common Name</td><td>RED CABBAGE</td><td>[]</td></tr><tr><td>1.4.1</td><td colspan="2">Hybrid between the species above (please provide details)</td><td>[]</td></tr></table>			1.1.1	Latin Name	<i>Brassica</i>		1.1.2	Common Name	WHITE CABBAGE	[]	1.2.1	Latin Name	<i>Brassica</i>		1.2.2	Common Name	SAVOY CABBAGE	[]	1.3.1	Latin Name	<i>Brassica</i>		1.3.2	Common Name	RED CABBAGE	[]	1.4.1	Hybrid between the species above (please provide details)		[]
1.1.1	Latin Name	<i>Brassica</i>																												
1.1.2	Common Name	WHITE CABBAGE	[]																											
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1.3.2	Common Name	RED CABBAGE	[]																											
1.4.1	Hybrid between the species above (please provide details)		[]																											
2. Applicant <table><tr><td>Name</td><td> </td></tr><tr><td>Address</td><td> </td></tr><tr><td>Telephone No.</td><td> </td></tr><tr><td>Fax No.</td><td> </td></tr><tr><td>E-mail address</td><td> </td></tr><tr><td>Breeder (if different from applicant)</td><td> </td></tr></table>			Name		Address		Telephone No.		Fax No.		E-mail address		Breeder (if different from applicant)																	
Name																														
Address																														
Telephone No.																														
Fax No.																														
E-mail address																														
Breeder (if different from applicant)																														

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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3. Proposed denomination and breeder's reference

Proposed denomination
(if available)

Breeder's reference

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)

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

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
5.1a <u>White cabbage varieties only:</u> Plant: height (1.1)		
very short		1[]
short	Gouden Akker (W), Minicole (W)	3[]
medium	Marnier Lagerweiss (W), Strukton (W)	5[]
tall	Amager hochstrunkig (W), Thurner (W), Zerlina (W)	7[]
very tall	Filderkraut (W)	9[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note	
5.1b (1.2) <u>Red cabbage varieties only:</u> Plant: height			
very short	Langedijker Allervroegste (R), Primero (R)	1[]	
short	Marner Frührotkohl (R), Ruby Ball (R)	3[]	
medium	Allrot (R), Roxy (R)	5[]	
tall	Langedijker Bewaar 3 (R), Langedijker Herfst (R), Rovita (R)	7[]	
very tall		9[]	
5.1c (1.3) <u>Savoy cabbage varieties only:</u> Plant: height			
very short		1[]	
short	Fitis (S), Vorbote 2 (S)	3[]	
medium	Marner Grünkopf (S)	5[]	
tall	Hammer (S), Roi de l'hiver 2 (S)	7[]	
very tall	Bloemendaalse Gele (S)	9[]	
5.2a (5.1) <u>White cabbage varieties only:</u> Outer leaf: size			
small	Golden Cross (W)	3[]	
medium	Braunschweiger (W), Marner Lagerweiss (W), Atria (W)	5[]	
large	Turner (W), Robustor (W)	7[]	
5.2b (5.2) <u>Red cabbage varieties only:</u> Outer leaf: size			
small	Langedijker Allervroegste (R), Primero (R)	3[]	
medium	Langedijker Vroege (R), Ruby Ball (R)	5[]	
large	Marner Lagerrot (R), Langedijker Herfst (R), Rovita (R)	7[]	

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note	
5.2c (5.3)	<u>Savoy cabbage varieties only:</u> Outer leaf: size		
small	Promasa (S)	3[]	
medium	Belvoy (S)	5[]	
large	Vertus 3 (S)	7[]	
5.3a (8.1)	<u>White and Red cabbage varieties only:</u> Outer leaf: degree of blistering		
absent or weak	Slawdena (W); Rookie (R)	1[]	
moderate	Fieldrocket (W); Langedijker Herfst (R)	2[]	
strong	Roem van Enkhuizen 3 (W); Kissendrup (R)	3[]	
5.3b (8.2)	<u>Savoy cabbage varieties only:</u> Outer leaf: degree of blistering		
absent or very weak	De Pointoise 2 (S)	1[]	
weak	Celsa (S)	3[]	
medium	Savoy King (S)	5[]	
strong	Hammer (S)	7[]	
very strong	Novusa (S), Roi de l'hiver 2 (S)	9[]	
5.4 (11)	Outer leaf: color (with wax)		
yellow green	April (W)	1[]	
green	Hammer (S)	2[]	
grey green	Bison (W), Gloria (W); Roi de l'hiver 2 (S)	3[]	
blue green	Market Pride (W)	4[]	
violet	Langedijker Bewaar 2 (R)	5[]	

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note	
5.5 Outer leaf: intensity of color (12)			
light	Gouden Akker (W); Rebus (R); Bloemendaalse Gele (S)	3[]	
medium	Cabri (W); Redsky (R); Kilosa (S)	5[]	
dark	Excel (W); Integro (R); Norma (S)	7[]	
5.6 Head: shape in longitudinal section (17)			
transverse narrow elliptic	Braunschweiger (W)	1[]	
transverse elliptic	Centurion (W), Conquistador (W), De Pointoise 2 (S)	2[]	
circular	Octoking (W), Roem van Enkhuizen 2 (W)	3[]	
broad elliptic	Langedijker Herfst (R)	4[]	
broad obovate	Langedijker Bewaar (W)	5[]	
broad ovate	Cape Horn (W)	6[]	
angular ovate	Filderkraut (W), Hispi (W)	7[]	
5.7 Head: diameter (20)			
small	Marner Allfrüh (W); Vorbote 2 (S)	3[]	
medium	Celsa (S), Pampa (S)	5[]	
large	Braunschweiger (W), Quintal d'Alsace (W)	7[]	
5.8 Head: density (30)			
very loose	Mignon (W)	1[]	
loose	Hornspi (W)	3[]	
medium	Dacato (S), Spivoy (S)	5[]	
dense	Pampa (S)	7[]	
very dense	Slawdena (W)	9[]	

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics		Example Varieties	Note
5.9a (33.1)	<u>White cabbage varieties only:</u> Time of harvest maturity		
	very early	Golden Cross (W)	1[]
	early	Green Express (W), Hijula (W)	3[]
	medium	Roem van Enkhuizen 2 (W)	5[]
	late	Holsteiner platter (W), Marner Lagerweiss (W), Strukton (W)	7[]
	very late	Bartolo (W)	9[]
5.9b (33.2)	<u>Red cabbage varieties only:</u> Time of harvest maturity		
	early	Langedijker Vroege (R), Normiro (R), Ruby Ball (R)	3[]
	medium	Langedijker Herfst (R), Marner Septemberrot (R), Autoro (R)	5[]
	late	Langedijker Bewaar 2 (R), Marner Lagerrot (R), Huzaro (R)	7[]
5.9c (33.3)	<u>Savoy cabbage varieties only:</u> Time of harvest maturity		
	very early	Spivoy (S)	1[]
	early	Walasa (S)	3[]
	medium	Belvoy (S)	5[]
	late	Hammer (S)	7[]
	very late	Alexander's No.1 (S)	9[]
5.10 (35)	Male sterility		
	absent	Winnigstadt (W); Pluton (R); Belvoy (S)	1[]
	present	Unifor (W); Roderick (R); Emerald (S)	9[]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
5.11 (37) Resistance to <i>Plasmodiophora brassicae</i> (Pb) – Race Pb: 0		
absent	Passat	1 []
present	Kilaton	9 []
not tested		[]
5.12 (38) Resistance to <i>Plasmodiophora brassicae</i> (Pb) – Race Pb: 1		
absent	Kilaton, Passat	1 []
present		9 []
not tested		[]
5.13 (39) Resistance to <i>Plasmodiophora brassicae</i> (Pb) – Race Pb: 2		
absent	Passat	1 []
present	Kilaton	9 []
not tested		[]
5.14 (40) Resistance to <i>Plasmodiophora brassicae</i> (Pb) – Race Pb: 3		
absent	Passat	1 []
present	Kilaton	9 []
not tested		[]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:	
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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
<i>Example</i>	<i>Outer leaf: color (with wax)</i>	<i>yellow green</i>	<i>green</i>

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
7. Additional information which may help in the examination of the variety 7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety? Yes [] No [] (If yes, please provide details) 7.2 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:
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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]