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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

BRUSSELS SPROUT

(*Brassica oleracea* L. var. *gemmifera* DC.) *

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from the Netherlands (Kingdom of the)
to be considered by the
Technical Committee at its sixty-first session,
to be held Geneva from 2025-10-20 to 2025-10-21

Disclaimer: this document does not represent UPOV policies or guidance

This document contains the following changes proposed by the Technical Working Party for Vegetables (TWV), at its fifty-ninth session[1], 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:*

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

ASSOCIATED DOCUMENTS

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

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1. Subject of these Test Guidelines

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

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 at least 5,000 seeds;
for vegetatively propagated varieties: 60 plants.

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

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

2.6 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

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) Plant: height (characteristic 1)
(b) Leaf blade: color (characteristic 5)
(c) Leaf blade: intensity of color (characteristic 6)
(d) Leaf blade: cupping (characteristic 8)
(e) Time of harvest maturity (characteristic 19)
(f) Male sterility (characteristic 21).

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

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

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

6.5 Legend

(*) Asterisked characteristic – see Section 6.1.2

QL Qualitative characteristic – see Section 6.3
QN Quantitative characteristic – see Section 6.3
PQ Pseudo-qualitative characteristic – see Section 6.3

MG Single measurement of a group of plants or parts of plants – see Section 3.3.1
MS Measurement of a number of individual plants or parts of plants – see Section 3.3.1
VG Visual assessment by a single observation of a group of plants or parts of plants – see Section 3.3.1
VS Visual assessment by observation of individual plants or parts of plants – see Section 3.3.1

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

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

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. (*)	**VG/ MG**	**Plant: height**	**Plante: hauteur**	**Pflanze: Höhe**	**Planta: altura**		
QN		short	basse	niedrig	baja	Jade Cross	3
		medium	moyenne	mittel	media	Cascade	5
		tall	haute	hoch	alta	Bridge	7
2.	**VG**	**Plant: tendency to form a head**	**Plante: tendance à former une tête**	**Pflanze: Neigung zur Kopfbildung**	**Planta: tendencia a formar un repollo**		
QN		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Masterline	1
		weak	faible	gering	débil	Cyrus	3
		medium	moyenne	mittel	media	Bridge	5
		strong	forte	stark	fuerte	Cor	7
		very strong	très forte	sehr stark	muy fuerte	Oliver	9
3. (*)	**VG**	**Leaf blade: size**	**Limbe: taille**	**Blattspreite: Größe**	**Limbo: tamaño**		
QN		small	petit	klein	pequeño	Angus	3
		medium	moyen	mittel	mediano	Peer Gynt	5
		large	grand	groß	grande	Braveheart	7
4.	**VG**	**Leaf blade: length**	**Limbe: longueur**	**Blattspreite: Länge**	**Limbo: longitud**		
QN		short	court	kurz	corto	Prince Marvel	3
		medium	moyen	mittel	medio	Cascade	5
		long	long	lang	largo	Braveheart	7
5. (*)	**VG**	**Leaf blade: color**	**Limbe: couleur**	**Blattspreite: Farbe**	**Limbo: color**		
PQ		green	vert	grün	verde	Masterline	1
		blue green	vert-bleu	blaugrün	verde azulado	Angus	2
		purple	pourpre	purpur	púrpura	Rubine	3

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
6. (*)	**VG**	**Leaf blade: intensity of color**	**Limbe: intensité de la couleur**	**Blattspreite: Intensität der Farbe**	**Limbo: intensidad del color**		
QN		light	claire	hell	claro	Origus, Prince Marvel	3
		medium	moyenne	mittel	medio	Angus, Boxer	5
		dark	foncée	dunkel	oscuro	Estate, Placido, Rubine	7
7.	**VG**	**Leaf blade: waxiness**	**Limbe: glaucescence**	**Blattspreite: Wachsschicht**	**Limbo: cerosidad**		
QN		weak	faible	gering	débil	Evesham Special	3
		medium	moyenne	mittel	media	Peer Gynt	5
		strong	forte	stark	fuerte	Cavalier	7
8. (*)	**VG**	**Leaf blade: cupping**	**Limbe: courbure**	**Blattspreite: Wölbung**	**Limbo: acopado**		
QN		moderately convex	modérément convexe	mäßig konvex	moderadamente convexo		3
		plane	plane	flach	plano	Braveheart	5
		moderately concave	modérément concave	mäßig konkav	moderadamente cóncavo	Estate	7
		strongly concave	fortement concave	stark konkav	muy cóncavo	Explorer	9
9.	**VG**	**Leaf blade: blistering**	**Limbe: cloqûre**	**Blattspreite: Blasigkeit**	**Limbo: abullonado**		
QN		weak	faible	gering	débil	Cavalier	3
		medium	moyenne	mittel	medio	Masterline	5
		strong	forte	stark	fuerte	Breeze	7
10.	**VG**	**Leaf blade: reflexing of margin**	**Limbe: enroulement du bord**	**Blattspreite: Randbiegung**	**Limbo: curvatura del margen**		
QL		absent	absent	fehlend	ausente	Lunet, Masterline	1
		present	présent	vorhanden	presente	Breeze, Odessa	9

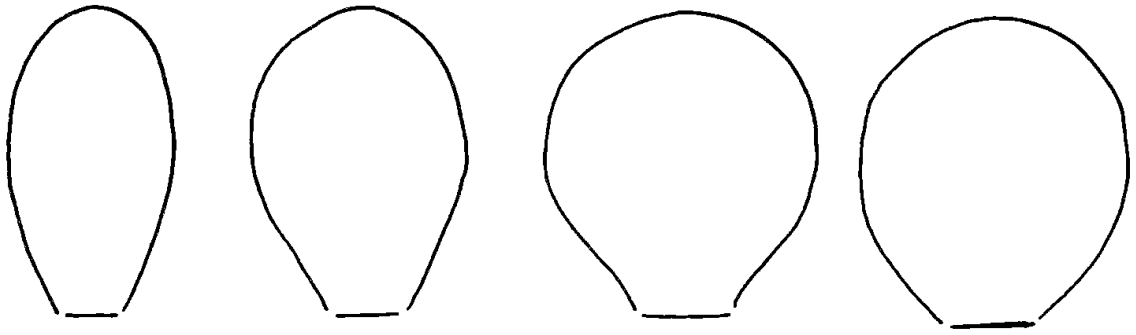
		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
11. (*)	**VG**	**Petiole: attitude**	**Pétiole: port**	**Blattstiel: Haltung**	**Pecíolo: porte**		
QN		semi erect	demi-dressé	halbaufrecht	semierecto	Montgomery	3
		horizontal	horizontal	waagerecht	horizontal	Angus	5
		semi pendulous	demi-retombant	halbhängend	semi-colgante	Odessa	7
12.	**VG**	**Petiole: length compared to blade**	**Pétiole: longueur par rapport au limbe**	**Blattstiel: Länge im Verhältnis zur Blattspreite**	**Pecíolo: longitud en relación con el limbo**		
QN		moderately shorter	modérément plus court	mäßig kürzer	moderadamente más corto	Braveheart	3
		equal	égal	gleich lang	igual	Masterline	5
		moderately longer	modérément plus long	mäßig länger	moderadamente más largo	Odessa	7
13.	**VG**	**Petiole: anthocyanin coloration**	**Pétiole: pigmentation anthocyanique**	**Blattstiel: Anthocyanfärbung**	**Pecíolo: pigmentación antociánica**		
QN		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Revenge	1
		weak	faible	gering	débil	Breeze	3
		medium	moyenne	mittel	media	Odessa	5
		strong	forte	stark	fuerte	Prince Marvel	7
		very strong	très forte	sehr stark	muy fuerte	Rasalon	9
14. (+)	**VG**	**Sprout: shape in longitudinal section**	**Bourgeon: forme en section longitudinale**	**Knospe: Form im Längsschnitt**	**Yema: forma en sección longitudinal**		
PQ		narrow obovate	obovale étroite	schmal verkehrt eiförmig	oboval estrecha	Explorer	1
		obovate	obovale	verkehrt eiförmig	oboval		2
		broad obovate	obovale large	breit verkehrt eiförmig	oboval ancha	Odessa	3
		circular	circulaire	kreisförmig	circular	Braveheart	4

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
15.	**VG**	**Sprout: color**	**Bourgeon: couleur**	**Knospe: Farbe**	**Yema: color**		
PQ		green	vert	grün	verde	Estate	1
		blue green	vert-bleu	blaugrün	verde azulado	Cascade	2
		purple	pourpre	purpur	púrpura	Rubine	3
16.	**VG**	**Sprout: intensity of color**	**Bourgeon: intensité de la couleur**	**Knospe: Intensität der Farbe**	**Yema: intensidad del color**		
QN		light	claire	hell	claro	Prince Marvel	3
		medium	moyenne	mittel	medio	Estate	5
		dark	foncée	dunkel	oscuro	Placido, Rubine	7
17.	**VG**	**Sprout: density at harvest maturity**	**Bourgeon: densité à maturité de récolte**	**Knospe: Dichte bei Erntereife**	**Yema: densidad en la madurez para la cosecha**		
QN		loose	lâche	locker	laxa	Steffiline	3
		medium	moyenne	mittel	media	Angus	5
		dense	dense	dicht	densa	Prelent	7
18.	**VG**	**Stem: spacing of sprouts**	**Tige: espacement entre les bourgeons**	**Sproß: Abstand zwischen den Knospen**	**Tallo: espaciado entre las yemas**		
QN		narrow	faible	gering	estrecho	Estate, Prelent	3
		medium	moyen	mittel	medio	Cavalier, Cor	5
		wide	large	groß	ancho	Silverline	7
19. (*)	**VG**	**Time of harvest maturity**	**Époque de maturité de récolte**	**Zeitpunkt der Erntereife**	**Época de madurez para la cosecha**		
QN		very early	très précoce	sehr früh	muy temprana	Lancer, Oliver	1
		early	précoce	früh	temprana	Masterline, Peer Gynt	3
		medium	moyenne	mittel	media	Lunet, Odessa	5
		late	tardive	spät	tardía	Braveheart, Bridge	7
		very late	très tardive	sehr spät	muy tardía	Ulysses	9

		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
20. **(+)**	**VG**	**Stem: profile of sprout column**	**Tige: profil de la partie avec des bourgeons**	**Sproß: Profil einschließlich der Knospen**	**Tallo: perfil de la parte con las yemas**		
QN		conical	conique	kegelförmig	cónica	Falstaff	1
		conical to cylindrical	cónique à cylindrique	kegelförmig bis zylindrisch	cónica à cilíndrica	Regent, Setterline	2
		cylindrical	cylindrique	zylindrisch	cilíndrica	Angus, Braveheart	3
21. **(+)**	**VS/ MS**	**Male sterility**	**Stérilité mâle**	**Männliche Sterilität**	**Androesterilidad**		
QL		absent	absente	fehlend	ausente	Attis, Pontus	1
		present	présente	vorhanden	presente	Abacus, Platinus	9
22. **(+)**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 0**	**Résistance à *Plasmodiophora brassicae* (Pb) – Race Pb: 0**	**Resistenz gegen *Plasmodiophora brassicae* (Pb) – Pathotyp Pb: 0**	**Resistencia a *Plasmodiophora brassicae* (Pb) – Raza Pb: 0**		
QL		absent	absente	fehlend	ausente	Abacus	1
		present	présente	vorhanden	presente	Cryptus	9
23. **(+)**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 1**	**Résistance à *Plasmodiophora brassicae* (Pb) – Race Pb: 1**	**Resistenz gegen *Plasmodiophora brassicae* (Pb) – Pathotyp Pb: 1**	**Resistencia a *Plasmodiophora brassicae* (Pb) – Raza Pb: 1**		
QL		absent	absente	fehlend	ausente	Abacus	1
		present	présente	vorhanden	presente	Cryptus	9
24. **(+)**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 2**	**Résistance à *Plasmodiophora brassicae* (Pb) – Race Pb: 2**	**Resistenz gegen *Plasmodiophora brassicae* (Pb) – Pathotyp Pb: 2**	**Resistencia a *Plasmodiophora brassicae* (Pb) – Raza Pb: 2**		
QL		absent	absente	fehlend	ausente	Abacus, Cryptus	1
		present	présente	vorhanden	presente		9
25. **(+)**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 3**	**Résistance à *Plasmodiophora brassicae* (Pb) – Race Pb: 3**	**Resistenz gegen *Plasmodiophora brassicae* (Pb) – Pathotyp Pb: 3**	**Resistencia a *Plasmodiophora brassicae* (Pb) – Raza Pb: 3**		
QL		absent	absente	fehlend	ausente	Abacus	1
		present	présente	vorhanden	presente	Cryptus	9

8. Explanations on the Table of Characteristics

Ad. 14: Sprout: shape in longitudinal section



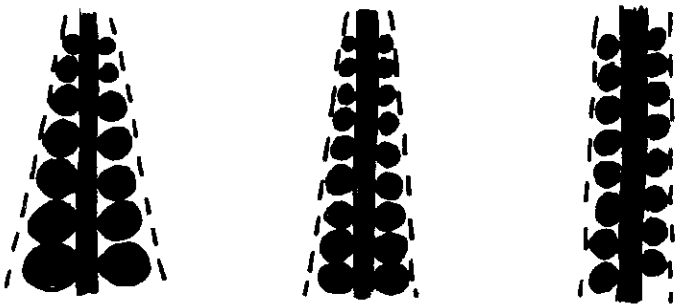
1
narrow obovate

2
obovate

3
broad obovate

4
circular

Ad. 20: Stem: profile of sprout column



1
conical

2
conical to cylindrical

3
cylindrical

Ad. 21: Male sterility

To be tested in a field trial and/or in a DNA marker test[2].

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

1.	Pathogen	*Plasmodiophora brassicae*
2.	Quarantine status	no
3.	Host species	*Brassica oleracea*
4.	Source of inoculum	Naktuinbouw[3] (NL)
5.	Isolate	Race Pb: 0, Pb: 1, Pb: 2 and Pb: 3
6.	Establishment isolate identity	with genetically defined differentials from Naktuinbouw (NL) The most recent table is available through ISF at https://www.worldseed.org/our-work/plant-health/differential-hosts/
7.	Establishment pathogenicity	symptoms on susceptible *Brassica oleracea spp.*
8.	Multiplication inoculum	
8.1	Multiplication medium	Plant roots
8.2	Multiplication variety	Susceptible variety Bartolo (WC), Granaat (CC)[4]
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.
9.8	Season	Not in winter, not in too warm conditions if test performed in greenhouse

[3] Naktuinbouw: resistentie@naktuinbouw.nl
[4] WC=White cabbage, CC=Chinese cabbage, RC=Red cabbage, CF=Cauliflower

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 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

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

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

1.1 *Latin Name*	*Brassica oleracea* L. var. *gemmifera* DC.
1.2 Common Name	Brussels Sprout

2. Applicant

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

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

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

4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

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

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Self-pollination [ ]
(b) Cross-pollination
(i) population [ ]
(ii) synthetic variety [ ]
(c) Hybrid [ ]
(d) Other [ ]
(please provide details)

4.2.2 Vegetatively propagated varieties [ ]

4.2.3 Other [ ]
(please provide details)

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

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (1)	**Plant: height**		
	short	Jade Cross	3[ ]
	medium	Cascade	5[ ]
	tall	Bridge	7[ ]
5.2 (5)	**Leaf blade: color**		
	green	Masterline	1[ ]
	blue green	Angus	2[ ]
	purple	Rubine	3[ ]
5.3 (6)	**Leaf blade: intensity of color**		
	light	Origus, Prince Marvel	3[ ]
	medium	Angus, Boxer	5[ ]
	dark	Estate, Placido, Rubine	7[ ]
5.4 (8)	**Leaf blade: cupping**		
	moderately convex		3[ ]
	plane	Braveheart	5[ ]
	moderately concave	Estate	7[ ]
	strongly concave	Explorer	9[ ]

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

	Characteristics	Example Varieties	Note
5.5 (19)	**Time of harvest maturity**		
	very early	Lancer, Oliver	1[ ]
	early	Masterline, Peer Gynt	3[ ]
	medium	Lunet, Odessa	5[ ]
	late	Bridge, Braveheart	7[ ]
	very late	Ulysses	9[ ]
5.6 (21)	**Male sterility**		
	absent	Attis, Pontus	1[ ]
	present	Abacus, Platinus	9[ ]
5.7 (22)	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 0**		
	absent	Abacus	1 [ ]
	present	Cryptus	9 [ ]
	not tested		[ ]
5.8 (23)	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 1**		
	absent	Abacus	1 [ ]
	present	Cryptus	9 [ ]
	not tested		[ ]
5.9 (24)	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 2**		
	absent	Abacus, Cryptus	1 [ ]
	present		9 [ ]
	not tested		[ ]
5.10 (25)	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 3**		
	absent	Abacus	1 [ ]
	present	Cryptus	9 [ ]
	not tested		[ ]

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

6. Similar varieties and differences from these varieties

Please use the table, and space provided for comments, below to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Plant: height*	*short*	*medium*

Comments:

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

7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Special conditions for the examination of the variety

7.2.1 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

7.2.2 If yes, please give details:

7.3 Other information

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

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

9. Information on plant material to be examined.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma) Yes [ ] No [ ]

(b) Chemical treatment (e.g. growth retardant or pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details of where you have indicated “yes”:

……

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]