CPVO · OCVV
Community Plant Variety Office
Office Communautaire des Variétés Végétales

PROTOCOL FOR TESTS ON DISTINCTNESS, UNIFORMITY AND STABILITY

Brassica oleracea L. var. *capitata* L.

CABBAGE

UPOV Code: BRASS_OLE_GC

Adopted on 28/01/2026

Entry into force on 15/02/2026

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CPVO-TP/048/3 Rev.4

1. SUBJECT OF THE PROTOCOL AND REPORTING

1.1 Scope of the technical protocol

This Technical Protocol applies to all varieties of ***Brassica oleracea*** **L. var.** ***capitata*** **L.**

The protocol describes the technical procedures to be followed in order to meet the requirements of Council Regulation 2100/94 on Community Plant Variety Rights. The technical procedures have been agreed by the Administrative Council and are based on documents agreed by the International Union for the Protection of New Varieties of Plants (UPOV), such as the General Introduction to DUS (UPOV Document TG/1/3 http://www.upov.int/export/sites/upov/resource/en/tg_1_3.pdf), its associated TGP documents (http://www.upov.int/tgp/en/) and the relevant UPOV Test Guideline TG/148/7 Rev. 2 dated 24/10/2023 (https://www.upov.int/edocs/tgdocs/en/tg048.pdf) for the conduct of tests for Distinctness, Uniformity and Stability.

1.2 Entry into Force

The present protocol enters into force on **15.02.2026**. Any ongoing DUS examination of candidate varieties started before the aforesaid date will not be affected by the approval of the Technical Protocol. Technical examinations of candidate varieties are carried out according to the TP in force when the DUS test starts. The starting date of a DUS examination is considered to be the due date for submitting of plant material for the first test period.

In cases where the Office requests to take-over a DUS report for which the technical examination has either been finalized or which is in the process to be carried out at the moment of this request, such report can only be accepted if the technical examination has been carried out according to the CPVO TP which was in force at the moment when the technical examination started.

1.3 Reporting between Examination Office and CPVO and Liaison with Applicant

1.3.1 Reporting between Examination Office and CPVO

The Examination Office shall deliver to the CPVO a preliminary report ("the preliminary report") no later than two weeks after the date of the request for technical examination by the CPVO.

The Examination Office shall also deliver to the CPVO a report relating to each growing period ("the interim report") and, when the Examination Office considers the results of the technical examination to be adequate to evaluate the variety or the CPVO so requests, a report relating to the examination ("the final report").

The final report shall state the opinion of the Examination Office on the distinctness, uniformity and stability of the variety. Where it considers those criteria to be satisfied, or where the CPVO so requests, a description of the variety shall be added to the report.

If a report is negative the Examination Office shall set out the detailed reasons for its findings.

The interim and the final reports shall be delivered to the CPVO as soon as possible and no later than on the deadlines as laid down in the designation agreement.

1.3.2 Informing on problems in the DUS test

If problems arise during the course of the test the CPVO should be informed immediately so that the information can be passed on to the applicant. Subject to prior permanent agreement, the applicant may be directly informed at the same time as the CPVO particularly if a visit to the trial is advisable.

1.3.3 Sample keeping in case of problems

If the technical examination has resulted in a negative report, the CPVO shall inform the Examination Office as soon as possible in case that a representative sample of any relevant testing material shall be kept.

2. MATERIAL REQUIRED

2.1 Plant material requirements

Information with respect to the agreed closing dates and submission requirements of plant material for the technical examination of varieties can be found on https://public.plantvarieties.eu/publication in the special issue S2 of the Official Gazette of the Office. General requirements on submission of samples are also to be found following the same link.

2.2 Informing the applicant of plant material requirements

The CPVO informs the applicant that

- he is responsible for ensuring compliance with any customs and plant health requirements.
- the plant material supplied should be visibly healthy, not lacking in vigour, nor affected by any important pest or disease.
- 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.

2.3 Informing about problems on the submission of material

The Examination Office shall report to the CPVO immediately in cases where the test material of the candidate variety has not arrived in time or in cases where the material submitted does not fulfil the conditions laid down in the request for material issued by the CPVO.

In cases where the examination office encounters difficulties to obtain plant material of reference varieties the CPVO should be informed.

3. METHOD OF EXAMINATION

3.1 Number of growing cycles

The minimum duration of tests should normally be two independent growing cycles.
The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 "Examining Distinctness" http://www.upov.int/edocs/tgpdocs/en/tgp_9.pdf.

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.

3.4 Test design

3.4.1 Each test should be designed to result in a total of at least 60 plants, which should be divided between at least 2 replicates.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Special tests for additional characteristics

In accordance with Article 23 of Implementing Rules N° 874/2009 an applicant may claim either in the Technical Questionnaire or during the test that a candidate has a characteristic which would be helpful in establishing distinctness. If such a claim is made and is supported by reliable technical data, a special test may be undertaken providing that a technically acceptable test procedure can be devised.

Special tests will be undertaken, with the agreement of the President of CPVO, where distinctness is unlikely to be shown using the characteristics listed in the protocol.

3.6 Constitution and maintenance of a variety collection

The process for the constitution and the maintenance of a variety collection can be summarized as follows:

Step 1: Making an inventory of the varieties of common knowledge

Step 2: Establishing a collection ("variety collection") of varieties of common knowledge which are relevant for the examination of distinctness of candidate varieties

Step 3: Selecting the varieties from the variety collection which need to be included in the growing trial or other tests for the examination of distinctness of a particular candidate variety.

3.6.1 Forms of variety collection
The variety collection shall comprise variety descriptions and living plant material, thus a living reference collection. The variety description shall be produced by the EO unless special cooperation exists between EOs and the CPVO. The descriptive and pictorial information produced by the EO shall be held and maintained in a form of a database.

3.6.2 Living Plant Material
The EO shall collect and maintain living plant material of varieties of the species concerned in the variety collection.

3.6.3 Range of the variety collection
The living variety collection shall cover at least those varieties that are suitable to climatic conditions of a respective EO.

3.6.4 Making an inventory of varieties of common knowledge for inclusion in the variety collection
The inventory shall include varieties protected under National PBR (UPOV contracting parties) and Community PBR, varieties registered in the Common Catalogue, the OECD list, the Conservation variety list and varieties in trade or in commercial registers for those species not covered by a National or the Common Catalogue.

3.6.5 Maintenance and renewal/update of a living variety collection
The EO shall maintain seeds in conditions which will ensure germination and viability, periodical checks, and renewal as required. For the renewal of existing living material, the identity of replacement living plant material shall be verified by conducting side-by-side plot comparisons between the material in the collection and the new material.

4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY

The prescribed procedure is to assess distinctness, uniformity and stability in a growing trial.

4.1 Distinctness

4.1.1 General recommendations
It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 9 'Examining Distinctness' (http://www.upov.int/edocs/tgpdocs/en/tgp_9.pdf) prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in this Technical Protocol.

4.1.2 Consistent differences
The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear differences
Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Technical Protocols are familiar with the recommendations contained in the UPOV-General Introduction to DUS prior to making decisions regarding distinctness.

4.1.4 Number of plants/parts of plants to be examined
Unless otherwise indicated, for the purposes of distinctness, 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, disregarding any off-type plants.

When resistance characteristics are used for assessing distinctness, uniformity and stability, records must be taken under conditions of controlled infection and, unless otherwise indicated, on at least 20 plants.

4.1.5 Method of observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the third column of the Table of Characteristics (see document TGP/9 "Examining Distinctness", Section 4 "Observation of characteristics"):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)
"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)
For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G) or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety, and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

4.2.1 It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 10 'Examining Uniformity' (http://www.upov.int/edocs/tgpdocs/en/tgp_10.pdf) prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in this Technical Protocol:

4.2.2 This Technical Protocol has been developed for the examination of seed propagated varieties. For varieties with other types of propagation the recommendations in the UPOV-General Introduction to DUS and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed.

4.2.3 The assessment of uniformity for cross-pollinated and hybrid varieties (excluding single cross hybrids) should be according to the recommendations for cross-pollinated varieties in the UPOV-General Introduction to DUS.

4.2.4 For the assessment of uniformity of vegetatively propagated varieties, single cross hybrids and inbred lines, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants, 2 off-types are allowed.

4.3 Stability

4.3.1 It is of particular importance for users of this Technical Protocol to consult the UPOV-General Introduction to DUS (link in chapter 1 of this document) and TGP 11 'Examining Stability' (http://www.upov.int/edocs/tgpdocs/en/tgp_11.pd)

In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

5. GROUPING OF VARIETIES AND ORGANISATION OF THE GROWING TRIAL

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organise the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics.

a) Outer leaf: colour (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)

f) Male sterility (characteristic 35)

5.4 If other characteristics than those from the Technical Protocol are used for the selection of varieties to be included into the growing trial, the EO shall inform the CPVO and seek the prior consent of the CPVO before using these characteristics.

5.5 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the UPOV-General Introduction to DUS and document TGP/9 "Examining Distinctness".

6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS

6.1 Characteristics to be used

The characteristics to be used in DUS tests and preparation of descriptions shall be those referred to in the table of characteristics. All the characteristics shall be used, providing that observation of a characteristic is not rendered impossible by the expression of any other characteristic, or the expression of a characteristic is prevented by the environmental conditions under which the test is conducted or by specific legislation on plant health. In the latter case, the CPVO should be informed.

The Administrative Council empowers the President, in accordance with Article 23 of Commission Regulation N°874/2009, to insert additional characteristics and their expressions in respect of a variety.

Asterisked characteristics
In the case of disease resistance characteristics, only those resistances marked with an asterisk (*) in the CPVO column are compulsory.

6.2. States of expression and corresponding notes

In the case of qualitative and pseudo-qualitative characteristics, all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

State	Note
small	3
medium	5
large	7

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

State	Note
very small	1
very small to small	2
small	3
small to medium	4
medium	5
medium to large	6
large	7
large to very large	8
very large	9

Further explanation of the presentation of states of expression and notes is provided in UPOV document TGP/7 "Development of Test Guidelines".

6.3 Example Varieties

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

6.4 Legend

For column 'CPVO N°':

G	Grouping characteristic	-see Chapter 5
QL	Qualitative characteristic	
QN	Quantitative characteristic	
PQ	Pseudo-qualitative characteristic	
(+)	Explanations for individual characteristics	-see Chapter 8.1
(*)	Asterisked characteristic	-see Chapter 6.1

For column 'UPOV N°':

The numbering of the characteristics is provided as a reference to the UPOV guideline.

(*)	UPOV Asterisked characteristic	-Characteristics that are important for the international harmonization of variety descriptions.

For column 'Stage, method':

MG, MS, VG, VS -see Chapter 4.1.5

7. TABLE OF CHARACTERISTICS

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1.1	**1.1**	**VG**	**<u>White cabbage varieties only</u>: Plant: height**		
QN			very short		1
			very short to short		2
			short	Gouden Akker, Minicole	3
			short to medium		4
			medium	Marner Lagerweiss, Strukton	5
			medium to tall		6
			tall	Amager hochstrunkig, Thurner, Zerlina	7
			tall to very tall		8
			very tall	Filderkraut	9
1.2	**1.2**	**VG**	**<u>Red cabbage varieties only</u>: Plant: height**		
QN			very short	Langedijker Allervroegste, Primero	1
			very short to short		2
			short	Marner Frührotkohl, Ruby Ball	3
			short to medium		4
			medium	Allrot, Roxy	5
			medium to tall		6
			tall	Langedijker Bewaar 3, Langedijker Herfst, Rovita	7
			tall to very tall		8
			very tall		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
1.3	**1.3**	**VG**	**<u>Savoy cabbage varieties only</u>: Plant: height**		
QN			very short		1
			very short to short		2
			short	Fitis, Vorbote 2	3
			short to medium		4
			medium	Marner Grünkopf	5
			medium to tall		6
			tall	Hammer, Roi de l'hiver 2	7
			tall to very tall		8
			very tall	Bloemendaalse Gele	9
2.1	**2.1**	**VG**	**<u>White cabbage varieties only</u>: Plant: maximum diameter (including outer leaves)**		
QN			very small		1
			very small to small		2
			small	Wiam	3
			small to medium		4
			medium	Marner Augustkohl	5
			medium to large		6
			large	Roem van Enkhuizen 2, Robuster	7
			large to very large		8
			very large		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
2.2	**2.2**	**VG**	**<u>Red cabbage varieties only</u>: Plant: maximum diameter (as for 2.1)**		
QN			very small		1
			very small to small		2
			small	Frührot, Primero	3
			small to medium		4
			medium	Allrot, Ruby Ball	5
			medium to large		6
			large	Marner Septemberrot, Rovita	7
			large to very large		8
			very large		9
2.3	**2.3**	**VG**	**<u>Savoy cabbage varieties only</u>: Plant: maximum diameter (as for 2.1)**		
QN			very small		1
			very small to small		2
			small	Vorbote 2	3
			small to medium		4
			medium	Marner Grünkopf	5
			medium to large		6
			large	Hammer	7
			large to very large		8
			very large		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
3.	**3.**	**VG/MS**	**Plant: length of outer stem**		
QN			very short		1
			very short to short		2
			short	Braunschweiger (W), Minicole (W), Vorox (R), Spivoy (S)	3
			short to medium		4
			medium	Bartolo (W), September (W), Langedijker Bewaar 2 (R), Belvoy (S)	5
			medium to long		6
			long	Amager hochstrunkig (W), Robuster (W), Pampa (S)	7
			long to very long		8
			very long		9
4.	**4.**	**VG**	**Plant: attitude of outer leaves**		
QN			erect	Filderkraut (W), Slawdena (W)	1
			erect to semi-erect		2
			semi-erect	Braunschweiger (W)	3
			semi-erect to prostrate		4
			prostrate	Christmas Drumhead (W), Spring Hero (W)	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
5.1	**5.1**	**VG**	**<u>White cabbage varieties only</u>: Outer leaf size**		
QN			very small		1
			very small to small		2
			small	Golden Cross	3
			small to medium		4
			medium	Atria, Braunschweiger, Marner Lagerweiss	5
			medium to large		6
			large	Robuster, Thurner	7
			large to very large		8
			very large		9
5.2	**5.2**	**VG**	**<u>Red cabbage varieties only</u>: Outer leaf size**		
QN			very small		1
			very small to small		2
			small	Langedijker Allervroegste, Primero	3
			small to medium		4
			medium	Langedijker Vroege, Ruby Ball	5
			medium to large		6
			large	Langedijker Herfst, Marner Lagerrot, Rovita	7
			large to very large		8
			very large		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
5.3	**5.3**	**VG**	**<u>Savoy cabbage varieties only</u>: Outer leaf size**		
QN			very small		1
			very small to small		2
			small	Promasa	3
			small to medium		4
			medium	Belvoy	5
			medium to large		6
			large	Vertus 3	7
			large to very large		8
			very large		9
6. (+)	**6.**	**VG**	**Outer leaf: shape of blade**		
PQ			elliptic	Filderkraut (W)	1
			broad ovate	September (W)	2
			circular	Wiam (W)	3
			transverse broad elliptic	Rookie (R)	4
			obovate	Marksman (W)	5
7.	**7.**	**VG**	**Outer leaf: profile of upper side of blade**		
QN			concave	Slawdena (W), Celsa (S)	1
			plane	Golden Cross (W), Allrot (R)	2
			convex	Comparsa (S)	3
8.1	**8.1**	**VG**	**<u>White and red cabbage varieties only</u>: Outer leaf: degree of blistering**		
QN			absent or very weak	Slawdena (W), Rookie (R)	1
			moderate	Fieldrocket (W), Langedijker Herfst (R)	2
			strong	Roem van Enkhuizen 3 (W), Kissendrup (R)	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
8.2	**8.2**	**VG**	**<u>Savoy cabbage varieties only</u>: Outer leaf: degree of blistering**		
QN			absent or very weak	De Pontoise 2	1
			very weak to weak		2
			weak	Celsa	3
			weak to medium		4
			medium	Savoy King	5
			medium to strong		6
			strong	Hammer	7
			strong to very strong		8
			very strong	Novusa, Roi de l'hiver 2	9
9.1	**9.1**	**VG**	**<u>White and red cabbage varieties only</u>: Outer leaf: size of blisters**		
QN			very small		1
			very small to small		2
			small	Hispi (W), Allrot (R)	3
			small to medium		4
			medium	Roem van Enkhuizen 2 (W), Kissendrup (R)	5
			medium to large		6
			large	Jason (W)	7
			large to very large		8
			very large		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
9.2	**9.2**	**VG**	**<u>Savoy cabbage varieties only</u>: Outer leaf: size of blisters**		
QN			very small		1
			very small to small		2
			small	Roi de l'hiver 2	3
			small to medium		4
			medium	Hammer	5
			medium to large		6
			large	Vertus 2	7
			large to very large		8
			very large		9
10. (+)	**10.**		**<u>Savoy cabbage varieties only</u>: Outer leaf: crimping**		
			very weak		1
			very weak to weak		2
			weak	Dauerwirsing	3
			weak to medium		4
			medium	Savoy King	5
			medium to strong		6
			strong	Hammer	7
			strong to very strong		8
			very strong		9
11. (+)	**11.**	**VG**	**Outer leaf: colour (with wax)**		
			yellow green	April (W)	1
PQ			green	Hammer (S)	2
			grey green	Bison (W), Gloria (W), Roi de l'hiver 2 (S)	3
			blue green	Market Prize (W)	4
G			violet	Langedijker Bewaar 2 (R)	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
12.	**12.**	**VG**	**Outer leaf: intensity of colour**		
QN			very light		1
			very light to light		2
			light	Gouden Akker (W), Rebus (R), Bloemendaalse Gele (S)	3
			light to medium		4
			medium	Cabri (W), Redsky (R), Kilosa (S)	5
			medium to dark		6
			dark	Excel (W), Integro (R), Norma (S)	7
			dark to very dark		8
			very dark		9
13.	**13.**	**VG**	**<u>Red cabbage varieties only</u>: Outer leaf: green flush**		
QL			absent	Autoro, Kissendrup	1
			present	Kempero, Roxy	9
14.	**14.**	**VG**	**Outer leaf: waxiness**		
QN			absent of very weak	First of June (W)	1
			very weak to weak		2
			weak	Derby Day (W), Octoking (W)	3
			weak to medium		4
			medium	Wiam (W), Celtic(S)	5
			medium to strong		6
			strong	Thurner (W), Bison (W)	7
			strong to very strong		8
			very strong	Rivera (W), Indaro(R)	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
15.	**15.**	**VG**	**Outer leaf: undulation of margin**		
QN			absent of very weak	Minicole (W)	1
			very weak to weak		2
			weak	Holsteiner platter (W)	3
			weak to medium		4
			medium	Saturn (W), Dacato (S)	5
			medium to strong		6
			strong	Snovoy (S)	7
			strong to very strong		8
			very strong	Roxy (R)	9
16.	**16.**	**VG**	**Outer leaf: reflexion of margin**		
QL			absent	Slawdena (W)	1
			present	Rinda (W)	9
17. (+)	**17.**	**VG**	**Head: shape in longitudinal section**		
PQ			transverse narrow elliptic	Braunschweiger (W)	1
			transverse elliptic	Centurion (W), Conquistador (W), De Pontoise 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
G			angular ovate	Filderkraut (W), Hispi (W)	7
18. (+)	**18.**	**VG**	**Head: shape of base in longitudinal section**		
PQ			rounded		1
			flat		2
			arched		3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
19.	**19.**	**VG/MS**	**Head: length**		
QN			very short		1
			very short to short		2
			short	Marner Allfrüh (W), Vorbote 2 (S)	3
			short to medium		4
			medium	Belvoy (S), Pampa (S)	5
			medium to long		6
			long	Offenham 3 (W)	7
			long to very long		8
			very long		9
20.	**20.**	**VG/MS**	**Head: diameter**		
QN			very small		1
			very small to small		2
			small	Marner Allfrüh (W), Vorbote 2 (S)	3
			small to medium		4
			medium	Celsa (S), Pampa (S)	5
			medium to large		6
			large	Braunschweiger (W), Quintal d'Alsace (W)	7
			large to very large		8
G			very large		9
21.	**21.**	**VG**	**Head: position of maximum diameter**		
QN			towards top	Slawdena (W)	1
			at middle	Derby Day (W), Gouden Akker (W)	2
			towards base	Hispi (W)	3

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
22. (+)	**22.**	**VG**	**Head: cover**		
QN			not covered	Late Putjes (S)	1
			partially covered	Holsteiner platter (W)	2
			covered	Langedijker Bewaar 2 (R)	3
23.	**23.**	**VG**	**<u>Savoy cabbage varieties only</u>: Head: blistering of cover leaf**		
QN			absent or very weak	De Pontoise 2	1
			very weak to weak		2
			weak	Celtic	3
			weak to medium		4
			medium	Julius	5
			medium to strong		6
			strong	Hammer	7
			strong to very strong		8
			very strong	Roi de l'hiver 2	9
24.	**24.**	**VG**	**Head: reflexion of margin of cover leaf**		
QN			absent	Apex(W), Morgan (W)	1
			present	Orbit (W)	9
25. (+)	**25.**	**VG**	**Head: colour of cover leaf**		
PQ			yellow green	April (W), Octoking (W)	1
			green	Hammer (S)	2
			grey green	Roi de l'hiver 2 (S)	3
			blue green		4
			violet	Kissendrup (R)	5

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
26.	**26.**	**VG**	**Head: intensity of colour of cover leaf**		
QN			very light		1
			very light to light		2
			light		3
			light to medium		4
			medium		5
			medium to dark		6
			dark		7
			dark to very dark		8
			very dark		9
27.	**27.**	**VG**	**<u>White cabbage and Savoy cabbage varieties only</u>: Head: anthocyanin coloration of cover leaf**		
QN			absent or very weak	Hammer (S)	1
			very weak to weak		2
			weak	Slawdena (W)	3
			weak to medium		4
			medium	De Pontoise 2 (S)	5
			medium to strong		6
			strong	Marabel (S)	7
			strong to very strong		8
			very strong		9
28.	**28.**	**VG**	**Head: internal colour**		
QN			whitish	Slawdena (W)	1
			yellowish	Langedijker Bewaargele (S)	2
			greenish		3
			violet	Langedijker Herfst (R)	4

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
29.	**29.**	**VG**	**<u>Red cabbage varieties only</u>: Head: intensity of internal colour**		
QN			very light		1
			very light to light		2
			light		3
			light to medium		4
			medium		5
			medium to dark		6
			dark		7
			dark to very dark		8
			very dark		9
30. (+)	**30.**	**VG**	**Head: density**		
QN			very loose	Mignon (W)	1
			very loose to loose		2
			loose	Hornspi (W)	3
			loose to medium		4
			medium	Dacato (S), Spivoy (S)	5
			medium to dense		6
			dense	Pampa (S)	7
			dense to very dense		8
G			very dense	Slawdena (W)	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
31. (+)	**31.**	**VG**	**Head: internal structure**		
QN			very fine		1
			very fine to fine		2
			fine	Slawdena (W), Quintal d'Alsace (W)	3
			fine to medium		4
			medium	Langedijker Herfst (R)	5
			medium to coarse		6
			coarse	Filderkraut (W), Roem van Enkhuizen 2 (W)	7
			coarse to very coarse		8
			very coarse		9
32. (+)	**32.**	**VG**	**Head: relative length of interior stem compared to length of head**		
QN			very short		1
			very short to short		2
			short	Erdeno (W)	3
			short to medium		4
			medium	Slawdena (W)	5
			medium to long		6
			long	Braunschweiger (W), Belvoy (S)	7
			long to very long		8
			very long		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
33.1.	**33.1.**	**VG**	**<u>White cabbage varieties only</u>: Time of harvest maturity**		
QN			very early	Golden Cross	1
			very early to early		2
			early	Green Express, Hijula	3
			early to medium		4
			medium	Roem van Enkhuizen 2	5
			medium to late		6
			late	Holsteiner platter, Marner Lagerweiss, Strukton	7
			late to very late		8
G			very late	Bartolo	9
33.2.	**33.2.**	**VG**	**<u>Red cabbage varieties only</u>: Time of harvest maturity**		
QN			very early		1
			very early to early		2
			early	Langedijker Vroege, Normiro, Ruby Ball	3
			early to medium		4
			medium	Autoro, Langedijker Herfst, Marner Septemberrot	5
			medium to late		6
			late	Huzaro, Langedijker Bewaar 2, Marner Lagerrot	7
			late to very late		8
G			very late		9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
33.3.	**33.3.**	**VG**	**<u>Savoy cabbage varieties only</u>: Time of harvest maturity**		
QN			very early	Spivoy	1
			very early to early		2
			early	Walasa	3
			early to medium		4
			medium	Belvoy	5
			medium to late		6
			late	Hammer	7
			late to very late		8
G			very late	Alexander's N°1	9
34.	**34.**	**VG**	**Time of bursting of head after maturity**		
QN			very early		1
			very early to early		2
			early	Winnigstadt (W), Primero (R), Curosa (S)	3
			early to medium		4
			medium	Excel (W), Pluton (R), Ruby Ball (R), Emerald (S)	5
			medium to late		6
			late	Quisto (W), Induro (R), Ermosa (S)	7
			late to very late		8
			very late		9
35. (+)	**35.**	**VS/MS**	**Male sterility**		
QL			absent	Winnigstadt (W), Pluton (R), Belvoy (S)	1
G			present	Unifor (W), Roderick (R), Emerald (S)	9

CPVO N°	UPOV N°	Stage, Method	Characteristics	Examples	Note
36. (+)	**36.**	**VS**	**Resistance to race 1 of *Fusarium oxysporum* f. sp. *conglutinans***		
QL			absent	Roem van Enkhuizen 2(W)	1
			present	Centurion (W), Delight YR(W), Gloria (W), Kaporal (W)	9
37. (+)	**37.**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 0**		
QL			absent	Passat	1
			present	Kilaton	9
38. (+)	**38.**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 1**		
QL			absent	Passat	1
			present	Kilaton	9
39. (+)	**39.**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 2**		
QL			absent	Kilaton, Passat	1
			present		9
40. (+)	**40.**	**VS**	**Resistance to *Plasmodiophora brassicae* (Pb) – Race Pb: 3**		
QL			absent	Passat	1
			present	Kilaton	9

8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS

8.1 Explanations for individual 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 out as far as possible before observation.

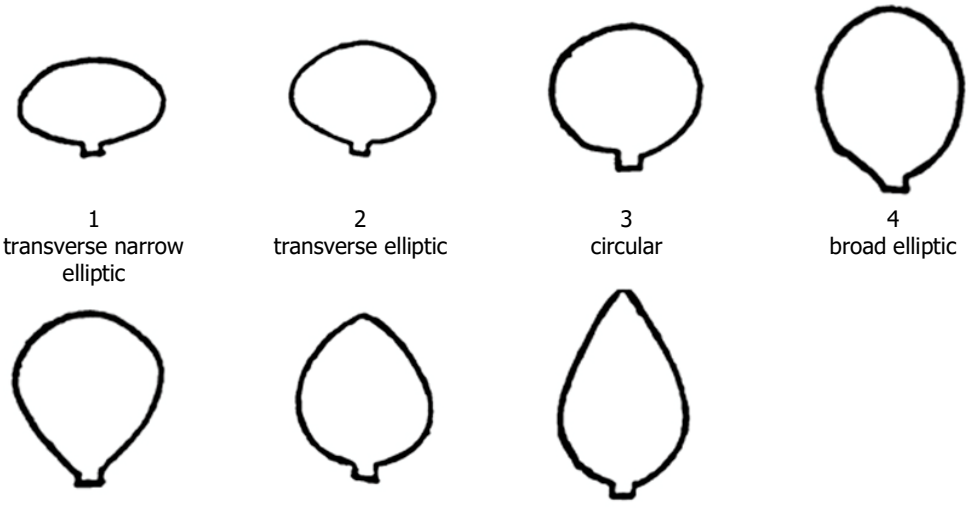
Ad. 10: Savoy cabbage varieties only: Outer leaf: crimping

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

Ad. 11 and Ad. 25: Outer leaf (with wax): Head: colour 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
partly covered

3
covered

Ad. 30: Head: density

1
very loose

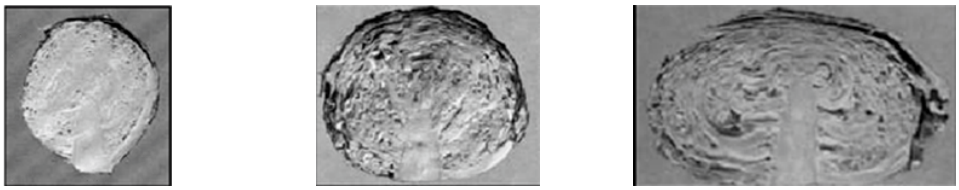
3
loose

5
medium

7
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 test[1].

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 coloured 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.

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

Records must be taken under conditions of controlled infection.

Maintenance of races

Type of medium:	on agar medium at 20*C
Special conditions:	multiplication by passing on parts of the agar medium to liquid Czapek-Dox-Broth. This liquid medium must be shaken permanently.

Execution of test

Growth stage of plants:	young plants, about two weeks after sowing
Temperature:	about 25*C
Light:	normal glasshouse conditions

[1] 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.

Growing method:	seeds sown in peat soil at rather low temperature: 12 – 14 °C during daytime and 10 – 12 °C during night time
Method of inoculation:	roots of lifted young plants are soaked for 5 minutes in a suspension of spores and parts of mycelium, thereafter, replanting
Duration of test:	
- from sowing to inoculation:	2 weeks
- from inoculation to reading:	first symptoms 7 days after inoculation, final reading 18 days after inoculation
Number of plants tested:	20
Remarks:	The disease might be a quarantine-disease in some countries. Race 1 of this pathogen is common; very rarely other races occur.

Ad. 37 to 40: 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[2] (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)[3]
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
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.

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

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 galling class 1 = a few small galls class 2 = 2a or 2b (2a = moderate galling; 2b = slight swelling of the main root and browning and ultimately death of all lateral roots) class 3 = severe galling
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.


class 0


class 1


class 2a


class 2b


class 3

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

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10. TECHNICAL QUESTIONNAIRE

The Technical Questionnaire is available on the CPVO website under the following reference:
CPVO-TQ/048/3 Rev.4 - *Brassica oleracea* L. var. *capitata* L. – cabbage

Link to e-TQ:

https://online.plantvarieties.eu/backOfficeFormQuestions?viewFormId=17739&viewFormType=TQ&viewFormLang=EN&commonName=cabbage&type=2&status=2&order=formName