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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT**KALE**

UPOV Code(s): BRASS_OLE_COS;
BRASS_OLE_GAM; BRASS_OLE_GAS;
BRASS_OLE_GAV; BRASS_OLE_PAL

Brassica oleracea L. var. *costata* DC.;
Brassica oleracea L. var. *medullosa* Thell.;
Brassica oleracea L. var. *sabellica* L.;
Brassica oleracea L. var. *viridis* L.;
Brassica oleracea L. var. *palmifolia* DC.

GUIDELINES**FOR THE CONDUCT OF TESTS****FOR DISTINCTNESS, UNIFORMITY AND STABILITY**

*prepared by experts from Japan
to be considered by the
Technical Working Party for Vegetables
at its fifty-fifth session, to be held in Antalya, Turkey,
from 2021-05-03 to 2021-05-07*

Disclaimer: this document does not represent UPOV policies or guidance

* 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.]

Alternative names:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Brassica oleracea</i> L. var. <i>costata</i> DC.	Bedford cabbage, Braganza, Portugese cole, Portuguese kale, Seakale cabbage, Tronchuda cabbage, Tronchuda kale			
<i>Brassica oleracea</i> L. var. <i>medullosa</i> Thell.	Marrow-stem kale			
<i>Brassica oleracea</i> L. var. <i>sabellica</i> L.	Curly kale, Borecole, Dwarf Siberian kale, Kitchen kale, Scotch kale			
<i>Brassica oleracea</i> L. var. <i>viridis</i> L.	Collards, Cow cabbage, Fodder kale, Kale, Spring- heading cabbage, Tall kale, Tree kale			
<i>Brassica oleracea</i> L. var. <i>palmifolia</i> DC.	Giant Jersey kale, Jersey kale, Palm kale, Palm-tree kale, Tree kale			

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

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1. Subject of these Test Guidelines

- 1.1 These Test Guidelines apply to all varieties of *Brassica oleracea* L. var. *costata* DC., *Brassica oleracea* L. var. *medullosa* Thell., *Brassica oleracea* L. var. *sabellica* L., *Brassica oleracea* L. var. *viridis* L. and *Brassica oleracea* L. var. *palmifolia* DC.
- 1.2 Guidance on the use of Test Guidelines for inter-variant hybrids that are not explicitly covered by Test Guidelines is provided in document TGP/13 “Guidance for New Types and Species”.

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 seed or seedling.
- 2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

seed-propagated varieties: 20g or 5000 seeds
vegetatively propagated varieties: 30 plants

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. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant.

- 2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.
- 2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 *Number of Growing Cycles*

- 3.1.1 The minimum duration of tests should normally be two independent growing cycles.
- 3.1.2 The two independent growing cycles should be in the form of two separate plantings.
- 3.1.3 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”.

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 In the case of seed-propagated varieties, each test should be designed to result in a total of at least 40 plants which should be divided between at least 2 replicates.
- 3.4.2 In the case of vegetatively propagated varieties, each test should be designed to result in a total of at least 20 plants which should be divided between at least 2 replicates.
- 3.4.3 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 *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 differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

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

4.1.4 Number of Plants or Parts of Plants to be Examined

In the case of seed-propagated varieties, 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 observation made on all plants in the test, disregarding any off-type plants.

In the case of vegetatively propagated varieties, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 10 plants or parts taken from each of 10 plants and any other observation made on all plants in the test, disregarding any off-type 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 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 these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:
- 4.2.2 These Test Guidelines have been developed for the examination of cross-pollinated, self-pollinated (inbred line), hybrid varieties and vegetatively propagated varieties. For varieties with other types of propagation, the recommendations in the General Introduction 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 varieties should be according to the recommendations for cross-pollinated varieties in the General Introduction.
- 4.2.4 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.
- 4.2.5 For the assessment of uniformity of 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. In addition, for single cross hybrids, a population standard of 3% and an acceptance probability of at least 95% should be applied for inbred plants obviously resulting from the selfing of a parent line. In the case of a sample size of 40 plants, 3 inbred plants are allowed.
- 4.2.6 For the assessment of uniformity of vegetatively propagated varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 20 plants, 1 off-type is allowed.

4.3 *Stability*

- 4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.
- 4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed or plant stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

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 are aided by the use of grouping characteristics.
- 5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.
- 5.3 The following have been agreed as useful grouping characteristics:
- (a) Plant: position of growing point (characteristic 3)
 - (b) Leaf: color (characteristic 9)
 - (c) Leaf: anthocyanin coloration (characteristic 10)
 - (d) Leaf: variegation (characteristic 13)
 - (e) Leaf: number of lobes (characteristic 14)
- 5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 "Examining Distinctness".

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*

- 6.2.1 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.
- 6.2.2 All relevant states of expression are presented in the characteristic.
- 6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 "Development of Test Guidelines".

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*

	English			français		deutsch	español	Example Varieties Exemples Be ejemplo	Note
1	2	3	4	5	6	7			
	Name of characteristics in English			Nom du caractère en français		Name des Merkmals auf Deutsch	Nombre del carácter en español		
	states of expression			types d'expression		Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression

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

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

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

6 (a)-(c) See Explanations on the Table of Characteristics in Chapter 8.1

7 Not applicable

7. Table of Characteristics/Tableau des caract  res/Merkmalstabelle/Tabla de caracteres

	English		fran��ais		deutsch	espa��ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	QN	MS/VG	(+)	(a)				
	Plant: height							
	short							3
	medium						Darkibor, Lav opretvoksende, Marriot, Rossignol	5
	tall						Cottagers, Esthe, Fizz, Nero di Toscana, Redbor	7
2.	QN	MS/VG	(+)	(a)				
	Plant: diameter							
	small						Tintoreto	3
	medium						Darkibor, Dwarf Green Curled	5
	large						Cottagers, Esthe, Nero di Toscana	7
3. (*)	QN	VG	(+)	(a)				
	Plant: position of growing point							
	lower part						Esthe, Fizz	1
	middle part						Black Magic, Kobolt	3
	upper part						Dwarf Green Curled, Kadet, Westlandse Herfst	5
4.	QN	MS/VG	(+)	(a)				
	Plant: number of leaves							
	few						Fizz, Pentland Brig	1
	medium						Redbor, Westlandse Herfst	3
	many						Esthe, Winnetou	5
5.	QN	MS/VG		(a)				
	Stem: length							
	short						Lav opretvoksende, Rednex	3
	medium						Dwarf Green Curled, Fizz	5
	long						Cottagers	7

	English		fran��ais		deutsch	espa��ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6.	QN	MS/VG	(a)					
	Stem: diameter							
	small							3
	medium							5
	large							7
7.	PQ	VG	(+)	(a)				
	Young leaf of plant: color							
	yellow green						Esthe, Tintoreto	1
	green						Dwarf Green Curled	2
	grey green						Lerchenzungen	3
	blue green						Black Magic, Nero di Toscana	4
	red purple						Redbor, Rednex	5
8. (*)	QN	VG	(+)	(a), (b)				
	Leaf: attitude							
	erect						Esthe, Nero di Toscana	1
	semi-erect						Cottagers, Redbor	3
	horizontal						Marriot, Starmaker	5
9. (*)	PQ	VG	(a), (b)					
	Leaf: color							
	light green						Tintoreto	1
	medium green						Dwarf Green Curled, Esthe	2
	dark green						Kapitan	3
	grey green						Fizz	4
	blue green						Black Magic, Nero di Toscana	5
	reddish green						Redbor	6
	purple						Rednex	7
10 (*)	QN	VG	(+)	(a), (b)				
	Leaf: anthocyanin coloration							
	absent						Esthe, Lerchenzungen, Pentland Brig	1
	partially present						Cottagers, Starmaker	2
	entirely present						Redbor, Rednex	3

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11	QN	VG	(+)	(a), (b)				
	Leaf: intensity of anthocyanin coloration of main vein							
	absent or very weak							1
	weak						Ragged Jack	2
	medium						Midnight Sun, Starmaker	3
	strong						Redbor, Rednex	4
	very strong							5
12	QN	VG	(+)	(b)				
	Leaf: intensity of anthocyanin coloration in winter							
	absent or very weak						Esthe	1
	weak						Cottagers, Ragged Jack	2
	medium							3
	strong						Midnight Sun, Redbor, Rednex	4
	very strong							5
13 (*)	QL	VG	(+)	(a), (b), (c)				
	Leaf: variegation							
	absent						Esthe	1
	present						Purple Varie	9
14	QN	MS/VG	(+)	(a), (b)				
	Leaf: number of lobes							
	absent or very few						Esthe, Nero di Toscana	1
	few						Cottagers	2
	medium						Pentland Brig	3
	many						Darkibor, Ragged Jack	4
	very many						Lerchenzungen	5
15 (*)	QN	MS/VG	(+)	(a), (b), (c)				
	Leaf blade: length							
	short						Redbor, Westlandse Herfst	3
	medium						Esthe, Lerchenzungen	5
	long						Nero di Toscana	7

	English		fran��ais		deutsch	espa��ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16	(*)	QN	MS/VG	(+)	(a), (b), (c)			
	Leaf blade: width							
	narrow						Dwarf Green Curled, Redbor	3
	medium						Cottagers, Esthe, Fizz	5
	broad						Beira	7
17	(*)	PQ	VG	(+)	(a), (b), (c)			
	Leaf blade: shape							
	very narrow elliptic						Nero di Toscana	1
	very narrow elliptic to narrow elliptic						Black Magic, Lerchenzungen	2
	narrow elliptic							3
	narrow elliptic to elliptic						Fizz	4
	elliptic						Esthe, Redbor, Tintoreto	5
	broad elliptic						Dauro	6
	circular						Beira	7
	transverse elliptic						Marriot, Starmaker	8
18		QN	MS/VG	(+)	(a), (b)			
	Leaf blade: number of incisions							
	absent or few						Esthe, Nero di Toscana	1
	medium						Westlandse Herfst	3
	many						Fizz, Ragged Jack	5
19	(*)	QN	VG	(+)	(a), (b)			
	Leaf blade: depth of incisions							
	absent or shallow						Esthe, Nero di Toscana	1
	medium						Starmaker	3
	deep						Fizz, Ragged Jack	5
20		QN	VG	(+)	(a), (b), (c)			
	Leaf blade: curvature of midrib							
	incurved						Starmaker	1
	straight						Midnight Sun	2
	slightly recurved						Esthe, Kadet, Lerchenzungen	3
	moderately recurved						Westlandse Winter	4
	strongly recurved						Westlandse Herfst	5
	very strongly recurved							6

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20	QN	VG	(+)	(a), (b), (c)				
	Leaf blade: curvature of midrib							
	incurved						Starmaker	1
	straight						Midnight Sun	2
	slightly recurved						Esthe, Kadet, Lerchenzungen	3
	moderately recurved						Westlandse Winter	4
	strongly recurved						Westlandse Herfst	5
	very strongly recurved							6
21	QN	VG	(+)	(a), (b), (c)				
	Leaf blade: blistering							
	absent or very weak						Starmaker	1
	weak						Esthe	3
	medium						Fizz	5
	strong						Black Magic, Nero di Toscana	7
22	QN	VG	(+)	(a), (b), (c)				
	Leaf blade: recurvature of margin							
	absent or weak						Esthe, Midnight Sun	1
	medium						Rossignol	2
	strong						Black Magic, Nero di Toscana	3
23	QN	VG	(+)	(a), (b), (c)				
	Leaf blade: folding in cross section							
	absent or very weak						Starmaker	1
	weak						Rossignol, Tintoreto	2
	medium						Dwarf Green Curled, Redbor	3
	strong						Lerchenzungen	4
	very strong							5
24	QN	VG	(+)	(a), (b), (c)				
	Leaf blade: undulation							
	absent or very weak						Black Magic, Nero di Toscana	1
	weak						Esthe, Starmaker	3
	medium						Cottagers	5
	strong							7

	English		fran��ais		deutsch	espa��ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25	QN	VG	(+)	(a), (b), (c)				
	Leaf blade: undulation of margin							
	absent or very weak						Cottagers, Esthe	1
	weak						Pentland Brig	2
	medium						Redbor	3
	strong						Dwarf Green Curled	4
	very strong						Westlandse Herfst	5
26	QN	MS/VG	(+)	(a), (b)				
	Petiole: length							
	absent or very short						Nero di Toscana, Starmaker	1
	short						Rossignol, Tintoreto	2
	medium						Halbhoher gr��ner krauser, Redbor	3
	long							4
	very long						Cottagers, Fizz	5
27	QN	MS/VG	(+)	(a), (b)				
	Petiole: width							
	very narrow							1
	narrow						Darkibor, Starmaker, Westlandse Herfst	2
	medium						Cottagers, Esthe, Halbhoher gr��ner krauser, Kobolt	3
	broad						Marriot	4
	very broad						Dauro	5
28	QL	MS/VG	(+)					
	Male sterility							
	absent							1
	present							9

8. Explanations on the Table of Characteristics

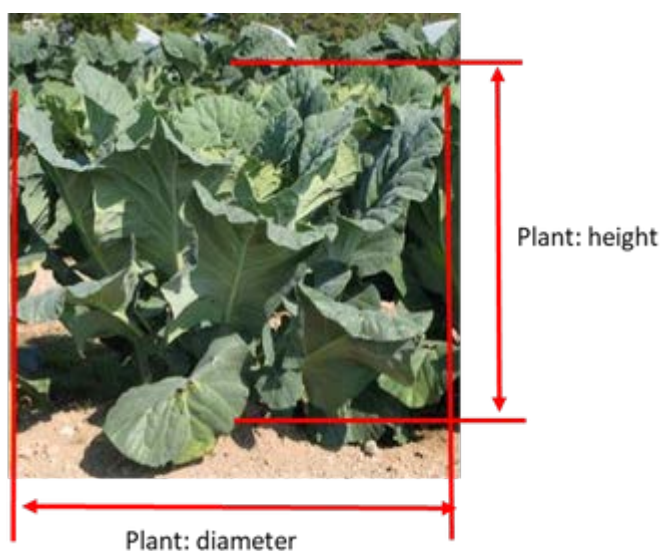
8.1 *Explanations covering several characteristics*

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

- (a) Observation should be made on the plants which grew for 3 to 5 months after sowing and when the lowest temperature is above 10 degrees Celsius.
- (b) Observation should be made on the fully developed leaves.
- (c) Leaf blade does not include the independent lateral lobes at the lower half of the leaf.

8.2 *Explanations for individual characteristics*

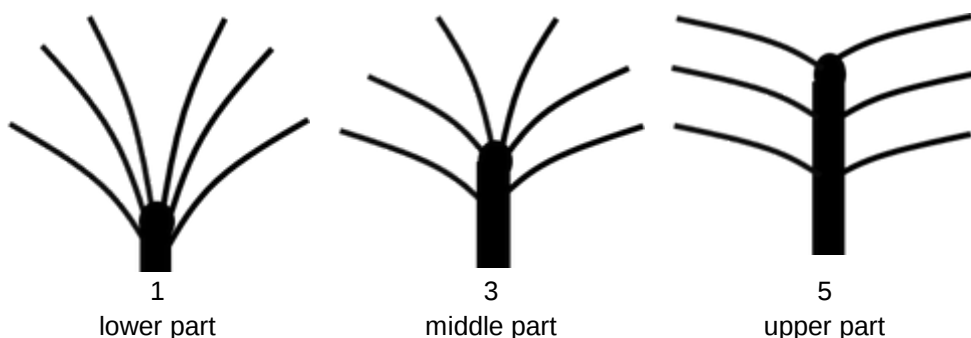
Ad. 1: Plant: height



Ad. 2: Plant: diameter

See Ad. 1

Ad. 3: Plant: position of growing point



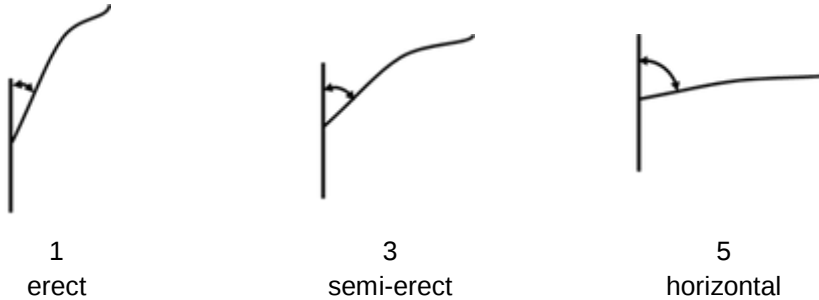
Ad. 4: Plant: number of leaves

Observation should be made on the number of the leaves of more than 10cm length.

Ad. 7: Young leaf of plant: color

Observation should be made on the top of (full grown) plants, not on leaves of young plants.

Ad. 8: Leaf: attitude



Ad. 10: Leaf: anthocyanin coloration

Observation should be made on upper side of the leaf including vein and petiole.

Ad. 11: Leaf: intensity of anthocyanin coloration of main vein

Observation should be made on the lower side of the leaf.

Ad. 12: Leaf: intensity of anthocyanin coloration in winter

Observation in winter should be made when the lowest temperature is below 5 degrees Celsius.

Ad. 13: Leaf: variegation



1
absent



9
present

Ad. 14: Leaf: number of lobes

Parts of the leaf blade are considered to be lobes if:

1. They have a minimum length of 1 cm and
2. When folded back to the midrib as shown in Figs 1 and 2, the folded tissue meets the midrib
3. their length is at least equivalent to the width of the leaf petiole at their point of attachment

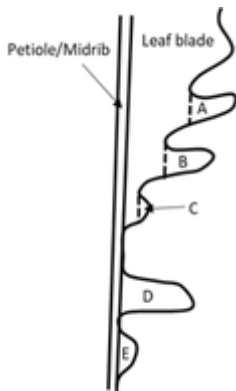


Figure 1

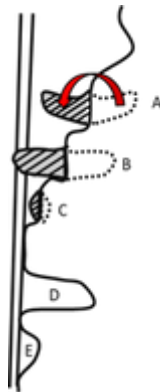
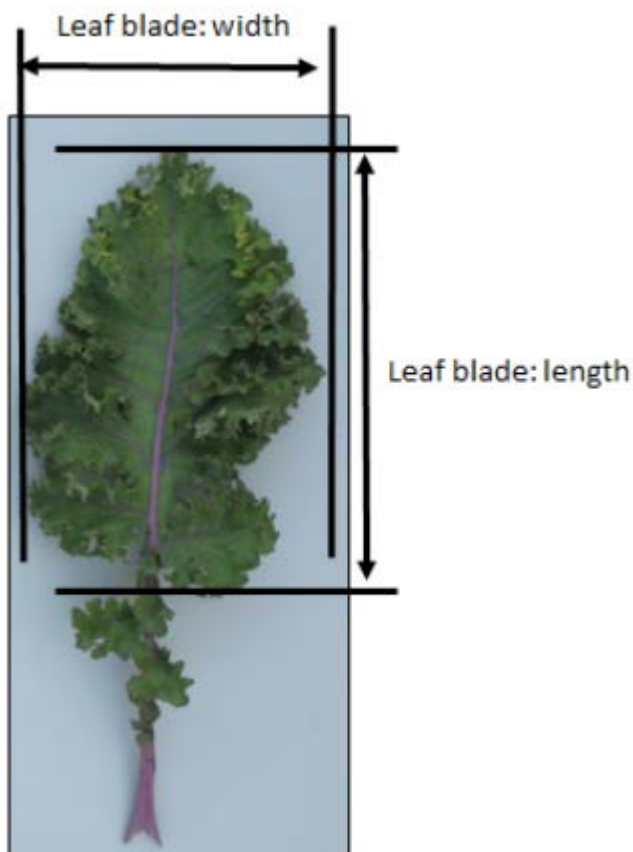


Figure 2

- A is not a lobe as it does not meet the midrib when folded
B is a lobe as it meets the midrib when folded
C is too small to be a lobe as it is less than 1 cm in length and does not meet the midrib when folded
D is lobe as the length is longer than the width of the leaf petiole at the point of attachment
E is not a lobe as the length is shorter than the width of the leaf petiole at the point of attachment

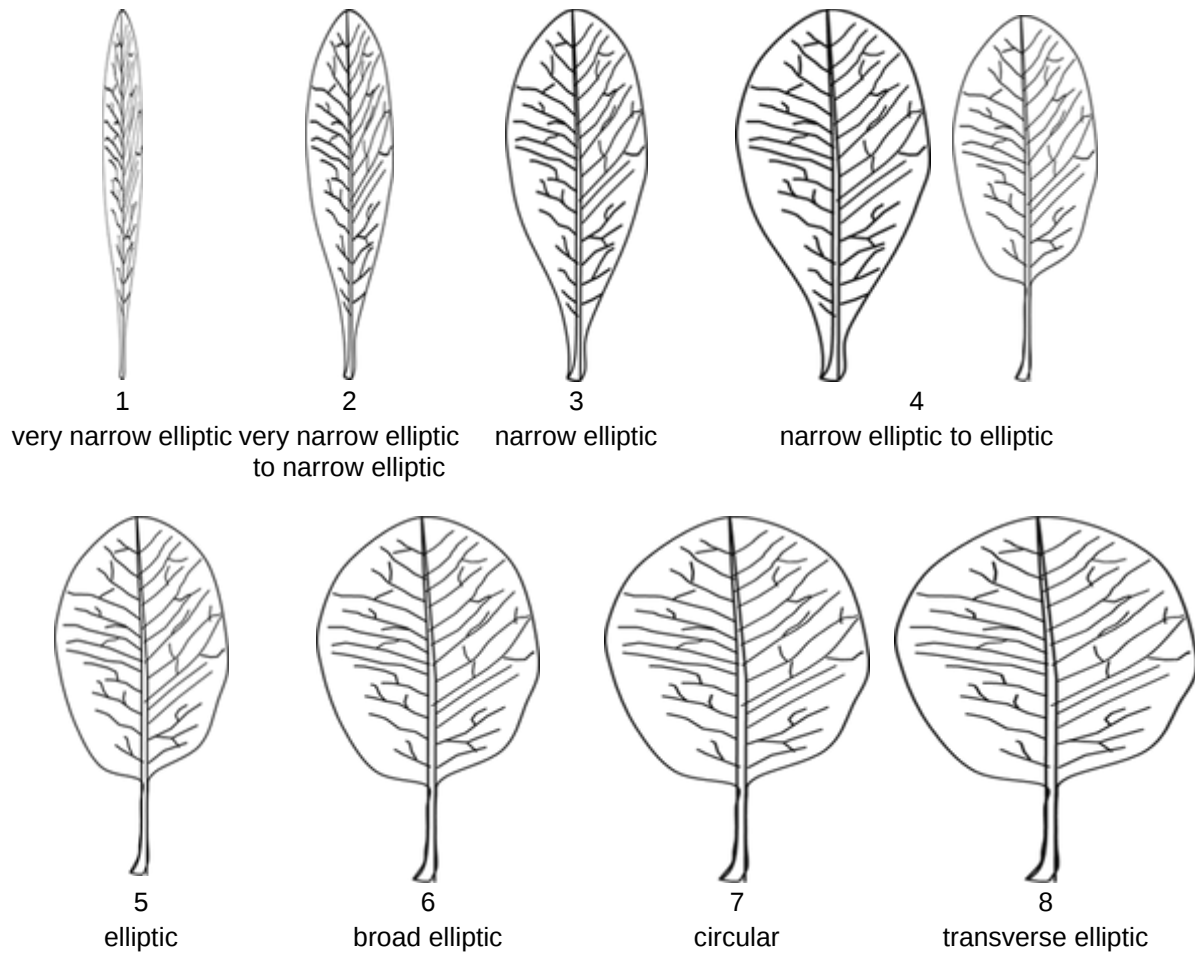
Ad. 15: Leaf blade: length



Ad. 16: Leaf blade: width

See Ad. 15

Ad. 17: Leaf blade: shape



Ad. 18: Leaf blade: number of incisions



Observation should be made on the extended leaf blade excluding the lobes.

Ad. 19: Leaf blade: depth of incisions

Observation should be made on upper third of the extended leaf blade.



1
absent or shallow



3
medium



5
deep

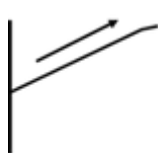
Ad. 20: Leaf blade: curvature of midrib

Observation should be made on the whole leaf shape, not on partial shape.

If almost of midrib is straight but the apical part of midrib is strongly recurved, it should be assessed straight.



1
incurved



2
straight



3
slightly recurved



4
moderately
recurved



5
strongly
recurved



6
very strongly
recurved

Ad. 21: Leaf blade: blistering



1
absent or very weak



3
weak



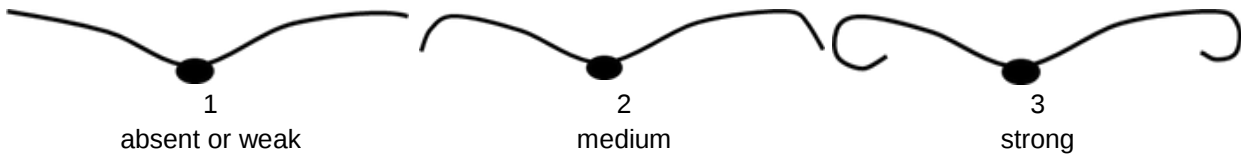
5
medium



7
strong

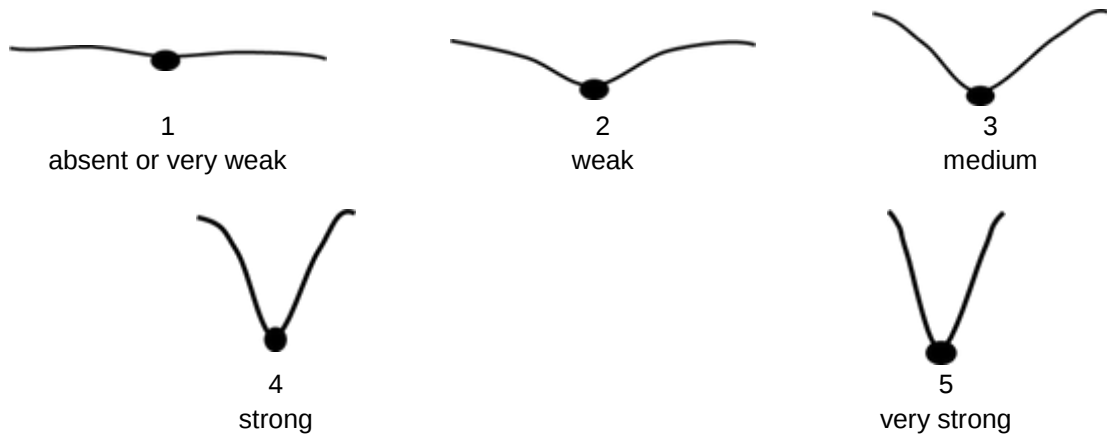
Ad. 22: Leaf blade: recurvature of margin

Observation should be made at the middle third of the leaf blade.

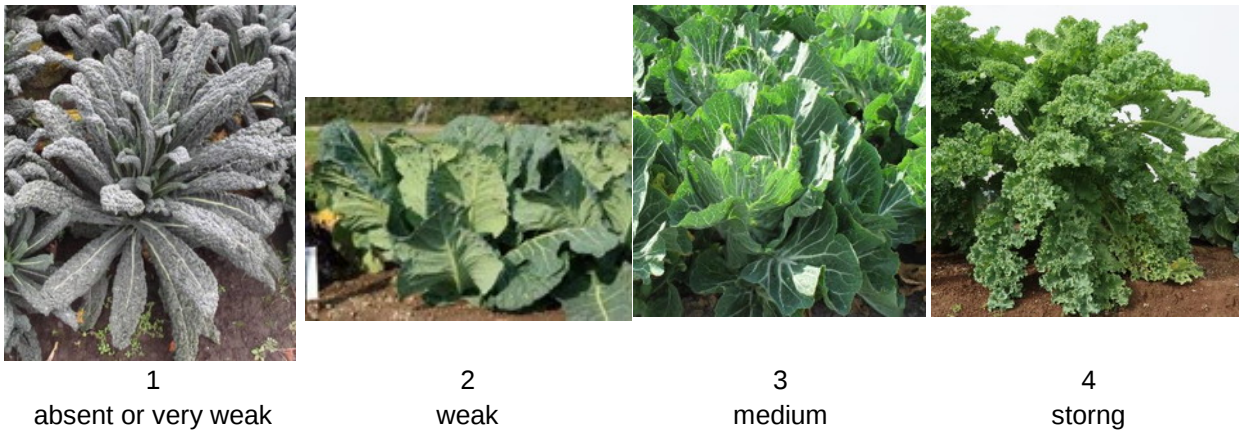


Ad. 23: Leaf blade: folding in cross section

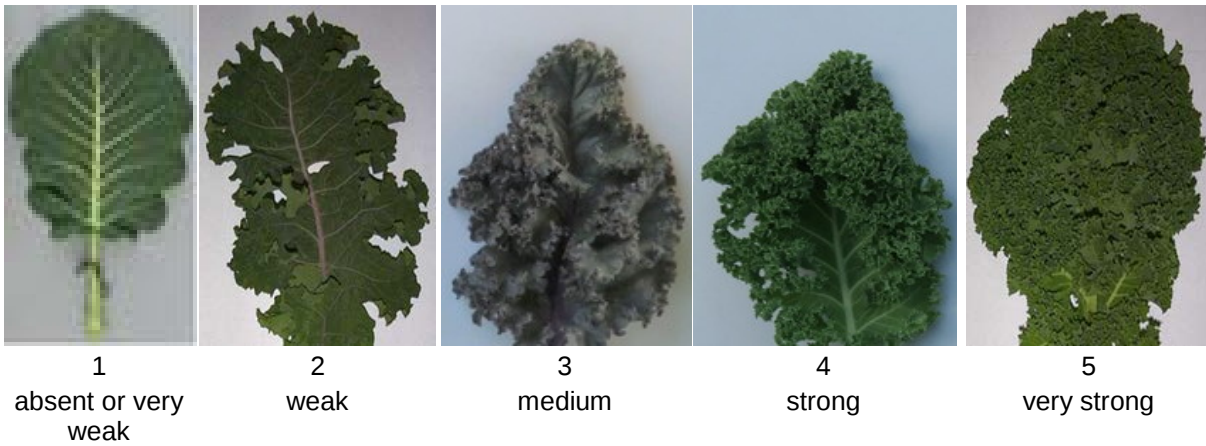
Observation should be made at the middle third of the leaf blade.



Ad. 24: Leaf blade: undulation

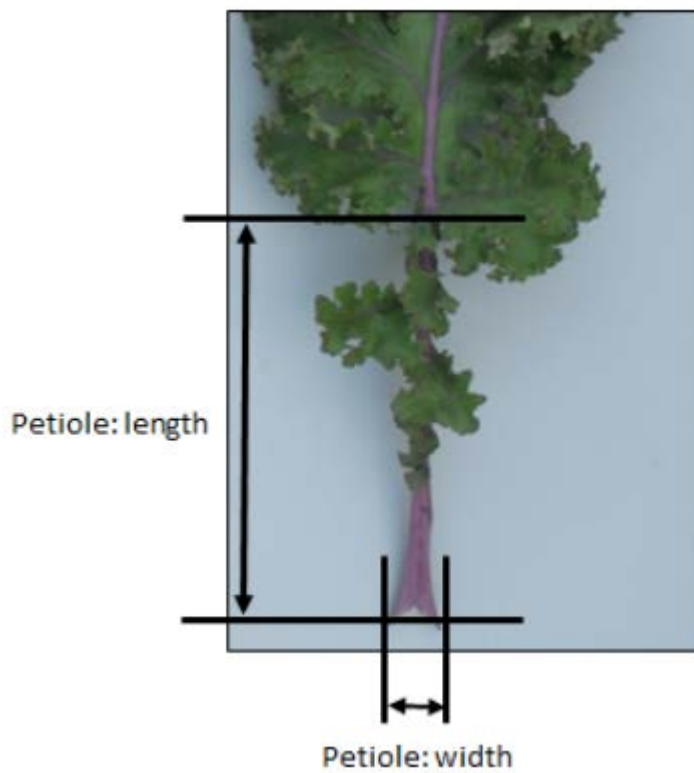


Ad. 25: Leaf blade: undulation of margin



Ad. 26: Petiole: length

Observation for 'Petiole: width' should be made at the base of petiole.



Ad. 27: Petiole: width

see Ad.25

Ad. 28: Male sterility

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

Field trial:

Check presence of pollen on stamen: if pollen on stamen is present then male sterility is absent; if pollen on stamen is absent then male sterility is present.

DNA marker test and/or field trial:

All varieties declared male sterile in the TQ can be examined in a field trial or in a DNA marker testⁱ. In the case of a DNA marker test, if the CMS marker appears to be not present, a field trial should be performed to observe whether the variety is male sterile (on another mechanism) or fertile. All varieties declared fertile are to be tested in a field trial.

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

i 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.

9. Literature

Akihiro Y., 2004: Yasai-engei-daihyakka 20. Shadanhojin Nousan-gyoson-bunkakyokai. Tokyo, JP. pp. 97 to 101

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Kaloo, G. and Bergh, B.O., 1993: Genetic Improvement of Vegetable Crops, 11 Kale. Pergamon Press. New York, US. pp.187 to 190

Langer, R.H.M., and Hill, G.D., 1982: Agricultural Plants 8, Cruciferae. Cambridge University Press. Cambridge, UK. pp.165 to 183

Lustinec, J., 1988: Biotechnology in Agriculture and Forestry 6. Ed. Y.P.S. Bajaj. Springer-Verlag Berlin, DE. pp.530 to 547

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Tsukamoto, Y., 1994: The Grand Dictionary of Horticulture Volume 1. The Shogakukan Ltd. Tokyo, JP. pp.829 to 830

Tsunoda, S., Hinata, K. and Gomez-Campo, C., 1980: Brassica Crops and Wild Allies. Biology and Breeding Japan Scientific Press. Tokyo, JP. pp.163 to 167

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			
1.	Subject of the Technical Questionnaire		
1.1.1	Botanical name	<i>Brassica oleracea</i> L. var. <i>costata</i> DC.	[]
1.1.2	Common name	Bedford cabbage, Braganza, Portugese cole, Portuguese kale, Seakale cabbage, Tronchuda cabbage, Tronchuda kale	
1.2.1	Botanical name	<i>Brassica oleracea</i> L. var. <i>medullosa</i> Thell.	[]
1.2.2	Common name	Marrow-stem kale	
1.3.1	Botanical name	<i>Brassica oleracea</i> L. var. <i>sabellica</i> L.	[]
1.3.2	Common name	Curly kale, Borecole, Dwarf Siberian kale, Kitchen kale, Scotch kale	
1.4.1	Botanical name	<i>Brassica oleracea</i> L. var. <i>viridis</i> L.	[]
1.4.2	Common name	Collards, Cow cabbage, Fodder kale, Kale, Spring-heading cabbage, Tall kale, Tree kale	
1.5.1	Botanical name	<i>Brassica oleracea</i> L. var. <i>palmifolia</i> DC.	[]
1.5.2	Common name	Giant Jersey kale, Jersey kale, Palm kale, Palm-tree kale, Tree kale	

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
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:
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#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 []
- (b) partially known cross []
- (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) Cross-pollination []
(i) Population []
(b) Hybrid []
(i) Single hybrid []
(c) Other (please provide details) []

4.2.2 Vegetative propagation

- (a) Cuttings []
(b) Other (state method) []

4.2.3 Other []
(Please provide details)

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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 Plant: height (1)		
short		3 []
medium	Darkibor, Lav opretvoksende, Marriot, Rossignol	5 []
tall	Cottagers, Esthe, Fizz, Nero di Toscana, Redbor	7 []
5.2 Plant: position of growing point (3)		
lower part	Esthe, Fizz	1 []
middle part	Black Magic, Kobolt	3 []
upper part	Dwarf Green Curled, Kadet, Westlandse Herfst	5 []
5.3 Leaf: attitude (8)		
erect	Esthe, Nero di Toscana	1 []
semi-erect	Cottagers, Redbor	3 []
horizontal	Marriot, Starmaker	5 []
5.4 Leaf: color (9)		
light green	Tintoreto	1 []
medium green	Dwarf Green Curled, Esthe	2 []
dark green	Kapitan	3 []
grey green	Fizz	4 []
blue green	Black Magic, Nero di Toscana	5 []
reddish green	Redbor	6 []
purple	Rednex	7 []
5.5 Leaf: anthocyanin coloration (10)		
absent	Esthe, Lerchenzungen, Pentland Brig	1 []
partially present	Cottagers, Starmaker	2 []
entirely present	Redbor, Rednex	3 []
5.6 Leaf: variegation (13)		
absent	Esthe	1 []
present	Purple Varie	9 []

Characteristics		Example Varieties	Note
5.7	Leaf blade: length		
(15)			
	short	Redbor, Westlandse Herfst	3 []
	medium	Esthe, Lerchenzungen	5 []
	long	Nero di Toscana	7 []
5.8	Leaf blade: width		
(16)			
	narrow	Dwarf Green Curled, Redbor	3 []
	medium	Cottagers, Esthe, Fizz	5 []
	broad	Beira	7 []
5.9	Leaf blade: shape		
(17)			
	very narrow elliptic	Nero di Toscana	1 []
	very narrow elliptic to narrow elliptic	Black Magic, Lerchenzungen	2 []
	narrow elliptic		3 []
	narrow elliptic to elliptic	Fizz	4 []
	elliptic	Esthe, Redbor, Tintoreto	5 []
	broad elliptic	Dauro	6 []
	circular	Beira	7 []
	transverse elliptic	Marriot, Starmaker	8 []
5.10	Leaf blade: depth of incisions		
(19)			
	absent or shallow	Esthe, Nero di Toscana	1 []
	medium	Starmaker	3 []
	deep	Fizz, Ragged Jack	5 []
5.11	Leaf blade: undulation of margin		
(25)			
	absent or very weak	Cottagers, Esthe	1 []
	weak	Pentland Brig	2 []
	medium	Redbor	3 []
	strong	Dwarf Green Curled	4 []
	very strong	Westlandse Herfst	5 []
5.12	Male sterility		
(28)			
	absent	Esthe, Westlandse Herfst	1 []
	present	Winnetou	9 []

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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6. Similar varieties and differences from these varieties

Please use the following table and box for comments 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>			
Comments:			

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

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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8. Authorization for release

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

Yes [] No []

- (b) Has such authorization been obtained?

Yes [] No []

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

9. Information on plant material to be examined or submitted for examination

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

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

- | | | | |
|-----|---|---------|--------|
| (a) | Microorganisms (e.g. virus, bacteria, phytoplasma) | Yes [] | No [] |
| (b) | Chemical treatment (e.g. growth retardant, pesticide) | Yes [] | No [] |
| (c) | Tissue culture | Yes [] | No [] |
| (d) | Other factors | Yes [] | No [] |

Please provide details for where you have indicated "yes".

.....

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

Applicant's name

Signature

Date

[End of document]