



INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

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

CURLY KALE

(Brassica oleracea L. var. sabellica L.)

GENEVA
2004 + 2014 + 2016

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These Guidelines should be read in conjunction with document TG/1/3, which contains explanatory notes on the general principles on which the Guidelines have been established.

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I. Subject of these Guidelines

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

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the seed required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. The minimum quantity of seed to be supplied by the applicant in one or several samples should be:

25 g or 6250 seeds.

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing seed in the country in which the application is made. The germination capacity should be as high as possible.

2. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

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

2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

3. The tests should be carried out under conditions ensuring normal growth. The size of the plots should be such that plants or parts of plants may be removed for measurement and counting without prejudice to the observations which must be made up to the end of the growing period. As a minimum, each test should include a total of 60 plants which should be divided between two or more replicates. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions.

4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. Unless otherwise indicated, all observations determined by measurement, weighing or counting should be made on 20 plants or parts taken from each of 20 plants.

2. For the assessment of uniformity of open-pollinated and hybrid varieties, relative uniformity standards should be applied.

3. Unless otherwise indicated, all observations on the leaves should be made on fully developed leaves which show no sign of senescence.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

2. It is recommended that the competent authorities use the following characteristics for grouping varieties:

- (a) Leaf: anthocyanin coloration (characteristic 5)
- (b) Leaf: color of fully developed leaf (characteristic 8).

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Table of Characteristics should be used.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of the different characteristics.

3. Legend:

(*) Characteristics that should be used on all varieties in every growing cycle over which the examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

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

(1) The optimum stage of development (growth key) for the assessment of each characteristic is indicated by a number in the second column. The stages of development (growth key) denoted by each number are described at the end of Chapter VIII.

VII. Table of Characteristics/Tableau des caract res/Merkmaletabelle/Tabla de caracteres

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. 220-240 (* (*)	Plant: height	Plante: hauteur	Pflanze: H�he	Planta: altura		
	short	basse	niedrig	baja	Niedriger gr�ner krauser	3
	medium	moyenne	mittel	media	Frosty, Hammer	5
	tall	haute	hoch	alta	Westlandse Herfst	7
2. 220-240	Plant: diameter	Plante: diam�tre	Pflanze: Durchmesser	Planta: di�metro		
	small	petit	klein	peque�o		3
	medium	moyen	mittel	medio	Spurt	5
	large	grand	gro�	grande	Hammer	7
3. 140-240 (* (*) (+)	Plant: shape (fully developed plants)	Plante: forme (plante compl�tement d�velopp�e)	Pflanze: Form (Pflanze ausgewachsen)	Planta: forma (plantas completamente desarrolladas)		
	inverted pyramid	pyramidale renvers�e	verkehrt pyramidenf�rmig	pir�mide invertida	Lerchenzungen	1
	flat	plane	flach	plana	Kobolt	2
	dome	en d�me	kuppelf�rmig	cupuliforme	Fribor	3
	pyramid	pyramidale	pyramidenf�rmig	piramidal	Mossbor	4
	column	colonnaire	s�ulenf�rmig	columnar	Arsis, Westlandse Herfst	5

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4. 140-180 (+)	<u>Only varieties of dome, pyramid or column shape:</u> Plant: position of growing point in relation to top of plant	<u>Vari�t�s en d�me, pyramidales ou cylindriques</u> seulement: Plante: position du point v�g�tatif par rapport au sommet de la plante	<u>Nur kuppelf�rmige, pyramidenf�rmige oder s�ulenf�rmige</u> Sorten: Pflanze: Position des Vegetationspunkts im Verh�ltnis zum obersten Pflanzenteil	<u>S�lo variedades cupuliformes, piramidales o columnares:</u> Planta: posici�n del punto vegetativo en relaci�n con el extremo superior de la planta		
	same level	au m�me niveau	auf gleicher H�he	al mismo nivel	Pentland Brig, Lavopretvoksende	1
	slightly below	faiblement au-dessous	leicht unterhalb	ligeramente por debajo	Spurt	2
	deeply below	fortement au-dessous	weit unterhalb	muy por debajo	Moosbor	3
5. 60-220 (*)	Leaf: anthocyanin coloration	Feuille: pigmentation anthocyanique	Blatt: Anthocyanf�rbung	Hoja: pigmentaci�n antocianica		
	absent	absente	fehlend	ausente	Lerchenzungen, Pentland Brig	1
	present	pr�sente	vorhanden	presente	Garna Red	9
6. 140-180	Leaf: distribution of anthocyanin coloration	Feuille: distribution de la pigmentation anthocyanique	Blatt: Verteilung der Anthocyanf�rbung	Hoja: distribuci�n de la pigmentaci�n autoci�nica		
	partial	partielle	partiell	parcial	Cottagers	1
	entire leaf	feuille enti�re	am gesamten Blatt	en la hoja completa	Garna Red, Redbor	2
7. 140-180	Leaf: color of <u>young</u> leaf	Feuille: couleur de la feuille <u>jeune</u>	Blatt: Farbe des <u>jungen</u> Blattes	Hoja: color de la hoja <u>joven</u>		
	yellow green	vert-jaune	gelbgr�n	verde amarillento	Frosty, Hammer	1
	green	verte	gr�n	verde	Dwarf Green Curled	2
	grey green	vert-gris	graugr�n	verde gris	Lerchenzungen	3
	blue green	vert-bleu	blaugr�n	verde azul	Vates	4
	red or purple	rouge ou pourpre	rot oder purpurn	rojo o p�rpura	Garna Red	5

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8. 140-180 (*)	Leaf: color of fully developed leaf	Feuille: couleur de la feuille <u>compl�tement d�velopp�e</u>	Blatt: Farbe des <u>voll entwickelten</u> Blattes	Hoja: color de la <u>hoja completamente desarrollada</u>		
	yellow green	vert-jaune	gelbgr�n	verde amarillento	Hammer	1
	green	verte	gr�n	verde	Frosty	2
	grey green	vert-gris	graugr�n	verde gris	Lerchenzungen	3
	blue green	vert-bleu	blaugr�n	verde azul	Vates	4
	red or purple	rouge ou pourpre	rot oder purpurn	rojo o p�rpura	Garna Red	5
9. 140-180 (*)	Leaf: intensity of color of <u>fully developed</u> leaf	Feuille: intensit� de la couleur de la <u>feuille compl�tement d�velopp�e</u>	Blatt: Intensit�t der <u>Farbe des voll entwickelten</u> Blattes	Hoja: intensidad del color de la <u>hoja completamente desarrollada</u>		
	light	claire	hell	claro		3
	medium	moyenne	mittel	medio		5
	dark	fonc�e	dunkel	oscuro		7
10. 140-180 (*)	Leaf blade: shape	Limbe: forme	Blattspreite: Form	Limbo: forma		
	very narrow elliptic	elliptique tr�s �troit	sehr schmal elliptisch	el�ptica muy estrecha	Lerchenzungen	1
	very narrow elliptic to narrow elliptic	elliptique tr�s �troit � elliptique �troit	sehr schmal elliptisch bis schmal elliptisch	el�ptica muy estrecha a el�ptica estrecha	Kobolt	2
	narrow elliptic	elliptique �troit	schmal elliptisch	el�ptica estrecha	Hammer	3
	narrow elliptic to elliptic	elliptique �troit � elliptique	schmal elliptisch bis elliptisch	el�ptica estrecha a el�ptica	Frosty, Halbhoher gr�ner krauser	4
	elliptic	elliptique	elliptisch	el�ptica	Westlandse Herfst	5
11. 140-180 (*)	Leaf blade: length	Limbe: longueur	Blattspreite: L�nge	Limbo: longitud		
	short	court	kurz	corto	Vates	3
	medium	moyen	mittel	medio	Spurt	5
	long	long	lang	largo	Lerchenzungen	7

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12. 140-180 (* (*)	Leaf blade: width	Limbe: largeur	Blattspreite: Breite	Limbo: anchura		
	narrow	�troit	schmal	estrecho	Vates	3
	medium	moyen	mittel	medio	Spurt	5
	broad	large	breit	ancho	Westlandse Herfst	7
13. 140-180 (+ (+)	Leaf blade: curvature of midrib	Limbe: courbure de la nervure m�diane	Blattspreite: Biegung der Mittelrippe	Limbo: curvatura del nervio central		
	weak	faible	gering	d�bil	Lerchenzungen	3
	medium	moyenne	mittel	media	Hammer	5
	strong	forte	stark	fuerte	Halbhoher gr�ner krauser	7
14. 140-180 (* (+)	Leaf blade: density of “curling” (leaves at middle of plant)	Limbe: densit� de “frisure” (des feuilles au milieu de la plante)	Blattspreite: Dichte der “Kr�uselung” (Bl�tter in der Pflanzenmitte)	Limbo: densidad del “rizado” (las hojas en la mitad de la planta)		
	absent or very low	absente ou tr�s faible	fehlend oder sehr gering	ausente o muy baja	Cottagers	1
	low	faible	gering	baja	Garna Red, Pentland Brig	3
	medium	moyenne	mittel	media	Dwarf Green Curled	5
	high	grande	hoch	alta	Halbhoher gr�ner krauser, Westlandse Herfst	7
15. 140-180 (+ (+)	Leaf blade: folding in cross section	Limbe: pliure en section transversale	Blattspreite: Faltung im Querschnitt	Limbo: plegado en secci�n transversal		
	weak	faible	gering	d�bil	Pentland Brig	3
	medium	moyenne	mittel	medio	Vates	5
	strong	forte	stark	fuerte	Lerchenzungen	7

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16. 140-180 (*)	Petiole: attitude at middle of plant	P�t�ole: port au milieu de la plante	Blattstiel: Haltung in der Pflanzenmitte	Pec�olo: porte a la mitad de la planta		
	erect	dress�	aufrecht	erecto	Arsis	1
	semi-erect	demi-dress�	halbaufrecht	semi-erecto	Vates	3
	horizontal	horizontal	waagrecht	horizontal	Kobolt	5
17. 180-220	Petiole: length	P�t�ole: longueur	Blattstiel: L�nge	Pec�olo: longitud		
	short	court	kurz	corto	Fribor	3
	medium	moyen	mittel	medio	Spurt	5
	long	long	lang	largo	Halbhoher gr�ner krauser	7
18. 180-220	Petiole: width	P�t�ole: largeur	Blattstiel: Breite	Pec�olo: anchura		
	narrow	�troit	schmal	estrecho	Hammer	3
	medium	moyen	mittel	medio	Halbhoher gr�ner krauser	5
	broad	large	breit	ancho		7
19. VG/MSⁱ (+)	Male sterility	St�rilit� m�le	M�nnliche Sterilit�t	Androesterilidad		
QLⁱⁱ	absent	absente	fehlend	ausente	Buffalo, Westlandse Herfst	1
	present	pr�sente	vorhanden	presente	Winnetou	9

i See document TGP/7 “Development of Test Guidelines”, Annex 3 “Guidance Notes (GN) for the TG Template”, GN 25 “Recommendations for conducting the examination” (http://www.upov.int/edocs/tgpdocs/en/tgp_7.pdf)

ii See document TGP/7 “Development of Test Guidelines”, Annex 3 “Guidance Notes (GN) for the TG Template”, GN 20 “Presentation of characteristics: States of expression according to type of expression of a characteristic”, 2. “Qualitative Characteristics” (http://www.upov.int/edocs/tgpdocs/en/tgp_7.pdf)

VIII. Explanations on the Table of Characteristics

Ad. 3: Plant: shape (fully developed plants)



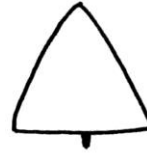
1
inverted
pyramid



2
flat



3
dome



4
pyramid



5
column

Ad. 4: Plant: position of growing point in relation to the top of plant



1
same level



2
slightly below

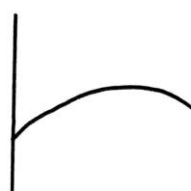


3
deeply below

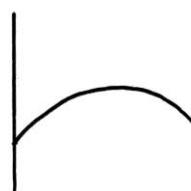
Ad. 13: Leaf blade: curvature of midrib



3
weak



5
medium



7
strong

Ad. 14: Leaf blade: density of “curling” (leaves at middle of plant)



1
absent or very low



3
low

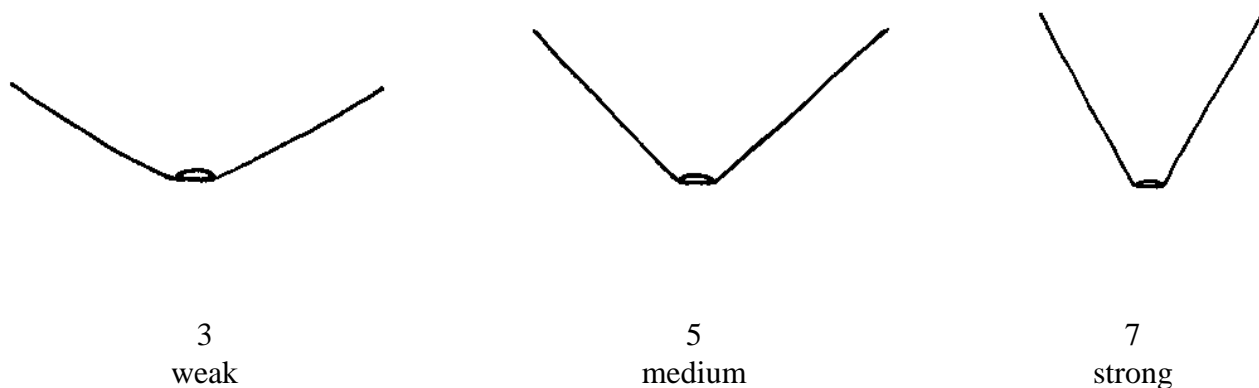


5
medium



7
high

Ad. 15: Leaf blade: folding in cross section



Ad. 19: 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 on the TQ can be examined in a field trial or in a DNA marker testⁱⁱⁱ. 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.

ⁱⁱⁱ 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.

Key for growth stage (Growth key):

00	dry seed
10	germination
15	fully opened cotyledons
20	early growth of first true leaf
25	early growth of second true leaf
30	first true leaf fully developed
40	second true leaf fully developed
50	third true leaf fully developed
60	fourth true leaf fully developed
100	new leaves developing rapidly
110	early stem formation
140	plant developing mature shape
160	lower leaves becoming coarse and large
180	middle leaves well developed, but not too coarse
200	stem fully developed becoming woody
220	plant fully developed with mature shape
240	lower leaves beginning to senesce
260	leaves at lower and middle part of plant senescing
280	very slow development of new leaves
400	initiation of flowering

X. Literature

IBPGR, 1990: “Descriptors of *Brassica* and *Raphanus*”, International Board for Plant Genetic Resources, Rome.

Kaloo, G. and Bergh, B.O., 1993: “Genetic Improvement of Vegetable Crops, 11 Kale”, 187-190, Pergamon Press, New York.

Langer, R.H.M., and Hill, G.D., 1982: “Agricultural Plants 8, Cruciferae”, 165-183, Cambridge University Press, Cambridge.

Lustinec, J., 1988: “III. 11 Kale (*Brassica oleracea* L. var. *acephala*, *medullosa*, *ramosa*, *sabellica*)”, 530-547, in: Biotechnology in Agriculture and Forestry 6. Ed: Y.P.S. Bajaj, Springer-Verlag Berlin.

Nieuwhof, M., 1969: “Cole Crops: Botany, Cultivation and Utilisation”, Leonard Hill, London.

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

X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)
TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights	
<p>1. Species: <i>Brassica oleracea</i> L. var. <i>sabellica</i> L.</p> <p style="text-align: center;">CURLY KALE</p>	
<p>2. Applicant (Name and address)</p>	
<p>3. Proposed denomination or breeder's reference</p>	

4. Information on origin, maintenance and reproduction of the variety

4.1 Origin and breeding method

- | | |
|-----------------------------|-----|
| (a) Open-pollinated variety | [] |
| (b) Single hybrid | [] |
| (c) Three-way hybrid | [] |
| (d) Other (indicate type) | [] |

.....

4.2 Other information

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

Characteristics	Example Varieties	Note
5.1 Plant: height (1)		
short	Niedriger grüner krauser	3[]
medium	Frosty, Hammer	5[]
tall	Westlandse Herfst	7[]
5.2 Plant: shape (fully developed plants) (3)		
inverted pyramid	Lerchenzungen	1[]
flat	Kobolt	2[]
dome	Fribor	3[]
pyramid	Mossbor	4[]
column	Arsis, Westlandse Herfst	5[]
5.3 Leaf: anthocyanin coloration (5)		
absent	Lerchenzungen, Pentland Brig	1[]
present	Garna Red	9[]
5.4 Leaf: color of <u>fully developed leaf</u> (8)		
yellow green	Hammer	1[]
green	Frosty	2[]
grey green	Lerchenzungen	3[]
blue green	Vates	4[]
red or purple	Garna Red	5[]

Characteristics	Example Varieties	Note
5.5 Leaf blade: shape (10)		
very narrow elliptic	Lerchenzungen	1[]
very narrow elliptic to narrow elliptic	Kobolt	2[]
narrow elliptic	Hammer	3[]
narrow elliptic to elliptic	Frosty, Halbhoher grüner krauser	4[]
elliptic	Westlandse Herfst	5[]
5.6 Leaf blade: length (11)		
short	Vates	3[]
medium	Spurt	5[]
long	Lerchenzungen	7[]
5.7 Leaf blade: width (12)		
narrow	Vates	3[]
medium	Spurt	5[]
broad	Westlandse Herfst	7[]
5.8 Leaf blade: density of “curling” (leaves at middle of plant) (14)		
absent or very low	Cottagers	1[]
low	Garna Red, Pentland Brig	3[]
medium	Dwarf Green Curled	5[]
high	Halbhoher grüner krauser, Westlandse Herfst	7[]
5.9 Petiole: attitude at middle of plant (16)		
erect	Arsis	1[]
semi-erect	Vates	3[]
horizontal	Kobolt	5[]

6. Similar varieties and differences between these varieties

Denomination of similar variety	Characteristic in which the similar variety is different ^{o)}	State of expression of similar variety	State of expression of candidate variety
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^{o)} In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 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 that question is yes, please attach a copy of such an authorization.

[End of document]