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WORKING PAPER ON TEST GUIDELINES FOR CURLY KALE
(*Brassica oleracea* L. convar. *acephala* (DC.) Alef. var. *sabellica* L.)

Document prepared by experts from the United Kingdom

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
I. Subject of these Guidelines	3
II. Material Required	3
III. Conduct of Tests	3
IV. Method and Observations	3
V. Grouping of Varieties	4
VI. Characteristics and Symbols	4
VII. Table of Characteristics	5
VIII. Explanations on the Table of Characteristics	9
XI Growth Key	12
X. Literature	13
XI. Technical Questionnaire	14

I. Subject of these Guidelines

These Test Guidelines apply to all varieties of Curly Kale (*Brassica oleracea* L. convar. *acephala* (DC.) Alef. 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:

30g

20g for F1 hybrids

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing standard 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 similar growing periods.
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 80 plants which should be divided between 2 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. All observations determined by measurement or counting should be made on 20 plants or parts of 20 plants.

2. All plants indicated under Chapter III above should be used for the testing of uniformity. For F1 hybrids a population standard of 1% with an acceptance probability of at least 95% should be applied. In the case of a population size of 80 plants, the maximum number of off-types allowed would be 2.

3. Unless otherwise indicated, all observations on the foliage 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 blade: anthocyanin pigmentation (characteristic 5)
- (b) Leaf blade: foliage colour (characteristic 8)
- (c) Leaf: type (characteristic 10)
- (d) Leaf blade: density of 'curling' (characteristic 15)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the 4 UPOV working languages in the Table of Characteristics should be used. Additional information on the characteristics can be found in the Annex to this document.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic.

3. Legend:

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

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

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

VII. Table of Characteristics/Tableau des caracteres/Merkmalstabelle

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 1. Plant: height		short	basse	niedrig	Niedriger gruner krauser	3
Plante: hauteur		medium	moyenne	mittel	Frosty, Harrier	5
Pflanze: Hohe		tall	haute	hoch	Westlandse Herfst	7
2. Plant:width		narrow	etroite	schmall		3
Plante: largeur		medium	moyenne	mittel	Spurt	5
Pflanze: Breite		broad	large	lang	Hammer	7
(*) 3. Plant: shape (fully grown plants prior to senescence)		inverted pryamid				1
(+)		prostrate				2
		dome				3
		pyramid				4
		column				5
4. Plant: position of growing (+) point in relation to top of plant		very low				1
		low				3
		level				5
(*) 5. Plant: anthocyanin pigmentation		absent			Pentland Brig, Lerchenzungen	1
		present			Garna Red	9
6. Plant: distribution of anthocyanin pigmentation		petiole and midrib				1
		petiole, midrib and leaf blade margin				2
		entire leaf blade			Garna Red	3

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
7. Leaf blade: color of young leaf		yellow green	vert-jaune	gelbgrun	Frosty, Hammer	1
		green	vert	grun	Dwarf Green Curled	2
	Limbe: couleur de la feuille jeune	grey green	vert-gris	graugrun	Lerchenzungen	3
Blattspreite: Farbe des jungen Blattes		blue green	vert-bleu	blaugrun	Vates	4
		blue	bleu	blau	Nero di Toscan precoce	5
		red or purple	rouge pourple	rot	Garna Red	6
(*) 8. Leaf blade: color of fully developed leaf		yellow green			Hammer	1
		green			Frosty	2
		grey green			Lerchemzungen	3
		blue green			Vates	4
		blue			Nero di Toscana precoce	5
		red or purple			Garna Red	6
9. Leaf: intensity of color of fully developed leaf		light				3
		medium				5
		dark				7
(*) 10. Leaf : type		entire			Nero di Toscana	1
		lobed			Pentland Brig, Lerchenzungen	9
(*) 11. Leaf blade: shape (for (+) varieties with 'curled' leaves only)		very narrow elliptic			Lerchenzungen	1
		very narrow elliptic to narrow elliptic				2
		narrow elliptic			Hammer	3
		narrow elliptic to elliptic			Frosty, Halbhoher gruner krauser	4
		elliptic				5

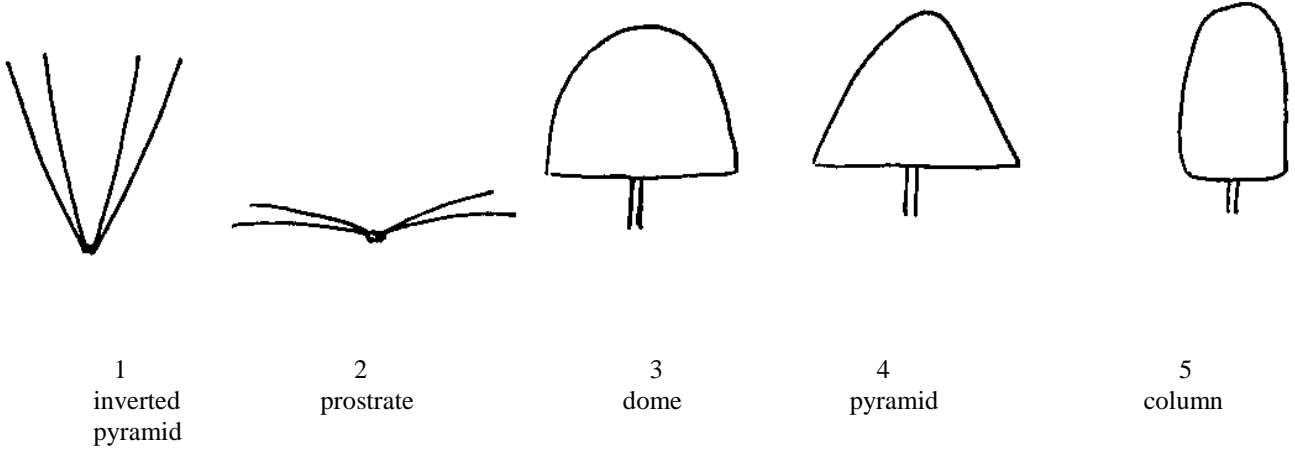
Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) 12. Leaf blade: length	00	short			Vates	3
		medium			Spurt	5
		long			Lerchenzungen	7
(*) 13. Leaf blade: width		narrow			Vates	3
		medium			Spurt	5
		broad			Westlandse Herfst	7
14. Leaf blade: curvature of [+] midrib		weak			Lerchenzungen	3
		medium			Hammer	5
		strong			Halbhoher gruner krauser	7
(*) 15. Leaf blade: density of (+) 'curling' (on leaves on middle of the plant)		flat leaf with coarse margin undulation			Pentland Brig	1
		medium margin undulation with small area of flat leaf visible			Garna Red	2
		fine margin undulation with small area of flat leaf visible			Westlandse Herfst	3
		fine margin undulation with no flat leaf visible			Halbhoher gruner krauser	4
16. Leaf blade: blistering		absent	absente		Lerchenzungen	1
		present	present		Nero di Toscana precoce	9
17. Leaf blade: folding in [+] transverse section		weak	faible	gering	Pentland Brig	3
		medium	moyenne	mittel		5
Limbe: concavite en section transversaler		strong	forte	breit	Lerchenzungen	7

Characteristics Caracteres Merkmale	Growth Key	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 18. Petiole: attitude at middle of plant Petiole: port Blattstiel: Stellung		erect	arresse	aufrecht		1
		semi-erect	deimi-arresse	halbaufrecht	Vates	3
		horizontal	horizontal	waagerecht	Hammer	5
19. Petiole: length Petiole: longueur Blattstiel: Lange		short	court	kurz	Fribor	3
		medium	moyenne	mittel	Spurt	5
		long	long	lang	Halbhoher gruner krauser	7
20. Petiole: width Petiole: largeur Blattstiel: Breite		narrow	etroit	schmal	Hammer	3
		medium	moyen	mittel	Halbhoher gruner krauser	5
		broad	large	breit		7
21. Time of senescence of first leaf		very early				1
		early				3
		medium				5
		late				7
		vey late				9

VIII. Explanations and methods/explications et methodes/Erläuterungen und methoden

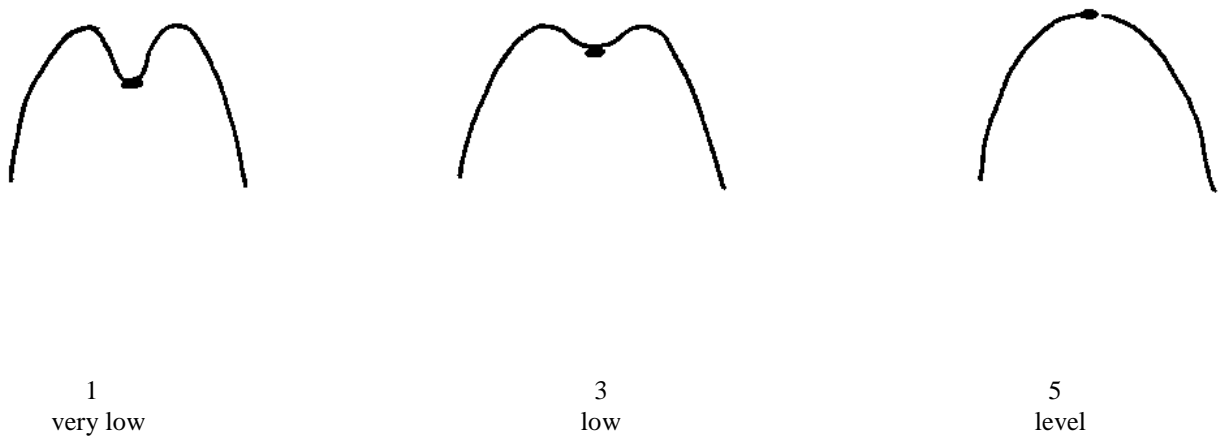
Ad/Add.Zu 3

Plant: shape



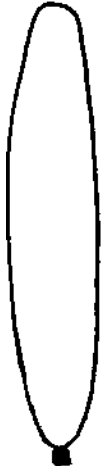
Ad/Add./Zu 4

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

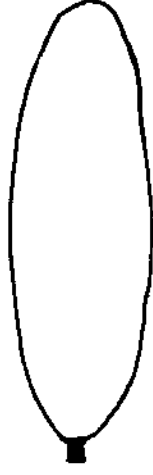


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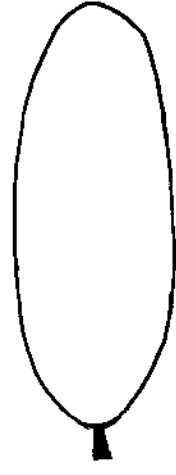
Leaf blade: shape



1
very narrow
elliptic



3
narrow elliptic



5
elliptic

Ad/Add./Zu 14

Leaf blade: curvature of midrib



3
weak



5
medium



7
strong

Ad/Add./Zu 15

Leaf blade: density of 'curling'

[drawings to be prepared]

1
coarse margin
undulation with
visible flat leaf

2
medium margin undulation
with small area of visible
flat leaf

3
fine margin undulation
with small area of visible
flat leaf

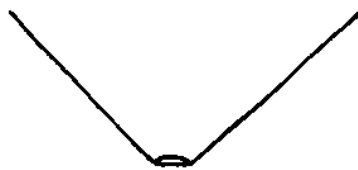
4
fine margin undulation
with no visible flat leaf

Ad/Add./Zu 17

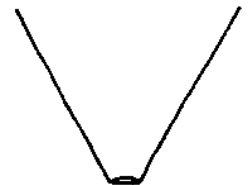
Leaf blade: folding in transverse section



3
weak



5
medium



7
strong

IX. Key for growth stage:

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.

XI. Technical Questionnaire/Questionnaire technique/Technischer Fragebogen

Reference Number
(not to be filled in by the applicant)

Reference
(reserve aux Administrations)

Referenznummer
(nicht vom Anmelder auszufüllen)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

QUESTIONNAIRE TECHNIQUE
a remplir en relation avec une demande de certificat d'obtention végétale

TECHNISCHER FRAGEBOGEN
in Verbindung mit der Anmeldung zum Sortenschutz auszufüllen

1. Species/Espece/Art Brassica oleracea L.convar. acephala, var. sabellica L.

Curly Kale, Chou Frise, Grunkohl

2. Applicant (Name and address)/Demandeur (nom et adresse)/Anmelder (Name und Adresse)

3. Proposed denomination or breeder's reference
Denomination proposee ou reference de l'obtenteur
Vorgeschlagene Sortenbezeichnung oder Anmeldebezeichnung

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

4.1 Variety Type

- (i) Open-pollinated variety []
- (ii) Single Hybrid []
- (iii) Three-way hybrid []
- (iv) Other []

4.2 Other information

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

Caracteres de la variete a indiquer (le chiffre entre parentheses renvoie au caractere correspondant dans les principes directeurs d'examen; priere de marquer d'une croix le niveau d'expression approprie).

Anzungebende Merkmale der Sorte (die in Klammern angegebene Zahl verweist auf das entsprechende Merkmal in den Prüfungsrichtlinien; die Ausprägungsstufe, die der Sorte am nächsten kommt, bitte ankreuzen).

Characteristics Caracteres Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
5.1 Plant: height (*1)	short	basse	niedrig	Niedriger grüner krauser	3 []
Plante: hauteur	medium	moyenne	mittel	Frosty, Hammer	5 []
Pflanze: Höhe	tall	haute	hoch	Westlandse Herfst	7 []
5.2 Plant: shape (*3)	inverted pyramid				1 []
	prostrate				2 []
	dome				3 []
	pyramid				4 []
	column				5 []
5.3 Plant: anthocyanin pigmentation (*5)	absent				1 []
	present				9 []
5.4 Leaf blade: colour of fully developed leaf (*8)	yellow green	vert-jaune	gelbgrün	Frosty, Hammer	1 []
Aile: tache de mélanine	green	vert	grün		2 []
Flügel: Melaninfleck	grey green	vert-gris	graugrün	Lerchenzungen	3 []
	blue green	vert-bleu	blaugrün		4 []
5.5 Leaf : type (10)	entire				1 []
	lobed				9 []

Characteristics Caracteres Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
5.6 Leaf blade: shape (*11) (for varieties with curled leaves only)	very narrow elliptic	elliptique tres etroit	sehr schmal elliptisch	Lerchenzungen	1 []
Limbe: forme	very narrow elliptic to narrow elliptic	elliptic tres etroit a elliptique etroit	sehr schmal elliptisch bis schmal elliptisch		2 []
Blattspreite: Form	narrow elliptic	elliptique etroit	schmal elliptisch	Hammer	3 []
	narrow elliptic to elliptic	elliptique etroit a elliptique	schmal elliptisch bis elliptisch	Frosty, Halbhoher gruner krauser	4 []
	elliptic	elliptique	elliptisch		5 []
5.7. Leaf blade: length (*12)	short	court	kurz	Vates	3 []
Limbe: longueur	medium	moyen	mittel	Spurt	5 []
Blattspreite: Lange	long	long	lang	Westlandse Herfst	7 []
5.8 Leaf blade: width (*13)	narrow	etroit	schmal	Vates	3 []
Limbe: largeur	medium	moyen	mittel	Spurt	5 []
Blattspreite: Breite	broad	large	breit	Westlandse Herfst	7 []
5.9 Leaf blade: density of curling (*15) (on leaves at middle of the plant)	coarse margin undulation with visible flat leaf			Pentland Brig	1 []
	medium margin undulation with small area of visible flat leaf			Garna red	2 []
	fine margin undulation with small area of visible flat leaf			Westlandse Herfst	3 []
	fine margin undulation with no visible flat leaf			Halbhoher gruner krauser	4 []

Characteristics Caracteres Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
5.10 Petiole: attitude at middle of the plant	erect	arresse	aufrecht		1 []
(*16)	semi-erect	demi-arresse	halbaufrecht	Vates	3 []
Petiole: port	horizontal	horizontal	waagrecht	Hammer	5 []
Blattteil: Stellung					

6. Similar varieties and differences from 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 expression of both varieties, please indicate the size of the difference

7. Additional information which may help to distinguish the variety
Renseignements complémentaires pouvant faciliter la détermination des caractères distinctifs de la variété
Zusätzliche Informationen zur Erleichterung der Unterscheidung der Sorte

7.1 Resistance to pests and diseases
Résistance aux parasites et aux maladies
Resistenzen gegenüber Schadorganismen

7.2 Main Use

Agricultural Fodder []
Vegetable []

7.3 Type of kale

Black Kale	<input type="checkbox"/>
Curly Kale	<input type="checkbox"/>
Collard	<input type="checkbox"/>
Cottage Kale	<input type="checkbox"/>
Galega Kale	<input type="checkbox"/>
Perrenial	<input type="checkbox"/>
Rape Kale	<input type="checkbox"/>

7.4 Other information

Autres reseignements
Andere Informationen

8. Authorisation for release

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

Yes No

(b) Has such authorisation been obtained?

Yes No

If the answer to that question is 'yes', please attach a copy of such authorisation.

[End of Annex and of document/
Fin de l'annexe et du document/
Ende der Anlage und des Dokuments]