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INTERNATIONAL UNION
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OF NEW VARIETIES OF
PLANTS

UNION INTERNATIONALE
POUR LA PROTECTION
DES OBTENTIONS
VÉGÉTALES

INTERNATIONALER
VERBAND ZUM SCHUTZ
VON PFLANZEN-
ZÜCHTUNGEN

UNIÓN INTERNACIONAL
PARA LA PROTECCIÓN
DE LAS OBTENCIONES
VEGETALES

DRAFT

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

KOHLRABI

*(Brassica oleracea L.
convar. acephala (DC.) Alef.
var. gongylodes L.; Brassica
oleracea L. Gongylodes
Group)*

These Guidelines should be read in conjunction with document TG/1/2, which contains explanatory notes on the general principles on which the Guidelines have been established.

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
I. Subject of these Guidelines	3
II. Material Required	3
III. Conduct of Tests	3
IV. Methods and Observations	3
V. Grouping of Varieties	4
VI. Characteristics and Symbols	4
VII. Table of Characteristics	5
VIII. Explanations on Table of Characteristics	11
IX. Literature	15
X. Technical Questionnaire	16

I. Subject of these Guidelines

These Guidelines apply to all varieties of *Brassica oleracea* L. convar. *acephala* (DC.) Alef. var. *gongylodes* L. (*Brassica oleracea* L. *Gongylodes* Group).

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. As a minimum, for each year of the test the following quantity of seed is recommended:

20 g. or at least 4,000 seeds.

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 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. Each test should include a total of 40 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 40 plants or parts taken from each of 40 plants.
2. For the assessment of uniformity of open-pollinated and hybrid varieties relative uniformity standards should be applied.

3. All observations on the plant and the leaf should be made before harvest maturity.
4. All observations on the kohlrabi should be made at harvest maturity.

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) Seedling: anthocyanin coloration of cotyledons (characteristic 1)
 - (b) Harvest maturity (characteristic 24)

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 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 characteristic or regional environmental conditions render this impossible.
 - (+) See Explanations on the Table of Characteristics in Chapter VIII.

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	Seedling: (*) anthocyanin coloration of cotyledons	Plantule: pigmentation anthocyanique des cotylédons	Keimpflanze: Anthocyanfärbung der Keimblätter	Plántula: pigmentación antociánica de los cotiledones		
	absent	absente	fehlend	ausente	Expreß Forcer	1
	present	présente	vorhanden	presente	Azur-Star	9
2.	Seedling: intensity of green coloration of cotyledons	Plantule: intensité de la couleur verte des cotylédons	Keimpflanze: Intensität der Grünfärbung der Keimblätter	Plántula: intensidad del color verde del cotiledón		
	light	faible	hell	clara	Erko	3
	medium	moyenne	mittel	media	Expreß Forcer	5
	dark	forte	dunkel	oscura	Eder, Velko	7
3.	Petioles: crossing (+)	Pétiolos: recouvrement	Blattstiele: Überschlagen	Pecíolos: cruzamiento		
	absent	absent	fehlend	ausente	Expreß Forcer	1
	present	présent	vorhanden	presente	Delikateß blauer	9
4.	Petiole: length (*) (+)	Pétiolo: longueur	Blattstiel: Länge	Pecíolo: longitud		
	very short	très court	sehr kurz	muy corto	Primavera weiß	1
	short	court	kurz	corto	Quickstar, Spree	3
	medium	moyen	mittel	medio	Patrick, Rolano	5
	long	long	lang	largo	Delikateß blauer	7
	very long	très long	sehr lang	muy largo		9
5.	Petiole: thickness (in the middle)	Pétiolo: épaisseur (au centre)	Blattstiel: Dicke (in der Mitte)	Pecíolo: grosor (en el medio)		
	thin	mince	dünn	delgado	Avanti, Kohyro	3
	medium	moyenne	mittel	medio	Noriko, Rolano	5
	thick	forte	dick	grueso	Adriana	7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. Petiole: attitude (* (*)	Pétiolo: port	Blattstiel: Haltung	Pecíolo: porte		
erect	dressé	aufrecht	erecto	Eder, Pader	1
semi-erect	demi-dressé	halbaufrecht	semierecto	Erko, Lanro	3
horizontal	horizontal	waagerecht	horizontal		5
7. Leaf blade: attitude (* (*)	Limbe: port	Blattspreite: Haltung	Limbo: porte		
erect	dressé	aufrecht	erecto	Eder	1
semi-erect	demi-dressé	halbaufrecht	semierecto	Erko, Lanro	3
horizontal	horizontal	waagerecht	horizontal		5
8. Leaf blade: length (* (+)	Limbe: longueur	Blattspreite: Länge	Limbo: longitud		
very short	très court	sehr kurz	muy corto		1
short	court	kurz	corto	Kohyro, Primavera weiß	3
medium	moyen	mittel	medio	Domino, Logo	5
long	long	lang	largo	Lanro, Noriko	7
very long	très long	sehr lang	muy largo	Gigant, Superschmelz	9
9. Leaf blade: width (* (+)	Limbe: largeur	Blattspreite: Breite	Limbo: anchura		
very narrow	très étroit	sehr schmal	muy estrecho		1
narrow	étroit	schmal	estrecho	Knaufs Ideal	3
medium	moyen	mittel	medio	Expreß Forcer, Spree	5
broad	large	breit	ancho	Noriko, Velko	7
very broad	très large	sehr breit	muy ancho	Gigant, Superschmelz	9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. Leaf blade: shape of apex (+)	Limbe: forme de la partie apicale	Blattspreite: Form des oberen Teils	Limbo: forma del ápice		
acute	aiguë	schmal spitz	aguda		1
pointed	pointue	spitz	puntiaguda		2
obtuse	obtuse	stumpf	obtusa	Avanti, Expreß Forcer	3
rounded	arrondie	abgerundet	redondeada	Noriko, Spree, Velko	4
broadly rounded	arrondie large	breit abgerundet	redondeada ancha	Gigant, Superschmelz	5
11. Leaf blade: (lower part) divisions to midrib (* (+)	Limbe: (partie inférieure) incisions jusqu'à la nervure principale	Blattspreite: (unterer Teil) Einschnitte bis zur Mittelrippe	Limbo: (envés) divisiones de la nervadura principal		
absent or very few	absentes ou très peu	fehlend oder sehr wenige	ausentes o muy escasas		1
few	peu	wenige	escasas	Azur-Star	3
medium	moyennes	mittel	medias	Noriko	5
many	nombreuses	viele	numerosas	Avanti, Korist	7
very many	très nombreuses	sehr viele	muy numerosas	Lanro	9
12. Leaf blade: number of margin incisions (on lower part of leaf) (+)	Limbe: nombre d'incisions du bord (partie inférieure de la feuille)	Blattspreite: Anzahl Randeinschnitte (am unteren Teil des Blattes)	Limbo: número de incisiones del borde (en la parte inferior de la hoja)		
few	petit	gering	escasas		3
medium	moyen	mittel	medias		5
many	grand	groß	numerosas		7

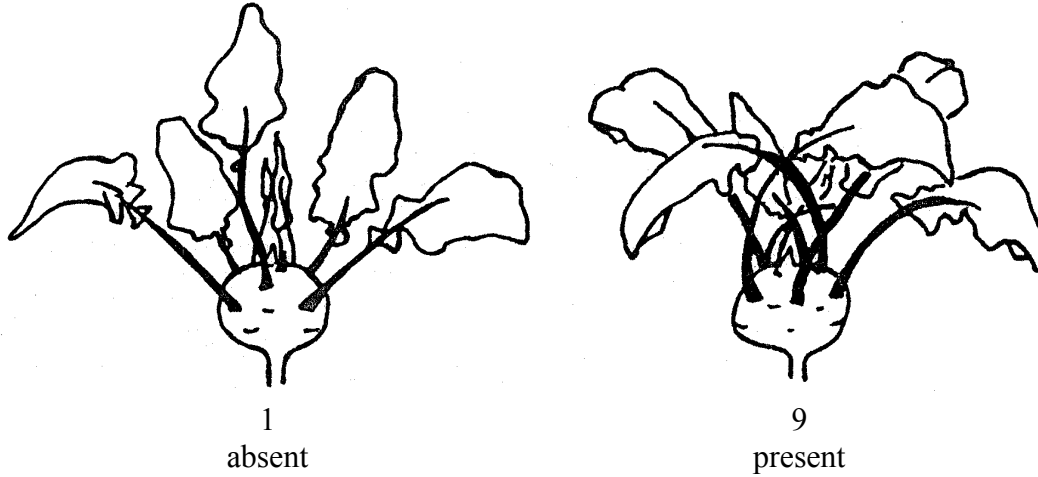
English	français	deutsch	español	Example Varieties Exemples Beispielsorten Variedades ejemplo	Note/ Nota
13. Leaf blade: depth of margin incisions (on lower part of leaf) (+)	Limbe: profondeur des incisions du bord (partie inférieure de la feuille)	Blattspreite: Tiefe der Randeinschnitte (am unteren Teil des Blattes)	Limbo: profundidad de las incisiones del borde (en la parte inferior de la hoja)		
absent or very shallow	nulle ou très faible	fehlend oder sehr flach	ausentes o muy poco profundas		1
shallow	faible	flach	poco profundas		3
medium	moyenne	mittel	medias		5
deep	profonde	tief	profundas		7
14. Leaf blade: number of margin incisions (on upper part of leaf) (+)	Limbe: nombre d'incisions du bord (partie supérieure de la feuille)	Blattspreite: Anzahl Randeinschnitte (am oberen Teil des Blattes)	Limbo: número de incisiones en el borde (de la parte superior de la hoja)		
absent or very few	nul ou très petit	fehlend oder sehr gering	ausentes o muy escasas		1
few	petit	gering	escasas	Azur-Star, Velko	3
medium	moyen	mittel	medias	Expreß Forcer	5
many	grand	groß	numerosas	Isar	7
very many	très grand	sehr groß	muy numerosas		9
15. Leaf blade: shape in cross section	Limbe: forme en coupe transversale	Blattspreite: Form im Querschnitt	Limbo: forma en sección transversal		
concave	concave	konkav	cóncava		1
plane	droite	eben	plana	Expreß Forcer	2
convex	convexe	konvex	convexa	Azur-Star, Erko	3
16. Leaf blade: blistering (*)	Limbe: cloquère	Blattspreite: Blasigkeit	Limbo: abullonado		
weak	faible	gering	débil	Avanti	3
medium	moyenne	mittel	media	Spree	5
strong	forte	stark	fuerte	Isar, Lanro	7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17. Leaf blade: waxiness	Limbe: pruine	Blattspreite: Wachsschicht	Limbo: cerosidad		
weak	faible	gering	débil		3
medium	moyenne	mittel	media	Expreß Forcer	5
strong	forte	stark	fuerte	Blaril	7
18. (*) Leaf blade: hue of green color	Limbe: teinte de la couleur verte	Blattspreite: Ton der Grünfärbung	Limbo: tono del color verde		
absent	absente	fehlend	ausente	Erko, Noriko	1
greyish	grisâtre	gräulich	grisáceo	Expreß Forcer, Lanro	2
bluish	bleuâtre	bläulich	azulado	Azur-Star	3
19. (*) Leaf blade: intensity of green color	Limbe: intensité de la couleur verte	Blattspreite: Intensität der Grünfärbung	Limbo: intensidad del color verde		
very light	très claire	sehr hell	muy claro		1
light	claire	hell	claro		3
medium	moyenne	mittel	medio	Noriko, Quickstar	5
dark	foncée	dunkel	oscuro	Avanti, Lanro	7
very dark	très foncée	sehr dunkel	muy oscuro	Pader	9
20. (+) Kohlrabi: number of inner leaves	Chou-rave: nombre de feuilles intérieures	Kohlrabi: Anzahl der inneren Blätter	Colinabo: número de hojas interiores		
few	petit	gering	escasas	Erko	3
medium	moyen	mittel	medias	Expreß Forcer	5
many	grand	groß	numerosas	Lanro	7
21. (*) Kohlrabi: color of skin	Chou-rave: couleur de l'épiderme	Kohlrabi: Farbe der Haut	Colinabo: color de la epidermis		
white green	vert blanc	weißgrün	verde blanquecino	Expreß Forcer, Lanro	1
green	vert	grün	verde	Erko, Noriko	2
pale violet	violet clair	hellviolett	violeta pálido		3
dark violet	violet foncé	dunkelviolett	violeta oscuro	Azur-Star	4

English	français	deutsch	español	Example Varieties Exemples Beispielsorten Variedades ejemplo	Note/ Nota
22. Kohlrabi: shape (in longitudinal section) (*)(+)	Chou-rave: forme (coupe longitudinale)	Kohlrabi: Form (im Längsschnitt)	Colinabo: forma (en sección longitudinal)		
transverse narrow elliptic	elliptique transversal étroit	quer schmal elliptisch	elíptica transversal estrecha	Erko	1
transverse elliptic	elliptique transversal	quer elliptisch	elíptica transversal	Azur-Star, Quickstar	2
transverse broad elliptic	elliptique transversal large	quer breit elliptisch	elíptica transversal ancha	Noriko	3
circular	rond	rund	circular	Blaril	4
broad elliptic	elliptique large	breit elliptisch	elíptica ancha		5
23. Kohlrabi: shape of apex (*)(+)	Chou-rave: forme du sommet	Kohlrabi: Form des oberen Endes	Colinabo: forma del ápice		
indented	concave	eingesunken	hundido	Expreß Forcer, Rasant	3
level	plane	eben	plano	Avanti, Spree	5
raised	convexe	vorgewölbt	elevado	Gigant, Superschmelz	7
24. Harvest maturity (*)(+)	Maturité de récolte:	Erntereife	Madurez para la cosecha		
very early	très précoce	sehr früh	muy temprana	Expreß Forcer	1
early	précoce	früh	temprana	Azur-Star, Quickstar	3
medium	moyenne	mittel	media	Lanro	5
late	tardive	spät	tardía	Delikateß blauer	7
very late	très tardive	sehr spät	muy tardía	Blaril	9

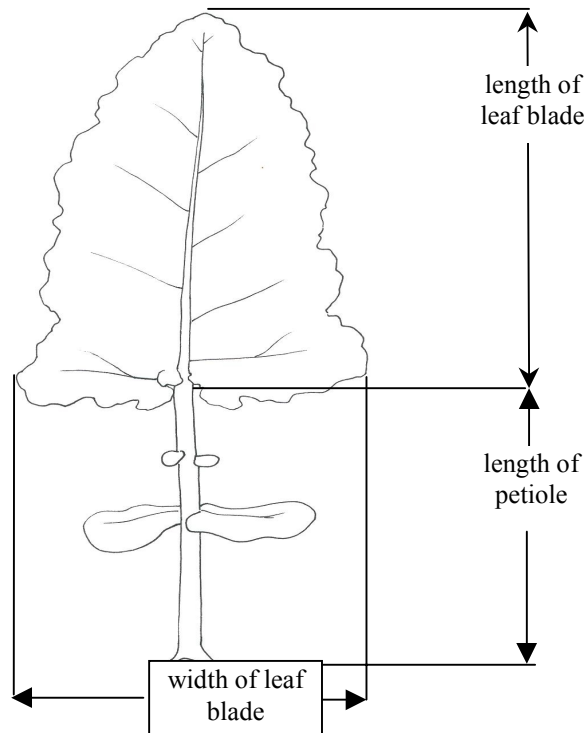
VIII. Explanations on the Table of Characteristics

Ad. 3: Petioles: crossing

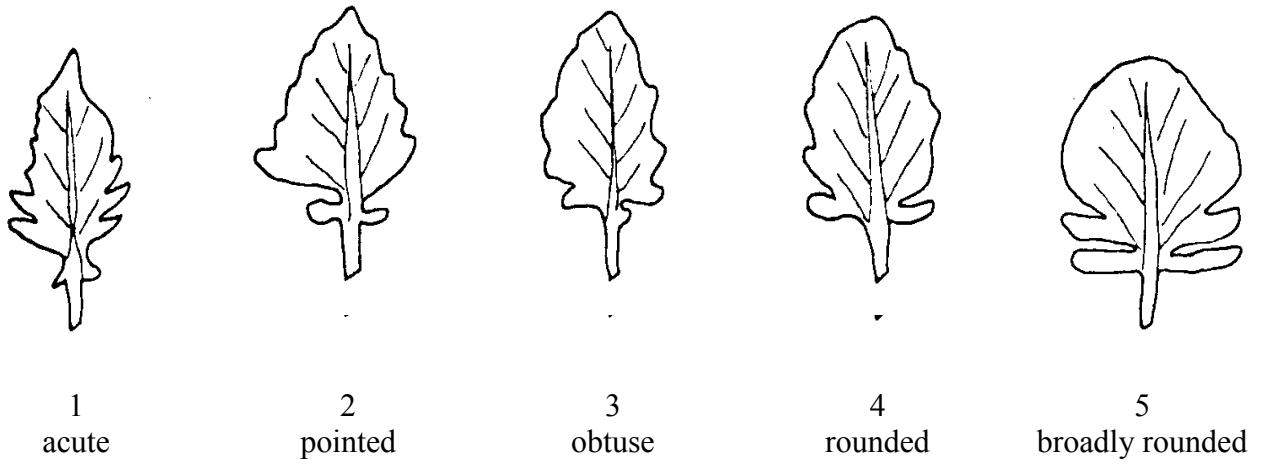


Ad. 4: Petiole: length

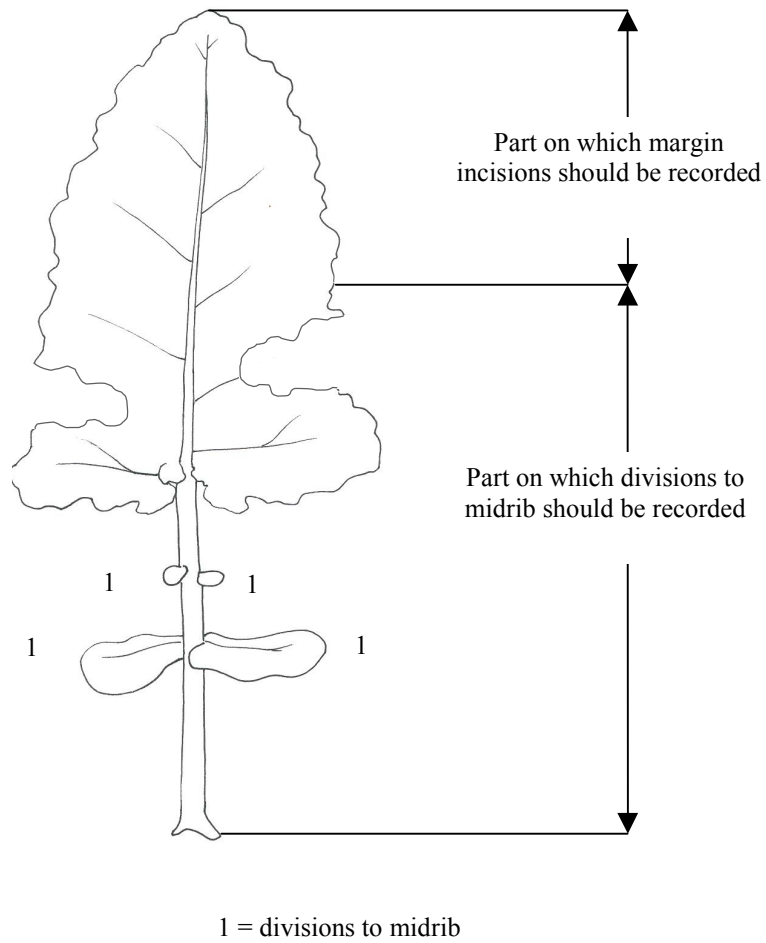
Ad. 8 and 9: Leaf blade: length and width



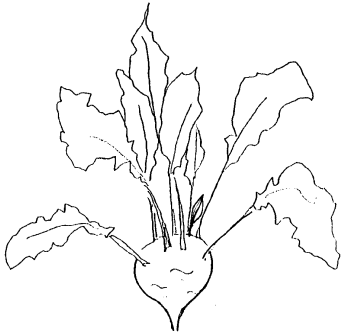
Ad. 10: Leaf blade: shape of apex



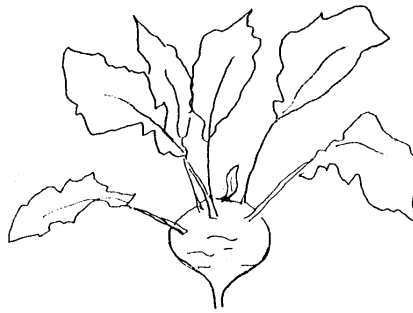
Ad. 11-14: Leaf blade: divisions to midrib, margin incisions



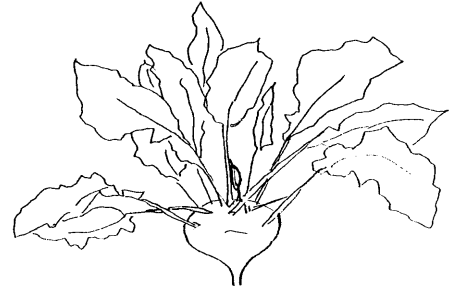
Ad. 20: Kohlrabi: number of inner leaves



3
few

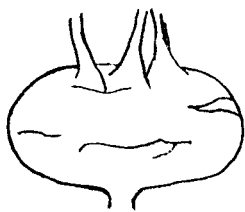


5
medium

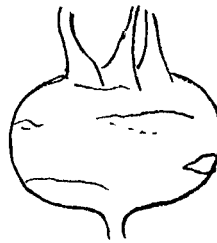


7
many

Ad. 22: Kohlrabi: shape (in longitudinal section)



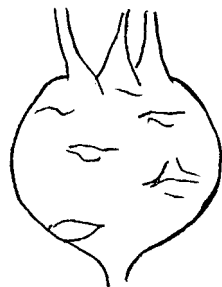
1
transverse narrow elliptic



2
transverse elliptic



3
transverse broad elliptic



4
circular



5
broad elliptic

Ad. 23: Kohlrabi: shape of apex



3
indented



5
level



7
raised

Ad. 24: Harvest maturity

Harvest maturity is considered as being reached if 50 % of kohlrabis reach 7 cm diameter in the greenhouse or 8 cm diameter in the open field.

IX. Literature

BECKER, G. (1962): Kohlrabi in: Handbuch der Pflanzenzüchtung, Band VI, 2. Auflage, Paul Parey Verlag, Berlin –Hamburg, 201-203.

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HAHN, P. und SCHMITT, U. (1951): Kohlrabi in: Kohl- und Wurzelgemüse, Arten- und Sortenkunde, Band 2, 1. Auflage, Deutscher Bauernverlag, Berlin, 108-138.

KAMPE, K.; BASSE, H.; GLASCHKE, B. und SCHREIBER, F. (1956): Kohlrabi in: Gemüsesorten, II. Teil (Kohl-, Blatt- und Wurzelgemüse), 1. Auflage, Parey Verlag, Berlin – Hamburg, 44-51.

WIEBE, H.-J. (1989): Vernalisation von wichtigen Gemüsearten – Ein Überblick. Gartenbauwissenschaft 54 (3), Ulmer Verlag, Stuttgart, 97-104.

VOGEL, G. (1996): Kohlrabi in: Handbuch des speziellen Gemüsebaues. Ulmer Verlag, Stuttgart, 304 – 323.

X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)
<p>TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p>	
1. Species	<p><i>Brassica oleracea</i> L. convar. <i>acephala</i> (DC.) Alef. var. <i>gongylodes</i> L. (<i>Brassica oleracea</i> L. <i>Gongylodes</i> Group)</p> <p>KOHLRABI</p>
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

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

4.1 Method of maintenance and reproduction

- (i) hybrid
- (ii) open-pollinated variety
- (iii) other

4.2 Other information

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

	Characteristics	Example Varieties	Note
5.1	Seedling: anthocyanin coloration of cotyledons		
(1)			
	absent	Expreß Forcer	1[]
	present	Azur-Star	9[]
5.2	Leaf blade: (lower part) divisions to midrib		
(11)			
	absent or very few		1[]
	few	Azur-Star	3[]
	medium	Noriko	5[]
	many	Avanti, Korist	7[]
	very many	Lanro	9[]
5.3	Leaf blade: blistering		
(16)			
	weak	Avanti	3[]
	medium	Spree	5[]
	strong	Isar, Lanro	7[]
5.4	Leaf blade: intensity of green color		
(19)			
	very light		1[]
	light		3[]
	medium	Noriko, Quickstar	5[]
	dark	Avanti, Lanro	7[]
	very dark	Pader	9[]

Characteristics	Example Varieties	Note
5.5 (21) Kohlrabi: color of skin		
white green	Expreß Forcer, Lanro	1[]
green	Erko, Noriko	2[]
pale violet		3[]
dark violet	Azur-Star	4[]
5.6 (22) Kohlrabi: shape (in longitudinal section)		
transverse narrow elliptic	Erko	1[]
transverse elliptic	Azur-Star, Quickstar	2[]
transverse broad elliptic	Noriko	3[]
circular	Blaril	4[]
broad elliptic		5[]
5.7 (24) Harvest maturity		
very early	Expreß Forcer	1[]
early	Azur-Star, Quickstar	3[]
medium	Lanro	5[]
late	Delikateß blauer	7[]
very late	Blaril	9[]

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 Special conditions for the examination of the variety

Variety for glasshouse culture		1 []
Variety for field production at	spring	2 []
	summer	3 []
	autumn	4 []

7.3 Other information

A representative photograph of one or more leaf blades of the variety may be added to the Technical Questionnaire.

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.

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