

**TWV/35/4****ORIGINAL:** English**DATE:** May 8, 2001

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

TECHNICAL WORKING PARTY FOR VEGETABLES

Thirty-Fifth Session

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WORKING PAPER ON REVISED DRAFT TEST GUIDELINES FOR KOHLABI
(*Brassica oleracea* L. convar. *Acephala* (DC.)
Alef. Var. *gongylodes* (*Brassica oleracea* L. *Gongylodes* Group)

Document prepared by experts from Germany

I. Subject of these Guidelines

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

60 g.

***NL: If the TWV formula is applied the material requested is 20 g or at least 4000 seeds
D: We agree***

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

***NL: change 40 plants to 60 plants as in all other Brassicas
D: We agree***

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.

CZ: We propose to include a percentage of standard population with acceptance probability and maximum number of off-types for hybrids

D: For this species it is difficult to include maximum number of off-types for hybrids, we prefer to apply relative uniformity standards for all types including hybrids

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) Start of 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 (in most cases 1 to 9), 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		Keimpflanze: Anthocyanfärbung der Keimblätter			
absent		fehlend		Expreß Forcer	1
present		vorhanden		Azur-Star	9
2. Seedling: green coloration of cotyledons		Keimpflanze: Grünfärbung der Keimblätter			
light green		hellgrün		Erko	3
medium green		mittelgrün		Expreß Forcer	5
dark green		dunkelgrün		Eder, Velko	7
<i>NL: change into Seedling: intensity of green color of cotyledons (light 3 - medium 5 - dark 7)</i>					
3. Petioles: crossing (+)		Blattstiele: Überschlagen			
absent		fehlend		Expreß Forcer	1
present		vorhanden		Delikateß blauer	9
4. Petiole: length (*)		Blattstiel: Länge			
very short		sehr kurz		Primavera weiß	1
short		kurz		Quickstar, Spree	3
medium		mittel		Patrick, Rolano	5
long		lang		Delikateß blauer	7
very long		sehr lang			9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. Petiole: thickness (in the middle)		Blattstiel: Dicke (in der Mitte)			
thin		dünn		Avanti, Kohyro	3
medium		mittel		Noriko, Rolano	5
thick		dick		Adriana	7
6. Petiole: attitude		Blattstiel: Haltung			
(*) erect		aufrecht		Eder, Expeß Forcer	1
semi-erect		halbaufrecht		Erko, Lanro	3
horizontal		waagrecht			5
7. Leaf blade: attitude (*)		Blattspreite: Haltung			
erect		aufrecht		Eder	1
semi-erect		halbaufrecht		Erko, Lanro	3
horizontal		waagrecht			5
8. Leaf blade: length (*)		Blattspreite: Länge (ohne Lappen)			
very short		sehr kurz			1
short		kurz		Kohyro, Primavera weiß	3
medium		mittel		Domino, Logo	5
long		lang		Lanro, Noriko	7
very long		sehr lang		Gigant, Superschmelz	9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9. (* (*)	Leaf blade: width	Blattspreite: Breite			
	very narrow		sehr schmal		1
	narrow		schmal	Knaufs Ideal	3
	medium		mittel	Expreß Forcer, Spree	5
	broad		breit	Noriko, Velko	7
	very broad		sehr breit	Gigant, Superschmelz	9
10. (+ (+)	Leaf blade: shape of the tip	Blattspreite: Form der Spitze			
	narrowly acute		schmal spitz		1
	acute		spitz		2
	obtuse		abgestumpft	Avanti, Expreß Forcer	3
	rounded		abgerundet	Noriko, Spree, Velko	4
	broadly rounded		breit abgerundet	Gigant, Superschmelz	5
11. (* (*) (+)	Leaf blade: lobing (division to midrib)	Blattspreite: Lappung (Teilung bis zur Mittelrippe)			
	absent or very weak		fehlend oder sehr gering		1
	weak		gering	Azur-Star	3
	medium		mittel	Noriko	5
	strong		stark	Avanti, Korist	7
	very strong		sehr stark	Lanro	9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12. Leaf blade: outline (+)		Blattspreite: Umriß			
entire or very weakly sinuated		ganzrandig oder sehr gering gebuchtet			1
weakly sinuated		gering gebuchtet			3
medium sinuated		mittel gebuchtet		Noriko, Quickstar	5
strongly sinuated		stark gebuchtet		Lanro	7
very strongly sinuated		sehr stark gebuchtet			9
<i>NL: to delete</i>					
<i>D: Should be discussed in the meeting</i>					
13. Leaf blade: incisions of margin (+)		Blattspreite: Randeinschnitte			
absent or very weak		fehlend oder sehr gering			1
weak		gering		Azur-Star, Velko	3
medium		mittel		Expresß Forcer	5
strong		stark		Isar	7
very strong		sehr stark			9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14. Leaf blade: number of teeth at margin (+)		Blattspreite: Anzahl der Zähne am Rand			
absent or very few		fehlend oder sehr gering			1
few		gering		Lanro, Noriko	3
medium		mittel		Kohyro, Spree	5
many		groß		Isar, Soko	7
very many		sehr groß			9
<i>NL: change 13 and 14 into</i>					
<i>13. Leaf blade: depth of incisions of margin: very shallow 1, shallow 3, medium 5, deep 7, very deep 9</i>					
<i>14. Leaf blade: density of incisions of margin: very sparse 1, sparse 3, medium 5, dense 7, very dense 9</i>					
<i>D: Should be discussed in the meeting</i>					
15. Leaf blade: shape in cross section		Blattspreite: Form im Querschnitt			
concave		konkav			1
plane		eben		Expreß Forcer	2
convex		konvex		Azur-Star, Erko	3
16. Leaf blade: blistering (*)		Blattspreite: Blasigkeit			
absent or very weak		fehlend oder sehr gering			1
weak		gering		Avanti	3
medium		mittel		Spree	5
strong		stark		Lanro, Isar	7
very strong		sehr stark			9

English	français	deutsch	español	Example Varieties Exemples Beispielsorten Variedades ejemplo	Note/ Nota
17. Leaf blade: waxiness		Blattspreite: Wachsschicht			
absent or very weak		fehlend oder sehr gering			1
weak		gering			3
medium		mittel		Expreß Forcer	5
strong		stark		Blaril	7
very strong		sehr stark			9
18. Leaf blade: color (*)		Blattspreite: Farbe			
green		grün		Erko, Noriko	1
grey green		graugrün		Expreß Forcer, Lanro	2
blue green		blaugrün		Azur-Star	3
<i>NL: Leaf blade: hue absent 1, greyish 2, blueish 3</i>					
19. Leaf blade: intensity of green color (*)		Blattspreite: Intensität der Grünfärbung			
very light		sehr hell			1
light		hell			3
medium		mittel		Noriko, Quickstar	5
dark		dunkel		Avanti, Lanro	7
very dark		sehr dunkel		Pader	9
20. Kohlrabi: number of inner leaves (+)		Knolle: Anzahl der inneren Blätter			
few		gering		Erko	3
medium		mittel		Expreß Forcer	5
many		groß		Lanro	7
<i>NL: Proposed to delete as difficult to observe</i>					
<i>D: We agree</i>					

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. Kohlrabi: color of skin (*)		Knolle: Farbe der Haut			
white green		weißgrün		Expreß Forcer, Lanro	1
green		grün		Erko, Noriko	2
pale violet		hellviolett			3
dark violet		dunkelviolett		Azur-Star	4
22. Kohlrabi: shape (in longitudinal section) (* (+)		Knolle: Form (im Längsschnitt)			
transverse narrow elliptic		quer schmal elliptisch		Erko	1
transverse elliptic		quer elliptisch		Azur-Star, Quickstar	2
transverse broad elliptic		quer breit elliptisch		Noriko	3
circular		rund		Blaril	4
broad elliptic		breit elliptisch			5
23 Kohlrabi: shape of apex (+)		Knolle: Form des oberen Endes			
indented		eingesunken		Expreß Forcer, Rasant	3
level		eben		Avanti, Spree	5
raised		vorgewölbt		Gigant, Superschmelz	7
24. Start of harvest maturity (* (+)		Beginn der Erntereife			
very early		sehr früh		Expreß Forcer	1
early		früh		Azur-Star, Quickstar	3
medium		mittel		Lanro	5
late		spät		Delikateß blauer	7
very late		sehr spät		Blaril	9

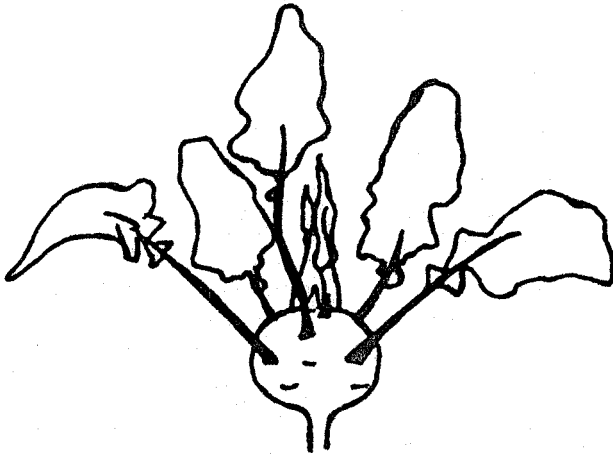
NL: Change into Harvest maturity

D: We agree

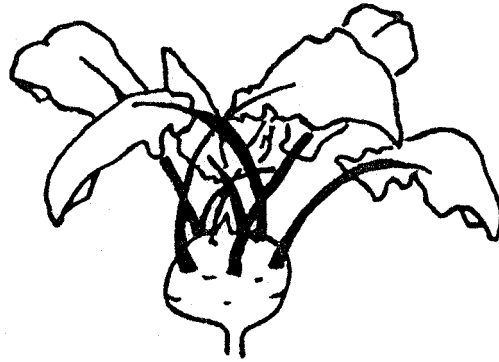
VIII. Explanations on the Table of Characteristics/Explications du tableau des caractères
Erklärungen zu der Merkmalstabelle

Ad/zu 3

Petioles: crossing
Blattstiele: Überschlagen



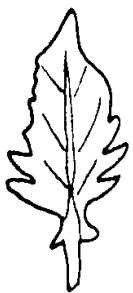
1 absent
fehlend



9 present
vorhanden

Ad/zu 10

Leaf blade: shape of the tip
Blattspreite: Form der Spitze



1 narrowly
broadly
acute
rounded
schmal
spitz
abgerundet



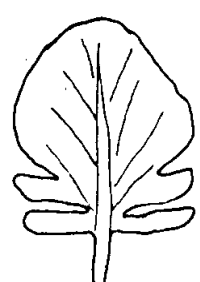
2 acute
spitz



3 obtuse
abgestumpft



4 rounded
abgerundet

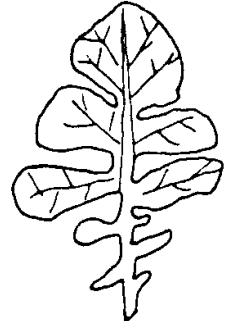
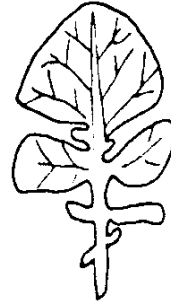


5
breit

Ad/zu 11

Leaf blade: lobing (division to midrib)

Blattspreite: Lappung (Teilung bis zur Mittelrippe)



1 absent or
very weak
fehlend oder
sehr gering

3 weak
gering

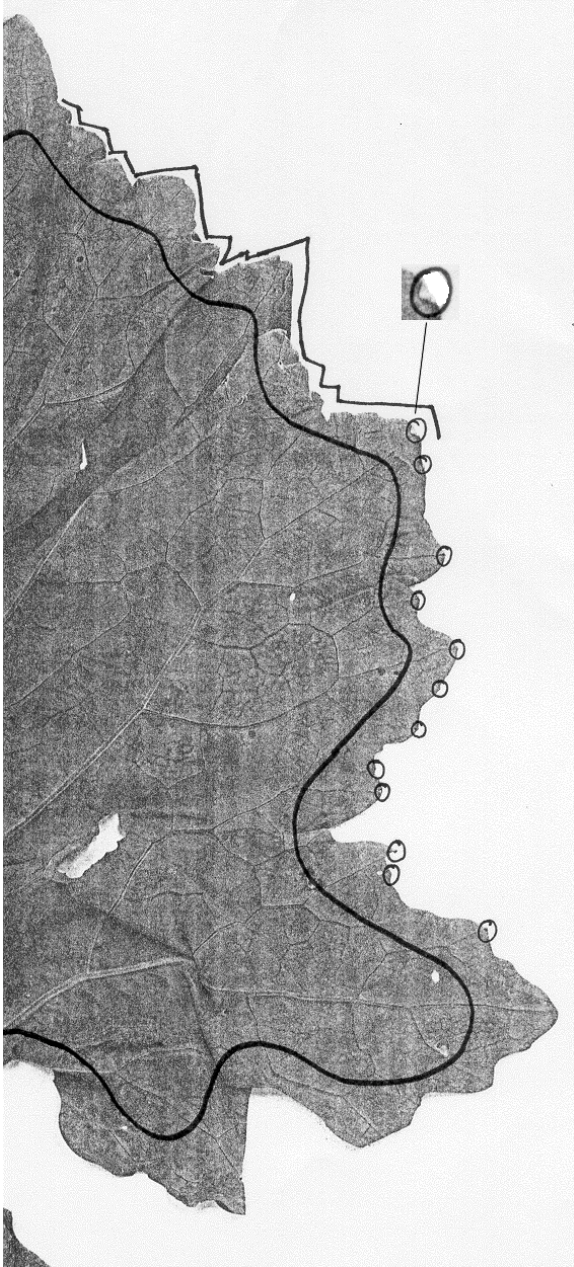
5 medium
mittel

7 strong
stark

9 very strong
sehr stark

Lobes are present if the leaf blade is divided to midrib. Often overlapping and growing together of leaf blades around the petiole can be observed.

Ad/zu 12/13/14



Ad/zu 12

Leaf blade: outline
Blattspreite: Umriß



Ad/zu 13

Leaf blade: incisions
of margin
Blattspreite:
Randeinschnitte



Incisions: crenation,
sinuation and serration of
margin

Randeinschnitte: Kerbung,
Buchtung und Säugung des
Randes

Ad/zu 14

Leaf blade: number
of teeth at margin
Blattspreite: Anzahl
der Zähne am Rand



Teeth: small set up teeth
visible on the lower side of
the margin of leaf blade,
often inwards reflexed and
with a white tip.

Zähnung:
kleine, auf dem Blattrand
der Blattunterseite sichtbar
aufgesetzte Zähne, häufig
nach innen gebogen und
mit einer weißen Spitze
versehen.

Ad/zu 20

Kohlrabi: number of inner leaves
Knolle: Anzahl der inneren Blätter



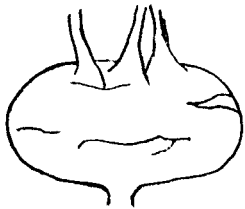
3 few
gering

5 medium
mittel

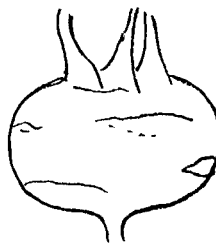
7 many
groß

Ad/zu 22

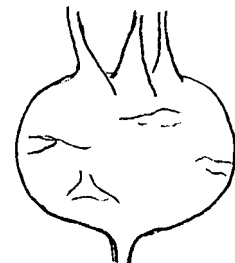
Kohlrabi: shape (in longitudinal section)
Knolle: Form (im Längsschnitt)



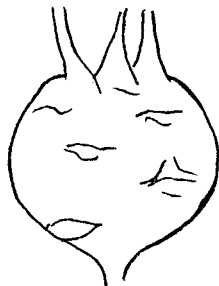
1 transverse narrow
elliptic
quer schmal elliptisch



2 transverse elliptic
quer elliptisch



3 transverse broad elliptic
qquer breit elliptisch



4 circular
rund



5 broad elliptic
breit elliptisch

Ad/zu 23

Kohlrabi: shape of apex
Knolle: Form des Kopfes



3 indented
ingesunken



5 level
eben



7 raised
vorgewölbt

Ad/zu 24

Start of harvest maturity
Beginn der Erntereife

Start of harvest maturity is regarded as being reached when 50 % of kohlrabis reach 7 cm diameter under greenhouse and 8 cm diameter in the open field.

Der Beginn der Erntereife wird als erreicht angesehen, wenn 50 % der Pflanzen einen Knollendurchmesser im Gewächshaus von 7 cm und im Freiland von 8 cm erreicht haben.

IX. Literature

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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)

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

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

Kohlrabi/Kohlrabi

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

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: lobing (division to midrib) (11)		
absent or very weak		1[]
weak	Azur-Star	3[]
medium	Noriko	5[]
strong	Avanti, Korist	7[]
very strong	Lanro	9[]
5.3 Leaf blade: blistering (16)		
absent or very weak		1[]
weak	Avanti	3[]
medium	Spree	5[]
strong	Lanro, Isar	7[]
very strong		9[]
5.4 Leaf blade: color (18)		
green	Erko, Noriko	1[]
grey green	Expreß Forcer, Lanro	2[]
blue green	Azur-Star	3[]
5.5 Kohlrabi: color of skin (21)		
white green	Expreß Forcer, Lanro	1[]
green	Erko, Noriko	2[]
pale violet		3[]
dark violet	Azur-Star	4[]

Characteristics		Example Varieties	Note
5.6 Kohlrabi: shape (in longitudinal section) (22)			
	transverse narrow elliptic	Erko	1[]
	transverse elliptic	Azur-Star, Quickstar	2[]
	transverse broad elliptic	Noriko	3[]
	circular	Blaril	4[]
	broad elliptic		5[]
5.7 Start of harvest maturity (24)			
	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
<p>^{o)} In the case of identical states of expressions of both varieties, please indicate the size of the difference.</p>			

