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GENEVA

TECHNICAL WORKING PARTY FOR VEGETABLES

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WORKING PAPER ON REVISED TEST GUIDELINES FOR CELERIAC
(*Apium graveolens* L. var. *rapaceum* (Mill.) Gaud.)

Document prepared by experts from Germany

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I. Subject of these Guidelines

These Guidelines apply to all varieties of *Apium graveolens* L. var. *rapaceum* (Mill.) Gaud.

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:

4 g.

UK: The amount of seed has been reduced. In your calculations, have you allowed for the variation in Thousand Seed Weight? In Celery this varies from 3.43g to 6.09 g

D: In Celeriac it varies from 0.35g to 0.5g. That means that for 1000 plants not more than 0.5 g are necessary. The new amount of seed should be sufficient.

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 on fully developed plants before harvest maturity. All observations on the leaf should be made on leaves in the middle of the rosette of leaves.

4. All observations on the tuber 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) Petiole: anthocyanin coloration (characteristic 11)

UK: Are the following discontinuous tuber characteristics useful for classification:

18: Tuber: ground color of skin

24: Tuber: color of flesh

D: We do not need these characteristics for grouping. 18 is often, but not always correlated with 11 (petiole: anthocyanin coloration). 24: There are only a few modern varieties with the state 2 (ivory).

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 Exemples Beispielssorten Variedades ejemplo	Varieties Nota/Nota
1. Plant: height (*)		Pflanze: Höhe			
short		niedrig		Ofir	3
medium		mittel		Ibis, Monarch	5
tall		hoch		Bergers weisse Kugel, Mars, Boule de Marbre	7
2. Foliage: attitude (*)		Laub: Haltung			
(+) erect		aufrecht		Mars, Regent	1
erect to semi-erect		aufrecht bis halbaufrecht		Bergers weisse Kugel, Monarch	2
semi-erect		halbaufrecht		Alba, Anita, Ibis	3
semi-erect to horizontal		halbaufrecht bis waagerecht		Ofir	4
horizontal		waagerecht		<i>NL: Ilona</i>	5
3. Foliage: quantity of leaves		Laub: Menge			
low		gering		Alba	3
medium		mittel		Ibis, Prinz	5
high		groß		Mars	7
<i>UK proposal: 3. Foliage: number of leaves: 3 few 5 medium 7 many</i>					
<i>D: We agree to this proposal</i>					
4. Foliage: green coloration of inner leaves		Laub: Grünfärbung der inneren Blätter			
light		hell		Alba, Ortho	3
medium		mittel		Bergers weisse Kugel, Cesar, Prinz	5
dark		dunkel		President	7

English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties Note/ Nota
5. Foliage: green coloration of fully developed leaves		Laub: Grünfärbung der ausgewachsenen Blätter			
light		hell		<i>NL: Ibis</i>	3
medium		mittel		<i>NL: Alba, Prinz</i>	5
dark		dunkel		Bergers weisse Kugel, Mars, Monarch, Prinz	7
6. Leaf: length (*) (including petiole)		Blatt: Länge (einschließlich Blattstiel)			
short		kurz		Ofir, Ortho	3
medium		mittel		Anita	5
long		lang		Bergers weisse Kugel	7
7. Leaf blade: length (+)		Blattspreite: Länge			
short		kurz		Ortho	3
medium		mittel		Anita, Cesar, President	5
long		lang		Bergers weisse Kugel	7
8. Leaf blade: distance (+) between 1. and 2. pair of leaflets		Blattspreite: Abstand zwischen 1. und 2. Blattfiederpaar			
short		kurz		Alba	3
medium		mittel		Monarch, President, Prinz	5
long		lang		Bergers weisse Kugel	7
<i>UK: This characteristic may give good discrimination, but do we need another measurement?</i>					
<i>D: A useful characteristic, which can be observed visually. Measurements are not necessary.</i>					
9. Petiole: length (+)		Blattstiel: Länge			
small		klein		Prinz	3
medium		mittel		Cesar, Diamant	5
large		groß		Bergers weisse Kugel, Hochdahler Markt	7

English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties Note/ Nota
10. Petiole: width		Blattstiel: Breite			
(+)	narrow		schmal	Alba	3
	medium		mittel	Cesar, Prinz, Regent	5
	broad		breit	Bergers weisse Kugel	7
11. Petiole: (* anthocyanin coloration		Blattstiel: Anthocyanfärbung			
	absent		fehlend	Mars, Regent, Neve	1
	present		vorhanden	Bergers weisse Kugel, Hochdahler Markt, Geant Danois	9

UK: Is there a need for intensity of anthocyanin which will be included in Celery?

D: We think not, in Celeriac there are little differences in intensity.

12. Leaf: size of the (* terminal leaflet		Blatt: Größe des Endfiederblattes			
(+)	small		klein	Ortho	3
	medium		mittel	Ibis, Kojak	5
	large		groß	Regent	7
13. Leaflet: shape of (* tips of margin		Blattfieder: Form der Spitzen des Randes			
(+)	acute		spitz	Ibis, Dolvi	3
	pointed		zugespitzt	Monarch, Prinz, President	5
	truncate		abgerundet	Radiant	7

UK: State 7 would be better described as rounded (D agrees)

In Celery, we find this characteristic difficult to record and would prefer that it could be simplified with 2 discontinuous states pointed 1 pointed 2 rounded

D: We prefer to keep this characteristic as it is (3-5-7)

English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties Note/ Nota
14. Leaflet: density of incisions of margin (+)		Blattfieder: Dichte der Randeinschnitte			
sparse		locker		Cesar, Hans, Rex	3
medium		mittel		Ibis, Prinz	5
dense		dicht		Diamant, Kojak	7
<i>UK: Leaflet: density of margin incisions (editorial remark)</i>					
15. Leaflet: arrangement (*) (+)		Blattfieder: Anordnung			
detached		freistehend		Cascade	1
touching		sich berührend		Monarch	2
overlapping		überlappend		Kojak	3
<i>UK: We are not sure whether 'arrangement' of lobes is best, but we cannot think of anything much better, perhaps position, density or spacing of lobes?</i>					
<i>For state 1 the lobes may be discrete, but not detached. We would propose 'not touching'</i>					
<i>D: The present is the same wording as in other guidelines</i>					
16. Tuber: size (*)		Knolle: Größe			
small		klein		Ofir	3
medium		mittel		Anita, Bergers weisse Kugel, Des Maraichers	5
large		groß		Ibis, Neve	7
<i>UK: Size could be assessed without measurement. However, if there are different shaped tubers, would this information be better represented by length and diameter?</i>					
<i>D: We prefer to keep it as it is. It is easy to assess size, even if there are different shaped tubers.</i>					

English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties Note/ Nota
17. Tuber: protrusion (+)		Knolle: Wulstbildung			
absent or very weak		fehlend oder sehr gering			1
weak		gering		Alba, Ortho, Regent	3
medium		mittel		Bergers weisse Kugel, Monarch, President	5
strong		stark		Anita, Dolvi, Boule de Marbre	7
very strong		sehr stark			9
18. Tuber: ground color of skin (*)		Knolle: Grundfarbe der Haut			
whitish		weißlich		Mars, Monarch, Neve	1
brown		braun		Anita, Bergers weisse Kugel, Des Maraichers	2
19. <u>Varieties with tubers with brown ground color only</u> Tuber: intensity of ground color of skin		<u>Nur Sorten mit brauner Grundfarbe der Knolle</u> Knolle: Intensität der Grundfarbe der Haut			
light		hell		Anita	3
medium		mittel		Ortho	5
dark		dunkel		Balder	7
20. Tuber: insertion of roots (+)		Knolle: Wurzelansatz			
low		tief		Cesar, Ortho	3
medium		mittel		Monarch, Hochdahler Markt	5
high		hoch			7

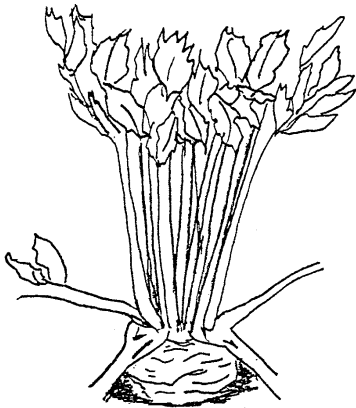
English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties Note/ Nota
21. Tuber: quantity of roots		Knolle: Wurzelmenge			
low		gering		Cesar, Ortho	3
medium		mittel		Bergers weisse Kugel, Brilliant, Monarch	5
high		groß			7
22. Tuber: thickness of roots		Knolle: Wurzeldicke			
thin		dünn		Cesar, Ortho	3
medium		mittel		Diamant, Monarch, Bergers weisse Kugel	5
thick		dick		Hochdahler Markt	7
23 (*) Tuber: shape in longitudinal section		Knolle: Form im Längsschnitt			
(+) broad elliptic		breit elliptisch		Kojak	1
round		rund		Alba, Monarch	2
transverse broad elliptic		quer breit elliptisch		Bergers weisse Kugel, Anita	3
truncate conical		kegelstumpfförmig		Dolvi	4
transverse ovate		quer eiförmig		Alabaster 3	5
24. Tuber: color of flesh		Knolle: Fleischfarbe			
white		weiß		Monarch, Diamant	1
ivory		elfenbeinfarben		Ofir, Hochdahler Markt	2
25. Tuber: cavity in the middle of the tuber		Knolle: Hohlraum in der Mitte der Knolle			
weak		gering		Alba	3
medium		mittel		Mars, Regent	5
strong		stark		Ortho	7

English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties Note/ Nota
26. Tuber: sponginess		Knolle: Schwammigkeit			
weak		gering		Monarch, Prinz	3
medium		mittel		Bergers weisse Kugel, Cesar, Regent	5
strong		stark		Ortho	7
<i>NL: For characteristics 25 and 26 we wonder if it is possible to describe them on the same way under all growing conditions. What are your experiences?</i>					
<i>D: The relation between varieties is the same under different growing conditions. We think we should keep these characteristics.</i>					
27. Tuber: internal rust (+) spot of flesh (after cut open)		Knolle: Eisenfleckigkeit des Fleisches (nach dem Aufschneiden)			
weak		gering		Monarch, Brilliant	3
medium		mittel		Bergers weisse Kugel, Mars	5
strong		stark		Ortho	7
<i>UK: internal rust spotting (after cutting)</i>					
<i>D: we agree</i>					

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

Ad/zu 2

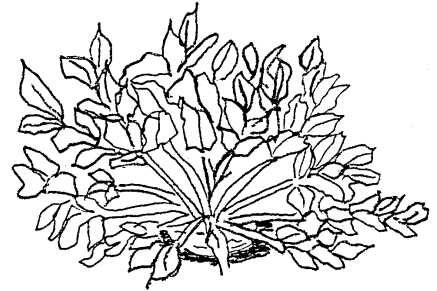
Foliage: attitude
Laub: Haltung



1 erect
aufrecht



3 semi-erect
halbaufrecht



5 horizontal
waagrecht

Ad/zu 7, 8, 9, 10, 12

Leaf blade: length (7)
Blattspreite: Länge (7)

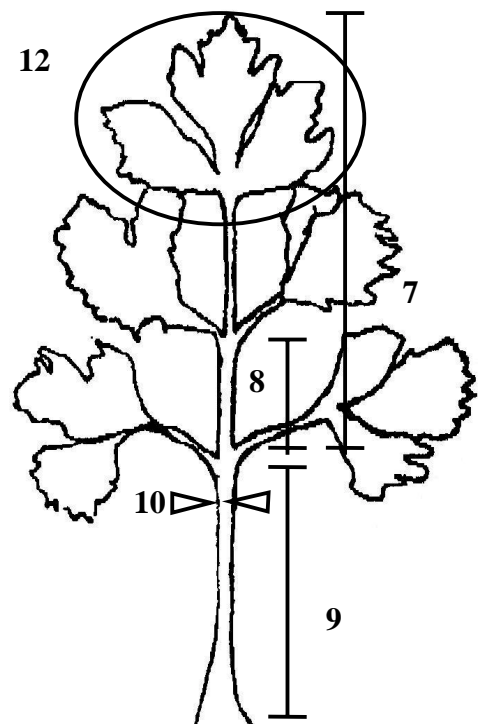
Leaf blade: distance between
1 and 2. pair of
leaflets (8)

Blattspreite: Abstand zwischen
1. und 2. Blattpaar
paar (8)

Petiole: length (9)
width (10)

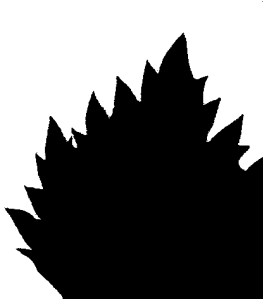
Blattstiel: Länge (9)
Dicke (10)

Leaf: size of the terminal leaflet (12)
Blatt: Größe des Endfiederblattes (12)

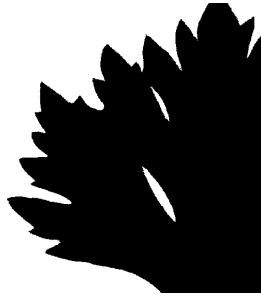


Ad/zu 13

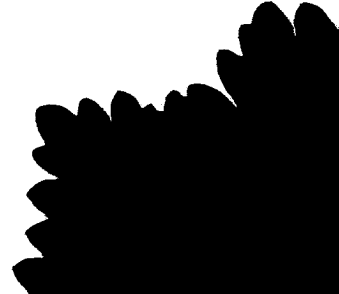
Leaflet: shape of tips of margin
Blattfieder: Form der Spitzen des Randes



3 acute
spitz



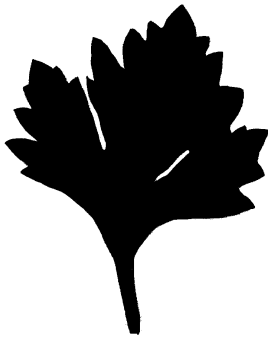
5 pointed
zugespitzt



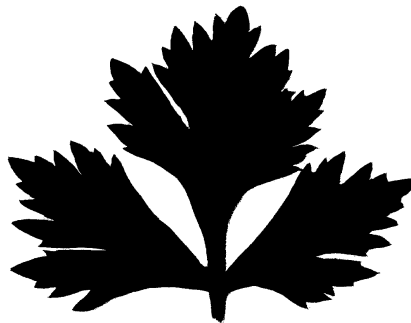
7 truncate
rundlich

Ad/zu 14

Leaflet: density of incisions of margin
Blattfieder: Dichte der Randeinschnitte



3 sparse
locker



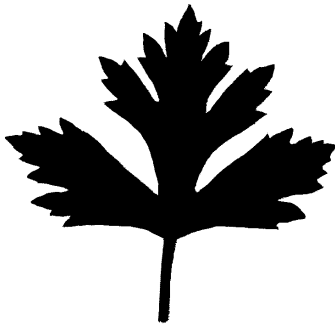
5 medium
mittel



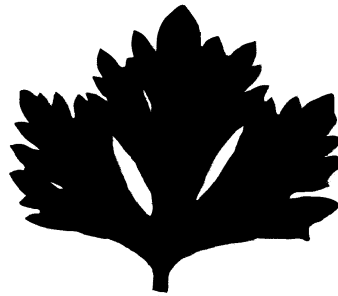
7 dense
dicht

Ad/zu 15

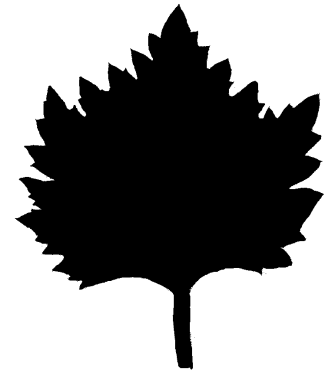
Leaflet: arrangement
Blattfieder: Anordnung



1 detached
freistehend



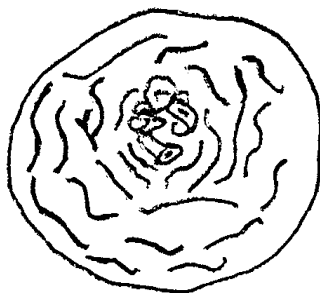
2 touching
sich berührend



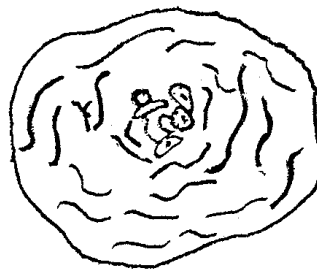
3 overlapping
überlappend

Ad/zu 17

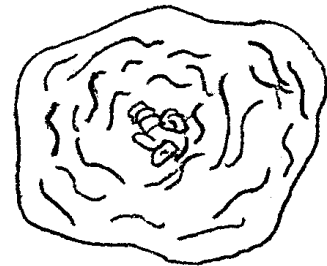
Tuber: protrusion
Knolle: Wulstbildung



3 weak
gering



5 medium
mittel



7 strong
stark

Protrusions are raised/heightened insertion points of the main roots, which give the tuber with increasing intensity an irregular shape in view from above.

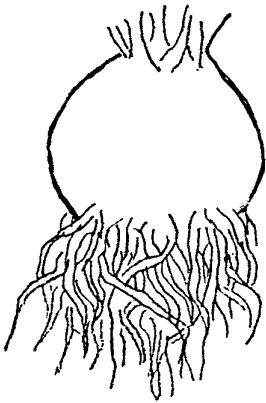
Wülste sind erhöhte Ansatzstellen der Hauptwurzeln, die der Knolle mit zunehmender Stärke eine unregelmäßige Form in der Draufsicht geben.

UK: This characteristic is difficult to illustrate and I do not find the drawing very instructive. Could photographs be the answer?

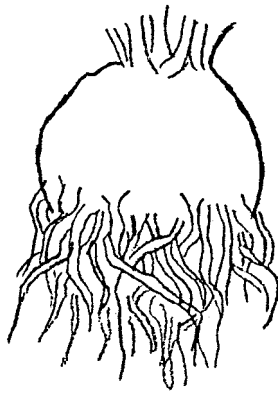
D: We will try and prepare photographs before the next meeting

Ad/Zu 20

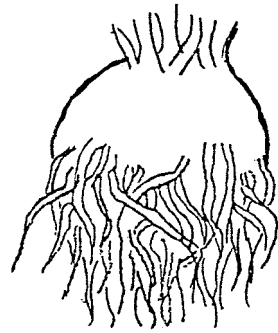
Tuber: insertion of roots
Knolle: Wurzelansatz



3 low
tief



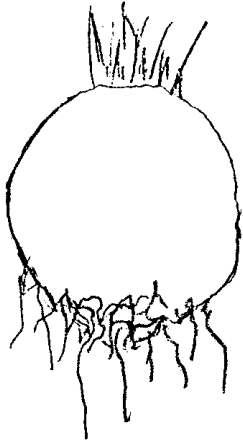
5 medium
mittel



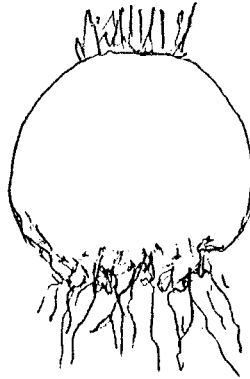
7 high
hoch

Ad/Zu 23

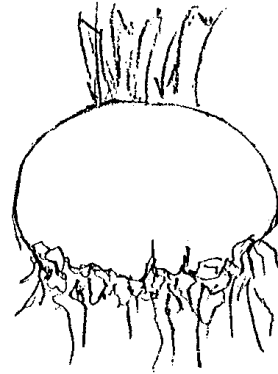
Tuber: shape in longitudinal section
Knolle: Form im Längsschnitt



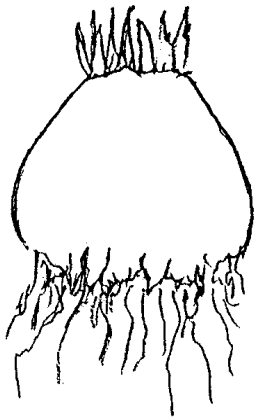
1 broad elliptic
breit elliptisch



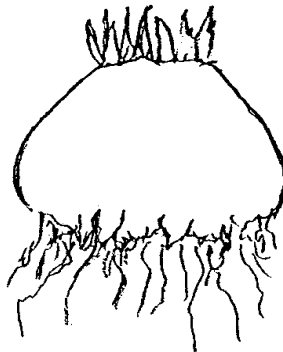
2 round
rund



3 transverse broad elliptic
quer breit elliptisch



4 truncate conical
kegelstumpfförmig



5 transverse ovate
quer eiförmig

Ad/Zu 27

Tuber: internal rust spot of flesh (after cut open)

Knolle: Eisenfleckigkeit des Fleisches (nach dem Aufschneiden)

UK: change the wording as in the table of characteristics

The tubers should be cut through in longitudinal section. After one hour the internal rust spot of flesh will be judged.

UK: The flesh should be assessed for internal rust spots, one hour after cutting the tuber

D: It should be indicated to cut the tubers longitudinal. What is the correct English wording?

Die Knollen werden längs aufgeschnitten. Nach einer Stunde wird die Eisenfleckigkeit des Fleisches bonitiert.

Das Fleisch sollte eine Stunde nachdem die Knollen längs aufgeschnitten worden sind auf Eisenfleckigkeit bonitiert werden

IX. Literature

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

WIEBE, H.-J.(1998): Blütenbildung von Knollensellerie (*Apium graveolens* L. var *rapaceum*). I. Vernalisation und Devernalisation. Gartenbauwissenschaft 63 (4), Ulmer Verlag, Stuttgart, 171-177

IX. 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>	
1.1 Species	<p><i>Apium graveolens</i> L. var. <i>rapaceum</i> (Mill.) Gaud. <i>Celeriac/Knollensellerie</i></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 []

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	Characteristics	Example Varieties	Note
5.1 Plant: height (1)			
	short	Ofir	3 []
	medium	Ibis, Monarch	5 []
	tall	Bergers weisse Kugel, Mars	7 []
5.2 Foliage: attitude (2)			
	erect	Mars	1 []
	erect to semi erect	Bergers weisse Kugel, Monarch	2 []
	semi erect	Alba, Anita, Ibis	3 []
	semi erect to horizontal	Ofir	4 []
	horizontal		5 []
5.3 Petiole: anthocyanin coloration (11)			
	absent	Alba, Mars, Regent	1 []
	present	Bergers weisse Kugel	9 []
5.4 Leaf: size of the terminal leaflet (12)			
	small	Ortho	3 []
	medium	Ibis, Kojak	5 []
	large	Regent	7 []
5.5 Leaflet: shape of tips of margin (13)			
	acute	Ibis, Dolvi	3 []
	pointed	Monarch, Prinz	5 []
	truncate	Radiant	7 []

Characteristics	Example Varieties	Note
5.6 Leaflet: arrangement (15)		
detached	Cascade	1 []
touching	Monarch	2 []
overlapping	Kojak	3 []
5.7 Tuber: size (16)		
small	Ofir	3 []
medium	Anita, Bergers weisse Kugel	5 []
large	Ibis	7 []
5.8 Tuber: ground color of skin (18)		
white	Alba, Mars, Monarch	1 []
brown	Anita, Bergers weisse Kugel	2 []
5.9 Tuber: insertion of roots (20)		
low		3 []
medium		5 []
high		7 []
5.10 Tuber: shape in longitudinal section (23)		
broad elliptic	Kojak	1 []
round	Alba, Monarch	2 []
transverse broad elliptic	Anita, Bergers weisse Kugel	3 []
truncate conical	Dolvi	4 []
transverse ovate	Alabaster 3	5 []
5.11 Tuber: color of flesh (24)		
white		1 []
ivory		2 []

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

7.3 Other information

A representative photocopy of one or more terminal leaflets in original size of the variety should be included in 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.

[End of document]