



TG/191/2

INTERNATIONAL UNION
FOR THE PROTECTION
OF NEW VARIETIES OF
PLANTS

UNION INTERNATIONALE
POUR LA PROTECTION
DES OBTENTIONS
VÉGÉTALES

INTERNATIONALER
VERBANDZUMSCHUTZ
VON PFLANZEN -
ZÜCHTUNGEN

UNIÓN INTERNACIONAL
PARA LA PROTECCIÓN
DE LAS OBTENCIONES
VEGETALES

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

HORSERADISH

*(Armoracia rusticana
Gaertn. Mey. et Scherb.)*

GENEVA
2001

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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.

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I. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Armoracia rusticana* Gaertn. Mey. et Scherb.

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the plant material 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 plant material to be supplied by the applicant in one or several samples should be:

80 rootstocks for a growing season.

2. The plant material (rootstocks) supplied should be 200 mm in length and 8 - 10 mm in diameter, visibly healthy, not lacking in vigor or affected by any important pest or disease. It must in particular be free from visually recognizable virus diseases and nematodes.

3. 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 cycle. 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 a population standard of 1% with an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants the maximum number of off types allowed would be 2.

3. Unless otherwise indicated, all observations on the leaf blade should be made on the fourth fully developed leaf. All observations on the incised (secondary) leaf should be made on the first incised leaf. All observations on rhizome should be made on the fully developed rhizome. The number of shoots should be observed on fully developed rhizomes after forcing in wet sand.

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: shape (characteristic 1);
- (b) Petiole: anthocyanin coloration at base (characteristic 15);
- (c) Rhizome: shape in longitudinal section (characteristic 18).

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.

VII. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tablă de caractere

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. Leafblade:shape (* (+)	Limbe:forme	Blattspreite:Form	Limbo:forma		
narrow elliptic	elliptique étroite	schmalelliptisch	elíptica estrecha	Brassói	1
elliptic	elliptique	elliptisch	elíptica	Bagaméri93/1	2
broad elliptic	elliptique large	breitelliptisch	elíptica ancha	Tel-Aviv	3
ovate	ovale	eiförmig	oval	Danvit	4
2. Leafblade:length	Limbe:longueur	Blattspreite:Länge	Limbo:longitud		
short	court	kurz	corto	Bagaméri Delikat, Kolozsvári	3
medium	moyen	mittel	medio		5
long	long	lang	largo	Grazi	7
3. Leafblade:width	Limbe:largeur	Blattspreite:Breite	Limbo:anchura		
narrow	étroit	schmal	estrecho		3
medium	moyen	mittel	medio		5
broad	large	breit	ancho		7
4. Leafblade:ratio length/width	Limbe:rapport longueur/largeur	Blattspreite: Verhältnis Länge/Breite	Limbo:relación longitud/anchura		
small	petit	gering	pequeña		3
medium	moyen	mittel	media		5
large	grand	groß	grande		7
5. Leafblade:green color (*	Limbe:couleur verte	Blattspreite: Grünfärbung	Limbo:color verde		
light	claire	hell	claro	Steierische	3
medium	moyenne	mittel	medio	Danvit	5
dark	foncée	dunkel	oscuro	Bagaméri93/1	7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. Leafblade:glossiness (* of upper side)	Limbe:brillancede lafacesupérieure	Blattspreite:Glanz derOberseite	Limbo:brillodelhaz		
absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Grazi	1
weak	faible	gering	débil		3
medium	moyenne	mittel	medio	Danvit	5
strong	forte	stark	fuerte	Bagaméri93/1	7
very strong	très forte	sehr stark	muy fuerte	Kolozsvári	9
7. Leafblade:twisting (* of tip)	Limbe:torsion du sommet	Blattspreite: Krümmung der Spitze	Limbo:torsión del extremo		
absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Danvit	1
weak	faible	gering	débil		3
medium	moyenne	mittel	media	Pózna	5
strong	forte	stark	fuerte		7
very strong	très forte	sehr stark	muy fuerte	Bagaméri93/1	9
8. Leafblade:glaucosity (*)	Limbe:glaucescence	Blattspreite:Bereifung	Limbo:cerosidad		
absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Steierische	1
weak	faible	gering	débil	Bihari	3
medium	moyenne	mittel	media	Nemes,Pózna	5
strong	forte	stark	fuerte		7
very strong	très forte	sehr stark	muy fuerte		9
9. Leafblade: (*) undulation of margin	Limbe:ondulation du bord	Blattspreite: Randwellung	Limbo:ondulación del borde		
absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Danvit	1
weak	faible	gering	débil		3
medium	moyenne	mittel	media	Pózna	5
strong	forte	stark	fuerte	Bagaméri93/1	7
very strong	très forte	sehr stark	muy fuerte	Eperjesi	9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. Leafblade: serration (*)	Limbe: dentelure	Blattspreite: Einschnitte	Limbo: serrado		
very weak	très faible	sehr gering	muy débil	Grazi, Lucsonyi	1
weak	faible	gering	débil	Pózna	3
medium	moyenne	mittel	medio	Bagaméri 93/1	5
strong	forte	stark	fuerte		7
very strong	très forte	sehr stark	muy fuerte	Eperjesi	9
11. Leaf: color of midrib	Feuille: couleur de la nervure médiane	Blatt: Farbe der Mittelrippe	Hoja: color del nervio central		
whitish	blanchâtre	weißlich	blanquecino	Bagaméri 93/1, Pózna	1
green	verte	grün	verde	Danvit	2
12. Leaf: green color of midrib	Feuille: couleur verte de la nervure médiane	Blatt: Grünfärbung der Mittelrippe	Hoja: color verde del nervio central		
light	claire	hell	claro	Danvit	3
medium	moyenne	mittel	medio	Steierische	5
dark	foncée	dunkel	oscuro		7
13. Petiole: length	Pétiole: longueur	Blattstiel: Länge	Pecíolo: longitud		
short	court	kurz	corto	Pózna	3
medium	moyen	mittel	medio	Bagaméri Delikát	5
long	long	lang	largo		7
14. Petiole: width	Pétiole: largeur	Blattstiel: Breite	Pecíolo: anchura		
narrow	étroit	schmal	estrecho	Bagaméri Delikát	3
medium	moyen	mittel	medio	Danvit	5
broad	large	breit	ancho		7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. Petiole:antho cyanin coloration at base (*)	Pétiole: pigmentation anthocyanique à la base	Blattstiel:Anthocyanfärbung an der Basis	Pecíolo:pigmentación antocianica en la base		
absent	absente	fehlend	ausente		1
present	présente	vorhanden	presente	Rzezowi	9
16. Time of appearance of incised (secondary) leaf (*)	Époque d'apparition de la première feuille incisée (secondaire)	Zeitpunkt des Erscheinens des ersten eingeschnittenen (sekundären) Blattes	Epoca de aparición de la primera hoja incisa (secundaria)		
early	précoce	früh	precoz	Bagaméri93/1	3
medium	moyen	mittel	media	Pózna	5
late	tardif	spät	tardía	Danvit	7
17. Incised (secondary) leaf: incision of the margin (+)	Feuille incisée (secondaire): incisions du bord	Eingeschnittenes (sekundäres) Blatt: Randeinschnitte	Hojaincisa (secundaria): incisiones del borde		
absent or very weak	nulles ou très faibles	fehlend oder sehr gering	ausentes o muy débiles		1
weak	faibles	gering	débiles	Danvit	3
medium	moyennes	mittel	medias		5
strong	fortes	stark	fuertes		7
very strong	très fortes	sehr stark	muy fuertes	Bagaméri93/1	9
18. Rhizome: shape in longitudinal section (+)	Rhizome: forme en section longitudinale	Rhizom: Form im Längsschnitt	Rizoma: forma en la sección longitudinal		
narrow oblong	oblong étroit	schmal rechteckig	oblonga estrecha	Pózna	1
narrow obtriangular	obtriangulaire étroit	trapezförmig	obtriangulare estrecha		2
obtriangular	obtriangulaire	breit trapezförmig	obtriangular	Danvit	3
19. Rhizome: curvature	Rhizome: courbure	Rhizom: Krümmung	Rizoma: curvatura		
straight	droit	gerade	recto	Pózna	1
slightly curved	légèrement courbé	leicht gekrümmt	ligeramente curvado	Nagykörösi	2
strongly curved	fortement courbé	stark gekrümmt	fuertemente curvado	Daróczfalvi	3

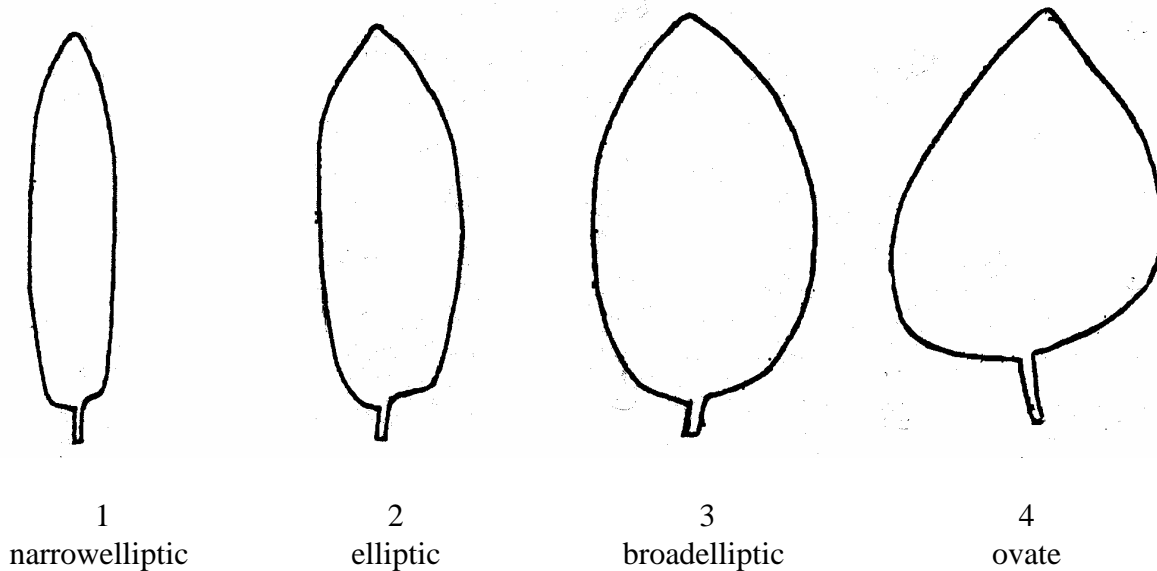
English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20. Rhizome:diameter at top (+)	Rhizome: diamètre au sommet	Rhizom: Durchmesser am Kopf	Rizoma: diámetro en el apice		
small	petit	klein	pequeño		3
medium	moyen	mittel	medio	Bagaméri Delikát, Pózna	5
large	grand	groß	grande	Danvit	7
21. Rhizome:diameter at base (+)	Rhizome: diamètre à la base	Rhizom: Durchmesser an der Basis	Rizoma: diámetro en la base		
small	petit	klein	pequeño		3
medium	moyen	mittel	medio	Pózna	5
large	grand	groß	grande	Bagaméri 93/1	7
22. Rhizome:weight	Rhizome: poids	Rhizom: Gewicht	Rizoma: peso		
low	faible	niedrig	bajo		3
medium	moyen	mittel	medio	Pózna	5
high	élevé	hoch	alto	Danvit	7
23. Rhizome:surface texture	Rhizome: texture de la surface	Rhizom: Textur an der Oberfläche	Rizoma: textura de la superficie		
smooth	lisse	glatt	lisa	Bagaméri 93/1	1
intermediate	intermédiaire	leicht rau	media		2
rough	rugueuse	deutlich rau	rugosa		3
24. Rhizome:internal color	Rhizome: couleur interne	Rhizom: Innenfarbe	Rizoma: color interno		
whitish	blanchâtre	weißlich	blanquecino	Bagaméri 93/1	1
yellowish	jaunâtre	gelblich	amarillento	Bátai	2

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25. Rhizome: brownish coloration of flesh	Rhizome: coloration brunâtre de la chair	Rhizom: Bräunlichfärbung des Fleisches	Rizoma: coloración marrón de la pulpa		
absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Bagaméri 93/1	1
weak	faible	gering	débil	Danvit	3
medium	moyenne	mittel	media		5
strong	forte	stark	fuerte		7
very strong	très forte	sehr stark	muy fuerte		9
26. Rhizome: density of sideroots (at the upper third)	Rhizome: densité des racines latérales (au tiers supérieur)	Rhizom: Dichte der Seitenwurzeln (im oberen Drittel)	Rizoma: densidad de las raíces laterales (en el tercio superior)		
sparse	lâche	locker	rala		3
medium	moyenne	mittel	media		5
dense	dense	dicht	densa	Brassói	7
27. Rhizome: density of roots at base	Rhizome: densité des racines à la base	Rhizom: Dichte der Wurzeln an der Basis	Rizoma: densidad de las raíces en la base		
sparse	lâche	locker	rala	Bagaméri 93/1	3
medium	moyenne	mittel	media	Bagaméri Delikát	5
dense	dense	dicht	densa	Pózna	7
28. Rhizome: (*) predominant number (+) of shoots on the crown	Rhizome: nombre prédominant de rameaux à la partie supérieure	Rhizom: überwiegende Anzahl Triebe am Kopf	Rizoma: número predominante de brotes en la corona		
one	un	einer	uno	Bayerischer, Pózna	1
two	deux	zwei	dos	Bagaméri 93/1	2
three or more	trois ou plus	drei oder mehr	tres o más	Brassói	3

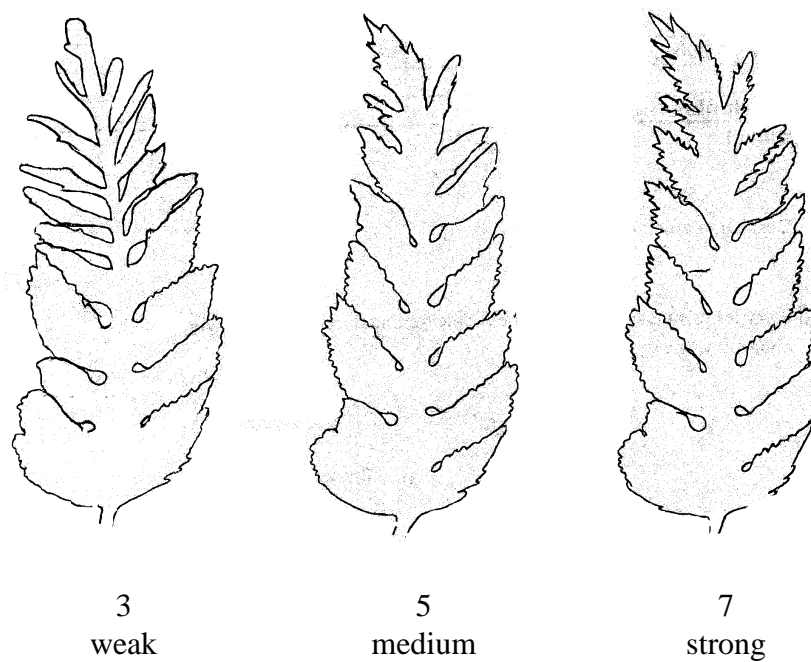
English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29. Stem:height (at full flowering in second year)	Tige:hauteur (en pleine floraison la deuxième année)	Stiel:Höhe (zum Zeitpunkt der Vollblüte im zweiten Jahr)	Tallo:altura (en el momento de floración plena del segundo año)		
short	courte	niedrig	corto	Bagaméri Delikát	3
medium	moyenne	mittel	medio		5
tall	haute	hoch	alto	Pózna	7

VIII. ExplanationsontheTableofCharact eristics

Ad.1:Leafblade:shape

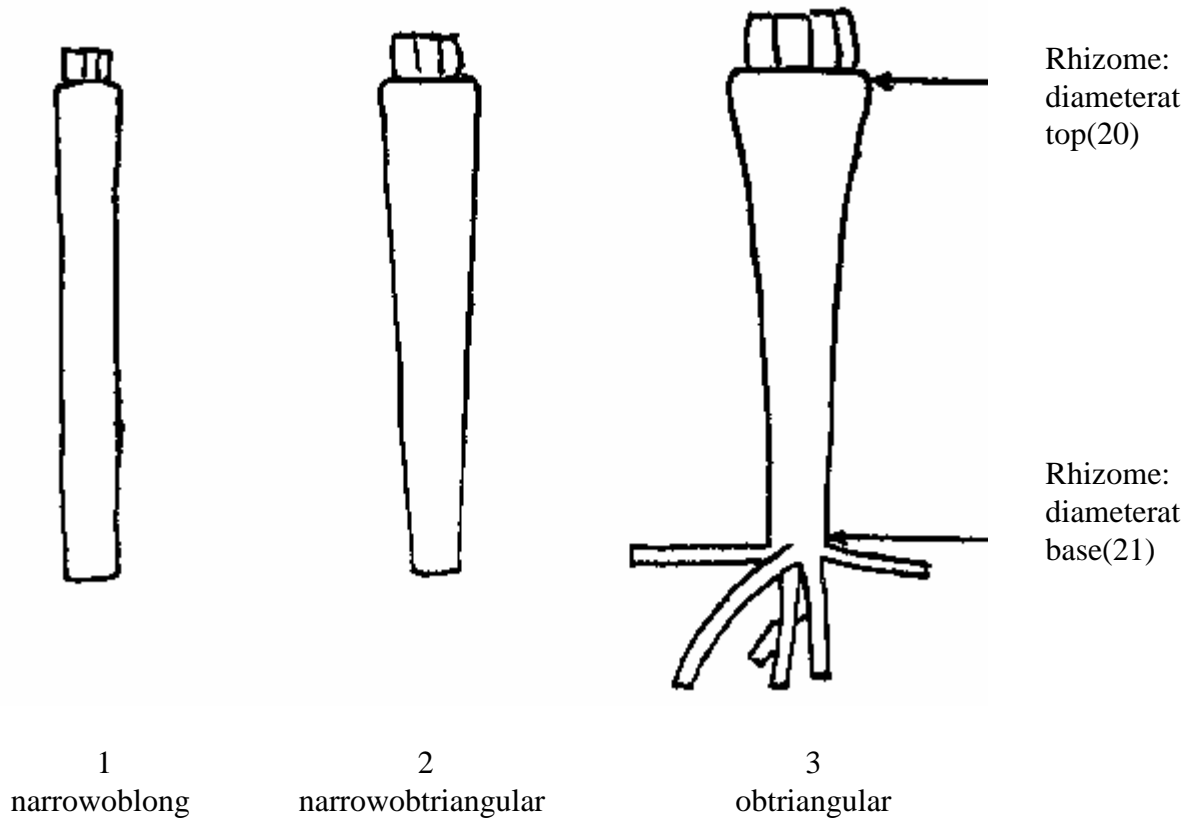


Ad.17: Incised(secondary)leaf: incisionsofthemargin(observedontheupperthirdofthe leafblade)



Ad.18,20,21: Rhizome: shape in longitudinal section (18), diameter at top (20) and diameter at base(21)

Shape in longitudinal section(18)



Ad28:Rhizome:predominant number of shoots on the crown

Twenty fully developed rhizomes should be put vertically in wet sand and kept at 15°-17°C for two weeks. The shoots developed on the crown can be counted.

IX. Literature

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Géczi L., 1999: A torna Mezőgazda Kiadó.

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Rhodes, A. M., Carmer, S. G., Courter, J. W., 1969: Measurement and classification of genetic variability in horseradish. Am. Soc. Hortic. Sci. J. 94, 98 -102.

Wonneberger, C., 1978: Meerrettich, Anbau und Verwertung. Eigenverlag. Fürth/Osnabrück.

X. TechnicalQuestionnaire

	ReferenceNumber (nottobefilledinbytheapplicant)
<p>TECHNICALQUESTIONNAIRE tobecompletedinconnectionwithanapplicationfo rplantbreeders' rights</p>	
1. Species	<p><i>Armoratarusticana</i> Gaertn.Mey.etScherb. HORSE RADISH</p>
2. Applicant(Nameandaddress)	
3. Proposeddenominationorbreeder'sreference	

4.	Information on origin, maintenance and reproduction of the variety		
4.1	Origin and breeding method		
	(a) natural clone	<input type="checkbox"/>	
	(b) clone from <i>in vitro</i> culture	<input type="checkbox"/>	
	(c) clone from seedlings	<input type="checkbox"/>	
	(d) discovery (indicate where and when)	<input type="checkbox"/>	
		
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	Leafblade: shape		
(1)			
	narrow elliptic	Brassói	1 <input type="checkbox"/>
	elliptic	Bagaméri93/1	2 <input type="checkbox"/>
	broad elliptic	Tel-Aviv	3 <input type="checkbox"/>
	ovate	Danvit	4 <input type="checkbox"/>
5.2	Leafblade: twisting of tip		
(7)			
	absence or very weak	Danvit	1 <input type="checkbox"/>
	weak		3 <input type="checkbox"/>
	medium	Pózna	5 <input type="checkbox"/>
	strong		7 <input type="checkbox"/>
	very strong	Bagaméri93/1	9 <input type="checkbox"/>

Characteristics	Example Varieties	Note	
5.3 Leafblade:serration (10)			
veryweak	Grazi,Lucsonyi	1[]	
weak	Pózna	3[]	
medium	Bagaméri93/1	5[]	
strong		7[]	
verystrong	Eperjesi	9[]	
5.4 Petiole:anthocyanincolorationatbase (15)			
absent		1[]	
present	Rzezowi	9[]	
5.5 Rhizome:shapeinlongitudinalsection (18)			
narrowoblong	Pózna	1[]	
narrowobtriangular		2[]	
obtriangular	Danvit	3[]	
5.6 Rhizome:predominantnumberofshootsonthecrown (28)			
one	Bayerischer,Pózna	1[]	
two	Bagaméri93/1	2[]	
threeormore	Brassói	3[]	
6. Similarvarietiesanddifferencesbetwe nthesevarieties			
Denominationof similarvariety	Characteristicin whichthesimilar varietyisdifferent ^{o)}	Stateofexpression ofsimilarvariety	Stateofexpressionof candidatevariety
<p>^{o)} Inthecaseofidenticalstatesofex pressionsofbothvarieties,pleaseindicatethesizeof thedifference.</p>			

7. Additional information which may help to distinguish the variety

7.1 Resistances to pests and diseases

7.2 Special conditions for the examination of the variety

7.3 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]