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INTERNATIONAL UNION FOR THE PROTECTION 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

TURNIP

(*Brassica rapa* L.
var. *rapa* L.)

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 *Brassica rapa* L. var. *rapa* L. with swollen roots.

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:

50 g.

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing 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. As a minimum, 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, weighting 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. 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) Ploidy (characteristic 1)
(b) Leaf: type (characteristic 5)
(c) Root: color of skin above soil (characteristic 18)
(d) Root: color of flesh (characteristic 21)
(e) Root: shape in longitudinal section (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 the different characteristics.

3. Legend:

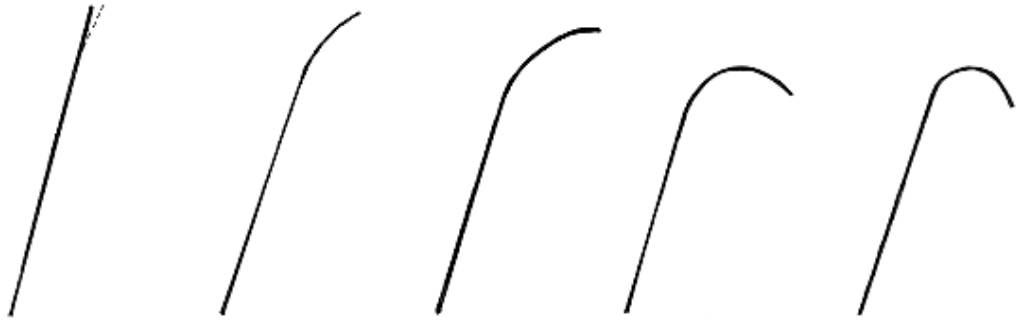
(*) Characteristics that should be used on all varieties in every growing cycle over which the examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

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

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

VIII. Explanations on the Table of Characteristics

Ad. 3: Leaf: reflexion of top



1	3	5	7	9
absent or very weak	weak	medium	strong	very strong

Ad. 5: Leaf: type

1	9
entire	lobed

Assessment of leaf lobing should be undertaken on several leaves of the plant.

Plants with absent lobes have usually obovate and spatulate shaped leaves. These have continuous lamina tissue to the base of the leaf, no terminal lobe and may be strongly incised.

Ad. 6: Lobed-leaf varieties only: Leaf: number of lobes

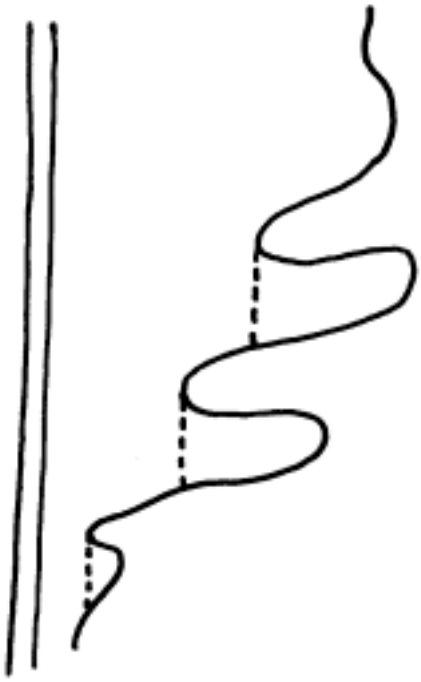


Figure 1

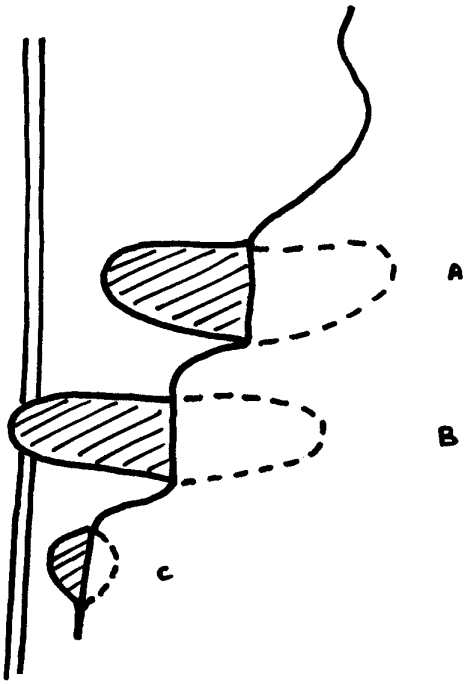


Figure 2

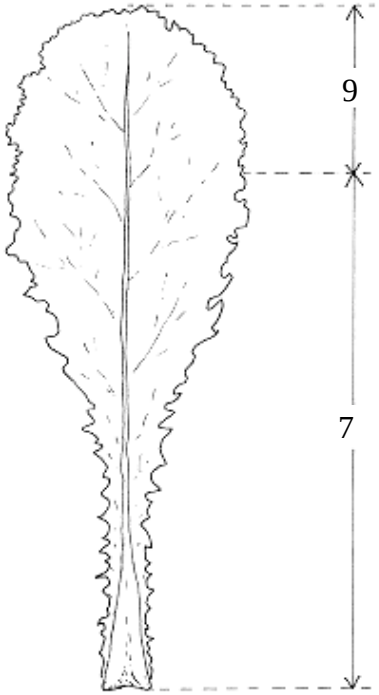
To determine whether part of the leaf is a lobe, fold that part along a line parallel to the midrib as indicated by the dotted line in figure 1. The fold starts at the base of the shorter side.

If the folded tissue meets the midrib, it is a lobe (Figure 2)
A lobe must have a minimum length of 1 cm.

A is not a lobe as it does not meet the midrib when folded
B is a lobe as it meets the midrib when folded
C is too small to be a lobe as it is less than 1 cm in length and does not meet the midrib when folded.

Ad. 7: Entire-leaf varieties only: Leaf: incisions of blade base

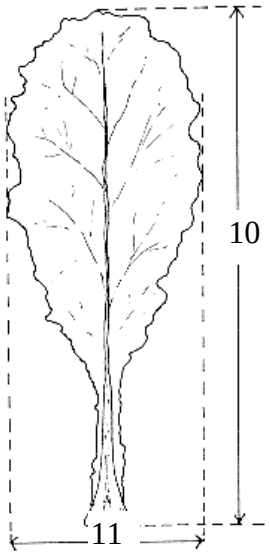
Ad. 9: Leaf: dentation of margin

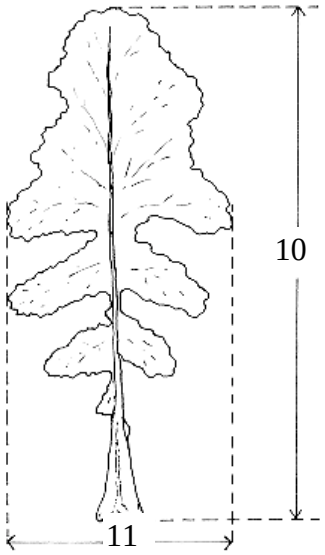


part on which the dentation should be recorded (characteristic 9)

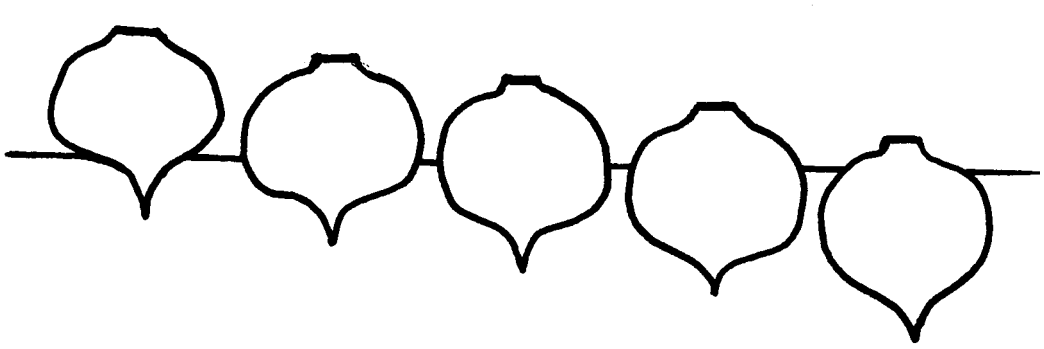
part on which the incisions of base of the blade should be recorded (characteristic 7)

Ad. 10, 11: Leaf: length (10), width (11)



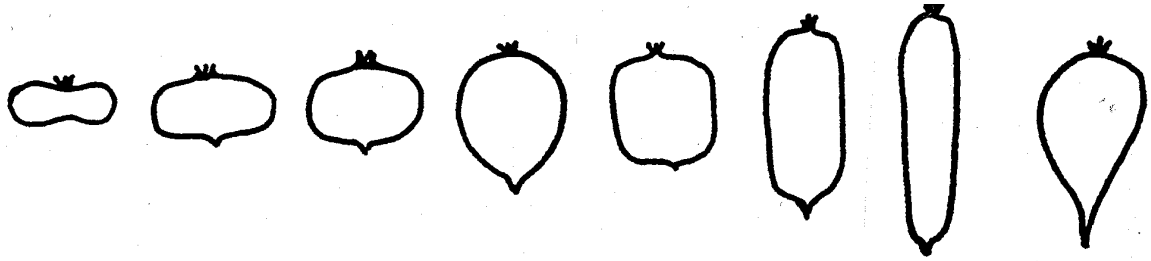


Ad. 16: Root: position in soil



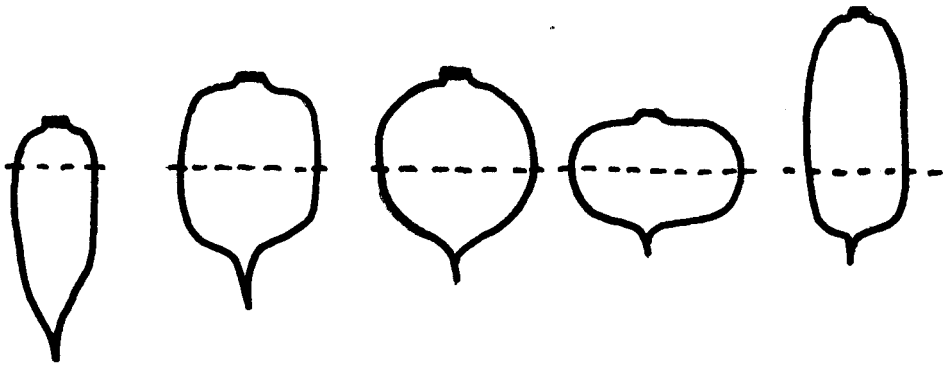
1	3	5	7	9
very shallow	shallow	medium	deep	very deep

Ad. 24: Root: Shape in longitudinal section



1	2	3	4	5	6	7	8
transverse elliptic	oblate	circular	obovate	square	broad oblong	narrow oblong	obtriangular

Ad. 27: Root: position of widest point

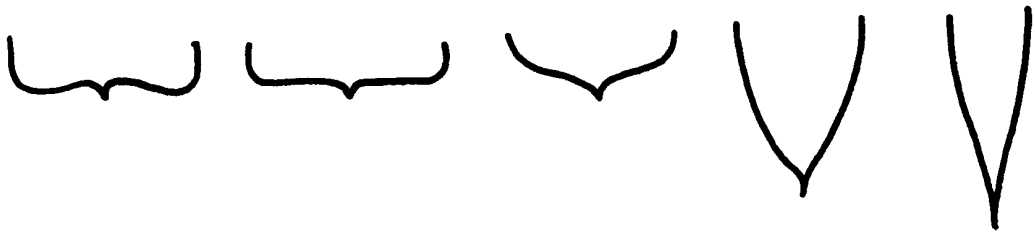


3	5	5	5	7
above middle	at middle	at middle	at middle	below middle

Ad. 29: Root: shape of top

3	5	7	9
indented	level	raised	strongly raised

Ad. 30: Root: shape of base



1	3	5	7	9
indented	truncate	rounded	obtuse	pointed

Key to Growth Stages

00	Dry seed	
1- 10	Germination and emergence through soil	
	Seedling growth	
12	Elongation of emerging shoot	
15	Elongation and opening of cotyledons	
20	Cotyledons fully opened	
30	Cotyledons fully opened and full development of first true leaf	
40	Second leaf fully developed	
50	Third leaf fully developed and initial senescence of cotyledons	
60	Fourth leaf fully developed and partial senescence of cotyledons	
70	Fifth leaf fully developed and advanced senescence/drop of cotyledons	
	Leaf development	
80	Sixth leaf fully developed	
90	Seventh leaf fully developed;	initial senescence of first true leaf in early cultivars
100	Eighth leaf fully developed;	30 % senescence of first true leaf
110	Ninth leaf fully developed;	60% senescence of first true leaf
120	Tenth leaf fully developed;	complete senescence and drop of first true leaf
130	Eleventh leaf fully developed.	
	Root development	
200	Slight swelling of the root at ground level	
220	Development of a small swollen root above ground level	
240	Swollen root increasing in size but not fully developed	
260	Root fully developed with no cork on skin	
270	Root fully developed with 40% cork development on skin	
280	Root fully developed with 80 - 100% cork development	
290	Root flesh becoming pithy and fibrous	
300	Root flesh pithy and fibrous	
	Flowering and seed production on main stem	
310	Initial formation and elongation of the flowering stem	
330	Elongation of the flowering stem with clear space between leaves	
350	First bud formation and further elongation of stem	
360	Terminal inflorescence in bud	
370	Terminal inflorescence with first open flower	
380	Terminal inflorescence partially flowering	
400	Terminal inflorescence fully flowering	
420	Development of siliqua with elongation of flowering stem	
430	Lowest fully developed siliqua green	
450	Lowest fully developed siliqua senescing and going brown	
475	Lowest fully developed siliqua dry with seed beginning to dry	
500	Lowest fully developed siliqua dry with mature dry seed	

IX. Literature

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Baltjes, H.J., Klein Geltink, D.J.A., Nienhuis, K.H. and Luesink, B., 1985: “Linking Distinctness and Description of Varieties.” Journal National Institute Agricultural Botany. 17. p. 9-19.

Green, F.N. and Winfield, P.J., 1984: “The Development of Distinctness, Uniformity and Stability tests for Turnip, Turnip Rape and Swede in the United Kingdom. ” Procedures of Better Brassicas '84 Conference. St. Andrews. Eds. W. H. Macfarlane Smith, T. Hodgkin and A. B. Wills. 96-107. Scottish Crop Research Institute, Dundee.

Kajanus, B., 1913: “Über die Vererbungsweise gewisser Merkmale der Beta- und Brassica-Ruben. II Brassica.” Zeitschrift für Pflanzenzüchtung, Band I (4): 419-466.

Klein Geltink, D.J.A., 1983: “Inheritance of Leaf Shape in Turnip (*Brassica rapa* L. partim) and Rape (*Brassica napus* L.). ” Euphytica 32 (2): 361-365.

McMaster Davey, V., 1931: “Color Inheritance in Swedes and Turnips and its Bearing on the Identification of Commercial Stocks.” Nat. Journ. Agric. XIV (3): 1-13.

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. Species	*Brassica rapa* L. var. *rapa* L. TURNIP
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

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

4.1 Origin and breeding method

(a) Open-pollinated variety [ ]

(b) Single hybrid [ ]

(c) Three-way hybrid [ ]

(d) Other (indicate type) [ ]

.....

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 (1)	**Ploidy**		
	diploid	Milan White	2[ ]
	tetraploid	Taronda	4[ ]
5.2 (4)	**Leaf: green color**		
	very light		1[ ]
	light	Leielander	3[ ]
	medium	Bency	5[ ]
	dark	Frisia	7[ ]
	very dark	Aberdeen Green Top Yellow	9[ ]
5.3 (5)	**Leaf: type**		
	entire	Polybra	1[ ]
	lobed	Samson	2[ ]
5.4 (10)	**Leaf: length**		
	short	Milan White Forcing	3[ ]
	medium	Tokyo Cross	5[ ]
	long	Tyfon	7[ ]

	Characteristics	Example Varieties	Note
5.5 (16)	**Root: position in soil**		
	very shallow	Milan White Forcing	1[ ]
	shallow	Oasis	3[ ]
	medium	Agressa	5[ ]
	deep	Noir long	7[ ]
	very deep	Teltower Kleine	9[ ]
5.6 (17)	**Root: thick cork layer around skin**		
	absent	Bency	1[ ]
	present	Noir long	9[ ]
5.7 (18)	**Root: color of skin above soil**		
	white	Tokyo Cross	1[ ]
	green	Leielander	2[ ]
	yellow	Topaz	3[ ]
	orange	Golden Ball	4[ ]
	bronze	Grandessa	5[ ]
	scarlet	Scarlet Ball	6[ ]
	reddish purple	Bency	7[ ]
	bluish purple	The Bruce	8[ ]
5.8 (21)	**Root: color of flesh**		
	white	Agressa	1[ ]
	yellow	Teutonengold	2[ ]

	Characteristics	Example Varieties	Note
5.9 (24)	**Root: shape in longitudinal section**		
	transverse elliptic	Platte Witte Mei	1[ ]
	oblate	Milan White	2[ ]
	circular	Rondo	3[ ]
	obovate	Alwi	4[ ]
	square	Champion Green Top Yellow	5[ ]
	broad oblong	Rekord	6[ ]
	narrow oblong	Long d'Alsace	7[ ]
	obtriangular	Sirius	8[ ]
5.10 (25)	**Root: length**		
	very short	Milan White	1[ ]
	short	The Wallace	3[ ]
	medium	Dynamo	5[ ]
	long	Taronda	7[ ]
	very long	Alander	9[ ]
5.11 (26)	**Root: diameter (at widest point)**		
	small	Hakutaka	3[ ]
	medium	Rondo	5[ ]
	large	Massif	7[ ]
5.12 (27)	**Root: position of widest point**		
	above middle	Marteau	3[ ]
	middle	Taronda	5[ ]
	below middle	Blanc dur d'hiver	7[ ]

	Characteristics	Example Varieties	Note
5.13 (29)	**Root: shape of top**		
	strongly indented		1[ ]
	indented	Milan White Forcing	3[ ]
	level	Milan White	5[ ]
	raised	Taronda	7[ ]
	strongly raised	Agressa	9[ ]
5.14 (30)	**Root: shape of base**		
	indented	Milan White Forcing	1[ ]
	truncate	Miland White	3[ ]
	round	Frisia	5[ ]
	obtuse	Sirius	7[ ]
	pointed	Noir long	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

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 Main use:

– Root Vegetable [ ]
– Stubble or Forage Turnip [ ]

7.3 Time of Sowing

– Spring sown [ ]
– Summer sown [ ]
– Autumn sown [ ]

7.4 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.

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