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TG/178/3

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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

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

FODDER RADISH

(*Raphanus sativus* L. var. *oleiformis* Pers.)

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.

TABLE OF CONTENTS PAGE

I. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Raphanus sativus* L. var. *oleiformis* Pers.

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 seed to be supplied by the applicant in one or several samples should be:

1000 g

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing certified 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 distance between rows and between plants within the rows should be adjusted to enable observations on individual plants. 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 300 plants which should be divided between three or more replicates. In addition each test should include a replicate of minimum 300 plants for the characteristics assessed by observation of a group of plants.

4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. Unless otherwise stated, all observations determined by measurement or counting should be made on 60 plants or parts taken from each of 60 plants.

2. For the assessment of uniformity

– unless otherwise stated, all observations determined by measurements should be made on 60 plants or part of plants (MS)

– all visual observations of a number of individual plants or parts of plants should be made on 100 plants (VS)

– all single observations of a group of plants or parts of plants should be made on the total plot of minimum 300 plants (VG).

The variability within the variety should not exceed the variability of comparable varieties already known.

3. Interpretation of results should be made according to the rules for cross-pollinated varieties as stated in the General Introduction to the Test Guidelines.

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) Time of flowering (characteristic 12)
(c) Flower: color of petals (characteristic 14)

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 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 for the assessment of each characteristic is indicated by a number in the second column. The stages of development denoted by each number are described at the end of Chapter VIII.

MS: actual measurement

VG: visual assessment by a single observation of a group of plants or parts of plants

VS: visual assessment by observations of a number of individual plants or parts of plants.

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

	Stage [1] Stade [1] Stadium [1] Estadio [1]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*) (+)	**05**	**Ploidy**	**Ploïdie**	**Ploidie**	**Ploidía**		
		diploid	diploïde	diploid	diploide	Pegletta	2
		tetraploid	tétraploïde	tetraploid	tetraploide	Romulus	4
2. (+)	**11 MS**	**Cotyledon: length**	**Cotylédon: longueur**	**Keimblatt: Länge**	**Cotiledón: longitud**		
		short	court	kurz	corta		3
		medium	moyen	mittel	media	Siletina	5
		long	long	lang	larga	Mira	7
3. (+)	**11 MS**	**Cotyledon: width**	**Cotylédon: largeur**	**Keimblatt: Breite**	**Cotiledón: anchura**		
		narrow	étroit	schmal	estrecha		3
		medium	moyen	mittel	media	Siletina	5
		broad	large	breit	ancha	Iris	7
4. (*)	**19-30 VG**	**Leaf: intensity of green color**	**Feuille: intensité de la couleur verte**	**Blatt: Intensität der Grünfärbung**	**Hoja: intensidad del color verde**		
		light	claire	hell	clara		3
		medium	moyenne	mittel	media	Diabolo	5
		dark	foncée	dunkel	oscura	Mator	7
5. (*) (+)	**19-30 VS**	**Leaf: lobes**	**Feuille: lobes**	**Blatt: Lappen**	**Hoja: lóbulos**		
		absent	absents	fehlend	ausentes		1
		present	présents	vorhanden	presentes	Pegletta	9

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. **(*)** **(+)**	**19-30 MS**	**Leaf: number of lobes (fully developed leaf)**	**Feuille: nombre de lobes (feuille complètement développée)**	**Blatt: Anzahl Lappen (vollständig entwickeltes Blatt)**	**Hoja: número de lóbulos (hoja completamente desarrollada)**		
		few	faible	gering	bajo	Colonel	3
		medium	moyen	mittel	medio	Nemex	5
		many	grand	groß	alto	Regresso	7
7. **(+)**	**19-30 VG**	**Leaf: dentation of margin**	**Feuille: dentelure du bord**	**Blatt: Zähnung des Randes**	**Hoja: dentado del borde**		
		weak	faible	gering	débil	Pecari	3
		medium	moyenne	mittel	medio	Resal	5
		strong	forte	stark	fuerte	Kwatro	7
8. **(*)** **(+)**	**19-30 MS**	**Leaf: length (blade and petiole)**	**Feuille: longueur (limbe et pétiole)**	**Blatt: Länge (Spreite und Stiel)**	**Hoja: longitud (limbo y pecíolo)**		
		short	courte	kurz	corta	Tempo	3
		medium	moyenne	mittel	media	Resal	5
		long	longue	lang	larga	Toro	7
9. **(*)** **(+)**	**19-30 MS**	**Leaf: width (widest point)**	**Feuille: largeur (au point le plus large)**	**Blatt: Breite (an breitester Stelle)**	**Hoja: anchura (en el punto más ancho)**		
		narrow	étroite	schmal	estrecha	Tempo	3
		medium	moyenne	mittel	media	Resal	5
		broad	large	breit	ancha	Slobolt	7
10. **(+)**	**19-30 MS**	**Leaf: length of petiole**	**Feuille: longueur du pétiole**	**Blatt: Länge des Stieles**	**Hoja: longitud del peciolo**		
		short	court	kurz	corta	Tempo	3
		medium	moyen	mittel	media	Resal	5
		long	long	lang	larga		7

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
11. **(+)**	**52** **VG**	**Plant: height at emergence of flower buds**	**Plante: hauteur à l'apparition des boutons floraux**	**Pflanze: Höhe beim Erscheinen der Blütenknospen**	**Planta: altura en la época de aparición de los botones florales**		
		low	basse	niedrig	baja	Colonel	3
		medium	moyenne	mittel	media	Toro	5
		tall	haute	hoch	alta	Siletta Nova	7
12. **(*)** **(+)**	**60** **MS**	**Time of flowering**	**Époque de floraison**	**Zeitpunkt der Blüte**	**Época de la floración**		
		very early	très précoce	sehr früh	muy precoz	Iris	1
		early	précoce	früh	precoz	Siletina	3
		medium	moyenne	mittel	medio	Trick	5
		late	tardive	spät	tardía	Nemex	7
		very late	très tardive	sehr spät	muy tardía	Ultimo	9
13. **(+)**	**65** **VG**	**Plant: height at flowering**	**Plante: hauteur à floraison**	**Pflanze: Höhe zur Zeit der Blüte**	**Planta: altura en floración**		
		low	basse	niedrig	baja	Tempo	3
		medium	moyenne	mittel	media	Resal	5
		tall	haute	hoch	alta	Siletta Nova	7
14. **(*)** **(+)**	**65** **VS**	**Flower: color of petals**	**Fleur: couleur des pétales**	**Blüte: Farbe der Blütenblätter**	**Flor: color de los pétalos**		
		white	blancs	weiß	blanco	Ultimo	1
		violet	violets	violett	violeta	Radical, Toro	2
		reddish	rougeâtres	rötlich	rojizo	Mator	3
		yellow	jaunes	gelb	amarillo		4

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. (*)	**89 MS**	**Plant: total length**	**Plante: longueur totale**	**Pflanze: Gesamtlänge**	**Planta: longitud total**		
		very short	très courte	sehr kurz	muy corta	Mator	1
		short	courte	kurz	corta	Toro	3
		medium	moyenne	mittel	media	Adagio	5
		long	longue	lang	larga	Siletta Nova	7
		very long	très longue	sehr lang	muy larga		9
16. (*) (+)	**89 MS**	**Siliqua: length (between peduncle and beak)**	**Silique: longueur (entre pédoncule et bec)**	**Schote: Länge (zwischen Stiel und Spitze)**	**Silicua: longitud (entre pedúnculo y rostro)**		
		short	courte	kurz	corta	Tempo	3
		medium	moyenne	mittel	media	Pegletta	5
		long	longue	lang	larga	Ultimo	7
17. (+)	**89 MS**	**Siliqua: length of beak**	**Silique: longueur du bec**	**Schote: Länge der Spitze**	**Silicua: longitud del rostro**		
		short	court	kurz	corta	Tempo	3
		medium	moyen	mittel	media	Siletina	5
		long	long	lang	larga	Toro	7
18. (+)	**89 MS**	**Siliqua: width**	**Silique: largeur**	**Schote: Breite**	**Silicua: anchura**		
		narrow	étroite	schmal	estrecha	Radical	3
		medium	moyenne	mittel	media	Toro	5
		broad	large	breit	ancha	Pegletta	7
19. (+)	**89 MS**	**Siliqua: length of peduncle**	**Silique: longueur du pédoncule**	**Schote: Länge des Stieles**	**Silicua: longitud del pedúnculo**		
		short	court	kurz	corta	Nemex	3
		medium	moyen	mittel	media	Mator	5
		long	long	lang	larga	Toro	7

	Stage [1)] Stade [1)] Stadium [1)] Estadio [1)]	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20. **(+)**	**89** **MS**	**Siliqua: number of seeds**	**Silique: nombre de grains**	**Schote: Anzahl Samen**	**Silicua: número de semillas**		
		low	faible	gering	bajo	Romulus	3
		medium	moyen	mittel	medio	Pegletta	5
		high	élevé	groß	alto		7
21.	**89** **MS**	**Seed: thousand seed weight**	**Semence: poids de mille grains**	**Samen: Tausend-korngewicht**	**Semilla: peso de mil semillas**		
		very low	très petit	sehr niedrig	muy pequeño		1
		low	petit	niedrig	pequeño	Siletina	3
		medium	moyen	mittel	medio	Adagio	5
		high	grand	hoch	grande		7
		very high	très grand	sehr hoch	muy grande	Romulus	9
22. **(+)**	**VG**	**Tendency to form inflorescences in year of sowing for late summer sown trials**	**Tendance à former des inflorescences l'année du semis dans un essai semé tard en été**	**Neigung zur Bildung von Blütenständen im Aussaatjahr bei Spätsommeraussaat**	**Tendencia a formar inflores-cencias el año de siembra en los ensayos sembrados al final del verano**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Ultimo	1
		weak	faible	gering	débil	Resal	3
		medium	moyenne	mittel	media	Romulus	5
		strong	forte	stark	fuerte	Peglatta	7
		very strong	très forte	sehr stark	muy fuerte	Iris	9
23. **(*)** **(+)**	**VS**	**Root: color**	**Racine: couleur**	**Rübe: Farbe**	**Raíz: color**		
		white	blanche	weiß	blanco	Nemex	1
		red	rouge	rot	rojo	Mator	2
		violet	violette	violett	violeta		3
		blackish brown	brun noirâtre	schwärzlich braun	marrón negrusco		4

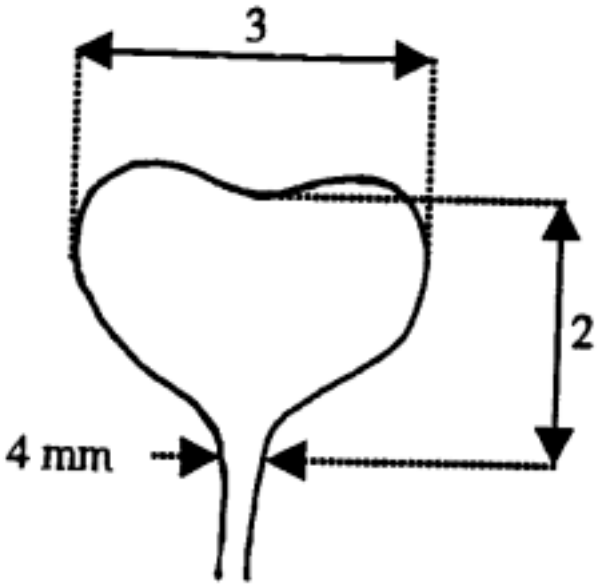
VIII. Explanations on the Table of Characteristics

Ad. 1: Ploidy

Ploidy should be assessed on at least 100 seedlings.

Ad. 2 + 3: Cotyledon: length (2) and width (3)

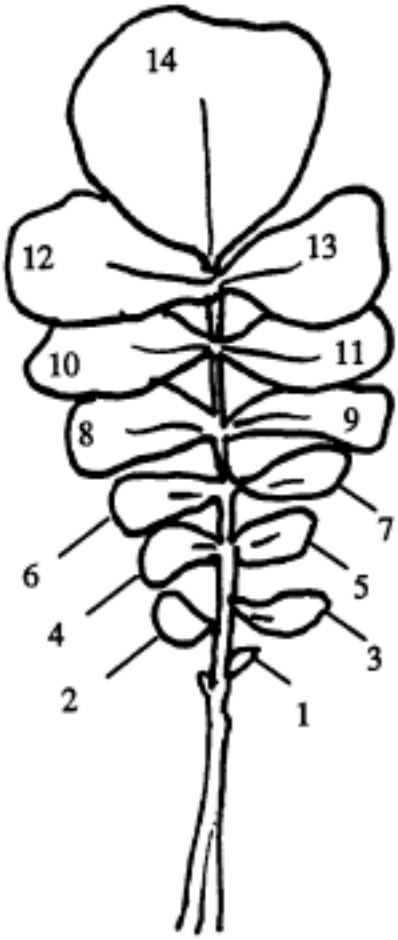
The measurements should be taken in the glasshouse. If the two cotyledons differ in size, the bigger one should be measured. The length is defined as distance between the inclination at top of the cotelydon and the point where the width of the petiole is about 4 mm. The width of the cotyledon should be measured at the widest point of the cotyledons.



Ad. 5 + 6: Leaf: presence (5) and number of lobes (6)

Absence or presence of lobing should be observed on the whole plant at rosette stage. Parts of the leaf blade are considered as lobes if their length is at least equivalent to the width of the leaf petiole at their point of attachment and if the upper notch of the blade has at least half the length of the lobe itself.

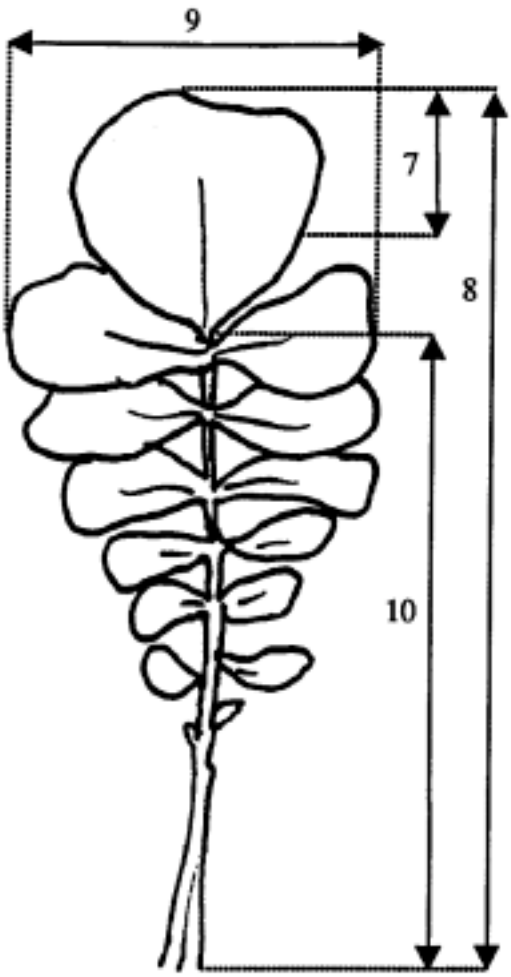
1
absent



2
present

Ad. 7 – 10: Leaf: dentation (7), length (8), width (9), length of petiole (10)

7 = part on which the dentation should be recorded (characteristic 7)



Ad 11: Plant: height at emergence of flower buds

The height of the plants should be assessed when 50% of the plants have reached stage 52.

Ad 12: Time of flowering

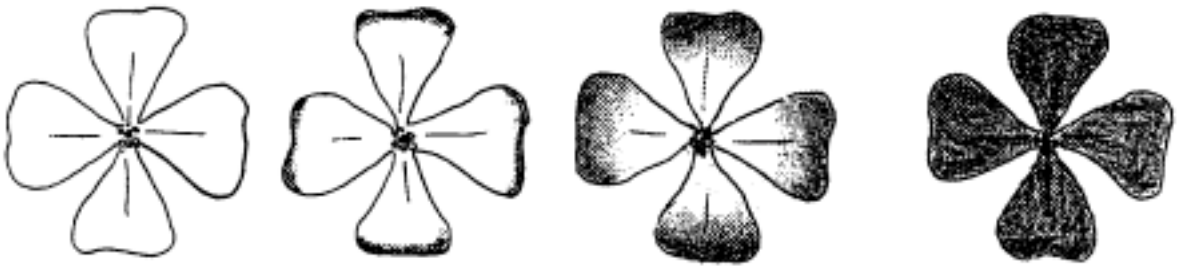
The observation should be done at least three times per week and more frequently if there is any need to do so. The date should be calculated – if necessary by interpolation – at which 50% of plants show at least one open flower.

Ad. 13: Plant: height at flowering

The height of the plants should be assessed when all normally developed plants have opened at least one flower.

Ad. 14: Flower: color of petals

The violet and reddish color should be observed independent of its extension on the petal.



white or yellow — violet or reddish

For varieties which show a segregation of plants with violet petals and white petals or with reddish petals and white petals the proportions of the states of expression should be recorded. A segregation of plants with three different colors is not tolerated.

Ad. 16-20: Siliqua

All observations on the siliqua should be recorded in the midpart of the inflorescence of the main stem or top branch.

Ad. 22: Tendency to form inflorescence in year of sowing for late summer sown trials

In a separate sowing the observation of the growth stage should be made in autumn, when the development stagnates.

Ad. 23: Root: color

In a separate sowing in late summer with half the density of the normal plots the color of skin should be recorded when the development in autumn stagnates.

The color is observed independent of its extension on the root and its intensity, immediately after lifting of the roots.

Phenological growth stages according to the BBCH-identification keys of oilseed rape (Meier, 1997)

Code	Description
Principal growth stage 0: Germination	
00	Dry seed
01	Beginning of seed imbibition
03	Seed imbibition complete
05	Radicle emerged from seed
07	Hypocotyl with cotyledons emerged from seed
08	Hypocotyl with cotyledons growing towards soil surface
09	Emergence: cotyledons emergence through
Principal growth stage 1: Leaf development	
10	Cotyledons completely unfolded
11	First leaf unfolded
12	2 leaves unfolded
13	3 leaves unfolded
14	4 leaves unfolded
15	5 leaves unfolded
16	6 leaves unfolded
17	7 leaves unfolded
18	8 leaves unfolded
19	9 or more leaves unfolded
Principal growth stage 2: Formation of side shoots	
20	No side shoots
21	Beginning of side shoot de development: first side shoot detectable
22	2 side shoots detectable
23	3 side shoots detectable
24	4 side shoots detectable
25	5 side shoots detectable
26	6 side shoots detectable
27	7 side shoots detectable
28	8 side shoots detectable
29	End of side shoot development: 9 or more side shoots detectable
Principal growth stage 3: Stem elongation	
30	Beginning of stem elongation: no internodes (“rosette”)
31	1 visibly extended internodes
32	2 visibly extended internodes
33	3 visibly extended internodes
34	4 visibly extended internodes
35	5 visibly extended internodes
36	6 visibly extended internodes
37	7 visibly extended internodes
38	8 visibly extended internodes
39	9 or more visibly extended internodes
Principal growth stage 4: --	

Code	Description
Principal growth stage 5: Inflorescence emergence	
50	Flower buds present, still enclosed by leaves
51	Flower buds visible from above (“green bud”)
52	Flower buds free, level with the youngest leaves
53	Flower buds raised above the youngest leaves
55	Individual flower buds (main inflorescence) visible but still closed
57	Individual flower buds (secondary inflorescences) visible but still closed
59	First petals visible, flower buds still closed (“colored bud”)
Principal growth stage 6: Flowering	
60	First flowers open
61	10% of flowers on main raceme open, main raceme elongating
62	20% of flowers on main raceme open
63	30% of flowers on main raceme open
64	40% of flowers on main raceme open
65	Full flowering 50% flowers on main raceme open, older petals falling
67	Flowering declining: majority of petals fallen
69	End of flowering
Principal growth stage 7: Development of fruit	
71	10% of pods have reached final size
72	20% of pods have reached final size
73	30% of pods have reached final size
74	40% of pods have reached final size
75	50% of pods have reached final size
76	60% of pods have reached final size
77	70% of pods have reached final size
78	80% of pods have reached final size
79	Nearly all pods have reached final size
Principal growth stage 8: Ripening	
80	Beginning of ripening: seed green, filling pod cavity
81	10% of pods ripe, seeds dark and hard
82	20% of pods ripe, seeds dark and hard
83	30% of pods ripe, seeds dark and hard
84	40% of pods ripe, seeds dark and hard
85	50% of pods ripe, seeds dark and hard
86	60% of pods ripe, seeds dark and hard
87	70% of pods ripe, seeds dark and hard
88	80% of pods ripe, seeds dark and hard
89	Fully ripe: nearly all pods ripe, seeds dark and hard

IX. Literature

Growth stages of mono- and dicotyledonous plants: BBCH-Monograph. Federal Biological Research Centre of Agriculture and Forestry (ed.) Ed. by Uwe Meier.-Berlin; Wien [u.a.]: Blackwell Wiss.-Verl., 1997.

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 *Raphanus sativus* L. var. *oleiformis* Pers.

FODDER RADISH

2. Applicant (Name and address)

3. Proposed denomination or breeder's reference

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

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	Pegletta	2[ ]
	tetraploid	Romulus	4[ ]
5.2 (12)	**Time of flowering**		
	very early	Iris	1[ ]
	early	Siletina	3[ ]
	medium	Trick	5[ ]
	late	Nemex	7[ ]
	very late	Ultimo	9[ ]
5.3 (14)	**Flower: color of petals**		
	white	Ultimo	1[ ]
	violet	Radical, Toro	2[ ]
	reddish	Mator	3[ ]
	yellow		4[ ]

	Characteristics	Example Varieties	Note
5.4 (15)	**Plant: total length**		
	very short	Mator	1[ ]
	short	Toro	3[ ]
	medium	Adagio	5[ ]
	long	Siletta Nova	7[ ]
	very long		9[ ]
5.5 (23)	**Root: color**		
	white	Nemex	1[ ]
	red	Mator	2[ ]
	violet		3[ ]
	blackish brown		4[ ]

6. Similar varieties and differences from 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 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]