TG/63/7(proj.1)
**ORIGINAL:** English
**DATE:** 2007-05-14

UPOV

# INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

# DRAFT

## BLACK RADISH

UPOV code: RAPHA_SAT_NIG

*Raphanus sativus* L. var. *niger* (Mill.) S. Kerner *

## GUIDELINES

## FOR THE CONDUCT OF TESTS

## FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by an expert from Germany*

*to be considered by the Technical Working Party for Vegetables at its forty-first session, to be held in Nairobi, Kenya, from June 11 to 15, 2007*

Alternative Names:*

| *Botanical name* | *English* | *French* | *German* | *Spanish* |
|---|---|---|---|---|
| *Raphanus sativus* L. var. *niger* (Mill.) S. Kerner., *Raphanus sativus* L. var. *major* A. Voss, *Raphanus sativus* L. var. *longipinnatus* L.H. Bailey | Black Radish | Radis d'été, d'automne et d'hiver | Rettich | Rabano de invierno, Rabano negro |

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

## ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Raphanus sativus* L. var. *niger* (Mill.) S. Kerner, ~~*Raphanus sativus* L. var. *major* A. Voss and *Raphanus sativus* L. var. *longipinnatus* L.H. Bailey~~.

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of seed.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

100 g or 10 000 seeds

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

*3.1 Number of Growing Cycles*

The minimum duration of tests should normally be two independent growing cycles.

*3.2 Testing Place*

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

*3.3 Conditions for Conducting the Examination*

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The recommended method of observing the characteristic is indicated by the following key in the second column of the Table of Characteristics:

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants"

*3.4 Test Design*

3.4.1 Each test should be designed to result in a total of at least 60 plants in the glasshouse and of at least 90 plants in the open which should be divided between two or more replicates.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

*3.5 Number of Plants / Parts of Plants to be Examined*

Unless otherwise indicated, all observations should be made on 40 plants or parts taken from each of 40 plants.

*3.6 Additional Tests*

Additional tests, for examining relevant characteristics, may be established.

## 4. Assessment of Distinctness, Uniformity and Stability

*4.1 Distinctness*

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the

recommendations contained in the General Introduction prior to making decisions regarding distinctness.

*4.2 Uniformity*

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

*4.2.1 Cross-pollinated varieties*

The assessment of uniformity should be according to the recommendations for cross-pollinated varieties in the General Introduction.

*4.2.2 Hybrid varieties*

For the assessment of uniformity, a population standard of 1 % and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 90 plants, 3 off-types are allowed. In the case of a sample size of 60 plants, 2 off-types are allowed.

*NL (same wording as for carrot): For the assessment of uniformity of single cross hybrids and inbred lines, a population standard of 2 % and an acceptance probability of at least 95 % should be applied. (90 plants = 4 off-types, 60 plants = 3 off-types are allowed)*

*4.3 Stability*

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be tested, either by growing a further generation, or by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

4.3.3 Where appropriate, or in cases of doubt, the stability of a hybrid variety may, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity and stability of its parent lines.

*NL: 4.3.2 and 4.3.3 not to be added*

## 5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded

from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Ploidy (characteristic 1)
(b) Leaf blade: lobes (division to midrib) (characteristic 11)
(c) Radish: shape (characteristic 18)
(d) Radish: color of skin (characteristic 21)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

## 6. Introduction to the Table of Characteristics

### *6.1 Categories of Characteristics*

#### 6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

#### 6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

### *6.2 States of Expression and Corresponding Notes*

States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

### *6.3 Types of Expression*

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

### *6.4 Example Varieties*

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

*6.5 Legend*

(*) Asterisked characteristic – see Chapter 6.1.2

QL: Qualitative characteristic – see Chapter 6.3
QN: Quantitative characteristic – see Chapter 6.3
PQ: Pseudo-qualitative characteristic – see Chapter 6.3

MG, MS, VG, VS: See Chapter 3.3.2

C: special test

(a), (b) See Explanations on the Table of Characteristics in Chapter 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8.2

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

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **1. (*) (+) add.** | **VS C** | **Ploidy** | **Ploïdie** | **Ploidie** | **Ploidía** | | |
| **QL** | | diploid | diploïde | diploid | diploide | ~~Unus Treib~~ Halblanger weißer Sommer **(add.)** | 2 |
| | | tetraploid | tétraploïde | tetraploid | tetraploide | Rex | 4 |
| **2. (*)** | **VG** | **Seedling: anthocyanin coloration of hypocotyl** | **Plantule: pigmentation anthocyanique de l'hypocotyle** | **Keimpflanze: Anthocyan-färbung des Hypokotyls** | **Plantula: pigmentacion antocianica del hipocotilo** | | |
| **QL** | **(a)** | absent | absente | fehlend | ausente | Minowase Summer Cross Nr. 3 | 1 |
| | | present | présente | vorhanden | presente | Kaiser, Rex **(add.)** | 9 |
| **3.** | **VG** | **Cotyledon: shape** | **Cotylédon: forme** | **Keimblatt: Form** | **Cotiledon: forma** | | |
| **(+)** | | | | | | | |
| **QL** | **(a)** | **small** heart-shaped | en forme de cœur | **schmal** herzförmig | acorazonada | Münchner Bier | 1 |
| | | broad heart-shaped | en forme de cœur large | breit herzförmig | acorazonada ancha | Kaiser, Rex **(add.)** | 2 |
| **DE: to propose to change heartshaped into small heartshaped<br>DE: to propose to insert after char. 4:"Cotyledon: color", 3 = light green ('Rex'), 5 = medium green ('Halbl. wei.So'), 7 = dark green ('Noir gros rond d'hiver') QN, VG and (a); *NL: agree with proposals but instead of "small" should be "narrow"*** | | | | | | | |
| **4.** | **VG** | **Cotyledon: size** | **Cotyledon: taille** | **Keimblatt: Größe** | **Cotiledon: tamano** | | |
| **QN** | **(a)** | small | petit | klein | pequeno | Neptun **(add.)** | 3 |
| | | medium | moyen | mittel | medio | Servatius | 5 |
| | | large | grand | groß | grande | ~~Unus Treib~~ **Martina** | 7 |
| **5.** | **VS *NL: VG*** | **Foliage: number of fully developed leaves** | **Feuillage: nombre de feuille à complet développement** | **Laub: Anzahl der ausgewachsenen Blätter** | **Follaje: numero de hojas completamente desarrolladas** | | |
| **QN** | **(b)** | few | petit | gering | bajo | Rex, Ostergruß rosa 2 **(add.)** | 3 |
| | | medium | moyen | mittel | medio | Neptun **(add.)** | 5 |
| | | many | grand | groß | alto | April Cross **(add.)** | 7 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **6. (*)** | **VG** | **Leaf: attitude** | **Feuille: port** | **Blatt: Haltung** | **Hoja: porte** | | |
| **QN** | **(b)** | erect | dressé | aufrecht | erecto | Rex | 1 |
| | | semi erect | demi-dressé | halbaufrecht | semierecto | ~~Unus Treib~~ Ostergruß rosa 2 **(add.)** | 3 |
| | | horizontal | horizontal | waagerecht | horizontal | Minowase Summer Cross Nr. 3, ***NL: Mikura Cross*** | 5 |
| **7. (*)** | **MS** | **Leaf: length** | **Feuille: longueur** | **Blatt: Länge** | **Hoja: longitud** | | |
| **QN** | **(b)** | short | courte | kurz | corta | Runder weißer **(add.)** **NL: Sutong** | 3 |
| | | medium | moyenne | mittel | media | Noir long maraicher, Rex | 5 |
| | | long | longuel | lang | largal | Noir gros rond d'hiver, ~~Ovale blanc de Munich~~ | 7 |
| **8.** | **VG** | **Leaf blade: shape** | **Limbe: forme** | **Blattspreite: Form** | **Limbo: forma** | | |
| **PQ** | **(b)** | narrow-obovate | obovale étroit | schmal verkehrt eiförmig | oboval estrecha | Florian | 1 |
| | | obovate | obovale | verkehrt eiförmig | oboval | April Cross **(add.)** | 2 |
| | | broad obovate | obovale large | breit verkehrt eiförmig | oboval ancha | Mantanghong, Rex **(add.)** | 3 |
| **9.** | **VG** | **Leaf blade: hue of green color** | **Limbe: teinte de la couleur verte** | **Blattspreite: Farbton der Grünfärbung** | **Limbo: matiz del color verde** | | |
| **QN** | **(b)** | absent | absente | fehlend | ausente | Minowase Summer Cross Nr. 3 | 3 |
| | | yellowish | jaunatre | gelblich | amarillento | Rex | 5 |
| | | greyish | grisatre | gräulich | grisaceo | Silverstar | 7 |

**DE: to propose to change the order and the wording of expressions: yellowish green *(NL: Mikura Cross)*, green, greyish green (NL: Unicorn and delete Silverstar) and change the notes 3 – 5 – 7 to 1 – 2 – 3. PQ.**

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **10.** | **VG** | **Leaf blade: intensity of green color** | **Limbe: intensité de la couleur verte** | **Blattspreite: Intensität der Grünfärbung** | **Limbo: intensidad del color verde** | | |
| **QN** | **(b)** | light | claire | hell | claro | ***NL: Mikura Cross and delete Kaiser*** | 3 |
| | | medium | moyenne | mittel | medio | Mino early, Omny **(add.)** | 5 |
| | | dark | foncée | dunkel | oscuro | Houseking | 7 |
| **NEW: DE: propose to delete char. 9 and keep char. 10 only. Add 'Hilds roter Neckarruhm' for note 3, ''Colosseo' for 5, 'Neptun' for 7.** | | | | | | | |
| **11. (*) (+)** | **VG** | **Leaf blade: lobes (division to midrib)** | **Limbe: lobes (division attei-gnant la nervure principale**) | **Blattspreite: Lappung (Teilung bis zur Mittelrippe)** | **Limbo: lobulos (division hasta al nervio principal)** | | |
| **QL** | **(b)** | absent | absents | fehlend | ausente | Rex, ~~Wiela~~, Servatius **(add.)** | 1 |
| | | present | présents | vorhanden | presente | ~~Unus Treib~~ Halblanger weißer Sommer **(add.)** | 9 |
| **12. (*)** | **VS** ***NL: VG*** | **Leaf blade: number of lobes (as for 11)** | **Limbe: nombre de lobes (comme pour 11)** | **Blattspreite: Anzahl Lappen (wie unter 11)** | **Limbo: numero de lobulos (como para 11)** | | |
| **QN** | **(b)** | very few | très petit | sehr gering | muy bajo | Ostergruß rosa 2 | 1 |
| | | few | petit | gering | bajo | ~~Unus Treib~~ Halblanger weißer Sommer **(add.)** | 3 |
| | | medium | moyen | mittel | medio | De cinq semaines rose 3 | 5 |
| | | many | grand | groß | alto | Noir long maraicher, Minowase Summer Cross Nr. 3 **(add.)** | 7 |
| | | very many | très grand | sehr groß | muy alto | Mikura Cross | 9 |

**DE: proposal to add the qualification: "<u>Varieties with lobes divided to midrib only:</u> Leaf blade: number of lobes" and delete (as for 11)** *NL: agree with the proposal*

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **13.** | **VG** | **Leaf blade: size of terminal lobe** | **Limbe: taille du lobe terminal** | **Blattspreite: Größe des Endlappens** | **Limbo: tamano del lobula terminal** | | |
| **QN** | **(b)** | small | petit | klein | pequeno | Omny, ~~Silverstar~~ | 3 |
| | | medium | moyenne | mittel | medio | Rose d'hiver de Chine, ~~Unus Treib~~ Hilds blauer Herbst und Winter **(add.)** | 5 |
| | | large | grand | groß | grande | ***NL: Sutong*** | 7 |
| **14.** | **VG** | **Leaf blade: depth of incisions of margin** | **Limbe: profondeur des découpures du bord** | **Blattspreite: Tiefe der Randeinschnitte** | **Limbo: profundidad de las incisiones del borde** | | |
| **QN** | **(b)** | shallow | peu profondes | flach | poco profundas | ~~Unus Treib~~ Neptun **(add.)** | 3 |
| | | medium | moyennes | mittel | medias | April Cross **(add.)** | 5 |
| | | deep | profondes | tief | profundas | Hilds blauer Herbst und Winter **(add.)** | 7 |
| **15.** | **VG** | **Petiole: anthocyanin coloration** | **Pétiole: pigmentation anthocyanique** | **Blattstiel: Anthocyan-färbung** | **Peciolo: pigmentacion antocianica** | | |
| **QL** | **(b)** | absent | absente | fehlend | ausente | Noir gros rond d'hiver, Omny, April Cross **(add.)** | 1 |
| | | present | présente | vorhanden | presente | Rose d'hiver de Chine, Violet de Gournay, Rex **(add.)** | 9 |
| **16 (*)** | **MS/ *NL: VG*** | **Radish: length** | **Racine: longueur** | **Rübe: Länge** | **Raiz: longitud** | | |
| **QN** | **(b)** | very short | très courte | sehr kurz | muy corta | Runder weißer | 1 |
| | | short | courte | kurz | corta | ~~Jaune d'or oval~~ Noir gros long d'hiver **(add.)** | 3 |
| | | medium | moyenne | mittel | media | Neptun, Gentoku **(add.)** | 5 |
| | | long | longue | lang | larga | Servatius, Ninja **(add.)** | 7 |
| | | very long | très longue | sehr lang | muy larga | April Cross, Martina **(add.)** | 9 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **17.** | ***MS/ NL: VG*** | **Radish: thickness** | **Racine:épai-sseur** | **Rübe: Dicke** | **Raiz: espesor** | | |
| **QN** | **(b)** | thin | mince | dünn | delgada | Ostergruß rosa 2 | 3 |
| | | medium | moyenne | mittel | media | Rex | 5 |
| | | thick | épaisse | dick | gruesa | Noir gros rond d'hiver | 7 |
| **18. (*)** | **VG** | **Radish: shape** | **Racine: forme** | **Rübe: Form** | **Raiz: forma** | | |
| **PQ** | **(b)** | transverse elliptic | elliptique transverse | quer elliptisch | eliptica transversal | Jumbo Scarlet | 1 |
| | | circular | ronde | rund | circular | Noir gros rond d'hiver | 2 |
| | | elliptic | elliptique | elliptisch | eliptica | ***NL: Sutong*** | 3 |
| | | narrow elliptic | elliptique étroite | schmal elliptisch | eliptica estrecha | ~~Langer schwarzer Winter~~ | 4 |
| | | obovate | obovale | verkehrt eiförmig | oboval | Münchner Bier, ~~Jaune d'or ovale~~ | 5 |
| | | rectangular | rectangulaire | rechteckig | rectangular | Noir long maraicher, ~~Tsukushi Spring Cross,~~ Neptun **(add.)** | 6 |
| | | obtriangular | obtriangulaire | verkehrt dreieckig | obtriangular | Ovale blanc de Munich | 7 |
| | | narrow obtriangular | obtriangulaire étroite | schmal verkehrt dreieckig | obtriangular estrecha | Rex | 8 |
| | | iciclical | en glacon | eiszapfenförmig | en estalagmita | De cinq semaines rose 3, Minowase Summer Cross Nr. 3 | 9 |
| **19.** | **VG** | **Radish: shape of crown** | **Racine: forme de la partie supérièure** | **Rübe: Kopfform** | **Raiz: forma de la parte superior** | | |
| **(+)** | | | | | | | |
| **QL** | **(b)** | flat | aplatie | flach | aplanada | Minowase Summer Cross Nr. 3 | 1 |
| | | rounded | arrondie | abgerundet | redondeada | Rex | 2 |
| | | conical | conique | kegelförmig | conica | | 3 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **20. (+)** | **VG** | **Radish: shape of base** | **Racine: forme de la base** | **Rübe: Form der Basis** | **Raiz: forma de la base** | | |
| **QL** | **(b)** | narrow acute | aigue étroite | schmal spitz | aguda angosta | Minowase Summer Cross Nr. 3 | 1 |
| | | acute | aigue | spitz | aguda | Münchner Bier | 2 |
| | | obtuse | obtuse | stumpf | obtusa | ~~Tsukushi Spring Cross~~ Ninja, Tama Winter **(add.)** | 3 |
| | | rounded | arrondie | abgerundet | redondeada | Noir gros rond d'hiver | 4 |
| | | flat | plate | eben | plana | Jumbo Scarlet | 5 |
| **21. (*)** | **VG** | **Radish: color of skin** | **Racine: couleur de l'épiderme** | **Rübe: Farbe der Haut** | **Raiz: color de la epidermis** | | |
| **PQ** | **(b)** | white | blanc | weiß | blanco | Rex | 1 |
| | | yellow | jaune | gelb | amarillo | ~~Jaune d'or ovale~~ | 2 |
| | | brown | brun | braun | marron | ~~Fridolin braun~~ | 3 |
| | | pink | rose | rosa | rosa | De cinq semaines rose 3 | 4 |
| | | red | rouge | rot | rojo | ~~Belrosa~~ | 5 |
| | | carmine | carmin | karmin | carmin | Ostergruß rosa 2 | 6 |
| | | purple | pourpre | purpurn | purpura | | 7 |
| | | violet | violet | violett | violeta | Violet de Gournay, Hilds blauer Herbst und Winter **(add.)** | 8 |
| | | black | noir | schwarz | negro | Noir gros rond d'hiver | 9 |

**DE: to change the order of the color: white – yellow – pink – red – carmine – purple – violet – brown – black** ***NL: agree***

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **22.** | **VG** | **<u>White Radish only:</u> Radish: green color of shoulder** | **<u>Variétés à racine blanche seulement:</u> Racine: couleur verte du collet** | **<u>Nur weiße Rettichsorten:</u> Rübe: Grünfärbung des Kopfes** | **<u>Solo variedades de raiz blanca:</u> Raiz: color verde del cuello** | | |
| **QN** | **(b)** | absent or very weak | absente ou très faible | fehlend oder sehr gering | ausente o muy débil | Minowase Summer Cross Nr. 3 | 1 |
| | | weak | faible | gering | débil | April Cross **(add.)** | 3 |
| | | medium | moyenne | mittel | medio | ~~Tsukushi Spring Cross,~~ Halblanger weißer Sommer **(add.)** | 5 |
| | | strong | forte | stark | fuerte | Münchner Bier | 7 |
| | | very strong | très forte | sehr stark | muy fuerte | | 9 |

***NL: prefers for note 3 'Omny' instead of 'April Cross' as the green shoulder is nearly absent for April Cross***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **23.** | **VG** | **<u>White radish varieties only:</u> Radish: anthocyanin coloration** | **<u>Variétés à racine blanche seulement:</u> Racine: pigmentation anthocyanique** | **<u>Nur weiße Rettichsorten:</u> Rübe: Anthocyan-färbung** | **<u>Solo variedades de raiz blanca:</u> Raiz: pigmentacion antociana** | | |
| **QL** | **(b)** | absent | absente | fehlend | ausente | Rex | 1 |
| | | present | présente | vorhanden | presente | Neckarruhm weiß | 9 |
| **24.** | **VG** | **Radish: ridging of surface** | **Racine: annelé de la surface** | **Rübe: Ringelung der Oberfläche** | **Raiz: anillada de la superficie** | | |
| **QN** | **(b)** | absent or very weak | absente ou très faible | fehlend oder sehr gering | ausente o muy débil | Minowase Summer Cross Nr. 3 | 1 |
| | | weak | faible | gering | débil | | 3 |
| | | medium | moyen | mittel | media | ~~Unus Treib~~ Halblanger weißer Sommer **(add.)** | 5 |
| | | strong | fort | stark | fuerte | Münchner Bier | 7 |
| | | very strong | très fort | sehr stark | muy fuerte | | 9 |

| | | English | français | deutsch | español | Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo | Note/ Nota |
|---|---|---|---|---|---|---|---|
| **25.** | **VG** | **Radish: color of the flesh** | **Racine: couleur de la chair** | **Rübe: Farbe des Fleisches** | **Raiz: color de la pulpa** | | |
| **PQ** | **(b)** | translucent white | blanc vitreux | glasigweiß | blanco traslucido | ~~Minowase Summer Cross Nr. 3~~, Rex **(add.)** | 1 |
| | | opaque white | blanc mat | mattweiß | blanco opaco | Noir gros long d'hiver de Paris | 2 |
| | | green | vert | grün | verde | Green Meat | 3 |
| | | red | rouge | rot | rojo | Mantanghong | 4 |
| **26. (*) (+)** | **VG** | **Time of harvest maturity** | **Epoque de maturité de récolte** | **Zeitpunkt der Erntereife** | **Fecha de madurez de cosecha** | | |
| **QN** | | early | précoce | früh | temprana | ~~Rex,~~ Ostergruß rosa 2 **(add.)** | 3 |
| | | medium | moyenne | mittel | media | Rex **(add.)** | 5 |
| | | late | tardive | spät | tardia | Noir gros rond d'hiver **(add.)** | 7 |

***NL: proposal to delete the char***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **27. (*) (+) (add.)** | **VG C** | **Radish: tendency to become pithy** | **Racine: tendance à se creuser** | **Rübe: Neigung zum Pelzigwerden** | **Raiz: tendencia a ahuecarse** | | |
| **QN** | **(b)** | absent or very weak | absente ou très faible | fehlend oder sehr gering | ausente o muy débil | ~~South Pole, Runder Schwarzer~~, Noir gros rond d'hiver **(add.)** | 1 |
| | | weak | faible | gering | débil | | 3 |
| | | medium | moyenne | mittel | media | ~~Unus Treib~~ | 5 |
| | | strong | forte | stark | fuerte | Rex **(add.)** | 7 |
| | | very strong | très forte | sehr stark | muy fuerte | | 9 |

***NL: to delete the char. difficult to assess***

**DE: proposal to add the characteristic "Radish: tendency to bolting" with the expressions 1 = absent or very weak, 3 = weak, 5 = medium, 7 = strong, 9 = very strong.**

**Planting of 40 (2 x 20) plants in an additional replication. The date is to be recorded when 50 % of the plants are bolted.**

***NL: disagrees***

**DE: proposal to add the characteristic "Male sterility" 1 = absent (Minowase Summer Cross Nr. 3), 9 = present (Colosseo)**

***NL: agrees***

## 8. Explanations on the Table of Characteristics

### *8.1 Explanations covering several characteristics*

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) All observations on the seedling and the cotyledon should be made when the first true leaf is expanded.
(b) All observations on the leaf and the radish should be made at harvest maturity (see Ad. 26).

### *8.2 Explanations for individual characteristics*

Ad. 1: Ploidy **(add.)**

The ploidy status of the plant can be checked by different methods as determination of the number:

- of chromosomes of the root meristem
- and length of stoma on the lower side of the cotyledon (tetraploid varieties have a longer stoma than diploid varieties)
- of chloroplasts of the guard cells on the lower side of the cotyledon (the guard cells of tetraploid varieties are bigger and contain more chloroplasts (> 20) than those of diploid varieties (> 10).

Another efficient method to determine the ploidy status is the flow cytometry.

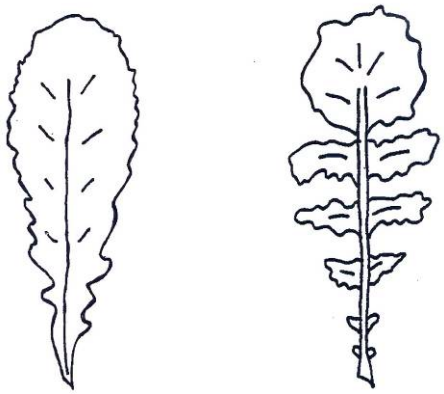
Ad. 3: Cotyledon shape ***NL: needs more clear drawings to distinguish shapes***

heart-shaped

broad heart-shaped

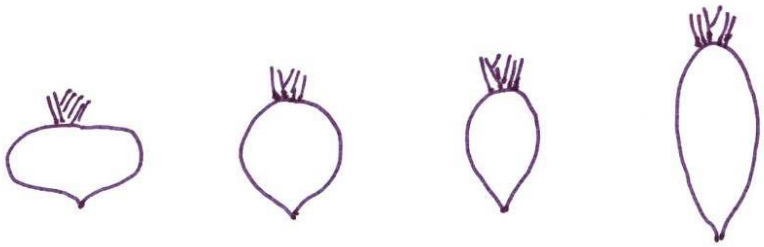
*newly provided according comment of NL*

Ad. 11: Leaf blade: lobes (division to midrib)



absent present

Ad. 18: Radish: shape



1 transverse elliptic



2 circular



3 elliptic



4 narrow elliptic

5 obovate

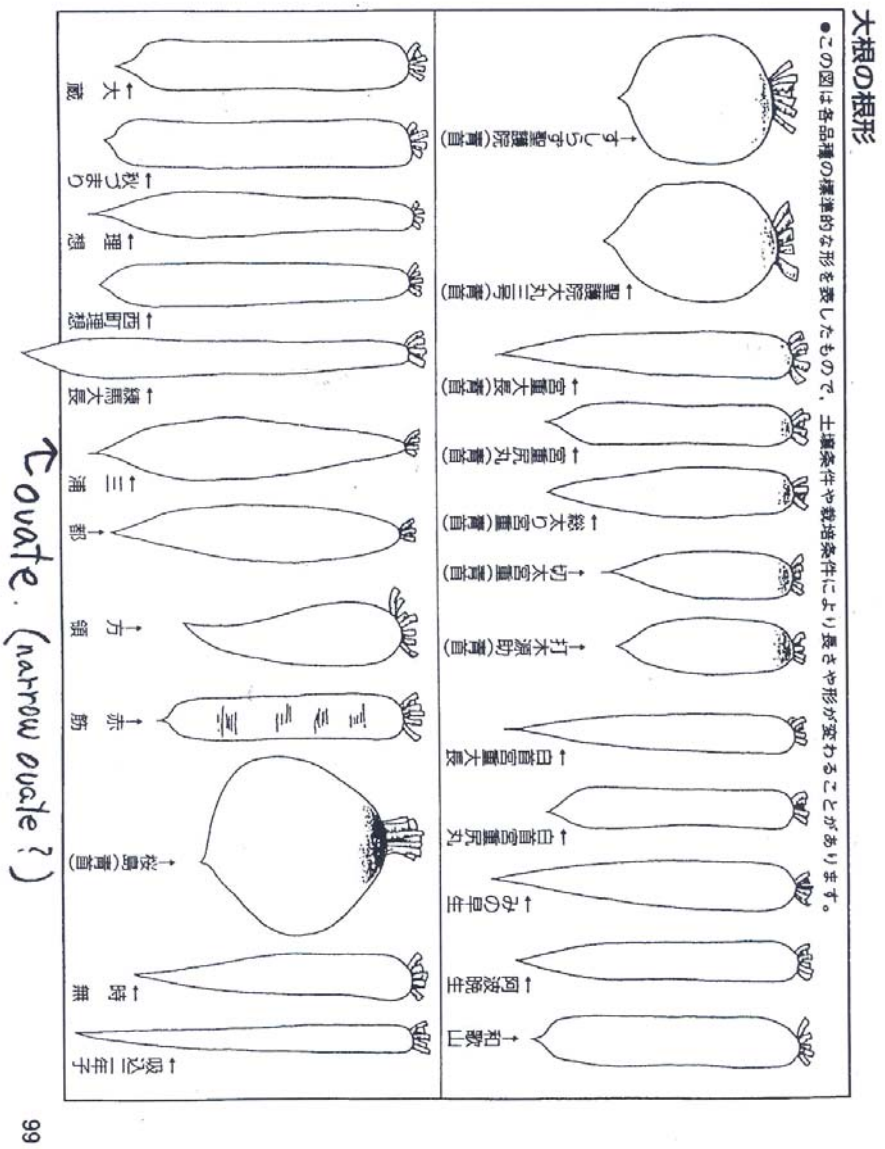
6 rectangular

7 obtriangular

8 narrow obtriangular

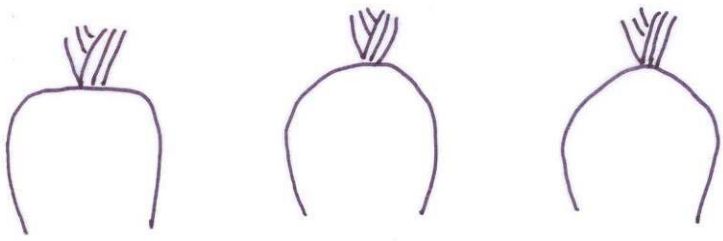
9 iciclical

***NL: the drawing for obovate can be improved so that it is more egg shaped: broader at the top***



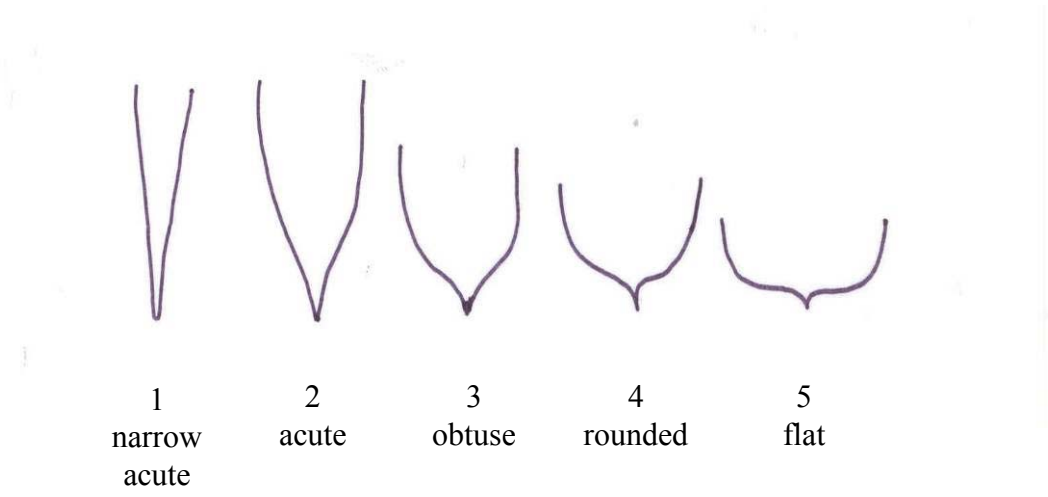

*J: proposal to add the shape "obovate"*

Ad. 19: Radish: shape of crown



| 1 | 2 | 3 |
|---|---|---|
| flat | rounded | conical |

Ad. 20: Radish: shape of base



| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| narrow acute | acute | obtuse | rounded | flat |

Ad. 26: Time of harvest maturity

Due to the different types of black radish it is difficult to fix this characteristic appropriately for all types. (We harvest the plants when the crown is about 6 cm for big radishes and 3 cm for small bunching types).
*I appreciate very much your comments concerning this point.*

Ad. 27: Radish: Tendency to become pithy **(add.)**

For the determination of this characteristic an additional replication should be grown. After having reached the harvest maturity radishes should be repeatedly harvested and cut in cross section to determine the tendency of becoming pithy. The date is to be recorded when 50 % of the plants show this characteristic. Varieties which are very early pithy correspond to the expression very strong, varieties becoming pithy very late correspond to the expression absent or very weak.
*I appreciate very much your comments concerning this point.*

***NL: to delete 26 and 27***

## 9. Literature

Vogel, G., 1996: "Handbuch des speziellen Gemüsebaues", Stuttgart, Verlag Eugen Ulmer, DE.

10. Technical Questionnaire

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|
| | | |
| | | Application date:<br>(not to be filled in by the applicant) |

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

In the case of hybrid varieties which are the subject of an application for plant breeders' rights, and where the parent lines are to be submitted as a part of the examination of the hybrid variety, this Technical Questionnaire should be completed for each of the parent lines, in addition to being completed for the hybrid variety.

1. Subject of the Technical Questionnaire

| | |
|---|---|
| 1.1.1 Botanical name | *Raphanus sativus* L. var. *niger* (Mill.) S. Kerner (*Raphanus sativus* L. var. *major* A. Voss, *Raphanus sativus* L. var. *longipinnatus* L.H. Bailey) |
| 1.1.2 Common name | Black radish |

2. Applicant

| | |
|---|---|
| Name | |
| Address | |
| Telephone No. | |
| Fax No. | |
| E-mail address | |

Breeder (if different from applicant)

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

3. Proposed denomination and breeder's reference

| | |
|---|---|
| Proposed denomination (if available) | |
| Breeder's reference | |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]
(please state parent varieties)
(b) partially known cross [ ]
(please state known parent variety(ies))
(c) unknown cross
[ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered
and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Self-pollination [ ]

(b) Cross-pollination
(i) population [ ]
(ii) synthetic variety [ ]

(c) Hybrid [ ]

(d) Other [ ]
(please provide details)

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

| | Characteristics | Example Varieties | Note |
|---|---|---|---|
| **5.1 (1)** | **Ploidy** | | |
| | diploid | Unus Treib | 2[ ] |
| | tetraploid | Rex | 4[ ] |
| **5.2 (2)** | **Seedling: anthocyanin coloration of hypotcotyl** | | |
| | absent | Minowase Summer Cross Nr. 3 | 1[ ] |
| | present | Kaiser, Rex **(add.)** | 9[ ] |
| **5.3 (16)** | **Radish: length** | | |
| | very short | Runder weißer | 1[ ] |
| | short | ~~Jaune d'or oval~~ Noir gros long d'hiver **(add.)** | 3[ ] |
| | medium | Neptun, Gentoku **(add.)** | 5[ ] |
| | long | Servatius, Ninja **(add.)** | 7[ ] |
| | very long | April Cross, Martina **(add.)** | 9[ ] |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

| | Characteristics | Example Varieties | Note |
|---|---|---|---|
| **5.4 (18)** | **Radish: shape** | | |
| | transverse elliptic | Jumbo Scarlet | 1[ ] |
| | circular | Noir gros rond d'hiver | 2[ ] |
| | elliptic | ***NL: Sutong*** | 3[ ] |
| | narrow elliptic | ~~Langer schwarzer Winter~~ | 4[ ] |
| | obovate | Münchner Bier, ~~Jaune d'or ovale~~ | 5[ ] |
| | rectangular | Noir long maraicher, ~~Tsukushi Spring Cross,~~ Neptun **(add.)** | 6[ ] |
| | obtriangular | Ovale blanc de Munich | 7[ ] |
| | narrow obtriangular | Rex | 8[ ] |
| | iciclical | De cinq semaines rose 3, Minowase Summer Cross Nr. 3 | 9[ ] |
| **5.5 (21)** | **Radish: color of skin** | | |
| | white | Rex | 1[ ] |
| | yellow | ~~Jaune d'or ovale~~ | 2[ ] |
| | brown | ~~Fridolin braun~~ | 3[ ] |
| | pink | De cinq semaines rose 3 | 4[ ] |
| | red | ~~Belrosa~~ | 5[ ] |
| | carmine | Ostergruß rosa 2 | 6[ ] |
| | purple | | 7[ ] |
| | violet | Violet de Gournay, Hilds blauer Herbst und Winter **(add.)** | 8[ ] |
| | black | Noir gros rond d'hiver | 9[ ] |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

6. Similar varieties and differences from these varieties

*Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.*

| Denomination(s) of variety(ies) similar to your candidate variety | Characteristic(s) in which your candidate variety differs from the similar variety(ies) | Describe the expression of the characteristic(s) for the **similar** variety(ies) | Describe the expression of the characteristic(s) for **your** candidate variety |
|---|---|---|---|
| *Example* | *Radish: color of skin* | *white* | *yellow* |
| | | | |
| | | | |
| | | | |

Comments:

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

[#]7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

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 (b) is yes, please attach a copy of the authorization.

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

9. Information on plant material to be examined or submitted for examination.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma) Yes [ ] No [ ]

(b) Chemical treatment (e.g. growth retardant, pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details for where you have indicated “yes”.

……

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]