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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

BROWN MUSTARD

UPOV Code(s):

BRASS_JUN

Brassica juncea (L.) Czern.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Japan
to be considered by the
Technical Working Party for Vegetables
at its fifty-first session, to be held in Roelofarendsveen, Netherlands,
from 2017-07-03 to 2017-07-07

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Brassica juncea (L.) Czern.	Brown mustard, Indian mustard, Oriental mustard	Moutarde brune	Sareptasenf	Mostaza de Sarepta, Mostaza india

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.]

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Brassica juncea* (L.) Czern..

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:

3,000 seeds for single spaced plants. 20,000 seeds for drilled plants.

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant.

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 optimum stage of development for the assessment of each characteristic is indicated by a number in the second column of the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

3.4 Test Design

3.4.1 single spaced plants: Each test should be designed to result in a total of at least 60 plants, which should be divided between at least 2 replicates.

3.4.2 drilled plots: Each test should be design to result in a total of at least 200 plants which should be divided between at least 2 replicates.

3.5 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.

4.1.4 Number of plants or parts of plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 30 plants or parts of plants taken from each of 30 plants and any other observations made on all plants in the test, disregarding any off-type plants.

4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the second column of the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation 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

Type of observation: visual (V) or measurement (M)

“Visual” observation (V) is an observation made on the basis of the expert’s judgment. For the purposes of this document, “visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

4.2.1 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:

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

4.2.3 For the assessment of uniformity of inbred lines, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants, 3 off-type(s) is/are allowed.
In the case of a sample size of 200 plants for drilled plants, 7 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 further examined by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

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.

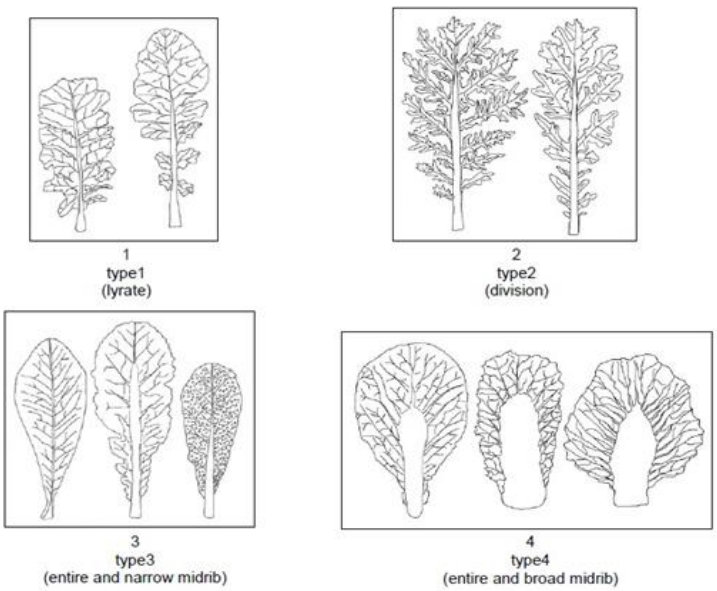
5.3 The following have been agreed as useful grouping characteristics:

(a) Seed: color (characteristic 1)
(b) Leaf blade: anthocyanin coloration (characteristic 14)
(c) Leaf blade: density of incisions of margin (excluding type2) (characteristic 17)
(d) Leaf blade: blistering (excluding type2) (characteristic 18)
(e) Plant: head formation (characteristic 20)

In the first place, the collection should be divided according to leaf types in the following table.

In case of doubt to which type a variety belongs to, it should be tested in all relevant types.

Leaf: type	**Example varieties**	**Leaf blade: size of terminal lobe (11)**	**Leaf blade: number of lateral lobes (12)**	**Leaf blade: blistering (excluding type2) (18)**	**Leaf blade: width of midrib(19)**	**Plant: head formation (20)**
type1	Hagarashina, Kigarashina, Terrafit	medium to very large	few to medium	absent or weak to medium	-	absent
type2	Akariasu, Riasu Karashina, Scarlet Frills, Flaming Frills	very small to small	many to very many	-	-	absent
type3	Akaoba Takana, Sagami Green	-	absent or very few	medium to strong	narrow	absent
type4	Kekkyu Takana, Miike Takana, Shinkoku Seisai	-	absent or very few	medium to strong	medium to broad	absent or present



5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 “Examining Distinctness”.

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

6.2.1 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.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

State	*Note*
small	3
medium	5
large	7

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

State	*Note*
very small	1
very small to small	2
small	3
small to medium	4
medium	5
medium to large	6
large	7
large to very large	8
very large	9

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

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

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1	**2**	**3**	**4**	**5**	**6**	**7**			
		Name of characteristics in English		**Nom du caractère en français**		**Name des Merkmals auf Deutsch**	**Nombre del carácter en español**		
		states of expression		types d'expression		Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

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

6 (a)-(e) See Explanations on the Table of Characteristics in Chapter 8.1

7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	**(*)**	**PQ VG**		**00**			
		Seed: color					
		yellow				Kigarashina	1
		brown				Miike Takana, Akaoba Takana, Esperance, Terraplus, Terrafit	2
		black				TTK456	3
2.		**QN VG**		**10**			
		Hypocotyl: anthocyanin coloration					
		absent or weak				Kigarashina, Zasai FM-58	1
		medium				Shinkoku Seisai	2
		strong				TTK456	3
3.		**QN MS/VG**	**(a)**	**10**			
		Cotyledon: length					
		short				Junkei Yamashiona, Vittasso	3
		medium				Katsuona, Terraplus	5
		long				Scala	7
4.		**QN MS/VG**	**(a)**	**10**			
		Cotyledon: width					
		narrow				Junkei Yamashiona, Vittasso	3
		medium				Katsuona, Pacific Gold, Terraplus	5
		broad				Minaret, Terminator	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.		**PQ VG**	**(+) (b)**	**19**			
		Leaf: shape					
		ovate				Serihon	1
		circular				Kekkyu Takana	2
		elliptic				Akariasu	3
		oblong				Zasai FM-58, Etamine	4
		obovate				Katsuona, Esperance	5
		spatulate				Kigarashina	6
6.		**QN VG**	**(+) (b)**	**19**			
		Leaf: attitude					
		erect				Wasabina	1
		semi-erect				Shinkoku Seisai, Esperance	3
		horizontal				Miike Takana, Etamine	5
7.	**(*)**	**QN MS/VG**	**(b), (c)**	**19**			
		Leaf: length					
		short				Chirimen Hakarashina	3
		medium				Miike Takana	5
		long				Akaoba Takana	7
8.		**QN MS/VG**	**(b), (c)**	**19**			
		Leaf: width					
		narrow				Chirimen Hakarashina	3
		medium				Miike Takana	5
		broad				Katsuona	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9.	**(*)**	**QN MS/VG**	**(b), (c)**	**19**			
		Leaf: length of petiole					
		absent or very short				Serihon	1
		short				Miike Takana	3
		medium				Junkei Yamashiona	5
		long				Kigarashina	7
10.		**QN MS/VG**	**(b), (c)**	**19**			
		Leaf: width of petiole					
		narrow				Kigarashina	3
		medium				Katsuona	5
		broad				Shinkoku Seisai	7
11.		**QN VG**	**(+) (b), (d)**	**19**			
		Leaf blade: size of terminal lobe					
		small				Chirimen Hakarashina, Etamine	3
		medium				Kigarashina	5
		large				Perm Green, Pacific Gold	7
12.	**(*)**	**QN VG**	**(b), (d)**	**19**			
		Leaf blade: number of lateral lobes					
		absent or very few					1
		few				Minaret	3
		medium				Kigarashina, Esperance	5
		many				Akariasu, TTK456, Etamine	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13.		**QN VG**	**(b)**	**19**			
		Leaf blade: pubescence on lower side					
		absent or weak				Miike Takana	1
		medium				Oba Takana	2
		strong				Kigarashina	3
14.	**(*)**	**QN VG**	**(+)** **(b)**	**19**			
		Leaf blade: anthocyanin coloration					
		absent or very weak				Kekkyu Takana, Vitamine	1
		weak					3
		medium				Miike Takana	5
		strong				TTK456	7
15.		**QN VG**	**(b)**	**19**			
		<u>Only varieties with anthocyanin coloration: absent or very weak</u>: Leaf blade: intensity of green color					
		light				Wasabina	3
		medium				Katsuona, Etamine, Golden Streaks	5
		dark				Minaret	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16.		**QN VG**	**(+) (b)**	**19**			
		Leaf blade: undulation of margin (excluding type2)					
		absent or very weak					1
		weak				Akaoba Takana	2
		medium				Katsuona	3
		strong				Chirimen Hakarashina	4
		very strong					5
17.	**(*)**	**QN VG**	**(+) (b)**	**19**			
		Leaf blade: density of incisions of margin (excluding type2)					
		absent or very sparse					1
		sparse				Katsuona, Etamine	3
		medium				Opaleska	5
		dense				Oportuna	7
18.	**(*)**	**QN VG**	**(+) (b)**	**19**			
		Leaf blade: blistering (excluding type2)					
		absent or weak				Kigarashina, Etamine	1
		medium				Akaoba Takana	2
		strong				Katsuona	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
19.		**QN MS/VG**	**(+) (b), (c)**	**19**			
		<u>Only varieties with leaf: type: type3 and 4</u>: Leaf blade: width of midrib					
		narrow				Sagami Green	3
		medium				Katsuona	5
		broad				Shinkoku Seisai	7
20.	**(*)**	**QL VG**	**(+)**	**19**			
		Plant: head formation					
		absent				Kigarashina	1
		present				Kekkyu Takana	9
21.		**QN MS/VG**		**19**			
		Head: height					
		short					1
		medium				Unzen Kekkyu Takana	2
		tall					3
22.		**QN MS/VG**		**19**			
		Head: width					
		narrow					1
		medium				Kekkyu Takana	2
		broad					3
23.		**QN MS/VG**		**19**			
		Head: number of leaves					
		few					3
		medium				Kekkyu Takana	5
		many					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24.	**PQ VG**		**19**			
	Head: internal color					
	yellowish white				Unzen Kekkyu Takana	1
	light green					2
	medium green				Kekkyu Takana	3
25.	**PQ VG**	**(+)**	**20-29**			
	Stem: type of main stem					
	narrow conical				Kigarashina	1
	rounded				Umino	2
	broad conical				Zasai FM-58	3
	branched				FE-K226	4
26.	**QN MG**		**31**			
	Time of beginning of bolting					
	early				Junkei Yamashiona, Scala	3
	medium				Katsuona	5
	late				Akaoba Takana	7
27.	**QN MG/MS**		**50**			
	Time of flowering					
	early				Terrafit	3
	medium				Terraplus	5
	late					7
	very late				Vittasso	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.	**QN MS/VG**	**(+)**	**65-79**			
	Only varieties with head formation: absent: plant: length					
	short				Pacific Gold, Terminator	3
	medium				Terraplus	5
	long				Minaret	7
	very long				Vittasso	9
29.	**QN MS/VG**	**(+) (e)**	**65-79**			
	Only varieties with head formation: absent: silique: length					
	short				Vittasso, Terraplus	3
	medium				Pacific Gold	5
	long				Minaret	7
30.	**QN MS/VG**	**(e)**	**65-79**			
	Only varieties with head formation: absent: silique: length of beak					
	short				Vittasso, Terraplus	3
	medium				Terrafit	5
	long					7
31.	**QN MS/VG**	**(e)**	**65-79**			
	Only varieties with head formation: absent: silique: width					
	narrow				Vittasso	3
	medium				Energy, Terrafit	5
	broad					7

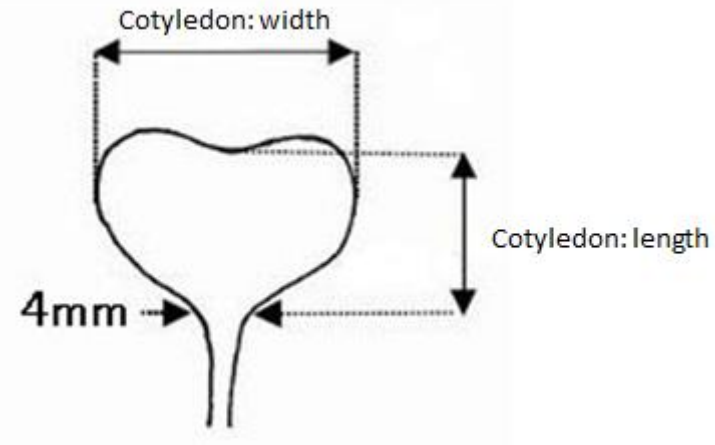
	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
32.	**QN MS/VG**	**(e)**	**65-79**			
	<u>Only varieties with head formation:</u> <u>absent</u>: silique: length of peduncle					
	short				Vittasso	3
	medium				Energy	5
	long					7
33.	**QN VG**	**(+)**				
	Tedency to form infloresences in the year of sowing under long day conditions					
	absent or very weak				Vittasso	1
	weak					3
	medium				Terraplus	5
	strong				Energy, Terrafit, Terratop	7
	very strong					9

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

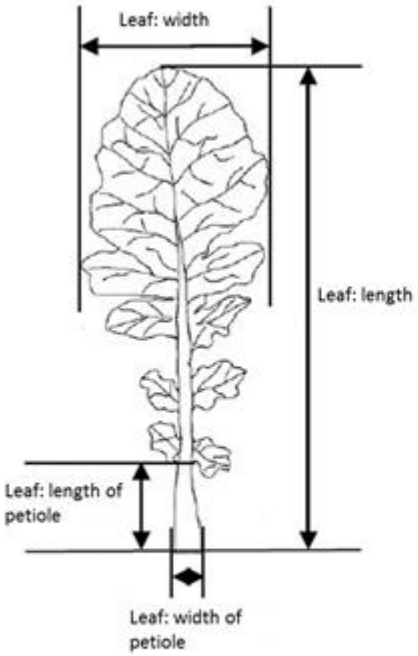
Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

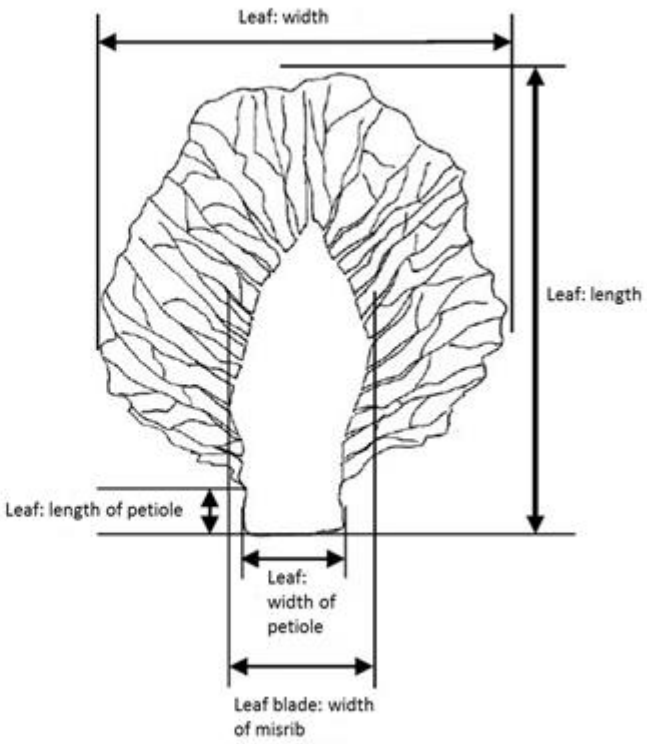
(a) The measurements should be made on cotyledons of 30 seedlings. If the two cotyledons differ in size, the biggest one should be measured. The length is defined as distance between the inclination at top of the cotyledon and the point where the width of the petiole is about 4 mm. The width of the cotyledon should be measured at the widest point of the cotyledons.



(b) observations on the leaves should be made on the largest fully developed (non-senescent) leaf.

(c)

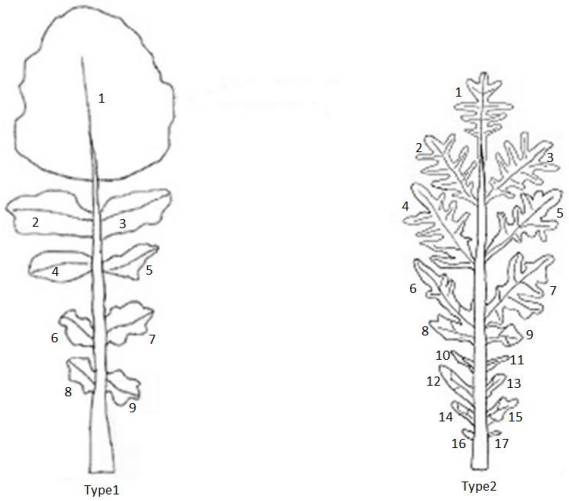




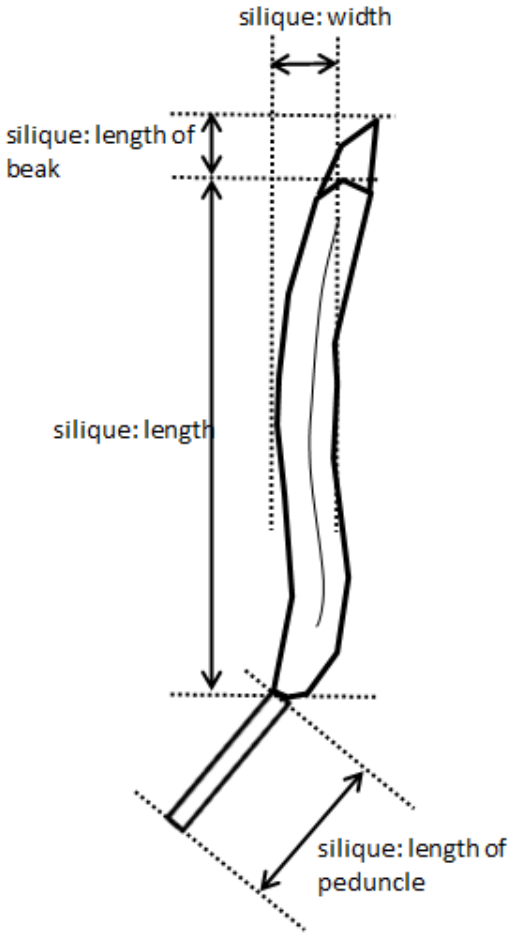
(d) Parts of the leaf blade are considered as lobes if their length is at least equivalent to the width of the leaf petiole at their point of attachment and if the upper notch of the blade has at least half the length of the lobe itself.

The terminal lobe is the top lobe of the leaf ,which is the No.1 lobe in the following figure. In the case of Type2 leaf, the shape of terminal lobe is similar to the shape of near other lobes.

The lateral lobes are the lobes excluding the terminal lobe.

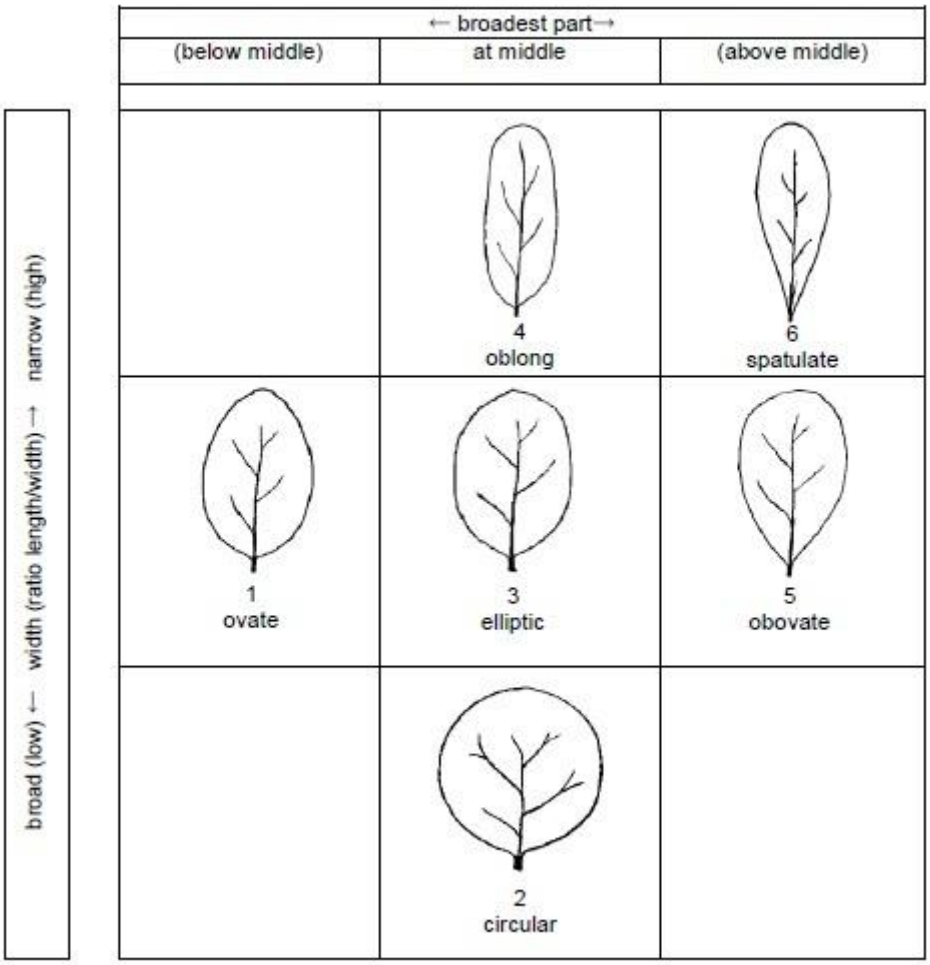


(e) All observations on the silique should be recorded in the midpart of the inflorescence of the main stem.



8.2 Explanations for individual characteristics

Ad. 5: Leaf: shape



Ad. 6: Leaf: attitude

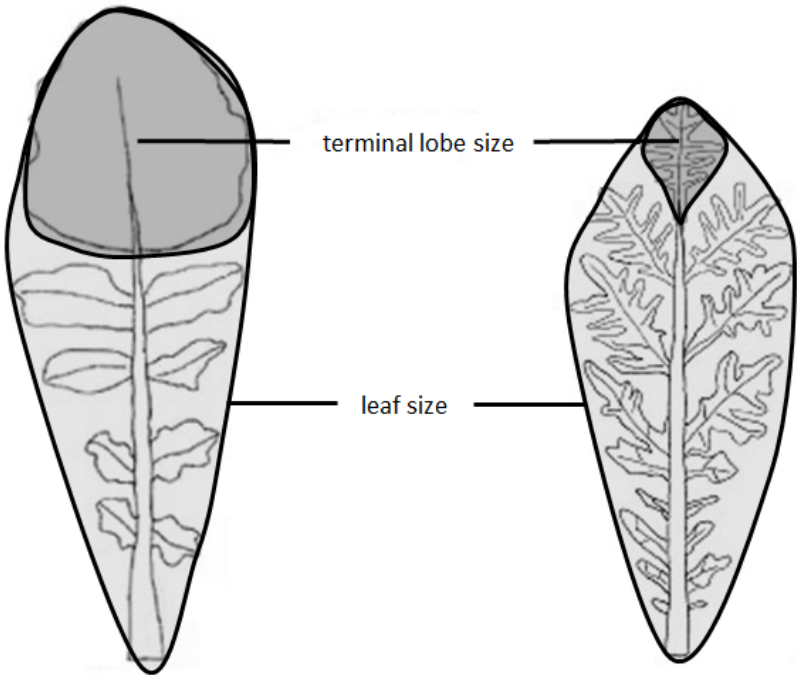
1
erect

3
semi-erect

5
horizontal

Ad. 11: Leaf blade: size of terminal lobe

The size of terminal lobe should be assessed by the ratio of the terminal lobe size/the leaf size. The terminal lobe size and the leaf size are the size of the area which was surrounded by each outline of them.

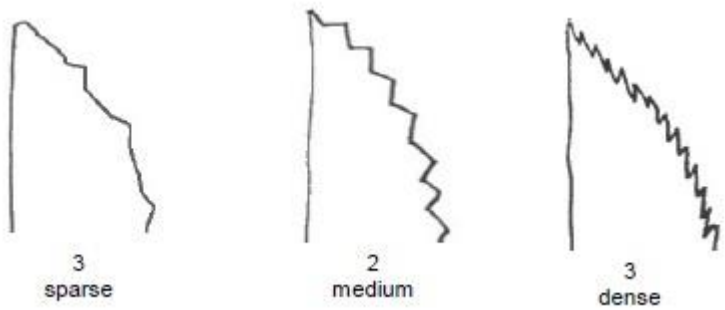


Ad. 14: Leaf blade: anthocyanin coloration

the strongest intensity of anthocyanin should be observed (not the extension).

Ad. 16: Leaf blade: undulation of margin (excluding type2)

Ad. 17: Leaf blade: density of incisions of margin (excluding type2)



Ad. 18: Leaf blade: blistering (excluding type2)

1
absent or weak

2
medium

3
strong

Ad. 19: Only varieties with leaf: type: type3 and 4: Leaf blade: width of midrib

The width of midrib should be measured at the widest point.

Ad. 20: Plant: head formation

1
absent

9
present

Ad. 25: Stem: type of main stem

Observation on type of main stem should be made on shape of main stem without lateral stem which locate at the base of main stem..

1
narrow conical

2
rounded

3
broad conical

4
branched

Ad. 28: Only varieties with head formation: absent: plant: length

Observations should be made when the growth stagnates by observing the total plant height from soil to highest point of the plant.

Ad. 29: Only varieties with head formation: absent: silique: length

Observations should be made on the length of the silique from attachment of peduncle to top, excluding beak.

Ad. 33: Tedency to form infloresences in the year of sowing under long day conditions

The observation of the tendency to form inflorescence (proportion of plants below bud stage, in bud stage, in flowering stage, in stage of silique formation) should be made in autumn, when the development stagnates.
Alternatively the beginning of flowering may be observed in this trial; early flowering would mean strong tendency, late flowering would mean weak tendency.

8.3 KEY FOR THE STAGE OF DEVELOPMENT

KEY	GENERAL DESCRIPTION
0	Principal growth stage 0:Germination
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 emerge through soil surface
1	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
2	Principal growth stage 2: Formation of side shoots
20	No side shoots
21	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	9 or more side shoots detectable
3	Principal growth stage 3: Stem elongation
30	no internodes(“rosette”)
31	1 visibly extended internode
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
4	Principal growth stage 4: Inflorescence emergence
40	Flower buds present, still enclosed by leaves
41	Flower buds visible from above (“green bud”)
42	Flower buds free, level with the youngest leaves
43	Flower buds raised above the youngest leaves
45	Individual flower buds (main inflorescence) visible but still closed
47	Individual flower buds (secondary inflorescence) visible but still closed
49	First petals visible, flower buds still closed by (“yellow bud”)
5	Principal growth stage 5: Oprning of flowers
50	First flowers open
51	10% of flowers on main raceme open, main raceme elongating
52	20% of flowers on main raceme open
53	30% of flowers on main raceme open
54	40% of flowers on main raceme open
55	Full flowering: 50% flowers on main raceme open, older petals falling
57	Flowering declining: majority of petals fallen
59	End of flowering

6 Principal growth stage 6: Development of silique
61 10% of siliques have reached final size
62 20% of siliques have reached final size
63 30% of siliques have reached final size
64 40% of siliques have reached final size
65 50% of siliques have reached final size
66 60% of siliques have reached final size
67 70% of siliques have reached final size
68 80% of siliques have reached final size
69 Nearly all siliques have reached final size
7 Principal growth stage 7: Ripening
70 seed green, filling silique cavity
71 10% of siliques ripe, seeds dark and hard
72 20% of siliques ripe, seeds dark and hard
73 30% of siliques ripe, seeds dark and hard
74 40% of siliques ripe, seeds dark and hard
75 50% of siliques ripe, seeds dark and hard
76 60% of siliques ripe, seeds dark and hard
77 70% of siliques ripe, seeds dark and hard
78 80% of siliques ripe, seeds dark and hard
79 Fully ripe: nearly all siliques ripe, seeds dark and hard
8 Principal growth stage 8: Senescence
87 Plant dead and dry
89 Harvested product

Other Names of the Example Varieties

TTK456(1)	Chaplin(2)
Akaoba Takana(3)	Red Giant(4)

(1) official denomination registered under the law in Japan in 2011.
(2) official denomination of TTK456 registered under the law in European Union in 2014.
(3) commercial name in Japan.
(4) commercial name of Akaoba Takana in European Union.

9. Literature

Fujishiro, T., 1996: Breeding processes and characteristics of a newly bred leaf mustard (Brassica Juncea Coss.)., Kanagawa, Japan.

Joy Larkcom., 1991: Oriental Vegetables (The Complete guide for Garden and Kitchen) London, United Kingdom. pp. 39 to 45

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Roger Phillips, Martyn Rix., 1993: VEGETABLES (The Pan Garden Plants Series) p.44

Tsukamoto, Y., 1994: The Grand Dictionary of Horticulture Volume 1. The Shogakukan Ltd., Tokyo, Japan, pp. 520 to 522.

Takasi A., 2004: Yasai-engei-daihyakka 17. Shadanhojin Nousan-gyoson-bunkakyokai. Tokyo, Japan. 169-233

Uwe Meier. Federal Biological Research Centre for Agriculture and Forestry, 2001: Growth stages of mono-and dicotyledonous plants, BBCH Monograph,

10. Technical Questionnaire

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

	Application date: (not to be filled in by the applicant)

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

1. Subject of the Technical Questionnaire

1.1	Botanical name	*Brassica juncea* (L.) Czern.
1.2	Common name	Brown mustard, India mustard, Indian mustard, Oriental mustard

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

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)

(……..……..…) x (……..……..…)

female parent male parent

(b) partially known cross [ ]

(please state known parent variety(ies))

(……..……..…) x (……..……..…)

female parent male parent

(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)

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:

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Cross-pollination [ ]
(b) Other (please provide details) [ ]

4.2.2 Other [ ]
(Please provide details)

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)	**Seed: color**		
	yellow	Kigarashina	1 [ ]
	brown	Akaoba Takana, Esperance, Miike Takana, Terrafit, Terraplus	2 [ ]
	black	TTK456	3 [ ]
5.2 (5)	**Leaf: shape**		
	ovate	Serihon	1 [ ]
	circular	Kekkyu Takana	2 [ ]
	elliptic	Akariasu	3 [ ]
	oblong	Etamine, Zasai FM-58	4 [ ]
	obovate	Esperance, Katsuona	5 [ ]
	spatulate	Kigarashina	6 [ ]
5.3 (6)	**Leaf: attitude**		
	erect	Wasabina	1 [ ]
	semi-erect	Esperance, Shinkoku Seisai	3 [ ]
	horizontal	Etamine, Miike Takana	5 [ ]
5.4 (14)	**Leaf blade: anthocyanin coloration**		
	absent or very weak	Kekkyu Takana, Vitamine	1 [ ]
	weak		3 [ ]
	medium	Miike Takana	5 [ ]
	strong	TTK456	7 [ ]
5.5 (16)	**Leaf blade: undulation of margin (excluding type2)**		
	absent or very weak		1 [ ]
	weak	Akaoba Takana	2 [ ]
	medium	Katsuona	3 [ ]
	strong	Chirimen Hakarashina	4 [ ]
	very strong		5 [ ]

	Characteristics	Example Varieties	Note
5.6 (17)	**Leaf blade: density of incisions of margin (excluding type2)**		
	absent or very sparse		1 [ ]
	sparse	Etamine, Katsuona	3 [ ]
	medium	Opaleska	5 [ ]
	dense	Oportuna	7 [ ]
5.7 (18)	**Leaf blade: blistering (excluding type2)**		
	absent or weak	Etamine, Kigarashina	1 [ ]
	medium	Akaoba Takana	2 [ ]
	strong	Katsuona	3 [ ]
5.8 (20)	**Plant: head formation**		
	absent	Kigarashina	1 [ ]
	present	Kekkyu Takana	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	*Leaf: shape*	*ovate*	*oblong*

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

(a) Main use

Vegetable [ ]
Oilseed [ ]
Condiment [ ]
Green manure [ ]
other [ ]

(b) Leaf type (according to Section5.3 of the Test Guidelines)

type 1 [ ]
type 2 [ ]
type 3 [ ]
type 4 [ ]

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:

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.

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]