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TG/16/9(proj.1)
ORIGINAL: English
DATE: 2017-05-05

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

RICE

UPOV Code(s):

ORYZA_SAT

Oryza sativa L.

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 Agricultural Crops
at its forty-sixth session, to be held in Hanover, Germany,
from 2017-06-19 to 2017-06-23

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Oryza sativa L.	Rice	Riz	Reis	Arroz

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 *Oryza sativa* L..

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 and panicles (if requested).

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

Seed: 2 kg
Panicles (if requested): 120

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.

The panicles should be well developed and should contain a sufficient number of viable seeds to establish a satisfactory row of plants for observation.

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

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

3.1.2 The two independent growing cycles should be in the form of two separate plantings.

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 Each test should be designed to result in a total of at least 2000 plants, which should be divided between at least 2 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.

3.4.3 If tests on panicle rows are conducted, at least 100 panicle rows should be observed.

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.

To assess distinctness of hybrids, the parent lines and the formula may be used according to the following recommendations:

(i) description of parent lines according to the Test Guidelines;

(ii) check of the originality of the parent lines in comparison with the variety collection, based on the characteristics in Chapter 7, in order to identify similar parent lines;

(iii) check of the originality of the hybrid formula in relation to the hybrids in the variety collection, taking into account the most similar lines; and

(iv) assessment of the distinctness at the hybrid level for varieties with a similar formula.

Further guidance is provided in documents TGP/9 "Examining Distinctness" and TGP/8 "Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability".

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 10 plants or parts of plants taken from each of 10 plants and any other observations made on all plants in the test, disregarding any off-type plants.

In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 1.

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 hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction.

4.2.3 Where the assessment of a hybrid variety involves the parent lines, the uniformity of the hybrid variety should, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity of its parent lines.

4.2.4 The recommended sample size for the assessment of uniformity is indicated by the following key in the table of characteristics:

A: sample size of 100 plants/parts of plants/panicle rows
B: sample size of 2000 plants

4.2.5 For the assessment of uniformity in a sample of 2000 plants, a population standard of 0.1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 2000 plants, 5 off-types are allowed.

4.2.6 4.2.6 For the assessment of uniformity in a sample of 100 panicle-rows, plants or parts of plants, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 100 panicle-rows, plants or parts of plants, 3 off-types are allowed. An panicle-row is considered to be an off-type panicle-row if there is more than 1 off-type plant within that panicle-row.

4.2.7 For "A" characteristics, the assessment of uniformity can be done in 2 steps. In a first step, 20 plants or parts of plants are observed. If no off-types are observed, the variety is considered to be uniform. If more than 3 off-types are observed, the variety is considered not to be uniform. If 1 to 3 off-types are observed, an additional sample of 80 plants or parts of plants must be observed.

4.2.8 For the assessment of uniformity of hybrid varieties, a population standard of 10% and an acceptance probability of at least 95% should be applied. In case of characteristics indicated by B, the sample size for the assessment of uniformity may be reduced to 200 plants. In case of a sample size of 200 plants, 27 off-types are allowed. In case of a sample size of 100 ear-rows, plants or parts of plants, 15 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.

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.

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) Leaf: anthocyanin coloration (characteristic 4)
(b) Time of heading (50% of plants with heads) (characteristic 18)
(c) Excluding deepwater/floating varieties: Stem: length (excluding panicle) (characteristic 25)
(d) Panicle: length of main axis (characteristic 33)
(e) Lemma: color of tip (characteristic 34)
(f) Decorticated grain: weight of 1000 seeds (characteristic 52)
(g) Decorticated grain: color (characteristic 56)
(h) Endosperm: type (characteristic 59)

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)

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

A: sample size of 100 plants/parts of plants
B: sample size of 2000 plants/parts of plants

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QN VG|A**	**(+)**	**10**			
		Coleoptile: anthocyanin coloration					
		absent or weak				koshihikari	1
		medium				murasakikoboshi	3
		strong					5
2.		**QN VG|B**	**(a)**	**40**			
		Leaf sheath: anthocyanin coloration					
		absent or very weak				koshihikari	1
		weak				murasakikoboshi	3
		medium					5
		strong					7
3.		**QN VG|B**	**(a)**	**40**			
		Leaf: intensity of green color					
		light					3
		medium				koshihikari	5
		dark				takanari, hoshiyutaka	7
4.	**(*)**	**QL VG|A**	**(a)**	**40**			
		Leaf: anthocyanin coloration					
		absent				koshihikari	1
		present				murasakikoboshi, sayomurasaki	9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.		**PQ**	**VG|B**		**(a)**	**40**			
		Leaf: distribution of anthocyanin coloration							
		on tips only							1
		on margins only						murasakikoboshi, sayomurasaki	2
		in blotches only							3
		even							4
6.		**QL**	**VG|A**		**(a)**	**40**			
		Leaf: auricles							
		absent							1
		present						koshihikari	9
7.	**(*)**	**QL**	**VG|A**		**(a)**	**40**			
		Leaf: anthocyanin coloration of auricles							
		absent						koshihikari	1
		present						murasakikoboshi, sayomurasaki	9
8.		**QL**	**VG|A**		**(a)**	**40**			
		Leaf: collar							
		absent							1
		present						koshihikari	9
9.		**QL**	**VG|A**		**(a)**	**40**			
		Leaf: anthocyanin coloration of collar							
		absent						koshihikari	1
		present						murasakikoboshi, sayomurasaki	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10.	**QL VG|A**	**(a)**	**40**			
	Leaf: ligule					
	absent					1
	present				koshihikari	9
11.	**PQ VG|B**	**(+) (a)**	**40**			
	Leaf: shape of ligule					
	truncate					1
	acute					2
	cleft					3
12.	**PQ VG|B**	**(a)**	**40**			
	Leaf: color of ligule					
	colorless				koshihikari	1
	green					2
	green with purple lines					3
	light purple					4
	purple				murasakikoboshi, sayomurasaki	5
13.	**QN MS|B/VG|B**	**(+)**	**40**			
	Flag leaf: length					
	short					3
	medium					5
	long					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14.	**QN MS|B/VG|B**	**(+)**	**40**			
	Flag leaf: width					
	narrow					3
	medium					5
	broad					7
15.	**QN VG|B**	**(a)**	**40**			
	Leaf blade: pubescence of surface					
	absent or very weak				leafstar	1
	weak					2
	medium				koshihikari	3
	strong					4
16.	**QN VG|B**	**(+)**	**40**			
	Culm: habit					
	erect					1
	semi-erect					3
	open					5
	spreading					7
	prostrate					9
17.	**QL VG|A**	**(+)**	**40**			
	Culm: kneeing ability					
	absent					1
	present					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18.	**(*)**	**QN MG|B**		**55**			
		Time of heading (50% of plants with heads)					
		very early					1
		early					3
		medium					5
		late					7
		very late					9
19.	**(*)**	**PQ MS|B/VG|B**	**(+)**	**60**			
		Male sterility					
		absent				koshihikari, takanari	1
		partial					2
		total					3
20.		**QN VG|B**		**60-65**			
		CMS and EMS lines only: Spikelet: angle between lemma and palea					
		small					3
		medium					5
		large					7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21.	**(*)**	**QN VG|B**		**60-80**			
		Lemma: pubescence					
		absent or very weak				leafstar	1
		weak					3
		medium				koshihikari	5
		strong					7
		very strong					9
22.	**(*)**	**PQ VG|B**		**65**			
		Spikelet: color of stigma					
		white				koshihikari	1
		light green					2
		yellow					3
		light purple				sayomurasaki	4
		purple				murasakikoboshi	5
23.	**(*)**	**QN VG|B**		**70**			
		Stem: anthocyanin coloration of nodes					
		absent or weak				koshihikari	1
		medium				sayomurasaki	3
		strong				murasakikoboshi	5
24.		**QL VG|A**		**70**			
		Stem: anthocyanin coloration of internodes					
		absent				koshihikari	1
		present					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25.	**(*)**	**QN MG|B/MS|B**		**70**			
		Excluding deepwater/floating varieties: Stem: length (excluding panicle)					
		very short					1
		short					3
		medium					5
		long					7
		very long					9
26.		**QN VG|B**		**70**			
		Stem: thickness					
		thin					3
		medium				koshihikari, sayomurasaki, benizomemochi	5
		thick				hoshiyutaka, momiroman, leafstar	7
27.		**QN MS|B**		**70**			
		panicle: number per plant					
		few				takanari, momiroman	3
		medium				koshihikari	5
		many					7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.	**(*)**	**QN MS|B**		**70**			
		Panicle: distribution of awns					
		absent					1
		few					2
		medium					3
		many					4
29.		**QN MS|B/VG|B**		**70-80**			
		Panicle: length of longest awns					
		very short					1
		short				koshihikari	2
		medium				benizomemochi, leafstar	3
		long					4
		very long					5
30.		**PQ VG|B**		**70-80**			
		Panicle: color of awns					
		light gold				koshihikari	1
		gold					2
		brown					3
		reddish brown					4
		light red					5
		red					6
		light purple					7
		purple				sayomurasaki	8
		black					9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.	**(*)**	**QN**	**VG|B**			**70-80**			
		Lemma: intensity of anthocyanin coloration							
		absent or very weak						koshihikari	1
		weak							3
		medium							5
		strong							7
		very strong							9
32.	**(*)**	**QN**	**VG|B**			**70-80**			
		Lemma: extent of anthocyanin coloration from tip							
		absent or very small						koshihikari	1
		small							3
		medium							5
		large							7
		very large							9
33.	**(*)**	**QN**	**MS|B**	**(+)**		**72-90**			
		Panicle: length of main axis							
		short							3
		medium						koshihikari, benizomemochi, leafstar	5
		long						momiroman	7

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
34.	**(*)**	**PQ**	**VG|B**			**80-90**			
		Lemma: color of tip							
		white						koshihikari	1
		yellowish							2
		brown						koshinokaori, leafstar	3
		red							4
		purple						murasakikoboshi, sayomurasaki	5
		black							6
35.	**(*)**	**QN**	**VG|B**	**(+)**		**90**			
		Flag leaf: attitude of blade							
		erect							1
		semi-erect							3
		horizontal							5
		recurved							7
36.		**QN**	**VG|B**			**90**			
		Panicle: density							
		lax							3
		medium						koshihikari	5
		dense						takanari, hoshiyutaka	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
37.	**(*)**	**PQ VG|B**	**(+)**	**90**			
		Panicle: attitude in relation to stem					
		upright					1
		semi-upright					2
		slightly drooping				koshihikari	3
		strongly drooping					4
38.	**(*)**	**QN VG|B**	**(+)**	**90**			
		Panicle: attitude of branches					
		erect					1
		semi-erect				murasakikoboshi	3
		spreading					5
39.		**QN VG|B**		**90**			
		Panicle: number of secondary branches					
		absent					1
		few					2
		medium					3
		many					4
40.		**QN VG|B**	**(+)**	**90**			
		Panicle: exsertion					
		enclosed					1
		partly exserted					2
		just exserted					3
		well exserted				koshihikari	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41.	**QN MG|B/VG|B**		**90**			
	Time of maturity					
	very early					1
	early					3
	medium					5
	late					7
	very late					9
42.	**QN VG|B**	**(+)**	**92**			
	Leaf: time of senescence					
	early					3
	medium					5
	late				koshihikari	7
43.	**PQ VG|B**		**92**			
	Lemma: color					
	light gold				koshihikari	1
	gold				leafstar	2
	brown					3
	reddish to light purple					4
	purple					5
	black					6

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
44.	**PQ VG|B**		**92**			
	Lemma: ornamentation					
	absent				koshihikari	1
	gold furrows					2
	brown furrows					3
	purple spots					4
	purple furrows					5
45.	**QN VG|B**	**(+)**	**92**			
	Lemma: coloration with phenol					
	absent or very light				koshihikari, momiroman, leafstar	1
	light					3
	medium					5
	dark					7
46.	**QN MS|B**	**(+)**	**92**			
	Glume: length					
	short					3
	medium				koshihikari	5
	long					7
47.	**PQ VG|B**		**92**			
	Glume: color					
	straw				koshihikari	1
	gold					2
	red					3
	purple					4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
48.	**QN MG|B**	**(+)**	**92**			
	Grain: weight of 1000 seeds					
	low				sari queen	3
	medium				koshihikari, takanari, leafstar	5
	high					7
49.	**QN MS|B**		**92**			
	Grain: length					
	short					3
	medium				koshihikari	5
	long					7
50.	**QN MS|B**		**92**			
	Grain: width					
	narrow				hoshiyutaka, leafstar	3
	medium				koshihikari	5
	broad					7
51.	**QN MS|B**	**(+)**	**92**			
	Grain: ratio length/width					
	small					1
	small to medium					2
	medium					3
	medium to large					4
	large					5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
52.	**(*)**	**QN MG|B**		**92**			
		Decorticated grain: weight of 1000 seeds					
		low				sari queen	3
		medium				koshihikari, takanari, leafstar	5
		high					7
53.	**(*)**	**QN MS|B**		**92**			
		Decorticated grain: length					
		short					3
		medium				koshihikari	5
		long				takanari, hoshiyutaka, momiroman	7
54.		**QN MS|B**		**92**			
		Decorticated grain: width					
		narrow				hoshiyutaka, leafstar	3
		medium				koshihikari	5
		broad					7
55.	**(*)**	**QN MS|B**	**(+)**	**92**			
		Decorticated grain: ratio length/width					
		small					1
		small to medium				koshihikari	2
		medium				hoshiyutaka, leafstar	3
		medium to large					4
		large					5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
56.	**(*)**	**PQ VG|B**		**92**			
		Decorticated grain: color					
		white					1
		light brown				koshihikari, takanari	2
		variegated brown					3
		dark brown				leafstar	4
		light red					5
		red				benizomemochi	6
		variegated purple					7
		purple					8
		dark purple/ black				murasakikoboshi, sayomurasaki	9
57.		**QN MG|B**	**(+)**	**92**			
		Decorticated grain: alkali digestion					
		not digested					1
		low digested					3
		intermediate					5
		completely digested					7
58.	**(*)**	**QN MG|B**	**(+)**	**92**			
		Decorticated grain: aroma					
		absent or weak				koshihikari	1
		medium				sari queen	2
		strong					3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
59.	**(*)**	**PQ VG|B**	**(+)**	**92**			
		Endosperm: type					
		glutinous				sayomurasaki, benizomemochi	1
		intermediate					2
		non-glutinous				koshihikari, takanari, momiroman	3
60.		**QN MG|B**	**(+)**	**92**			
		Endosperm: content of amylose					
		very low				sayomurasaki, benizomemochi	1
		low					3
		medium				koshihikari	5
		high				hoshiyutaka	7
		very high				koshinokaori	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) Unless otherwise indicated, all observations on the leaf should be made on the penultimate leaf.

8.2 Explanations for individual characteristics

Ad. 1: Coleoptile: anthocyanin coloration

Non-dormant grains are placed on moistened filter paper and covered with a petri-dish lid during germination. After the coleoptiles have reached a length of about 5mm in darkness they are placed in artificial light (daylight equivalent) at 750-1250 lux continuously for 3 to 4 days, at a temperature of 25 to 30 degree. The color of the coleoptiles is observed when they are fully developed at stage 09-11 (about 6 to 7 days).

Ad. 11: Leaf: shape of ligule

1
truncate

2
acute

3
cleft

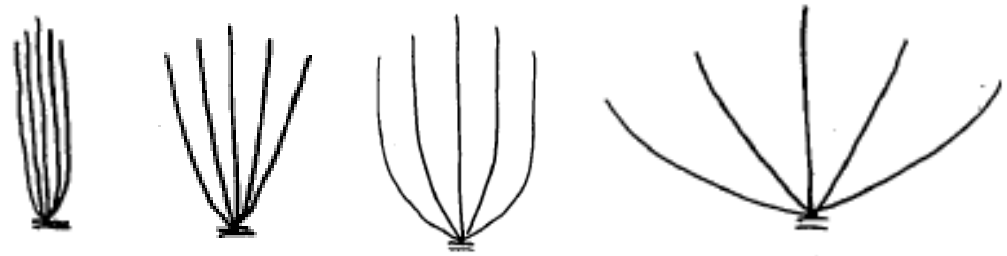
Ad. 13: Flag leaf: length

Measurements should be made on the same leaf.
Length should be measured from the tip of the leaf blade to the leaf sheath.
Width should be measured at the widest point of the leaf blade.

Ad. 14: Flag leaf: width

See Ad. 13

Ad. 16: Culm: habit



1
erect

3
semi-erect

5
open

7
spreading

9
prostrate

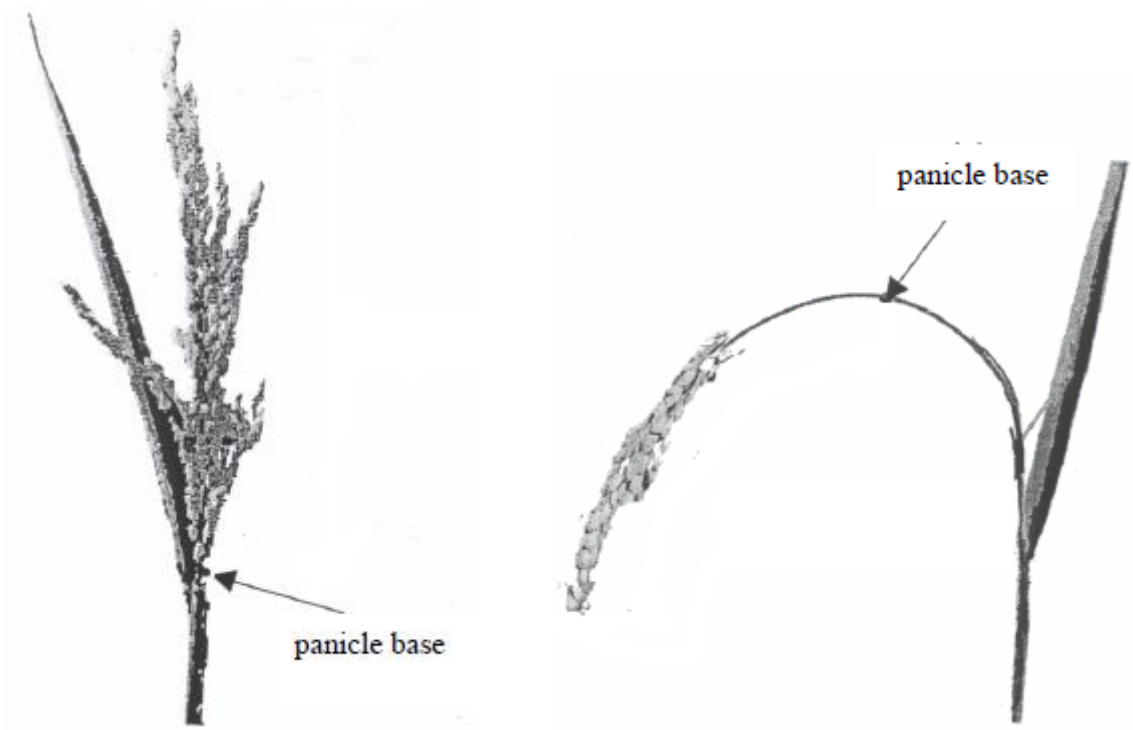
Ad. 17: Culm: kneeing ability

Kneeing ability is one of the most important characteristics for deep water/floating types of rice. After falling flat due to receding water flow, the stems of varieties with kneeing ability start to grow upright with 3 to 4 nodes and bear panicles.

Ad. 19: Male sterility

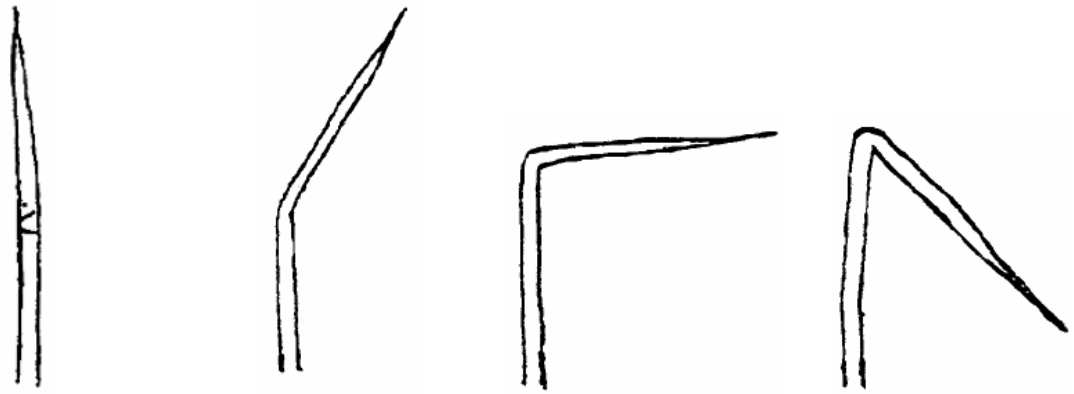
1 - absent: less than 25% sterile pollen
2 - partial: 25 to 95% sterile pollen
3 - total: more than 95% sterile pollen

Ad. 33: Panicle: length of main axis



To be measured from panicle base to top.

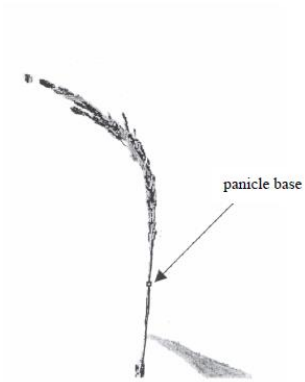
Ad. 35: Flag leaf: attitude of blade



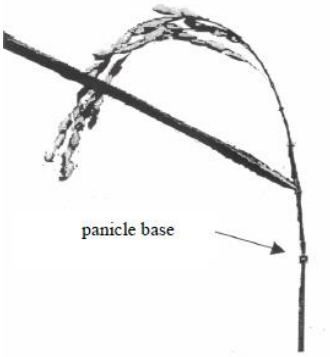
1	3	5	7
erect	semi-erect	horizontal	recurved

Ad. 37: Panicle: attitude in relation to stem

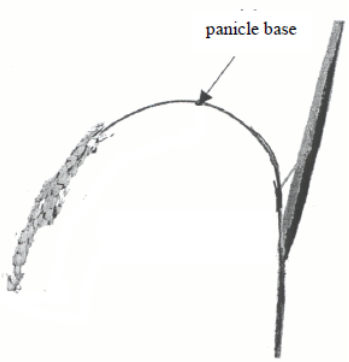
1
upright



2
semi-upright



3
slightly drooping



4
strongly drooping

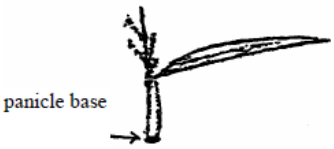
Ad. 38: Panicle: attitude of branches

1
erect

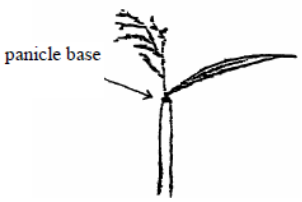
3
semi-erect

5
spreading

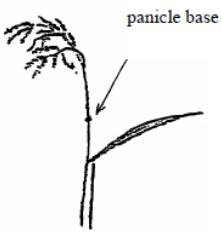
Ad. 40: Panicle: exsertion



2
partly exserted



3
just exserted



4
well exserted

Ad. 42: Leaf: time of senescence

The leaves below the flag leaf are observed at the time of harvest for their retention of greenness.

3 - early: Leaves are dead when the grains have become fully ripened.
5 - medium: There must be 1 leaf which retains its color.
7 - late: 2 or more leaves retain their color at maturity.

Ad. 45: Lemma: coloration with phenol

Method of testing: Place hulls from 10 grains into a petri dish of 5cm diameter, and add 5ml of 1.5% phenol solution. Cover the petri dish, and keep at room temperature (not very cold) for one day.

Ad. 46: Glume: length

The measurement is made on longer glumes.

Ad. 48: Grain: weight of 1000 seeds

To be calculated at 14% moisture.

Ad. 51: Grain: ratio length/width

1 - small: <1.50
2 - small to medium: 1.50-1.99
3 - medium: 2.00-2.49
4 - medium to large: 2.50-2.99
5 - large: ≧3.00

Ad. 55: Decorticated grain: ratio length/width

See Ad. 51

Ad. 57: Decorticated grain: alkali digestion

Put 10 milled complete (unbroken) rice grains in a petri dish with 1.5% solution of KOH, and keep still under room temperature of around 25 degree for about 24 hours.

1 - not digested: Rice grains are not affected.
3 - low digested: Only the margin of the grains are dissolved.
5 - intermediate: Shape of grains become unclear, but incompletely dissolved.
7 - completely digested: No margin is identified between the core part and the outer skirt.

Ad. 58: Decorticated grain: aroma

The main component of the aroma in rice is the 2-acetyl-1-pirroline (AcPy). To vaporize this chemical, 10ml of a 1.7% solution of KOH should be added to 2g of decorticated grains. The aroma, which is similar to that in pop-corn, is released within 10 minutes. The level of expression is determined by reference to the example varieties.

Ad. 59: Endosperm: type

The three states of expression can be simply defined by reaction to KI-I solution which is prepared by mixing 0.1 % I2 solution and 0.2 % KI solution.
1 - glutinous: endosperm is stained to reddish purple.
2 - intermediate: endosperm is stained to reddish blue purple.
3 - non-glutinous: endosperm is stained to dark blue purple.

Ad. 60: Endosperm: content of amylose

Method ISO 6647 should be used.

8.3 8.3 Decimal code for the growth stage codes of cereals

Germination

00 Dry seed
01 Start of imbibition
02 -
03 Imbibition complete
04 -
05 Radicle emerged from caryopsis
06 -
07 Coleoptile emerged from caryopsis
08 -
09 Leaf just at coleoptile tip

Seedling growth

10 First leaf through coleoptile
11 First leaf unfolded (1)
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

Germination

20 Main shoot only
21 Main shoot and 1 tiller
22 Main shoot and 2 tillers
23 Main shoot and 3 tillers
24 Main shoot and 4 tillers
25 Main shoot and 5 tillers
26 Main shoot and 6 tillers
27 Main shoot and 7 tillers
28 Main shoot and 8 tillers
29 Main shoot and 9 or more tillers

Stem elongation

30 Pseudo stem erection (2)
31 1st node detectable

32 2nd node detectable
33 3rd node detectable
34 4th node detectable
35 5th node detectable
36 6th node detectable
37 Flag leaf just visible
38 -
39 Flag leaf ligule/collar just visible

Booting

40 -
41 Flag leaf sheath extending
42 -
43 Boots just visibly swollen

-
Boots swollen
-
Flag leaf sheath opening
-
First awns visible

Inflorescence emergence

First spikelet of inflorescence just visible

1/4 of inflorescence emerged

1/2 of inflorescence emerged

3/4 of inflorescence emerged

Emergence of inflorescence completed

Anthesis

Beginning of anthesis

-
-

Anthesis half-way

-
-

Anthesis complete

Milk development

-
Caryopsis watery ripe
-
Early milk
-
Medium milk

-
Late milk
-
-

Dough development

80 -
81 -
82 -
83 Early dough
84 -
85 Soft dough
86 -
87 Hard dough
88 -
89 -

Ripening

90 -
91 Caryopsis hard (difficult to divide by thumbnail) (3)
92 Caryopsis hard (can no longer be dented by thumbnail) (4)
93 Caryopsis loosening in daytime
94 Over-ripe, straw dead and collapsing

Ripening (continued)

95 Seed dormant
96 Viable seed giving 50% germination
97 Seed not dormant
98 Secondary dormancy induced
99 Secondary dormancy lost

Notes on the table
(1) Stage of seedling inoculation with rust in the greenhouse.
(2) Only applicable to cereals with a prostrate or semi-prostrate early growth habit.
(3) Ripeness for binder (ca. 16% water content). Chlorophyll of inflorescence largely lost.
(4) Ripeness for combine harvester (< 16% water content).
(5) Optimum harvest time.

9. Literature

Matsuo, T. (edit.), 1993-97: Science of the Rice Plant. Nosan Gyoson Bunka Kyokai. Tokyo, JP
Vol. 1 Morphology (1993)
Vol. 2 Physiology (1995)
Vol. 3 Genetics (1997)

Zadoks, J.C., Chang, T.T., Konzak, C.F., 1974: A Decimal code for the Growth Stages of Cereals. Weed Research. NL, 14: pp. 415 – 421.

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	*Oryza sativa* L.
1.2 Common name	Rice

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) Self-pollination [ ]
(b) Hybrid [ ]
(c) [ ]
(d) Other (please provide details) [ ]

4.2.2 Other [ ]
(Please provide details)

In the case of hybrid varieties the production scheme for the hybrid should be provided on a separate sheet. This should provide details of all the parent lines required for propagating the hybrid e.g.

Single Hybrid

(……..……..…) x (……..……..…)

female parent male parent

Three-Way Hybrid

(……..……..…) x (……..……..…)

female parent male parent

(……..……..…) x (……..……..…)

single hybrid used as female parent male parent

and should identify in particular:

(a) any male sterile lines

(b) maintenance system of male sterile lines.

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 (4)	**Leaf: anthocyanin coloration**		
	absent	koshihikari	1 [ ]
	present	murasakikoboshi, sayomurasaki	9 [ ]
5.2 (18)	**Time of heading (50% of plants with heads)**		
	very early		1 [ ]
	early		3 [ ]
	medium		5 [ ]
	late		7 [ ]
	very late		9 [ ]
5.3 (25)	**Excluding deepwater/floating varieties: Stem: length (excluding panicle)**		
	very short		1 [ ]
	short		3 [ ]
	medium		5 [ ]
	long		7 [ ]
	very long		9 [ ]
5.4 (33)	**Panicle: length of main axis**		
	short		3 [ ]
	medium	benizomemochi, koshihikari, leafstar	5 [ ]
	long	momiroman	7 [ ]
5.5 (34)	**Lemma: color of tip**		
	white	koshihikari	1 [ ]
	yellowish		2 [ ]
	brown	koshinokaori, leafstar	3 [ ]
	red		4 [ ]
	purple	murasakikoboshi, sayomurasaki	5 [ ]
	black		6 [ ]

	Characteristics	Example Varieties	Note
5.6 (52)	**Decorticated grain: weight of 1000 seeds**		
	low	sari queen	3 [ ]
	medium	koshihikari, leafstar, takanari	5 [ ]
	high		7 [ ]
5.7 (56)	**Decorticated grain: color**		
	white		1 [ ]
	light brown	koshihikari, takanari	2 [ ]
	variegated brown		3 [ ]
	dark brown	leafstar	4 [ ]
	light red		5 [ ]
	red	benizomemochi	6 [ ]
	variegated purple		7 [ ]
	purple		8 [ ]
	dark purple/ black	murasakikoboshi, sayomurasaki	9 [ ]
5.8 (59)	**Endosperm: type**		
	glutinous	benizomemochi, sayomurasaki	1 [ ]
	intermediate		2 [ ]
	non-glutinous	koshihikari, momiroman, takanari	3 [ ]

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	*Panicle: length of main axis*	*long*	*short to medium*

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

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]