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Oryza sativa L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by an expert from Japan**to be considered by the**Technical Committee at its fifty-sixth session
to be held in Geneva on October 26 and 27, 2020**Disclaimer: this document does not represent UPOV policies or guidance*

Alternative names:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Oryza sativa</i> 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.

3.1.3 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

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 Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

3.4 *Test Design*

- 3.4.1 In the case of sowed trials, each test should be designed to result in a total of at least 1500 plants which should be divided between at least 2 replicates.
- 3.4.2 In the case of transplanted plantlets, each test should be designed to result in a total of at least 400 plants which should be divided between at least 2 replicates.
- 3.4.3 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.
- 3.4.4 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 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 These Test Guidelines have been developed for the examination of self-pollinated and hybrid varieties. For varieties with other types of propagation, the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

4.2.3 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.

4.2.4 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.

4.2.5 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 1500 plants/400 plants

4.2.6 For the assessment of uniformity in a sample of 1500 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 1500 plants, 4 off-types are allowed.

4.2.7 For the assessment of uniformity in a sample of 400 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 400 plants, 2 off-types are allowed.

4.2.8 For the assessment of uniformity in a sample size of 100 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. A panicle row is considered to be an off-type if there is more than one off-type plant within that panicle row.

4.2.9 For "A" characteristics, the assessment of uniformity can be done in 2 steps. In a first step, 20 panicle rows, 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 panicle rows, plants or parts of plants must be observed.

4.2.10 For the assessment of uniformity of hybrid varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied.

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) Endosperm: type (characteristic 1)
 - (b) Leaf blade: anthocyanin coloration (characteristic 8)
 - (c) Time of panicle emergence (characteristic 12)
 - (d) Stem: length (characteristic 17)
 - (e) Lemma: color of tip (characteristic 25)
 - (f) Grain: ratio length/width (characteristic 41)
 - (g) Grain: color (characteristic 42)
- 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:

<i>State</i>	<i>Note</i>
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)-(b) See Explanations on the Table of Characteristics in Chapter 8.1
- 7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3

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 A	(+)	00		
	Endosperm: type	Endosperme : type	Endosperm: Typ	Endospermo: tipo		
	glutinous	glutineux	mit Gluten	glutinoso	Ruriaoba, Sayomurasaki	1
	intermediate	intermédiaire	Zwischentyp	intermedio	Milky Summer	2
	non-glutinous	non glutineux	ohne Gluten	no glutinoso	Koshihikari, Takanari	3
2. (*)	QN	MG A	(+)	00		
	Endosperm: content of amylose	Endosperme : teneur en amylose	Endosperm: Amylosegehalt	Endospermo: contenido de amilosa		
	very low	très faible	sehr gering	muy bajo	Ruriaoba, Sayomurasaki	1
	low	faible	gering	bajo	Milky Summer	3
	medium	moyenne	mittel	medio	Koshihikari	5
	high	élevée	hoch	alto	Hoshiyutaka	7
	very high	très élevée	sehr hoch	muy alto	Koshinokaori	9
3.	QN	VG A	(+)	10-11		
	Coleoptile: anthocyanin coloration	Coléoptile : pigmentation anthocyanique	Keimscheide: Anthocyanfärbung	Coleóptilo: pigmentación antociánica		
	absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Koshihikari	1
	medium	moyenne	mittel	media	Murasakikoboshi	3
	strong	forte	stark	fuerte	Akaneasobi, Satsumakuromochi	5
4. (*)	QN	VG B	(+)	40-49		
	Plant: growth habit	Plante : port	Pflanze: Wuchsform	Planta: hábito de crecimiento		
	erect	dressé	aufrecht	erecto	Leafstar	1
	semi-erect	demi-dressé	halbaufrecht	semierecto	Koshihikari, Momiroman	3
	intermediate	intermédiaire	mittel	intermedio	Onari	5
	semi-prostrate	demi-étalé	halbliiegend	semipostrado		7
	prostrate	étalé	liegend	postrado		9

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.	QN	VG B	(a)	40-49			
	Distal leaf sheath: anthocyanin coloration	Gaine de la feuille distale : pigmentation anthocyanique	Distale Blattscheide: Anthocyanfärbung	Vaina de la hoja distal: pigmentación antociánica			
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Koshihikari		1
	weak	faible	gering	débil	Murasakikoboshi, Sayomurasaki		3
	medium	moyenne	mittel	media	Minamiyutaka		5
	strong	forte	stark	fuerte	Beniasobi, Shikibumochi		7
	very strong	très forte	sehr stark	muy fuerte			9
6.	QN	VG B	(a)	40-49			
	Basal leaf sheath: anthocyanin coloration	Gaine de la feuille basale : pigmentation anthocyanique	Basale Blattscheide: Anthocyanfärbung	Vaina de la hoja basal: pigmentación antociánica			
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Koshihikari		1
	weak	faible	gering	débil	Murasakikoboshi, Sayomurasaki		3
	medium	moyenne	mittel	media	Beniasobi		5
	strong	forte	stark	fuerte			7
	very strong	très forte	sehr stark	muy fuerte			9
7.	QN	VG B	(a)	40-49			
	Leaf blade: intensity of green color	Limbe : intensité de la couleur verte	Blattspreite: Intensität der Grünfärbung	Limbo: intensidad del color verde			
	light	claire	hell	clara	Koihonoka		3
	medium	moyenne	mittel	media	Hinohikari, Koshihikari		5
	dark	foncée	dunkel	oscura	Hoshiyutaka, Takanari		7
8. (*)	QN	VG B	(a)	40-49			
	Leaf blade: anthocyanin coloration	Limbe : pigmentation anthocyanique	Blattspreite: Anthocyanfärbung	Limbo: pigmentación antociánica			
	absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Koshihikari		1
	medium	moyenne	mittel	media	Akaneasobi		3
	strong	forte	stark	fuerte			5

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9.	QN	VG B	(+)	(a)	40-49			
	Leaf blade: pubescence		Limbe : pubescence		Blattspreite: Behaarung	Limbo: pubescencia		
	absent or weak		absente ou faible		fehlend oder gering	ausente o débil	Leafstar	1
	medium		moyenne		mittel	media	Koshihikari	3
	strong		forte		stark	fuerte		5
10.	PQ	VG B	(+)	(a)	40-49			
	Ligule: shape		Ligule : forme		Ligula: Form	Lígula: forma		
	truncate		tronquée		stumpf	truncada		1
	acute		aiguë		spitz	aguda	Murasakikoboshi	2
	lobed		lobée		gelappt	lobulada	Onari, Salt star	3
11.	PQ	VG B		(a)	40-49			
	Ligule: color		Ligule : couleur		Ligula: Farbe	Lígula: color		
	white		blanc		weiß	blanco	Koshihikari	1
	green		vert		grün	verde		2
	purple		violet		purpurn	púrpura	Beniasobi, Sayomurasaki	3
12. (*)	QN	MG B	(+)					
	Time of panicle emergence		Époque de l'apparition de la panicule		Zeitpunkt des Rispen-schiebens	Época de emergencia de las panículas		
	early		précoce		früh	temprana	Koshihikari	3
	medium		moyenne		mittel	intermedia	Momiroman	5
	late		tardive		spät	tardía	Leafstar	7
13.	QN	MS B VG B	(+)		60-79			
	Flag leaf: length of blade		Dernière feuille : longueur du limbe		Fahnenblatt: Länge der Spreite	Hoja bandera: longitud del limbo		
	short		courte		kurz	corta	Ouukan 383	3
	medium		moyenne		mittel	media	Hinohikari	5
	long		longue		lang	larga	Tachiaoba	7
14.	QN	MS B VG B	(+)		60-79			
	Flag leaf: width of blade		Dernière feuille : largeur du limbe		Fahnenblatt: Breite der Spreite	Hoja bandera: anchura del limbo		
	narrow		étroite		schmal	estrecha	Ouukan 383	1
	medium		moyenne		mittel	media	Hinohikari	3
	broad		large		breit	ancha	Tachiaoba	5

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15.	QN	VG B		60-89			
	Lemma: pubescence	Glumelle inférieure : pubescence	Deckspelze: Behaarung	Lema: pubescencia			
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Leafstar		1
	weak	faible	gering	débil	Murasakikoboshi		2
	medium	moyenne	mittel	media	Koshihikari		3
	strong	forte	stark	fuerte			4
	very strong	très forte	sehr stark	muy fuerte			5
16. (*)	PQ	VG B		65			
	Stigma: color	Stigmate : couleur	Narbe: Farbe	Estigma: color			
	white	blanc	weiß	blanco	Koshihikari		1
	green	vert	grün	verde			2
	yellow	jaune	gelb	amarillo			3
	purple	violet	purpurn	púrpura	Ouukan 383, Sayomurasaki		4
	black	noir	schwarz	negro	Murasakikoboshi, Shikibumochi		5
17. (*)	QN	MG B/MS B	(+)	70-79			
	Stem: length	Tige : longueur	Halm: Länge	Tallo: longitud			
	very short	très courte	sehr kurz	muy corta			1
	short	courte	kurz	corta	Takanari		3
	medium	moyenne	mittel	media	Hinohikari		5
	long	longue	lang	larga	Koshihikari		7
	very long	très longue	sehr lang	muy larga	Minamiyutaka		9
18. (*)	QN	VG B	(+)	70-79			
	Stem: thickness	Tige : épaisseur	Halm: Dicke	Tallo: grosor			
	thin	fine	dünn	delgado	Murasakikoboshi		3
	medium	moyenne	mittel	medio	Hinohikari, Koshihikari		5
	thick	épaisse	dick	grueso	Hoshiyutaka, Momiroman		7
19.	QN	VG B		70-79			
	Stem: anthocyanin coloration of nodes	Tige : pigmentation anthocyanique des nœuds	Halm: Anthocyanfärbung der Knoten	Tallo: pigmentación antocianica de los nudos			
	absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Koshihikari		1
	medium	moyenne	mittel	media	Sayomurasaki		3
	strong	forte	stark	fuerte	Murasakikoboshi		5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20.	QN	VG B			70-79	
	Stem: anthocyanin coloration of internodes	Tige : pigmentation anthocyanique des entrenœuds	Halm: Anthocyanfärbung der Internodien	Tallo: pigmentación antocianica de los entrenudos		
	absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Koshihikari	1
	medium	moyenne	mittel	media		3
	strong	forte	stark	fuerte	Shikibumochi	5
21.	QN	MS B			70-79	
	Plant: number of panicles	Plante : nombre de panicules	Pflanze: Anzahl Rispen	Planta: número de panículas		
	few	petit	wenige	bajo	Momiroman, Takanari	3
	medium	moyen	mittel	medio	Koshihikari	5
	many	grand	viele	alto	Ouukan 383	7
22. (*)	QN	VG B			70-89	
	Panicle: distribution of awns	Panicule : répartition des arêtes	Rispe: Verteilung der Begrannung	Panícula: distribución de las aristas		
	absent	absente	fehlend	ausentes	Momiroman, Onari	1
	apical quarter	quart apical	am apikalen Viertel	en el cuarto apical	Sari queen	2
	upper half	moitié supérieure	in der oberen Hälfte	en la mitad superior		3
	upper three quarters	trois-quarts supérieurs	an den oberen drei Vierteln	en los tres cuartos superiores	Beniroman	4
	whole length	longueur totale	auf der ganzen Länge	en toda la longitud	Saikaikan 246	5
23.	QN	VG B	(+)		70-89	
	Awns: length	Arêtes : longueur	Grannen: Länge	Arista: longitud		
	very short	très courte	sehr kurz	muy corta	Hinohikari	1
	short	courte	kurz	corta	Koshihikari	2
	medium	moyenne	mittel	media	Benizomemochi, Leafstar	3
	long	longue	lang	larga	Saikaikan 246	4
	very long	très longue	sehr lang	muy larga		5
24. (*)	QN	MS B	(+)		72-92	
	Panicle: length	Panicule : longueur	Rispe: Länge	Panícula: longitud		
	short	courte	kurz	corta	Shikibumochi	3
	medium	moyenne	mittel	media	Koshihikari, Leafstar	5
	long	longue	lang	larga	Momiroman	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25. (*)	PQ	VG B			80-92	
	Lemma: color of tip	Glumelle inférieure : couleur du sommet	Deckspelze: Farbe der Spitze	Lema: color del ápice		
	white	blanc	weiß	blanco	Koshihikari	1
	yellowish	jaunâtre	gelblich	amarillento		2
	red	rouge	rot	rojo	Minamiyutaka	3
	purple	violet	purpurn	púrpura	Murasakikoboshi, Sayomurasaki	4
	brown	brun	braun	marrón	Koshinokaori, Leafstar	5
	black	noir	schwarz	negro		6
26. (*)	QN	VG B	(+)		80-92	
	Flag leaf: attitude of blade	Dernière feuille : port du limbe	Fahnenblatt: Haltung der Spreite	Hoja bandera: porte del limbo		
	erect	dressé	aufrecht	erecto	Leafstar, Minamiyutaka	1
	semi-erect	demi-dressé	halbaufrecht	semierecto	Momiroman, Onari	3
	horizontal	horizontal	waagerecht	horizontal	Murasakikoboshi, Ouukan 383	5
	moderately reflexed	modérément récurvé	mäßig zurückgebogen	moderadamente reflejo		7
	strongly reflexed	fortement récurvé	stark zurückgebogen	muy reflejo		9
27.	QN	VG B			90-92	
	Panicle: density	Panicule : densité	Rispe: Dichte	Panícula: densidad		
	lax	faible	locker	laxa		3
	medium	moyenne	mittel	media	Koshihikari	5
	dense	forte	dicht	densa	Hoshiyutaka, Takanari	7
28. (*)	QN	VG B	(+)		90-92	
	Panicle: attitude	Panicule : port	Rispe: Haltung	Panícula: porte		
	erect	dressé	aufrecht	erecto	Akaneasobi	1
	semi-erect	demi-dressé	halbaufrecht	semierecto	Ouukan 383	2
	semi-drooping	demi-retombant	halbüberhängend	semicolgante	Koshihikari	3
	drooping	retombant	überhängend	colgante		4
29. (*)	QN	VG B	(+)		90-92	
	Panicle: attitude of branches	Panicule : port des ramifications	Rispe: Stellung der Seitenäste	Panícula: porte de las ramificaciones		
	adpressed	appliqué	anliegend	adpreso	Habataki	1
	erect	dressé	aufrecht	erecto	Murasakikoboshi	3
	semi-erect	demi-dressé	halbaufrecht	semierecto		5

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30.	QN	VG B	(+)	90-92			
	Panicle: number of secondary branches	Panicule : nombre de ramifications secondaires	Rispe: Anzahl sekundäre Seitenäste	Panícula: número de ramificaciones secundarias			
	absent or few	nul ou très petit	fehlend oder wenige	ausente o bajo			1
	medium	moyen	mittel	medio	Koshihikari		2
	many	grand	viele	alto	Takanari		3
31.	QN	VG B	(+)	90-92			
	Panicle: exertion	Panicule : déploiement	Rispe: Hervorstehen	Panícula: ejerción			
	enclosed	inclus	eingeschlossen	envuelta			1
	partly exerted	partiellement saillant	teilweise hervorstehend	parcialmente exerta	Tachisuzuka		2
	just exerted	tout juste saillant	gerade noch hervorstehend	apenas exerta	Minamiyutaka		3
	well exerted	bien saillant	deutlich hervorstehend	muy exerta	Koshihikari		4
32. (*)	QN	MG B	(+)				
	Time of maturity	Époque de maturité	Zeitpunkt der Reife	Época de madurez			
	early	précoce	früh	temprana	Koshihikari		3
	medium	moyenne	mittel	intermedia	Asahinoyume		5
	late	tardive	spät	tardía	Leafstar		7
33.	QN	MG B	(+)	90			
	Time of senescence	Époque de sénescence	Zeitpunkt des Alterns	Época de senescencia			
	early	précoce	früh	temprana	Onari		1
	medium	moyenne	mittel	intermedia	Salt star		2
	late	tardive	spät	tardía	Koshihikari		3
34. (*)	PQ	VG B		92			
	Lemma: color	Glumelle inférieure : couleur	Deckspelze: Farbe	Lema: color			
	white	blanc	weiß	blanca	Koshihikari		1
	yellowish	jaunâtre	gelblich	amarillento	Leafstar		2
	red	rouge	rot	rojo			3
	purple	violet	purpurn	púrpura	Ouukan 383, Satsumakuromochi		4
	brown	brun	braun	marrón	Beniasobi		5
	black	noir	schwarz	negro			6

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35.	QN	VG A	(+)		92			
	Lemma: coloration with phenol		Glumelle inférieure : réaction au phénol		Deckspelze: Phenolfärbung	Lema: coloración con fenol		
	absent or very weak		absente ou très faible		fehlend oder sehr gering	ausente o muy débil	Koshihikari, Momiroman	1
	weak		faible		gering	débil		3
	medium		moyenne		mittel	media	Onari, Salt star	5
	strong		forte		stark	fuerte	Ruriaoba	7
	very strong		très forte		sehr stark	muy fuerte		9
36.	QN	VG B	(+)		92			
	Glume: length		Glume : longueur		Hüllspelze: Länge	Gluma: longitud		
	short		courte		kurz	corta	Ruriaoba	1
	medium		moyenne		mittel	media	Koshihikari	2
	long		longue		lang	larga		3
37.	PQ	VG B			92			
	Glume: color		Glume : couleur		Hüllspelze: Farbe	Gluma: color		
	white		blanc		weiß	blanco	Koshihikari	1
	yellowish		jaunâtre		gelblich	amarillento		2
	red		rouge		rot	rojo		3
	purple		violet		purpurn	púrpura	Beniasobi, Ouukan 383	4
	brown		brun		braun	marrón		5
	black		noir		schwarz	negro		6
38. (*)	QN	MG A	(+)	(b)	92			
	Grain: 1000 seed weight		Grain : poids de 1000 grains		Korn: 1000-Kornmasse	Grano: peso de 1.000 semillas		
	low		petit		niedrig	bajo	Beniasobi, Sari queen	3
	medium		moyen		mittel	medio	Koshihikari, Takanari	5
	high		grand		hoch	alto	Momiroman	7
39. (*)	QN	MS A		(b)	92			
	Grain: length		Grain : longueur		Korn: Länge	Grano: longitud		
	short		courte		kurz	corta	Murasakikoboshi	3
	medium		moyenne		mittel	media	Koshihikari	5
	long		longue		lang	larga	Hoshiyutaka, Leafstar	7

	English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
40. (*)	QN	MS A	(b)		92			
	Grain: width	Grain : largeur	Korn: Breite	Grano: anchura				
	narrow	étroite	schmal	estrecha	Hoshiyutaka, Leafstar			1
	medium	moyenne	mittel	media	Koshihikari			3
	broad	large	breit	ancha				5
41. (*)	QN	MS A	(+)	(b)	92			
	Grain: ratio length/width	Grain : rapport longueur/largeur	Korn: Verhältnis Länge/Breite	Grano: relación longitud/anchura				
	low	bas	klein	baja	Akaneasobi			1
	low to medium	bas à moyen	klein bis mittel	baja a media	Koshihikari			2
	medium	moyen	mittel	media	Hoshiyutaka, Leafstar			3
	medium to high	moyen à élevé	mittel bis groß	media a alta				4
	high	élevé	groß	alta				5
42. (*)	PQ	VG A	(b)		92			
	Grain: color	Grain : couleur	Korn: Farbe	Grano: color				
	white	blanc	weiß	blanco	Ruriaoba			1
	red	rouge	rot	rojo	Benizomemochi			2
	brown red	rouge-brun	braunrot	rojo amarronado	Beniroman			3
	purple	violet	purpurn	púrpura				4
	light brown	brun clair	hellbraun	marrón claro	Koshihikari, Takanari			5
	dark brown	brun foncé	dunkelbraun	marrón oscuro	Leafstar			6
	black	noir	schwarz	negro	Murasakikoboshi, Sayomurasaki			7
43.	QN	MG A	(+)	(b)	92			
	Grain: alkali digestion	Grain : digestion par des alcalis	Korn: Zersetzung durch Alkali	Grano: digestión alcalina				
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Koshinokaori			1
	weak	faible	gering	débil	Murasakikoboshi, Ouukan 383			2
	moderate	modérée	mäßig	moderada	Salt star			3
	strong	forte	stark	fuerte	Koshihikari			4
44. (*)	QN	VG A	(+)	(b)	92			
	Grain: aroma	Grain : arôme	Korn: Aroma	Grano: aroma				
	absent or weak	absent ou faible	fehlend oder gering	ausente o débil	Koshihikari			1
	medium	moyen	mittel	medio	Sari queen			2
	strong	fort	stark	fuerte				3

8. Explanations on the Table of Characteristics

8.1 *Explanations covering several characteristics*

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

- (a) Observations should be made on the penultimate leaf.
- (b) Observations should be made after removal of husks.

8.2 *Explanations for individual characteristics*

Ad. 1: 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. 2: Endosperm: content of amylose

The amylose content of endosperm should be determined using the iodine color reaction according to ISO 6647.

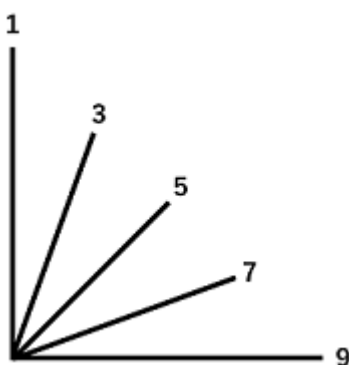
The absorbance of the amylose-iodine complex of endosperm starch formed by the iodine color reaction should be measured using a spectrophotometer.

The amylose mass fraction of the sample should be read from a calibration graph, which is prepared using mixtures of potato amylose and amylopectin to allow for the effect of amylopectin on the color of the amylose-iodine complex.

Ad. 3: 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 degrees. The color of the coleoptiles is observed when they are fully developed at stage 09-11 (about 6 to 7 days).

Ad. 4: Plant: growth habit



- 1 = erect
- 3 = semi-erect
- 5 = intermediate
- 7 = semi-prostrate
- 9 = prostrate

Ad. 9: Leaf blade: pubescence

Observations should be made on the upper side of the blade.

Ad. 10: Ligule: shape



1
truncate



2
acute



3
lobed

Ad. 12: Time of panicle emergence

Time of panicle emergence is reached when the first spikelet is visible on 50% of panicles.

Ad. 13: Flag leaf: length of blade

Length and width should be assessed on the same leaf blade. Length should be measured from the tip to the base. Width should be measured at the widest part.

Ad. 14: Flag leaf: width of blade

See Ad. 13

Ad. 17: Stem: length

Measurements should be made from the base of plant to the panicle base on the longest stem, excluding deep water rice.

Ad. 18: Stem: thickness

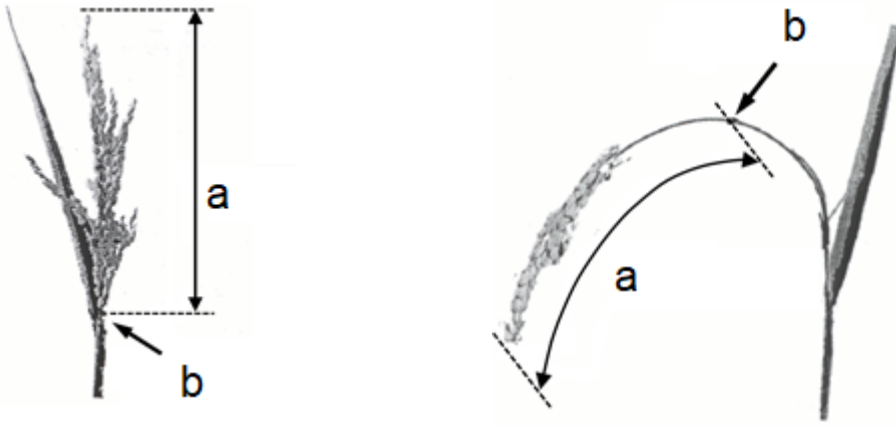
Observations should be made at the basal internode of the longest stem.

Ad. 23: Awns: length

Observations should be made on the longest awn in the panicle.

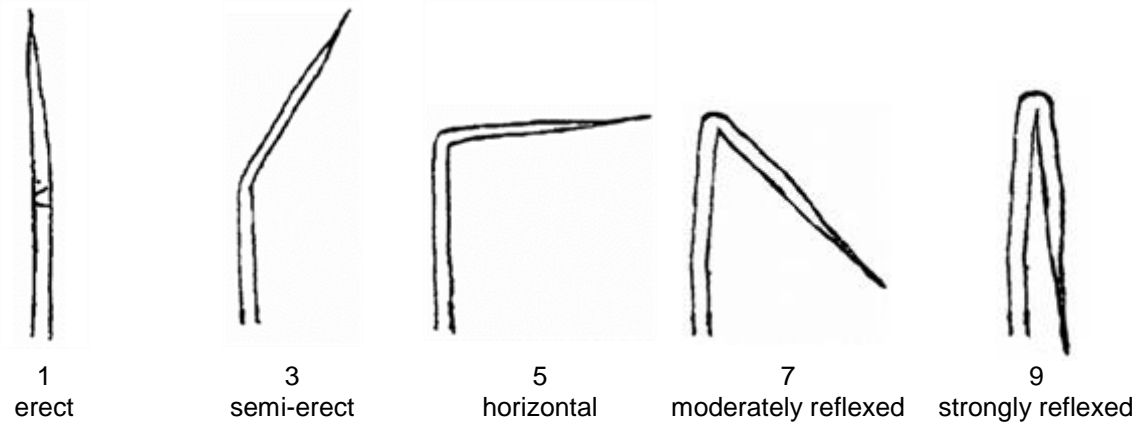
Ad. 24: Panicle: length

Length of panicle should be observed from panicle base to the top excluding awns.



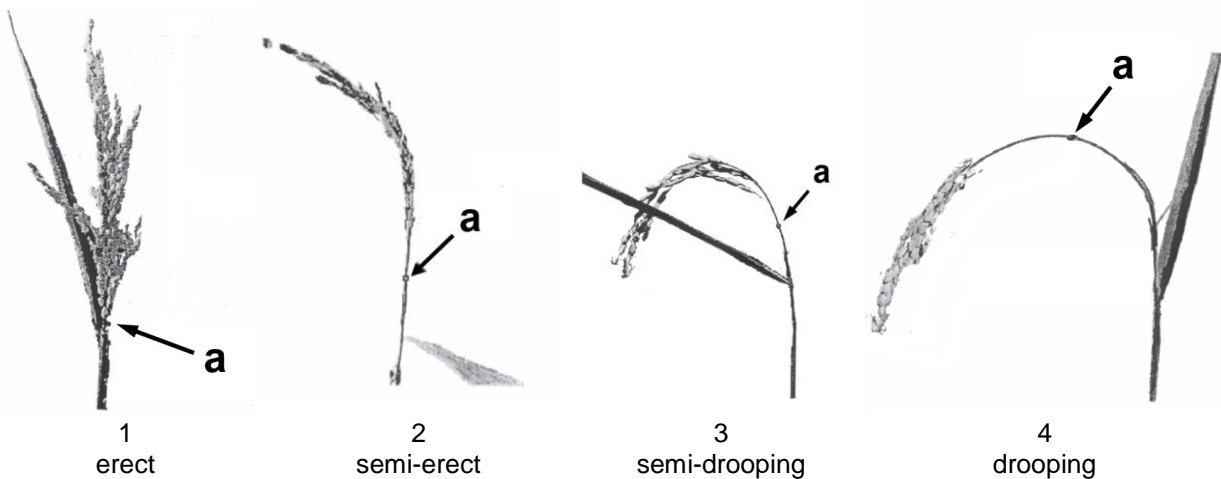
a = Length
 b = Panicle base

Ad. 26: Flag leaf: attitude of blade



1 erect 3 semi-erect 5 horizontal 7 moderately reflexed 9 strongly reflexed

Ad. 28: Panicle: attitude

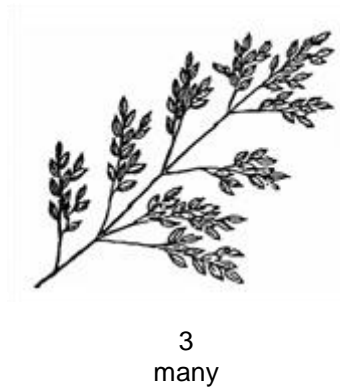
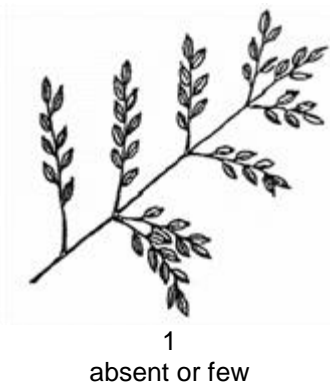


a = Panicle base

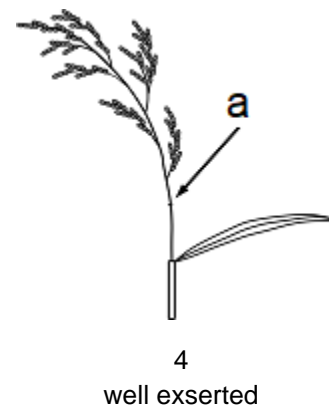
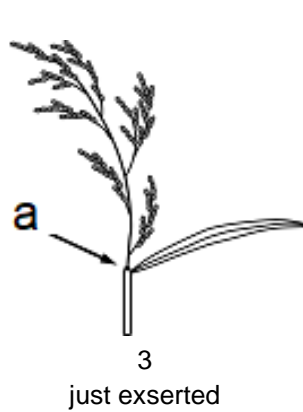
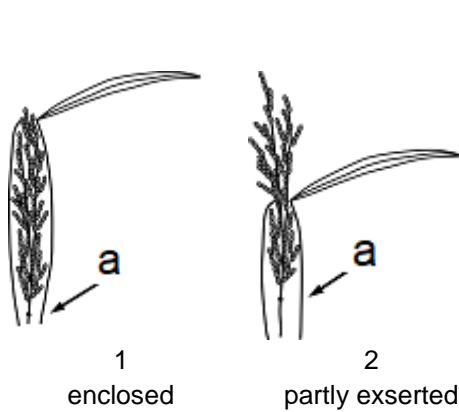
Ad. 29: Panicle: attitude of branches



Ad. 30: Panicle: number of secondary branches



Ad. 31: Panicle: exertion



a = Panicle base

Ad. 32: Time of maturity

Time of maturity is reached when 80% of the grains in a panicle can no longer be dented by thumbnail.

Ad. 33: Time of senescence

- 1 – early: All leaves are dead.
- 2 – medium: One leaf is still green.
- 3 – late: More than one leaf is still green.

Ad. 35: Lemma: coloration with phenol

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

Ad. 36: Glume: length

Measurements should be made on the longest glume.

Ad. 38: Grain: 1000 seed weight

Measurements should be calculated at 14% moisture.

Ad. 41: Grain: ratio length/width

- 1 - low: < 1.50
- 2 - low to medium: 1.50-1.99
- 3 - medium: 2.00-2.49
- 4 - medium to high: 2.50-2.99
- 5 - high: > 2.99

Ad. 43: Grain: alkali digestion

Put 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 - absent or very weak: Rice grains are not affected.
- 2 - weak: Only the margin of the grains are dissolved.
- 3 - moderate: Shape of grains become unclear, but incompletely dissolved.
- 4 - strong: No margin is identified between the core part and the outer skirt.

Ad. 44: Grain: aroma

The main component of the aroma in rice is the 2-acetyl-1-pyrroline (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.

8.3 Decimal code for the growth stage codes of cereals

	<u>Germination</u>		<u>Inflorescence emergence</u>
00	Dry seed	50	-
01	Start of imbibition	51	First spikelet of inflorescence just visible
02	-	52	20% of inflorescence emerged
03	Imbibition complete	53	30% of inflorescence emerged
04	-	54	40% of inflorescence emerged
05	Radicle emerged from caryopsis	55	50% of inflorescence emerged
06	-	56	60% of inflorescence emerged
07	Coleoptile emerged from caryopsis	57	70% of inflorescence emerged
08	-	58	80% of inflorescence emerged
09	Leaf just at coleoptile tip	59	Emergence of inflorescence completed
	<u>Seedling growth</u>		<u>Anthesis</u>
10	First leaf through coleoptile	60	-
11	First leaf unfolded	61	Beginning of anthesis
12	2 leaves unfolded	62	-
13	3 leaves unfolded	63	-
14	4 leaves unfolded	64	-
15	5 leaves unfolded	65	Anthesis half-way
16	6 leaves unfolded	66	-
17	7 leaves unfolded	67	-
18	8 leaves unfolded	68	-
19	9 or more leaves unfolded	69	Anthesis complete
	<u>Germination</u>		<u>Milk development</u>
20	Main shoot only	70	-
21	Main shoot and 1 tiller	71	Caryopsis watery ripe
22	Main shoot and 2 tillers	72	-
23	Main shoot and 3 tillers	73	Early milk
24	Main shoot and 4 tillers	74	-
25	Main shoot and 5 tillers	75	Medium milk
26	Main shoot and 6 tillers	76	-
27	Main shoot and 7 tillers	77	Late milk
28	Main shoot and 8 tillers	78	-
29	Main shoot and 9 or more tillers	79	-
	<u>Stem elongation</u>		<u>Dough development</u>
30	Pseudo stem erection ⁽¹⁾	80	-
31	1st node detectable	81	-
32	2nd node detectable	82	-
33	3rd node detectable	83	Early dough
34	4th node detectable	84	-
35	5th node detectable	85	Soft dough
36	6th node detectable	86	-
37	Flag leaf just visible	87	Hard dough
38	-	88	-
39	Flag leaf ligule/collar just visible	89	-
	<u>Booting</u>		<u>Ripening</u>
40	-	90	-
41	Flag leaf sheath extending	91	Caryopsis hard (difficult to divide by thumbnail) ⁽²⁾
42	-	92	Caryopsis hard (can no longer be dented by thumbnail) ^{(3) (4)}
43	Boots just visibly swollen		
44	-	93	Caryopsis loosening in daytime
45	Boots swollen	94	Over-ripe, straw dead and collapsing
46	-		
47	Flag leaf sheath opening		<u>Ripening (continued)</u>
48	-	95	Seed dormant
49	First awns visible	96	Viable seed giving 50% germination
		97	Seed not dormant
		98	Secondary dormancy induced
		99	Secondary dormancy lost

Notes on the table

⁽¹⁾ Only applicable to cereals with a prostrate or semi-prostrate early growth habit.

⁽²⁾ Ripeness for binder (ca. 16% water content). Chlorophyll of inflorescence largely lost.

⁽³⁾ Ripeness for combine harvester (< 16% water content).

⁽⁴⁾ Optimum harvest time.

9. Literature

Matsuo, T. (edit.), 1993-97: Science of the Rice Plant. Nisan 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	<input type="text" value="Oryza sativa L."/>
1.2	Common name	<input type="text" value="Rice"/>
2. Applicant		
	Name	<input type="text"/>
	Address	<input type="text"/>
	Telephone No.	<input type="text"/>
	Fax No.	<input type="text"/>
	E-mail address	<input type="text"/>
	Breeder (if different from applicant)	<input type="text"/>
3. Proposed denomination and breeder's reference		
	Proposed denomination (if available)	<input type="text"/>
	Breeder's reference	<input type="text"/>

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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#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 variety)

(.....) 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.

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Self-pollination []

(b) Hybrid []

(c) 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:
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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 Endosperm: type (1)		
glutinous	Ruriaoba, Sayomurasaki	1 []
intermediate	Milky Summer	2 []
non-glutinous	Koshihikari, Takanari	3 []
5.2 Leaf blade: anthocyanin coloration (8)		
absent or weak	Koshihikari	1 []
weak to medium		2 []
medium	Akaneasobi	3 []
medium to strong		4 []
strong		5 []
5.3 Time of panicle emergence (12)		
very early		1 []
very early to early		2 []
early	Koshihikari	3 []
early to medium		4 []
medium	Momiroman	5 []
medium to late		6 []
late	Leafstar	7 []
late to very late		8 []
very late		9 []
5.4 Stem: length (17)		
very short		1 []
very short to short		2 []
short	Takanari	3 []
short to medium		4 []
medium	Hinohikari	5 []
medium to long		6 []
long	Koshihikari	7 []
long to very long		8 []
very long	Minamiyutaka	9 []

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
5.5 Lemma: color of tip (25)		
white	Koshihikari	1 []
yellowish		2 []
red	Minamiyutaka	3 []
purple	Murasakikoboshi, Sayomurasaki	4 []
brown	Koshinokaori, Leafstar	5 []
black		6 []
5.6 Grain: ratio length/width (41)		
low	Akaneasobi	1 []
low to medium	Koshihikari	2 []
medium	Hoshiyutaka, Leafstar	3 []
medium to high		4 []
high		5 []
5.7 Grain: color (42)		
white	Ruriaoba	1 []
red	Benizomemochi	2 []
brown red	Beniroman	3 []
purple		4 []
light brown	Koshihikari, Takanari	5 []
dark brown	Leafstar	6 []
black	Murasakikoboshi, Sayomurasaki	7 []

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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
<i>Example</i>	<i>Panicle: length</i>	<i>long</i>	<i>short to medium</i>
Comments:			

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#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.

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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]