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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

RYE

UPOV Code(s):

SECAL_CER

Secale cereale L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Germany
to be considered by the
Technical Working Party for Agricultural Crops
at its forty-eighth session, to be held in Montevideo, Uruguay,
from 2019-09-16 to 2019-09-20

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Secale cereale L.	Rye	Seigle	Roggen	Centeno

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 *Secale cereale* 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.

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

Open-pollinated and hybrid varieties: 5 kg
Parental components: 1.5 kg

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

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

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

3. Method of Examination

3.1 Number of Growing Cycles

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

3.2 Testing Place

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

3.3 Conditions for Conducting the Examination

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

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

3.3.3 The recommended type of plot in which to observe the characteristic is indicated by the following key in the Table of Characteristics:

A: Single spaced plants
B: Drill plots

3.3.4 For characteristics indicated by A, in case of inbred lines and single crosses from inbred lines, uniformity should be assessed on drill plots (see chapter 4.2)

3.4 Test Design

3.4.1 Open pollinated varieties, hybrid varieties and synthetic varieties: Each test should be designed to result in a total of at least 60 single spaced plants (A), which should be divided between at least 2 replicates. In addition, the test should include at least 300 plants in a drill plot (B).

Inbred lines and single crosses from inbred lines: Each test should be designed to result in a total of at least 20 single spaced plants (A). In addition, the test should include at least 600 plants in drill plots which should be divided between at least 2 replicates (B).

3.4.2 The assessment of the characteristic "Seasonal type" should be carried out on at least 300 plants.

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.

3.5 Additional Tests

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

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

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

4.1.2 Consistent Differences

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

4.1.3 Clear Differences

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

4.1.4 Number of Plants or Parts of Plants to be Examined

Open pollinated varieties, hybrid varieties and synthetic varieties: Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 60 plants or parts of plants taken from each of 60 plants and any other observations made on all plants in the test. In the case of observations of parts of plants, the number of parts to be taken from each of the plants should be 1.

Inbred lines and single crosses from inbred lines: 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 of 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, observation on a group of plants (MG, VG) always refers to inbred lines and hybrids from inbred line and observation on single plants (MS, VS) refers to open pollinated varieties, hybrid varieties and synthetic varieties.

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 [to be completed] varieties. For varieties with other types of propagation the recommandation 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 open pollinated, hybrid varieties other than single crosses from inbred lines and synthetic varieties should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.2.4 For the assessment of uniformity for inbred lines and single crosses from inbred lines a population standard of 0.5 % and an acceptance probability of at least 95% should be applied. In the case of a sample size of 600 plants, 6 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) Grain: color of aleurone layer (characteristic 1)
(b) Seasonal type (characteristic 21)

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.

The varieties are indicated as follows:
(s) - spring rye
(w) - winter rye

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) 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.	**(*)**	**QL VG**	**(+)**	**00**			
		Grain: color of aleurone layer					
		light				(w) Helltop	1
		dark				(s) Arantes, (w) Bonfire	2
2.		**QN VG**	**(+)**	**00**			
		Grain: coloration with phenol	**Grain: coloration au phénol**	**Korn: Phenolfärbung**	**Grano: coloración al fenol**		
		absent or very light	nulle ou très clair	fehlend oder sehr hell	ausente o muy claro		1
		light	claire	hell	claro		3
		medium	moyenne	mittel	medio	(s) Tiroler, (w) Gonello	5
		dark	foncée	dunkel	oscuro	(s) Arantes, (w) Marcelo	7
		very dark	très foncée	sehr dunkel	muy oscuro	(w) SU Stakkato	9
3.	**(*)**	**QN VG**	**(+)**	**10-11**			
		Coleoptile: anthocyanin coloration					
		absent or very weak				(w) Helltop	1
		weak					3
		medium				(w) Tonus	5
		strong				(s) Ovid, (w) Turbogreen	7
		very strong					9
4.		**QN MS|A**	**(a)**	**12-13**			
		Coleoptile: length	**Coléoptile: longueur**	**Keimscheide: Länge**	**Coleóptilo: longitud**		
		very short	très courte	sehr kurz	muy corto		1
		short	courte	kurz	corto	(w) Dukato	3
		medium	moyenne	mittel	medio	(s) Arantes, (w) Tonus	5
		long	longue	lang	largo	(w) Jobaro	7
		very long	très longue	sehr lang	muy largo		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.	**QN MS|A**	**(a)**	**12-13**			
	First leaf: length of sheath	**Première feuille: longueur de la gaine**	**Erstes Blatt: Länge der Blattscheide**	**Primera hoja: longitud de la vaina**		
	very short	très courte	sehr kurz	muy corta		1
	short	courte	kurz	corta		3
	medium	moyenne	mittel	media	(s) Arantes, (w) Marcelo	5
	long	longue	lang	larga	(w) Jobaro	7
	very long	très longue	sehr lang	muy larga		9
6.	**QN MS|A**	**(a)**	**12-13**			
	First leaf: length of blade	**Première feuille: longueur du limbe**	**Erstes Blatt: Länge der Blattspreite**	**Primera hoja: longitud del limbo**		
	very short	très courte	sehr kurz	muy corto		1
	short	courte	kurz	corto	(w) Guttino	3
	medium	moyenne	mittel	medio	(w) Marcelo	5
	long	longue	lang	largo	(w) Turbogreen	7
	very long	très longue	sehr lang	muy largo		9
7. **(*)**	**QN VG|B/VS|A**	**(+)**	**25-29**			
	Plant: growth habit	**Plante: port**	**Pflanze: Wuchsform**	**Planta: porte**		
	erect	dressé	aufrecht	erecto		1
	semi-erect	demi-dressé	halbaufrecht	semierecto		3
	intermediate	demi-dressé à demi-étalé	mittel	intermedio	(s) Tiroler, (w) Turbogreen	5
	semi-prostrate	demi-étalé	halbliegend	semipostrado	(w) Guttino	7
	prostrate	étalé	liegend	postrado		9
8. **(*)**	**QN MG|B/MS|A**	**(+)**				
	Time of ear emersgence	**Époque d'épiaison**	**Zeitpunkt des Ährenschiebens**	**Fecha del espigado**		
	very early	très précoce	sehr früh	muy precoz	(w) Bonfire	1
	early	précoce	früh	precoz	(w) Turbogreen	3
	medium	moyenne	mittel	media	(w) Jobaro	5
	late	tardive	spät	tardía	(w) Beskyd	7
	very late	très tardive	sehr spät	muy tardía	(w) Tonus	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9.	**(*)**	**QN** **VG|B**	**(+)**	**54-58**			
		Flag leaf: glaucosity of sheath	**Dernière feuille: glaucescence de la gaine**	**Oberstes Blatt: Bereifung der Blattscheide**	**Ultima hoja: glauescencia de la vaina**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy baja		1
		weak	faible	gering	baja	(w) Bonfire	3
		medium	moyenne	mittel	media	(w) Helltop	5
		strong	forte	stark	alta	(w) SU Stakkato	7
		very strong	très forte	sehr stark	muy alta		9
10.		**QN** **MS|A**		**60-69**			
		Leaf next to flag leaf: length of blade	**Avant-dernière feuille: longueur du limbe**	**Zweitoberstes Blatt: Länge der Spreite**	**Penúltima hoja: longitud del limbo**		
		very short	très court	sehr kurz	muy corta		1
		short	court	kurz	corta	(w) Guttino	3
		medium	moyen	mittel	media	(w) Helltop	5
		long	long	lang	larga	(w) Turbogreen	7
		very long	très long	sehr lang	muy larga		9
11.		**QN** **MS|A**		**60-69**			
		Leaf next to flag leaf: width of blade	**Avant-dernière feuille: largeur du limbe**	**Zweitoberstes Blatt: Breite der Blattspreite**	**Penúltima hoja: anchura del limbo**		
		very narrow	très étroit	sehr schmal	muy estrecho		1
		narrow	étroit	schmal	estrecho	(w) Tonus	3
		medium	moyen	mittel	medio	(w) Marcelo	5
		broad	large	breit	ancho	(w) Virgiai	7
		very broad	très large	sehr breit	muy ancho		9
12.	**(*)**	**QN** **VG|B/VS|A**		**69-75**			
		Ear: glaucosity	**Épi: glaucescence**	**Ähre: Bereifung**	**Espiga: glauescencia**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy baja		1
		weak	faible	gering	baja	(w) Tonus	3
		medium	moyenne	mittel	media	(s) Tiroler, (w) Marcelo	5
		strong	forte	stark	alta		7
		very strong	très forte	sehr stark	muy alta		9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13.	**(*)**	**QN VG|B/VS|A**	**(+)**	**70-85**			
		Stem: hairiness below ear	**Tige: pilosité au-dessous de l'épi**	**Halm: Behaarung unterhalb der Ähre**	**Tallo: vellosidad bajo la espiga**		
		absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy baja		1
		weak	faible	gering	baja	(w) Guttino	3
		medium	moyenne	mittel	media	(w) Tonus	5
		strong	forte	stark	alta	(w) KWS Dolaro	7
		very strong	très forte	sehr stark	muy alta		9
14.	**(*)**	**QN MS|A**	**(+)**	**80-92**			
		Plant: length					
		very short					1
		short				(w) Guttino	3
		medium				(s) Ovid, (w) Marcelo	5
		long				(w) Jobaro	7
		very long				(w) Bonfire	9
15.		**QN MS|A**		**80-92**			
		Stem: length between upper node and ear	**Tige: longueur entre le dernier nœud et l'épi**	**Halm: Länge zwischen oberstem Knoten und Ähre**	**Tallo: longitud entre el nudo superior y la espiga**		
		very short	très court	sehr kurz	muy corto		1
		short	court	kurz	corto	(w) Gonello	3
		medium	moyen	mittel	medio	(w) Marcelo	5
		long	long	lang	largo	(w) Beskyd	7
		very long	très long	sehr lang	muy largo	(w) Turbogreen	9
16.	**(*)**	**QN MS|A**	**(+)**	**80-92**			
		Ear: length					
		very short					1
		short				(s) Arantes, (w) Brandie	3
		medium				(w) Turbogreen	5
		long				(s) Tiroler, (w) Tonus	7
		very long					9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17.	**(*)**	**QN MS|A**	**(+)**	**80-92**			
		Ear: density	**Épi: compacité**	**Ähre: Dichte**	**Espiga: densidad**		
		very lax	très lâche	sehr locker	muy laxa		1
		lax	lâche	locker	laxa	(w) Bonfire	3
		medium	demi-lâche à demi-compact	mittel	media	(s) Ovid, (w) Gonello	5
		dense	compact	dicht	densa	(w) Helltop	7
		very dense	très compact	sehr dicht	muy densa		9
18.		**QN VG|B/VS|A**	**(+)**	**90-92**			
		Ear: attitude	**Épi: port**	**Ähre: Haltung**	**Espiga: porte**		
		erect	droit	aufrecht	erecto		1
		semi-erect	légèrement incurvé	geneigt	semierecto		3
		horizontal	demi-incurvé	waagerecht	horizontal	(w) Beskyd	5
		semi-recurved	incurvé	überhängend	colgante	(w) Helltop	7
		recurved	très incurvé	stark überhängend	muy colgante		9
19.	**(*)**	**QN MG|B**	**(+)**	**92**			
		Grain: weight per thousand grains	**Grain: poids de mille grains**	**Korn: Tausendkorngewicht**	**Grano: peso de mil granos**		
		very small	très faible	sehr niedrig	muy bajo		1
		small	faible	niedrig	bajo	(w) Tonus	3
		medium	moyen	mittel	medio	(w) Turbogreen	5
		large	élevé	hoch	alto	(w) Jobaro	7
		very large	très élevé	sehr hoch	muy alto		9
20.	**(*)**	**QN MS|B**	**(+)**	**92**			
		Grain: length	**Grain: longueur**	**Korn: Länge**	**Grano: longitud**		
		very short	très court	sehr kurz	muy corto		1
		short	court	kurz	corto	(w) Tonus	3
		medium	moyen	mittel	medio	(s) Arantes, (w) Gonello	5
		long	long	lang	largo	(w) Jobaro	7
		very long	très long	sehr lang	muy largo		9
21.	**(*)**	**PQ VG**					
		Seasonal type	**Type de développement**	**Wechselverhalten**	**Tipo de desarrollo**		
		winter	hiver	Winterform	invierno	(w) SU Stakkato	1
		alternative	alternatif	Wechselform	alternativo		2
		spring	printemps	Sommerform	primavera	(s) Arantes	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) 3 x 24 seeds are sown in multipot plates with standard soil in 1 cm sowing depth. The plants are produced in the greenhouse at 20 ºC and with additional light for 12 hours per day for 12 days. 20 plants per replicate are measured.

8.2 Explanations for individual characteristics

Ad. 1: Grain: color of aleurone layer

The observation should be made on a sample of 100 seeds.

Ad. 2: Grain: coloration with phenol

Number of grains per test:	100 The grains should not have been treated chemically
Preparation of grains:	Soak in tap water for 16 to 20 hours, drain and remove surface water, place the grains with crease downwards, cover dish with lid
Concentration of solution:	1% Phenol-solution (freshly made up)
Amount of solution:	2 ml in a petri-dish on filter paper
Place:	Laboratory
Light:	Daylight, out of direct sunshine
Temperature:	18 to 20º C
Time of recording:	4 hours after adding solution
Scale of recording:	See chapter 7. Table of Characteristics
Note:	At least two of the example varieties should be included as a control

Ad. 3: Coleoptile: anthocyanin coloration

Number of seeds per test: 100

Preparation of seeds: Set up non-dormant seeds on moistened filter paper covered with a Petri dish lid during germination

Place: Laboratory or greenhouse

Temparature and light: When the coleoptiles have reached a length of about 1 cm at 15 to 16 oC in the dark, they are placed in continous light (daylight equivalent) of 13000 to 15000 lux at 18 to 19oCfor 4 days

Time of recording: Coleoptiles fully developed, growth stage 09-11

Note: At least two example varieties should be included as a control

Any alternative method may be used if it gives the same results

Ad. 7: Plant: growth habit

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

Ad. 8: Time of ear emergence

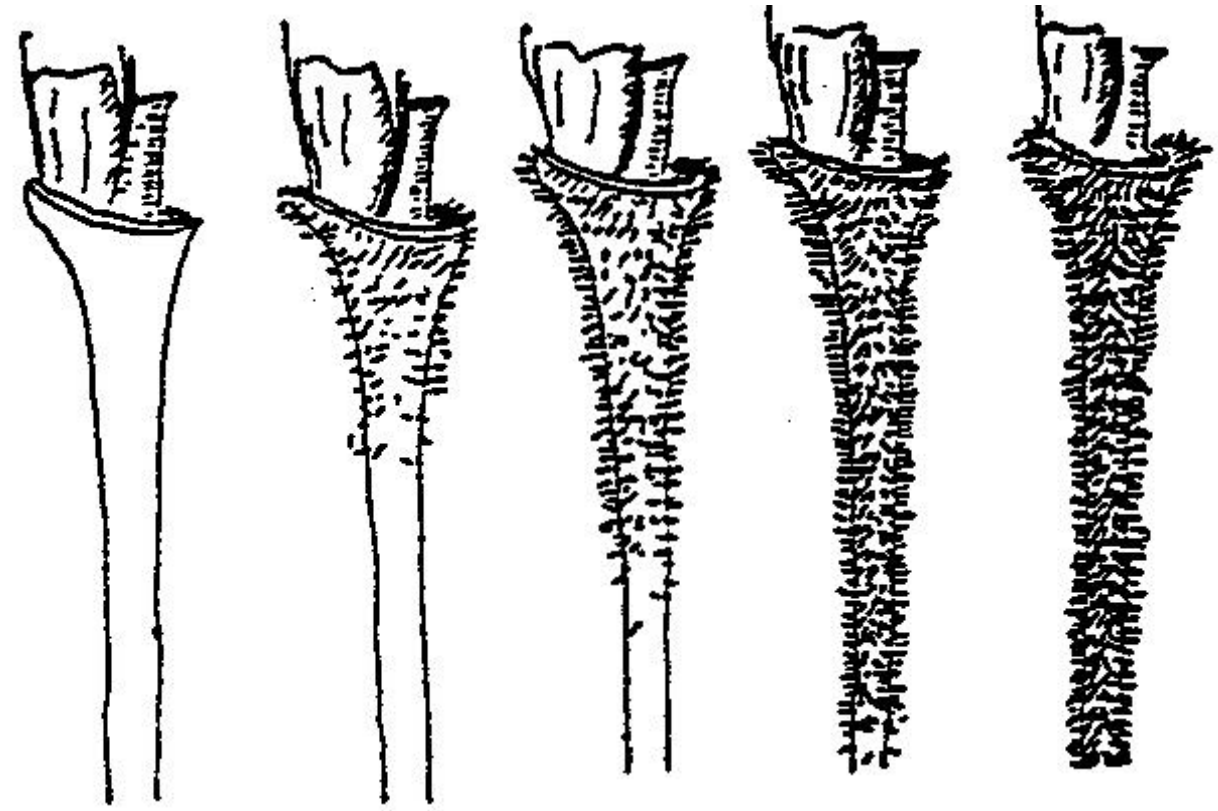
Open pollinated varieties, hybrid varieties and synthetic varieties (MS/A):
The number of plants which have reached stage 52 of the EUCARPIA Decimal Code for the Growth Stages of Cereals should be recorded at two-day intervals. From these data the average time of ear emergence of the variety should be calculated.

Inbred lines and single crosses from inbred lines (MG/B):
Time of ear emergance is reached when 50 % of the plants have reached stage 52 of the EUCARPIA Decimal Code for the Growth Stages of Cereals.

Ad. 9: Flag leaf: glaucosity of sheath

The observation should be done on the upper third of the sheath.

Ad. 13: Stem: hairiness below ear



1	3	5	7	9
absent or very weak	weak	medium	strong	very strong

Ad. 14: Plant: length

Plant length should be measured including stem, ear and awns.

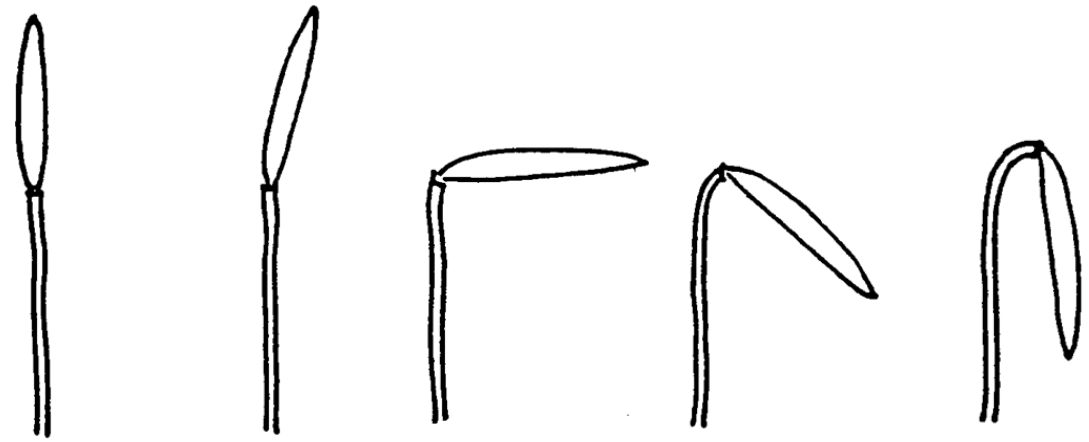
Ad. 16: Ear: length

Ear length should be measured without awns.

Ad. 17: Ear: density

Ear density is the number of rachis segments devided by length of ear.

Ad. 18: Ear: attitude



1	3	5	7	9
erect	semi-erect	horizontal	semi-recurved	recurved

Ad. 19: Grain: weight per thousand grains

Thousand grain weight and grain length should be assessed in a harvested bunch from a drill plot (about 80 to 100 ears).

Ad. 20: Grain: length

See Ad. 19

8.3 Descriptions of the growth stages of the Zadoks decimal code for cereals (ZADOKS et al., 1974)

Zadoks Decimal code	Description
	Germination
00	Dry seed
01	Start of imbibition
03	Imbibition complete
05	Radicle emerged from seed
07	Coleoptile emerged from seed
09	Leaf just at coleoptile tip
	Seedling growth
10	First leaf through coleoptile
11	First leaf unfolded
12	2 leaves unfolded
13	3 leaves unfolded
14	4 leaves unfolded
15	5 leaves unfolded
16	6 leaves unfolded
17	7 leaves unfolded
18	8 leaves unfolded
19	9 or more leaves unfolded
	Tillering
20	Main shoot only
21	Main shoot only and 1 tiller
22	Main shoot only and 2 tillers
23	Main shoot only and 3 tillers
24	Main shoot only and 4 tillers
25	Main shoot only and 5 tillers
26	Main shoot only and 6 tillers
27	Main shoot only and 7 tillers
28	Main shoot only and 8 tillers
29	Main shoot only and 9 or more tillers
	Stem elongation
30	Pseudo stem erection
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
39	Flag leaf ligule/collar just visible
	Booting
41	Flag leaf sheath extending
43	Boots just visibly swollen
45	Boots swollen
47	Flag leaf sheath opening
49	First awn visible
	Inflorescence emergence
51	First spikelet of inflorescence visible
52	-
53	¼ of inflorescence emerged
54	-
55	½ of inflorescence emerged
57	¾ of inflorescence emerged
58	-
59	Emergence of inflorescence completed

	Anthesis
60	-
61	Beginning of anthesis
65	Anthesis half-way
69	Anthesis completed
	Milk development
70	-
71	Caryopsis watery ripe
73	Early milk
75	Medium milk
77	Late milk
	Dough development
80	-
83	Early dough
85	Soft dough
87	Hard dough
	Ripening
91	Caryopsis hard (difficult to divide with thumbnail)
92	Caryopsis hard (no longer dented with thumbnail)
93	Caryopsis loosening in daytime
94	Overripe, straw dead and collapsing
95	Seed dormant
96	Viable seed giving 50% germination
97	Seed not dormant
98	Secondary dormancy induced
99	Secondary dormancy lost

9. Literature

ZADOKS, J. C., CHANG, T. T. and KONZAK, C. F., 1974. A decimal code for the growth stages of cereals. Weed Research, 14: 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	*Secale cereale* L.
1.2	Common name	Rye

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 [ ]

(b) partially known cross [ ]
(please state known parent variety(ies))

(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

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

4.1.4 Other [ ]
(Please provide details)

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) open pollinated variety [ ]
(b) inbred line [ ]
(c) single hybrid [ ]
(d) three-way hybrid [ ]
(e) double hybrid [ ]
(f) top-cross hybrid [ ]
(g) synthetic variety [ ]
(h) other (please specify) [ ]

.....

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 (1)	**Grain: color of aleurone layer**		
	light	(w) Helltop	1 [ ]
	dark	(s) Arantes, (w) Bonfire	2 [ ]
5.2 (3)	**Coleoptile: anthocyanin coloration**		
	absent or very weak	(w) Helltop	1 [ ]
	weak		3 [ ]
	medium	(w) Tonus	5 [ ]
	strong	(s) Ovid, (w) Turbogreen	7 [ ]
	very strong		9 [ ]
5.3 (8)	**Time of ear emer-gence**		
	very early	(w) Bonfire	1 [ ]
	early	(w) Turbogreen	3 [ ]
	medium	(w) Jobaro	5 [ ]
	late	(w) Beskyd	7 [ ]
	very late	(w) Tonus	9 [ ]
5.4 (13)	**Stem: hairiness below ear**		
	absent or very weak		1 [ ]
	weak	(w) Guttino	3 [ ]
	medium	(w) Tonus	5 [ ]
	strong	(w) KWS Dolaro	7 [ ]
	very strong		9 [ ]
5.5 (14)	**Plant: length**		
	very short		1 [ ]
	short	(w) Guttino	3 [ ]
	medium	(s) Ovid, (w) Marcelo	5 [ ]
	long	(w) Jobaro	7 [ ]
	very long	(w) Bonfire	9 [ ]
5.6 (21)	**Seasonal type**		
	winter	(w) SU Stakkato	1 [ ]
	alternative		2 [ ]
	spring	(s) Arantes	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	*Time of ear emergence*	*4*	*7*

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

7.3.1 Ploidie
diploid [ ]
tetraploid [ ]

7.3.2 Other

.....

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]