

UPOV

TG/4/8(proj.2)

ORIGINAL: English

DATE: 2005-09-28

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

RYEGRASS *

UPOV code: LOLIU_PER
 LOLIU_MUL_ITA
 LOLIU_MUL_WES
 LOLIU_BOU
 [LOLIU_RIG]
 (Lolium spp.)

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Prepared by an expert from the United Kingdom

to be considered by the

*Technical Working Party for Agricultural Crops at its thirty-fourth session
 to be held in Christchurch, New Zealand, from October 31 to November 4, 2005*

Alternative Names:*

<i>Latin</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Lolium perenne</i> L.	Perennial ryegrass	Ray-grass anglais	Deutsches Weidelgras	Ballico perenne, Raygrás inglés
<i>Lolium multiflorum</i> Lam. <i>ssp. italicum</i> (A. Br.) Volkart; <i>Lolium multiflorum</i> Lam. <i>ssp. non alternativum</i> .	Italian ryegrass	Ray-grass d'Italie	Italienisches Raygras	Ballico italiano, Raygrás italiano
<i>Lolium multiflorum</i> Lam. <i>var.</i> <i>westerwoldicum</i> Wittm; <i>Lolium</i> <i>multiflorum</i> Lam. <i>ssp. alternativum</i> .	Westerwolds ryegrass	Ray-grass de Westerwold	Welsches Weidelgras	Raigrás de Westerwold
<i>Lolium boucheanum</i> Kunth; <i>Lolium x</i> <i>hybridum</i> Hausskn..	Hybrid ryegrass	Ray-grass hybride	Bastardweidelgras, Oldenburgisches Weidelgras	Ballico híbrido, Raygrás híbrido
[<i>Lolium rigidum</i> Gaudin.]	[Stiff darnel, Wimmera ryegrass]	[Ivraie raide]	[Steifre Lolch]	[Raygrás rígido]

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 guidelines ("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.]

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
1. SUBJECT OF THESE TEST GUIDELINES.....	3
2. MATERIAL REQUIRED.....	3
3. METHOD OF EXAMINATION.....	3
3.1 Number of Growing Cycles.....	3
3.2 Testing Place	3
3.3 Conditions for Conducting the Examination	3
3.4 Test Design.....	4
3.5 Number of Plants / Parts of Plants to be Examined	4
3.6 Additional Tests.....	4
4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY	4
4.1 Distinctness.....	4
4.2 Uniformity	5
4.3 Stability	5
5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL.....	5
6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS	6
6.1 Categories of Characteristics	6
6.2 States of Expression and Corresponding Notes	6
6.3 Types of Expression	7
6.4 Example Varieties.....	7
6.5 Legend	7
7. TABLE OF CHARACTERISTICS/TABLEAU DES CARACTÈRES/MERKMALSTABELLE/TABLA DE CARACTERES.....	8
8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS.....	17
8.1 Explanations covering several characteristics	17
8.2 Explanations for individual characteristics.....	18
8.3 Growth stages of grasses derived from the decimal code for the growth stages of cereals (Zadoks, et al., 1974).....	19
9. LITERATURE.....	21
10. TECHNICAL QUESTIONNAIRE.....	22

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Lolium perenne* L., *Lolium multiflorum* Lam. *ssp. italicum* (A. Br.) Volkart, *Lolium multiflorum* Lam. *var. westerwoldicum*, and *Lolium boucheanum* Kunth. [*and Lolium rigidum* Gaudin. ?]

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:

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 second column of the Table of Characteristics. The stages of development denoted by each number are described at the end of Chapter 8.

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

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

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

- A: spaced plants
- B: row plot
- C: special test

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 60 spaced plants and 8 meters of row plot which should be divided between 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.

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

3.5.1 Unless otherwise indicated, all observations on single plants should be made on 60 plants or parts taken from each of 60 plants and any other observations made on all plants in the test. 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.

3.6 *Additional Tests*

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

4. Assessment of Distinctness, Uniformity and Stability

4.1 *Distinctness*

4.1.1 General Recommendations

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

4.1.2 Consistent Differences

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

4.1.3 Clear Differences

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

4.2 *Uniformity*

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 should be according to the recommendations for cross-pollinated varieties in the General Introduction.

4.3 *Stability*

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

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

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:

Annual varieties:

- (a) Plant: ploidy (characteristic 1)
- (b) Plant: time of inflorescence emergence (without vernalization – annual types only) (characteristic 4)
- (c) Plant: length of longest stem, inflorescence included (when fully expanded) (characteristic 17)

Biennial and Perennial varieties:

- (a) Plant: ploidy (characteristic 1)
- (b) Plant: time of inflorescence emergence (after vernalization – biennial and perennial types only) (characteristic 11)
- (c) Plant: length of longest stem, inflorescence included (when fully expanded) (characteristic 17)

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

6. Introduction to the Table of Characteristics

6.1 *Categories of Characteristics*

6.1.1 Standard Test Guidelines Characteristics

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

6.1.2 Asterisked Characteristics

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

6.2 *States of Expression and Corresponding Notes*

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

6.3 *Types of Expression*

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

6.4 *Example Varieties*

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

6.4.2 Species of example varieties

(Lp): *Lolium perenne* L.

(Lmi): *Lolium multiflorum* Lam. *italicum* (A. Br.) Volkart

(Lmw): *Lolium multiflorum* Lam. *var. westerwoldicum* Wittm

(Lb): *Lolium boucheanum* Kunth.

6.5 *Legend*

(*) Asterisked characteristic – see Chapter 6.1.2

QL: Qualitative characteristic – see Chapter 6.3

QN: Quantitative characteristic – see Chapter 6.3

PQ: Pseudo-qualitative characteristic – see Chapter 6.3

MG: single measurement of a group of plants or parts of plants – see Chapter 3.3.3

MS: measurement of a number of individual plants or parts of plants – see Chapter 3.3.3

VG: visual assessment by a single observation of a group of plants or parts of plants – Chapter 3.3.3

VS: visual assessment by observation of individual plants or parts of plants” – see Chapter 3.3.3

A: spaced plants – see Chapter 3.3.4

B: row plot – see Chapter 3.3.4

C: special test – see Chapter 3.3.4

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

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

(Lp): *Lolium perenne* L. See Chapter 6.4.2

(Lmi): *Lolium multiflorum* Lam. *italicum* (A. Br.) Volkart See Chapter 6.4.2

(Lmw): *Lolium multiflorum* Lam. *var. westerwoldicum* Wittm See Chapter 6.4.2

(Lb): *Lolium boucheanum* Kunth. See Chapter 6.4.2

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

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. MS Plant: ploidy (*) C (+)			Method to be provided, ref. "C" . see Ad. 1			
QL	diploid				Denver (Lp), Lemtal (Lmi)	2
	tetraploid				Condesa (Lp), Celebrity (Lmi)	4
2. 20-29 Plant: vegetative growth habit VS A (without VG B vernalization)						
QN (a)	erect					1
	semi-erect				Yatsyn (Lp)	3
	medium				Jumbo (Lp)	5
	semi-prostrate				Condesa (Lp)	7
	prostrate					9
3. 50 Plant: tendency to form inflorescences (+) VS A (without VG B vernalization)						
QN	absent or very weak				Vigor (Lp)	1
	weak				Vital (Lp)	3
	medium				Faveur (Lp)	5
	strong				Lemtal (Lmi)	7
	very strong				Weldra (Lmi)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
4. 50	Only Westerwolds ryegrass varieties:					
(*) MS A	Plant: time of MGB inflorescence emergence (without vernalization)					
			Explanation to be provided that observational will depend on time of planting – See 8.1 (b)			
QN (b)	very early					1
	early				Lirasand (Lmw)	3
	medium				Merwester (Lmw), [Obsolete?]	5
	late				Advance (Lmw)	7
	very late					9
5. 50	Leaf: intensity of green color					
(+) VG B						
QN	very light					1
	light				Abermont (Lp)	3
	medium				Melino (Lp), Lental (Lmi)	5
	dark				Condesa (Lp)	7
	very dark					9
6. 30-39	Plant: vegetative growth habit (after vernalization)					
VS A						
VG B						
			Is there any correlation with Ch. 2? – Re: some correlation but still useful			
QN (a)	erect					1
	semi-erect				Grasslands Nui (Lp)	3
	medium				Palmer (Lp), Taxy (Lb)	5
	semi-prostrate				Cheops (Lp), Polly (Lb)	7
	prostrate					9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
7. VS A Leaf : width (at VG B vegetative stage)			New characteristics proposed at 33 TWA			
QN	very narrow					1
	narrow					3
	medium					5
	broad					7
	very broad					9
8. MS A Leaf: length (at MG vegetative stage) B			New characteristics proposed at 33 TWA See Ch.7 = MSA-MGB or VSA-VGB?			
QN	very short					1
	short					3
	medium					5
	broad					7
	very broad					9
9. MS A Plant: height (after MG vernalization) B						
QN	very short					1
	short				Lorina (Lp)	3
	medium				Fennema (Lp)	5
	tall				Embassy (Lp), Fox (Lmi)	7
	very tall					9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
10. 30	Plant: width (after vernalization)					
	MS A					
		Explanation to be provided – See Section 8.1 (c)				
QN (c)	very narrow				Aberelf (Lp)	1
	narrow				Disco (Lp)	3
	medium				Twystar (Lp), Abercomo (Lmi)	5
	wide				Prana (Lp), Solid (Lb)	7
	very wide				Barylou (Lp)	9
11. 50	Only Perennial ryegrass, Italian ryegrass and Hybrid ryegrass [and <i>Lolium rigidum</i> Gaudin.] varieties:					
(*)	MS A					
	MG					
	B					
	Plant: time of inflorescence emergence (after vernalization)					
		Is this a different characteristic in single spaced plants than in rows? Re: Same if measured but different if visually observed In rows.				
QN (b)	very early				Barylou (Lp)	1
	early				Labrador (Lp)	3
	medium				Fantoom (Lp), Lemtal (Lmi)	5
	late				Meltra (Lp)	7
	very late				Belfort (Lp)	9
12. 50	Plant: natural height at inflorescence emergence					
	MS A					
QN (d)	very short				Loretta (Lp)	1
	short				Lilora (Lp)	3
	medium				Embassy (Lp), Polly (Lb)	5
	tall				Lemtal (Lmi)	7
	very tall				Lipo (Lmi)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
13. 50 Plant: width at inflorescence emergence MS A						
		Explanation to be provided. See Section 8.1 (c).				
QN (c)	very narrow				Brightstar (Lp)	1
	narrow				Navajo (Lp), Lemtal (Lmi)	3
	medium				Vital (Lp), Monarque (Lmi)	5
	wide				Moronda (Lp), Skipper (Lb)	7
	very wide				Fanal (Lp)	9
14. 50 Flag leaf: length (* MS A						
QN (d)	very short				Brightstar (Lp)	1
	short				Boulevard (Lp)	3
	medium				Abergold (Lp), Brutus (Lb)	5
	long				Twins (Lp), Aberlinnet (Lb)	7
	very long				Cyrano (Lmi)	9
15. 50 Flag leaf: width (* MS A						
QN (d)	very narrow				Bargold (Lp)	1
	narrow				Profit (Lp)	3
	medium				Anaconda (Lp)	5
	broad				Skipper (Lb)	7
	very broad				Lipo (Lmi)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
16. 50	Flag leaf: length/width ratio					
	MS A					
		New characteristic proposed at 33 TWA				
QN (d)	very low					1
	low				Howard (Lmi)	3
	medium				Fabio (Lmi), Mondial (Lp)	5
	high				Veritas (Lp)	7
	very high					9
17. 60-68	Plant: length of longest stem, inflorescence included (when fully expanded)					
(*)						
	MS A					
QN (e)	very short					1
	short				Elka (Lp)	3
	medium				Vigor (Lp)	5
	long				Ernesto (Lp)	7
	very long				Lipo (Lmi)	9
18. 60-68	Plant: length of longest stem from base to top node					
		New characteristic proposed at 33 TWA – This appears to be highly correlated with Ch. 17.				
(e)	very short					1
	short					3
	medium					5
	long					7
	very long					9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
19. 60-68 Plant : length of upper internode on MS A longest stem						
	New characteristic proposed at 33 TWA – This appears to be highly correlated with Ch. 17.					
(e) very short						1
short						3
medium						5
long						7
very long						9
20. 60-68 Inflorescence: length MS A						
	Should this measurement be made on a primary tiller? Re: See Section 8.1 (e)					
QN (e) very short					Sunbright (Lp)	1
short					Score (Lp)	3
medium					Vigor (Lp), Lemtal (Lmi)	5
long					Condesa (Lp), Lipo (Lmi)	7
very long					Fabio (Lmi)	9
21. 60-68 Inflorescence: number of spikelets MS A						
	Should this measurement be made on a primary tiller? Re: See Section 8.1 (e)					
QN (e) very few						1
few					Abersprite (Lp)	3
medium					Terry (Lp), Lemtal (Lmi)	5
many					Lipo (Lmi)	7
very many						9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
22. 60-68 Inflorescence: density MS A						
		New characteristic proposed at 33 TWA				
QN (e)	very sparse					1
	sparse				Concord (Lmi)	3
	medium				Montagne (Lp), Meritra (Lmi)	5
	dense				Bastion (Lp)	7
	very dense					9
23. 60-68 Inflorescence: length of outer glume on basal spikelet MS A						
		Should the glume be from middle of the inflorescence? Re: no too hard to define				
QN (e)	very short				Abercomo (Lmi)	1
	short				Prestyl (Lmi)	3
	medium				Fennema (Lp), Gazella (Lb)	5
	long				Meradonna (Lp), Texy (Lb)	7
	very long				Bastion (Lp)	9
24. 60-68 Inflorescence: length of basal spikelet excluding awn MS A						
QN (e)	very short				Abercomo (Lmi)	1
	short				Sunbright (Lp), Bartissimo (Lmi)	3
	medium				Pippin (Lp), Barprisma (Lmi)	5
	long				Herbus (Lp), Storm (Lb)	7
	very long				Bastion (Lp)	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
25. VG B	Plant: growth habit in aftermath	New characteristic proposed at 33 TWA – Growth stage?				
QN	erect					1
	semi-erect					3
	medium					5
	semi-prostrate					7
	prostrate					9
26. VG B	Plant: intensity of green color in aftermath	New characteristic proposed at 33 TWA – Growth stage?				
QN	very light					1
	light					3
	medium					5
	dark					7
	very dark					9
27. MG B	Plant: height in aftermath	New characteristic proposed at 33 TWA – MGB or VGB? - Growth stage?				
QN	very short					1
	short					3
	medium					5
	tall					7
	very tall					9
28. VG B	Plant: number of vegetative tillers	New characteristic proposed at 33 TWA – Growth stage?				
QN	very low					1
	low					3
	medium					5
	high					7
	very high					9

8. Explanations on the Table of Characteristics

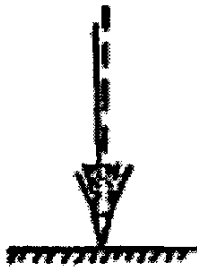
8.1 *Explanations covering several characteristics*

(a) Growth habit

Characteristic 2 may be recorded on annual, biennial and perennial types, during the same growing season as when the trials are planted

Characteristic 6 should only be recorded on biennial and perennial types.

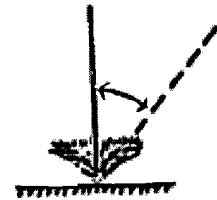
The observations should be made visually from the attitude of the leaves of the plant as a whole. The angle formed by the imaginary line through the region of greatest leaf density and the vertical should be used.



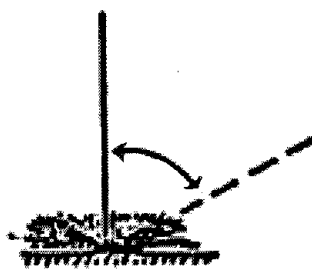
1
erect



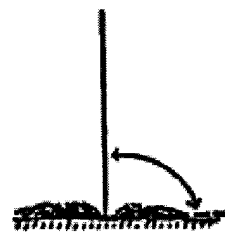
3
semi-erect



5
medium



7
semi-prostrate



9
prostrate

(b) Time of inflorescence emergence

Characteristic 4 should normally only be recorded on annual types. Timing of observations will depend upon time of planting.

Characteristic 11 should normally only be recorded on biennial and perennial types.

Spaced plants or row plots should be observed at least twice per week.

Plots with spaced plants

The date of inflorescence emergence of each single plant should be observed. A single plant is considered to have headed when the tip of three inflorescences can be seen protruding from the flag leaf sheath (Growth Stage DC 50). From the single plant data, a mean date per plot and a mean date per variety is obtained.

Row plots

At each observation date the average plot stage should be expressed in one of the following growth stages (see 8.3 below):

- | | | |
|-----|-------|---|
| (1) | DC 45 | Boot swollen (late-boot stage) |
| (2) | DC 50 | First spikelet of inflorescence just visible |
| (3) | DC 52 | 25% of the inflorescence emerged (across all stems) |
| (4) | DC 54 | 50% of the inflorescence emerged (across all stems) |

The date of inflorescence emergence is the date at which the average plot stage 2 (Growth Stage DC 50) has been reached. This date should, if necessary, be obtained by interpolation.

(c) Plant: width

To allow for irregular plant shapes (for example due to wind shaping effects) the average plant width is determined by taking two measurements of the diameter across the plant at right angles to each other and mentally deciding on the average of these two figures.

- (d) To be recorded on each individual plant at the time of inflorescence emergence, (Growth Stage DC 50) that is, at the same time as Characteristic 4 for annual types and Characteristic 9 for biennial and perennial types.
- (e) Characteristic 17, 18 and 19 should be recorded when the inflorescence is fully expanded, using the same longest stem from the middle of the plant for all. Measurements for characteristics 20, 21, 22, 23 and 24 should be made on the inflorescence from the same longest stem.

8.2 *Explanations for individual characteristics*

Ad. 1: Plant: ploidy

The ploidy of the plant can be determined either by standard cytological methods or by observing the occurrence of 5-band genotypes (which are present only in tetraploid varieties) in phosphoglucoisomerase (PGI) isoenzyme electrophoresis.

Ad. 3: Plant: tendency to form inflorescences (without vernalization)

The number of plants showing at least three inflorescences should be recorded for each variety. To be assessed on one occasion on the whole trial when the varieties are judged to have reached their full expression of this characteristic.

Ad. 5: Leaf: intensity of green color

Annual types:

Leaf color should be recorded at beginning of inflorescence emergence (Growth Stage DC 50).

Biennial and perennial types:

Leaf color should be recorded during the same growing season as when the trials are planted (Growth Stage DC 20-29).

8.3 *Growth stages of grasses derived from the decimal code for the growth stages of cereals (Zadoks, et al., 1974)*

Seedling growth (seedling: one shoot)

DC 10	First leaf through coleoptile
DC 15	Five leaves unfolded
DC 19	Nine or more leaves unfolded

Tillering

DC 20	Main shoot only (beginning of tillering)
DC 23	Main shoot and 3 tillers
DC 25	Main shoot and 5 tillers
DC 29	Main shoot and 9 more tillers

Stem elongation

DC 30	Pseudo-stem erection (formed by sheaths of leaves)
DC 31	First node detectable (early stem extension across all stems)
DC 35	Fifth node detectable (50% extension across all stems)
DC 39	Flag leaf ligula/collar just visible (pre-boot stage)

Booting

DC 41	Flag leaf sheath extending (little enlargement of the inflorescence, early boot-stage)
DC 45	Boots swollen (late-boot stage)
DC 47	First leaf sheath opening
DC 49	First awns visible (in awned forms only)

Inflorescence emergence (mostly non-synchronous)

DC 50	First spikelet of inflorescence just visible
DC 52	25% of the inflorescence emerged (across all stems)
DC 54	50% of the inflorescence emerged (across all stems)
DC 56	75% of the inflorescence emerged (across all stems)
DC 58	Emergence of inflorescence completed

Anthesis (mostly non-synchronous)

DC 60	Beginning of anthesis
DC 64	Anthesis half-way
DC 68	Anthesis complete

9. Literature

Hawkins, R.P. (1958), "The Classification of the Strains (Varieties) of Herbage Plants," *Journal of the National Institute of Agricultural Botany*, 9, pages 434-449

Weatherup, S.T.C. (1980), "Statistical Procedures for Distinctness, Uniformity and Stability Trials," *Journal of Agricultural Science, Cambridge*, 94, page 31-46

Patterson, H.D. and Weatherup S.T.C. (1984), "Statistical Criteria for Distinctness between Varieties of Herbage Crops," *Journal of Agricultural Science, Cambridge*, 102, pages 59-68

Tyler, B.F., Hayes, J.D. and Ellis Davies, W. (1985), "IBPGR/CEC Descriptive List for Forage Grasses," *International Board for Plant Genetic Resources (IBPGR)*, 83/90

Baltjes, H.J., Klein Geltink, D.J.A., Nienhuis, K.H. and Luesink, B. (1985), "Linking Distinctiveness and Description of Varieties," *Journal of the National Institute of Agricultural Botany*, 17, pages 9-19

Camlin, M.S., Watson, S., Waters, B.G. and Weatherup, S.T.C. (2001), "The potential for management of reference collections in herbage variety registration trials using a cyclic planting system for reference varieties". *Plant Varieties and Seeds*, 14, pages 1-14.

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 (please indicate the relevant species):		
1.1.1 <i>Botanical Name</i>	<input style="width: 90%;" type="text" value="Lolium perenne L."/>	[]
1.1.2 Common Name	<input style="width: 90%;" type="text" value="Perennial ryegrass"/>	
1.2.1 <i>Botanical Name</i>	<input style="width: 90%;" type="text" value="Lolium multiflorum Lam. ssp. italicum(A. Br.) Volkart"/>	[]
1.2.2 Common Name	<input style="width: 90%;" type="text" value="Italian ryegrass"/>	
1.3.1 <i>Botanical Name</i>	<input style="width: 90%;" type="text" value="Lolium multiflorum Lam. var. westerwoldicum Wittm."/>	[]
1.3.2 Common Name	<input style="width: 90%;" type="text" value="Westerwolds (annual) ryegrass"/>	
1.4.1 <i>Botanical Name</i>	<input style="width: 90%;" type="text" value="Lolium boucheanum Kunth."/>	[]
1.4.2 Common Name	<input style="width: 90%;" type="text" value="Hybrid ryegrass"/>	
1.5.1 <i>Botanical Name</i>	<input style="width: 90%;" type="text" value="Lolium rigidum Gaudin"/>	[]
2. Applicant		
Name	<input style="width: 100%;" type="text"/>	
Address	<input style="width: 100%; height: 60px;" type="text"/>	
Telephone No.	<input style="width: 100%;" type="text"/>	
Fax No.	<input style="width: 100%;" type="text"/>	
E-mail address	<input style="width: 100%;" type="text"/>	
Breeder (if different from applicant)	<input style="width: 100%;" type="text"/>	

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

3. Proposed denomination and breeder's reference

Proposed denomination

(if available)

Breeder's reference

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

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross
(please state parent varieties)

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

(c) unknown cross

4.1.2 Mutation
(please state parent variety)

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

4.1.4 Other
(please provide details)

4.2 Method of propagating the variety

Authorities may allow certain parts of this information to be given in a confidential section of the Technical Questionnaire.

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

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

Characteristics	Example Varieties	Note
5.1 Characteristics (1)		
diploid	Denver (Lp) Lemtal (Lmi)	2
tetraploid	Condesa (Lp) Celebrity (Lmi)	4
5.2 Time of inflorescence emergence (without vernalization - annual types only) (4)		
very early		1
early	Lirasand (Lmw)	3
medium	[Merwester (Lmw) - Obsolete?]	5
late	Avance (Lmw)	7
very late		9
5.3 Time of inflorescence emergence (after vernalization - biennial and perennial types only) (11)		
very early	Barylou (Lp)	1
early	Labrador (Lp)	3
medium	Fantoom (Lp) Lemtal (Lmi)	5
late	Meltra (Lp))	7
very late	Belfort (Lp)	9

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

Characteristics	Example Varieties	Note
5.4 Plant: length of longest stem, inflorescence included (when fully expanded) (17)		
very short		1
short	Elka (Lp)	3
medium	Vigor (Lp)	5
long	Ernesto (Lp)	7
very long	Lipo (Lmi)	9

6. Similar varieties and differences from these varieties

Please use the table, and space provided for comments, below 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>			

Comments:

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

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

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

Yes [] No []

(If yes, please provide details)

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

Yes [] No []

(If yes, please provide details)

7.3 Other information

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [] No []

(b) Has such authorization been obtained?

Yes [] No []

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

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

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

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

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

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

- | | | |
|---|---------|--------|
| (a) Microorganisms (e.g. virus, bacteria, phytoplasma) | Yes [] | No [] |
| (b) Chemical treatment (e.g. growth retardant, pesticide) | Yes [] | No [] |
| (c) Tissue culture | Yes [] | No [] |
| (d) Other factors | Yes [] | No [] |

Please provide details for where you have indicated "yes".

.....

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

Applicant's name

Signature

Date

[End of document]