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GENEVA

Associated Document
to the
General Introduction to the Examination
of Distinctness, Uniformity and Stability and the
Development of Harmonized Descriptions of New Varieties of Plants (document TG/1/3)

DOCUMENT TGP/7

“DEVELOPMENT OF TEST GUIDELINES”

Section TGP/7.1: Guidance for Drafters of Test Guidelines

Document prepared by the Office of the Union

to be considered by the

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SECTION TGP/7.1

GUIDANCE FOR DRAFTERS OF TEST GUIDELINES

1. Introduction

1.1 UPOV Test Guidelines as the Basis for the DUS Test

The General Introduction (Chapter 2, section 2.2.1) states that “Where UPOV has established specific Test Guidelines for a particular species, or other group(s) of varieties, these represent an agreed and harmonized approach for the examination of new varieties and, in conjunction with the basic principles contained in the General Introduction, should form the basis of the DUS test.” The purpose of this document is to provide guidance on the development of these UPOV Test Guidelines (“Test Guidelines”).

1.2 National Test Guidelines

The General Introduction also states that “Where UPOV has not established individual Test Guidelines relevant to the variety to be examined, the examination should be carried out in accordance with the principles in this document and, in particular, the recommendations contained in Chapter 9, “Conduct of DUS Testing in the Absence of Test Guidelines.” In particular, the recommendations in Chapter 9 are based on the approach whereby, in the absence of Test Guidelines, the DUS examiner proceeds in the same general way as if developing new Test Guidelines.” Thus, in the absence of Test Guidelines, this document is also aimed at the drafters of national test guidelines.

1.3 The TG Template (document TGP/7.2)

This document builds on document TGP/7.2 “TG Template” which provides a template containing the universal standard wording which is appropriate for all Test Guidelines. It builds on document TGP/7.2 in two ways. Firstly, it provides additional standard wording which is relevant for some, but not all, Test Guidelines and secondly, it provides general guidance for drafters of Test Guidelines on how to develop the various aspects of the document.

1.4 Additional Standard Wording

As explained above, document TGP/7.2 “TG Template” contains the universal standard wording which is appropriate for all Test Guidelines. However, UPOV has developed additional standard wording which should be used, where appropriate, for the Test Guidelines concerned. For example, for Test Guidelines where the material is supplied in the form of seed, there is standard wording concerning the quality of the material to be supplied. Of course, this standard wording for seed should not be included in Test Guidelines where, for example, the material is only provided as tubers and for this reason this additional standard wording is not included in the TG Template but is included in this document. The additional standard wording is presented in Section 2 “Additional Standard Wording.”

1.5 Guidance Notes

There are many aspects of the Test Guidelines where standard wording cannot be developed and where the individual drafter’s experience and knowledge are the only basis for drafting the Test Guidelines. In particular, this includes the identification of characteristics and

selection of example varieties. In such situations this document seeks to provide general guidance on how to proceed in a harmonized way, in line with the experience accumulated by UPOV through the crop experts. This guidance is provided in Section 3 “Guidance Notes.”

2. Additional Standard Wording (ASW)

This section presents the additional standard wording (ASW) which can be added to the standard wording within the TG Template (TGP/7.2). The numbering refers to the numbering in the TG Template.

Key

wording already agreed by the Technical Committee at its thirty-eighth session, held in Geneva from April 15 to 17, 2002.

{...} blank for the relevant information to be inserted by the drafter of the Test Guidelines.

[x] / [y] drafter of Test Guidelines to delete “x” or “y,” as appropriate.

ASW 1 (TGP/7.2: Section 2.3) – seed quality requirements

(a)# *Test Guidelines which only apply to seed-propagated varieties*

“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.”

(b)# *Test Guidelines which apply to seed-propagated as well as other types of varieties*

“In the case of seed, 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.”

ASW 2 (TGP/7.2: Section 3.1) – number of growing cycles

(a)# *Single growing cycle*

“The minimum duration of tests should normally be a single growing cycle.”

(b)# *Two independent growing cycles*

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

ASW 3 (TGP/7.2: Section 3.3) – information for conducting the examination of particular characteristics

- (a) *Characteristics on plants or parts of plants to be selected in a particular way (e.g. fruit from the periphery of the tree; leaves from the upper third of the plant)*

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

a Young leaf: All observations on the young leaf should be made on actively growing spring flush.

b Flower bud: All observations on the flower bud should be made when the petal tips are just visible.”

- (b) *Timing of the examination*

“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.”

- (c) *Type of observation – visual or measurement*

“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”

- (d) *Type of plot for observation*

“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 plant

B: row plot

C: special test”

- (e) *Observation of color-by eye*

“Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background.”

ASW 4 (TGP/7.2: Section 3.4.2) – plot design

(a)# *Single plots*

“Each test should be designed to result in a total of, at least { ... } [plants] /[trees]”

(b)# *Spaced plants and row plots*

“Each test should be designed to result in a total of, at least { ... } spaced plants and { ... } meters of row plot.”

(c)# *Replicated plots*

“Each test should be designed to result in a total of, at least { ... } plants, which should be divided between { ... } replicates.”

ASW 5 (TGP/7.2: Section 4.2) – uniformity assessment

(a)# *Cross-pollinated varieties*

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

(b)# *Hybrid varieties*

“The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations in the General Introduction.”

(c)# *Seed-propagated varieties where the Test Guidelines also cover vegetatively propagated varieties (ornamentals in particular)*

“For the assessment of uniformity of seed-propagated varieties, the recommendations in the General Introduction for cross-pollinated or hybrid varieties should be followed, as appropriate.”

(d) *Uniformity assessment by off-types*

“The acceptable number of off-types tolerated in a sample size of { e.g. 40 plants } is { e.g. 2 } on the basis of a population standard of { e.g. 1% } and an acceptance probability of { 95% }.”

(e) *Uniformity assessment by COYU*

“When uniformity is assessed by COYU, the acceptance probability should be { e.g. 95% }.”

ASW 6 (TGP/7.2: Section 4.3.3) – stability assessment of hybrid varieties

“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.”

ASW 7 (TGP/7.2: Section TQ 4.1) – information on breeding scheme

“4.1.1 Variety resulting from:

- (a) controlled cross []
(please state parent varieties)
- (b) partially unknown cross []
(please state known parent variety(ies))
- (c) totally unknown cross []

4.1.2 Mutation []
(please state parent variety)

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

4.1.4 Other []”
(please provide details)

ASW 8 (TGP/7.2: Section TQ 4.2) – information on method of propagating the variety

“4.2.1 Seed-propagated varieties

- (a) Self-pollinated []
- (b) Cross-pollinated []
 - (i) population []
 - (ii) synthetic variety []
- (c) Hybrid []
{...see options below...}
- (d) Other []
(please provide details)

4.2.2 Vegetatively propagated varieties

{...options...} [... ..]

4.2.3 Other []”
(please provide details)

ASW 9 (TGP/7.2: Section TQ 4.2) – information on method of propagating hybrid varieties

“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 lines required for propagating the hybrid e.g.

Single Hybrid (SH)

(...female parent....) x (...male parent....)

Three-Way Hybrid (3WH)

(...female line) x (...male line....)

=> single hybrid used as female parent x (...male parent....)

and should identify in particular:

- (a) any male sterile lines
- (b) maintainers of male sterile lines.”

ASW 10 (TGP/7.2: Section TQ 7.3) – where a photograph of the variety is to be provided

“A representative color photograph of the variety should accompany the Technical Questionnaire.”

2. Guidance Notes (GN)

This section presents guidance notes (GN) for drafters of Test Guidelines for use when developing the TG Template (TGP/7.2) into specific Test Guidelines. The numbering refers to the numbering in the TG Template.

GN 1 (TGP/7.2: Cover page) – Associated Documents

“Other associated UPOV documents” seeks information on other UPOV documents which should be read in conjunction with the Test Guidelines concerned. In particular, it seeks information on other Test Guidelines which might be relevant, e.g. a user of the Field Bean Test Guidelines might wish to know that Test Guidelines also exist for Broad Bean and that, previously, these two crops were combined in a single set of Test Guidelines. Thus, the associated documents for the Field Bean Test Guidelines might be:

TG/08/4 + Corr. Broad Bean, Field Bean (Replaced)
TG/xx/1 Broad Bean

It is not necessary to make reference to the General Introduction or the TGP documents which are already referenced in the paragraph above.

GN 2 (TGP/7.2: Section 1.1) – Subject of the Test Guidelines: More than one species

Separate Test Guidelines are usually drawn up for each species. It may however be considered necessary to include two or more species, a whole genus or even a larger unit in one Test Guidelines document.

GN 3 (TGP/7.2: Section 1.1) – Subject of the Test Guidelines: Different types or groups within a species

The General Introduction states that “Different groups of varieties within a species can be dealt with in separate or subdivided Test Guidelines if the categories can be reliably separated on the basis of characteristics suitable for distinctness, or where an appropriate procedure has been developed to ensure that all varieties of common knowledge will be adequately considered for distinctness”.

This explanation is provided to ensure that groups or types of varieties are only created where it is possible to ensure that a variety will be clearly placed into the appropriate group, or if not, that other measures are taken to ensure that all varieties of common knowledge are considered for distinctness. Thus, if the Test Guidelines cover only a group, or type, within a species, this section should explain which characteristics, or what other basis, ensure distinctness of all the varieties covered by the Test Guidelines from all other varieties.

The Test Guidelines should also explain the characteristics, or other basis, which allow distinctness for types or groups of varieties covered by different sets of example varieties (e.g. Winter/Spring) or should explain what other basis ensures distinctness of all the varieties covered by one type or group, from all the varieties of another.

GN 4 (TGP/7.2: Section 1.1) – Subject of the Test Guidelines: Family name

In some cases, it is also considered helpful to identify the family (not in italics).

GN 5 (TGP/7.2: Section 1.1) – Guidance for new types and species

Document TGP/13 “Guidance Notes for New Types and Species” may provide useful information for drafters of Test Guidelines covering new types (e.g. multi- or interspecific hybrids) or species.

GN 6 (TGP/7.2: Section 2.3) –Quantity of plant material required

Option 1: Standardized formula

The following formula can be used to calculate the quantity of material required in a harmonized way:

(a) *Number of propagules/seeds:*

$$\text{Number of Propagules/Seeds (N)} = X_1(p_1^{1/a}) + \dots X_n(p_n^{1/a}) + Y_1(r_1^{1/b_1}) + \dots Y_n(r_n^{1/b_n}) + Z(1/s^{p_{(1+\dots+n)}})^{1/a}$$

X _n	Number of growing trials – type X _n
p _(n)	Number of plants per growing trial – type X _n
a	Level of plant establishment in growing trial from initial submitted seed/propagule
Y _n	Number of special tests – type Y _n
r _n	Number of plants per test - type Y _n
b _n	Level of plant establishment in special test, type Y _n , from initial submitted seed/propagule
Z	Number of years of stock required for growing trials for reference sample
s	rate of deterioration in store

(b) *Quantity of seed*

$$\text{Quantity of Seed (Q)} = N/1000 * \text{Thousand Seed Weight}$$

The thousand seed weight should be that provided by ISTA, where possible, and the maximum thousand seed weight should be used where a range is given.

Option 2: Basis for determining the quantity of plant material

The drafter of the Test Guidelines should report the following information to the Technical Working Party to clarify the basis used for determining the quantity of material required:

- (a) Anticipated level of plant establishment from submitted plant material
- (b) Proportion of submitted plant material to be used for reference samples
- (c) Rate of deterioration in store

GN 7 (TGP/7.2: Section 3.4) – Test design

Document TGP/8 “Use of Statistical Procedures in DUS Testing” contains guidance on experimental design.

GN 8 (TGP/7.2: Section 4.2) – Uniformity assessment

Document TGP/10 “Examining Uniformity” contains guidance on the development of appropriate uniformity standards.

GN 9 (TGP/7.2: Section 5.3) – Grouping characteristics

The General Introduction explains that grouping characteristics are characteristics in which the documented states of expression, even where recorded at different locations, can be used either individually or in combination with other such characteristics: to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness, and/or to organize the growing trial so that similar varieties are grouped together.

Thus, grouping characteristics:

1. Must be:
 - (a) qualitative characteristics or,
 - (b) quantitative or pseudo-qualitative characteristics which provide useful discrimination between the varieties of common knowledge from documented states of expression recorded at different locations.
2. Must be useful for:
 - (a) selecting varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness and/or,
 - (b) organizing the growing trial so that similar varieties are grouped together.
3. Should be:
 - (a) an asterisked characteristic and/or,
 - (b) included in the Technical Questionnaire or application form.

The number of grouping characteristics is not fixed. If there are only a few characteristics which satisfy the criteria these are all likely to be selected as grouping characteristics. However, if there are many characteristics which fulfill the criteria these might not all be selected as grouping characteristics in the Test Guidelines. In the latter case, a selection of the most efficient characteristics for the uses set out in 2(a) and 2(b) might be made.

GN 10 (TGP/7.2: Section 6.4) – Example varieties

(a) *Purpose of example varieties*

The General Introduction (Section 4.3) states that “example varieties are provided in the Test Guidelines to clarify the states of expression of a characteristic.” This clarification of the states of expression is required with respect to two aspects:

- (a) to illustrate the characteristic and/or
- (b) to provide the basis for ascribing the appropriate state of expression to each variety and, thereby, to develop internationally harmonized variety descriptions.

The requirement to illustrate a characteristic (aspect (a)) is self-explanatory. However, the role of example varieties in the international harmonization of variety descriptions is less obvious. It is not always understood why example varieties are used in place of, for example, actual measurements. The following example demonstrates why example varieties are superior to absolute measurements in this respect.

Example:

Characteristic to be examined: First leaf: length of blade

(i) Example varieties in the Test Guidelines

	Example Varieties	Note
First leaf: length of blade		
short	Alpha	3
medium	Beta	5
long	Gamma	7

Results of leaf length (cm) for candidate varieties X, Y and Z from DUS growing trials in countries 1 and 2:

	Country 1	Country 2
Alpha	note 3 (29 cm)	note 3 (27 cm)
Beta	note 5 (35 cm)	note 5 (30 cm)
Gamma	note 7 (41 cm)	note 7 (33 cm)
variety X	note 5 (35 cm)	note 5 (30 cm)
variety Y	note 9 (48 cm)	note 9 (36 cm)
variety Z	note 3 (29 cm)	note 3 (27 cm)

Using the relative scale provided by the example varieties, it can be seen that the example variety Beta measured 35 cm in Country 1 and 30 cm in Country 2, but in both locations, defines the state of expression “medium.” Thus, example varieties are important to adjust for the variation of the expression of the characteristics due to the genotype / year interaction and to the genotype / environment interaction.

(ii) Fixed measurements in the Test Guidelines

On the basis of the data from (i), if the Test Guidelines were drafted in Country 1, the Table of Characteristics would show the following:

	Length	Note
First leaf: length of blade		
short	29 cm	3
medium	35 cm	5
long	41 cm	7

Because there is no “relative scale” provided by the example varieties the same data as for (i) would lead to the following descriptions:

	Country 1	Country 2
variety X	35 cm (note 5)	30 cm (note 3)
variety Y	48 cm (note 9)	36 cm (note 6)
variety Z	29 cm (note 3)	27 cm (note 2)

Thus, if absolute measurements were used in the Test Guidelines, variety X, when grown in Country 1, would be described as “medium (note 5),” but if grown in Country 2, would be described as “short (note 3)”. This demonstrates that it would be very misleading to compare descriptions from different locations on the basis of absolute measurements, without the adjustment for year or environmental effects provided by example varieties.

(b) *Deciding if example varieties are needed for a characteristic*

As explained in (a), the drafter must decide if example varieties are required for each characteristic:

either to illustrate the characteristic
or, to provide the basis for ascribing the appropriate state of expression to each variety and, thereby, to develop internationally harmonized variety descriptions.

(i) illustration of the characteristic

In many cases, the illustration of a characteristic by photographs or drawings (to be provided in chapter 8 of the Test Guidelines) may be better than by example varieties. However, even in such cases, example varieties can still be useful since they ensure that examiners can see the characteristic in “real life” by growing the example varieties.

(ii) harmonization of variety descriptions

The drafter should decide if the characteristic is useful for international harmonization of variety descriptions. In deciding this, the drafter should remember that UPOV has, in particular, identified “Asterisked Characteristics” as those which are important for the international harmonization of variety descriptions.

- If the characteristic is not important for the international harmonization of variety descriptions and example varieties are not necessary for illustration of the characteristic (see (i)), there is no requirement for example varieties to be provided.
- If the characteristic is important for the international harmonization of variety descriptions but is not influenced by the year or environment (e.g. qualitative characteristics) and example varieties are not necessary for illustration of the characteristic (see (i)) it may not be necessary to provide example varieties.
- If the characteristic is important for the international harmonization of variety descriptions (e.g. asterisked characteristics) and is influenced by the environment (e.g. most

quantitative characteristics) or example varieties are necessary for illustration of the characteristic (see (i)) it is necessary to provide example varieties.

(c) *Availability*

Authorities responsible for DUS testing and breeders need to be able to obtain plant material of example varieties and therefore, in general, example varieties should be widely and freely available for the coverage of the Test Guidelines (see also (h) “Multiple sets of example varieties”). If an example variety it is not widely available, it should only be recommended if there are specific reasons for this, for example, if it is the only variety with a particular state of expression for a given characteristic.

(d) *Fluctuation of expression*

The example variety should provide a clear example of the state of expression. Any fluctuation in the expression of the example variety for the given state for which it has been selected, in relation to other varieties in the collection, should not be such as to lead to problems for harmonization of variety descriptions.

(e) *Illustration of the range of expression within the variety collection*

The set of example varieties for a given characteristic should provide information on the range of expression of the characteristic in the collection of varieties covered by the Test Guidelines. Thus, in general, it is necessary to provide example varieties for more than one state of expression and in the case of:

- Quantitative characteristics: to provide example varieties for the states of expression (3), (5) and (7).
- Pseudo-qualitative characteristics: to provide a set of example varieties to cover the different components within the range of expression of the characteristics

(f) *Minimizing the number*

For practical reasons it is recommended to choose the overall set of example varieties for the Test Guidelines in a way that all the desired characteristics and states of expression are covered by the minimum total number of example varieties. This means that, if possible, each example variety should be used for as many characteristics as possible and example varieties should not be used only for one or very few characteristics.

(g) *Agreement of interested experts*

The set of example varieties proposed by the leading expert in the preparation of the Test Guidelines should be prepared in cooperation with all the interested experts. If one or more expert(s) consider(s) that certain example varieties are not suitable for their conditions, a new example variety should, if possible, be found (see also Section (h) “Multiple sets of example varieties”).

- (h) *Multiple sets of example varieties*
 - (i) Regional sets of example varieties

UPOV Test Guidelines often need to cover many different countries, regions and environments. For some Test Guidelines, this means that a single universal set of example varieties cannot be found. It is accepted that, where unavoidable, different sets of example varieties may be developed. However, the establishment of different sets of example varieties means that harmonization of variety descriptions produced in these different regions will be lost.

The General Introduction states that “Different groups of varieties within a species can be dealt with in separate or subdivided Test Guidelines if the categories can be reliably separated on the basis of characteristics suitable for distinctness, or where an appropriate procedure has been developed to ensure that all varieties of common knowledge will be adequately considered for distinctness.” In this respect, the creation of different sets of example varieties results in “subdivided Test Guidelines.”

Thus, if the sets of example varieties within the Test Guidelines cover only certain regions the Test Guidelines should explain which characteristics, or what other basis (e.g. defined agro-environment types) ensure distinctness of all the varieties covered by one set of example varieties in the Test Guidelines, from all other varieties.

The following options are being considered for presentation of regional sets of example varieties:

Option 1: Extra column(s) in the Table of Characteristics

Example: (This would be presented in landscape format)

					Example Varieties Exemples Beispielssorten Variedades ejemplo		
Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Region A	Region B	Note/ Nota
5. 12-13 M	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	Variety A	Alpha	3
	medium	moyenne	mittel	media	Variety B	Beta	5
	long	longue	lang	larga	Variety C	Gamma	7
	very long	très longue	sehr lang	muy larga			9
6. 12-13 M	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	Variety X	Delta	3
	medium	moyenne	mittel	medio	Variety Y	Epsilon	5
	long	longue	lang	largo	Variety Z	Zeta	7
	very long	très longue	sehr lang	muy largo			9

Option 2: More than one Table of Characteristics in the Test Guidelines

Example

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Table of Characteristics

REGION A

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota	
5. (+)	12-13 M	First leaf: length of sheath	Première feuille: longueur de la gaine	Erstes Blatt: Länge der Blatt- scheide	Primera hoja: longitud de la vaina		
		very short	très courte	sehr kurz	muy corta		1
		short	courte	kurz	corta	Variety A	3
		medium	moyenne	mittel	media	Variety B	5
		long	longue	lang	larga	Variety C	7
very long	très longue	sehr lang	muy larga		9		

... / ...

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Table of Characteristics

REGION B

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota	
5. (+)	12-13 M	First leaf: length of sheath	Première feuille: longueur de la gaine	Erstes Blatt: Länge der Blatt- scheide	Primera hoja: longitud de la vaina		
		very short	très courte	sehr kurz	muy corta		1
		short	courte	kurz	corta	Alpha	3
		medium	moyenne	mittel	media	Beta	5
		long	longue	lang	larga	Gamma	7
very long	très longue	sehr lang	muy larga		9		

Option 3: Additional sets of example varieties to be attached as separate annex(es) to the Test Guidelines

Example: How the Annex might look with abbreviated information from Table of Characteristics

Annex

Region B

	Stage Stade Stadium Estado ¹⁾	¹⁾ English	français	deutsch	español	Example Exemples Beispielssorten Variedades ejemplo	Varieties	Note/ Nota
5. (+)	12-13 M	First leaf: length of sheath	Première feuille: longueur de la gaine	Erstes Blatt: Länge der Blatt- scheide	Primera hoja: longitud de la vainá	Alpha		3
						Beta		5
						Gamma		7
6. (+)	12-13 M	First leaf: length of blade	Première feuille: longueur du limbe	Erstes Blatt: Länge der Blattspreite	Primera hoja: longitud del limbo	Delta		1
						Epsilon		3
						Zeta		5

The advantages and disadvantages of each approach are summarized in the following table:

<u>Consideration</u>	Option 1 (Extra column(s))	Option 2 (Extra table(s))	Option 3 (Separate annex(es))
(a) Risk that readers may assume correspondence between the different sets of example varieties because they are side-by-side?	Yes	No	No
(b) Need to develop criteria to decide which is the “main set” of example varieties, which will be included in the Table of Characteristics, and which set(s) will be presented in the annex?	No	No	Yes
(c) Need for clear header on each page to ensure no confusion over which set is being read?	No	Yes	No (if only one extra set) / Yes (if more than one extra set)
(d) Necessity to change format of Table of Characteristics from “portrait” to “landscape”?	Yes	No	No
(e) Increase size of Test Guidelines?	Minimized overall	Full repeat(s) of the Table of Characteristics	Main document remains the same size, but annex will be (a) repeat (s) of the Table of Characteristics – although it may be possible to condense the information (see example)

(ii) Different types of variety

If it is not possible, with a single set of example varieties, to describe all the types of varieties (e.g. winter-types and spring-types) covered by the same Test Guidelines, they may be subdivided to create different sets of example varieties. However, the establishment of different sets of example varieties means that harmonization of variety descriptions produced for these different types will be lost.

The General Introduction states that “Different groups of varieties within a species can be dealt with in separate or subdivided Test Guidelines if the categories can be reliably separated on the basis of characteristics suitable for distinctness, or where an appropriate procedure has been developed to ensure that all varieties of common knowledge will be adequately considered for distinctness.”

This explanation is provided to ensure that groups or types of varieties are only created where it is possible to ensure that a variety will be clearly placed into the appropriate group or, if not, that other measures are taken to ensure that all varieties of common knowledge are considered for distinctness. Thus, if the example varieties in the Test Guidelines cover only a group, or type, within a species, the Test Guidelines should explain which characteristics, or what other basis, ensure distinctness of all the varieties of one type of variety from all the varieties of the other types.

Where different sets of example varieties are provided for different types of varieties covered by the same Test Guidelines, they are placed in the Table of Characteristics in the same column as normal. The two set of example varieties (e.g. winter and spring) are separated by a semicolon and an explanation included in the legend of chapter 6 of the Test Guidelines e.g. “For certain characteristics, different example varieties, separated by a semicolon, are indicated for winter and spring Where spring varieties are indicated they follow the semicolon.”

Example

	Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estado ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7. (*) (+)	25-29 M	Plant: growth habit	Plante: port	Pflanze: Wuchsform	Planta: porte		
		erect	dressé	aufrecht	erecto		1
		semi-erect	demi-dressé	halbaufrecht	semierecto	Variety A; Alpha	3
		intermediate	demi-dressé à demi-étalé	mittel	intermedio	Variety B; Beta	5
		semi-prostrate	demi-étalé	halbliiegend	semipostrado	Vareity C; Gamma	7
		prostrate	étalé	liegend	postrado		9

GN 11 (TGP/7.2: Section 7) – Selecting a characteristic for inclusion in the Table of Characteristics

The characteristics included in the Table of Characteristics are called “Standard Test Guidelines Characteristics.” The General Introduction (Chapter 4, Section 4.8 Table) explains that such characteristics are those “characteristics that are accepted by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.”

To be included in the Table of Characteristics, the characteristic must satisfy the criteria for a Standard Test Guidelines Characteristic, namely:

- (i) it must satisfy the criteria for use of any characteristic for DUS as set out in the General Introduction (Chapter 4, Section 4.2) which are that it:
 - (a) results from a given genotype or combination of genotypes;
 - (b) is sufficiently consistent and repeatable in a particular environment;
 - (c) exhibits sufficient variation between varieties to be able to establish distinctness;
 - (d) is capable of precise definition and recognition;
 - (e) allows uniformity requirements to be fulfilled;
 - (f) allows stability requirements to be fulfilled, meaning that it produces consistent and repeatable results after repeated propagation or, where appropriate, at the end of each cycle of propagation;
- (ii) it must have been used to develop a variety description by at least one member of the Union and
- (iii) where there is a long list of such characteristics and, where considered appropriate, there may be an indication of the extent of use of each characteristic.

GN 12 (TGP/7.2: Section 7) – Special characteristics

Document TGP/12 “Special Characteristics” provides guidance on the use of special characteristics e.g. resistance to diseases, insects and chemicals and chemical constituents examined by protein electrophoresis

GN 13 (TGP/7.2: Section 7) – New types of characteristics

Document TGP/15 “New Types of Characteristics” provides guidance on the possible use of new types of characteristics.

GN 14 (TGP/7.2: Section 7) – Table of Characteristics: Handling a long list of characteristics

The General Introduction (Chapter 4, Section 4.8, “Functional Categorization of Characteristics”) clarifies that the function of characteristics included in the Test Guidelines is to provide a list of UPOV accepted characteristics from which users can select those suitable for their particular circumstances. The criteria for inclusion in the Test Guidelines are that they must satisfy the basic requirements for a characteristic set out in the General Introduction (Chapter 4, Section 4.2, “Selection of Characteristics”) and must have been used to develop a variety description by at least one member of the Union. Through the work of its TWPs, UPOV provides a system of “quality control” by ensuring that any characteristics included in the Test Guidelines meet these criteria.

The purpose and criteria set out above demonstrate the intention that the Test Guidelines should contain all characteristics which are suitable for examination of DUS and that there should be no restriction, on the inclusion of characteristics in Test Guidelines, on the basis of the degree of use. This intention is confirmed by recognition that, in the case of a long list of characteristics, an indication of the extent of use of each characteristic might be considered.

At its thirty-eighth session, held in Geneva from April 15 to 17, 2002, the Technical Committee decided **to request that, during their sessions in 2002, the Technical Working Parties propose practical measures for structuring a large Table of Characteristics and possible schemes for indicating the extent of use of each characteristic.**

GN 15 (TGP/7.2: Section 7: column 1) – Order of characteristics in the Table of Characteristics

The order of characteristics should be as follows:

(a) Botanical order

The characteristics in the Table of Characteristics should follow the botanical order as follows: grain (seed submitted), seedling, plant (e.g. growth habit), root, root system or other subterranean organs, stem, leaf (blade, petiole, stipule), inflorescence, flower (calyx, sepal, corolla, petal, stamen, pistil), fruit, grain (harvested). The order normally starts with larger organs followed by smaller organs or sub-organs (inflorescence, flower, stamen, anther, pollen), normally from the outer/lower parts to the inner/higher parts (e.g. inflorescence, calyx, corolla). This order may, however, be applied with some flexibility. Alternatively it may be more appropriate to follow the chronological order of recording.

(b) Order of parts of an organ

The order normally starts with characteristics of the whole organ followed by those of its parts e.g. base, apex, margin.

(c) Exceptions

In cases where the characteristics of a sub-organ are units of the higher organ (e.g.: Flower: arrangement of petals; flower: number of styles), these would normally be placed with the characteristics of the higher organ. However, where more practical, these can be kept together with the characteristics of the sub-organ concerned (e.g.: “Flower: arrangement of

petals” could remain together with the other characteristics on the petal and “Flower: number of styles” could remain together with the other characteristics on the styles).

(d) Order of type of observation

Within the order above, the following subdivision has been adopted for the characteristics of the plant as a whole or the various organs, or sub-organs, of the plant: attitude, height, length, width, size, shape, color, other details (such as surface, etc., and individual parts of the organ such as base, apex and margin). In general, the shape of base and apex are grouped together with the shape of the whole organ since, for practical reasons, these shapes are recorded at the same time.

GN 16 (TGP/7.2: Section 7: column 1) – Asterisked characteristics

The General Introduction states that asterisked characteristics are “characteristics that are important for the international harmonization of variety descriptions.” The criteria for selecting a characteristic as an asterisked characteristic are that:

- (a) it must be a characteristic included in the Test Guidelines;
- (b) it 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;
- (c) it must be useful for the international harmonization of variety descriptions;
- (d) particular care should be taken before selection of disease resistance characteristics.

It should be clarified that criterion (b) is worded to ensure that members of the Union which are not able to examine the characteristic do not use this as a reason to object to the characteristic being agreed as an asterisked characteristic. Thus, any characteristic which satisfies the criteria and, in particular, is useful for the international harmonization of variety descriptions should be selected as an asterisked characteristic, even if it cannot be examined for all varieties or by all members of the Union. The upper limit on the number of asterisked characteristics should, therefore, be determined by the number which are required to provide useful internationally harmonized variety descriptions.

GN 17 (TGP/7.2: Section 7: column 1) – Explanation of the characteristic

A plus “(+)” is indicated in the Table of Characteristics where an explanation of the characteristic is provided in Chapter 8 “Explanations on the Table of Characteristics.” This is particularly intended to be used for illustrations of the characteristic and its states of expression. It is not, in general, used to indicate the method of examining the characteristic, which is covered by the entry in column 2 of the Table of Characteristics (see GN 19 and 20).

GN 18 (TGP/7.2: Section 7: column 1) – Type of expression of the characteristic

Document TGP/7.3.1 “Standardized UPOV Terms and Explanations: Types of Expression of Characteristics” provides guidance on categorizing characteristics into the appropriate type of expression i.e. qualitative, quantitative and pseudo-qualitative. It also provides examples of states of expression for some commonly used characteristics.

GN 19 (TGP/7.2: Section 7: column 2 – box 1) – Conditions for conducting the examination

This box provides the key for guidance which is to be provided in TGP/7.2 Section 3.3 “Conditions for Conducting the Examination.” For example, guidance may be provided on: the timing of the examination; the part of the plant on which the observation should be made; the type of plot on which to make the observation, etc.

GN 20 (TGP/7.2: Section 7: column 2 – box 2) – Growth stage

In some Test Guidelines, the growth stage at which the examination of the characteristic should be done is provided here. In such cases, the stages of development denoted by each number are described at the end of Chapter 8.

GN 21 (TGP/7.2: Section 7: column 3) – Heading of a characteristic

(a) *General*

A characteristic normally starts by identifying the plant or, alternatively, the plant part (organ) concerned, followed, after a colon, by the organ or, alternatively, the sub-organ or the specialty to be observed (e.g. “Plant: number of flowers” or “Flower: width of petal” or “Petal: color of margin”). The heading of a characteristic should be worded precisely and, if possible, be self-contained to be understood and clear without the knowledge of the states. The states should also be easily understood without the full text of the characteristic, irrespective of whether the overall text of the characteristic may appear repetitive. For example, the word “presence of” or “intensity of” could be added, even if the first state would read “absent” or “absent or very weak.” This applies particularly to cases where not only the absence/presence is to be listed as a characteristic but where a number of criteria are of importance with regard to a single organ, such as number, size, length, width, density, color, etc.. In the case of two or more characteristics where there is only one difference (e.g. lower or upper side of blade) to be observed, the part that differs should be underlined (e.g. “lower side”, or “upper side”).

(b) *Splitting a characteristic*

Characteristics should be split into two or more characteristics where this improves clarity and always, because of the rules on distinctness, where it is possible to identify a separate qualitative characteristic. It is important that independent characteristics are split to avoid confusion. For example, in Pea, marbling and anthocyanin spotting of the testa should be separated.

GN 22 (TGP/7.2: Section 7: column 3) – States of expression of a characteristic

(a) *Harmonized states of expression – approved characteristics*

Document TGP/7.3.2 “Standardized UPOV Terms and Explanations: Harmonized States of Expression of Characteristics”. seeks to ensure that the states of expression used for the same or similar characteristics used in the Test Guidelines are harmonized as far as possible. It aims to achieve this by presenting a database of characteristics, with their corresponding states of expression, which have already been approved for inclusion in existing Test Guidelines. Drafters are invited to search this database for the characteristic which they wish to use. If the appropriate characteristic, and its corresponding states of expression, are found this can be copied directly into the new Test Guidelines.

(b) *Harmonized states of expression – new characteristics or states of expression*

In cases where the required characteristic is not present in the database, or its states of expression are not appropriate, drafters are invited to refer to document TGP/7.3.1 “Standardized UPOV Terms and Explanations: Types of Expression of Characteristics” which provides guidance on categorizing characteristics into the appropriate type of expression, i.e. qualitative, quantitative and pseudo-qualitative, and also provides examples of states of expression for some commonly used characteristics. In addition, drafters should refer to document TGP/14.2 “Botanical Terms,” which contains information on the presentation of certain characteristics, such as plant shapes.

(c) *Order of states of expression*

Insofar as it is possible to impose an order on the expressions inside a characteristic, the smaller, lesser or lower expressions should be assigned the lower Note. The order of states should as far as possible be:

- from weak to strong,
- from light to dark ,
- from low to high,
- from narrow to broad.

In the case of colors, the chronological appearance of the color (e.g. as the fruit ripens) may also be used. The same sequence should be used for organs with similar states within a single document (e.g. color of leaf and color of stem).

In the case of shape characteristics, the order should, in general, be from the lesser expression to the greater expression. Shapes of apex should go from pointed to rounded or from raised to depressed.

(d) *Absence/presence*

In characteristics with the states “absent, present,” “absent” means total absence on all plants, e.g. of asymmetric leaves, “present” means some leaves on a plant are affected.

(e) *Repetitions of words inside states*

In the description of the states, the same word should only be used once after the heading of the characteristics, e.g. instead of “Leaf blade: color of upper side: light green (3), medium green (5), dark green (7), it should read “Leaf blade: green color of upper side: light (3), medium (5), dark (7).”

(f) *Hyphen (-)*

In the English wording, there should be no hyphen for the connection of the words (narrow acute, yellow green, green yellow, etc.). In English, yellow - green with a space before and after the hyphen would mean yellow to green while yellow-green without spaces would mean yellowish green. This differentiation cannot be made in other languages and, to avoid confusion for translation into other languages, hyphens should not be used.

(g) *Numbers*

Numbers lower than 10 should be written. Higher numbers should be indicated numerically.

GN 23 (TGP/7.2: Section 7: column 3) – Notes

The format of notes (numbers) for the states of expression of a characteristic is, in general, related to the type of expression of the characteristic, i.e. whether it is a qualitative, quantitative or pseudo-qualitative characteristic. There is no absolute rule but the aim is to provide some consistency in the approach to the wide range of characteristics and varieties which are covered by UPOV Test Guidelines. The following guidelines are developed on this basis:

(a) *Qualitative characteristics*

The states are given notes starting with one, except in the case of ploidy, where—in order to avoid confusion—the number of chromosome sets is accepted as the Note (e.g. diploid (2), tetraploid (4)).

Qualitative characteristics are presented by consecutive numbers according to the state, starting with Note 1 and often with no upper limit, for example:

Plant: sex

dioecious female	(1)
dioecious male	(2)
monoecious unisexual	(3)
monoecious hermaphrodite	(4)

In alternative observations, where there is a clear-cut separation between complete absence and presence, the state “absent” is given by Note 1 and the state “present” Note 9. If in a characteristic it is necessary to make a distinction between complete absence and different degrees of presence, the characteristic is split into an alternative (qualitative) characteristic with the states “absent (1)” and “present (9)” and a quantitative characteristic with Notes from 1 to 9 (see quantitative characteristics below).

(b) *Quantitative characteristics*

(i) Quantitative characteristics: 1-9 scale

As a general rule, states are formed in such a way that for the weak and strong expressions a reasonable word pair is chosen, for example:

weak/strong
short/long
small/large.

These word pairs are given Notes 3 and 7 and the intermediate state Note 5. The remaining states of the scale using Notes 1 to 9 are formed according to the following example:

<u>State</u>	<u>Note</u>
very weak (or absent to very weak)	1
very weak to weak	2
weak	3
weak to medium	4
medium	5
medium to strong	6
strong	7
strong to very strong	8
very strong	9

However, it is not necessary to present all the 9 states in the Table of Characteristics and the following abbreviated versions are, in general, more appropriate:

Standard Range Version 1	Standard Range Version 2	Standard Range Version 3	Standard Range Version 4
1 very weak (or absent to very weak)	1 very weak (or absent to very weak)	-	-
3 weak	3 weak	3 weak	3 weak
5 medium	5 medium	5 medium	5 medium
7 strong	7 strong	7 strong	7 strong
9 very strong	-	9 very strong	-

(ii) Quantitative characteristics: “condensed” range

In addition to the presentation of quantitative characteristics in 1-9 scale, a “condensed” range, comprising notes 1 to 3, has also been accepted for quantitative characteristics. This condensed range was introduced to address situations where the range has extreme states but, in practice, it is only possible to recognize a single intermediate state. Two versions of the condensed range have been accepted as follows:

Condensed Range 1		Condensed Range 2	
1	(e.g. absent to very weakly expressed)	1	(e.g. absent to weak)
2	(weakly expressed)	2	(intermediate)
3	(strongly expressed)	3	(strong)

(c) *Pseudo-qualitative characteristics*

The General Introduction (Chapter 4, Section 4.4.3) states that “In the case of “pseudo-qualitative characteristics,” the range of expression is at least partly continuous, but varies in more than one dimension (e.g. shape: ovate (1), elliptic (2), circular (3),

obovate (4)) and cannot be adequately described by just defining two ends of a linear range. In a similar way to qualitative (discontinuous) characteristics – hence the term “pseudo-qualitative” – each individual state of expression needs to be identified to adequately describe the range of the characteristic.”

More detailed guidance is provided in TGP/7.3.1 “Standardized UPOV Terms and Explanations: Types of Expression of Characteristics.”

GN 24 (TGP/7.2: Section 10 - TQ: question 5) – Selection of TQ characteristics

The model Technical Questionnaire included in the Test Guidelines seeks information on specific characteristics of importance for distinguishing varieties.

Characteristics to be included in the Technical Questionnaire should comprise:

- (a) the grouping characteristics and
- (b) the most discriminating characteristics,

unless it is considered unrealistic to expect breeders to be able to understand or examine these characteristics.

Where necessary, characteristics in the Test Guidelines can be simplified for inclusion in the TQ, if this will be of assistance for the breeder completing the TQ.

[End of document]