PRINCIPLES OF DRAFTING A TEST GUIDELINE

Harmonisation of Technical Guidelines for Rambutan and Star Fruit

East Asia Plant Variety Protection Forum

Kluang, Johor

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PREVIEW

- purpose and need
- knowledge transfer
- guideline design and components
- selection and use of the characteristics
- explanations and diagrams
- testing the guideline

Purpose and Need

The purpose of a Test Guideline:

1.Forms the basis of the DUS test

2.Drafts the variety description for a variety

3.Assists in the determination of distinctness and uniformity for a variety

The variety description is the foundation of the intellectual property

Purpose and Need

- The test guideline provides an objective and systematic record of the morphological or physiological characteristics which make up the variety description

- The characteristics can be used to identify differences between varieties included in the growing trial

Purpose and Need

- The test guideline is based on a comparison and reference approach. A new variety is described in relation to other varieties using standard or example varieties.

- This approach to describing a variety differs from others used in plant science, botany and agriculture.

Purpose and Need

- Consider the need to draft a national test guideline

- An existing national TG may be in use by another country or a UPOV TG may be adopted or under development

- Ask critical questions

Purpose and Need

Questions?

- What will the new TG cover: A single species, several species, a whole genus?
- What varieties are available or known?
- What is the authority or national expertise and experience?

Knowledge Transfer

Taking existing expertise and applying to a test guideline

- **Recognise and record existing expertise**
- Variety testing; DUS or other purpose
- Variety Collections
- Experts
- Assess existing variety descriptions
- Check known botanical and morphological resources

Guideline Design and Components

- UPOV Resources

- Start on the UPOV website
- Look at existing test guidelines
- Look at the General Introduction

Guideline Design and Components

- Go to Development of Test Guidelines TGP7

http://www.upov.int/export/sites/upov/en/publications/tgp/documents/tgp7_1.pdf

- The TG Template

Guideline Design and Components

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Guideline Design and Components

- Four main sections

1. Plant Materials, Assessment and Methodology
2. Table of Characteristics
3. Explanatory notes
4. Literature and Technical Questionnaire

Guideline Design and Components

Plant Materials, Assessment and Methodology

Provides guidance regarding

- Amount and type of plant material
- Examination method
- Assessment of DUS
- Introduction to the table of characteristics

Guideline Design and Components

Table of Characteristics

Selection of characteristics

Suitability of characteristics

Types of expression

Method of observation

Example Varieties

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

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. **(*)**	**Seed: color**	**Semence: couleur**	**Samen: Farbe**	**Semilla: color**		
	white	blanche	weiß	blanco	Verpia	1
	yellow	jaune	gelb	amarillo	Durango	2
	black	noire	schwarz	negro	Kagraner Sommer	3
2. **(*)** **(+)**	**Seedling: anthocyanin coloration**	**Plantule: pigmentation anthocyanique**	**Keimpflanze: Anthocyanfärbung**	**Plántula: pigmentación antociánica**		
	absent	absente	fehlend	ausente	Verpia	1
	present	présente	vorhanden	presente	Pirat	9
3.	**Seedling: size of cotyledon (fully developed)**	**Plantule: taille du cotylédon (à complet développement)**	**Keimpflanze: Größe des Keimblatts (voll entwickelt)**	**Plántula: tamaño del cotiledón (plenamente desarrollado)**		
	small	petit	klein	pequeño	Romance	3
	medium	moyen	mittel	medio	Expresse	5
	large	grand	groß	grande	Verpia	7

Guideline Design and Components

Explanatory Notes

Provides explanation for individual or groups of characteristics

Consists of text, diagrams and photos

Guideline Design and Components

Literature and technical questionnaire

Literature provides published or available references on the plant species or related research

The technical questionnaire for that species required as part of the application requirements

Selection and Use of the Characteristics

- Selection of characteristics
- **CHARACTERISTICS**
- - may have direct commercial relevance
    - - Fruit: time of harvest maturity
      - Fruit: colour
- - but **commercial relevance NOT required**
    - - Leaf shape

Selection and Use of the Characteristics

The basic requirements that a characteristic should fulfill before it is used for DUS testing or producing a variety description are that its expression :

(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.

Selection and Use of the Characteristics

Criteria	Fruit: color	Leaf: shape	Yield
(a) results from a given genotype or combination of genotypes	Yes	Yes	Yes
(b) sufficiently consistent and repeatable in a particular environment	Yes	Yes	(No)
(c) exhibits sufficient variation between varieties to be able to establish distinctness	Yes	Yes	???
(d) is capable of precise definition and recognition	Yes	Yes	(No)
(e) allows uniformity requirements to be fulfilled	Yes	Yes	???
(f) allows stability requirements to be fulfilled	Yes	Yes	???
Commercial value	Yes	No	Yes
ACCEPTABILITY	Yes	Yes	No

Selection and Use of the Characteristics

TYPE OF EXPRESSION OF CHARACTERISTICS (**QL, QN, PQ**):

and consequences for consideration of ***distinctness***

Selection and Use of the Characteristics

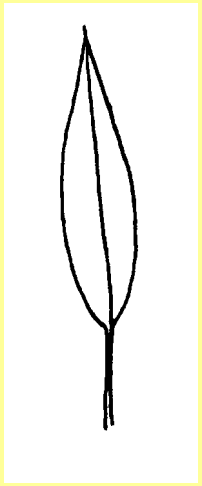
20.	VG	**Fruit: depth of carpel**		
(+)	(e)	absent or weak	Kanyao	1
QN		medium	Monthong	3
		strong	Kop Lep-yiao	5
21.	VG	**Fruit: shape**		
(*)	(e)	ovate	Chani	1
(+)		oblong	Monkhang	2
PQ		elliptic	Phuang Mani	3
		circular	Kanyao	4
		obovate	Monthong	5
		oblate		6

QUALITATIVE Characteristics

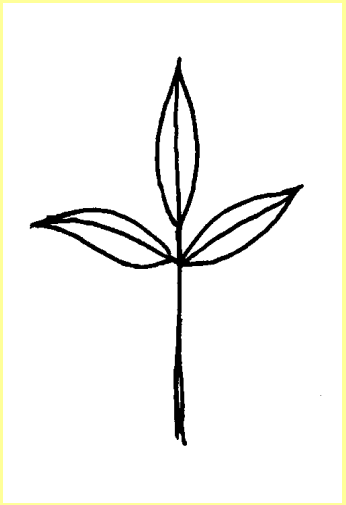
"Qualitative characteristics" are those that are **expressed in discontinuous states** (e.g. sex of plant: dioecious female (1), dioecious male (2), monoecious unisexual (3), monoecious hermaphrodite (4)).

These states are self-explanatory and independently meaningful. All states are necessary to describe the full range of the characteristic, and every form of expression can be described by a single state. The order of states is not important. As a rule, the **characteristics are not influenced by environment**.

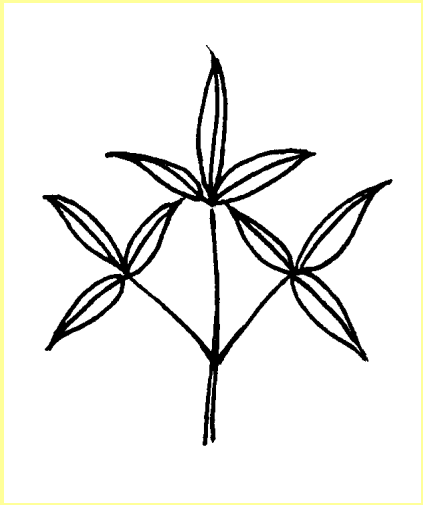
Leaf: type



1
simple



2
ternate



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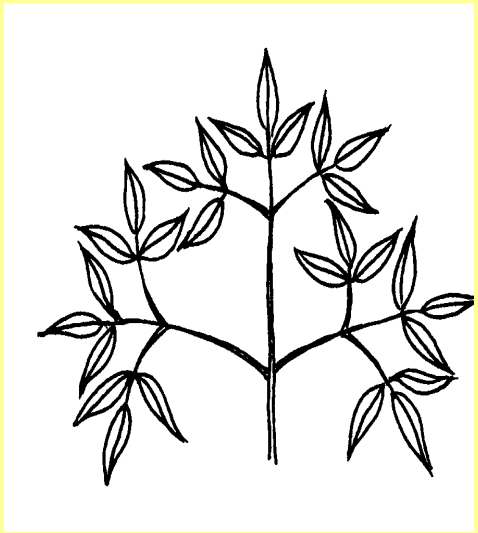


4
triternate

Qualitative Characteristics (special cases)

Char No.	Method of Examination	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. (*)	**MS C**	**Plant: ploidy**					
QL		diploid					2
		tetraploid					4
3. (*)	**VG**	**Stem: anthocyanin coloration**					
QL		absent				Gumpoong	1
		present				Chunpoong, Gopoong	9

Selection and Use of the Characteristics

- **QUANTITATIVE** Characteristics

- "Quantitative characteristics" are those where the expression covers the full range of variation from one extreme to the other. The **expression can be recorded on a one-dimensional, continuous or discrete, linear scale**. The range of expression is divided into a number of states for the purpose of description (e.g. length of stem: very short (1), short (3), medium (5), long (7), very long (9)). The division seeks to provide, as far as is practical, an even distribution across the scale. The states of expression should, however, be meaningful for DUS assessment.

Selection and Use of the Characteristics

- **Quantitative** Characteristics: **distinctness**

- Quantitative characteristics are considered for distinctness according to the method of observation and the features of propagation of the variety concerned.

Quantitative Characteristics (1-9)

weak/strong
short/long
small/large

Note	State
1	very weak (or: absent or very weak)
2	very weak to weak
3	**weak**
4	weak to medium
5	**medium**
6	medium to strong
7	**strong**
8	strong to very strong
9	very strong

Note	State
1	very small (or: absent or very small)
2	very small to small
3	**small**
4	small to medium
5	**medium**
6	medium to large
7	**large**
8	large to very large
9	very large

Quantitative Characteristics (1-9)

Standard Range Version 1	**Standard Range Version 2**	**Standard Range Version 3**	**Standard Range Version 4**
1 very weak (or: absent or very weak)	1 very weak (or: absent or 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	-

Quantitative Characteristics (1-9)

State	Example 1 **Size relative to:**	Example 2 **Angle:**	Example 3 **Position:**	Example 4 **Length in relation to:**
1	**much smaller**	**very acute**	**at base**	**equal**
3	moderately smaller	moderately acute	one quarter from base	slightly shorter
5	**same size**	**right angle**	**in middle**	**moderately shorter**
7	moderately larger	moderately obtuse	one quarter from apex end	much shorter
9	**much larger**	**very obtuse**	**at apex**	**very much shorter**

Quantitative Characteristics (at least 3 notes)

Example 2	
1	e.g. absent or weak *(absent or weakly expressed)*
2	moderate (or medium) *(moderately expressed)*
3	strong *(strongly expressed)*

State	Example 1 **Stem: attitude**
1	erect
3	semi-erect
5	prostrate

TGP/9/1 “Examining Distinctness”

5.2 Approaches for assessing distinctness

5.2.1 Introduction

5.2.1.1 Approaches for assessment of distinctness based on the growing trial can be summarized as follows:

(a) **Side-by-side visual comparison** in the growing trial (see Section 5.2.2);

(b) **Assessment by Notes / single variety records (“Notes”):** the assessment of distinctness is based on the recorded state of expression of the characteristics of the variety (see Section 5.2.3);

(c) Statistical analysis of growing trial data:

Selection and Use of the Characteristics

Quantitative Characteristics: **distinctness**

As a general principle, a difference of **two States (Notes) to represent a clear difference if,** the **comparison** between two varieties is performed **at the level of States (Notes)**:

15. QN	MS(e)	**Fruit: weight** low medium high		3 5 7
16. QN	MS(e)	**Fruit: length** short medium long		3 5 7
17. QN	MS(e)	**Fruit: width** narrow medium broad		3 5 7

1 to 9 scale: **Notes 1 and 3**, **Notes 2 and 4**, Notes 3 and 5 **etc.** represent a clear difference

Selection and Use of the Characteristics

- **PSEUDO-QUALITATIVE** Characteristics

- 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.

← broadest part →		
(below middle)	at middle	(above middle)

broad (compressed) ← width (ratio length/width) → narrow (elongated)

		 3 linear			
		 4 oblong	 7 oblanceolate	 9 spatulate	
 1 triangular	 2 ovate	 5 elliptic	 8 obovate		 10 obtriangular
		 6 circular			

Color

Intensity

METHOD OF OBSERVATION

Method of Observation

M: Measurement:

an objective **observation against a calibrated, linear scale** e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.);

V: 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).

"Visual" observation refers to the sensory observations of the expert and, therefore, also **includes smell, taste and touch**.

Type of Record

(for the purposes of distinctness)

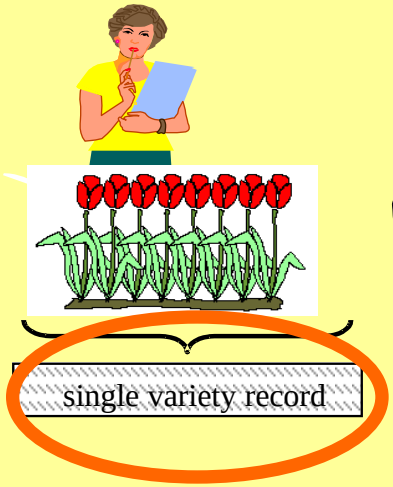
G: single record for a variety, or a **GROUP of plants** or parts of plants;

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.

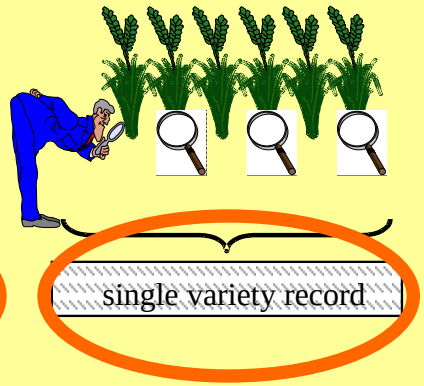
S: records for a number of **SINGLE**, individual **plants** or parts of plants …

Single record for a group of plants or parts of plants (G)

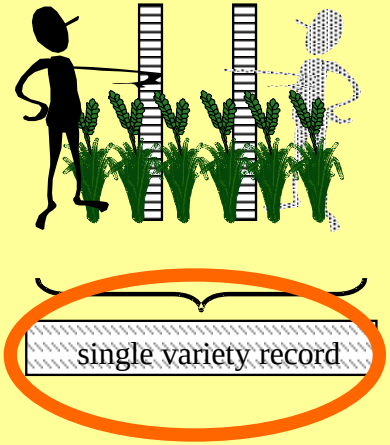
Section 4.3.2.3
Example (VG): Flower: type
(tulip: vegetatively propagated)



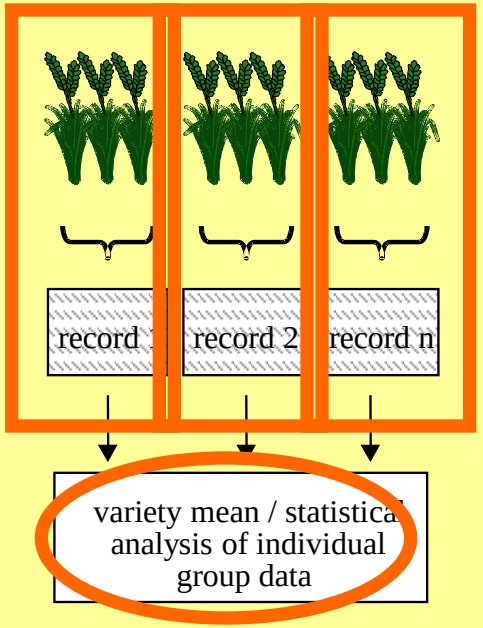
Section 4.3.2.3
Example (VG): Lowest leaf: hairiness of leaf sheaths
(barley: self-pollinated)



Section 4.3.2.3
Example (MG): Plant: height
(wheat: self-pollinated)

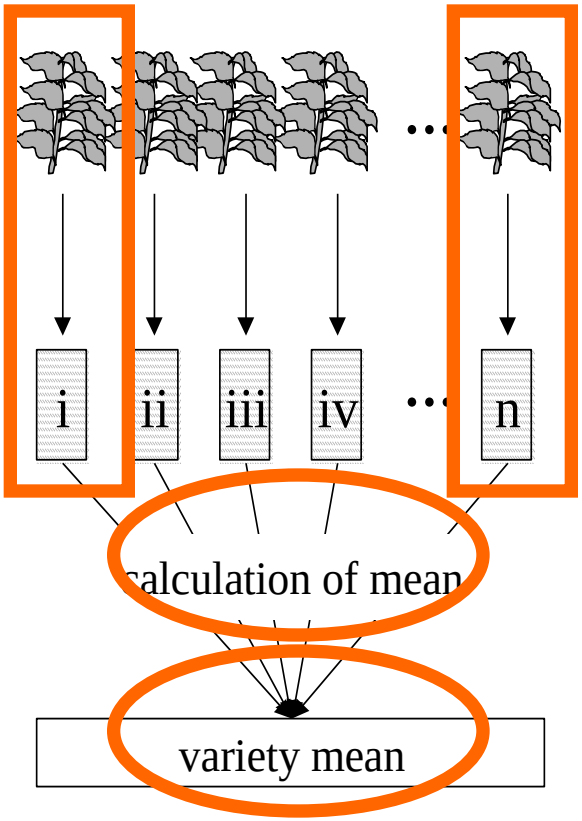


Section 4.3.2.4
Example: (statistical analysis)

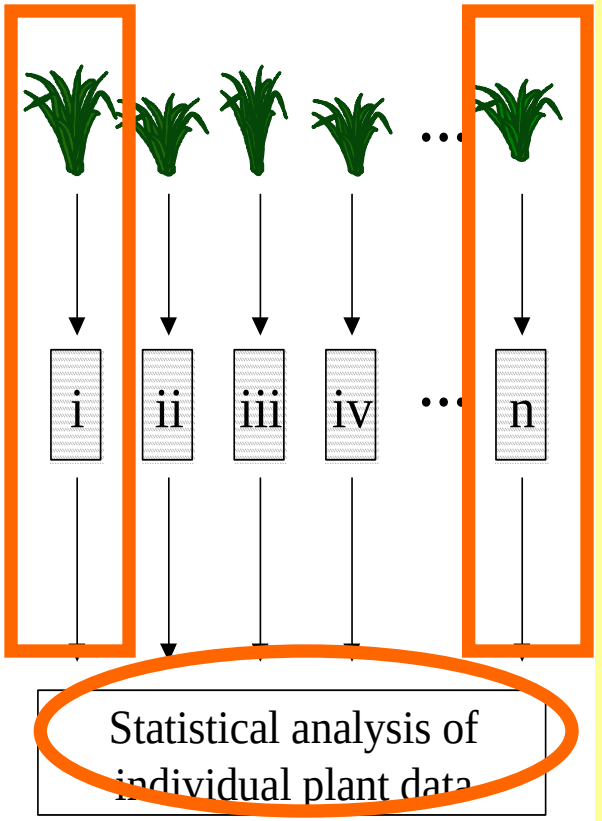


Records for a number of single, individual plants or parts of plants (S)

Section 4.3.3.1
Example (MS): Leaflet: length
(pea: self-pollinated)



Section 4.3.3.2
Example (MS): Plant: natural height
Example (VS): Plant: growth habit
(ryegrass: cross-pollinated)



EXAMPLE VARIETIES

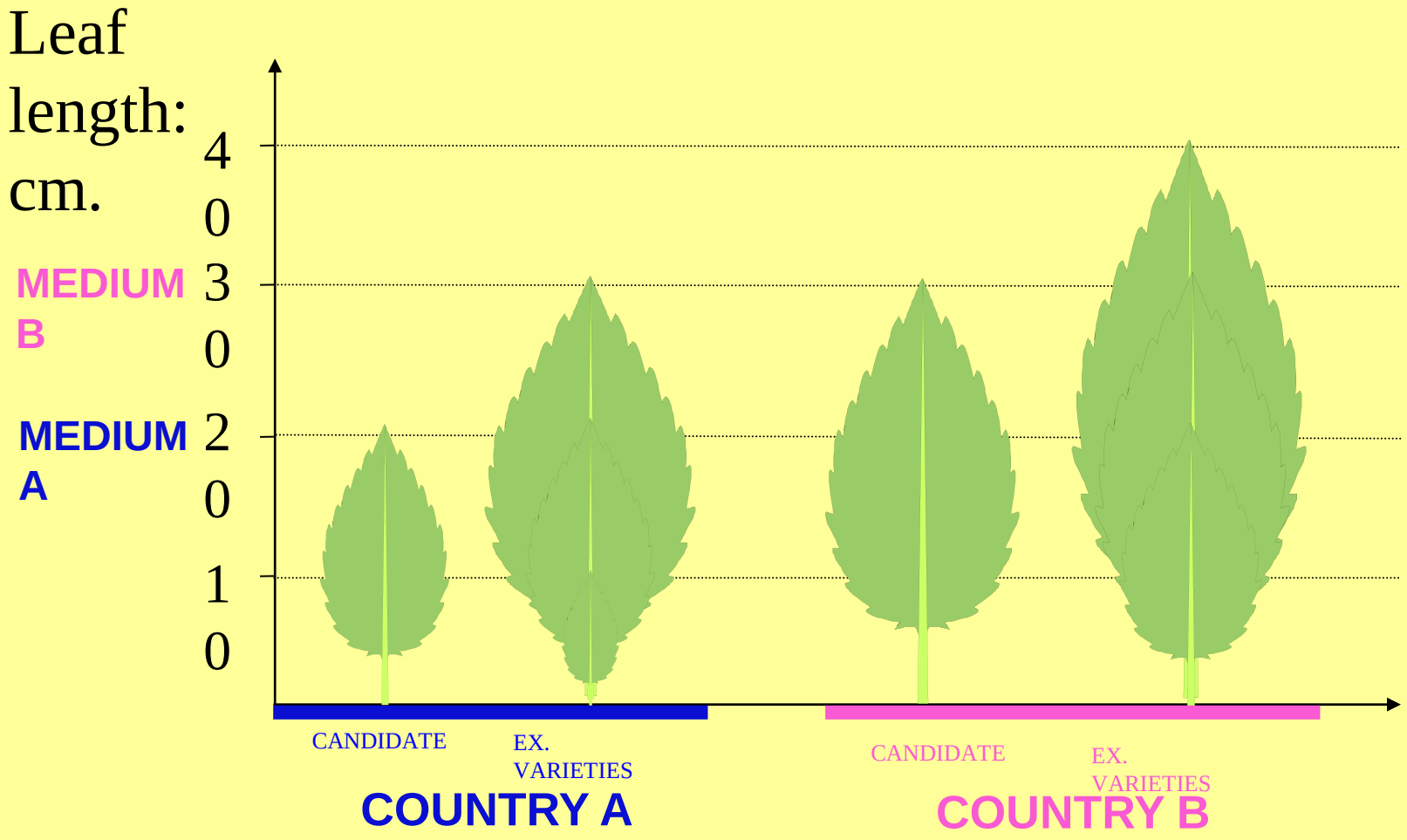
Example Varieties: the Objective

Clarify states of expression

- **Illustrate characteristics**
- **Determine the state of expression**

Harmonized descriptions

Example Varieties versus Measurements



Example Varieties –the need

NO NEED

- illustration available (e.g. photo) and
- characteristics NOT used to harmonize descriptions or
- characteristics NOT influenced by the environment

Example Varieties – the need

NEED

in characteristics USED TO HARMONIZE descriptions

and

WHICH ARE influenced by the environment

Example Varieties - availability

widely and freely available

- National Authority
- DUS examiners
- Breeders

Example Varieties within the collection

must show the range of expression in the collection

QN
- **3 : short**
- **5 : medium**
- **7 : long**

PQ:
- **cover the whole range**

Explanation on the Table of Characteristics

8. Explanations on the Table of Characteristics

[8.1 Explanations covering several characteristics

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

(a)

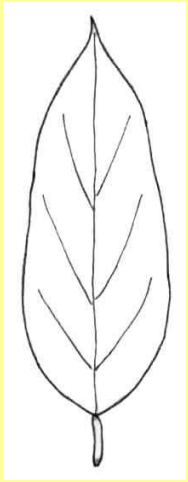
(b) etc.

8.2 Explanations for individual characteristics]

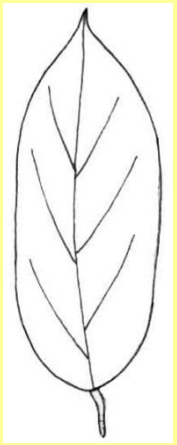
Ad. 1 etc.]

Explanation on the Table of Characteristics

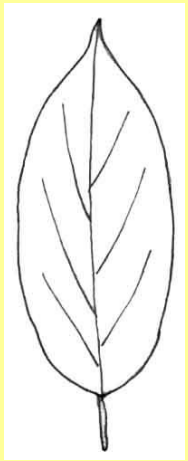
Ad.5: Leaf blade: shape



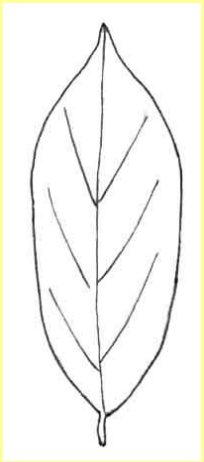
1
ovate



2
oblong



3
elliptic



4
obovate

Literature

9. Literature

Plant Varieties Protection Division, 2001 “Plant Germplasm Database for Durian” Department of Agriculture, Government Press, Bangkok, Thailand 154 Pages.

10. Technical Questionnaire

- to be completed by the applicant
- to be submitted to the PVP office together with the application form
- to provide the DUS growing trial with relevant information for conducting the DUS trial

Technical Questionnaire

Contents of the Technical Questionnaire

1. Subject of the Technical Questionnaires
2. Applicant
3. Proposed denomination and breeder's reference
4. Information on the breeding scheme and propagation of the variety
5. Characteristics of the variety to be indicated
6. Similar varieties and difference from these varieties
7. Additional Information
8. Authorization for release
9. Information on plant materials to be examined)
10. Signature

Testing the Guideline

- After drafting the test guideline, apply it
- Use it in the field and the workroom
- Does it work, is it practical, is it clear?

THANK YOU