



**TWC/26/23**

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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

**TECHNICAL WORKING PARTY ON AUTOMATION AND  
COMPUTER PROGRAMS**

**Twenty-Sixth Session**  
**Jeju, Republic of Korea, September 2 to 5, 2008**

DATA PROCESSING FOR (MEASUREMENTS OF) QUANTITATIVE  
CHARACTERISTICS IN SELF-POLLINATED CROPS FOR THE ASSESSMENT OF  
DISTINCTNESS AND VARIETY DESCRIPTION


*Document prepared by experts from Germany*


 Bundessortenamt

Workshop on trial design and data handling Jeju 2008

**Data processing for (measurements of)  
quantitative characteristics in self-pollinated crops  
for the assessment of distinctness and variety  
description**

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**Approaches for assessing distinctness  
UPOV – TGP/9 section 5.2**

- Side by side
- Notes
- Statistical analysis

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## Approach to get notes

For the assessment of distinctness and the description of varieties it is important to consider:

1. How many varieties are in the trial?
2. Do these varieties represent the whole variation of the known varieties or only a part of it?


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## Approach to get notes


3. What is the smallest appropriate difference between two varieties which can be considered to be clear and consistent for a characteristic?
4. How many notes are reasonable to describe the range over all varieties in the trial and in the whole collection?


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## Approach to get notes


5. Do you need measurements or are visual assessments sufficient?
6. In the case of measurements, is it possible to observe the characteristic on a group of plants (MG) or is it necessary to measure single plants (MS)?


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## Approach to get notes

It is important to answer these questions in the presented order!!

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## Decision rule (General Introduction)

For quantitative characteristics, a difference of two notes often represents a clear difference, but that is not an absolute standard...

Depending on factors,....., a clear difference may be more or less than two notes.


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## Example

Barley (Winter barley)  
Hordeum vulgare L. sensu lato  
UPOV – Code: HORDE\_VUL


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## Table of characteristics (measurements)

### Barley

Plant:	length	MG
Awn:	length (compared to ear)	MS
Ear:	length	MS
Rachis:	length of first segment	MS

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## Example: Plant length

### Measurements in cm (MG)

Notes for description:

1	very short
3	short
5	medium
7	long
9	very long

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## Method of observation

MG: Single Measurement of a group of plants or part of plants for the assessment of distinctness


MS: Measurement of a number of individual plants or part of plants for the assessment of distinctness

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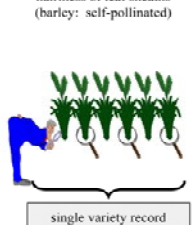
## TGP/9/1 Single record for a group of plants or part of plants (G)

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



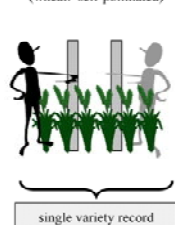
single variety record

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



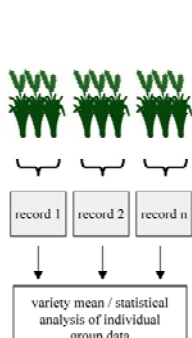
single variety record

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



single variety record

*Section 4.3.2.4*  
Example: (statistical analysis)



record 1   record 2   record n

variety mean / statistical analysis of individual group data

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## TGP/9/1

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

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

Diagram description: A stack of leaflets is shown above a series of boxes labeled i, ii, iii, iv, ..., n. Arrows point from each box to a central point labeled 'calculation of mean', which then points to a box labeled 'variety mean'.

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

Diagram description: A row of plants is shown above a series of boxes labeled i, ii, iii, iv, ..., n. Arrows point from each box to a box labeled 'Statistical analysis of individual plant data'.

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## Over - determination

Statistical analysis on the basis of MS or on the basis of replicated MG for self-pollinated crops could lead to a so-called over-determination:

- too small differences could be declared as significant
- the direction of the difference could be different over years

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## Over - determination

Crop expert has to decide whether a minimum distance calculated by statistical procedures is appropriate to be considered as a clear difference

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## Fixing of states of expressions (Barley)

Char.: Plant length	States	from	to
- 241 varieties (146 registered varieties) One record per variety	• 1		≤ 69 cm
- mean of all varieties 90 cm	• 2	> 69	≤ 75 cm
- Mean of registered varieties 89 cm	• 3	> 75	≤ 81 cm
shortest variety 75 cm	• 4	> 81	≤ 87 cm
longest variety 105 cm	• 5	> 87	≤ 93 cm
$105 \text{ cm} - 75 \text{ cm} = 30 \text{ cm}$	• 6	> 93	≤ 99 cm
$30 \text{ cm} / 5 = 6 \text{ cm} \rightarrow$ width of states	• 7	> 99	≤ 105 cm
	• 8	> 105	≤ 111 cm
	• 9	> 111 cm	

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## Fixing of states of expressions (Barley)

Char.: Plant length  
 $30 \text{ cm} / 5 = 6 \text{ cm} \rightarrow \text{width of states}$

The number of notes (here 5) has to be defined by the crop expert according to questions 3 and 4 (see slide 4)

3. What is the smallest appropriate difference ...?  
4. How many notes are reasonable to describe the range ...?

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## Thank you for your attention!

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