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REVISION SUGGESTIONS ON DOCUMENT TGP/8

Document prepared by an expert from China

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The annex to this document contains a presentation “Revision suggestions on document TGP/8”, made by an expert from China, at the fourth session of the TWM.

[Annex follows]

REVISION SUGGESTIONS ON DOCUMENT TGP/8

"TRIAL DESIGN AND TECHNIQUES USED IN THE EXAMINATION OF DISTINCTNESS, UNIFORMITY AND STABILITY"

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TWM4, Cambridge, Jun 2 to 5, 2026

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1. THE ROLE OF TGP/8

Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability

Document reference	Issue	Title	Issue date
TGP/0	/17	List of TGP Documents and Latest Issue Dates	October 24, 2025
TGP/1		General Introduction with Explanations	not yet issued
TGP/2	/2	List of Test Guidelines Adopted by UPOV	October 16, 2014
TGP/3		Varieties of Common Knowledge	not yet issued
TGP/4	/1	Constitution and Maintenance of Variety Collections	April 11, 2008
TGP/5		Experience and Cooperation in DUS Testing	
Introduction		Introduction	October 30, 2008
Section 1	/3	Model Administrative Agreement for International Cooperation in the Testing of Varieties	November 2, 2018
Section 2	/4	UPOV Model Form for the Application for Plant Breeders' Rights	September 21, 2021
Section 3	/2	Technical Questionnaire to be Completed in Connection with an Application for Plant Breeders' Rights	October 29, 2015
Section 4	/2	UPOV Model Form for the Designation of the Sample of the Variety	October 30, 2008
Section 5	/2	UPOV Request for Examination Results and UPOV Answer to the Request for Examination Results	October 30, 2008
Section 6	/5	UPOV Report on Technical Examination and UPOV Variety Description	October 24, 2025
Section 7	/2	UPOV Interim Report on Technical Examination	October 30, 2008
Section 8	/2	Cooperation in Examination	October 29, 2015
Section 9	/2	List of Species in Which Practical Knowledge has Been Acquired or for Which National Test Guidelines Have Been Established	October 29, 2015
Section 10	/3	Notification of Additional Characteristics	October 16, 2014
Section 11	/1	Examples of Policies and Contracts for Material Submitted by the Breeder	October 30, 2008
TGP/6	/1	Arrangements for DUS Testing	
Section 1	/1	Introduction	April 6, 2005
Section 2	/1	Examples of Arrangements for DUS Testing	April 6, 2005
Section 3	/1	Declaration on the Conditions for the Examination of a Variety Based on Trials Carried Out by or on behalf of the Breeder	April 6, 2005
TGP/7	/11	Development of Test Guidelines	October 24, 2025
TGP/8	/5	Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability	October 28, 2022
TGP/9	/2	Examining Distinctness	October 29, 2015
TGP/10	/2	Examining Uniformity	November 1, 2019
TGP/11	/1	Examining Stability	October 20, 2011
TGP/12	/5	Guidance on Certain Physiological Characteristics	October 25, 2024
TGP/13	/1	Guidance for New Types and Species	October 22, 2009
TGP/14	/6	Glossary of Terms Used in UPOV Documents	October 27, 2023
TGP/15	/3	Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)	October 25, 2020

PART I: DUS TRIAL DESIGN AND DATA ANALYSIS

1. DUS TRIAL DESIGN
2. DATA TO BE RECORDED
3. MINIMIZING THE VARIATION DUE TO DIFFERENT OBSERVERS OF THE SAME TRIAL
4. VALIDATION OF DATA AND ASSUMPTIONS
5. CHOICE OF STATISTICAL METHODS FOR EXAMINING DISTINCTNESS
6. CYCLIC PLANTING OF VARIETIES FROM THE VARIETY COLLECTION TO REDUCE TRIAL SIZE

PART II: SELECTED TECHNIQUES USED IN DUS EXAMINATION

1. THE GAIA METHODOLOGY
2. PARENT FORMULA OF HYBRID VARIETIES
3. THE COMBINED OVER-YEARS CRITERIA FOR DISTINCTNESS (COYD)
4. 2X1% METHOD
5. PEARSON'S CHI-SQUARE TEST APPLIED TO CONTINGENCY TABLES
6. FISHER'S EXACT TEST
7. MATCH APPROACH
8. THE METHOD OF UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES
9. THE COMBINED-OVER-YEARS UNIFORMITY CRITERION (COYU)
10. UNIFORMITY ASSESSMENT ON THE BASIS OF THE RELATIVE VARIANCE METHOD
11. EXAMINING CHARACTERISTICS USING IMAGE ANALYSIS
12. EXAMINING CHARACTERISTICS ON THE BASIS OF BULK SAMPLES

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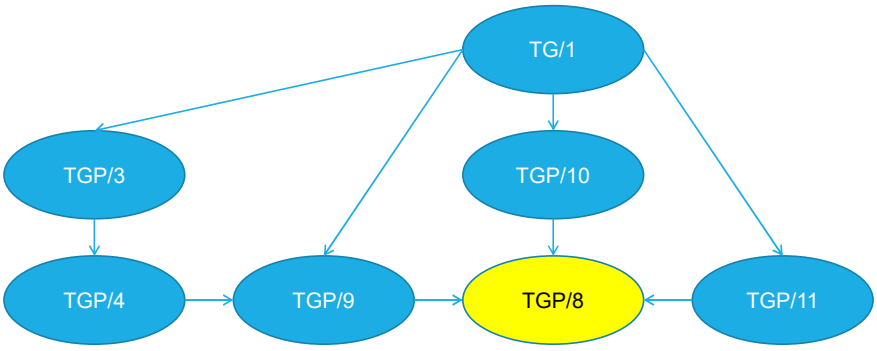
1. THE ROLE OF TGP/8

From theory to practice



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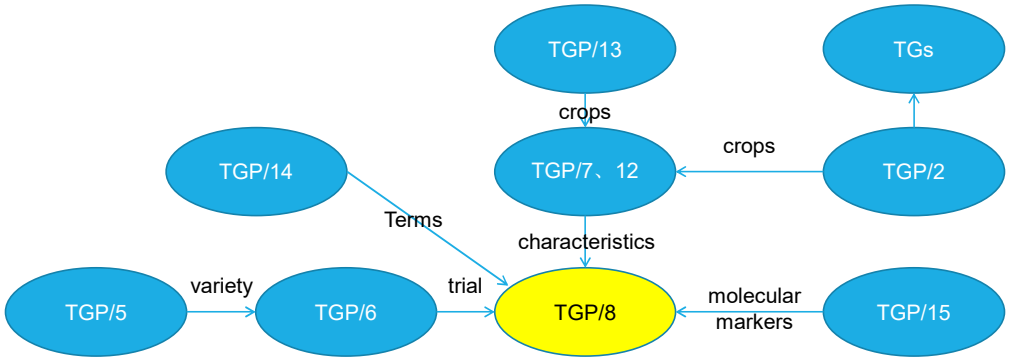
1. THE ROLE OF TGP/8

From elements to synthesis



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1. THE ROLE OF TGP/8

6 roles:

- Trial design techniques
- Data acquisition techniques
- Data analysis techniques
- Image analysis techniques
- Quality control and traceability techniques
- Automation techniques

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2. WHY REVISE

- Repetitive content
- Missing process
- Unsystematic structure

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2. WHY REVISE

- Repetitive content

2. DATA TO BE RECORDED

2.1 Introduction

Document TGP/9 Examining Distinctness, sections 4.4 and 4.5, provide the following guidance on the type of observation for distinctness in respect of the type of characteristic and the method of propagation of the variety:

'4.4 Recommendations in the UPOV Test Guidelines

"The indications used in UPOV Test Guidelines for the method of observation and the type of record for the examination of distinctness, are as follows:

"Method of observation

"M: to be measured (an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.);

"V: to be observed visually (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(s)

"G: single record for a variety, or a group of plants or parts of plants;

"S: records for a number of single, individual plants or parts of plants

"For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

'4.5 Summary

"The following table summarizes the common method of observation and type of record for the assessment of distinctness, although there may be exceptions:

	Type of expression of characteristic		
Method of propagation of the variety	QL	PQ	QN
Vegetatively propagated	VG	VG	VG/MG/MS
Self-pollinated	VG	VG	VG/MG/MS
Cross-pollinated	VG/(VS*)	VG/(VS*)	VS/VG/MS/MG
Hybrids	VG/(VS*)	VG/(VS*)	**

* Records of individual plants only necessary if segregation is to be recorded.
** To be considered according to the type of hybrid."

A lot of copies from other TGP documents

Shape of ear:
1 = conical
2 = conico-cylindrical
3 = cylindrical

Comparison between difference in notes and weighting	Different in notes	Weighting
conical (1) vs. conical (1)	0	0
conical (1) vs. conico-cylindrical (2)	1	2
conical (1) vs. cylindrical (3)	2	6
conico-cylindrical (2) vs. conico-cylindrical (2)	0	0
conico-cylindrical (2) vs. cylindrical (3)	1	2
cylindrical (3) vs. cylindrical (3)	0	0

When the crop expert compares a variety 'i' with conical ear (note 1) to a variety 'j' with cylindrical ear (note 3), he attributes a weighting of 6 etc. The weightings are summarized in the form of a weighting matrix:

Weighting matrix		Variety 'j'		
		1	2	3
Variety 'i'	1	0	2	6
	2		0	2
	3			0

When the crop expert compares a variety i with conical ear (note 1) to a variety j with cylindrical ear (note 3), he attributes a weighting of 6.

1.3.5.2 Analysis of notes

1.3.5.2.1 In qualitative analysis notes (1 to 9) are used. Notes can come from qualitative, quantitative and pseudo-quantitative characteristics.

1.3.5.2.2 For each characteristic, weightings according to differences between levels of expression are pre-defined in a matrix of distances.

1.3.5.2.3 "Shape of ear": observed on a 1 to 3 scale, the crop expert has attributed weightings greater than zero to differences which they consider significant:

1 = conical
2 = conico-cylindrical
3 = cylindrical

	Variety 'j'		
Variety 'i'	1	2	3
1	0	2	6
2		0	2
3			0

1.3.5.2.4 When the crop expert compares a variety 'i' with conical ear (note 1) to a variety 'j' with cylindrical ear (note 3), they attribute a weighting of 6.

Same contents in 1.3.1 Weighting of characteristics, 1.3.2 Example of use, 1.3.5 Example of Zea mays data

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2. WHY REVISE

- Missing process
  - Converting measured data to notes.
  - Selection of similar varieties.
  - Optimal sample size calculation methods.

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2. WHY REVISE

- Unsystematic structure

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The content lacks depth or hierarchy.

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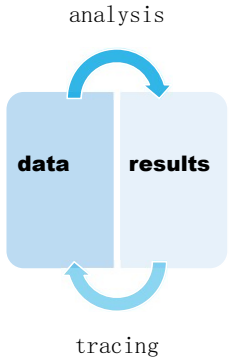
3. HOW TO REVISE

- Principles:
  - Based on the principles of genetics
  - Based on the principles of statistics
  - Take data as the source of analysis
  - Take results as the starting point of tracing



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3. HOW TO REVISE

Part 1 Principles of genetics

1. Relationship of genotype and phenotype
2. Breeding methods
3. Genetic basis of DUS

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3. HOW TO REVISE

Part 2 Principles of statistics

1. Trial design: repetition, randomization and local control
2. Statistical hypothesis testing and two types of errors
3. Analysis of Variance
4. Analysis of Differences significance
5. Correlation and Clustering analysis

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3. HOW TO REVISE

Part 3 Data acquisition technology

1. Morphological data
2. Molecular data
3. Environmental parameters affecting expression of characteristics

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3. HOW TO REVISE

Part 4 Assessment of Distinctness, Uniformity and Stability

1. Validation of data
2. Assessment of trial and characteristics quality
3. Convert data to note / cluster analysis
4. Assessment of uniformity
5. Assessment of distinctness
6. Paternity Test

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THANK YOU FOR YOUR ATTENTION!

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[End of Annex and of document]