

**Technical Committee****TC/57/25****Fifty-Seventh Session  
Geneva, October 25 and 26, 2021****Original:** English  
**Date:** October 26, 2021

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**REPORT***adopted by the Technical Committee**Disclaimer: this document does not represent UPOV policies or guidance*

1. The Technical Committee (TC) held its fifty-seventh session via electronic means on October 25 and 26, 2021. The list of participants is reproduced in Annex I to this report.

2. The session was opened by Mr. Nik Hulse (Australia), Chairperson of the TC, who welcomed the participants.

Adoption of the agenda

3. The TC adopted the agenda as presented in document TC/57/1 Rev. 2.

Outcome of the consideration of documents by correspondence

4. The TC considered document TC/57/14.

5. The TC noted the information on outcome of the procedure for consideration of documents by correspondence, as reported in document TC/57/14.

Report by the Vice Secretary-General on developments in UPOV

6. The TC noted that a video presentation in English, with subtitles in English, French, German and Spanish, had been made available on the TC/57 webpage in advance of the session. A copy of the presentation was provided in document TC/57/INF/8.

7. The Vice Secretary-General reported that Ms. Nadia Gianoli had started working at UPOV under an agency contract, since September 1, 2021 to provide cover for the maternity leave of Urska Cerv.

Progress report on the work of the Technical Working Parties and the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT)

8. The TC noted that the Technical Working Party for Agricultural Crops (TWA), Technical Working Party on Automation and Computer Programs (TWC), Technical Working Party for Ornamental Plants and Forest Trees (TWO), Technical Working Party for Vegetables (TWV) and the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT) had held their sessions in 2021 via electronic means.

9. The TC noted that the reports from the Chairpersons on the work of the TWA, TWC, TWF, TWO, TWV and BMT were provided in documents TC/57/INF/9 and TC/57/INF/9 Add.

10. The TC considered document TC/57/24.

*Program of work for the TWPs in 2022*Technical Working Party on Testing Methods and Techniques

11. The TC considered the program of work for the TWM and agreed the following items to be considered at its first session, to be held in 2022, as set out in document TC/57/24, paragraph 7:

*Opening, adoption of the agenda and short reports*

1. Opening of the Session
2. Adoption of the agenda
3. Short reports on developments in plant variety protection:
  - (a) Reports from members and observers (written reports to be prepared by members and observers)
  - (b) Report on developments within UPOV (report by the Office of the Union)

*Guidance and cooperation*

4. Development of guidance and information materials (documents to be prepared by the Office of the Union)
5. Increasing participation in the work of the TC and the TWPs (document to be prepared by the Office of the Union)
6. Cooperation in examination (document to be prepared by the Office of the Union)
7. Information and databases (documents invited)
  - (a) UPOV PRISMA (document to be prepared by the Office of the Union)
  - (b) UPOV information databases (document to be prepared by the Office of the Union)
  - (c) Variety description databases including databases containing molecular data (papers invited)
8. Variety denominations (document to be prepared by the Office of the Union)

*Software and statistical analysis methods for DUS examination*

9. Statistical tools and methods for DUS examination (documents invited)
  - (a) Comparison of results obtained for COYD and COYU procedures using different software (document to be prepared by France)
  - (b) Development of software for the improved COYU method (splines) (document to be prepared by the United Kingdom)
  - (c) Extrapolation in relation to COYU (document to be prepared by the United Kingdom and documents invited)
10. Exchange and use of software and equipment (document to be prepared by the Office of the Union and documents invited)
  - Development of Statistical Analysis Software: DUSCEL (document to be prepared by China)

*Phenotyping and image analysis*

11. Phenotyping and image analysis (documents invited)

*Molecular techniques*

12. Molecular Techniques and bioinformatics (document to be prepared by the Office of the Union and documents invited)
13. Methods for analysis of molecular data, management of databases and exchange of data and material (papers invited)
14. Report of work on molecular techniques in relation to DUS examination (papers invited)
15. The use of molecular techniques in examining essential derivation<sup>1</sup> (papers invited)
16. The use of molecular techniques in variety identification<sup>2</sup> (papers invited)
17. The use of molecular techniques for enforcement<sup>2</sup> (papers invited)

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<sup>1</sup> "Breeders day"

18. Cooperation between international organizations (document to be prepared by the Office of the Union and papers invited)
19. Confidentiality, ownership and access to molecular data, including model agreement template<sup>2</sup> (papers invited)
20. Session to facilitate cooperation (possible break-out sessions)

*Future program, report and closing*

21. Date and place of the next session
22. Future program
23. Adoption of the Report on the session (if time permits)
24. Closing of the session

Technical Working Party for Agricultural Crops

*Date and place of the next session*

12. The TC considered the proposal from the United Kingdom and agreed that the fifty-first session of the TWA be held in Cambridge, from May 23 to 27, 2022.

Discussion items at the Technical Working Parties in 2022

13. The TC approved the program of work for the TWP sessions in 2022, as presented in the respective meeting reports and in annexes III to VI to document TC/57/24. The TC agreed that the programs of work should be proposed for approval by the Council, at its session to be held on October 29, 2021.

Matters arising from the Technical Working Parties

14. The TC considered documents TC/57/3 and TC/57/3 Add. and noted developments in the TWV, TWO, TWA, TWF and TWC concerning:

- (i) Access to plant material for the purpose of management of variety collections and DUS examination;
- (ii) DUS examination of mutant varieties of apple;
- (iii) Use of disease resistance characteristics;
- (iv) Experiences with new types and species;
- (v) Procedures for grouping varieties using UPOV codes and relevant information sources;
- (vi) Providing information on similar varieties in the UPOV model variety description;
- (vii) Assessing ornamental crops using individual plant measurements (MS);
- (viii) New technologies in DUS examination;
- (ix) Matters relevant in DUS examination for the fruit sector;
- (x) Big Data Platform for DUS Examination; and
- (xi) Phenotyping and image analysis.

Development of guidance and information materials

*Matters for adoption by the Council in 2021*

15. The TC noted that document TC/57/4 Rev. had been considered by correspondence.
16. The TC noted that decisions on document TC/57/4 Rev. had been taken and the following documents had been approved by the TC by correspondence as provided in document TC/57/14, paragraphs 10 to 20:

- |              |   |
|--------------|---|
| UPOV/INF/16: | Exchangeable Software (Revision) (on the basis of document UPOV/INF/16/10 Draft 2)  |
| UPOV/INF/17: | Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction ("BMT Guidelines") (Revision) (on the basis of document UPOV/INF/17/2 Draft 6) |

- UPOV/INF/22: Software and Equipment Used by Members of the Union (Revision) (on the basis of document UPOV/INF/22/8 Draft 2)
- UPOV/INF/23: UPOV Code System (on the basis of document UPOV/INF/23/1 Draft 3)

17. The TC noted that comments on document UPOV/INF/23 had been received from the European Union in response to Circular E-21/122 of August 23, 2021, which had not resulted in a revision of the document.

18. The TC noted the report from the Office of the Union that the documents above had been approved by the CAJ and adopted by the Council on September 21, 2021, in the procedure by correspondence (see documents CAJ/78/12 “Outcome of consideration of documents by correspondence”, paragraph 35; and C/55/12 “Outcome of consideration of documents by correspondence”, paragraph 32).

*Possible future revisions of guidance and information materials*

19. The TC considered documents TC/57/5 and TC/57/5 Add.

(a) Information document

*Document UPOV/INF/16 “Exchangeable software”*

20. The TC noted that the Office of the Union had received a proposal from China to include software “DUS Excel - Data Analysis System for DUS Testing of Plant Varieties” in document UPOV/INF/16. A copy of the user manual was provided as Annex I to document TC/57/5 (in English only).

21. The TC noted the report from the TWC, at its thirty-ninth session, that the software “DUS Excel - Data Analysis System for DUS Testing of Plant Varieties” was still under development. The TC noted that the TWC had agreed to invite experts to contact China for cooperation in the further development of the software and had agreed to invite China to report developments at the first session of the TWM.

(b) TGP documents

*TGP/5 Section 6: UPOV Report on Technical Examination and UPOV Variety Description*

TESTING FACILITY AND LOCATION

22. The TC agreed to revise document TGP/5 Section 6, chapters “UPOV Report on Technical Examination” and “UPOV Variety Description”, to read as follows:

- Chapter: UPOV Report on Technical Examination

13. Testing ~~station~~ facility(ies) and ~~place~~ location(s)

[...]

16. Date and document number of UPOV Test Guidelines

17. Date and/or document number of Reporting Authority’s test guidelines

- Chapter: UPOV Variety Description

Item 11 to read “Testing ~~station~~ facility(ies) and ~~place~~ location(s)”

ADDITIONAL INFORMATION TO BE INCLUDED IN DUS TEST REPORTS

23. The TC noted the comments from the TWPs, at their sessions in 2021, on the proposal to revise document TGP/5, Section 6 “UPOV Report on Technical Examination and UPOV Variety Description” to include additional information in DUS test reports and alternative approaches to enhance the use of existing DUS test reports.

24. The TC noted the invitation from the TWF for the expert from New Zealand to make a presentation at its fifty-third session, on what should be required as information to enhance the use of existing DUS test reports.

25. The TC agreed to discontinue discussions on a possible future revision of document TGP/5, Section 6, to address additional information to be included in DUS test reports, for the time being.

*Document TGP/8: Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability (Revision)*

DATA PROCESSING FOR THE PRODUCTION OF VARIETY DESCRIPTIONS FOR MEASURED QUANTITATIVE CHARACTERISTICS

26. The TC considered documents TC/57/6 and TC/57/6 Add.

27. The TC agreed to include guidance on “Different forms that variety descriptions could take and the relevance of scale levels” in document TGP/8 Part I Section 2 “Data to be recorded” as new Section 2.5, as set out in the Annex to document TC/57/6.

28. The TC agreed to invite members of the Union to propose the inclusion of software incorporating their methods for converting observations into notes in document UPOV/INF/16 or document UPOV/INF/22, as appropriate, with a reference to the availability of such methods in document TGP/8 Part I, new Section 2.5.

THE COMBINED-OVER-YEARS UNIFORMITY CRITERION (COYU)

29. The TC considered documents TC/57/7 and TC/57/7 Add.

30. The TC noted that software for COYU Splines was under evaluation and was planned to be implemented in the United Kingdom from 2022.

31. The TC noted that evaluation versions of software for COYU Splines were made available in August 2021.

32. The TC noted the invitation for members of the Union to participate in the test campaign of the COYU Splines software and report outcomes to the expert from the United Kingdom by December 31, 2021

33. The TC agreed to request the TWC to prepare a report of the results of the test campaign of the software for COYU Splines for consideration by the TC, at its fifty-eighth session, in conjunction with the revision of document TGP/8.

New proposals

*Document UPOV/INF/12 “Explanatory Notes on Variety Denominations under the UPOV Convention”*

PROPOSAL TO REVISE THE DENOMINATION CLASS 201

34. The TC considered a proposal to revise document UPOV/INF/12/5, Annex I, Part II “Classes encompassing more than one genus” and agreed to propose the inclusion of genus *xTrititrigia* in the variety denomination Class 201, as follows:

LIST OF CLASSES (Part II)

*Classes encompassing more than one genus*

	Botanical names	UPOV codes
Class 201	<i>Secale, Triticale, Triticum, <del>xTrititrigia</del></i>	SECAL; TRITL; TRITI; <u>TRITI</u>

*Document UPOV/INF/23 “UPOV Code System”*

35. The TC considered a proposal to clarify the maximum number of characters to be used in the appended element to UPOV codes, as set out in document UPOV/INF/23 “UPOV Code System”, and agreed to request the Office of the Union to develop a proposal for consideration by the TWPs and the TC, at their sessions in 2022.

*Document TGP/7 "Development of Test Guidelines"*

## ADDITION OF STATE OF EXPRESSION AND PLACEMENT OF NON-ASTERISKED DISEASE RESISTANCE CHARACTERISTICS IN SECTION 5 OF THE TECHNICAL QUESTIONNAIRE

36. The TC considered a proposal to revise document TGP/7, GN 13 "Characteristics with specific functions" to clarify that disease resistance characteristics should be presented in Section 5 of Technical Questionnaires with the addition of a state of expression "not tested", when a characteristic was not indicated with an asterisk at the table of characteristics.

37. The TC noted that there were ongoing discussions at the TWPs on the relationship between asterisks in the Test Guidelines and TQ characteristics. The TC agreed to postpone considering the placement of non-asterisked disease resistance characteristics in the TQ until its fifty-eighth session, to be considered in conjunction with any proposals from the TWPs on the relationship between asterisks in the Test Guidelines and TQ characteristics.

## INDICATION OF GROUPING CHARACTERISTICS IN UPOV TEST GUIDELINES (TABLE OF CHARACTERISTICS AND TQ 5)

38. The TC considered a proposal to add the indication of grouping characteristics in the Table of Characteristics and Technical Questionnaire of UPOV Test Guidelines.

39. The TC agreed to request the Office of the Union to develop a proposal for the TWPs and the TC, at their sessions in 2022, to indicate characteristics in the Table of Characteristics and Technical Questionnaire when used as grouping characteristics. The proposal should consider the introduction of such functionality in the Web-based TG Template and the required revision of document TGP/7 "Development of Test Guidelines".

## EXAMPLE VARIETIES FOR ASTERISKED QUANTITATIVE CHARACTERISTICS WHEN ILLUSTRATIONS ARE PROVIDED

40. The TC considered a proposal to amend document TGP/7 GN 28, paragraph 1.3 (iii) to read as follows:

"(iii) If a characteristic is important for the international harmonization of variety descriptions (asterisked characteristics) and is influenced by the environment and cannot be illustrated by photographs or drawings in a meaningful way (most quantitative and pseudo-qualitative characteristics) or example varieties are necessary for illustration of the characteristic (see Section 3.1) it is necessary to provide example varieties."

41. The TC agreed to request the TWPs, at their sessions in 2022, to consider the proposal to amend document TGP/7 to remove the requirement to provide example varieties for asterisked quantitative characteristics when illustrations were provided and to clarify the situations when example varieties would still be required.

## CONVERTING THE STANDARD WORDING IN THE TEST GUIDELINES TEMPLATE, PARAGRAPH 4.2.2, INTO ADDITIONAL STANDARD WORDING (ASW).

42. The TC considered a proposal to convert the following standard wording in the "Uniformity" chapter of Test Guidelines into additional standard wording:

"4.2.2 These Test Guidelines have been developed for the examination of [type or types of propagation] varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species", Section 4.5: "Testing Uniformity" should be followed."

43. The TC agreed to request the TWPs, at their sessions in 2022, to consider the proposal to amend document TGP/7 "Development of Test Guidelines" to convert the standard wording in the Test Guidelines template, paragraph 4.2.2, into additional standard wording (ASW).

Document TGP/12 'Guidance on certain physiological characteristics'

USE OF DISEASE RESISTANCE CHARACTERISTICS

44. The TC agreed to amend document TGP/12/2, Section 2.3.2, to replace state of expression "moderately resistant" by "intermediate" in the example of disease resistance characteristic with '1-3' scale, to read as follows:

“Example with “1–3” scale: Resistance to *Sphaerotheca fuliginea* (*Podosphaera xanthii*)  
“(Powdery mildew) in Melon (UPOV Test Guidelines: TG/104/5)

	English	Example Varieties	Note
<b>70. VG (+)</b>	<b>Resistance to <i>Sphaerotheca fuliginea</i> (<i>Podosphaera xanthii</i>) (Powdery mildew)</b>		
<b>70.1</b>	<b>Race 1</b>		
QN	susceptible	[...]	1
	<del>moderately resistant</del> intermediate	[...]	2
	highly resistant	[...]	3

45. The TC noted that the word “highly” was only used for the resistant state of expression and agreed to invite the TWV to consider the example further.

Program for the development of relevant information materials

46. The TC agreed the program for the development of TGP documents and relevant information materials, on the basis of Annexes I and II to document TC/57/5 and its conclusions at the session.

47. The TC noted that the program for the development of TGP documents and information materials would be considered by the Administrative and Legal Committee, at its seventy-eighth session, to be held in Geneva on October 27, 2021, in conjunction with the conclusions of the TC at its fifty-seventh session.

Molecular techniques

48. The TC considered document TC/57/8 by correspondence. The TC noted that decisions on document TC/57/8 had been taken by the TC by correspondence as provided in document TC/57/14, paragraphs 21 to 24, and reproduced below:

“21. The TC considered document TC/57/8.

“22. The TC noted that on October 16, 2020, the Office of the Union issued Circular E-20/189 inviting members to complete the survey on the use of molecular marker techniques, by December 15, 2020, and noted the results of the survey on the use of molecular marker techniques by members, per crop as set out in the Annex I to document TC/57/8.

“23. The TC requested the Office of Union to inform OECD of the result of the survey and to report on the developments at the TC, at its fifty-eighth session.

“24. The TC approved the draft joint document explaining the principal features of the systems of OECD, UPOV and ISTA, as set out in Annex II to document TC/57/8 and to inform OECD and ISTA accordingly.”

49. The TC noted that comments had been received from the European Union in response to Circular E-21/122 of August 23, 2021, that had not resulted in a revision of the document

50. The TC considered document TC/57/8 Add..

*Cooperation between international organizations*

Lists of possible joint initiatives with OECD and ISTA in relation to molecular techniques

51. The TC agreed to propose the following topics for a future joint UPOV/OECD/ISTA workshop:

- (i) providing information on the use of molecular techniques in each organization;
- (ii) procedure for approval of biochemical and molecular methods in each organization; and
- (iii) possibilities for harmonizing terms, definitions and methods between UPOV, OECD and ISTA.

52. The TC agreed to request the Office of the Union to contact OECD and ISTA to explore suitable dates for a future joint workshop, such as in conjunction with the first session on the TWM, to be held in September 2022.

53. The TC agreed to continue the survey on the use of molecular markers to obtain information from a greater number of members and to investigate the reasons for members not responding to the first survey.

Cooperation in examination

54. The TC considered document TC/57/9.

55. The TC noted that members of the Union had the possibility to update information on a person(s) to be contacted for matters concerning international cooperation in DUS examination by:

(i) updating information when invited to provide information for document TC/[xx]/4 "List of genera and species for which authorities have practical experience in the examination of distinctness, uniformity and stability"; and/or

(ii) notifying the Office of the Union by sending an e-mail to [upov.mail@upov.int](mailto:upov.mail@upov.int)

56. The TC noted the development of a package of compatible IT tools to address the technical and related administrative concerns that prevent cooperation in DUS examination, as reported in paragraphs 9 to 14 of document TC/57/9.

57. The TC noted that the development of a platform for UPOV member databases containing variety description information would depend on UPOV members indicating which databases they would wish to share.

58. The TC noted that the use of machine translation technology would be considered within a review of UPOV's policy on translation.

59. The TC noted that the CAJ, at its seventy-eighth session would consider:

(i) the policy or legal barriers identified by the TC as preventing international cooperation in DUS examination and possible measures to address those barriers; and

(ii) proposals for developing guidance to encourage members of the Union, on a voluntary basis, to take-over DUS test reports when the applicants could not submit plant material due to phytosanitary or other related issues.

60. The TC noted that the impact of the proposed measures would be assessed on the basis of the number of cooperation agreements reported by members of the Union, as presented in document C/[xx]/INF/5 "Cooperation in examination".

Increasing participation in the work of the TC and the TWPs

61. The TC considered document TC/57/10.



*Participation at the TC and TWP meetings by electronic means*

62. The TC noted the participation at the TWP sessions in 2021, as presented in Annex I to document TC/57/10.

*Possible measures for physical and virtual participation at TWP meetings*

63. The TC noted the comments by the TWPs, at their sessions in 2021, on possible measures for physical and virtual participation at TWP meetings, as presented in Annex II to document TC/57/10.

*Proposals for increasing participation in the work of the Technical Working Parties*

64. The TC agreed the following measures for physical and virtual participation at TWP meetings, as set out in paragraphs 11 to 13 of document TC/57/10:

(a) Virtual preparatory workshops prior to the TWPs

- The virtual preparatory workshops would be organized as a series of webinars.
- The content of the virtual preparatory workshops would be agreed by the TC under agenda item "Preparatory Workshops".
- The content would be organized according to themes (e.g. drafting of Test Guidelines, molecular techniques in DUS testing, DUS testing methods, image analysis).
- Arrangements for the webinars would be finalized by the Office of the Union in coordination with the chairpersons of the TC and TWPs (e.g. dates, number of webinars required to cover content, speakers and panelists).
- The virtual preparatory workshops would replace the preparatory workshops held before each individual TWP. The series of webinars would open for experts from all TWPs.
- The webinars would be recorded and maintained online until replaced by an updated version. The Office of the Union would organize a webpage to host the videos (e.g. UPOV YouTube channel).

(b) Comments and questions on TWP meeting documents to be provided in advance of the sessions

- Participants would be invited to provide written comments on meeting documents in advance of the sessions, in the same way as in 2020 and 2021.
- The compilation of written comments would be circulated to registered participants one week prior to the session.
- Comments received in advance would be included in the discussions on the respective agenda item during the session.

(c) Alternating one year of physical meeting with one year of virtual meeting

- The TWP sessions would be scheduled one year as a virtual meeting and the following year as a physical meeting (e.g. 2023: virtual; 2024: physical).
- There would be at least two virtual TWP meetings in a calendar year, thereby ensuring that experts would be able to participate electronically in all discussions on Test Guidelines, TGP and TWP documents.
- Technical visits via virtual means: there would be an open invitation for any UPOV member to make a presentation on aspects of their testing systems through presentations, videos or live online demonstrations (e.g. DUS examination for particular crops, testing procedures, image analysis, trial layout).
- The timing of a particular virtual TWP session would be discussed by the TWP when planning the agenda for the forthcoming session.

(d) Electronic participation at physical TWP sessions

- The TWP host or the Office of the Union should provide a meeting platform for electronic participation in Test Guidelines subgroup meetings at physical TWP sessions. This measure should enable participation of crop experts otherwise not attending TWP sessions.
- The hosts of TWP physical meetings should participate in deciding how to organize virtual participation in Test Guidelines subgroup discussions.

(e) Technical Working Party on Testing Methods and Techniques (TWM)

- The TWM will meet electronically in 2022 and will assess the need to meet physically in the future, according to the range of topics to be covered.

(f) Reporting and review of measures

65. The TC agreed to invite the Office of the Union to report on the measures adopted for review and consideration by the TC, at its fifty-eighth session.

66. The TC agreed to request the Office of the Union to conduct a survey on the needs of members and observers in relation to TWPs and report to the TC at its fifty-eighth session.

Information and databases

(a) UPOV information databases

67. The TC considered document TC/57/11.

Amending the UPOV code system to provide information on variety groups or types

68. The TC noted that the TWPs, at their sessions in 2021, had agreed with the proposal for amending the UPOV code system, as set out in document UPOV/INF/23/1 Draft 2.

Proposals for amending UPOV codes

69. The TC noted that the proposals for amending UPOV codes presented in document TC/57/11 were made on the basis that they would be made in conjunction with the adoption of document UPOV/INF/23/1.

70. The TC noted that members of the Union and contributors of data to the PLUTO database would be informed of the changes to UPOV codes and the date of the changes by means of a circular in advance.

UPOV codes for *Beta vulgaris*

71. The TC agreed to amend the UPOV codes for *Beta vulgaris* L. subsp. *vulgaris*, as reproduced in Annex I to document TC/57/11.

72. The TC agreed to append information to UPOV codes for *Beta vulgaris* L. subsp. *vulgaris* to establish the following groups:

- (i) Fodder beet group: Class 2.1 ("21FB"),
- (ii) Sugar beet group: Class 2.1 ("21SB"),
- (iii) Beetroot group: Class 2.2 ("22BR"),
- (iv) Leaf beet group: Class 2.2 ("22LB").

73. The TC agreed that information on denomination classes in document UPOV/INF/12 would need to be updated as follows:

	<u>Botanical names</u>	<u>UPOV codes</u>
Class 2.1	<i>B. vulgaris</i> L. ssp. <i>vulgaris</i> (synonym to <i>B. vulgaris</i> L. var. <i>alba</i> DC.), <i>B. vulgaris</i> L. ssp. <i>vulgaris</i> (synonym to <i>B. vulgaris</i> L. var. <i>altissima</i> )	BETAA_VUL_VUL_21FB; BETAA_VUL_VUL_21SB
Class 2.2	<i>Beta vulgaris</i> ssp. <i>vulgaris</i> var. <i>conditiva</i> Alef. (synonym to <i>B. vulgaris</i> L. var. <i>rubra</i> L.), <i>B. vulgaris</i> L. var. <i>cicla</i> L., <i>B. vulgaris</i> L. ssp. <i>vulgaris</i> var. <i>vulgaris</i>	BETAA_VUL_VUL_22BR; BETAA_VUL_VUL_22LB
Class 2.3	<i>Beta</i> other than classes 2.1 and 2.2.	other than classes 2.1 and 2.2

UPOV codes for *Brassica oleracea*

74. The TC agreed to amend the botanical names for *Brassica oleracea* in accordance with GRIN, with the consequent changes to the UPOV codes in relation to groups, as provided in the Appendix to Annex II of document TC/57/11.

75. The TC agreed appending information to the UPOV code for *Brassica oleracea* L. var. *capitata* L. (BRASS\_OLE\_GC) to create variety groups or types for White and Red Cabbage, as follows:

- (i) White Cabbage: 1W (e.g. BRASS\_OLE\_GC\_1W)
- (ii) Red Cabbage: 2R (e.g. BRASS\_OLE\_GC\_2R)

UPOV codes for *Citrus*

76. The TC agreed to append information to UPOV code CITRU\_AUM to create groups “1MA” for mandarins; and “2OR” for oranges.

77. The TC agreed to amend the UPOV code CITRU\_AUM, following the reclassification of *Citrus clementina* hort. ex *Tanaka* (UPOV code: CITRU\_CLE) as a synonym of *Citrus aurantium* L. (UPOV code: CITRU\_AUM), as set out in Annex III to document TC/57/11.

78. The TC agreed with the proposal from the TWF for partial revision of the Test Guidelines for Citrus to move obsolete species from the “principle botanical names” box to the “alternative botanical names”.

UPOV codes ZEAAA\_MAY\_SAC, ZEAAA\_MAY\_EVE and ZEAAA\_MAY\_MIC

79. The TC agreed to delete the UPOV Codes ZEAAA\_MAY\_SAC, ZEAAA\_MAY\_EVE and ZEAAA\_MAY\_MIC, that would be covered by the UPOV code ZEAAA\_MAY\_MAY.

80. The TC agreed to append information on variety types or groups to the UPOV code ZEAAA\_MAY\_MAY to establish the following variety types or groups:

- (i) Corn; Maize: “1MA”,
- (ii) Sweet Corn: “2SW”,
- (iii) Popcorn: “3PO”.

Additional proposals for amending UPOV codes considered by the TWP in 2021

UPOV code for *Aloe aristata*

81. The TC agreed to delete the UPOV Code ALOEE\_ARI, as set out in paragraph 37 of document TC/57/11.

UPOV code for *Dicentra species*

82. The TC agree to delete the UPOV Code DICEN\_SPE, as set out in paragraph 41 of document TC/57/11.

(b) *Web-based TG template*

83. The TC considered document TC/57/12.

84. The TC noted that the web-based TG template and database of approved characteristics would be migrated to cloud servers by 2022. This migration would also involve an upgrade to new technologies to address issues reported by users and to enable use for drafting individual authorities' test guidelines.

85. The TC noted that interviews with UPOV members would be conducted to collect requirements of members of the Union for the development of individual authorities' test guidelines using the web-based TG template.

86. The TC noted that training on the web-based TG template could be organized upon request.

Preparatory workshops

87. The TC considered document TC/57/13 by correspondence. The TC noted that a decision on document TC/57/13 had been taken by the TC by correspondence as provided in document TC/57/14, paragraph 27, and reproduced below:

“27. The TC agreed to organize preparatory workshops as a series of webinars, to be organized at suitable dates according to the schedule of TWP sessions in 2022, in conjunction with workshops with physical participation, where requested, as set out in paragraphs 20 to 21 of document TC/57/13.”

Matters for information

88. The TC noted the following documents under item 14 “Matters for information”:

- (a) List of genera and species for which authorities have practical experience in the examination of distinctness, uniformity and stability (document TC/57/INF/4)
- (b) UPOV information databases (document TC/57/INF/3)
- (c) UPOV PRISMA (document TC/57/INF/2)
- (d) Variety description databases (document TC/57/INF/5)
- (e) Molecular techniques (document TC/57/INF/6)
- (f) Variety denominations (document TC/57/INF/7)

Test Guidelines

89. The TC considered documents TC/57/2, TC/57/2 Add., TC/57/15, TC/57/16, TC/57/17, TC/57/18, TC/57/19, TC/57/20, TC/57/21, TC/57/22 and TC/57/23.

*Revision of Technical Questionnaires of test guidelines*

Proposals for partial revisions of Test Guidelines

90. The TC noted that the following Test Guidelines had been proposed to be partially revised for the inclusion of characteristics in the Technical Questionnaires:

- TWV

TG reference	Test Guidelines Common Name
TG/2/7	Maize
TG/13/11	Lettuce
TG/49/8 Corr.	Carrot
TG/55/7 Rev. 5	Spinach
TG/61/7 Rev. 2	Cucumber, Gherkin
TG/104/5 Rev.	Melon
TG/119/4	Vegetable Marrow, Squash
TG/142/5	Watermelon
TG/294/1 Corr. Rev. 2	Tomato Rootstocks

- TWO:

TG reference	Test Guidelines Common Name
TG/11/8 Rev.	Rose

- TWA:

TG reference	Test Guidelines Common Name
TG/2/7	Maize
TG/3/12	Wheat
TG/276/1	Hemp

- TWF:

TG reference	Test Guidelines Common Name
TG/53/7 Rev.	Peach
TG/84/4 Corr. 2 Rev.	Japanese Plum
TG/98/7 Rev. Corr.	Actinidia
TG/187/2	Prunus Rootstocks

91. The TC noted that the TWV had invited interested experts to discuss characteristics for inclusion in the Technical Questionnaires for Carrot, Cucumber, Lettuce, Maize, Melon, Spinach, Squash, Tomato Rootstocks and Watermelon, including any elements of document TGP/7 that might need to be revised.

92. The TC noted that the TWO had invited the expert from the European Union to coordinate discussions to define characteristics for inclusion in the Technical Questionnaire for Rose, including any elements of document TGP/7 that might need revising.

93. The TC noted that a proposal for partial revision of the Test Guidelines for Hemp had been adopted, presented in document TC/57/19.

94. The TC noted that the TWA had invited the expert from the European Union to coordinate discussions among TWA and TWV experts to propose characteristics for inclusion in the Technical Questionnaire for Maize.

95. The TC noted that the TWA had invited the expert from the United Kingdom to coordinate discussions and present a proposal for the revision of the Technical Questionnaire for Wheat.

96. The TC noted that the TWA had invited experts discussing the partial revision of the Test Guidelines for Maize and Wheat to consider whether guidance in document TGP/7 concerning the relationship between asterisks in the Test Guidelines and TQ characteristics should be revised.

97. The TC noted that the proposals for partial revision of the Test Guidelines for Peach, Japanese Plum, Actinidia and Prunus Rootstocks had been adopted, as presented in documents TC/57/20, TC/57/21, TC/57/22 and TC/57/23, respectively.

Harmonization of Technical Questionnaires in the European Union

98. The TC noted the presentation made at the TWV, at its fifty-fifth session, on a “Project to harmonize Technical Questionnaires in the European Union”.

*Additional characteristics*

99. The TC noted the following additional characteristics notified to the Office of the Union since the fifty-sixth session of the TC:

- *Brassica napus* L.:
  - “Alpha-linolenic acid content”
- *Lolium perenne* L.:
  - “Plant: length in autumn of year of sowing”
- *Triticum aestivum* L.:
  - “Production of pollen (male sterility)”

100. The TC noted that the additional characteristics notified would be presented to the TWA, at its fifty-first session, for consideration on whether these should be posted on the TG Drafters’ webpage of the UPOV website and/or whether to initiate a revision of partial revision of the Test Guidelines concerned.

*Test Guidelines for adoption*

101. According to the procedures established in document TGP/7, the TC adopted two new Test Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, four revised Test Guidelines and eight partially revised Test Guidelines, as listed in the table below, on the basis of the amendments specified in Annex II to this document and the linguistic changes recommended by the TC-EDC and agreed that they should be published on the UPOV website at the earliest opportunity:

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name Nom botanique Botanischer Name Nombre botánico
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<u>NEW TEST GUIDELINES / NOUVEAUX PRINCIPES DIRECTEURS D'EXAMEN / NEUE PRÜFUNGSRICHTLINIEN / NUEVAS DIRECTRICES DE EXAMEN</u>							
MX	TWF	TG/JATRO_CUR (proj.5)	Physic Nut	Jatropha	Purgiernuss	Piñón mexicano	<i>Jatropha curcas</i> L.
QZ	TWF	TG/PISTA (proj.6)	Pistachio	Pistachier	Pistazie	Pistachero	<i>Pistacia vera</i> L.

<u>REVISIONS OF TEST GUIDELINES / RÉVISIONS DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / REVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES DE DIRECTRICES DE EXAMEN ADOPTADAS</u>							
FR	TWO	TG/95/4(proj.4)	Lagerstroemia	Lagerstroemia	Lagerstroemia	Lagerstroemia	<i>Lagerstroemia</i> L.
HU	TWF	TG/70/5(proj.6)	Apricot	Abricotier	Marille, Aprikose	Albaricoquero	<i>Prunus armeniaca</i> L.
JP	TWO	TG/197/2(proj.4)	Eustoma	Eustoma	Eustoma	Eustoma	<i>Eustoma exaltatum</i> (L.) Salisb. ex G. Don subsp. <i>russellianum</i> (Hook.) Kartesz
GB	TWO	TG/281/2(proj.3)	Echinacea	Echinacée	Echinacea, Igelkopf	Equinàcea	<i>Echinacea</i> Moench

<u>PARTIAL REVISIONS OF TEST GUIDELINES / RÉVISIONS PARTIELLES DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / TEILREVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES PARCIALES DE DIRECTRICES DE EXAMEN ADOPTADAS</u>							
NL	TWV	TG/13/11 Rev.2 (proj.2)	Lettuce	Laitue	Salat	Lechuga	<i>Lactuca sativa</i> L.
	TWF	TG/53/7 Rev. 2 (proj.1)	Peach	Pêcher	Pfirsich	Durazno, Meocotonero	<i>Prunus persica</i> (L.) Batsch
	TWF	TG/84/4 Corr. 2 Rev. 2(proj.1)	Japanese Plum	Prunier japonais	Ostasiatische Pflaume	Ciruelo japonés	<i>Prunus salicina</i> Lindl.

	TWF	TG/98/7 Rev. 2 (proj.1)	Actinidia	Actinidia	Kiwi	Kiwi	<i>Actinidia</i> Lindl.
	TWF/TWO	TG/187/2 Rev. (proj.1)	Prunus Rootstocks	Porte-greffes de prunus	Prunus-Unterlagen	Portainjertos de prunus	<i>Prunus</i> L.
NL	TWV	TG/244/1 Rev. (proj.2)	Wild Rocket	Roquette sauvage	Wilde Rauke	Roqueta silvestre	<i>Diploaxis tenuifolia</i> (L.) DC.
NL	TWV	TG/245/1 Rev. (proj.2)	Garden Rocket	Roquette cultivée	Ölrauke	Roqueta	<i>Eruca sativa</i> Mill.
	TWA	TG/276/1 Rev. (proj.1)	Hemp	Chanvre	Hanf	Cáñamo	<i>Cannabis sativa</i> L.

102. UPOV has adopted 336 Test Guidelines, all of which are freely available on the UPOV website ([http://www.upov.int/test\\_guidelines/en/](http://www.upov.int/test_guidelines/en/)).

103. On the basis of the recommendations of the TC-EDC, as set out in Annex II of this document, the TC agreed there were editorial clarifications required from the leading experts for the following draft Test Guidelines:

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name Nom botanique Botanischer Name Nombre botánico

NEW TEST GUIDELINES / NOUVEAUX PRINCIPES DIRECTEURS D'EXAMEN / NEUE PRÜFUNGSRICHTLINIEN / NUEVAS DIRECTRICES DE EXAMEN							
MX	TWO	TG/ZINNI (proj.10)	Zinnia	Zinnia	Zinnia	Zinnia	<i>Zinnia xmarylandica</i> D. M. Spooner et al. , <i>Zinnia elegans</i> Jacq. , <i>Zinnia angustifolia</i> Kunth , <i>Zinnia peruviana</i> (L.) L.

REVISIONS OF TEST GUIDELINES / RÉVISIONS DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / REVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES DE DIRECTRICES DE EXAMEN ADOPTADAS							
FR	TWV	TG/37/11(proj.8)	Turnip	Navet	Mairübe	Nabo	<i>Brassica rapa</i> L. var. <i>rapa</i>
FR	TWO	TG/68/4(proj.5)	Berberis	Berberis	Berberitze	Berberis	<i>Berberis</i> L.
KE	TWA	TG/238/2(proj.5)	Tea	Théier	Tee	Té	<i>Camellia sinensis</i> (L.) Kuntze

104. On the basis of the recommendations of the TC-EDC, as set out in Annex II of this document, the TC agreed there were technical issues to be resolved on the partial revision of the Test Guidelines for Tomato Rootstocks (document TC/57/18) which should be addressed by the TWV at its fifty-sixth session.

#### Corrections to Test Guidelines

105. The TC noted the following corrections made to the adopted Test Guidelines for Actinidia and Phalaenopsis:

- Test Guidelines for Actinidia (document TG/98/7 Rev. Corr.)
  - Characteristic 47: correction of spelling of example variety “Hort16A (A)” (instead of Hort16 (A))
  - Characteristic 63: correction of spelling of example variety “Abbott” (instead of “Abott”)
  - Characteristic 72: correction of notes (1, 2, 3, 4 instead of 1, 2, 3, 5)
  - Ad. 50: in the legend of the grid, “elongated” replaced with “high” and “compressed” with “low”
- Test Guidelines for Phalaenopsis (document TG/213/2 Rev. Corr.)
  - Characteristic 20: to be indicated as QN instead of PQ
  - Characteristic 79: to add missing method of observation (VG)
  - Ad. 12: to read “..., the darker color is considered to be the main color.” instead of “..., the darkest color...”

*Draft Test Guidelines discussed by the TWPs in 2021*

106. The TC noted the draft Test Guidelines discussed by the TWPs, at their sessions in 2021, as listed in Annex III to document TC/57/2.

*Draft Test Guidelines to be discussed by the TWPs in 2022*

107. The TC agreed to request a partial revision of the Test Guidelines for Blueberry (document TG/137/5) to be considered by the TWF, at its session in 2022, with Ms. Nahida Bhuiyan (Australia) as Leading Expert and revision of the following elements:

- Expansion of the scope to include *V. darrowii*;
- Char. 14: to delete example variety 'Ridley' from note 2
- Ad. 8: to replace the illustration for the state of expression "lanceolate"

108. The TC agreed to request a full revision of the Test Guidelines for Fodder Beet (document TG/150/3) to be considered by the TWA, at its session in 2022, with Ms. Anne-Lise Corbel (France) as Leading Expert.

109. The TC agreed with the program for the development of new Test Guidelines and for the revision of adopted Test Guidelines, as set out in Annex IV to document TC/57/2.

*Status of existing Test Guidelines or draft Test Guidelines*

110. The TC noted the status of the existing Test Guidelines or draft Test Guidelines, as listed in Annex V to document TC/57/2.

*Superseded Test Guidelines*

111. The TC noted the list of superseded Test Guidelines, as presented in Annex VI to document TC/57/2.

112. The TC noted that the superseded versions of Test Guidelines are available on the Test Guidelines page of the UPOV website.

Program for the fifty-eighth session

113. The TC proposed to discuss the following items at its next session:

1. Opening of the session
2. Adoption of the agenda
3. Report on developments in UPOV
4. Progress reports on the work of the Technical Working Parties
5. Matters arising from the Technical Working Parties
6. Guidance and Information materials
7. Molecular techniques
8. Cooperation in examination
9. Increasing participation of new members of the Union in work of the TC and the TWPs
10. Information and databases
  - (a) UPOV information databases
  - (b) UPOV PRISMA
  - (c) Exchange and use of software and equipment
  - (d) Variety description databases
  - (e) Web-based TG template
11. Preparatory workshops
12. Variety denominations
13. Discussion on: minimum distances between varieties
14. List of genera and species for which authorities have practical experience in the examination of distinctness, uniformity and stability
15. Test Guidelines



16. Program for the fifty-ninth session
17. Adoption of the report (if time permits)
18. Closing of the session

*114. The TC adopted this report at the close of its session on October 26, 2021.*

[Annex I follows]

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(in the alphabetical order of the French names of the Members)

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[Annex II follows]

AMENDMENTS TO THE DRAFT TEST GUIDELINES  
PRIOR TO THEIR ADOPTION AT THE FIFTY-SEVENTH SESSION OF  
THE TECHNICAL COMMITTEE (TC)

Partial revisions

**TC/57/15 Partial revision of the Test Guidelines for Garden Rocket**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/15 and agreed that the partial revision of the Test Guidelines for Garden Rocket be submitted to the TC for adoption.

**TC/57/16 Partial revision of the Test Guidelines for Wild Rocket**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/16 and agreed that the partial revision of the Test Guidelines for Wild Rocket be submitted to the TC for adoption.

**TC/57/17 Partial revision of the Test Guidelines for Lettuce**

The TC-EDC, at its meeting organized by electronic mean, on October 12 and 13, 2021, considered document TC/57/17 and made the recommendations presented in the table below.

The TC-EDC agreed that the partial revision of the Test Guidelines for Lettuce be submitted to the TC for adoption.

Ad. 53 (ii)	to read as follows
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(ii) DNA marker test

The gene *mo1* (with its recessive alleles *mo1<sup>1</sup>* or *mo1<sup>2</sup>*) gives resistance to LMV pathotype II. Alleles for resistance *mo1<sup>1</sup>* and *mo1<sup>2</sup>* and the dominant allele for susceptibility *mo1<sup>0</sup>* can be detected by the co-dominant marker as described by V. Nicaise *et al.* (2003). Specific aspects:

1.	Pathogen	<i>Lettuce mosaic virus</i> pathotype II
2.	Functional gene	<i>mo1</i> (with two recessive alleles for resistance <i>mo1<sup>1</sup></i> and <i>mo1<sup>2</sup></i> and one dominant allele for susceptibility <i>mo1<sup>0</sup></i> )
3.	Probes and primers for Taqman PCR	
3.1.	Assay 1	to distinguish <i>mo1<sup>1</sup></i> genotypes from <i>mo1<sup>0</sup></i> and <i>mo1<sup>2</sup></i> genotypes (6 base deletion at nucleotide position 344-349):

Probe	DNA sequence '5-'3	Fluorophore color (optional)
Pr-del-mo1	GGCTCAAGGAGCTGACTTCTATTG	Texas Red (Susceptible)
Pr-del-mo1 <sup>1</sup>	GGCTCATGACTTCTATTG	6FAM-MGB (Resistant <i>mo1</i> <sup>1</sup> )

Primers	DNA sequence '5-'3
Fw-del-mo1	CAACAACATACATCGACCAA
Rev-del-mo1	CTTCCCACTTAGGCTCGAT

Sequence amplicon: '5-'3

The amplicon sequence of the *mo1*<sup>0</sup> and *mo1*<sup>2</sup> allele:

TTACAACAACATACATCGACCAAGCAAGTTGGCTCAAGGAGCTGACTTCTATTGTTTCAAGAA  
TAAAATCGAGCCTAAGTGGGAAGACC

The amplicon sequence of the allele for resistance *mo1*<sup>1</sup>:

TTACAACAACATACATCGACCAAGCAAGTTGGCTCATGACTTCTATTGTTTCAAGAATAAAATC  
GAGCCTAAGTGGGAAGACC

3.2. Assay 2 to distinguish *mo1*<sup>2</sup> genotypes from *mo1*<sup>0</sup> and *mo1*<sup>1</sup> genotypes (SNP at nucleotide position 228):

Probe	DNA sequence '5-'3	Fluorophore color (optional)
Pr-SNP228- <i>mo1</i>	CTCCCTCTGCTAAGTC	6FAM-MGB (Susceptible)
Pr-SNP228- <i>mo1</i> <sup>2</sup>	ACTCCCTCTCCTAAGT	VIC-MGB (Resistant <i>mo1</i> <sup>2</sup> )

Primers	DNA sequence '5-'3
Fw-SNP228- <i>mo1</i>	GATCCGCTCGAGCATTC
Rev-SNP228- <i>mo1</i>	CTACCCCAAGCGACTTGCTT

Sequence amplicon: '5-'3

The amplicon sequence of the *mo1*<sup>0</sup> and the *mo1*<sup>1</sup> allele:

TCAGCATCCGCTCGAGCATTCTTGGACTTTCTGGTTTCGATACTCCCTCTGCTAAGTCCAAGCA  
AGTCGCTTGGGGTAGTTCCATGCGCC

The amplicon sequence of the allele for resistance *mo1*<sup>2</sup>:

TCAGCATCCGCTCGAGCATTCTTGGACTTTCTGGTTTCGATACTCCCTCTCCTAAGTCCAAGCA  
AGTCGCTTGGGGTAGTTCCATGCGCC

4.	Format of the test	
4.1	Number of plants per genotype	at least 20 plants
4.2	Control varieties	Homozygous allele for susceptibility <i>mo1</i> <sup>0</sup> present: Sprinter, Sucrine Homozygous allele for resistance <i>mo1</i> <sup>1</sup> present: Capitan, Kanaryole Homozygous allele for resistance <i>mo1</i> <sup>2</sup> present: Corianas Mix DNA to have heterozygous controls
5.	Preparation	
5.1	Preparation DNA	Harvest per individual plant a part of a young leaf. Isolate total DNA with a standard DNA isolation protocol.
5.2	Preparation PCR	Pipette each DNA sample and a commercial real-time PCR mastermix into individual wells for assay 1 and for assay 2. Analyse the samples in a real-time PCR machine capable of reading the fluorophores of all the probes, with reaction conditions suitable for the mastermix used.
6.	PCR conditions	(detailed test protocol available through Naktuinbouw <sup>2</sup> (NL))

<sup>2</sup> Naktuinbouw: resistentie@naktuinbouw.nl

	Assay 1:	<table border="1"> <tr> <td></td> <td>Temperature</td> <td>Time</td> <td>Ramping speed</td> </tr> <tr> <td>Initial activation of enzyme</td> <td>95°C</td> <td>2' 00"</td> <td></td> </tr> <tr> <td>40 cycles</td> <td>95°C</td> <td>0' 15"</td> <td>5°C/sec</td> </tr> <tr> <td></td> <td>65°C</td> <td>0' 48"</td> <td>5°C/sec</td> </tr> </table>		Temperature	Time	Ramping speed	Initial activation of enzyme	95°C	2' 00"		40 cycles	95°C	0' 15"	5°C/sec		65°C	0' 48"	5°C/sec							
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	Assay 2:	<table border="1"> <tr> <td></td> <td>Temperature</td> <td>Time</td> <td>Ramping speed</td> </tr> <tr> <td></td> <td>95°C</td> <td>2' 00"</td> <td></td> </tr> <tr> <td>40 cycles</td> <td>95°C</td> <td>0' 15"</td> <td>5°C/sec</td> </tr> <tr> <td></td> <td>60°C</td> <td>0' 48"</td> <td>5°C/sec</td> </tr> </table> <p>Analysis at end point RFU.</p>		Temperature	Time	Ramping speed		95°C	2' 00"		40 cycles	95°C	0' 15"	5°C/sec		60°C	0' 48"	5°C/sec							
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x	(x) (FAM RFU >> VIC RFU)	Heterozygous <i>mo1<sup>0</sup>mo1<sup>2</sup></i> or <i>mo1<sup>1</sup>mo1<sup>2</sup></i>																							
-	-	No result, repeat test																							
7.2	Validation of the test	Control varieties should give the expected results.																							
8.	Interpretation of data in terms of UPOV characteristic states	The combination of the two PCR assays leads to the following predicted result in a bio-assay with LMV pathotype II:																							
		<table border="1"> <tr> <td></td> <td></td> <td colspan="3"><b>Assay 2 (<i>mo1<sup>2</sup></i>)</b></td> </tr> <tr> <td></td> <td></td> <td><b>absent</b></td> <td><b>present homozygous</b></td> <td><b>heterozygous</b></td> </tr> <tr> <td rowspan="3"><b>Assay 1 (<i>mo1<sup>1</sup></i>)</b></td> <td><b>absent</b></td> <td>susceptible (<i>mo1<sup>0</sup></i>)</td> <td>resistant (<i>mo1<sup>2</sup></i>)</td> <td>susceptible (<i>mo1<sup>0</sup>/mo1<sup>2</sup></i>)</td> </tr> <tr> <td><b>present homozygous</b></td> <td>resistant (<i>mo1<sup>1</sup></i>)</td> <td>-</td> <td>-</td> </tr> <tr> <td><b>heterozygous</b></td> <td>susceptible (<i>mo1<sup>0</sup>/ mo1<sup>1</sup></i>)</td> <td>-</td> <td>not yet validated</td> </tr> </table>			<b>Assay 2 (<i>mo1<sup>2</sup></i>)</b>					<b>absent</b>	<b>present homozygous</b>	<b>heterozygous</b>	<b>Assay 1 (<i>mo1<sup>1</sup></i>)</b>	<b>absent</b>	susceptible ( <i>mo1<sup>0</sup></i> )	resistant ( <i>mo1<sup>2</sup></i> )	susceptible ( <i>mo1<sup>0</sup>/mo1<sup>2</sup></i> )	<b>present homozygous</b>	resistant ( <i>mo1<sup>1</sup></i> )	-	-	<b>heterozygous</b>	susceptible ( <i>mo1<sup>0</sup>/ mo1<sup>1</sup></i> )	-	not yet validated
		<b>Assay 2 (<i>mo1<sup>2</sup></i>)</b>																							
		<b>absent</b>	<b>present homozygous</b>	<b>heterozygous</b>																					
<b>Assay 1 (<i>mo1<sup>1</sup></i>)</b>	<b>absent</b>	susceptible ( <i>mo1<sup>0</sup></i> )	resistant ( <i>mo1<sup>2</sup></i> )	susceptible ( <i>mo1<sup>0</sup>/mo1<sup>2</sup></i> )																					
	<b>present homozygous</b>	resistant ( <i>mo1<sup>1</sup></i> )	-	-																					
	<b>heterozygous</b>	susceptible ( <i>mo1<sup>0</sup>/ mo1<sup>1</sup></i> )	-	not yet validated																					

	<p>Heterozygous plants (<math>mo1^0mo1^1</math> or <math>mo1^0mo1^2</math>) are predicted to be susceptible in the bio-assay, as <math>mo1^1</math> and <math>mo1^2</math> are recessive alleles.</p> <p>Heterozygous plants <math>mo1^1mo1^2</math> need a conclusion from a bio-assay.</p> <p>Varieties showing a mixture of genotypes (heterozygous plants <math>mo1^0mo1^1</math>, <math>mo1^0mo1^2</math> or homozygous <math>mo1^0</math> plants (susceptible predicted phenotype) and homozygous <math>mo1^1</math> or <math>mo1^2</math> plants (resistant predicted phenotype)) are predicted to be non-uniform in the bio-assay.</p> <p>In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether the variety is resistant due to on another mechanism.</p>
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**TC/57/18 Partial revision of the Test Guidelines for Tomato Rootstocks**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/18 and made the recommendations presented in the table below.

The TC-EDC agreed there were technical issues to be resolved on the partial revision of the Test Guidelines for Tomato Rootstocks (indicated below by “#”) which should be addressed by the TWV at its fifty-sixth session.

#Char. 22, Ad. 22	to check whether to reduce the scale to 3 notes or to improve the explanation about scoring the characteristic using all notes on the scale of 5 notes.
#Ad. 22, 9.1, 9.4, 11.3	to improve the explanation clarifying how would germination effect the scoring of the characteristic
Ad. 22, 9.1	to read “... due to nematode <del>or not</del> ”
Ad. 22, 9.2	to read “at least 2, preferably 3 <del>to allow statistical analysis</del> ”
Ad. 22, 9.6	to read “20-26°C, the temperature <del>may</del> should be ...”
Ad. 22, 10.2	to read “ <del>the ratio is depending of</del> <u>Quantity of inoculum depends on</u> aggressiveness of test and <del>lab's</del> <u>growing</u> conditions (e.g. between 30 g to 60 g of infested roots, for 100 plants in a tray of 45*30 cm containing approximately 5.5 kg of substrate);, galls should be homogeneously mixed with soil.”
Ad. 22, 10.4	to read “ <del>plants</del> seed sown in soil contaminated with galls.”
Ad. 22, 11.4	to be deleted
Ad. 22, 12.	- in the figure, blue text: “Tyonoc” should read “Tyonic” - to add the following wording: “Absent [1] distribution of plants in the classes comparable with the susceptible controls. “Present [9] distribution of plants in the classes comparable with the resistant controls.”
TQ 5.7 to 5.10	to delete 5.7 and add name of char to 5.8 to 5.9 (as in 5.12-5.17 and 5.18-5.20)

**TC/57/19 Partial revision of the Test Guidelines for Hemp**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/19 and agreed that the partial revision of the Test Guidelines for Hemp be submitted to the TC for adoption.

**TC/57/20 Partial revision of the Test Guidelines for Actinidia**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/20 and agreed that the partial revision of the Test Guidelines for Actinidia be submitted to the TC for adoption.

**TC/57/21 Partial revision of the Test Guidelines for Japanese Plum**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/21 and agreed that the partial revision of the Test Guidelines for Japanese Plum be submitted to the TC for adoption.

**TC/57/22 Partial revision of the Test Guidelines for Peach**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/22 and agreed that the partial revision of the Test Guidelines for Peach be submitted to the TC for adoption.

The TC-EDC agreed that the translation correction presented in the table below be made in the Test Guidelines for Peach in conjunction with the partial revision.

Char. 49	to correct DE translation of state 1 to read “sehr gering” in the table of characteristics
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**TC/57/23 Partial revision of the Test Guidelines for Prunus Rootstocks**

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TC/57/23 and agreed that the partial revision of the Test Guidelines for Prunus Rootstocks be submitted to the TC for adoption.

New Test Guidelines

Physic Nut ( <i>Jatropha curcas</i> L.)	TG/JATRO_CUR(PROJ.5)	Mr. Alejandro Barrientos-Priego (MX)	TWF	*
	No. of chars.: 30 No. of (*) chars.: 10	(Interested experts: BR, IL, QZ)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/JATRO\_CUR(proj.5) and made the recommendations presented in the table below.

The TC-EDC agreed that the draft Test Guidelines for Physic Nut be submitted to the TC for adoption.

Char. 7	to read “Leaf blade: serration <del>on</del> of margin”
8.1 (a)	to read “Observations should be made on mature leaves taken from the middle third of the current’s season’s shoots.”
8.1 (b)	to read “Observations should be made on mature leaves taken from the middle third of the current season shoots and attached adjacent to the inflorescence.”
Ad. 6	to delete “cordate”

Pistachio ( <i>Pistacia vera</i> L.)	TG/PISTA(PROJ.6)	Ms. Urszula Braun-Mlodecka (QZ)	TWF	*
	No. of chars.: 37 No. of (*) chars.: 17	(Interested experts: AU, ES, IT, KE, MX, ZA)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/PISTA (proj.6) and made the recommendations presented in the table below.

The TC-EDC agreed that the draft Test Guidelines for Pistachio be submitted to the TC for adoption.

8.1 (b)	to read “Observations should be made on fully developed leaves from the middle third of the current season shoots.”
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Zinnia ( <i>Zinnia xmarylandica</i> D. M. Spooner et al.; <i>Z. angustifolia</i> Kunth; <i>Zinnia elegans</i> Jacq.; <i>Zinnia haageana</i> Regel; <i>Zinnia peruviana</i> (L.) L.)	TG/ZINNI(PROJ.10)	Mr. Jose Mejía Muñoz (MX)	TWO	*
	No. of chars.: 36 No. of (*) chars.: 20	(Interested experts: CN, FR, GB, IL, JP, KR, NL, QZ, US, CIOFORA)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/ZINNI(proj.10) and made the recommendations presented in the following table.

The TC-EDC agreed there were editorial clarifications required from the leading expert on the draft Test Guidelines for Zinnia (indicated below by "#") and agreed to reconsider the draft Test Guidelines at its meeting to be held in March 2022.

Cover page	to spell "Peruvian zinnia" and "Wild zinnia" with a capital "Z"
#2.3	to check whether to read: "The minimum quantity of plant material, to be supplied by the applicant, should be: <del>"F1 hybrids Self-pollinated varieties:</del> a sufficient quantity of seed to produce a minimum of 15 plants. "Cross-pollinated varieties: a sufficient quantity of seed to produce a minimum of 40 plants."
#3.4.1	to check whether to read "In the case of <del>F1 hybrids self-pollinated varieties</del> , each test ..."
#4.1.4	"In the case of <del>F1 hybrids cross-pollinated varieties</del> , unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observation made on all plants in the test, disregarding any off-type plants. In the case of <del>cross-self-pollinated varieties</del> , unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 10 plants or parts taken from each of 10 plants and any other observation made on all plants in the test, disregarding any off-type plants."
#4.2.4	to check whether to read "For the assessment of uniformity of <del>F1 hybrids self-pollinated varieties</del> , a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 15 plants, 1 off-type is allowed."
#Char. 2	to check whether "Profusion Red" is correctly indicated in note 4, or whether it should be note 3
#Chars. 12, 13	to check whether to add explanation "Observations should be made on the upper side of a typical leaf."
Char. 26	to read "Ray floret: degree of curvature"
Chars. 28 to 34	to delete "of inner side" (see 8.1 (b))
8.1 (a)	to read "Observations should be made on <del>the upper side of a typical leaf</del> <u>leaves</u> from the middle third of the stem."
#Ad. 4	to check whether to improve contrast of illustrations (provide illustration with white background for better contrast)
#9.	to review formatting and complete references (see document TGP/7, GN 30)
#TQ 4.2	to check whether to be adjusted according to proposed changes in sections 3.4.1, 4.1.4 and 4.2.4



Revisions










Turnip ( <i>Brassica rapa</i> L. var. <i>rapa</i> )	TG/37/11(PROJ.8)	Mr. Dominique Rousseau (FR)	TWV	*
	No. of chars.: 32 No. of (*) chars.: 16	(Interested experts: TWA, CA, CN, CZ, DE, ES, GB, IT, JP, KR, NL, PL, QZ, US, ZA, CLI, Euroseeds, ISF)		

The TC-EDC, at its meeting, organized by electronic means, on October 12 and 13, 2021, considered document TG/37/11(proj.8) and made the recommendations presented in the table below.

The TC-EDC agreed there were editorial clarifications required from the leading expert on the draft Test Guidelines for Turnip (indicated below by "#") and agreed to reconsider the draft Test Guidelines at its meeting to be held in March 2022.

Char. 3	- state 4 to read "semi-erect to horizontal" - state 5 to read "horizontal"
Char. 6	- to delete (b) - to add (+) (see comment on 8.1 (b))
Char. 7	to delete (b)
Char. 9	- to read "Leaf: depth of the incisions of margin of upper part of the leaf" with states "absent or very shallow" to "very deep" - to be moved after Char. 7
#Char. 22	- state 2 to read "broad oblate" - state 5 to read "broad oblong" - state 7 to read "narrow obovate" - to renumber states (see comment on grid in Ad. 22)
8.1 (b)	- to move the first part referring to the number of lobes to Ad. 6 - to read "Parts of the leaf blade are considered to be <u>lobes</u> <del>lobed</del> if: ..." - to delete reference to char. 6 from the illustration and legend currently at the bottom of (b)
#Ad. 1	-to check whether 20 plants are required (Genetic non-uniformity is unlikely and mixtures will be detected by other characteristics.) - to make the following changes to the wording of Ad. 1 "The ploidy status of the plant can be checked by different methods: • determination of the number of chromosomes of the non-thickened root meristem ( <del>which is the most reliable method</del> ), .... Observations should be made on 20 plants/ <del>seeds</del> ."
Ad. 4	sentence to read "The <del>black line</del> represents the profile of the whole leaf <u>should be observed</u> ."
Ad. 15	to read: "The ratio weight of leaves / weight of root should be observed. absent or weak >10 medium 2 to10 strong <2"

#Ad. 22	<p>- to confirm where is the point of attachment on illustration for state 1. Check whether to improve illustration (point of attachment is clearly seen on other illustrations and are positioned on top of respective illustrations)</p> <p>- to check whether to use the modified grid below (numbering of states of expression adjusted according to document TGP/14; size of illustration for state 8 adjusted; narrow/broad added to relevant states; names of states “broad obovate” and “narrow obovate” inverted according to illustrations)</p>
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		←      broadest part      →				
		below middle	at middle	above middle		
relative width ↑ ↓	narrow		 6 narrow oblong			
	↑		 5 broad oblong			
	relative width	 1 ovate	 4 circular	 7 broad obovate	 8 narrow obovate	 9 triangular
	↓		 3 broad oblate			
	broad		 2 narrow oblate			

#Ad. 30	to crop the images to focus on the characteristic explained (upper part). This should mitigate confusion on the term sprout.
TQ 6.	example to read “Leaf: attitude”, “erect” and “semi-erect”

Berberis ( <i>Berberis</i> L.)	TG/68/4(PROJ.5)	Ms. Stéphanie Christien (FR)	TWO	*
	No. of chars.: 31 No. of (*) chars.: 27	(Interested experts: CA, GB, PL, QZ, CIOPORA)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/68/4(proj.5) and made the recommendations presented in the table below.

The TC-EDC agreed there were editorial clarifications required from the leading expert on the draft Test Guidelines for Berberis (indicated below by "#") and agreed to reconsider the draft Test Guidelines at its meeting to be held in March 2022.

Cover page	to add "excluding..." (as in Chapter 1.) to name box
#Char. 2	to check whether state 1 to read "upright" (see e.g. TG Lavender)
Chars. 6, 7	to add (a)
Char. 6	to be indicated as PQ and VG (as in proj.4; correction)
Char. 8	to read "Stem: type of spines"
Char. 9	to read "Stem: length of spines"
Char. 10	to delete (d) and add explanation "Observations should be made on fully expanded leaves from the middle third of the stem."
Char. 14	to read "Leaf: spines"
Char. 18	to delete "the"
Chars. 22, 23	to delete (d)
Char. 23	to read "Leaf: undulation of margin"
#Char. 24	to check whether to read "Inflorescence: type"
Char. 28	example variety "Electra" in state 1 to read "Erecta"
#Ad. 5	to be improved (current pictures show trees, which is not appropriate for Berberis and to present more clearly the difference from Char. 2)
Ad. 29	to adjust legend of the grid according to TGP/14 ("relative width", "narrow", "broad")
#9.	- to correct typo in date of second reference: "Caduc Alain, 2017: ..." - to add city and country to both references
TQ 6.	characteristic name to read "Fruit: shape in lateral view"

Apricot ( <i>Prunus armeniaca</i> L.)	TG/70/5(PROJ.6)	Mr. Zsolt Szani (HU)	TWF	*
	No. of chars.: 59 No. of (*) chars.: 29	(Interested experts: AU, BG, CN, CZ, ES, FR, HU, IL, IT, JP, KR, MA, NZ, PL, QZ, RO, ZA, CIOPORA)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/70/5(proj.6) and made the recommendations presented in the table below.

The TC-EDC agreed that the draft Test Guidelines for Apricot should be submitted to the TC for adoption.

Char. 27	to delete (c)
Char. 29	- to delete (d) - to delete example variety "Tengeribarack C. 2546"
Char. 39	to delete example variety "Kayzee"
Char. 47	to delete example variety "Kayzee"
Char. 50	state 3 to read "very small spots throughout"
8.1 (d)	- to add „Observations should be made on mature fruits. Fruit ripening should be considered as the time of eating maturity." - legends of the illustration to read: "c = <del>Lateral</del> width" "c = <del>Ventral</del> width"
Ad. 15	Check font size of sentence. (It appears smaller)

Ad. 38	- to update states to match characteristic - to remove frame from illustration for state 1 - to replace illustrations for states 2 to 4 with the ones below
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2  
slightly sunken



3  
moderately sunken



4  
strongly sunken

Ad. 40	to delete text above illustrations
Ad. 47	to be deleted
Ad. 58	to read "Time of beginning of flowering is reached when 5 - 10 % of flowers are open."
Ad. 59	to read "Time of beginning of fruit ripening is reached when 5 - 10 % of fruits have eating maturity."

Lagerstroemia ( <i>Lagerstroemia</i> L.)	TG/95/4(PROJ.5)	Ms. Stéphanie Christien (FR)	TWO	*
	No. of chars.: 37 No. of (*) chars.: 29	(Interested experts: AU, JP, KR, QZ)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/95/4(proj.5) and made the recommendations presented in the table below.

The TC-EDC agreed that the draft Test Guidelines for Lagerstroemia should be submitted to the TC for adoption.

Char. 19	to read "Plant: number of thyrses"
8.1 (d)	"Observations should be made on fully developed thyrses, when all flowers are open."
8.1 (e)	"Observations should be made on just opened flowers."
8.1 (g)	"Observations should be made on well-developed ripe fruits from the top of the primary thyrses, at maturity."

Eustoma ( <i>Eustoma exaltatum</i> (L.) Salisb. ex G. Don subsp. <i>russellianum</i> (Hook.) Kartesz)	TG/197/2(PROJ.4)	Mr. Kiyofumi Nakamura (JP)	TWO	*
	No. of chars.: 34 No. of (*) chars.: 20	(Interested experts: DE, MX, KR, QZ, CIOPORA)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/197/2(proj.4) and made the recommendations presented in the table below.

The TC-EDC agreed that the draft Test Guidelines for Eustoma should be submitted to the TC for adoption.

Char. 8	to add explanation "Observations should be made on the upper side of the leaves."
Char. 19	to delete "of"
8.1 (a)	"Observations should be made on the upper side of fully developed leaves from the middle third of a stem." ("upper side" is not relevant for chars. 5 to 7.; see Ad. 9)
Ad. 33	to be deleted

Tea ( <i>Camellia sinensis</i> (L.) Kuntze)	TG/238/2(PROJ.5)	Mr. Simeon Kibet Kogo (KE)	TWA	*
	No. of chars.: 33 No. of (*) chars.: 19	(Interested experts: AR, BR, CN, KR, JP, TZ, US)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/238/2(proj.5) and made the recommendations presented in the table below.

The TC-EDC agreed there were editorial clarifications required from the leading expert on the draft Test Guidelines for Tea (indicated below by "#") and agreed to reconsider the draft Test Guidelines at its meeting to be held in March 2022.

Table of Chars.	to reinstate char. 12 (correction)
Char. 11	state 2 to read "upwards to horizontal"
#Char. 14	to check whether to add MS
Char. 17	to check whether to add (b)
#Ad. 2	to check whether illustration for state 1 is appropriate (current illustration presents "fastigiated" instead of "upright" growth habit)
#Ad. 14	to adjust illustration according to new wording (please indicate two images to show low and high ratio)

Echinacea ( <i>Echinacea</i> Moench)	TG/281/2(PROJ.3)	Ms. Hilary Papworth (GB)	TWO	*
	No. of chars.: 54 No. of (*) chars.: 42	(Interested experts: CA, FR, JP, NZ, QZ, CIOPORA)		

The TC-EDC, at its meeting organized by electronic means on October 12 and 13, 2021, considered document TG/281/2(proj.3) and made the recommendations presented in the table below.

The TC-EDC agreed that the draft Test Guidelines for Echinacea should be submitted to the TC for adoption.

Botanical name	- English common name "Cone Flower" be written as a single word "Coneflower" - to add German common name "Scheinsonnenhut"
2.3	to delete "young" from vegetatively propagated varieties
Char. 49	to read " <u>Only varieties with disc type: daisy: with ray florets present within the disc:...</u> "
8.1 (a)	to read "Observations should be made on <del>stem</del> leaves taken from the middle third of the flowering stem, and, <u>unless otherwise indicated</u> , on the upper surface <del>unless otherwise indicated</del> ."
9.	fourth reference to read "Köck, O. 2001: Medicinal plant varieties of Hungary: Dr Károly Neszmélyi, OMMI, Budapest, HU, pp. 23"

[End of Annex II and of document]