

Technical Working Party on Testing Methods and Techniques

TWM/1/26

First Session**Virtual meeting, September 19 to 23, 2022****Original:** English**Date:** September 23, 2022

REPORT*Adopted by the Technical Working Party on Testing Methods and Techniques**Disclaimer: this document does not represent UPOV policies or guidance*Opening of the session

1. The Technical Working Party on Testing Methods and Techniques (TWM) held its first session, organized by electronic means, from September 19 to 23, 2022. The list of participants is reproduced in Annex to this report.
2. The session was opened by Ms. Beate Rücker (Germany), Chairperson of the TWM, who welcomed the participants.

Adoption of the agenda

3. The TWM adopted the agenda as reproduced in document TWM/1/1 Rev. 2.

Developments in plant variety protection*(a) Reports on developments in plant variety protection from members and observers*

4. The TWM noted the information on developments in plant variety protection from members and observers provided in document TWM/1/3 Prov. The TWM noted that reports submitted to the Office of the Union after September 15, 2022, and until September 22, 2022, would be included in the final version of document TWM/1/3.

(b) Reports on developments within UPOV

5. The TWM received a presentation from the Office of the Union on developments within UPOV, a copy of which is provided in document TWM/1/2.

Guidance and cooperation*(a) Development of guidance and information materials*

6. The TWM considered document TWP/6/1.

Matters for consideration by the Technical Working Parties*Document UPOV/INF/23 "UPOV Code System"*

7. The TWM agreed to revise document UPOV/INF/23 "Guide to the UPOV Code System" as set out in document TWP/6/1, paragraph 13.

Document TGP/7 “Development of Test Guidelines”

Example varieties for asterisked quantitative characteristics when illustrations are provided

8. The TWM noted the proposal to amend document TGP/7 to remove the requirement to provide example varieties for asterisked quantitative characteristics if illustrations are provided, as set out in document TWP/6/1, paragraphs 18 and 19.

Indication of grouping characteristics in UPOV Test Guidelines (Table of characteristics and TQ 5)

9. The TWM noted the proposal to revise document TGP/7 “Development of Test Guidelines” to indicate characteristics in the Table of Characteristics and Technical Questionnaires used as grouping characteristics, as set out in document TWP/6/1, paragraph 22.

Converting standard wording in Test Guidelines into optional wording

10. The TWM noted 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 (optional), as set out in document TWP/6/1, paragraph 25.

Document TGP/8 ‘Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability

The Combined-Over-Years Uniformity Criterion (COYU)

11. Developments on the revision of the Combined-Over-Years Uniformity Criterion are reported in section “Software and statistical analysis methods for DUS examination”, as presented in paragraphs 37 to 42 of this report.

Matters for information

12. The TWM noted the following matters for information presented in document TWP/6/1:

- The outcomes of discussion on a 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, as presented in Annex VI;
- Discussions on a proposal for the addition of state of expression and placement of non-asterisked disease resistance characteristics in the Technical Questionnaire, Section 5, as presented in Annex VII;
- Matters for adoption by the Council in 2022, as presented in Annex VIII; and
- The program for the development of relevant guidance and information materials, as presented in Annexes IX and X.

(b) Increasing participation in the work of the TWPs and the TC

13. The TWM considered document TWP/6/12.

Participation at TWP meetings by electronic means

14. The TWM noted the participation at the TWP sessions in 2021, as presented in document TWP/6/12, Annex.

Measures for physical and virtual participation at TWP meetings

15. The TWM noted the measures agreed by the TC for physical and virtual participation at TWP meetings, as set out in document TWP/6/12, paragraphs 9 to 12.

16. The TWM noted that the Office of the Union would interview members and observers and report outcomes to the TC, at its fifty-eighth session, along with options for improving the support provided by UPOV for DUS examination.

(c) *Cooperation in examination*

17. The TWM considered document TWP/6/9.

18. The TWM 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.

19. The TWM 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 document TWP/6/9, paragraphs 9 to 14.

20. The TWM noted that a presentation on e-PVP Asia had been made to all TWPs, at their sessions in 2022.

21. The TWM 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.

22. The TWM noted that the use of machine translation technology would be considered within a review of UPOV’s policy on translation.

23. The TWM noted that the CAJ, at its seventy-eighth session:

(i) had agreed to include possible “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 where acceptable to the members of the Union concerned” as part of the work to be agreed by the CAJ; and

(ii) agreed measures to address policy or legal barriers that the TC had identified as preventing international cooperation in DUS examination, as set out in document TWP/6/9, paragraph 34.

24. The TWM 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”.

(d) *Information and databases*

UPOV PRISMA

25. The TWM considered document TWP/6/3 and noted the developments concerning UPOV PRISMA.

UPOV information databases

26. The TWM noted the information provided in document TWP/6/4.

GENIE database

27. The TWM noted that 131 new UPOV codes were created in 2021 and a total of 9,342 UPOV codes were included in the GENIE database.

Proposals for amending UPOV codes

28. The TWM noted the amendments agreed by the TC, at its fifty-seventh session, to the UPOV codes for *Beta vulgaris*, *Brassica oleracea*, *Citrus*, *Zea mays*, *Aloe aristata* and *Dicentra spectabilis* as set out in paragraphs 15 to 26 of document TWP/6/4.

29. The TWM 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.

TWP checking

30. The TWM noted the invitation to check the amendments, new UPOV codes or information, and UPOV codes used in the PLUTO database for the first time, as reproduced in document TWP/6/4, Annex IV, and submit comments to the Office of the Union by December 31, 2022.

PLUTO database

31. The TWM noted the summary of data contributions from members of the Union to the PLUTO database from 2017 to 2021, as presented in document TWP/6/4, the Annex V.

Variety description databases including databases containing molecular data

32. The TWM considered document TWP/6/2.

33. The TWM noted the reports made at the TWPs in 2021 on databases containing morphological and/or molecular data.

34. The TWM noted that members of the Union would be invited to report to the TWPs on work concerning the development of databases containing morphological and/or molecular data.

Variety denominations

35. The TWM considered document TWP/6/6.

36. The TWM noted developments reported in document TWP/6/6 concerning the “Explanatory Notes on Variety Denominations under the UPOV Convention” (document UPOV/EXN/DEN/1), the possible development of a UPOV similarity search tool for variety denomination and the expansion of the content of the PLUTO database.

Software and statistical analysis methods for DUS examination

(a) Statistical tools and methods for DUS examination

Development of software for the improved COYU method (splines)

37. The TWM considered document TWM/1/8 and received a presentation from Mr. Adrian Roberts and Ms. Haidee Philpott (United Kingdom) on “Developments on the improved COYU method (splines)”, a copy of which is reproduced in document TWM/1/8 Add..

38. The TWM considered document TWP/6/11.

39. The TWM noted a circular had been issued by the Office of Union to invite members of Union to participate in the test campaign of the COYU Splines software. The TWM noted that feedback had been received from Czech Republic, Finland, Slovakia and United Kingdom.

40. The TWM noted that a new version of DUSTNT incorporating COYU with splines (DUST9NT) would be launched by September 2023, once the improvements identified from the testing campaign had been incorporated, including extrapolation.

41. The TWM noted a report of the results of the test campaign of the software for COYU Splines would be presented for consideration by the TC, at its fifty-eighth session, in conjunction with the revision of document TGP/8.

42. The expert noted that further revisions to document TGP/8 would be required to incorporate guidance on extrapolation and minimum data requirements.

Extrapolation in relation to COYU

43. The TWM considered document TWM/1/7 and received a presentation from Mr. Adrian Roberts (United Kingdom) on “Combined-over-year uniformity (COYU) criterion: Extrapolation”, a copy of which is reproduced in document TWM/1/7 Add..

44. The TWM noted the recommendation that there should be particular consideration of uniformity by the crop experts when extrapolation occurred. Whichever COYU approach is used (moving average; splines), the verdict on uniformity should be subject to confirmation by the crop experts (when extrapolation occurred).

45. The TWM agreed that further discussion would be required on approaches when extrapolation was indicated and agreed to invite the United Kingdom and other members to report at the second session of the TWM.

(b) *Exchange and use of software and equipment*

46. The TWM considered document TWP/6/5.

Document UPOV/INF/16 “Exchangeable Software”

47. The TWM noted that the Council had adopted by correspondence, on September 21, 2021, document UPOV/INF/16/10 “Exchangeable Software”.

48. The TWM noted that the Office of the Union had issued on January 18, 2022, Circular E-22/002 inviting the designated persons of the members of the Union in the TC to provide or update information regarding the use of the software included in document UPOV/INF/16/11 Draft 1 “Exchangeable Software” to the Office of the Union by February 28, 2022.

49. The TWM noted that information from China, the Czech Republic, France, Poland and Uzbekistan had been received to update document UPOV/INF/16.

50. The TWM agreed that clarification would be required on the software proposed by Uzbekistan, including its availability for exchange.

Statistical Analysis Software: DUSCEL (document TWM/1/10)

51. The TWM received a presentation from Mr. Kun Yang (China) on “Development of Statistical Analysis Software: DUSCEL and DUSBIGDATA”. A copy of the presentation is provided in document TWM/1/10.

52. The TWM noted the extensive work and expansion of the software to include additional functionalities. The TWM noted that the software was under development and scheduled to be completed by 2023. The TWM agreed to invite China to report developments at the second session of the TWM.

PATHOSTAT application

53. The TWM received a presentation from Mr. Thibaud Quémar (France) on “PATHOSTAT application”, a copy of which is reproduced in document TWM/1/11.

54. The TWM noted that PATHOSTAT was a web-based application made available for use by members of Union. The TWM noted the condition for supply of PATHOSTAT made available as a web service and not as a software for download.

55. The TWM recommended the TC, at its fifty-eighth session, to propose to include the PATHOSTAT application in document UPOV/INF/16.

Document UPOV/INF/22 “Software and Equipment Used by Members of the Union”

56. The TWM noted that the Council had adopted by correspondence, on September 21, 2021, document UPOV/INF/22/8 “Software and Equipment Used by Members of the Union”.

57. The TWM noted that the Office of the Union had issued on January 18, 2022, Circular E-22/002 inviting the designated persons of the members of the Union in the TC to provide or update information regarding the

use of the software included in document UPOV/INF/22/9 Draft 1 “Use of software and equipment” to the Office of the Union by February 28, 2022.

58. The TWM noted that information from the Czech Republic, the Netherlands, Poland and Uzbekistan had been received to update document UPOV/INF/22.

59. The TWM noted that the TC, at its fifty-eighth session, would be invited to consider whether to include the proposed software or equipment in document UPOV/INF/22/9 Draft 1, or whether to request further guidance from other relevant bodies.

Availability of documents UPOV/INF/16 “Exchangeable Software” and UPOV/INF/22 “Software and Equipment Used by Members of the Union” in a searchable form

60. The TWM noted that the information in documents UPOV/INF/16 and UPOV/INF/22 was available in a searchable format on the UPOV website.

Phenotyping and image analysis

61. The TWM received a presentation from Mr. Woo Gun Shin (Republic of Korea) on “Image Analysis in Plant Variety Testing”, a copy of which is reproduced in document TWM/1/4.

62. Clarifications were provided on the conditions for image correction indoor and outdoor and the use of software in flower color analysis.

63. The TWM received a presentation from Ms. Yanfang Liu (China) on “Color Imaging Analysis System”, a copy of which is reproduced in document TWM/1/5.

64. The TWM received a presentation from Mr. Yongxiang Tong (China) on “DUS characteristics image processor”, a copy of which is reproduced in document TWM/1/6.

65. The TWM received a presentation from Ms. Margaret Wallace (United Kingdom) on “UAV potential in DUS testing”, a copy of which is reproduced in document TWM/1/20.

66. The TWM received a presentation from Mr. Danilo Sarti (Maynooth University) on “Machine Learning InnoVar project”, a copy of which is reproduced in document TWM/1/25.

67. Clarifications were provided that the AMBARTI model could be used to comprehend and predict the behavior of DUS and VCU attributes considering interactions genotypes and environments for the characteristics including crop yield.

68. The TWM agreed to invite further developments on the assessment of color through phenotyping and image analysis to be presented at its second session.

Developments in molecular techniques and bioinformatics

(a) Latest developments in molecular techniques and bioinformatics

69. No documents were received for this agenda item.

(b) Cooperation between international organizations

70. The TWM received a presentation from Ms. Ana Laura Vicario (International Seed Testing Association (ISTA)) on “ISTA report on the use of molecular techniques”, a copy of which is reproduced in document TWM/1/23.

71. The TWM received a presentation from Mr. Christophe Rouillard (Organisation for Economic Co-operation and Development (OECD)) on “Latest developments in the application of BMT under the OECD Seed Schemes”, a copy of which is reproduced in document TWM/1/24.

72. The TWM thanked OECD and ISTA for reporting developments on the use of molecular techniques in their respective organizations. The TWM noted that OECD had formed the Advisory Group on BMT to deal

with all BMT issues under the Seed Schemes, including matters relating to cooperation with other international organizations.

73. The TWM considered document TWP/6/7.

74. The TWM noted the papers presented at the twentieth session of the BMT and the program of work for the first session of the TWM.

75. The TWM noted that a revision of document UPOV/INF/17 “Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction (“BMT Guidelines”) had been adopted by the Council, in 2021.

76. The TWM noted that the results of the survey on the use of molecular marker techniques had been made available on the webpage of the fifty-seventh session of the Technical Committee, as set out in document TWP/6/7, paragraph 28.

77. The TWM noted that on February 1, 2022, the Office of the Union had issued Circular E-22/009 inviting members to continue the survey on the use of molecular marker techniques. The TWM noted the report from the Office of the Union that 28 members of the Union had replied, 15 of which were new responses and 8 provided further information on the use of molecular marker techniques.

78. The TWM noted the draft joint document explaining the principal features of the systems of OECD, UPOV and ISTA, as set out in the Annex to document TWP/6/7.

79. The TWM noted the topics proposed by the TC for a future joint UPOV/OECD/ISTA workshop, as set out in document TWP/6/7, paragraph 35.

80. The TWM noted that on December 13, 2021, the Office of the Union had informed OECD and ISTA of the result of the survey, draft joint document and proposed topics for a future joint UPOV/OECD/ISTA workshop. Responses from OECD and ISTA, when available, would be reported to the Technical Working Parties and the Technical Committee.

(c) Report of work on molecular techniques in relation to DUS examination

81. The TWM received a presentation from Ms. Cécile Collonnier (Community Plant Variety Office (CPVO)) on “Update on IMODDUS activities”, a copy of which is reproduced in document TWM/1/14.

(d) Methods for analysis of molecular data, management of databases and exchange of data and material

82. The TWM received a presentation from Mr. Ruixi Han (China) on “Application of molecular markers in DUS testing of new varieties of Chinese cabbage”, a copy of which is reproduced in document TWM/1/9.

83. Clarifications were provided on the number of varieties considered for the establishment of the genetic similarity threshold.

84. The TWM received a presentation from Ms. Alexandra Ribarits (Austria) on “DURDUSTools: Development of a common online molecular database and a genetic distance calculation tool for durum wheat”, a copy of which is reproduced in document TWM/1/12.

85. Clarifications were provided on aspects related to the use of an external service provider for data extraction, including the perception that updates in the marker array could bring even more information into the database. Data obtained using a reduced number of markers from a prior version of the marker set would still be comparable to that obtained using a later version. The expert explained that molecular information was used during the second year of DUS trial due to difficulty in obtaining data at earlier stage of examination. Molecular data was then used along with morphological data during the second year of examination to ensure comparison with all relevant similar varieties.

86. The TWM received a presentation from Ms. Hedwich Teunissen (the Netherlands) on “Development of a SNP marker set in Cannabis to support DUS testing”, a copy of which is reproduced in document TWM/1/17.

87. The TWM received a presentation from Ms. Hedwich Teunissen (the Netherlands) on “International harmonisation and validation of a SNP set for the management of tomato reference collection”, a copy of which is reproduced in document TWM/1/18.

88. Clarifications were provided that the SNPs set could be applied to the tomato reference collection in other parts in the world.

89. Clarifications were provided that the selected marker set of 297 SNPs were publicly available and would soon be published. The expert clarified that due to the broad genetic base represented in the project, the selected markers could be used in any geographical region.

90. The TWM received a presentation from Mr. Alberto Ballesteros (Argentina) on “Cotton genotyping using the TAMU 63KSNPsArray”, a copy of which is reproduced in document TWM/1/13.

91. The TWM received a presentation from Mr. Jeffery Haynes (United States of America) on “The US PVPO Soybean molecular marker method”, a copy of which is reproduced in document TWM/1/16.

92. Clarifications were provided that the method presented had been developed in collaboration with plant breeders and was used as supplementary information in support of distinctness analysis.

(e) Confidentiality, ownership and access to molecular data, including model agreement template

93. The TWM considered document TWP/6/7.

94. The TWM noted discussions held at the TWPs and the BMT, at their sessions in 2021, on “Confidentiality & Ownership of Molecular Information”.

95. The TWM received a presentation from Mr. Marcel Bruins (CropLife International) on “Confidentiality and ownership of molecular information”, a copy of which is reproduced in document TWM/1/22.

96. The TWM noted the concern expressed by breeders’ organizations that molecular information provided for the examination of a variety should not be provided to others outside the authority that received the application without the permission of the breeder. The TWM further noted the concern that breeders were lacking clarity and information about how molecular information was being used, and especially shared.

97. The TWM agreed that further clarification was required on the type of information and purpose of use of data to be shared (e.g. molecular distances between varieties, genotype sequences) that would require permission before being shared by PVP offices with other PVP offices.

98. The TWM agreed to invite members and observers to report existing policies on confidentiality of molecular information at the second session of the TWM.

(f) The use of molecular techniques in examining essential derivation

99. No documents were received for this agenda item.

(g) The use of molecular techniques in variety identification

100. The TWM received a presentation from Ms. Ana Laura Vicario (Argentina) on “Variety identification: soybean case in Argentina”, a copy of which is reproduced in document TWM/1/15.

101. Clarifications were provided on the different types of samples used in the development of the method, which included seeds from different generations of propagation. The expert explained that a public set of markers had been used. Clarifications were also provided on a previous study that enabled the use of molecular distances to reduce the size of soybean trials in Argentina.

102. The TWM received a presentation from Ms. Chiara Delogu (Italy) on “Digital PCR for Genotype Quantification: A Case Study in a Pasta Production Chain”, a copy of which is reproduced in document TWM/1/21.

103. Clarifications were provided that up to 96 samples could be analyzed in each run of the equipment used by the presenter.

(h) The use of molecular techniques for enforcement

104. The TWM received a presentation by Ms. Hedwich Teunissen (the Netherlands) on “Variety Tracer: Fraudulent use of parental lines”, a copy of which is reproduced in document TWM/1/19.

105. Participants heard that allele frequencies had been requested in some cases and that these could provide additional information to address cases of potential infringement.

(i) Session to facilitate cooperation

106. The TWM considered document TWP/6/7.

107. The TWM noted the information on the discussion groups that had been formed at the Technical Working Parties, at their sessions in 2021, to allow participants to exchange information on their work on biochemical and molecular techniques and explore areas for cooperation.

108. On Thursday, September 22, 2022, the TWM held a discussion session to allow participants to exchange information on their work on biochemical and molecular techniques and explore possible areas for cooperation.

109. The TWM agreed that sufficient time should be allocated for discussing the agenda items in the future work plan for the meeting and agreed that it would not be necessary to have an open discussion session.

Date and place of the next session

110. The TWM agreed to hold its second session from April 8 to 12, 2024.

111. The TWM considered whether to hold its future sessions as virtual meetings. The TWM agreed that virtual meetings were useful to enhance participation of experts and agreed that face-to-face meetings are important for cooperation. The TWM agreed to propose holding a future meeting in hybrid format.

112. The TWM noted the expression of interest of the Seed Association of the Americas (SAA) to support the organization of a future in-person meeting of the TWM at a UPOV member.

113. The TWM noted that sub-groups could be created to discuss particular topics either during the session or during the period in-between sessions.

Future program

114. The TWM agreed that documents for its second session should be submitted to the Office of the Union by February 23, 2024. The TWM noted that items would be deleted from the agenda if the planned documents did not reach the Office of the Union by the agreed deadline.

115. The TWM proposed to discuss the following items at its second session:

1. Opening of the Session
2. Adoption of the agenda
3. 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)
4. Guidance and cooperation
 - (a) Development of guidance and information materials (document to be prepared by the Office of the Union)
 - (b) Increasing participation in the work of the TC and the TWPs (document to be prepared by the Office of the Union)
 - (c) Cooperation in examination (document to be prepared by the Office of the Union)

- (d) Information and databases
 - UPOV PRISMA (document to be prepared by the Office of the Union)
 - UPOV information databases (document to be prepared by the Office of the Union)
 - Variety description databases including databases containing molecular data (document to be prepared by the Office of the Union and papers invited)
 - Variety denominations (document to be prepared by the Office of the Union)
- 5. Software and statistical analysis methods for DUS examination
 - (a) Statistical tools and methods for DUS examination (papers invited)
 - The Combined-Over-Years Uniformity Criterion (COYU) (document to be prepared by the Office of the Union)
 - Development of software for the improved COYU method (splines) (document to be prepared by the United Kingdom)
 - Extrapolation in relation to COYU (document to be prepared by the United Kingdom and papers invited)
 - Comparison of results obtained for COYD and COYU procedures using different software (document to be prepared by France)
 - Development of Big Data platform for DUS examination (document to be prepared by China)
 - (b) Exchange and use of software and equipment (document to be prepared by the Office of the Union and papers invited)
 - Development of Statistical Analysis Software: DUSCEL (document to be prepared by China)
- 6. Phenotyping and image analysis (papers invited)
 - Assessment of color characteristics using image analysis (papers invited)
- 7. Developments in molecular techniques and bioinformatics
 - (a) Latest developments in molecular techniques and bioinformatics (papers invited)
 - (b) Cooperation between international organizations (document to be prepared by the Office of the Union and papers invited)
 - (c) Report of work on molecular techniques in relation to DUS examination (papers invited)
 - (d) Methods for analysis of molecular data, management of databases and exchange of data and material (papers invited)
 - (e) Confidentiality, ownership and access to molecular data, including model agreement template¹ (papers invited)
 - Examples of policies on confidentiality and access to molecular information data (papers invited)
 - (f) The use of molecular techniques in examining essential derivation¹ (papers invited)
 - (g) The use of molecular techniques in variety identification¹ (papers invited)
 - (h) The use of molecular techniques for enforcement¹ (papers invited)
- 8. Date and place of the next session
- 9. Future program

¹ "Breeders day" April 11, 2024

10. Adoption of the Report on the session (if time permits)
11. Closing of the session

116. The TWM adopted this report at the end of the session.

[Annex follows]

LIST OF PARTICIPANTS

I. MEMBERS

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