

Council

C/51/10

**Fifty-First Ordinary Session  
Geneva, October 26, 2017****Original:** English  
**Date:** September 26, 2017**PROGRESS REPORT OF THE WORK OF THE TECHNICAL COMMITTEE, THE TECHNICAL WORKING PARTIES AND THE WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES, AND DNA-PROFILING IN PARTICULAR***Document prepared by the Office of the Union**Disclaimer: this document does not represent UPOV policies or guidance*

## EXECUTIVE SUMMARY

1. This document presents the progress report of the work of the Technical Committee (TC) and its Technical Working Parties (TWPs), including the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT).

2. The Council will be invited to:

(a) note the work of the TC and that of the TWPs and BMT reported to the TC, as provided in this document; and

(b) approve the work of the TC and the work programs of the TWPs and BMT reported to the TC, as provided in this document.

3. The following abbreviations are used in this document:

CAJ:	Administrative and Legal Committee
TC:	Technical Committee
TC-EDC:	Enlarged Editorial Committee
TWPs:	Technical Working Parties
TWA:	Technical Working Party for Agricultural Crops
TWC:	Technical Working Party on Automation and Computer Programs
TWF:	Technical Working Party for Fruit Crops
TWO:	Technical Working Party for Ornamental Plants and Forest Trees
TWV:	Technical Working Party for Vegetables
BMT:	Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular
DUS:	Distinctness, Uniformity and Stability
Office:	Office of the Union

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## PROGRESS REPORT OF THE WORK OF THE TECHNICAL COMMITTEE

4. The Technical Committee (TC) held its fifty-third session in Geneva from April 3 to 5, 2017, chaired by Mr. Kees van Ettehoven (Netherlands), Chairman of the TC. The report of the session is contained in document TC/53/31 "Report".

5. The meeting was attended by 100 participants from 41 members of the Union, 3 observer States and 7 observer organizations.

### Report on developments in UPOV including relevant matters discussed in the last sessions of the Administrative and Legal Committee, the Consultative Committee and the Council (oral report by the Vice Secretary-General)

6. The TC considered document TC/53/10 and received a presentation by the Vice Secretary-General, a copy of which (in English only) the TC noted would be provided as an addendum to document TC/53/10.

7. The TC noted the developments in UPOV since its fifty-second session that were not presented under specific items on the agenda of its fifty-third session, including relevant matters discussed in the last sessions of the Administrative and Legal Committee (CAJ), the Consultative Committee and the Council as set out in paragraphs 4 to 47 of document TC/53/10.

### Organization of the UPOV sessions

8. The TC considered document TC/53/14.

9. The TC agreed that the TC sessions could be organized on a suitable date in the period from late October to early December.

10. The TC agreed to propose that Test Guidelines that could not be prepared in time for adoption by the Technical Committee at its session could be adopted by correspondence on the basis of the recommendations by the TC-EDC. The TC agreed that the TC-EDC should meet twice a year, once in the period March/April and once in conjunction with the TC sessions later in the year.

11. The TC agreed to use the following contingency measures for 2018, subject to the Council deciding that the TC should hold its fifty-fourth session in late 2018:

- (a) For Test Guidelines proposed for adoption in 2018, to use a procedure for adoption by correspondence as follows:
  - Draft Test Guidelines would be prepared as agreed by the TWPs and circulated with the recommendations of the TC-EDC;
  - In the absence of any objections the Test Guidelines would be adopted;
  - In the case of objections, the objections would be referred to the relevant TWP for consideration at their 2018 session, and the Test Guidelines considered for adoption by the TC at its fifty-fourth session, in 2018;
  - TC-EDC to meet on March 26 and 27, 2018, and in conjunction with the TC at its fifty-fourth session, in 2018, if necessary.
- (b) For TGP documents, to invite the TC-EDC to consolidate comments made by the TWPs at their sessions in 2017 and, in the absence of consensus between the TWPs, formulate proposals for further consideration by the TWPs at their sessions in 2018;
- (c) All other matters to be considered at the fifty-fourth session of the TC in 2018 in the normal way.

12. The TC agreed that the scheduling of *ad hoc* Working Group meetings in the period March/April could defeat the purpose of moving to a single set of sessions, because it would require experts to travel to Geneva. However, it agreed that if electronic participation was possible, such as was the case for the EAF meetings, meetings at that time could be an efficient approach.

### Matters arising from the Technical Working Parties

13. The TC considered document TC/53/3.

14. The TC noted the report by the TWF that PVP Offices sometimes had difficulty to obtain plant material from breeders, especially when a variety was no longer in commercialization. The TC noted that, in certain cases, the European Union reminded breeders of the need to maintain their varieties to avoid the possibility of the PBR being cancelled. The TC also noted that Australia reminded breeders of the importance of providing material of their varieties for maintaining an effective system of protection. It was recalled that genebanks could be an important source of plant material for seed-propagated varieties.

15. The TC agreed to request the Office of the Union to issue a questionnaire to members of the Union on the approaches used to obtain plant material from breeders, especially when a variety was no longer in commercialization. The questionnaire would also seek information on the approaches used by members of the Union on deciding on varieties whose existence is a matter of common knowledge. The TC agreed that results of the survey should be presented to the TWPs and the TC at their sessions in 2018.

16. The TC noted developments in the Technical Working Parties (TWPs) concerning the following matters reported in document TC/53/3:

- (i) Minimizing variation between observers;
- (ii) Experience with new types and species;
- (iii) Experience with the RHS Colour Chart and possible future addition of colors;
- (iv) Vegetatively propagated varieties in a normally seed propagated species;
- (v) Seed priming;
- (vi) Use of disease and insect resistance characteristics in DUS examination;
- (vii) Impact of endophytes on DUS characteristics in grasses;
- (viii) Calibration book for harmonized variety description in apple;
- (ix) DUS examination of mutant varieties of apple;
- (x) Minimum distance between varieties; and
- (xi) Method of observation for derived characteristics.

### TGP documents

#### *Future revisions of TGP documents*

*TGP/7: Development of Test Guidelines*

*Revision of document TGP/7: Drafter's Kit for Test Guidelines*

17. The TC considered document TC/53/15.

18. The TC agreed the proposed revisions of document TGP/7 "Development of Test Guidelines" to reflect the introduction of the web-based TG template, as set out in document TC/53/15, paragraphs 7 to 11, and agreed that a revised version of document TGP/7 should be presented for adoption by the Council in 2018 on that basis, subject to approval by the CAJ.

19. The TC noted that Annex 4 of document TGP/7: "Collection of approved characteristics" would be superseded by the web-based TG template and agreed that there should be no change to the basis for including characteristics in the collection, i.e. only characteristics which had been included in adopted Test Guidelines after the adoption of document TGP/7 ("approved characteristics") for preparing new Test Guidelines would be searchable.

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

20. The TC agreed that the document TGP/8 should provide an introductory paragraph describing the purpose of the document.

Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, Section 9: the Combined-Over-Years Uniformity Criterion (COYU)

21. The TC considered document TC/53/16.

22. The TC noted that:

- the Office of the Union had issued UPOV Circular E-16/098 to invite UPOV members' experts to provide to the United Kingdom, by May 27, 2016, data sets including at least 100 candidate varieties, with a possibility that data for those 100 varieties could be derived from several years.
- the TWC had received a report by an expert of the United Kingdom that a data set on red fescue had been submitted by Slovakia and that Denmark had agreed to submit a data set on spring and winter canola later in 2016.
- the TWC had received offers from China and France to submit data sets on maize and fescue, respectively.
- the TWC had agreed to invite the expert from the United Kingdom to report on progress during the thirty-fifth session of the TWC.
- the TWO had noted that COYU was not commonly used for DUS examination of ornamental plants.
- the TWV had received offers by the experts from France and the United Kingdom to provide data on pea and field pea, respectively.
- the TWA had received a report by the expert from Denmark that the software provided by the United Kingdom had been tested and that a data set on oilseed rape varieties would be provided to support the development of probability levels for the new method of calculation of COYU; and
- the expert from the United Kingdom had no new developments to report to the TC and would report on the progress of development of the new method of calculation of COYU to the TWC at its thirty-fifth session.

Revision of document TGP/8: Part II: Selected Techniques used in DUS Examination, New Section: Examining DUS in Bulk Samples

23. The TC considered document TC/53/17.

24. The TC considered the proposed guidance for examining DUS in bulk samples as presented in the Annex to document TC/53/17, for inclusion in a future revision of document TGP/8.

25. The TC recalled that it had agreed the following list of criteria as a basis for the development of future guidance:

- (a) "the characteristic should fulfill the requirements of a characteristic, as set out in the "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of new Varieties of Plants" (see document TG/1/3, Section 4.2.1);
- (b) "there should be knowledge of the genetic control of the characteristic;
- (c) "the suitability of the characteristic should be validated through an initial assessment of uniformity on individual plants;
- (d) "information on plant-by-plant variation and differences between growing cycles should be provided (data from routine measurement of the characteristic from different years);

- (e) "a full description of the method of assessment should be provided;
- (f) "states of expression should be based on existing variation between varieties considering environmental influence."

26. The TC endorsed the above guidance and agreed that it would not be feasible to develop further guidance for the time being.

Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions

27. The TC noted the developments reported in document TC/53/18.

28. The TC considered the analysis made by the expert from France in Annex II of document TC/53/18 and agreed to invite the experts from France to check the highlighted values in the table in Annex II, paragraph 6, for possible data inconsistency.

29. The TC agreed that participants in the practical exercise should be invited to provide a short description of their methods to transform measurements into notes and provide examples when these methods might be used, such as for particular characteristics, types of propagation or different situations, on the basis of the short descriptions provide by France and the United Kingdom. The TC agreed to invite the TWC to review the explanations to be provided by the participants in the practical exercise to be considered as a possible basis for guidance for revision of document TGP/8.

*TGP/10: Examining Uniformity*

Revision of document TGP/10: New section: Assessing Uniformity by Off-Types on the Basis of More than One Growing Cycle or on the Basis of Sub-Samples

30. The TC considered document TC/53/19.

31. The TC noted that presentations had been made by France and the United Kingdom to the TWC, TWV and TWA, at their sessions in 2016, and noted the offers by Germany, the Netherlands and the United Kingdom to provide examples on selecting the most suitable approach for the assessment of off-types to the TWC, at its session in 2017.

32. The TC noted the offers from France, Germany, the Netherlands, Poland and the United Kingdom to provide examples comparing the possible effect on uniformity decisions between Approach 3 and the other approaches to be presented to the TWA, at its forty-sixth session.

33. The TC agreed to invite experts at the TWPs, at their sessions in 2017, to provide information on the criteria for selecting the most suitable approach for the assessment of off-types on different types of crops.

34. The TC considered the draft guidance presented in Annexes I and II of document TC/53/19 as amended by the TWPs, at their sessions in 2016, for inclusion in a future revision of document TGP/10. The TC agreed to invite the TWPs, at their sessions in 2017, to clarify in Annex I whether more general criteria should be considered for a variety to be rejected after a single growing cycle rather than the specific case of having exceeded the allowed number of off types in two growing cycles.

35. The TC agreed that, in conjunction with the revision of document TGP/10, the guidance in document TGP/8/2: Part II: 8: "The method of uniformity assessment on the basis of off-types" should be revised to reflect the practice within members of the Union on the use of methods for more than one single test (year).

*New proposals for future revisions of TGP documents*

*TGP/7: Development of Test Guidelines*

(i) Duration of DUS tests in the fruit sector

36. The TC considered document TC/53/5.

37. The TC considered the proposal by the TWF to revise document TGP/7 "Development of Test Guidelines" to introduce new standard wording on the Test Guidelines template and amend Additional Standard Wording 2 to clarify the duration of DUS examination, as follows:

- **Addition of a standard sentence at the point 3 of the UPOV TG Template so that it reads:**

"3. Method of Examination

"3.1 Number of Growing Cycles

"The minimum duration of tests should normally be:

"{ **ASW 2** (Chapter 3.1(.1)) – number of growing cycles }

"{ GN 8 (Chapter 3.1.2) – explanation of the growing cycle }

"{ **ASW 3** (Chapter 3.1.2) – explanation of the growing cycle }

As soon as it can be established with certainty that the outcome of the DUS test will be negative, it can be stopped independently from the number of growing cycles carried out so far.

- **Additional option(s) to be included in the ASW 2**

ASW 2 (TG Template: Chapter 3.1) – Number of growing cycles

(a) *Single growing cycle*

(b) "The minimum duration of tests should normally typically be a single growing cycle. At the end of the growing cycle the competent authority will determine whether or not a following growing cycle is required."

(c) *Two independent growing cycles*

"The minimum duration of tests should normally typically be two independent growing cycles. Nevertheless, at the end of each growing cycle the competent authority will determine whether or not a following growing cycle is required.

38. The TC agreed that it was important to clarify that it was possible to terminate a DUS examination as soon as rejection was inevitable, rather than continuing the examination until the end of the normal period. It agreed that the standard wording in the Test Guidelines was not entirely clear in that respect and should be improved. However, it agreed that the proposed wording could be interpreted as encouraging additional growing cycles beyond the normal period and requested the TWPs to develop an improved version of the text at their sessions in 2017.

(ii) Order of UPOV codes and botanical names

39. The TC agreed that UPOV codes and botanical names in draft Test Guidelines should, in general, be displayed in alphabetical order. However, the TC agreed that the web-based TG Template should allow the Leading Expert to change the order, if appropriate.

(iii) Order of methods of observation

40. The TC agreed that the methods of observation of a characteristic should continue to be presented in alphabetical order, thereby avoiding any indication of order of preference.

(iv) Presentation of different types of example varieties

41. The TC agreed that the guidance in document TGP/7 "Development of Test Guidelines", GN 28, Section 3.2: "Different types of variety" should be revised in order to indicate that a comma could be used to separate different types of example varieties (e.g. (w) winter type, (s) spring type); and that the indication of

type should precede the denomination of each example variety (e.g. (w) winter 1, (w) winter 2, (s) spring 1, (s) spring 2).

(v) Explanations covering all characteristics

42. The TC considered whether explanations covering all characteristics should be displayed before Chapter 8.1 “Explanations covering several characteristics” without a note in the Table of Chars. The TC agreed to invite the TWPs, at their sessions in 2017, to consider this proposal and report to the TC, at its session in 2018.

(vi) Subsequent explanations covering several characteristics

43. The TC agreed that characteristics with the same explanation could be displayed in Chapter 8.2 “Explanations for individual characteristics” with subsequent explanations being cross-referenced to the first characteristic displaying the appropriate information, as follows:

e.g.: Ad. 10 “[*explanation text/illustration*]”

Ad. 11 “See Ad. 10”

[...]

Ad. 50 “See Ad. 10”

(vii) Characteristics which only apply to certain varieties

44. The TC considered whether to amend document TGP/7, Guidance Note 18(3), to clarify that, in addition to the state of expression of a preceding qualitative characteristic, in some cases the state of expression of a preceding pseudo-qualitative or quantitative characteristic would also determine that a subsequent characteristic was not applicable.

45. The agreed to invite the TWPs, at their sessions in 2017, to consider the possibility and, if appropriate, identify the circumstances under which characteristics could be excluded from observation on the basis of a preceding pseudo-qualitative or quantitative characteristic and agreed to discuss the matter further at the TC, at its session in 2018.

(viii) Procedure for partial revision of UPOV Test Guidelines

46. The TC considered whether to amend document TGP/7 to allow the addition of new proposals for partial revisions of Test Guidelines at any time during the year, subject to the provision of sufficient time for checking of the proposals by relevant experts and UPOV members.

47. The TC noted the role of UPOV for harmonization of Test Guidelines and recalled that UPOV members could amend their own test guidelines before changes were made to UPOV Test Guidelines. However, it recalled that it was important for authorities to report on such developments in order that the UPOV Test Guidelines could be revised, if appropriate.

48. The TC agreed that it would not be appropriate to develop proposals for partial revisions to UPOV Test Guidelines at any time in the course of the year. The TC agreed that Authorities should be invited to notify the use of new characteristics or states expression using the procedure established in document TGP/5, Section 10: “Notification of additional characteristics and states of expression”.

49. The TC agreed to request the Office of the Union to encourage the notification of additional characteristics and states of expression by making a presentation to the TWPs, at their sessions in 2017, on the procedures established in document TGP/5, Section 10.



*TGP/14: Glossary of Terms Used in UPOV Documents*

(ix) Definition of “recurved”

50. The TC noted that the expert from Israel had withdrawn the proposed revision of the term “recurved”.

(x) Grid for shape characteristics

51. The TC agreed to revise document TGP/14: Section 2: Subsection 2: Shapes and structures to amend the “grid for position of broadest part and width/ratio” presented in Alternative 2, to remove the wording on “ratio” and to display “relative width” in a separate column from the scale of “broad to narrow”, as presented in document TC/53/5, paragraph 30.

(xi) Revision of UPOV Color Groups

52. The TC noted the information from the TWO that some charts of the 1986 Edition and later versions of the RHS Colour Chart had different colors than the same charts in the Sixth Edition that document. The TC endorsed the proposal by the TWO that document TGP/14 “Glossary of terms used in UPOV documents” should be revised to replace the current list of UPOV Color Groups by a new list created on the basis of the Sixth Edition of the RHS Colour Chart.

53. The TC noted the discussions in the TWO on whether the UPOV color groups for the RHS Colour Charts could be used for grouping of varieties and organization of the growing trial and that the TWO had agreed that the difference between UPOV color groups was smaller than would be appropriate for excluding varieties from comparison in a growing trial.

54. The TC noted that the TWO had requested the expert from Germany, with support by the experts from Australia, Canada, European Union, the Netherlands, New Zealand and the United Kingdom, to draft guidance on the factors to be considered for creating color groups for grouping of varieties and organizing the growing trial.

*Program for the development of TGP documents*

55. The TC agreed the program for the development of TGP documents, as set out in the Annex to document TC/53/5, subject to its conclusions above.

Cooperation in examination

56. The TC considered document TC/53/20 and the oral report by the Office of the Union, which highlighted that:

- 93% of respondents were fairly/very confident of options for cooperation (whilst noting that only 38% of UPOV members had replied)
- 50% of respondents reported that the DUS report is used as the basis for the DUS decision without the need for further information
- 30% of respondents considered that further practical measures might facilitate the use of existing DUS reports
- 29% of respondents found that cooperation in DUS examination was “not at all easy”

57. The Office of the Union reported that the Working Group on a possible International System of Cooperation (WG-ISC) had identified the need to accept DUS reports from any member of the Union without further consideration as a matter for consideration.

58. The TC noted that there were important policy aspects relating to cooperation in DUS examination and agreed that the results of the survey should be reported to the WG-ISC with an explanation of the issues, if requested.

59. The TC agreed that a new survey should be issued in order to increase the number of members of the Union contributing information. The TC agreed that the questions in the previous survey should be used as the basis but the new survey should be shortened by consolidating some of the questions on the basis of the

information obtained from the first survey. The TC agreed that the results of the new survey should be presented to the TC at its session in 2018.

60. The TC also agreed that the causes of difficulties in establishing cooperation should be investigated via the new questionnaire.

61. The TC noted the report from Japan on its new administrative procedures to facilitate the exchange of DUS test reports between Japan and other UPOV members, as a result of which, DUS test reports would be provided free of charge for those UPOV members which Japan had a memorandum of cooperation.

#### Information and databases

##### *UPOV information databases*

62. The TC considered document TC/53/6.

##### *GENIE Database*

63. The TC noted that a document explaining the data structure and functions of the GENIE database was being developed by the Office of the Union in order to facilitate maintenance and future development. In addition to routine maintenance, a modification of the database was needed for uploading certain type of data when notes applied. Furthermore, improvements to the generation of reports for documents for the Council and relevant committees needed to be made. This work was planned to be completed by 2018.

##### *UPOV code system*

64. The TC noted that 173 new UPOV codes had been created in 2016 and that 8,149 UPOV codes were included in the GENIE database.

65. The TC noted that the Office of the Union would prepare tables of UPOV codes additions and amendments, for checking by the relevant authorities, for each of the TWP sessions in 2017, as set out in document TC/53/6, paragraph 11.

66. The TC considered the proposal to revise the Guide to the UPOV Code System in relation to the principal botanical name for intergeneric and interspecific hybrids, as set out in document TC/53/6, paragraphs 12 to 15. The TC noted the existence of different procedures among members and agreed that it would not be appropriate to revise the Guide to the UPOV Code System in relation to the principal botanical name for inter-generic and interspecific hybrids.

67. The TC noted that, in order to avoid any misinterpretation, the CPVO would make it clear that the information provided to the Office of the Union would be in alphabetical order.

##### *PLUTO Database*

68. The TC noted the summary of contributions to the PLUTO database from 2013 to 2016 and the current situation of members of the Union on data contribution, as presented in the Annex to document TC/53/6. The TC noted that 70% of all UPOV members had contributed data to the PLUTO database in 2016.

69. The TC noted that the WG-DEN, at its first meeting, had agreed to defer the work concerning the expansion of the content of the PLUTO database until its second or a subsequent meeting.

70. The TC noted that the WG-DEN, at its second meeting, had agreed that matters that it was not able to consider at its second meeting would be considered at its third meeting on the basis of the document presented at the second meeting.

71. The TC noted that the third meeting of the WG-DEN would be held in Geneva, on April 7, 2017.

*Electronic application form*

72. The TC noted the developments concerning the UPOV electronic application form as set out in document TC/53/7. The TC noted that Electronic Application Form (EAF) Version 1.0 had been launched in January 2017 (available at: <http://www.upov.int/upoveaf>).

73. The TC noted that the plans for new functionalities and future releases would be discussed at the Ninth Meeting on the Development of an Electronic Application Form (“EAF/9 meeting”), to be held on April 7, 2017, and in particular: the strategy for addition of new crops and species; communication and support plan; proposal for a new name for the EAF; participation in the EAF for Members of the Union; and the tentative timetable for the EAF.

*Exchange and use of software and equipment*

74. The TC considered document TC/53/8.

75. The TC noted that the Council, at its fiftieth ordinary session, held in Geneva, on October 28, 2016, had adopted document UPOV/INF/16/6 “Exchangeable Software”.

76. The TC noted the deletion of SIVAVE software from document UPOV/INF/16.

77. The TC considered the proposed revision of document UPOV/INF/16/6 to include information on the use of software by members of the Union with information provided by Brazil and Mexico, as set out in Annex I to document TC/53/8.

78. The TC noted that the comments by the TC, at its fifty-third session, concerning the exclusion of software and the use of software by members of the Union, would be reported to the CAJ at its seventy-fourth session, to be held in Geneva in October 2017, and if agreed by the CAJ, a draft of document UPOV/INF/16/7 would be presented for adoption by the Council at its fifty-first ordinary session, to be held on October 26, 2017, on that basis.

79. The TC agreed that the information in document UPOV/INF/16 should be made available in a searchable form on the UPOV website and noted that the Office of the Union would investigate a tool for that purpose.

80. The TC noted that the Council, at its forty-ninth ordinary session, held in Geneva, on October 28, 2016, had adopted document UPOV/INF/22/3 “Software and equipment used by members of the Union”.

81. The TC considered the information in Annex II to document TC/53/8 as a basis for a proposed revision of document UPOV/INF/22/3 and agreed to propose the following changes:

- |                                                     |                                                                                                                                        |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| (c) Variety denomination checking<br>(Row: Germany) | to read: “Checking of variety denominations in national procedures according to phonetic rules <del>as a supplement to testing</del> ” |
| (f) Image analysis                                  | to read: “E-mail: <a href="mailto:a.roberts@bioss.ac.uk">a.roberts@bioss.ac.uk</a> ”                                                   |

82. The TC agreed to propose the addition of a disclaimer to document UPOV/INF/22 explaining that the document was intended to provide information on the use of software and equipment by members of the Union and to clarify that that neither UPOV nor the contributing Authority were responsible for the performance of the software or equipment .

83. The TC considered whether the information in document UPOV/INF/22 should be presented in an alternative form (e.g. on-line format) rather than an INF document and agreed that only the existing document UPOV/INF/22 format should be maintained.

84. The TC noted that the proposals of the TC, at its fifty-third session, concerning the revision of document UPOV/INF/22 would be reported to the CAJ at its seventy-fourth session, and if agreed by the CAJ, a draft of document UPOV/INF/22/4 would be presented for adoption by the Council at its fifty-first ordinary session, to be held on October 26, 2017.

*Variety description databases*

85. The TC considered document TC/53/9.
86. The TC noted the presentations on databases made at the BMT, TWC and TWV at their sessions in 2016, as set out in document TC/53/9, paragraphs 9 to 35.
87. The TC noted that the TWC had invited members to present their experiences in the development of databases, at its thirty-fifth session.
88. The TC noted that the BMT had agreed that facilitating cooperation for the establishment of common databases containing molecular information was an important consideration for UPOV but would need to be initiated between UPOV members in the first instance, as set out in document TC/53/9, paragraph 10.
89. The TC noted the series of challenges for the establishment of common databases containing molecular information and agreed that UPOV might be able to facilitate cooperation in this area by the provision of training and sharing of information.
90. The TC agreed to request the Office of the Union to collect data on existing databases with morphological and/or molecular data. The TC agreed that the information collected should be included in the GENIE database and requested the Office of the Union to plan for the modification of the GENIE database according to available resources. .
91. The TC noted that breeders and academic institutions had extensive experience on the constitution and maintenance of databases and agreed on the value of inviting their contribution to UPOV's work in that regard.
92. The TC agreed that the guidance on plant material provided in document UPOV/TGP/5, Section 1 would be a suitable basis also for molecular data and requested the Office of the Union to propose guidance on confidentiality of molecular information for inclusion in document UPOV/TGP/5, Section 1, on that basis.

Number of growing cycles

93. The TC considered document TC/53/21.
94. The TC considered the presentations made by experts at the TWP sessions in 2016, simulating the impact of using different numbers of growing cycles on DUS decisions using actual data, as set out in the Annexes to document TC/53/21.
95. The TC noted the offers by members of the Union to make presentations to the TWPs, at their sessions in 2017, on the impact of using different numbers of growing cycles on DUS decisions using actual data and agreed to invite the TWPs to report to the TC, at its session in 2018.
96. The TC noted the expression of interest by Authorities to reduce the costs associated with DUS examination and agreed that the number of growing cycles for DUS examination should be the minimum necessary for a robust DUS decision and the establishment of a reliable variety description.
97. The TC agreed that it was not appropriate to generalize that ornamental varieties should be examined in a single growing trial while other types of crops should be examined in two growing cycles and agreed that the typical number of growing cycles should be established on a crop-by-crop basis.

Matters concerning variety descriptions

98. The TC considered document TC/53/22.
99. The TC noted the existence of different elements that could support the identification of plant material, such as the original and other official variety descriptions, including molecular markers. The TC agreed to invite the European Union to elaborate further guidance on the role of the variety description and role of plant material used as the basis for the DUS examination, but incorporating unchanged the text of document TC/53/22, Annex, and also taking into account the following aspects:

- (1) the purpose of the variety description developed at the time of the grant of the breeder's right;
- (2) the status of the original variety description in relation to the verification of the conformity of plant material to a protected variety for enforcement of the breeder's right; and
- (3) the conclusions provided by the expert from the European Union in document TWV/50/14 Add., Annex II, slide 19, as follows:
  - Notes of similar varieties shall come from the same growing trial as for the candidate variety
  - To inform parties concerned on amendments for the Official VD (variety description)
  - Agreement on data supplied to share databases

Development of calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD is used

100. The TC considered documents TC/53/23.

101. The TC received a presentation by the experts from the United Kingdom on excluding varieties of common knowledge from the second growing cycle when COYD was used, a copy of which is reproduced in document TC/53/23 Add..

102. The TC noted that further developments on calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD was used would be reported to the TWC, at its thirty-fifth session.

Statistical methods for visually observed characteristics

103. The TC considered document TC/53/24.

104. The TC noted that an expert from France would make a report to the TWC, at its thirty-fifth session, to be held in 2017, on the study to develop software to implement the method developed by experts from Denmark and Poland.

105. The TC agreed that the appropriate naming and drafting of guidance on the method developed by experts from Denmark and Poland should be considered once further experience had been acquired and software was available to facilitate its use in DUS examination.

106. The TC noted that China had made a presentation at the thirty-fourth session of the TWC to describe the statistical methods used in the DUSTC software package for the analysis of distinctness and uniformity.

Molecular techniques

107. The TC considered document TC/53/11.

108. The TC noted the report on developments in the TWPs and BMT, as set out in document TC/53/11, paragraphs 5 to 24.

109. The TC noted that the development of a joint document explaining the principal features of the systems of the OECD, UPOV and ISTA could only start after agreement by OECD and ISTA.

110. The TC noted that the development of a joint OECD/UPOV/ISTA document containing an inventory of molecular marker techniques used by crop could only start after agreement by OECD and ISTA.

111. The TC agreed that possible future collaboration between UPOV, OECD and ISTA might include the harmonization of terms and methodologies used for different crops and the possible development of standards, after agreement by those organizations.

112. The TC considered whether to explore circumstances in which the same techniques and information could be used by OECD, ISTA and UPOV, taking into account the different objectives of the organizations, and agreed that the organization by Naktuinbouw of a practical workshop in 2017, in Roelofarendsveen, Netherlands, from May 8 to 10, 2017, could explore such possibilities on the basis of real situations.

113. The TC agreed that UPOV and OECD should consider making progress in the matters above if ISTA was unable to participate in the near future.

114. The TC noted the offer by the Netherlands to report on projects on the use of molecular techniques in DUS examination to the TWC.

115. The TC noted the offer by China to report its experience on the use of DNA databases of maize, rice and wheat when selecting similar varieties for the examination of distinctness to the TWC.

116. The TC noted that the TWC had agreed to invite presentations from members on the statistical aspects of using molecular markers in DUS examination, including the selection of similar varieties and organization of growing trials.

117. The TC noted the offer by France to make a presentation on current work with databases that included molecular information with computation of molecular distances using the GAIA software, to the TWC at its thirty-fifth session.

118. The TC noted that the TWC had agreed that software and databases as well as associated statistical methods were important elements of DUS examination and of increasing relevance to plant variety protection, and the Chairperson of the TWC should report on these particular elements of the work of the TWC to the TC.

119. The TC noted that a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods had been held in Paris on June 8, 2016, and that the recommendations of the Joint OECD/UPOV/ISTA/AOSA Workshop as reproduced in document TC/53/11, paragraph 25, had been approved by the Annual Meeting of the OECD Seed Schemes, held in Paris on June 9 and 10, 2016.

120. The TC noted that a question and answer concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, had been adopted by the Council, at its fiftieth session.

121. The TC agreed to propose that the meetings of the BMT be held on an annual basis and that consideration be given to organizing the sessions of the TWC and BMT back-to-back in the same location to facilitate exchange of information.

#### Discussion session

##### *(a) Use of disease and insect resistance characteristics in DUS examination*

122. The TC received the following presentations on the use of disease and insect resistance characteristics in DUS examination (in order of presentation):

Use of disease and insect resistance characteristics in DUS examination	France (Mr. Richard Brand)
Harmonization of resistance tests for DUS testing: "Harmores 2"	European Union (Mr. Sergio Semon)
Resistance-specific molecular markers in DUS testing	Netherlands (Mr. Bert Scholte)
US PVP use of disease reaction characteristics in soybean DUS examination	United States of America (Mr. Paul Zankowski)

##### *(b) Management of variety collections*

123. The TC received the following presentations on the management of variety collections (in order of presentation):

How we use molecular techniques in France	France (Ms. Clarisse Leclair)
Variety collections - Harmonized DNA databases	Netherlands (Mr. Bert Scholte)
The management of variety collections by Cyclic Planting of Established Varieties	United Kingdom (Ms. Sally Watson)

(c) *Minimum distance between varieties*

124. The TC received the following presentation on minimum distance between varieties:

Current agriculture is endangered by a decline in genetic distances between plant varieties: Fact or fiction? - Tomato as case study	Netherlands (Mr. Henk Schouten)
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125. The TC welcomed the presentation by the Netherlands and noted that a complete report on the study would be published. The TC noted that the Office of the Union would seek to develop a short video on the study by the Netherlands to be made available on the UPOV website.

(d) *Increasing participation of new members of the Union in the work of the TC and TWPs*

126. The TC received the following presentations on the Increasing participation of new members of the Union in the work of the TC and TWPs (in order of presentation):

UPOV – How to increase participation of new Members	Netherlands (Mr. Marien Valstar)
“Intervención de Perú en la sesión del Comité Técnico de la UPOV”	Peru (Mr. Roger Becerra)

127. The TC agreed to invite the Netherlands to draft a paper on increasing participation of new members of the Union in the work of the TC and the TWPs, taking into consideration the survey of UPOV members reported at the fiftieth session of the TC (see: document TC/50/35: “Improving the effectiveness of the Technical Committee, Technical working Parties and the Preparatory Workshops”, available at: [http://www.upov.int/edocs/mdocs/upov/en/tc\\_50/tc\\_50\\_35.pdf](http://www.upov.int/edocs/mdocs/upov/en/tc_50/tc_50_35.pdf)).

128. The TC agreed that the program for the TWPs at their sessions in 2017 should include an item for presentations to be made by new members of the Union.

Variety denominations

129. The TC considered document TC/53/12.

130. The TC noted developments concerning a possible revision of document UPOV/INF/12 “Explanatory Notes on Variety Denominations under the UPOV Convention”, as set out in document TC/53/12, paragraphs 6 to 11.

131. The TC noted developments concerning a UPOV similarity search tool for variety denomination purposes, as set out in document TC/53/12, paragraphs 13 to 18.

132. The TC noted developments concerning the possible expansion of the content of the PLUTO Database, as set out in document TC/53/12, paragraphs 19 to 23.

133. The TC noted developments concerning non-acceptable terms, as set out in document TC/53/12, paragraphs 24 to 28.

134. The TC noted that the third meeting of the WG-DEN would be held in Geneva, on April 7, 2017.

135. The TC noted the draft agenda of the third meeting of the WG-DEN, as set out in document TC/53/12, paragraph 30.

136. The European Union recalled the importance of comparing results of the new algorithm with other existing algorithms and ensure that it would provide an improvement in terms of precision and recall and highlighted the need to address “false negatives” and treatment of data, such as double letters.

### Preparatory workshops

137. The TC considered document TC/53/13.

138. The TC noted the report of the preparatory workshops held in 2016.

139. The TC considered the proposed program for preparatory workshops for 2017, as set out in document TC/53/13, paragraphs 12 to 14, and agreed that the preparatory workshops in 2017 should demonstrate how to use the web-based TG template and should include an item on the use of molecular techniques in DUS examination.

140. The TC noted that the TWPs would meet twice before the 2018 session of the TC, which could result in a reduction of the number of matters to be discussed. The TC agreed that the preparatory workshops 2018 should be organized on the Monday/Tuesday of the TWPs session to encourage participation by all TWP participants.

141. The TC agreed that the exercises for the preparatory workshops should be renewed and invited members of the Union to provide suggestions on particular aspects of interest to be covered in the exercises.

### Web-based Test Guidelines template

142. The TC considered document TC/53/29.

143. The TC noted the comments by the TWPs, at their sessions in 2016, as presented in document TC/53/29, paragraphs 7 to 17.

144. The TC noted that the following items had been resolved in Version 1.0 of the web-based TG template:

- immediate visualization of updates made by the Leading Expert in the export file;
- online availability of tutorials (web-based TG template webpage);
- editing of comments by Interested Experts without replacing previously drafted text;
- confirmation message after successful introduction of comments by Interested Experts;
- addition of a free text box for wording on “form of plant material to be supplied” (e.g. “The material is to be supplied in the form of corms able to produce plants to show all the characteristics in the first year of examination.”)

145. The TC noted that a general revision of the software code was underway to eliminate remaining reported malfunctioning issues and to stabilize the system. The TC noted that the Office of the Union had introduced a translator’s interface for the generation of versions of Test Guidelines in the official UPOV languages but that further development of the interface would be needed before it could be used efficiently by the translators.

146. The TC recalled that the development of Version 2 of the web-based TG Template would not start before 2018, subject to availability of resources, after Version 1 had been fully stabilized and tested.

147. The TC noted that the following issues would be considered for inclusion in Version 2 of the web-based TG Template, as set out in document TC/53/29, paragraphs 21 and 22:

- Addition of hyperlinks in the exported documents to the symbols indicating that a characteristic has explanations covering individual and/or several characteristics in the Table of Characteristics in order to facilitate electronic navigation in the document;
- Possibility to display large tables in landscape format, such as for indication of growth types;
- Provide the comments by the Office of the Union on draft Test Guidelines in the web-based TG Template.

148. Subject to the completion of discussions on proposed amendments to document TGP/7 “Development of Test Guidelines”, further changes would need to be introduced in the web-based TG Template (see document TC/53/5 “TGP documents”).



149. The TC agreed that training on the use of the web-based TG template should be offered to the TWPs during the preparatory workshops of the session and/or during the discussions on the agenda item “guidance for drafters’ of Test Guidelines”. The TC agreed that training should also include FAQs and tutorials for users of the web-based TG template.

List of genera and species for which authorities have practical experience in the examination of distinctness, uniformity and stability

150. The TC considered document TC/53/4 and noted that the number of taxa for which members of the Union had indicated their practical experience in the examination of DUS had increased from 3,462 in 2016 to 3,561 in 2017 (+ 2.9%). The number of genera and species for which members of the Union had indicated their practical experience in the examination of DUS had increased to 3,416. Information on members of the Union with practical experience in DUS examination is freely accessible via the GENIE database.

Test Guidelines

151. The TC considered documents TC/53/2, TC/53/25, TC/53/26, TC/53/27, TC/53/28 and TC/53/30 Rev.

152. According to the procedures established in document TGP/7, the TC adopted 5 new Test Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, 9 revised Test Guidelines and 4 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
<u>NEW TEST GUIDELINES / NOUVEAUX PRINCIPES DIRECTEURS D'EXAMEN / NEUE PRÜFUNGSRICHTLINIEN / NUEVAS DIRECTRICES DE EXAMEN</u>							
FR	TWO	TG/ABELI(proj.6)	Abelia	Abelia	Abelia	Abelia	Abelia R. Br.
JP	TWO	TG/AGLAO(proj.9)	Chinese Evergreen	Aglaonema	Aglaonema	Aglaonema	Aglaonema Schott.
KE/ BR	TWA/ TWV	TG/CASSAV(proj.8)	Cassava	Manioc	Maniok	Mandioca, Yuca	Manihot esculenta Crantz
PL	TWA	TG/PHACE(proj.6)	Scorpion Weed	Phacélie à feuilles de tansaisie	Phazelie	Phazelia	Phacelia tanacetifolia Benth.

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name
BR	TWA	TG/UROCH(proj.11)	Bread Grass, Palisade Grass, Palisade Signal Grass, Signal Grass; Basilisk Signal Grass, Signal Grass, Spreading Liverseed Grass, Surinam Grass; Creeping Signal Grass, Koronivia Grass; Congo Grass, Congo Signal Grass, Ruzi Grass	Signal; Koronivia;	Palisadengras; Surinamgras;	Pasto alambre, Pasto señal, Zacate señal, Zacate signal; Zacate Surinam, Pasto chontalpo, Pasto de la palizada, Pasto de las orillas, Pasto peludo, Pasto prodigio, Zacate prodigio; Braquiaria dulce, Kikuyu de la Amazonía, Pasto humidícola, Pasto humidícola dulce; Congo señal, Gambutera, Kenia, Pasto Congo, Pasto ruzi	Urochloa brizantha (Hochst. ex A. Rich.) R. D. Webster (Brachiaria brizantha (Hochst. ex A. Rich.) Stapf); Urochloa decumbens (Stapf) R. D. Webster (Brachiaria decumbens Stapf); Urochloa dictyoneura (Fig. & De Not.) Veldkamp P. (Brachiaria dictyoneura (Fig. & De Not.) Veldkamp P.); Urochloa humidicola (Rendle) Morrone & Zuloaga (Brachiaria humidicola (Rendle) Schweick.); Urochloa ruzi ensis (R. Germ. & C. M. Evrard) Morrone & Zuloaga (Brachiaria ruzizensis R. Germ. & C. M. Evrard)
<b>REVISIONS OF TEST GUIDELINES / RÉVISIONS DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / REVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES DE DIRECTRICES DE EXAMEN ADOPTADAS</b>							
FR	TWA	TG/3/12(proj.7)	Wheat	Blé	Weizen	Trigo	Triticum aestivum L.
NL	TWV	TG/13/11(proj.5)	Lettuce	Laitue	Salat	Lechuga	Lactuca sativa L.
NL	TWO	TG/27/7(proj.5)	Freesia	Freesia	Freesie	Fresia	Freesia Eckl. ex Klatt
JP	TWF	TG/124/4(proj.5)	Chestnut	Châtaignier	Kastanie	Castaño	Castanea sativa Mill.
CN	TWF	TG/125/7(proj.5)	Walnut	Noyer	Walnuß	Nogal	Juglans regia L.
IT	TWV	TG/154/4(proj.6)	Leaf Chicory	Chicorée à feuille (sauvage)	Blattzichorie	Achicoria de hoja	Cichorium intybus L. var. foliosum Hegi
FR	TWV	TG/173/4(proj.6)	Witloof, Chicory	Chicorée, Endive	Chicorée	Endivia	Cichorium intybus L. partim
DE	TWO	TG/212/2(proj.5)	Petunia	Pétunia	Petunie	Petunia	Petunia Juss.; xPetchoa J. M. H. Shaw
MX	TWF	TG/264/2(proj.9)	Papaya, Pawpaw	Papayer	Melonenbaum, Papaya	Papayo, Lechosa	Carica papaya L.

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name
<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>							
QZ	TWV	TG/44/11 Rev. and document TC/53/27	Tomato	Tomate	Tomate	Tomate	Solanum lycopersicum (L.) Karst. ex. Farw.
FR	TWO	TG/194/1 and document TC/53/26	Lavendula, Lavendar	Lavande vraie, Lavandins	Echter Lavendel, Lavendel	Lavándula, Lavenda	Lavandula L.
AU	TWO	TG/288/1 Rev. and document TC/53/25	Flax-lily, Dianella	Dianella	Flachslilie, Dianella	Dianella	Dianella Lam. ex Juss.
ES	TWV	TG/294/1 Corr. Rev.2 and document TC/53/28	Tomato Rootstocks	Porte-greffe de tomate	Tomatenunterlagen	Portainjertos de tomate	Solanum lycopersicum L. x Solanum habrochaites S. Knapp & D.M. Spooner; Solanum lycopersicum L. x Solanum peruvianum (L.) Mill.; Solanum lycopersicum L. x Solanum cheesmaniae (L. Ridley) Fosberg

153. With regard to the draft Test Guidelines for Agaricus (document TG/259/2(proj.4)), on the basis of the recommendation of the TC-EDC, the TC agreed that the technical issues concerning those draft Test Guidelines, as set out in Annex II to this document, should be referred back to the TWV for further consideration.

#### *Corrections to Test Guidelines*

154. The TC noted that corrected versions of the Test Guidelines for Camellia (document TG/275/1 Corr.) and for Cucumber, Gherkin (document TG/61/7 Rev.2 Corr.) were posted on the UPOV website, as set out in document TC/53/30 Rev.

155. The TC noted that corrected versions of the Test Guidelines for Acca (document TG/306/1), Avocado Rootstocks (document TG/318/1), Japanese Plum (document TG/84/4 Corr.), Radish; Black Radish (document TG/63/7-TG/64/7 Rev.), and Mango (document TG/112/4) would be posted on the UPOV website after the TC session, as set out in document TC/53/30 Rev.

#### *Draft Test Guidelines discussed by the Technical Working Parties in 2016*

156. The TC noted the draft Test Guidelines discussed by the TWPs at their sessions in 2016, as listed in document TC/53/2, Annex II.

#### *Draft Test Guidelines to be discussed by the Technical Working Parties in 2017*

157. The TC agreed the program for the development of new Test Guidelines and for the revision of Test Guidelines, as shown in document TC/53/2, Annex III. The TC agreed that a revised version of document TC/53/2 should be published to include the Test Guidelines for Barley, Field Bean, Oats, Pea, Red Clover and Rice in Annex III.

#### *Status of existing Test Guidelines or draft Test Guidelines*

158. The TC noted the status of the existing Test Guidelines, as listed in document TC/53/2, Annex IV.

### *Superseded Test Guidelines*

159. The TC noted the list of superseded Test Guidelines, as presented in Annex V to document TC/53/2, and noted that the superseded versions of Test Guidelines were available on the Test Guidelines page of the UPOV website.

### *Date of publication of Test Guidelines on the UPOV website*

160. The TC noted that the Test Guidelines page of the UPOV website has been modified to display information on date of adoption and date of publication of Test Guidelines.

### *Additional characteristics*

161. The TC noted that no notifications of additional characteristics or states of expression were notified to the Office of the Union since the fifty second session of the Technical Committee.

### *Procedure for addressing additional information required by the TC-EDC*

162. The TC endorsed the recommendation by the TC-EDC, at its meeting in April 2017, to refer comments on Test Guidelines to Leading Experts and the TWPs in parallel to address issues requiring additional information. The TC also agreed to consider this approach at its session in 2018 and whether it should be included in document TGP/7.

### *Revision of document TGP/14: illustrations for shape and ratio characteristics*

163. The TC endorsed the recommendation by the TC-EDC, at its meeting in April 2017, to improve guidance available in document TGP/14 on providing illustrations for shape and ratio characteristics by the inclusion of additional examples. The TC agreed to invite the TWPs, at their sessions in 2017, to consider the issue and report to the TC at its session in 2018.

### *Program for the development of new Test Guidelines and for the revision of Test Guidelines in 2018*

164. As an additional contingency measure, the TC agreed that the program for the development of new Test Guidelines and for the revision of Test Guidelines in 2018 should be approved by the TC by correspondence on an exceptional basis.

### Chairpersons

165. The TC agreed to recommend to the Council the election of the next chairpersons of the TWPs as follows:

<u>TWP</u>	<u>Proposal</u>
BMT	Mr. Nik Hulse (Australia)
TWA	Ms. Cheryl Turnbull (United Kingdom)
TWC	Mr. Christophe Chevalier (France)
TWF	Mr. Jean Maison (European Union)
TWO	Mr. Henk de Greef (Netherlands)
TWV	Ms. Romana Bravi (Italy)

Program for the fifty-fourth session

1. Opening of the session
2. Adoption of the agenda
3. Report on developments in UPOV including relevant matters discussed in the last sessions of the Administrative and Legal Committee, the Consultative Committee and the Council
4. Organization of the UPOV sessions
5. Progress reports on the work of the Technical Working Parties, including the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT)
6. Matters arising from the Technical Working Parties
7. TGP documents
8. Cooperation in examination
9. Information and databases
  - (a) UPOV information databases
  - (b) Electronic application form
  - (c) Exchange and use of software and equipment
  - (d) Variety description databases
10. Number of growing cycles
11. Matters concerning variety descriptions
12. Development of calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD is used
13. Statistical methods for visually observed characteristics
14. Discussion on:
  - (a) Minimum distances between varieties
  - (b) Increasing participation of new members of the Union in the work of the TC and the TWPs (including the provision of training on using UPOV tools to new members of the Union)
15. Molecular techniques
16. Variety denominations
17. Preparatory workshops
18. List of genera and species for which authorities have practical experience in the examination of distinctness, uniformity and stability
19. Web-based Test Guidelines template
20. Test Guidelines
21. Program for the fifty-fifth session
22. Adoption of the report (if time permits)
23. Closing of the session

PROGRESS REPORT ON THE WORK OF THE TECHNICAL WORKING PARTIES AND THE WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES, AND DNA-PROFILING IN PARTICULAR IN 2016

166. The following reports were made by the Chairpersons on the work of the TWA, TWC, TWF, TWO, TWV, and BMT at the fifty-third session of the TC.

*Technical Working Party for Agricultural Crops*

167. The Technical Working Party for Agricultural Crops (TWA) held its forty-fifth session in Mexico City, Mexico, from July 11 to 15, 2016, under the chairmanship of Mr. Tanvir Hossain (Australia). The report of the session is provided in document TWA/45/25 "Report".

168. The session was attended by 64 participants from 19 members of the Union and 3 observer organizations. The preparatory workshop was held on the afternoon of July 10, 2016, and was attended by 21 participants from 9 members of the Union and one observer organization.

169. The TWA was welcomed by Ms. Graciela Ávila Quezada on behalf of H.E. the Minister for Agriculture, Livestock, Rural Development, Fisheries and Food, Mr. José Eduardo Calzada Roviroso, and by Mr. Manuel Rafael Villa Issa, Director General, National Service of Seed Inspection and Certification (SNICS). The TWA received a presentation on plant variety protection in Mexico by Mr. Eduardo Padilla Vaca, Director of Plant Varieties Registry (SNICS).

170. The TWA adopted the agenda as presented in document TWA/45/1 Rev.

171. On the revision of document TGP/7 "Development of Test Guidelines", section 4.3 "Drafter's Kit for Test Guidelines", the TWA agreed that the period for Leading Experts to draft Test Guidelines using the web-based TG Template should start shortly after the respective TWP session to avoid any unnecessary delay in finalizing the draft.

172. The TWA considered the proposed guidance for examining DUS in bulk samples, for inclusion as a new section in a future revision of document TGP/8 "Cooperation in Examination". The TWA agreed with the TWV that the proposed guidance did not present enough examples for examining DUS characteristics on the basis of bulk samples and that the drafter should be requested to further elaborate the proposal including more examples, as requested by the TC, at its fifty-second session. The TWA agreed that further development of guidance on bulk samples should be subject to the availability of appropriate examples with data from routine measurement of characteristics such as chemical content or 1000 seed weight.

173. The TWA received a presentation on "Genotype by Environment Interaction (GEI) - DUS test and data transformation into notes" by an expert from Italy. The TWA agreed on the relevance of the information provided on genotype-by-environment interaction for possible future guidance on converting observations into notes and for producing variety descriptions.

174. On the revision of document TGP/10 "Examining Uniformity", the TWA received a presentation on "Assessing uniformity by off-types on the basis of more than one growing cycle: drafting guidance" by experts from Germany and the United Kingdom by electronic means. The TWA also received a presentation on "Practical experience of assessing uniformity by off-types on oilseed rape and cauliflower" by an expert from France. The TWA, in conjunction with TWC experts via video link, considered the draft guidance for inclusion in a future revision of document TGP/10, including the new proposed "Approach 3: Combining the results of two growing cycles". The TWA agreed with the TWC that guidance should provide parameters for decisions on the most suitable approach based on experience from members. The TWA agreed to provide examples comparing the possible effect on uniformity decisions between Approach 3 and other approaches. The TWA welcomed the offers from France, Germany, the Netherlands, Poland and the United Kingdom to provide examples to be presented at its forty-sixth session.

175. The TWA agreed with the TWC on the importance of identifying whether differences in number of off-types between growing cycles were due to biological reasons or sampling variation and agreed that results from growing cycles using different lots of plant material should not be combined. The TWA agreed with the TWV that, in conjunction with the revision of document TGP/10 on "Assessing uniformity by off-types on basis of more than one growing cycle or on the basis of sub-samples", it would be important to review the guidance provided in document TGP/8: Part II: 8: "The method of uniformity assessment on the basis of off-types", Section 8.1.7 "Method for more than one single test (year)", because it did not reflect the practice within members of the Union.

176. Regarding matters concerning variety descriptions, the TWA agreed that the description of a variety had limitations due to its link to the circumstances of the DUS examination but agreed that it was an important element of the plant variety protection system. Australia, the European Union and Germany shared their own experiences on matters concerning variety description through individual presentations.

177. On the number of growing cycles, the TWA received a presentation by an expert from the Netherlands, and welcomed the offers from France, Germany, the Netherlands, Poland and the United Kingdom to simulate the impact of using different numbers of growing cycles on DUS decisions and the quality of variety descriptions using actual data and to report on their results at the TWA at its forty-sixth session.

178. The TWA received a presentation on the "Impact Analysis of Endophytes on the Phenotype of Varieties of *Lolium perenne* and *Festuca arundinacea*" by an expert from the Community Plant Variety Office of the European Union (CPVO). The TWA noted that there had been no interaction between the endophytes studied and expression of the DUS characteristics on the crops studied. The TWA agreed that it would not be possible to make a general recommendation on the effect of endophytes in DUS characteristics due to the possibility of positive interaction between other endophytes and the expression of DUS characteristics.

The TWA noted that New Zealand would consider the requirement for endophyte-free plant material for DUS examination and welcomed its offer to make a presentation on the outcome of discussions to the TWA at its session in 2017.

179. The TWA discussed the draft Test Guidelines of Cassava, Urochloa, Barley, Castor Bean, Cotton, Elytrigia, Field Bean, Oats, Quinoa, Red Clover, Scorpion Weed, Soya Bean and Wheat. The TWA agreed that the draft Test Guidelines for Cassava, Scorpion Weed, Urochloa and Wheat should be submitted to the TC for adoption at its fifty-third session, to be held in Geneva from April 3 to 5, 2017.

180. The TWA agreed to further discuss the following draft Test Guidelines at its forty-sixth session: Barley (revision), Castor Bean, Cotton (revision), Elytrigia, Field Bean (revision), Ginseng (revision), Oats (revision), Quinoa, Red Clover (revision), Rice (Revision), Soya Bean (revision) and Tea (revision).

181. At the invitation of Germany, the TWA agreed to hold its forty-sixth session in Hanover, from June 19 to 23, 2017, with the preparatory workshop on June 18, 2017.

182. The TWA agreed to propose to the TC that it recommend to the Council to elect Ms. Cheryl Turnbull (United Kingdom), as the next chairperson of the TWA.

183. The TWA agreed to discuss the following items at its next session:

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) Reports on developments within UPOV (oral report by the Office of the Union)
4. Molecular Techniques (document to be prepared by the Office of the Union)
5. TGP documents (documents to be prepared by the Office of the Union)
6. Variety denominations (document to be prepared by the Office of the Union)
7. Information and databases
  - (a) UPOV information databases (document to be prepared by the Office of the Union)
  - (b) Variety description databases (document to be prepared by the Office of the Union and documents invited)
  - (c) Exchangeable software (document to be prepared by the Office of the Union)
  - (d) Electronic application systems (document to be prepared by the Office of the Union and documents invited)
8. Uniformity assessment by off-types (documents to be prepared by France, Germany, the Netherlands, Poland and the United Kingdom)
9. Experiences with new types and species
10. Impact of endophytes on DUS characteristics in grasses (documents to be prepared by the European Union, Mexico and New Zealand and documents invited)
11. Regional set of example varieties in Wheat for South America (document to be prepared by Brazil)
12. Number of growing cycles in DUS examination (documents to be prepared by France, Germany, the Netherlands, Poland and the United Kingdom)
13. Minimum distance between varieties (documents to be prepared by the European Union and the Republic of Korea)
14. Use of disease and insect resistance characteristics in DUS examination (documents to be prepared by Australia, Brazil, the European Union and France)
15. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
16. Discussion on draft Test Guidelines (Subgroups)
17. Recommendations on draft Test Guidelines
18. Guidance for drafters of Test Guidelines
19. Date and place of the next session
20. Future program

21. Adoption of the Report on the session (if time permits)
22. Closing of the session

184. On July 13, 2016, the TWA visited the International Maize and Wheat Improvement Center (CIMMYT). The TWA was welcomed by Ms. Isabel Vianey Peña Mendoza, Institutional Relations for Latin America, and received three presentations: “CIMMYT – An overview”, presented by Mr. Bram Govaerts, Regional Representative for Latin America; “CIMMYT Global Program for Wheat”, presented by Mr. Matthew Reynolds, Distinguished Scientist, Global Program for Wheat; and “Working with the Private Sector”, presented by Mr. Arturo Silva Hinojosa, Lead, International Consortium for the Improvement of Maize. The TWA visited CIMMYT’s germplasm bank and was welcomed by Mr. Thomas Payne, Head, Genetic Resources Center. The TWA also visited castor bean and quinoa trials at the Autonomous University of Chapingo, and was welcomed by Mr. Agustín López Herrera, Professor Researcher, and Ms. María Antonieta Goytia Jiménez, Director General of Administration.

#### *Technical Working Party on Automation and Computer Programs*

185. The Technical Working Party on Automation and Computer Programs (TWC) held its thirty-fourth session in Shanghai, China, from June 7 to 10, 2016, under the Chairmanship of Mr. Adrian Roberts (United Kingdom). The report of the session is provided in document TWC/34/32 “Report”.

186. The session was attended by 34 participants from 10 members of the Union. The preparatory workshop was held on the afternoon of June 6, 2016, and was attended by 8 participants from 5 members of the Union.

187. The TWC was welcomed by Mr. Yang Xiongnian, Director General of Development Center of Science and Technology, Ministry of Agriculture (MOA) (Director General of DUS Testing Station of New Plant Varieties, MOA), Mr. Cai Youming, President, Shanghai Academy of Agricultural Sciences and Mr. Ma Zhiqiang, Division Chief of Variety Management, Bureau of Seed Management, MOA. The TWC received a presentation on the plant variety protection system in China from Mr. Cui Yehan, Professor, Director, Plant Variety Protection Division, Development Center of Science and Technology, MOA.

188. On the afternoon of June 9, 2016, the TWC visited the Zhuanghang Experimental Station of the Shanghai Academy of Agricultural Sciences (SAAS), in Shanghai, receiving presentations and visiting the DUS trials, which included ornamental plants and vegetables.

189. The TWC received an oral report on the fifteenth session of the BMT from Mr. Kees van Ettehoven (Netherlands), Chairperson of the BMT. The TWC also received a presentation by an expert from the Netherlands on bioinformatics (document TWC/34/24 Annex). The TWC agreed that bioinformatics was a field of work closely related to the mandate of the TWC, due to both software and statistic issues that arose. The TWC welcomed offers from China, France and the Netherlands to report on projects and experiences with the use of molecular techniques. Presentations from members were invited for the next session on statistical aspects of using molecular markers in DUS examination.

190. The TWC considered document TWC/34/10 “Revision of document TGP/8: Part II: Section 9: the Combined-Over-Years Uniformity Criterion (COYU)”, which reported on progress to improve COYU. The Office of the Union had issued a circular to seek additional data sets to assist the development of probability levels for the new method. An expert of the United Kingdom reported that data sets had since been offered by Denmark and Slovakia. The TWC welcomed offers from China and France to supply data sets. The expert from the United Kingdom agreed to report on progress at the thirty-fifth session of the TWC.

191. The TWC considered a document produced by an expert from France comparing different methods for producing variety descriptions from quantitative characteristics on a common Flax data set (document TWC/34/12, Annex I). The breakdown of the differences and commonalities between the methods provided in this document was useful and the TWC requested that the expert from France continue to develop the study so as to clarify the different methods further. In addition, an expert from the United Kingdom produced a short description of methods used in the United Kingdom, together with example situations when these methods may or may not be used (document TWC/34/12 Add.). The TWC invited experts from France, Germany, Italy and Japan to provide similar descriptions of their methods with a view to future incorporation into guidance.



192. Experts from Finland and Italy gave a joint presentation on “Genotype by Environment Interaction (GEI) - DUS test and data transformation into notes” (document TWC/34/17 Annex). They discussed the impact on variety descriptions produced from quantitative characteristics of genotype-by-environment interaction. The experts suggested measures for ameliorating this issue, such as careful choice of delineating varieties.

193. The TWC discussed the document “Revision of document TGP/10: New Section: Assessing uniformity by off-types on basis of more than one growing cycle or on the basis of sub-samples” (TWC/34/13). The TWC agreed that guidance should be developed to facilitate selection of the most suitable approach for each situation, with the cost of trials, consistency of results, time required for decisions and technical aspects of each approach all having an influence. An expert from France gave a presentation comparing the three approaches on oilseed rape and cauliflower data sets (document TWC/34/27). This exercise showed that cases of diverging results between the three methods were not very common. The TWC thought that further examples would be useful to develop guidance and welcomed offers from Germany, the Netherlands and the United Kingdom to present examples at the thirty-fifth session. The TWC noted that the TWA had agreed to request a video link with experts from the TWC to discuss this topic at the forty-fifth session.

194. There were several presentations on software systems being used or developed by members. These included:

- From the Netherlands, “Naktuinbouw application and information database: Integrated IT-tool to manage applications, requests, trials, reports and variety collections” (document TWC/34/22). This is a core system tailored to local requirements.
- From the Netherlands, “Search Plant: A search portal to facilitate tracking and tracing of ornamental varieties” (document TWC/34/20). This web service allows users to search for varieties over multiple databases with differing architecture.
- From China, “Statistical methods used in the DUSTC software package”. This included a demonstration of the DUSTC software package that incorporates statistical analysis procedures, including the methods for calculating COYU and COYD.
- From China, a demonstration of software for image analysis.
- From France, “A tool to define reference collection” (document TWC/34/28). This software helps to manage the reference collection from the collation of varieties of common knowledge to selection for trials.
- From France, “A single tool for DUS computation process” (document TWC/34/29). Progress on the development of a new software package was described, incorporating the existing GAIA software and using the same interface to give access to methods such as COYD and COYU.

195. The TWC noted the experience of France and Germany in developing, managing and sharing different databases and suggested that guidance on the development and management of databases may be of benefit to members. The TWC invited presentations from members on experiences with using databases and proposals for guidance.

196. China gave a presentation “A ring-test comparing three different software packages for COYD” (document TWC/34/30). COYD was applied to the same data set using different software used by members: DUSTC (China), SAS-based software (Germany) and DUST (United Kingdom). The same result was obtained from all three packages.

197. In respect of document UPOV/INF/22 “Software and equipment used by members of the Union”, the TWC made the following suggestions:

- That a note be added to the document explaining that the information in that document was the responsibility of the contributing authority.
- That reference could be made in both documents UPOV/INF/16 and UPOV/INF/22 to training materials and presentations.
- That an alternative format for the information in UPOV/INF/22, such as an online webpage, be considered to facilitate access.

198. An expert from the United Kingdom gave a presentation on “Calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD is used” (document TWC/34/8). This demonstrated a method for selecting similar varieties for comparison after the first growing cycle, based on quantitative characteristics. The method was evaluated on a data set for Pea from the United Kingdom. It was agreed that further data sets would be valuable for developing the method and welcomed the offers from Denmark, Finland, Germany and Slovakia to provide data sets. The TWC noted that software implementing the method would be developed, with a possibility to be integrated into the GAIA software.

199. An expert from Finland gave a presentation on “Minimizing variation between observers – practical example from Finland” (document TWC/34/19). In Finland, steps are taken to minimize variation between observers in the assessment of MS/VS characteristics in turnip rape. Training is conducted prior to beginning of work and calibration is carried out on different occasions during the day.

200. The TWC received a presentation by the expert from Finland on “Number of growing cycles in DUS examination -simulation of impact on DUS decisions” (document TWC/34/15). This study examined whether two or three cycles are needed for the cross-pollinated crops Timothy, Meadow Fescue, Red Clover, White Clover and Turnip Rape. The predominant number of cycles required depended on the crop. An expert from the Netherlands also gave a presentation on “Minimum number of growing cycles” (document TWC/34/21). This recalled the factors that may determine the number of growing cycles required and suggested that additional tests, such as disease resistance, light sprouting or DNA might be used to reduce the number of cycles required in some cases. The TWC noted that for some members of the Union, DNA tests were being considered for reducing the number of growing cycles while retaining decisions based on a growing trial. An expert of Argentina noted that, in the case of vegetatively propagated and self-pollinated crops, a second growing cycle would not be necessary in cases where distinctness was confirmed with clear differences between varieties (e.g. disease resistance characteristics) in a first growing cycle. The TWC welcomed the offers by France, Germany and the Netherlands to give presentations about simulations demonstrating the impact of using different numbers of growing cycles on DUS decisions at the thirty-fifth session.

201. The TWC agreed that software and databases as well as associated statistical methods were important elements of DUS examination and of increasing relevance to plant variety protection.

202. The TWC agreed to propose to the TC that it recommend to the Council to elect Mr. Christophe Chevalier (France), as the next chairperson of the TWC.

203. The TWC agreed to hold its third-fifth session in Buenos Aires, Argentina, from November 14 to 17, 2017, with the preparatory workshop on November 13, 2017.

204. The TWC planned to discuss the following items during the thirty-fifth session:

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
  - b) Reports on developments within UPOV
4. Variety denominations
5. Matters concerning variety descriptions
6. TGP documents
7. Consideration of possible reorganization of TGP/8
8. Uniformity assessment by off-types
  - a) Practical experience of uniformity by off-types
  - b) Factors influencing the choice of approach for off-types over two or more cycles
9. Molecular techniques
  - a) Selection of similar varieties for maize, rice and wheat using a DNA database
  - b) Use of molecular markers in DUS examination
  - c) Experience in the use of molecular markers in DUS examination
  - d) Statistical issues (bio-informatics) related to the use of molecular markers in DUS examination
10. Number of growing cycles in DUS examination
11. Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions
  - a) Short descriptions

- b) Review results of practical exercise
- c) Genotype-by-environment interaction, DUS tests and data transformation into notes
- 12. Software, information and databases
  - a) UPOV information databases
  - b) Variety description databases
  - c) Exchange and use of software and equipment
  - d) Electronic application systems
  - e) Management of databases
    - i. Experience of members on the application of databases
    - ii. Development of new ideas regarding the management of information
    - iii. Guidance on the management of databases
  - f) A single tool for DUS computation process
- 13. Statistical methods
  - a) Excluding varieties of common knowledge from the second growing cycle
  - b) Statistical methods and software for visually observed characteristics
  - c) The Combined-Over-Years Uniformity Criterion (COYU)
- 14. Image analysis
- 15. Date and place of the next session
- 16. Future program
- 17. Report on the session
- 18. Closing of the session

#### *Technical Working Party for Fruit Crops*

205. The Technical Working Party for Fruit Crops (TWF) held its forty-seventh session in Angers, France, from November 14 to 18, 2016, under the chairmanship of Mr. Katsumi Yamaguchi (Japan). The report of the session is provided in document TWF/47/25 "Report".

206. The session was attended by 45 participants from 23 members of the Union and one observer organization. The preparatory workshop was held on the afternoon of November 13, 2016, and was attended by 21 participants from 16 members of the Union.

207. The TWF was welcomed by Mr. Martin Ekvad, President of the Community Plant Variety Office of the European Union (CPVO) and received a presentation on the plant variety protection system in the European Union by Mr. Ekvad.

208. The TWF considered document TWF/47/19 "Duration of DUS Tests in the Fruit Sector" and the proposal from an expert from the European Union and agreed to propose to modify the wording of document TGP/7 as follows, in order to reflect common practice in the fruit sector (see document TWF/47/25 "Report", paragraphs 47 to 48):

#### "3.1 Number of Growing Cycles

"The minimum duration of tests should normally be:

"As soon as it can be established with certainty that the outcome of the DUS test will be negative, it can be stopped independently from the number of growing cycles carried out so far."

209. The TWF considered document TWF/47/15 "Number of Growing Cycles in DUS Examination" and received a presentation on the "Number of growing cycles in DUS Examination for fruit species" by an expert from France, a presentation on "Variability of assessment data over years in apple" by an expert from Germany and a presentation on "Interpreting Variety Descriptions for Apple – Environmental influence on Quantitative Characters" by an expert from New Zealand. The TWF agreed on the importance of the variety collections, in order to have reliable data when comparing varieties during DUS examination and agreed that some characteristics are more efficient than others to examine distinctness.

210. The TWF considered document TWF/47/23 "Calibration book for harmonized variety description in apple" and received a presentation from an expert of the European Union. It recognized the use of Test Guidelines as a means of facilitating harmonization among members of UPOV in DUS examination, however it further agreed:

- on the importance, during the Test Guidelines discussion, to agree between experts on the clarity of the states of expression and the scale to be used, in order to limit the risk of discrepancies in interpretation by examiners;
- that each characteristic should fulfill the requirements of a characteristic and this should be kept under review;
- on the need to revise some adopted Test Guidelines and adjust states and notes accordingly;
- on the importance of example varieties allocated to each state;
- on the importance of the method of observation and its explanation, to clarify for the examiners when and where to measure/observe in order to reduce variation between observers/observation;
- on the potential influence of the environment on the expression of the characteristic.

211. The TWF noted illustrated differences in variety descriptions between authorities for the same variety. It further agreed that this information would be interesting to be considered for each characteristic in any future revision of the Test Guidelines, in particular in this case for apple. The TWF agreed on the proposal to study the discriminating power of characteristics on the basis of a model study developed previously by the TWV for peas (see document TWV/47/25 "pea database study"). The study would aim to clarify the use of each characteristic in DUS examination and its ability to describe the variety and/or to assess distinctness in an efficient way.

212. The TWF considered document TWF/47/21 "DUS examination of mutant varieties of apple" and received a presentation by an expert from the European Union. The TWF agreed on the importance of exchanging information among PVP Offices about applications received by members of the Union, especially for some apple mutation groups where similar varieties might be submitted in various countries. Such an exchange would help to allow all relevant varieties of common knowledge to be taken into consideration and, if appropriate, included in the growing trial for the examination of distinctness. It further agreed on the importance of exchanging information about rejected varieties, which might be the subject of ongoing procedures in other members of the Union.

213. The TWF considered document TWF/47/18 "Proposal concerning the "Guide to the UPOV Code System" on the Principal Botanical name for Inter-Generic and Interspecific Hybrids" and considered the proposal to present the principal botanical name for UPOV Codes of hybrid genera and species indicating the parents in alphabetical order. The TWF noted the existence of different procedures among members of the Union and noted that, in some members of the Union, the information on parents of an intergeneric or interspecific hybrid variety were published with the female parent first. On that basis, the TWF agreed with the TWV and TWA that it would not be appropriate to revise the Guide to the UPOV Code System in relation to the principal botanical name for inter-generic and interspecific hybrids.

214. The TWF agreed that the following draft Test Guidelines should be submitted to the TC for adoption: Chestnut; Papaya; and Walnut. The TWF agreed to discuss 10 draft Test Guidelines at its forty-eighth session.

215. At the invitation of Canada, the TWF agreed to hold its forty-eighth session in Kelowna, British Columbia, Canada, from September 18 to 22, 2017, with the preparatory workshop on September 17, 2017.

216. The TWF agreed to propose to the TC that it recommend to the Council to elect Mr. Jean Maison (European Union), as the next chairperson of the TWF.

217. The TWF proposed to discuss the following items at its next session:

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) Reports on developments within UPOV (oral report by the Office of the Union)
4. Molecular Techniques (document to be prepared by the Office of the Union)
5. TGP documents (documents to be prepared by the Office of the Union)
6. Variety denominations (document to be prepared by the Office of the Union)
7. Information and databases

- (a) UPOV information databases (documents to be prepared by the Office of the Union)
- (b) Variety description databases (documents to be prepared by the Office of the Union)
- (c) Exchangeable software (document to be prepared by the Office of the Union)
- (d) Electronic application systems (document to be prepared by the Office of the Union)
8. Experiences with new types and species (oral reports invited)
9. Management of variety collections (oral reports invited)
10. Calibration book for harmonized variety description in apple (document to be prepared by the European Union)
11. DUS examination of mutant varieties of apple (document to be prepared by the European Union)
12. Impact of revisions of states of expression of existing characteristics in the revision of Test Guidelines (document to be prepared by France and presentations invited)
13. Minimum distance between varieties (document to be prepared by the European Union)
14. Guidance for drafters of Test Guidelines
15. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee
16. Proposals for partial revision/corrections of Test Guidelines
17. Discussion on draft Test Guidelines (Subgroups)
18. Recommendations on draft Test Guidelines
19. Date and place of the next session
20. Future program
21. Adoption of the Report of the session (if time permits)
22. Closing of the session

218. On the afternoon of November 16, 2016, the TWF visited the Variety and Seed Study and Control Group (GEVES) in Beaucouzé near Angers, where it was welcomed by Ms. Carole Dirwimmer, Manager of Fruit DUS team, GEVES, and received a presentation by Ms. Dirwimmer on the activities of GEVES with regard to DUS in fruit trees in France in general and DUS testing of Apple in particular. Afterwards, the TWF visited the National Institute for Agricultural Research (INRA) in Beaucouzé where, following the discussions on mutant varieties of Apple on Wednesday morning, the TWF saw several Apple mutant varieties of Gala and Fuji in order to demonstrate the difficulties in DUS testing of Apple mutant varieties. During this part of the visit the TWF was accompanied by M. Rémi Guisnel and Laurence Feugey, French Apple Examiners, Horticulture and Seeds Research Institute (*Institut de Recherche en Horticulture et Semence*, IRHS), INRA. The TWF also received presentations by Mr. François Laurens, Deputy Director, IRHS, INRA, on the activities of INRA-IRHS, and by Ms. Dominique Thévenon, Board member, CIOFORA, on minimum distances.

#### *Technical Working Party for Ornamental Plants and Forest Trees*

219. The TWO held its forty-ninth session in Gimcheon City, Republic of Korea, from June 13 to 17, 2016, under the chairmanship of Mr. Kenji Numaguchi (Japan). The report of the session is provided in document TWO/49/25 Rev. "Revised Report".

220. The session was attended by 53 participants from 14 members of the Union and one observer organization. The preparatory workshop was held on the afternoon of June 12, 2016, and was attended by 29 participants from 11 members of the Union and one observer organization.

221. The TWO was welcomed by Mr. Byeong Seok Oh, Director General, Korea Seed and Variety Service (KSVS), who also introduced the celebration of the 20<sup>th</sup> anniversary of the Plant Variety Protection System in the Republic of Korea in 2017. The TWO received a presentation on Plant Variety Protection in the Republic of Korea, from Mr. Mookyung Yoon, Division Director, KSVS, who introduced the recent developments on the organization, its mission, history and statistics of the PVP system in the country.

222. The TWO considered document TWO/49/11 "Revision of document TGP/8: Part II: Selected Techniques used in DUS Examination, New Section: Examining DUS in Bulk Samples". The TWO noted the proposed guidance for examining DUS in bulk samples as presented in the Annex to document TWO/49/11, for inclusion in a future revision of document TGP/8. The TWO considered the proposed approach to assess uniformity of individual plants for different varieties to validate the characteristic before being used in DUS

examination and agreed that for vegetatively propagated ornamental plants the number of applications per crop would not be sufficient to provide over-years data from many varieties.

223. The TWO noted the reports from members of the Union on experiences with assessing chemical component characteristics and agreed on the technical difficulty and cost implications to obtain a sufficient quantity of certain chemical components to assess uniformity on individual plants. The TWO agreed that characteristics assessed on the basis of bulk samples could provide complementary information for the analysis of distinctness in direct comparison of pairs of varieties for certain crops and agreed that the future guidance should set parameters for selecting among the approaches listed in the Annex to document TWO/49/11.

224. The TWO considered the draft guidance as presented in Annex I of document TWO/49/13 "Revision of document TGP/10: New section: Assessing uniformity by off-types on the basis of more than one growing cycle or on the basis of sub-samples" and agreed that the term "clear" should be clarified in the sentence: "Furthermore, on the basis of a clear lack of uniformity, a variety may be rejected after a single growing cycle". The TWO agreed to propose that the sentence in approaches 1 and 2 should read as follows:

"Furthermore, if a variety exceeds in the first growing cycle the allowed number of off-types in two growing cycles, the variety may be rejected after a single growing cycle."

225. The TWO agreed that it should be clarified in the draft guidance whether there was an assumption of assessing two growing cycles using plant material from a single submission by the breeder (e.g. seeds from the same seed lot).

226. The TWO considered a presentation by the Office of the Union on the tutorials for the different user roles of the web-based Test Guidelines template. The TWO agreed that the tutorials should continue to be developed to include additional comments received from users of the web-based TG template. The TWO agreed that the tutorials should be made available on the TG drafter's web page and a link provided in the web-based TG template webpage. The TWO welcomed Version 1 of the web-based TG template and proposed that the following issues should be addressed:

- to allow immediate visualization of updates made by the Leading Expert in the export file;
- to improve availability online of the tutorials (e.g. link on TG drafter's web page and web-based TG template);
- to open the Test Guidelines for drafting by Leading Experts as soon as possible after a TWP session;
- to add a shortcut to the print dialog box;
- to enable editing of a comment by an Interested Expert without replacing the text previously drafted;
- to generate a confirmation message when a comment by an Interested Expert had been successfully introduced;
- to improve formatting in TQ 5 to clarify that the applicant has an option to either fill in the RHS Colour Chart number or select to the appropriate color group from the list of color groups in a color characteristics;
- to adjust the standard wording for plant material supplied in the form of corms: "The material is to be supplied in the form of corms able to produce plants to show all the characteristics in the first year of examination."

227. The TWO considered document TWO/49/20 "Definition of color groups from RHS Colour Charts". The TWO considered the color names used in the Sixth Edition of the RHS Colour Chart and agreed they did not always reflect the color similarity among different patches. The TWO noted that similar colors in the RHS Colour Chart were grouped under the same UPOV color group and agreed that the current UPOV system was more suitable for variety description purposes. The TWO considered the terms used in color names of the Sixth Edition of the RHS Colour Chart and agreed they were not suitable for use in DUS examination and producing variety descriptions (e.g. "pale", "moderate", "vivid", "brilliant", "deep", "strong").

228. The TWO agreed to use the Sixth Edition as the basis to create a new revised list to replace the current UPOV Color Groups, as presented in document TGP/14 "Glossary of terms used in UPOV documents." The TWO agreed to request the expert from Germany with support by the experts from Australia, Canada, European Union, the Netherlands, New Zealand and the United Kingdom to draft guidance on the factors to be considered for creating color groups for grouping of varieties and organizing

the growing trial (e.g. knowledge on the range of variation within the species and necessary difference between colors for varieties to be considered clearly distinct).

229. The TWO agreed to submit six draft Test Guidelines to the technical Committee for adoption: Abelia; Aglaonema; Dianella (Partial Revision), Freesia (Revision); Lavender (Partial revision); and Petunia (Revision). At its fiftieth session, to be held in 2017, the TWO planned to discuss 16 Test Guidelines, consisting of 2 partial revision, 5 revisions and 9 new Test Guidelines.

230. At the invitation of Canada, the TWO agreed to hold its fiftieth session in Victoria, British Columbia, Canada, from September 11 to 15, 2017, with the preparatory workshop on September 10, 2017.

231. The TWO agreed to propose to the TC that it recommend to the Council to elect Mr. Henk de Greef (Netherlands), as the next chairperson of the TWO.

232. The TWO agreed to discuss the following items at its next session:

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) Reports on developments within UPOV (oral report by the Office of the Union)
4. Molecular Techniques (document to be prepared by the Office of the Union)
5. TGP documents (documents to be prepared by the Office of the Union)
6. Variety denominations (document to be prepared by the Office of the Union)
7. Information and databases
  - (a) UPOV information databases (document to be prepared by the Office of the Union)
  - (b) Variety description databases (document to be prepared by the Office of the Union and documents invited)
  - (c) Exchangeable software (document to be prepared by the Office of the Union)
  - (d) Electronic application systems (document to be prepared by the Office of the Union and documents invited)
8. Case study on minimum distances between vegetatively reproduced ornamental and fruit varieties (presentation by the European Union and presentations invited)
9. Number of growing cycles in DUS examination (document to be prepared by the Office of the Union and documents invited)
10. Characteristic expression between years or environments for ornamental varieties (documents to be prepared by Australia and New Zealand and documents invited)
11. Report on court cases dealing with technical matters (document to be prepared by the European Union and documents invited)
12. Defining color groups for grouping of varieties and organizing the growing trial (document to be prepared by Germany)
13. Experience with the RHS Colour Chart and possible future addition of colors
14. Guidance on illustrations for pseudo-qualitative characteristics for shape (document to be prepared by the Office of the Union)
15. Proposal on the principal botanical name for intergeneric and interspecific hybrids and possible effect on the "Guide to the UPOV Code System"
16. Experiences with new types and species (oral reports invited)
17. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee
18. Proposals for partial revision/correction of Test Guidelines
19. Discussion on draft Test Guidelines (Subgroups)
20. Recommendations on draft Test Guidelines
21. Guidance for drafters of Test Guidelines
22. Date and place of the next session
23. Future program
24. Adoption of the Report on the session (if time permits)
25. Closing of the session

233. On the afternoon of June 15, 2016, the TWO visited Gang San Orchids, an orchid breeding and production company located in Busan, Republic of Korea. The TWO was welcomed by Mr. Jae Hwan Soe, CEO, and received a presentation on *Phalaenopsis* breeding at Gang San Orchids, a copy of which is reproduced in Annex IV to document TWO/49/25 Rev. "Revised Report". The TWO received information on the breeding programs and techniques used for the development of new varieties of *Phalaenopsis* that had resulted in 23 protected varieties in the Republic of Korea and abroad.

#### *Technical Working Party for Vegetables*

234. The Technical Working Party for Vegetables (TWV) held its fiftieth session from June 27 to July 1, 2016, in Brno, Czech Republic, under the chairmanship of Ms. Swenja Tams (Germany). The report of the session is provided in document TWV/50/25 "Report".

235. The session was attended by 37 participants from 15 members of the Union and 3 observer organizations. The preparatory workshop was held on [the afternoon of] June 26, 2016, and was attended by 19 participants from 8 members of the Union.

236. The TWV was welcomed by Mr. Daniel Jurečka, General Director, Central Institute for Supervising and Testing in Agriculture (ÚKZÚZ). A presentation on the Section of Plant Production of ÚKZÚZ was made by Mr. Jiří Urban (Director, Plant production section), and on the National Plant Variety Office by Mr. Tomáš Mezlík (Director of the National Plant Variety Office).

237. On the afternoon of June 29, 2016, the TWV visited the ÚKZÚZ testing station in Chrlice, one of the 15 ÚKZÚZ testing stations, which mainly performs DUS and VCU testing of field crops and vegetables. The TWV was welcomed by Mr. Tomáš Jan, Head of the ÚKZÚZ testing station. The TWV visited several DUS trials including cauliflower, gherkin /cucumber, tomato, garlic, onion, pea, pepper and lucerne.

238. The TWV also visited the vegetable breeding company SEMO in Smržice, where it was welcomed by Mr. Jan Prášil, Director, SEMO, Mr. Vladislav Janeček, Vegetable Market Manager, and Mr. Jan Zavadil, pepper and lettuce breeder. At the SEMO premises, the TWV visited breeding trials for various vegetable species and discussed the impact of specific disease resistance characteristics on breeders' efforts during variety development.

239. The TWV considered the revisions of TGP documents. In general, it was not followed by controversial discussion. The TWV discussed the proposed guidance for examining DUS in bulk samples (document TWV/50/11) and highlighted the need to have enough plants to have the full range of expressions of variation within a characteristic and therefore the TWV was not in favor of the approach reducing the number of plants.

240. The TWV received presentations, followed by discussions, under agenda item "New issues arising for DUS examination". The TWV expressed concerns about the speed for making partial revisions of Test Guidelines especially in relation to disease resistance characteristics. The TWV agreed that it would be important to have the opportunity to make proposals for partial revisions in the period after the TC session and before the TWV session.

241. The TWV received presentations on "Minimum number of growing cycles" from France and the Netherlands, followed by discussions. The TWV agreed that the number of growing cycles needed to be considered on a case-by-case basis to design the DUS examination in the most efficient and effective way.

242. The draft Test Guidelines for Agaricus, Leaf Chicory, Witloof Chicory and Lettuce were revised and put forward for adoption by the TC. Partial revisions for disease resistance characteristics in the Test Guidelines for Tomato and a partial revision concerning the coverage of the tomato rootstock Test Guidelines were agreed.

243. For the fifty-first session, the TWV planned to discuss 3 new Test Guidelines, 3 revisions of Test Guidelines, and 8 partial revisions (mainly on disease resistance characteristics).

244. At the invitation of the Netherlands, the TWV agreed to hold its fifty-first session near Roelofarendsveen from July 3 to 7, 2017. The preparatory workshop will take place on July 2, 2017.

245. The TWV proposed to the TC that it recommend to the Council to elect Ms. Romana Bravi (Italy) as the next chairperson of the TWV.



246. The TWV proposed to discuss the following items at its next session:

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
  - (b) Reports on developments within UPOV (oral report by the Office of the Union)
4. Molecular Techniques
  - (a) Developments in UPOV (document to be prepared by the Office of the Union)
  - (b) Presentation on the use of molecular techniques in DUS examination (presentations invited from members of the Union)
5. TGP documents
6. Variety denominations (document to be prepared by the Office of the Union)
7. Information and databases
  - (a) UPOV information databases (document to be prepared by the Office of the Union)
  - (b) Variety description databases (document to be prepared by the Office of the Union and documents invited)
  - (c) Exchange and use of software and equipment (document to be prepared by the Office of the Union)
  - (d) Electronic application systems (document to be prepared by the Office of the Union)
8. Experiences with new types and species (oral reports invited)
9. New issues arising for DUS examination (presentations invited from members of the Union)
10. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
11. Discussions on draft Test Guidelines (Subgroups)
12. Recommendations on draft Test Guidelines
13. Guidance for drafters of Test Guidelines
14. Date and place of the next session
15. Future program
16. Report on the session (if time permits)
17. Closing of the session

*Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular*

247. The Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT) held its fifteenth session in Moscow, Russian Federation, from May 24 to 27, 2016, under the chairmanship of Mr. Kees van Ettehoven (Netherlands). The report of the session is provided in document BMT/15/28 Rev. "Revised Report".

248. The session was attended by 107 participants from 15 members of the Union and 7 observer organizations. The preparatory workshop was held on May 23, 2016, and attended by 48 participants from 12 members of the Union and 2 observer organizations.

249. The BMT was welcomed by Mr. Evgeny V. Gromyko, First Deputy Minister of Agriculture of the Russian Federation, Mr. Vitaly, S. Voloshchenko, Chairman of State Commission of the Russian Federation for Selection Achievements Test and Protection, Mr. Vladimir M. Kosolapov, Head of Department, Plant Production, Protection and Biotechnology, Russian Science Academy, Mr. Igor A. Lobach, President, National Association of Manufacturers of Seeds of Corn and Sunflower, Ms. Ekaterina V. Zhuravleva, Deputy Chief, Department of Cooperation and Support of Organizations in the Field of Agricultural Sciences, Federal Agency of Scientific Organizations, and Mr. Sergey Lupekhin, President, Russian Potato Union. Mr. Peter Button, Vice Secretary-General, UPOV, also made an opening remark.

250. The BMT received the following presentations concerning new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations:

- The creation of the new group on molecular techniques in the CPVO named "IMODDUS"
- Molecular marker use in the PVP application process in the United States of America
- Evaluation of soybean molecular marker public resources for potential application in Plant Breeders' Rights
- Comparison of genotypic and expression data to determine distinctness among inbred lines of maize for granting Plant Breeders' Rights
- Efficient DUS test in French bean by using molecular data
- Can molecular distance be used as a characteristic?
- Work on molecular techniques in relation to DUS examination of different fruit species

251. The BMT received the following presentations concerning international guidelines on molecular methodologies:

- UPOV and ISO TC 34/SC 16
- DNA-based method for variety testing: ISTA approach

252. The BMT received the following presentations on the use of molecular techniques in variety identification and breeding:

- Application of DNA marker technologies in vegetable breeding
- Gene and genome editing with CRISPR-cas9
- Variety identification of barley using KASP genotypes
- Fast single-step detection and identification of multiple phytopathogens and GMO with real-time PCR-matrix technique
- Laboratory seed control of barley cultivars
- New developments concerning biochemical and molecular techniques in Belarus
- Using of DNA-marker based techniques for varietal identification and fingerprinting of fruit crops and grape genetic resources
- Green forensics: Whole genome sequencing approach for PBR enforcement
- Assessment and classification of breeding accessions of vegetable plants with the use of DNA markers.

253. Cooperation between OECD, UPOV, ISTA and ISO:

- The BMT noted that the development of a joint OECD/UPOV/ISTA document containing an inventory of molecular marker techniques used by crop could only start after agreement by OECD and ISTA;
- The BMT welcomed the proposal by the Netherlands to organize a practical workshop in 2017, with support from UPOV, OECD and ISTA, to explore how molecular techniques might be applied in an efficient way for UPOV, OECD and ISTA purposes;
- The BMT agreed that possible future collaboration between UPOV, OECD and ISTA might include the harmonization of terms and methodologies used for different crops and the possible development of standards, after the agreement by these organizations.

254. The BMT received the following presentations on databases containing molecular data:

- Towards durable DNA databases to support DUS testing
- Advances in the construction and application of DNA fingerprint databases in maize.

255. In response to the invitation by France, the BMT agreed to hold its sixteenth session and a preparatory workshop in France (later confirmed to La Rochelle, France) at the end of September or beginning of October (later changed to November 7 to 10) 2017, with the preparatory workshop to be held the day before the BMT session.

256. The BMT planned to discuss the following items at its sixteenth session:

1. Opening of the session
2. Adoption of the agenda
3. Reports on developments in UPOV concerning biochemical and molecular techniques
4. Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations
5. Report of work on molecular techniques in relation to DUS examination

6. International guidelines on molecular methodologies
7. Variety description databases
8. Methods for analysis of molecular data
9. The use of molecular techniques in examining essential derivation
10. The use of molecular techniques in variety identification<sup>1</sup>
11. Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction ('BMT Guidelines')"
12. Date and place of next session
13. Future program
14. Report of the session (if time permits)
15. Closing of the session

257. The BMT visited the Russian State Agrarian University-Moscow, Agricultural Academy named after K. A. Timiryazev (RGAU-MSHA), and visited the N. I. Vavilov Memorial, where the BMT paid tribute to the great contribution of Mr. Vavilov in a flower offering ceremony.

*258. The Council will be invited to:*

*(a) note the work of the TC and that of the TWPs and BMT reported to the TC, as provided in this document; and*

*(b) approve the work of the TC and the work programs of the TWPs and BMT reported to the TC, as provided in this document.*

[Annex follows]

