

## Technical Committee

TC/54/31 Corr.

**Fifty-Fourth Session**  
**Geneva, October 29 and 30, 2018**

**Original:** English  
**Date:** March 22, 2019

## REPORT

*adopted by the Technical Committee*

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### Opening of the session

1. The Technical Committee (TC) held its fifty-fourth session in Geneva on October 29 and 30, 2018. The list of participants is reproduced in Annex I to this report.
2. The session was opened by Mr. Kees van Ettehoven (Netherlands), Chairperson of the TC, who welcomed the participants.
3. On behalf of the TC the Chairman of the TC expressed its deepest condolences for the sad loss of Mr. Joël Guiard who passed away suddenly in June 2018. He recalled that Joël was held in the highest regard in UPOV and his position as Chairman of the TC was a reflection of the esteem in which he was held by his fellow experts. In addition to being Chairman of the TC, Joël provided support, personally and through GEVES, as Directeur adjoint of GEVES for a multitude of UPOV activities. His knowledge, intelligence and personality enabled him to become a focal point for new and old experts alike and had been awarded a UPOV Gold Medal on the basis of his outstanding contribution to plant variety protection.
4. The Vice Secretary-General introduced Mr. Ruixi Han, who had joined UPOV under a one-year Fellowship, starting in May 2018. He reported that, prior to starting his fellowship, Ruixi was Senior Examiner, Division of DUS Tests, Development Center of Science and Technology, Ministry of Agriculture and Rural Affairs, China. He also introduced Ms. Kasumi Falquet, who was working at UPOV under an agency contract. The Vice Secretary-General further reported that, as a result of competitions, Mr. Tomochika Motomura, a national of Japan, had been appointed as Technical/Regional Officer (Asia) in February 2018 and Ms. Hend Madhour, a national of Tunisia, had been appointed to the post of IT Officer in July 2018.

### Adoption of the agenda

5. The TC considered the agenda for its fifty-fourth session as presented in document TC/54/1 Rev. The TC agreed to postpone until its next session, to be held in 2019, the discussions session scheduled under item 15. The TC adopted the agenda presented in document TC/54/1 Rev., with that amendment.

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 received a presentation by the UPOV Office, a copy of which would be provided as document TC/54/10. The TC noted developments on membership to UPOV and statistics, topics for discussion at the Administrative and Legal Committee (CAJ), communicating the benefits of UPOV and the new videos available on the UPOV website.

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

7. The TC noted that, since its fifty-third session, the Technical Working Party for Agricultural Crops (TWA), Technical Working Party on Automation and Computer Programs (TWC), Technical Working Party for Vegetables (TWV) and the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT), had each held two sessions. The TC noted that, during the same period, the Technical Working Party for Fruit Crops (TWF) and Technical Working Party for Ornamental Plants and Forest Trees (TWO) had each held one session.

8. The TC received oral reports from the Chairpersons on the work of the TWA, TWC, TWF, TWO, TWV and BMT. The Chairpersons provided the following summaries of the work.

*Technical Working Party for Agricultural Crops*

Report by Ms. Cheryl Turnbull (United Kingdom), Chairperson of the TWA

Forty-sixth session of the TWA

9. The TWA held its forty-sixth session in Hanover, Germany, from June 19 to 23, 2017, under the chairmanship of Mr. Tanvir Hossain (Australia). The detailed report of this meeting is provided in document TWA/46/10 "Report".

10. The session was attended by 50 participants from 28 members of the Union and 3 observer organizations. The preparatory workshop was held on the afternoon of June 18, 2017, and was attended by 20 participants from 12 members of the Union and 2 observer organizations.

11. The TWA was welcomed by Mr. Udo von Kröcher, President, Federal Plant Variety Office (Bundessortenamt), Germany. The TWA received a presentation on plant variety protection in Germany by Ms. Beate Rücker, Head of Department, Bundessortenamt, Germany. The TWA adopted the agenda as presented in document TWA/46/1 Rev.

12. The TWA considered the proposed revision of document TGP/7 to clarify the duration of DUS testing, as set out in document TWP/1/11, paragraph 11. The TWA agreed that it should be possible to terminate earlier the examination of a candidate variety (e.g. during the establishment period of the trial) and agreed to propose that particular situations should be addressed in a Guidance Note in document TGP/7 instead of amending the standard wording.

13. The TWA considered document TWP/1/17 Rev. and the draft guidance for inclusion in a future revision of document TGP/10 on "Assessing Uniformity by Off-Types on the Basis of More than One Growing Cycle or on the Basis of Sub-Samples." The TWA agreed to propose more general criteria for a variety to be rejected after a single growing cycle for inclusion in the different approaches of the draft guidance to read as follows:

"If in the first growing cycle a variety exceeds a predefined upper limit of off-types the variety may be rejected after a single growing cycle."

14. The TWA agreed that the upper limit of off-types could be defined by each authority according to the approaches used for the assessment of uniformity by off-types.

15. The TWA received the following four presentations comparing the possible effect on uniformity decisions between Approaches 1 and 3 in document TWP/1/17 Rev., as reproduced in the Annexes to documents TWA/46/4 and TWA/46/4 Add.:

(a)	"Effect of different approaches for the assessment of uniformity by off-types – examples for Barley", prepared by an expert from Germany
(b)	"Assessing Uniformity by Off-types on the basis of more than one Growing Cycle: examples from the Netherlands", prepared by an expert from the Netherlands
(c)	"Assessing uniformity by off-types on the basis of more than one growing cycle in wheat" prepared by an expert from Poland
(d)	"The United Kingdom's Experience with Winter Oilseed Rape (WOSR)" prepared by an expert from the United Kingdom

16. The TWA noted the approaches used for the assessment of uniformity by off-types in Germany and Poland for cereals, in the Netherlands for tomato and in the United Kingdom for oilseed rape.

17. The TWA considered documents TWP/1/21 "Number of growing cycles in DUS examination", TWA/46/8 and TWA/46/8 Add. "Impact of using different numbers of growing cycles on DUS decisions using actual data". The TWA received the following four presentations, as reproduced in documents TWA/46/8 and TWA/46/8 Add.:

(a)	"Impact of number of growing cycles on variety descriptions and discrimination power in wheat and barley", prepared by an expert from Germany
(b)	"Number of Growing Cycles in Potato", prepared by an expert from the Netherlands
(c)	"Number of growing cycles in potato varieties - DUS examination of lightsprouts", prepared by an expert from Poland
(d)	"Number of growing cycles: the impact on cereal variety descriptions", prepared by an expert from the United Kingdom

18. The TWA agreed that discussions on the number of growing cycles in DUS examination for agricultural crops should continue and welcomed the offers by Australia, Denmark, France, Germany, the United Kingdom and ISF to make presentations at its forty-seventh session.

19. The TWA received the following four presentations on the use of disease resistance characteristics in DUS examination, as reproduced in document TWA/46/7:

"Rust Resistance as DUS Characteristics in Wheat", presentation prepared by an expert from Australia
"Use of disease and insect resistance characteristics in DUS examination: experience of Brazil with soybean", document prepared by an expert from Brazil
"Harmonization of resistance tests for DUS testing: 'Harmores 2'", presentation prepared by an expert from the European Union
"Phasing-in period for asterisked disease resistance characteristics in CPVO vegetable technical protocols", presentation prepared by an expert from the European Union

20. The TWA noted that disease and insect resistance characteristics used by members of the Union in individual authorities' test guidelines could be notified to the Office of the Union using the procedure established in document TGP/5 Section 10 "Notification of additional characteristics and states of expression". The TWA agreed there were many requirements that should be considered before considering the inclusion of disease resistance characteristics in UPOV Test Guidelines for agricultural crops.

21. The TWA considered document TWP/1/12 "Characteristics which only apply to certain varieties" and agreed with the possibility to exclude varieties from observation on the basis of a preceding pseudo-qualitative or quantitative characteristic under particular circumstances, such as the impossibility to describe an organ that was not present in a variety or when variation existed only within a particular group of a crop.

22. The TWA agreed that the UPOV Code ZEAAA\_MAY\_SAC should be combined with the UPOV Code ZEAAA\_MAY\_MAY under a single UPOV Code ZEAAA\_MAY following the reclassification of Sweet Corn (*Zea mays* var. *saccharata*) as a subspecies of *Zea mays* subsp. *mays*.

23. The TWA discussed the draft Test Guidelines of Barley (Revision), Castor Bean, Cotton (revision), Elytrigia, Field Bean (revision), Ginseng (revision), Oats (revision), Quinoa, Red Clover, Rice (revision), and Soya Bean (revision). The TWA agreed that the draft Test Guidelines for Barley (revision), Cotton (revision), Elytrigia, Field Bean (revision) should be submitted to the TC for adoption at its fifty-fourth session, to be held in Geneva on October 29 and 30, 2018.

24. The TWA agreed to further discuss the following guidelines at its forty-seventh session: Castor Bean, Ginseng (revision), Oats (revision), Quinoa, Red Clover (revision), Rice (revision), Soya Bean (revision), Sunflower (revision), Tea (revision), and Triticale (revision).

25. At the invitation of Kenya, the TWA agreed to hold its forty-seventh session in Naivasha, Kenya, from May 21 to 25, 2018, with the preparatory workshop on the morning of May 21, 2018.

26. 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)
    - Increasing participation of new members of the Union in the work of the TC and TWPs
  - (b) Reports on developments within UPOV (oral report by the Office of the Union)
4. 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)
5. Variety denominations (document to be prepared by the Office of the Union)
6. Molecular Techniques (document to be prepared by the Office of the Union)
7. TGP documents (documents to be prepared by the Office of the Union)
8. Experiences with new types and species (presentations invited)
9. Number of growing cycles in DUS examination (documents to be prepared by Australia, Denmark, France, Germany, the United Kingdom and documents invited)
10. Minimum distance between varieties (document to be prepared by the European Union)
11. Development of calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD is used (document to be prepared by the Office of the Union)
12. Statistical methods for visually observed characteristics (document to be prepared by the Office of the Union)
13. Procedure for partial revision of UPOV Test Guidelines (document to be prepared by the Office of the Union)
14. Image analysis (documents invited)
15. Management of variety collections (documents invited)
16. Software for statistical analysis (documents invited)
17. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
18. Discussion on draft Test Guidelines (Subgroups)
19. Recommendations on draft Test Guidelines
20. Guidance for drafters of Test Guidelines
21. Date and place of the next session
22. Future program
23. Adoption of the Report on the session (if time permits)
24. Closing of the session

27. On the afternoon of June 21, 2017, the TWA visited the Bundessortenamt testing station at Scharnhorst. The TWA received a presentation by Ms. Elisabeth Thiemt on the history, organization and DUS testing performed at the Scharnhorst station, with 4400 varieties currently under examination. The TWA visited DUS trials for white mustard, fodder radish, field bean, phacelia, linseed, peas, red clover, and grasses. The visit to the trials was guided by Ms. Elisabeth Thiemt and Ms. Susanne Wöster, Head of Section, Bundessortenamt.

28. The TWA thanked Mr. Tanvir Hossain for his chairmanship and noted that he was awarded a UPOV bronze medal in recognition of his chairmanship of the TWA from 2015 to 2017.

Forty-seventh session of the TWA

29. The TWA held its forty-seventh session in Naivasha, Kenya, from May 21 to 25, 2018, under the chairmanship of Ms. Cheryl Turnbull (United Kingdom). The report of the session is provided in document TWA/47/7 "Report".

30. The session was attended by 59 participants from 23 members of the Union and 4 observer organizations. The preparatory workshop for this year was held on the morning of May 21, ahead of the official opening of the meeting in the afternoon of May 21. It was attended by 53 participants from 19 members of the Union and 5 observer organizations.

31. Suggestions were sought from participants on the format of the preparatory workshop. Holding the workshop on Monday morning increased participation from 20 in 2017 to 59 in 2018. The new content on the use of molecular techniques was well received. Other suggestions were to include elements of the workshop throughout the main body of the meeting rather than a specific preparatory workshop and a recommendation to include a section on the role and responsibilities of a Leading Expert, how to lead a TG review and how to participate as an Interested Expert.

32. The TWA was welcomed by Mr. Simeon Kibet, General Manager for Quality Assurance at Kenya Plant Health Inspectorate (KEPHIS), Mr. Isaac Macharia, General Manager for Phytosanitary Services at KEPHIS and, on behalf of Ministry of Agriculture and Irrigation, Ms. Anne Onyango.

33. The TWA adopted the agenda TWA/47/1 Rev. and the report of the meeting is presented in document TWA/47/7, however of note:

- The TWA considered document TWP/2/7 "Molecular Techniques" and received a presentation "Combining Phenotypic and Molecular Distances in the Management of Variety Collections" for maize, by an expert from France. The TWA was informed that this work continues and a final conclusion on the most suitable threshold had yet to be reached. An amendment to document TGP/15/2 Draft 1 was agreed to make this point clear. The TWA expressed its interest to discuss in 2019 the French Bean model presented in document TWP/2/7, Annex III.
- The TWA discussed document TWP/2/9 "Duration of DUS tests" and agreed a further amendment to the proposed wording to read simply:

"the testing of a variety may be concluded ~~earlier or later at the moment~~ when the competent authority can determine with certainty the outcome of the test".
- Regarding document TWP/2/10 "Method for more than one single test (year)" the TWA agreed that it should be clarified that results from different growing cycles should not be combined in situations where more than one sample has been submitted (i.e. in Year 1 and Year 2). Further, in situations where the two-stage test is used the results should also be considered separately in each year and a Third Year of test carried out in the case of divergent results.
- The TWA discussed document TWP/2/11 "Illustrations for shape and ratio characteristics" and agreed that they would prefer some flexibility in the way shapes are presented in the TGs and that the grids, although useful for many species, can sometimes lead to confusion.
- The TWA considered document TWP/2/4 "UPOV information databases" and discussed the proposal to amend the codes for ZEAA. The TWA was concerned about the potential loss of information which assists in grouping and organization of trials and maintaining reference collections (e.g. popcorn, sweet corn, etc.) and would prefer if this type of information could continue to be provided by contributors.
- The TWA discussed document TWA/47/5 "Impact of the number of growing cycles in on variety descriptions and discriminating power in potato" and received a presentation from the expert from Germany. The TWA discussed the quality of descriptions produced over one year vs. two years and generally agreed that 2-year descriptions allow a more robust assessment of characteristics. The TWA also discussed the impact of the number of growing cycles on the distinctness decision and agreed that this could be reached after 1 year given sufficient differences. The TWA also discussed other options that could also be used to supplement a single year of test such as molecular marker techniques and /or side by side plots.

- The TWA considered the comments from the TC-EDC in March 2018 regarding document TWA/47/6 "Cotton (*Gossypium* L.) (Revision)". In consultation with the Leading Expert, revisions were agreed to answer the queries from the TC-EDC.

34. The TWA discussed the draft Test Guidelines of Castor Bean, Oats, Quinoa, Ginseng, Red Clover, Quinoa, Rice, Sunflower, Tea, Triticale and Soya Bean.

35. The TWA agreed to request Leading Experts of draft Test Guidelines to follow recommendations by the subgroups of crop experts on the basis of the recommendations agreed at the session and those from previous sessions.

36. The TWA agreed to submit the draft Test Guidelines for Castor Bean, Oats and Quinoa to the Technical Committee for adoption.

37. The TWA agreed to discuss 9 Test Guidelines at its forty-eighth session, to be held in 2019. Of particular note Rice (*Oryza sativa* L.) will continue to proj.3, Rye (*Secale cereale* L.) and Timothy (*Phleum pratense* L.) will commence with proj.1 and it is expected that Red Clover (*Trifolium pratense* L.) will be finalised.

38. At the invitation of Uruguay, the TWA agreed to hold its forty-eighth session in Montevideo, Uruguay, from September 16 to 20, 2019, with the preparatory workshop on the afternoon of September 15, 2019.

39. The TWA agreed to discuss the following items at its next session. Items 6 and 8 are included at the particular request of the TWA:

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. 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)
5. Variety denominations (document to be prepared by the Office of the Union)
6. Molecular techniques (documents to be prepared by the Office of the Union, European Union, France, United States of America and documents invited)
7. TGP documents (documents to be prepared by the Office of the Union)
8. Experiences with new types and species (presentations invited)
 

General approaches to new species (document to be prepared by the Czech Republic and documents invited)
9. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
10. Discussion on draft Test Guidelines (Subgroups)
11. Recommendations on draft Test Guidelines
12. Guidance for drafters of Test Guidelines
13. Date and place of the next session
14. Future program
15. Adoption of the Report on the session (if time permits)
16. Closing of the session

*Technical Working Party on Automation and Computer Programs*

Report by Mr. Christophe Chevalier (France), Chairperson of the TWC

Thirty-fifth session of the TWC

40. The TWC held its thirty-fifth session in Buenos Aires, Argentina, from November 14 to 17, 2017, under the chairmanship of Mr. Adrian Roberts (United Kingdom). The report of the session is provided in document TWC/35/21 "Report".

41. The session was attended by 31 participants from 9 members of the Union. The preparatory workshop was held on November 13, 2017, and was attended by 23 participants from 5 members of the Union.

42. The TWC was welcomed by Mr. Raimundo Lavignolle, President, National Seeds Institute (INASE), Argentina, who made a presentation on Plant Variety Protection in the country. The TWC also received a presentation by Mr. Alberto Ballesteros, Examiner for Cereals, Cotton, Rice and Forage Crops, INASE, Argentina.

43. The TWC considered document TWP/1/24 "Organization of the UPOV sessions" and noted that the TC had agreed to propose 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. The TWC agreed that the number of participants at BMT meetings and TWC sessions was different and agreed that this aspect should be taken into consideration when organizing back-to-back sessions.

44. The TWC discussed different possibilities for cooperation between the work of the BMT and the TWC such as on databases and bio-informatics. The TWC agreed that strengthening the cooperation between the work of the BMT and the TWC would require further consideration within UPOV.

*Assessing Uniformity by Off-Types on the Basis of More than One Growing Cycle or on the Basis of Sub-Samples*

45. The TWC considered document TWP/1/17 Rev. "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 different approaches used in the assessment of off-types on the basis of more than one growing cycle produced different results in some cases. The TWC agreed that smaller sample sizes and number of off-types allowed (e.g. vegetable crops) could highlight borderline cases where different results could be produced when using different approaches.

46. The TWC agreed that the different results obtained using the different approaches for the assessment of off-types on the basis of more than one growing cycle were due in part to the different risks of type I and type II errors associated with each approach. The TWC agreed to invite the experts from Germany, the United Kingdom and other members of the Union to submit papers on the analysis of risks associated with each approach to be considered at its thirty-sixth session.

*Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions*

47. The TWC considered document TWC/35/9 "Comparison of methods used for producing variety descriptions: results of the practical exercise" and the revised information provided by an expert from France in relation to the comparison of methods used for producing variety descriptions. The TWC agreed that the document provided a useful comparison of methods for the future guidance on converting observations into notes. The TWC agreed that the table of notes attributed to candidate varieties using the different methods as provided in document TWC/35/9 should replace that of document TWP/1/15, Annex II.

48. The TWC considered documents TWC/35/10 "Guidance for development of variety descriptions: the Italian experience"; TWC/35/12 "Short explanation on the Japanese methods for assessment table for producing variety descriptions"; TWC/35/14 "Reasons and situations when the approaches described in the United Kingdom practical exercise (TWC/30/32) would/would not be appropriate for transforming observations into notes on measured, quantitative characteristics"; and TWC/35/15 "Short explanation on some United Kingdom methods for data processing for the assessment of distinctness and for producing variety descriptions for quantitative characteristics." The TWC reviewed the explanations provided by the participants in the practical exercise to be considered as a possible basis for guidance for revision of document TGP/8.

49. The TWC noted that explanations provided by the participants in the practical exercise presented information in different ways. The TWC agreed to request the expert from the United Kingdom to prepare a

document for the thirty-sixth session of the TWC compiling all explanations received using the same format and clarifying the differences.

### *Statistical methods*

#### *The Combined-Over-Years Uniformity Criterion (COYU)*

50. The TWC considered documents TWP/1/13 and TWC/35/6 “Method of calculation of COYU: practical exercise, probability levels, extrapolation and software” and received a presentation by the United Kingdom, a copy of which is provided in document TWC/35/6 Add.

51. The TWC considered the report on developments concerning the new method of calculation of COYU, provided by an expert from the United Kingdom and noted that the statistical development of the method had been completed.

### *Software, Information and databases*

#### *A single tool for DUS computation process*

52. The TWC agreed to invite France to report on progress in the development of a single tool for DUS computation process at the thirty-sixth session of the TWC.

#### *Management of databases*

53. The TWC suggested that the Office of the Union provide documentation on the UPOV website on the web services offered.

### *Variety description databases*

54. The TWC received a presentation by the Office of the Union on “Standards for databases containing molecular information”, a copy of which would be provided as document TWC/35/20. The TWC noted the offer for interested members to participate in the test campaigns to develop the ST-26 standard for the presentation of nucleotide and amino acid sequence listings using XML.

### *Date and place of the next session*

55. At the invitation of Germany, the TWC agreed to hold its thirty-sixth session in Hanover, Germany, from July 2 to 6, 2018, with a preparatory workshop on the morning of July 2, 2018.

### *Future program*

56. The TWC 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) Report on developments within UPOV (document to be prepared by the Office of the Union)
4. Variety denominations (document to be prepared by the Office of the Union)
5. TGP documents (document to be prepared by the Office of the Union)
6. Consideration of possible reorganization of document TGP/8 (document to be prepared by China)
7. Assessing Uniformity by Off-Types on the Basis of More than One Growing Cycle or on the Basis of Sub-Samples (document to be prepared by the Office of the Union)
  - Risks associated with assessment of uniformity by off-types on the basis of more than one growing cycle (document to be prepared by Germany and the United Kingdom)
8. Molecular Techniques (document to be prepared by the Office of the Union, the Netherlands and documents invited)
  - (a) Selection of similar varieties for maize, rice and wheat using a DNA database (document to be prepared by China)



- (b) Statistical methods and software tools for molecular techniques in DUS examination (documents to be prepared by France, Germany and the United Kingdom and documents invited)
- 9. Number of growing cycles in DUS examination (document to be prepared by the Office of the Union)
- 10. Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions (document to be prepared by the Office of the Union and documents invited)
  - Draft guidance on data processing for the assessment of distinctness and for producing variety descriptions using different methods (document to be prepared by the United Kingdom)
- 11. Software, 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 and documents invited)
  - (d) Electronic application systems (document to be prepared by the Office of the Union and documents invited)
  - (e) A single tool for DUS computation process (document to be prepared by France)
  - (f) Management of databases (documents invited)
  - (g) Building a database with molecular marker information for the management of variety collections (document to be prepared by Argentina)
  - (h) Document management system for variety files (document to be prepared by Germany)
  - (i) Web services provided by UPOV and members of the Union (document to be prepared by the Office of the Union and France and documents invited)
- 12. Statistical methods
  - (a) Statistical methods and software for visually observed characteristics (document to be prepared by France and the United Kingdom and documents invited)
  - (b) The Combined-Over-Years Uniformity Criterion (COYU) (document to be prepared by the United Kingdom)
- 13. Image analysis (documents invited)
- 14. Experience with using two locations by one year for DUS decisions (documents to be prepared by France and the Netherlands)
- 15. Guidance for drafters of Test Guidelines (document to be prepared by the Office of the Union)
- 16. Date and place of the next session
- 17. Future program
- 18. Adoption of the Report on the session (if time permits)
- 19. Closing of the session

### Thirty-sixth session of the TWC

57. The TWC held its thirty-sixth session in Hanover, Germany, from July 2 to 5, 2018, under the chairmanship of Mr. Christophe Chevalier (France). The TWC was welcomed by Ms. Beate Rücker, Head of Department, Bundessortenamt, Germany, and received a presentation on plant variety protection in Germany. The detailed report of the meeting is provided in document TWC/36/15 "Report".

58. The session was attended by 28 participants from 15 members of the Union. The preparatory workshop was held on the morning of July 2, 2018, and was attended by 14 participants from 10 members of the Union.

### *Molecular Techniques*

59. The TWC considered document TWP/2/7 Rev. and agreed to recommend that databases should store the "meta-data" or "reference data" of the original data on the observed characteristics to facilitate future exchange and data comparison.

### *Method of calculation of the Combined-Over-Years Uniformity Criterion (COYU)*

60. The TWC considered document TWC/36/4 "Method of calculation of the Combined-Over-Years Uniformity Criterion (COYU): an update on progress" and received a presentation by an expert from the United Kingdom.

61. The TWC agreed to invite the expert from the United Kingdom to draft a replacement section for document TGP/8 on the method of calculation of the Combined-Over-Years Uniformity Criterion.

*Compilation of explanations on methods for producing varieties descriptions for measured characteristics, and clarification of differences*

62. The TWC considered document TWC/36/2 “Compilation of explanations on methods for producing varieties descriptions for measured characteristics, and clarification of differences” and received a presentation by an expert from the United Kingdom, a copy of which would be provided as document TWC/36/2 Add..

63. The TWC agreed that document TWC/36/2 was an appropriate summary of the different approaches used by members of the Union and that it clarified the differences between the methods.

64. The TWC agreed to propose that document TWC/36/2 be considered by the Technical Committee as the basis for the possible development of general guidance on different approaches used for converting observed data into notes.

65. The TWC agreed that discussions on genotype-by-environment interaction should be continued and agreed to invite a paper to be prepared by Italy and Finland taking into consideration other types of characteristics and not only measured quantitative characteristics.

*Impact of the number of growing cycles on variety descriptions and discrimination power*

66. The TWC considered documents TWC/36/6 and TWC/36/6 Add. “Impact of the number of growing cycles on variety descriptions and discrimination power” and received a presentation by an expert from Germany.

67. The TWC welcomed the statistical analysis quantifying the genotype-by-environment interaction for descriptions generated over years.

68. The TWC agreed that variety descriptions generated over two growing cycles were more robust than those generated in one growing cycle only.

*Duration of DUS tests*

69. The TWC agreed with the TWA that the proposed text for a guidance note (GN8) should read as follows:

“The testing of a variety may be concluded ~~earlier or later at the moment~~ when the competent authority can determine with certainty the outcome of the test.”

*Assessing Uniformity by Off-Types on the Basis of More than One Growing Cycle or on the Basis of Sub-Samples*

70. The TWC considered document TWP/2/10 “Uniformity assessment on the basis of off-types: Method for more than one single test (year)” and agreed with the draft proposal for the revision of guidance in document TGP/8/2: Part II: Section 8: Subsection 8.1.7: “Method for more than one single test (year)” by the expert of the United Kingdom.

71. The TWC agreed with the TWA that the results from different growing cycles should only be combined if the tests are done with the same submission of plant material.

72. The TWC agreed to propose that the two-stage test described in paragraph 8.1.8 should be clarified to state that it is for testing in a single growing cycle.

73. The TWC agreed to invite the experts from Germany and the United Kingdom to develop examples demonstrating the risks and consequences for decisions on uniformity to be presented at its next session.

*Date and place of the next session*

74. At the invitation of China, the TWC agreed to hold its thirty-seventh session in Hangzhou, China, from October 14 to 16, 2019.

*Future program*

75. The TWC 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) Report on developments within UPOV (document to be prepared by the Office of the Union)
4. Variety denominations (document to be prepared by the Office of the Union)
5. TGP documents (document to be prepared by the Office of the Union)
6. Assessing Uniformity by Off-Types:
  - Risks associated with assessment of uniformity by off-types on the basis of more than one growing cycle (document to be prepared by Germany and the United Kingdom)
7. Effect of genotype-by-environment interaction in the production of variety descriptions (document to be prepared by Italy and Finland and documents invited)
8. Software, 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 and documents invited)
  - (d) Electronic application systems (document to be prepared by the Office of the Union and documents invited)
  - (e) A single tool for DUS computation process (document to be prepared by France)
  - (f) Management of databases (documents invited)
  - (g) Building a database with molecular marker information for the management of variety collections (documents invited)
  - (h) Web services provided by UPOV and members of the Union (document to be prepared by the Office of the Union)
9. Statistical methods
  - (a) Statistical methods and software for visually observed characteristics (document to be prepared by France and the United Kingdom and documents invited)
  - (b) The Combined-Over-Years Uniformity Criterion (COYU) (document to be prepared by the United Kingdom)
  - (c) Calculated thresholds for excluding varieties of common knowledge from second growing cycle when COYD is used (document to be prepared by the United Kingdom)
10. Image analysis (documents invited)
11. Experience with using two locations by one year for DUS decisions (documents to be prepared by France and Kenya)
12. Number of growing cycles in DUS examination
  - DNA markers as supporting information for DUS decisions in potatoes (document to be prepared by the Netherlands)
13. Molecular Techniques (document to be prepared by the Office of the Union and documents invited)
14. Date and place of the next session
15. Future program
16. Adoption of the Report on the session (if time permits)
17. Closing of the session

*Visit*

76. On the afternoon of July 5, 2018, the TWC visited the Bundessortenamt headquarters at Hanover. The TWC was welcomed by Mr. Uwe Meyer, Head, Information Technology Section, Bundessortenamt. The TWC received a presentation by Ms. Andrea Menne, Head, Ornamental DUS Section, on the trial station at Hanover, which is presented in Annex III to the TWC meeting report, and visited the DUS trials for ornamental plants. Mr. Burkhard Spellerberg, Head, Woody Ornamental DUS and Genebanks Section, guided the TWC on a visit to DUS trials of woody ornamental plants and the genebank at Bundessortenamt. The TWC visited the facilities where seed lots were handled and was guided by Ms. Beate Ruecker, Head, Department NLI, PBR & genetic resources, Bundessortenamt. The TWC also visited the computer center and received a presentation by Mr. Uwe Meyer, which is presented in Annex IV to the TWC meeting report.

*Technical Working Party for Fruit Crops*

Report by Mr. Jean Maison (European Union), Chairperson of the TWF

77. The TWF held its forty-eighth session in Kelowna, British Columbia, Canada, from September 18 to 22, 2017, under the chairmanship of Mr. Katsumi Yamaguchi (Japan). The report of the session is provided in document TWF/47/13 "Report".

78. The TWF session was attended by 32 participants from 19 members of the Union and 1 observer organization. The preparatory workshop was attended by 22 participants from 13 members of the Union.

79. The TWF was welcomed by Mr. Anthony Parker, Commissioner, Plant Breeders' Rights Office, Canadian Food Inspection Agency (CFIA) and received a presentation by Mr. Anthony Parker and Mr. Marc de Wit, Examiner, Plant Breeders' Rights Office, CFIA, on the fruit sector in Canada and the Canadian PBR system.

80. The TWF agreed on the importance of increasing participation in TWPs to share knowledge among UPOV members and DUS examiners and to bring more and new expertise to the TWF. The TWF recommended the TC to consider investigating the following ideas:

- to raise awareness at a high level at the level of UPOV members on the work done at the technical level by the Technical Working Parties (TWPs);
- to organize in Geneva a Seminar on DUS, to explain and promote the importance of the coordination and collaboration among DUS experts;
- to review the content of the preparatory workshop before the TWPs to allow new comers to understand more quickly all the available UPOV guidance and materials;
- to set TWP agendas with relevant technical items to be discussed and addressed by the group, and add a general item "matters relevant in DUS examination for the fruit sector" to allow open discussion and exchange of views;

81. The TWF recognized the attendance of new and existing members at its forty-eighth session, and appreciated the interactive technical discussion during the session.

82. The TWF considered the proposed revision of document TGP/7 to clarify the duration of DUS testing as set out in document TWP/1/11, paragraph 11:

"11. The following proposal has been developed on the basis of the comments of the TC:

"ASW 2(a):

'3. Method of Examination

'3.1 Number of Growing Cycles

'The ~~minimum~~ duration of tests should [normally]/[typically] be a single growing cycle.

'However, the testing of a variety may be terminated earlier if a negative conclusion on distinctness, uniformity or stability has already been reached.'

'Alternatively, the testing of a variety may be continued if a conclusion on distinctness, uniformity or stability has not been reached after the [normal]/[typical] duration of tests.'

and agreed with the TWA, TWV and the TWO that the term "normally" was preferred and should be used throughout the guidance in ASW 2.

83. The TWF agreed with the TWV that the reference to a negative conclusion should be deleted as it remained exceptional cases, and that in most of the cases the testing of a variety may be terminated with a positive conclusion on DUS.

84. The TWF noted the different views expressed from the TWA, TWV and TWO and agreed to suggest to the TC to keep ASW2 as it is, but to propose to amend the GN 8 as follows (proposed insertion of text indicated by highlighting and underlining):

GN 8 (TG Template: Chapter 3.1.2) – Explanation of the growing cycle

Chapter 3.1 makes reference to the number of growing cycles. In some cases it may be necessary to clarify what is meant by a growing cycle. Additional standard wording has been developed for some situations (see ASW 3).

'The testing of a variety may be concluded earlier or later at the moment when the competent authority can determine with certainty the outcome of the test.'

85. The TWF discussed the Glossary of Terms Used in UPOV Documents and agreed with the TWO that guidance on providing illustrations for shape and ratio characteristics in document TGP/14 should be amended to clarify that the base of a structure was at the point of attachment. It further agreed that clarification might be needed on the reasons to produce a grid when illustrating shape. The TWF invited the experts from New Zealand and Germany to check whether to develop a wording to explain when it is appropriate to use a grid in Test Guidelines.

86. The TWF considered the procedure for partial revision of UPOV Test Guidelines and agreed that the current procedure might be shortened. The TWF agreed to suggest to the TC the following proposals in order to simplify and shorten the procedure for partial revisions of Test Guidelines:

- to accept any new proposal for partial revision of TGs by correspondence during the course of the year between two TWP sessions, with a deadline of 2 months before the session in order to prepare the document and circulate to the experts;
- to approve the addition of partial revision of Test guidelines by correspondence, giving 4 weeks for any objections;
- as the interested experts will not have been listed during the adoption of the report under agenda item "Proposals for partial revision of Test Guidelines", it is proposed to send the document for comments to all relevant TWP experts;
- to restrict this rule only to partial revisions.

87. In respect of the number of growing cycles in DUS examination, the TWF noted that the TC had agreed that the typical number of growing cycles should be established on a crop-by-crop basis. However the TWF agreed to clarify to the TC that, in some cases in the fruit sector, the normal number of growing cycles needed to be established on variety-type by variety-type basis (for example rootstock varieties, male-female varieties).

88. The TWF agreed that the initial idea of a calibration book for apple should not be pursued further, but that the Test Guidelines for apple fruit varieties (document TG/14/9), should be revised and that each characteristic should be reviewed according to the following criteria:

- reproducibility/ repeatability of the characteristic;
- discriminating power of the characteristic;
- breeders' view on the importance of the characteristic.

89. The TWF received a presentation on a "Case study on minimum distances between vegetatively reproduced ornamental and fruit varieties" by an expert from the European Union and a presentation from the representative of the International Community of Breeders of Asexually Reproduced Ornamental and Fruit Plants (CIOPORA). The TWF noted that breeders in the fruit sector were defining the importance of a characteristic by the commercial value the characteristic could express. It further noted that some breeders (e.g. flower and fruit) are looking for larger differences between varieties (e.g. broad distance) when in other crops (e.g. agricultural or vegetables) breeders are looking for smaller differences (i.e. small distance). The TWF recalled that the General Introduction stated that characteristics used for DUS examination should exhibit sufficient variation between varieties to be able to establish distinctness. The TWF agreed that such an approach may have an implication on the use of the General Introduction. The TWF agreed with the TWO that breeders' organizations should ensure stronger involvement of breeders in discussions for drafting and revising Test Guidelines. The TWF agreed that the Test Guidelines for apple fruit varieties (document TG/14/9) will be proposed for a future revision and that special attention will be taken when choosing relevant characteristics for DUS examination, taking into consideration breeder's view on the importance of the characteristic.

90. The TWF received a presentation on a "DUS examination of mutant varieties of apple" by an expert from the European Union and agreed that in the case of DUS examination of mutant varieties of apple the exchange of information among DUS offices was important in order to ensure that the authorities were aware of all potentially existing similar varieties. It further agreed that the information provided in TQ Section 6 was not always sufficiently informative and, therefore, good coordination among offices was required. The TWF agreed that the expert from the European Union should coordinate a project to exchange information among authorities involved in DUS testing for apple to share information on the following principle:

- by electronic means;
- twice a year, probably in January and July when trials are planned in the northern and southern hemisphere respectively;
- including information on Gala and Fuji types or other mutant types at a later stage;
- including information on the most similar varieties grown by the authorities in the DUS trials.

91. The TWF further agreed that it would be useful to approach the breeders to check availability of plant material from all varieties listed as mutants in each territory.

92. The TWF agreed that the draft Test Guidelines for Black Walnut and Japanese plum should be submitted to the TC for adoption following the procedure adopted by the Council at its thirty-fourth extraordinary session. Thirteen draft Test Guidelines are planned for discussion at the forty-ninth session, especially for Apricot, Apple, Blueberry, Grapevine and Kiwifruit.

93. At the invitation of Chile, the TWF agreed to hold its forty-ninth session in Santiago de Chile, Chile, from November 19 to 23, 2018, with the preparatory workshop on the morning of November 19, 2018. The TWF thanked Mr. Katsumi Yamaguchi for his chairmanship and noted that he was awarded a UPOV bronze medal in recognition of his chairmanship of the TWF from 2015 to 2017.

94. 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 (presentations by the Netherlands, France and China and oral reports invited)
10. DUS examination of mutant varieties of apple (document to be prepared by the European Union)
11. 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)
12. Review of the proposal for guidance for the development of grids for shape illustration in Test Guidelines (document to be prepared by Germany and New Zealand)
13. Matters relevant in DUS examination for the fruit sector (presentations invited from members of the 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

95. During the afternoon of September 21, 2017, the TWF visited the Summerland Research and Development Centre, Agriculture and Agri-Food Canada, in Summerland, British Columbia. The TWF was welcomed by Ms. Erin Wallich, Research Project Administrator, Summerland Varieties Corp. (SVC). The TWF received a presentation by Ms. Wallich on the activities of SVC, a presentation by Mr. Chris Pagliocchini, Biologist, Tree Fruit Germplasm Development, Agriculture and Agri-Food Canada, Summerland Research and Development Center, on the sweet cherry and apple breeding program of Agriculture and Agri-Food Canada. The TWF visited apple and cherry orchards of different selection stages of the apple and cherry breeding programs, as well as the apple germplasm repository. During the visit to the orchards, the TWF was guided by Mr. Chris Pagliocchini and Mr. Nick Ibuki, Operations Manager, SVC.

*Technical Working Party for Ornamental Plants and Forest Trees*

Report by Mr. Henk de Greef (Netherlands), Chairperson of the TWO

96. The TWO held its fiftieth session in Victoria, British Columbia, Canada, from September 11 to 15, 2017, under the chairmanship of Mr. Kenji Numaguchi (Japan). The report of the session is provided in document TWO/50/14 "Report".

97. The session was attended by 30 participants from 14 members of the Union, 1 observer State and 1 observer organization. The preparatory workshop was held on the afternoon of September 10, 2017, and was attended by 27 participants from 13 members of the Union, 1 observer State and 1 observer organization.

98. The TWO was welcomed by Mr. Anthony Parker, Commissioner, Plant Breeders' Rights Office, Canadian Food Inspection Agency (CFIA). The TWO received a presentation on the Canadian ornamental sector and on the Plant Breeders' Rights Office, from Mr. Parker.

99. The TWO considered document TWP/1/18 "Illustrations for shape and ratio characteristics" and agreed that guidance on providing illustrations for shape and ratio characteristics in document TGP/14 should be amended to clarify that the base of a structure was at the point of attachment.

100. The TWO noted the examples of illustrations for shape and ratio characteristics provided in document TGP/14 and agreed that no further examples were necessary to improve the guidance. The TWO noted that characteristics with very few states of expression could be displayed in a single row as in the first two examples in document TWP/1/18, provided that the basis for the different states of expression was clear to readers.

101. The TWO considered documents TWO/50/4 "UPOV Color Groups", TWO/50/4 Add. and TWO/50/5 "Defining color groups for grouping of varieties and organizing the growing trial". The TWO agreed to propose the revision of the list of UPOV Color Groups in document TGP/14 "Glossary of Terms used in UPOV Documents" on the basis of the color groups set out in document TWO/50/4, paragraph 8, subject to confirmation of color groups 69 to 71 (light, medium and dark grey) by the expert from Germany.

102. The TWO noted that editorial changes would be required in document TGP/14 to reflect the introduction of the revised list of UPOV Color Groups.

103. The TWO agreed that document TGP/14 should be revised to include the guidance on the factors to be considered for creating color groups for grouping of varieties and organizing the growing trial, as set out in document TC/54/22, paragraph 15.

104. The TWO considered document TWO/50/8 "Case study on minimum distances between vegetatively reproduced ornamental and fruit varieties" and received a presentation by an expert from the Netherlands.

105. The TWO noted the results of the case study provided in document TWO/50/8 and agreed that further discussions were necessary on the basis of living plants and real cases of possible lack of distinctness for improving mutual understanding.

106. The TWO noted that one of the outcomes of the case study was a request for clarification on whether characteristics used for uniformity and stability could differ from those used for distinctness.

107. The TWO agreed that breeders' organizations should ensure stronger involvement of breeders in discussions for drafting and revising Test Guidelines and noted that the results of the case study would be reported to the TC, at its fifty-fourth session.

108. The TWO agreed to invite presentations at its next session to explain the approach used by breeders of vegetatively reproduced ornamental varieties for defining the importance of a characteristic to be used in the examination of distinctness.

109. The TWO agreed to submit five draft Test Guidelines to the Technical Committee for adoption: Coleus; Grevillea; Guzmania (revision); Hardy Geranium; and Oncidium (partial revision). At its fifty-first session, to be held in 2019, the TWO planned to discuss 14 Test Guidelines.

110. At the invitation of New Zealand, the TWO agreed to hold its fifty-first session in Christchurch, from February 18 to 22, 2019, with the preparatory workshop on the afternoon of February 17, 2019.

111. 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) 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 and documents invited)
8. Minimum distances between vegetatively reproduced ornamental and fruit varieties (documents invited)
9. Number of growing cycles in DUS examination (document to be prepared by the Office of the Union and documents invited)
10. Report on court cases dealing with technical matters (document invited)
11. Experiences with defining trees, shrubs and vines (document to be prepared by the European Union and documents invited)
12. Experience with the RHS Colour Chart and possible future addition of colors (document to be prepared by the United Kingdom)
13. Inconsistencies between TQ information and plant material submitted for trial (document to be prepared by the European Union and documents invited)
14. Experiences with taxonomic databases (document to be prepared by Australia, the United Kingdom and documents invited)
15. Experiences with characteristics assessed on the basis of bulk samples (document to be prepared by the United Kingdom and documents invited)
16. Defining "growing cycle" for ornamental species (document to be prepared by the European Union and documents invited)
17. Experiences with new types and species (oral reports invited)
18. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee
19. Proposals for partial revision/correction of Test Guidelines
20. Discussion on draft Test Guidelines (Subgroups)
21. Recommendations on draft Test Guidelines
22. Guidance for drafters of Test Guidelines
23. Date and place of the next session
24. Future program
25. Adoption of the Report on the session (if time permits)
26. Closing of the session

112. On Wednesday, September 13, 2017, the TWO visited the Butchart Gardens, in Brentwood Bay, British Columbia, Canada. The TWO visited the greenhouses producing ornamental plants for the Gardens with a range of varieties from different crop types and for different climatic zones, including varieties of Berberis, Coleus, Gazania, Hydrangea, Hardy Geranium, Kangaroo Paw and Lagerstroemia. The TWO visited different floral display gardens and a collection of garden rose varieties.



*Technical Working Party for Vegetables*

Report by Ms. Romana Bravi (Italy), Chairperson of the TWV

Fifty-first session of the TWV

113. The TWV held its fifty-first session in Roelofarendsveen, Netherlands, from July 3 to 7, 2017, under the chairmanship of Ms. Swenja Tams (Germany).

114. The TWV was attended by 47 participants from 18 members of the Union 3 observer organizations. The preparatory workshop was attended by 19 participants from 12 members of the Union and 1 observer organization.

115. The TWV received a presentation by Mr. John van Ruiten, Director, Naktuinbouw, on Plant Variety Protection in the Netherlands and the work of Naktuinbouw.

116. The TWV received a report and presentation prepared by an expert from the Netherlands on “Increasing participation of new members of the Union in the work of the TC and TWPs and agreed on the importance to increase participation in TWPs, and especially in the TWV, to share knowledge among UPOV members and DUS examiners and to bring more and new expertise within the TWV.

117. The TWV considered a proposal to support participation in the TWPs by electronic means and agreed that it was not in favor to recommend full participation by electronic means, as it would not allow sufficient interaction among experts and would complicate the work of the host. However, on exceptional basis, the TWV was in favor to allow experts to join some technical discussions for specific matters to be clarified or addressed, when technical requirements allow.

118. The TWV considered the proposed guidance on confidentiality of molecular information for inclusion in document TGP/5, Section 1 and agreed with the TWA that clarification was needed to make sure that the term “material” includes “DNA material” and agreed to propose that Article 4(2) should read as follows:

“(2) Except with the specific authorization of the Receiving Authority and the applicant, the Executing Authority shall refrain from passing on to a third person any material, including DNA, or molecular information of the varieties for which testing has been requested.”

119. The TWV considered the proposed revision of document TGP/7 to clarify the duration of DUS testing, and agreed with the TWA that the term “normally” was preferred and should be used throughout the guidance in ASW 2. The TWV agreed that the reference to negative conclusion should be deleted as it remains exceptional cases, and that in most of the cases the testing of a variety may be terminated with a positive conclusion on DUS. In that respect the TWV agreed with the TWA that the current standard wording in Test Guidelines allowed the examination of a candidate variety to be terminated earlier in case the differences observed between varieties were so clear that more than one growing cycle was not necessary.

120. The TWV agreed with the TWA that it should be possible to terminate earlier the examination of a candidate variety (e.g. during the establishment period of the trial) and agreed to propose that particular situations should be addressed as Guidance Note in document TGP/7 instead of amending the standard wording, clarifying that it is the decision of the authorities to decide whether or not to terminate earlier the examination.

121. The TWV agreed with the TWA on the possibility to exclude varieties from observation on the basis of a preceding pseudo-qualitative or quantitative characteristic under particular circumstances, such as the impossibility to describe an organ that was not present in a variety or when variation existed only within a particular group of a crop.

122. The TWV recalled the importance to refer to a table of grouping within a species, such as in the Test Guidelines for lettuce (see document TG/13/11(proj.5), Chapter 5.3). The TWV agreed that the approach of excluding varieties from observation on the basis of preceding PQ or QN characteristics should be used carefully and based on experience and discussions during the drafting of Test Guidelines, in order to be fully aware on the consequences.

123. The TWV considered a draft guidance for inclusion in a future revision of document TGP/10 for selecting the most suitable approach for the assessment of off-types on different types of crops. The TWV agreed with

the TWA to propose that the new sentence introduced in the draft guidance should be amended to read as follows:

"It is important to identify whether differences in number of off types between growing cycles were due to biological environmental reasons or sampling variation."

124. The TWV agreed to propose to modify the sentence for Approach 1 that is was the most commonly used in vegetable sector, as follows:

"Furthermore, on the basis of a clear lack of uniformity, a if a variety clearly 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".

125. The TWV agreed that no additional examples were available at this time for improving the guidance on providing illustrations for shape and ratio characteristics in document TGP/14.

126. The TWV received a presentation on the "Use of disease and insect resistance characteristics in DUS examination" by an expert from France. The TWV noted the possibilities to use methodologies that could improve disease resistance tests for DUS examination, even when protected by IP rights (e.g. patent), provided the methodologies to be available for all members for DUS examination.

127. The TWV agreed that before revising Test Guidelines for disease resistance characteristics, it was important to reach agreement by experts on the level of resistance and possible intermediate resistance. In that respect, the TWV encouraged collaborative work among experts to ensure common agreement on important matters, such as standard varieties for threshold in disease resistance tests, to ensure harmonization at UPOV level.

128. The TWV agreed on the importance of the use and availability of standard varieties that are used to set limits between different disease tolerance levels. It further agreed that in case of quantitative resistance such standard varieties should not be confused with the example varieties that represent a state of expression.

129. The TWV agreed on the importance to report on current work or projects done on disease resistance tests among experts and DUS offices to keep the experts informed at UPOV level, and therefore would welcome any new presentations to be made at a subsequent session.

130. The TWV noted that, after adoption of the partial revision of the Test Guidelines for Tomato (*Solanum lycopersicum* L.) document TC/53/27, a need for clarification was identified with regard to the explanation Ad. 57: Resistance to Tomato yellow leaf curl virus (TYLCV), (i) agroinoculation method. The TWV agreed to consider this issue during the discussions of the new partial revisions for the Test Guidelines of Tomato (see document TWV/51/10) and the Test Guidelines of Tomato Rootstocks (see document TWV/51/11).

131. The TWV proposed the following disclaimer for consideration by the TC for inclusion in the partial revision of the Test Guidelines for Tomato adopted in 2016:

"The transformed *Agrobacterium tumefaciens* is a Genetically Modified Organism and requires to comply with legislation concerning the protection of the environment, human and animal health."

132. The TWV requested the Office of the Union to check what was decided by the TC in relation to the new nomenclature for virus and disease names in Test Guidelines and adjust accordingly.

133. Regarding the use of molecular techniques in DUS examination, the TWV received the following presentations:

- |   |
|---|
| (a) "Management of variety collections - How we use molecular techniques in France" presented by an expert from France                      |
| (b) "Onion- Managing the variety collection with the use of DNA information" presented by an expert from the Netherlands                    |
| (c) "Efficient DUS test in French bean ( <i>Phaseolus vulgaris</i> L.) by using molecular data" presented by an expert from the Netherlands |

134. The TWV discussed the following draft Test Guidelines: *Agaricus bisporus* (revision), Artichoke, Cardoon (partial revision), Brown Mustard, Pea (partial revision), Pepino, Pepper (partial revision),

Spinach (partial revision), Squash (partial revision), Swiss Chard (revision), Tomato (partial revision) and Tomato rootstock (partial revision), Turnip (revision) and Watercress.

135. The TWV received a presentation by an expert from the Netherlands on “The use of DNA markers in the DUS of tomato and tomato rootstocks, proposal to revise the UPOV Test Guidelines.”

136. The TWV agreed to further discuss the following draft Test Guidelines at its fifty-second session: Fennel, Lettuce, Pea (partial revision), Pepper (partial revision), Spinach (partial revision), Swiss Chard, Tomato and Tomato rootstock (partial revision), Turnip, Watercress and Watermelon (partial revision).

137. At the invitation of China, the TWV agreed to hold its fifty-second session in Beijing, China, from September 17 to 21, 2018, with the preparatory workshop on the morning of September 17, 2018.

138. 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

#### Fifty-second session of the TWV

139. The TWV held its fifty-second session in Beijing, China, from September 17 to 21, 2018, under the chairmanship of Ms. Romana Bravi (Italy).

140. The TWV was attended by 41 participants from 15 members of the Union, 1 observer State and 3 observer organizations. The preparatory workshop was attended by 30 participants from 10 members of the Union and 2 observer organizations.

141. The TWV received a presentation by Mr. Yehan Cui, Director, Division of Protection of New Varieties of Plants, Development Center of Science and Technology, Ministry of Agriculture and Rural Affairs, on “PVP and DUS testing in China”. The TWV visited the Institute of Vegetables and Flowers of the Chinese Academy of Agricultural Sciences.

142. The TWV considered and discussed the following main topics:

*Method for more than one single test (year) TGP/8*

143. The TWV agreed that the result of different growing cycles should only be combined if the tests are done with the same submission sample of plant material and to propose that the two-stage test described in paragraph 8.1.8 should be clarified to state that it is for testing in a single growing cycle. The TWV agreed with the TWC on the importance of considering the risks associated with assessment of uniformity by off-types on the basis of more than one growing cycle and agreed that the calculation of a predefined upper limit of uniformity should be clarified.

*Illustrations for shape and ratio characteristics TGP/14*

144. The TWV considered the usefulness of grids under particular situations and agreed with the TWA that grids could provide useful information to describe the range of a characteristic. The TWV noted that some leading experts of Test Guidelines had difficulty to provide explanations on shape characteristics using grids. The TWV agreed with the TC-EDC that there should be flexibility for presenting explanations on shape characteristics using grids, provided the states of expression were clearly explained. The TWV agreed that photos are sometimes more useful and clear than drawings to illustrate shapes in three dimensions.

145. The TWV agreed with the proposal to establish a sub-group to discuss and propose the approaches to presenting information when using grids. It further agreed that it could be difficult to define a general rule on the difference in Notes to establish distinctness within a characteristic. The TWV requested the sub-group to also consider roots and tubers, especially when considering the definition of base. In that regard the experts from France and the Netherlands would be happy to assist the work of the sub-group when relevant for vegetables.

*GENIE database*

146. The TWV considered the proposal to amend UPOV codes for *Brassica oleracea* with the consequent changes to the UPOV codes.

147. The TWV noted the comment made by the TWA on the proposal to amend codes for ZEAAA, as set out in paragraph 23 of document TWP/2/4 Rev., and agreed with the TWA that the information on the type of maize varieties (popcorn, sweet corn) was useful for the grouping of varieties and organization of the growing trials. The TWV noted that TWA agreed that information on the type of maize varieties should remain in the database and should continue to be provided by data contributors. The TWV further agreed that the same approach should be followed for *Brassica oleracea* with regard to red and white cabbage.

*Molecular Techniques*

148. The TWV agreed with the BMT that the approach “Genetic selection of similar varieties for first growing cycle: example French bean” should be proposed for inclusion in document TGP/15 on the basis of a simplified version of draft text presented in document TGP/15/2 Draft 1. The TWV agreed to invite the Netherlands to review the schematic explaining the process and to simplify it. The TWV recommended to clarify on what basis it is decided which comparing varieties to select on the basis of genetic selection in the guidance. The TWV agreed with the BMT that the proposal to be put forward for approval by the TC should contain the description of the method without comparison to other approaches.

149. The TWV received a presentation by an expert from the European Union on “CPVO Report on IMODDUS, Integration of Molecular Data into DUS Testing” concerning the creation of a joint European Union database with DNA data of tomato varieties.

*New issues arising for DUS examination*

150. The TWV agreed that, looking at the increase of the use of disease resistance characteristics in DUS examination for vegetables, it would be useful to add a new agenda item in that respect. In particular, it proposed to invite presentations from France, the Netherlands, ISF and any other members and observers on the topic of standardization of the methodology, to understand better the different approaches used by pathologists, breeders and DUS examiners.

151. The TWV received a presentation on “Aberrant phenotypes in *Brassica oleracea* var. *botrytis*” by an expert from France. The TWV noted the results of the study made in France and in the Czech Republic,

Netherlands and Spain, about aberrant plants in cauliflower DUS trials, which are not considered as a specific type of off-type, and the possible measures to assess uniformity. The TWV agreed that the problem was not, for the time being, relevant at the international level but invited all DUS examiners to observe potential similar behavior on plants and report to the TWV if need be.

*Matters to be resolved concerning Test Guidelines adopted by the Technical Committee*

152. The TWV considered the matters to be resolved concerning the following partial revision of Test Guidelines adopted by the TC: Brown Mustard (*Brassica Juncea*); Calabrese, Sprouting Broccoli (*Brassica oleracea* L. convar. *botrytis* (L.) Alef. var. *cymosa* Duch.) (revision); Pea (*Pisum sativum* L.); Tomato (*Solanum lycopersicum* L.) and Tomato rootstock.

153. The TWV discussed the use of DNA-based information to assess disease resistance characteristics in tomato and tomato rootstock and agreed to introduce DNA marker test as alternative method to assess resistance to Tomato Mosaic Virus (ToMV) and Tomato Spotted Wilt Virus (TSWV). The TWV agreed to postpone the revision of Characteristic "Resistance to *Fusarium oxysporum* f.sp *lycopersici* (Fol)" until the results of a CPVO research project on harmonization of disease-resistance testing for DUS examination were available.

*Test Guidelines agreed for submission to TC*

154. The TWV agreed that the following draft Test Guidelines should be submitted to the TC for adoption at its fifty-fifth session, to be held in Geneva on October 28 and 29, 2019: Lettuce, Pea, Fennel, Spinach, Swiss Chard, Watercress and Watermelon

*New Draft Test Guidelines*

155. At the next session, 11 Test Guidelines will be discussed, including 6 partial revisions on disease-resistance characteristics. The partial revision of the Test Guidelines for Tomato and Tomato Rootstock will also include the revision of Characteristic "Resistance to *Fusarium oxysporum* (races 0, 1, 2)" with a possible inclusion of a molecular marker test as alternative to the traditional bio-assay, subject to developments in ongoing research.

*Proposed date and place of the next session*

156. At the invitation of the Republic of Korea, the TWV agreed to hold its fifty-third session in the Republic of Korea (place to be confirmed), from May 19 to 24, 2019, with the preparatory workshop on the afternoon of May 19, 2019.

*Outline of items on the agenda for the 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. Use of Disease resistance characteristics (presentations invited from France, Italy, the Netherlands, ESA, ISF)

11. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
12. Discussions on draft Test Guidelines (Subgroups)
13. Recommendations on draft Test Guidelines
14. Guidance for drafters of Test Guidelines
15. Date and place of the next session
16. Future program
17. Report on the session (if time permits)
18. Closing of the session

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

Report by Mr. Nik Hulse (Australia), Chairperson of the BMT

Sixteenth session of the BMT

157. The BMT held its sixteenth session in La Rochelle, France, from November 7 to 10, 2017. The session was opened by Mr. Kees van Ettehoven (Netherlands), Chairperson of the BMT. The BMT was welcomed by Mr. Frédéric Malterre, *Direction générale de l'alimentation, Ministère de l'agriculture et de l'alimentation*, Mr. Christian Huyghe, *Directeur Scientifique Agriculture, Institut national de recherche agronomique (INRA)*, Mr. Arnaud Deltour, *Directeur général, Groupe d'étude et de contrôle des variétés et des semences (GEVES)*, and Ms. Anne-Lise Corbel, Responsible for DUS, GEVES - Variety sector.

158. A preparatory workshop was held prior to the BMT session and attended by 35 participants from 14 members of the Union, 1 observer State and observer organization. The BMT session was attended by 56 participants from 19 members of the Union, 1 observer State and 6 observer organizations.

159. The BMT received the following presentations concerning molecular techniques in relation to DUS examination:

- Genetic Distance-based Selection of Similar Varieties for Wheat Distinctness Test
- Use of DNA-Based Markers in Testing for Distinctness, Uniformity and Stability (DUS) and Enforcement of Plant Breeders Rights (PBR)
- Test of the potential use of SNPs markers on oilseed rape varieties
- "The use of molecular distance as a characteristic?" Assessment of the reference variety model based on GEVES SNP maize data
- The use of molecular markers (SNP) for maize DUS testing: Development and official applications to assess distinctness of hybrids varieties (France)
- An attempt to use molecular markers for winter wheat reference collection management
- Update on the American Seed Trade Association and United States PVP Office Molecular Marker Working Group
- The use of Reference Variety Similarities in Varietal Distinctness II: Reference Variety Selection
- Immoddus proposal: Developing a toolbox to distinguish apple mutants for DUS testing
- The Tomato project proposal in CPVO IMODDUS program

*Proposed revision of document TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)"*

160. The BMT agreed that France should propose a revision to TGP/15 Annex II, "Example: Parent Lines in Maize", to reflect the refinements made by France on the basis of its experience in the application of the Model "Combining Phenotypic and Molecular Distances in the Management of Variety Collections".

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

- Assessment of reproducibility of 6K SNP genotyping in soybean across laboratories
- Assignment Tests for Genotype Classification
- Development on Use of Molecular Technique for PVP in Republic of Korea

- Determination of purity and quantification of varietal components through NGS (Next Generation Sequencing)
- Determining the parameters to characterize Soybean varieties using single nucleotide polymorphisms
- Confirmation of validation for DNA variety identification technique

*International guidelines on molecular methodologies including cooperation between the OECD, UPOV, ISTA and ISO*

162. The BMT agreed that the following initiatives agreed by the TC, at its fifty-first session, might be advanced through an international practical workshop jointly coordinated by OECD, UPOV and ISTA:

- (a) to develop a joint document explaining the principal features of the systems of the OECD, UPOV and ISTA; and
- (b) to develop an inventory on the use of molecular marker techniques, by crop, with a view to developing a joint OECD/UPOV/ISTA document containing that information, in a similar format to UPOV document UPOV/INF/16 "Exchangeable Software", subject to the approval of the Council and in coordination with OECD and ISTA

163. The BMT received a presentation on the OECD Seed Certification Schemes.

*Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction ('BMT Guidelines')"*

164. The BMT agreed to invite members and observers to provide comments on document UPOV/INF/17. Comments would be compiled by the Office of the Union and presented for consideration to the BMT at its seventeenth session. The BMT further agreed to propose to introduce a new chapter concerning cooperation in the exchange of data and construction of databases.

165. The BMT received the following presentation regarding variety description databases including databases containing molecular data:

- Integration of molecular data into DUS testing in Durum Wheat: Use of a standardized method for the efficient management of reference collections.

*The use of molecular techniques in examining essential derivation:*

166. The BMT received a presentation from the Office of the Union.

*Coordination session:*

167. Discussion groups were formed for: agricultural crops; fruit crops; ornamental plants and forest trees; and vegetables, for BMT participants to exchange information on their work and explore areas for cooperation.

*Technical visit:*

168. On the afternoon of November 9, 2017, the BMT participants visited the facilities of BIOGEVES at Le Magneraud, France.

*Next Session*

169. In response to the invitation by Uruguay, the BMT agreed to hold its seventeenth session in Montevideo, Uruguay, from September 10 to 13, 2018. The elements of the preparatory workshop would be included during the session.

170. The BMT planned to discuss the following items at its seventeenth session:

1. Opening of the session
2. Adoption of the agenda
3. Reports on developments in UPOV concerning biochemical and molecular techniques (document to be prepared by the Office of the Union)

4. Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations (oral reports by participants)
5. Report of work on molecular techniques in relation to DUS examination (papers invited)
6. Cooperation between international organizations (document to be prepared by the Office of the Union)
7. Variety description databases including databases containing molecular data (papers invited)
8. Methods for analysis of molecular data (papers invited)
9. The use of molecular techniques in examining essential derivation (papers invited)
10. The use of molecular techniques in variety identification (papers invited)
11. Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction"
12. Revision of document TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)"
13. Session to facilitate cooperation
14. Date and place of next session
15. Future program
16. Report of the session (if time permits)
17. Closing of the session

#### *Seventeenth Session of the BMT*

171. The BMT held its seventeenth session in Montevideo, Uruguay, from September 10 to 13, 2018. The session was opened by Mr. Nik Hulse (Australia), Chairperson of the BMT. The BMT was welcomed by Mr. Enzo Benech, Minister of Agriculture, Livestock and Fisheries, Uruguay, and Mr. Pedro Queheille, President of *Instituto Nacional de Semillas* (INASE). Mr. Queheille gave a presentation on the agribusiness and PVP system in Uruguay. Mr. Peter Button, Vice Secretary-General, UPOV and Scott Horner, President, Seed Association of the Americas (SAA) also made opening remarks.

172. As planned, a preparatory workshop was not held prior to the BMT session. Instead, presentations on preparatory topics were made during the BMT session by the UPOV Office and immediately preceding the introduction of related items. The BMT session was attended by 55 participants from 18 members of the Union and 6 observer organizations.

173. The BMT received the following presentations concerning molecular techniques in relation to DUS examination by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations:

- The United States Molecular Marker Working Group: Background for the use of DNA markers in DUS
- Use of DNA-Based Markers in Testing for Distinctness, Uniformity and Stability (DUS) and Enforcement of Plant Breeders Rights (PBR)
- Test of the potential use of SNPs markers on oilseed rape varieties
- Use of Molecular Marker Techniques in DUS Testing and Enforcement of Breeder's Right in the Republic of Korea
- Do resistance markers for tomato fulfil the requirements of TGP/15?
- Use of SNP markers for soybean variety protection purposes in Argentina
- New developments in biochemical and molecular techniques CPVO report on IMODDUS: latest developments
- New developments in biochemical and molecular techniques CPVO report on IMODDUS: Update on R&D projects co-funded by CPVO

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

- Implementation of SNP markers to identify soybean varieties commercialized in Uruguay
- Corn Hybrid parental identification: The Use of Hybrid Monomorphic Profile compared to Pericarp Genotyping
- Variety identification in soybeans using SNPs
- Presentation of a set of 11 SNPs capable of discriminating 80 soybean varieties from a reference collection.



*Review of document UPOV/INF/17 “Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction (‘BMT Guidelines’)”*

175. The BMT agreed to revise document UPOV/INF/17 on the basis of the joint comments from the European Union, France and the Netherlands. Consequently, the BMT agreed to deletions, additions and editorial changes to document UPOV/INF/17.

176. In particular, it was agreed to delete section 1 “Selection of Molecular Marker Methodology”, to add a new section 2 “Phase 2: Selection of the Detection Method” and to add section 6 “Data exchange”. It was also agreed to not include the proposed New Section 6: Phase 4: Database Management” and the new section C “Definitions”. In addition, the glossary should become a list of acronyms with their meanings but not providing explanations.

177. The BMT agreed to propose to the TC that the European Union, France and the Netherlands prepare a new draft of UPOV/INF/17 for consideration of the eighteenth session of the BMT.

178. The BMT received the following presentations regarding variety description databases including databases containing molecular data

- Construction of a European Potato database with varieties of common knowledge and its implementation in the potato DUS testing system:
  - Part I: Construction, maintenance and use of the common database;
  - Part II: Generation of molecular data.
- A DNA database for Rose – Development and validation of a SNP marker set.

*Cooperation between international organizations:*

179. The BMT agreed to propose to the TC that UPOV and OECD should continue to make progress on the proposed joint activities including: explaining the principal features of the systems of the OECD, UPOV, ISTA and the development of an inventory on the use of molecular marker techniques by crop as previously agreed by the TC. The BMT agreed that ISTA is welcome to join the initiatives when it is in a position to do so.

180. The BMT received a presentation on “DNA-based methods for variety testing: ISTA approach”.

*Revision of document TGP/15 “Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)”*

181. The BMT agreed to recommend the revision of the example in TGP/15 once the additional threshold level for genetic distance had been implemented in France.

182. The BMT agreed the new application model “Genetic Selection of Similar Varieties for the First Growing Cycle” be proposed for inclusion in document TGP/15.

*The use of molecular techniques in examining essential derivation:*

183. The BMT received a presentation on “Do new breeding techniques lead to Essentially Derived Varieties?”

*Session to facilitate cooperation:*

184. During the BMT session discussion groups were formed for: maize and soybean; other agricultural crops; fruit crops and forest trees; ornamental plants; and vegetables. The aim was for BMT participants to exchange information and explore areas for cooperation.

185. Each of the discussion groups identified crops considered of particular interest by authorities. Plans for possible cooperation were identified as well as proposals made for UPOV initiatives that could facilitate cooperation.

186. A common theme amongst the discussion groups was the need to determine how cooperation was managed between partners and service providers. Potential issues such as ownership of material, confidentiality, authorization for work, availability of results to others were considered.

187. The BMT agreed to propose to the TC that the results of the coordination be reported to the other Technical Working Parties (TWPs) and that the TWPs be invited to undertake a similar discussion in their session.

188. In response to the invitation by China, the BMT agreed to hold its eighteenth session in Hangzhou, China, from October 16 to 18, 2019, immediately following the TWC session to be held in the same location (October 14 to 16, 2019). The elements of the preparatory workshop will be included during the session.

189. The BMT planned to discuss the following items at its eighteenth session:

1. Opening of the session
2. Adoption of the agenda
3. Reports on developments in UPOV concerning biochemical and molecular techniques (document to be prepared by the Office of the Union)
4. Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations (oral reports by participants)
5. Report of work on molecular techniques in relation to DUS examination (papers invited)
6. Cooperation between international organizations (document to be prepared by the Office of the Union)
7. Variety description databases including databases containing molecular data (papers invited)
8. Management of databases and exchange of data and material<sup>1</sup> (papers invited)
9. Methods for analysis of molecular data (papers invited)
10. Report on developments of a software tool for marker selection using the traveling salesman algorithm
11. The use of molecular techniques in examining essential derivation (papers invited)
12. The use of molecular techniques in variety identification<sup>1</sup> (papers invited)
13. Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction"
14. Revision of document TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)"
15. Session to facilitate cooperation
16. Date and place of next session
17. Future program
18. Report of the session (if time permits)
19. Closing of the session

#### Matters arising from the Technical Working Parties

190. The TC considered document TC/54/3.

*Matters for information and for a possible decision to be taken by the Technical Committee (TC)*

#### Increasing participation of new members of the Union in the work of the TC and TWPs

191. The TC considered the proposals by the TWPs, at their sessions in 2017, on increasing participation on new members of the Union in the work of the TC and the TWPs.

192. The TC recalled that the results of the 2016 survey had indicated budgetary reasons as the main cause preventing participation of a greater number of members at UPOV meetings. The TC agreed that it would be useful to communicate the importance of the technical work conducted in UPOV and agreed to propose the organization of a seminar in Geneva in conjunction with the UPOV sessions.

193. The TC agreed to invite members to inform the UPOV Office of ways in which the invitation letters for the TC and TWPs meetings might be improved.

194. The TC noted that invitations to UPOV meetings and other relevant information were sent to the contact persons designated by the UPOV representative of each member of the Union. The TC noted that the list of contact persons could contain as many relevant experts as necessary and noted that members could update their list of contact persons at any time.

195. The TC agreed that participation at the TC and TWP meetings might be further enhanced through enabling participation by electronic means for particular topics. The TC agreed to invite members to indicate particular items they would like to attend by electronic means in future TC and TWP meetings. The relevant Chairperson, Office of the Union and host would then consider how to respond to the requests.

#### Procedure for partial revision of UPOV Test Guidelines

196. The TC considered whether to revise the procedure for partial revisions of Test Guidelines, on the basis of the following proposal by the TWF, as set out in document TC/54/3, paragraph 24:

- to accept any new proposal for partial revision of TGs by correspondence during the course of the year between two TWP sessions, with a deadline of 2 months before the session in order to prepare the document and circulate to the experts;
- to approve the addition of partial revision of Test guidelines by correspondence, giving 4 weeks for any objections;
- as the interested experts will not have been listed during the adoption of the report under agenda item "Proposals for partial revision of Test Guidelines", it is proposed to send the document for comments to all relevant TWP experts;
- to restrict this rule only to partial revisions.

197. The TC recalled that a similar proposal had been considered at its previous session and further recalled that UPOV members could amend their own test guidelines before changes were made to UPOV Test Guidelines.

198. The TC agreed to request the TWF to clarify under which circumstances changes would need to be implemented to UPOV Test Guidelines on short notice. In particular, the TC agreed to request clarification on the type of changes that were intended to be covered by the proposed procedure and to provide specific examples.

199. The TC agreed that, if an accelerated procedure were to be accepted, proposals for partial revisions of Test Guidelines would need to be published at least two months before the session to allow sufficient time for consideration by members.

#### Minimum distance between varieties

200. The TC considered discussions on minimum distances between varieties at the TWPs, at their sessions in 2017 and 2018, as set out in paragraphs 26 to 41 of document TC/54/3.

201. The TC noted that a follow-up project based on field trials was being considered with the participation of breeders of protected varieties and agreed to include an agenda item for its fifty-fifth session for a report on developments.

#### Use of disease and insect resistance characteristics in DUS examination

202. The TC considered the reports of discussions on disease resistance characteristics in DUS examination at the TWPs, at their sessions in 2017 and 2018, as set out in document TC/54/3, paragraphs 43 to 55.

203. The TC noted the plans of the TWV to discuss disease resistance characteristics in DUS examination at its subsequent session and agreed to invite the TWV to report on developments to the TC, at its fifty-fifth session. The TC recalled the importance of standardized methodologies and the need to meet the requirements of TGP/7 for disease resistance characteristics. It also agreed that it would be useful for the Office of the Union to present at the TWV the relevant guidance in TGP documents covering disease resistance characteristics, including the guidance in TGP/7 "Development of Test Guidelines", TGP/12 "Guidance on Certain Physiological Characteristics" and TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)".

#### *Matters for information*

204. The TC noted developments in the TWPs concerning:

- (i) Experiences with new types and species
- (ii) Management of variety collections
- (iii) Experience in the management of reference collections with the SELECT method

- (iv) Regional set of example varieties in Wheat for South America
- (v) Impact of revisions of states of expression of existing characteristics in the revision of Test Guidelines
- (vi) Experience with using two locations by one year for DUS decisions
- (vii) Characteristic expression between years or environments for ornamental varieties
- (viii) Nomination of novel plant pest races
- (ix) Impact of endophytes on DUS characteristics in grasses
- (x) DUS examination of mutant varieties of apple
- (xi) Calibration book for harmonized variety description in apple
- (xii) Experience with the RHS Colour Chart and possible future addition of colors
- (xiii) Consideration of possible reorganization of TGP/8
- (xiv) Excluding varieties of common knowledge from the second growing cycle
- (xv) Implementation of a Document Management System for Variety Files
- (xvi) Software for statistical analysis
- (xvii) A single tool for DUS computation process
- (xviii) Management of databases
- (xix) Web services provided by UPOV and members of the Union
- (xx) Image analysis
- (xxi) Report on court cases dealing with technical matters

#### TGP documents

205. The TC considered document TC/54/5 Rev..

*Matters for adoption by the Council in 2018*

#### Matters previously agreed by the Technical Committee

206. The TC noted that the proposed revisions to document TGP/7 on “Drafter’s kit for Test Guidelines” and “Presentation of different types of example varieties”, agreed by the TC at its fifty-third session, would be proposed for adoption by the Council at its fifty-second ordinary session, to be held in Geneva on November 2, 2018, subject to approval by the CAJ, at its seventy-fifth session, to be held in Geneva on October 31, 2018, on the basis of document TGP/7/6 draft 2.

#### Matters to be considered by the Technical Committee

*TGP/5: Section 1: “Model administrative agreement for international cooperation in the testing of varieties”*

207. The TC considered the proposed guidance on confidentiality of molecular information as set out in document TGP/5, Section 1/3 draft 2: “Model administrative agreement for international cooperation in the testing of varieties”. The TC agreed with the TWPs that document TGP/5, Section 1, Articles 4 and 6 should be revised to read as follows:

#### “Article 4

“(1) The Authorities shall take all necessary steps to safeguard the rights of the applicant.

“(2) Except with the specific authorization of the Receiving Authority and the applicant, the Executing Authority shall refrain from passing on to a third person any material, including DNA, or molecular information, of the varieties for which testing has been requested.”

[...]

#### “Article 6

“Practical details arising out of this Agreement –regarding in particular the provisions relating to the considerations, application forms, technical questionnaires and requirements as to propagating material, testing methods, exchange of reference samples, exchange of molecular information, maintenance of reference collections and the presentation of the results– shall be specified in this Agreement or settled between the Authorities by correspondence.”

208. The TC noted that, subject to the agreement by the CAJ, at its session to be held on October 31, 2018, the proposed guidance on confidentiality of molecular information would be put forward for adoption by the Council, at its session in 2018.

#### *Future Revisions of TGP Documents*

##### Matters previously agreed by the Technical Committee

209. The TC noted the revisions already agreed by the TC on “Examining DUS in bulk samples”, for inclusion in document TGP/8, and on “Illustrations for shape and ratio characteristics”, for inclusion in document TGP/14, as set out in Annexes II and III of document TC/54/5 Rev..

##### Matters to be considered by the Technical Committee

##### *TGP/7: Development of Test Guidelines*

##### *Duration of DUS tests*

210. The TC considered document TC/54/14.

211. The TC agreed that the guidance in document TGP/7 should be amended to clarify that the testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

212. The TC agreed that the following sentence should be included as standard wording in Test Guidelines:

“The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.”

##### *Characteristics which only apply to certain varieties*

213. The TC considered document TC/54/15.

214. The TC considered the proposal to amend the guidance in document TGP/7, Guidance Note 18 (GN 18), to allow the exclusion of a characteristic from observation on the basis of a state of expression of a preceding pseudo-qualitative or quantitative characteristic, as follows:

##### *“3. Characteristics which only apply to certain varieties*

“In some cases, the state of expression of a preceding ~~qualitative~~ characteristic determines that a subsequent characteristic is not applicable e.g. it would not be possible to describe the shape of leaf lobes for a variety which did not have leaf lobes. In cases where this is not obvious, or where the characteristics are separated in the Table of Characteristics, the heading of the subsequent characteristic is preceded by an underlined reference to the types of varieties to which it applies, on the basis of the preceding characteristic, e.g.:

“Only varieties with flower type: single: Flower: shape”

215. The TC considered the proposal for the amendment to document TGP/7 GN 18 to be made in conjunction with the inclusion of a warning on the consequences of using the approach to read as follows:

“The exclusion of characteristics from observation on the basis of a preceding pseudo-qualitative or quantitative characteristic should be used with caution, taking into account the consequences for the examination of distinctness. A grouping table could be used to ensure that characteristics are only excluded from observation on a robust basis.”

216. The TC agreed that the grouping table was a complex example. The TC further agreed that it would be necessary for suitable examples of a quantitative and of a pseudo-qualitative to be provided to demonstrate how the approach might be used in a way that would not present risks for decisions on distinctness. It would also be necessary to provide examples of unsuitable cases to demonstrate the risks.

*Procedure for the adoption of Test Guidelines by correspondence*

217. The TC considered document TC/54/16.

218. The TC considered the proposal for the revision of document TGP/7 "Development of Test Guidelines" to reflect the introduction of a procedure for adoption of Test Guidelines by correspondence, as set out in document TC/54/16, paragraph 14, and received presentation by the UPOV Office, a copy of which would be provided as an addendum to document TC/54/16. The TC agreed that guidance in document TGP/7 should be revised to read as follows:

"2.2.7 STEP 7 Consideration of Draft Test Guidelines by the TC-EDC

"2.2.7.1 The TC-EDC has been established by the Technical Committee to examine drafts of all Test Guidelines, produced by the TWPs, before these are put forward for adoption by the Technical Committee. The role of the TC-EDC is to ensure consistency of the Test Guidelines with the requirements of document TGP/7 and to check the alignment of texts across all the official UPOV languages. It does not conduct a substantive technical review of the Test Guidelines. The members of the TC-EDC are selected by the TC, both to provide broad experience of the UPOV system and also to represent the UPOV languages – English, French, German and Spanish. The Chairperson of the TC-EDC is provided by the UPOV Secretariat.

"2.2.7.2 The TC-EDC reviews the draft Test Guidelines, taking into account any specific instructions from the Technical Committee, and makes a recommendation on whether the Test Guidelines are suitable for adoption (Step 8). It may make a proposal to the Technical Committee for adoption subject to amendments of an editorial nature, which it specifies.

~~"2.2.7.3 If it considers that there are technical issues to be resolved, the TC-EDC may seek to resolve the issues with the Leading Expert, prior to consideration of the Test Guidelines by the Technical Committee. Where this is not possible, the TC-EDC may recommend that the Technical Committee:~~

- ~~(a) refer the Test Guidelines back to the TWP (Step 4) or;~~
- ~~(b) adopt the Test Guidelines subject to further information being provided by the Leading Expert with the agreement of all interested experts and the Chairperson of the TWP concerned.~~

"NEW Unless otherwise agreed by the TC, the TC-EDC meets twice each year, once in the period March/April and once in conjunction with the TC session (October/November). The TC-EDC will consider Test Guidelines submitted by the Technical Working Parties at least 14 weeks prior to the TC-EDC meeting. Test Guidelines submitted less than 14 weeks prior to the TC-EDC meeting will be considered at its subsequent meeting.

"NEW The potential outcomes for Test Guidelines considered by the TC-EDC are as follows:

- (a) no changes required to the Test Guidelines, or strictly editorial changes for which recommendations are agreed by the TC-EDC; or
- (b) editorial clarifications required; or
- (c) technical issues to be resolved.

"NEW In cases where no changes are required to the Test Guidelines, or strictly editorial changes for which recommendations are agreed by the TC-EDC, the Test Guidelines will be put forward for adoption by the Technical Committee.

"NEW The following procedure applies for Test Guidelines when editorial clarifications are required:

- request for clarifications is transmitted to the Leading Expert;
- clarifications to be provided within four weeks;
- if the clarifications are agreed by the TC-EDC, the Test Guidelines will be recommended for adoption at the TC-EDC meeting;
- the Test Guidelines are considered for adoption by the TC.

"NEW The following procedure applies for Test Guidelines with technical issues to be resolved:

- technical issues to be transmitted to the Leading Expert
- the technical issues are to be addressed at the respective Technical Working Party by means of a TWP document prepared by the Leading Expert at least four weeks before TWP session (new draft Test Guidelines should not be prepared)
- resolution of the issues to be provided to the TC-EDC at least seven weeks before the TC-EDC meeting;

- if agreed by the TC-EDC, the Test Guidelines would be recommended for adoption at the TC-EDC meeting;
- Test Guidelines are considered for adoption by the TC.

“2.2.8 **STEP 8** Adoption of Draft Test Guidelines by the Technical Committee

“2.2.8.1 The Technical Committee will, on the basis of the recommendations of the TC-EDC, decide whether to adopt the Test Guidelines, or refer them back to the TWP concerned.

“NEW The Technical Committee may adopt Test Guidelines at its session or by correspondence. Test Guidelines may be adopted by correspondence according to the following procedure:

- The draft Test Guidelines are circulated to the TC for adoption by correspondence with the recommendations by the TC-EDC;
- The draft Test Guidelines are considered as adopted if no comments are received within six weeks;
- If any comments are received, the draft Test Guidelines are referred to the relevant TWP to address those comments.

“2.2.8.2 Where the Technical Committee adopts the Test Guidelines, the Office will make all amendments agreed by the Technical Committee, which will be recorded in a report of the relevant Technical Committee meeting. The Office will then publish the adopted Test Guidelines.

~~“2.2.8.3 Where the Technical Committee adopts the Test Guidelines subject to further information being provided by the Leading Expert with the agreement of all interested experts and the Chairman of the TWP concerned (see 2.2.7.3(b)), the necessary information, agreed with all interested experts, should be provided to the Office within three months of the Technical Committee meeting, or before the subsequent session of the TWP concerned, whichever is the sooner. In those cases where the necessary information is not provided within this time, the Test Guidelines concerned will not be adopted and will be re-presented at the TWP concerned (Step 4).”~~

219. The TC agreed that a suitable timeline for the publication of adopted Test Guidelines should be added to the guidance.

220. The TC agreed that the procedure for the adoption of Test Guidelines by correspondence should be incorporated in the content of the preparatory workshops for the TWPs.

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

*The Combined-Over-Years Uniformity Criterion (COYU)*

221. The TC considered document TC/54/17.

222. The TC noted that the statistical development of the new method of calculation of COYU had been completed, including the establishment of the probability levels required to most closely match decisions using the current method for calculation of COYU.

223. The TC noted the invitation by the United Kingdom for interested experts to get in contact for testing the new software containing the improved method of calculation of COYU.

224. The TC noted the invitation by the TWC for the expert from the United Kingdom to draft a replacement section for document TGP/8 on the method of calculation of COYU.

*Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions*

225. The TC considered document TC/54/18 Corr..

226. The TC recalled that, at its fifty-second session, it had agreed that the guidance on “Different forms that variety descriptions could take and the relevance of scale levels”, as reproduced in Annex I to document TC/54/18 Corr., should be used as an introduction to future guidance to be developed on data processing for the assessment of distinctness and for producing variety descriptions.

227. The TC considered the summary of different approaches used by members of the Union to convert observations into notes for producing variety descriptions of measured characteristics as set out in Annex II to document TC/54/18 Corr..

228. The TC agreed to request France, Germany, Japan and the United Kingdom to provide information on the circumstances in which their methods would be suitable, including the method of propagation of the variety and other factors that had been used in deciding to use the method.

229. The TC noted that the TWC, at its thirty-sixth session, had agreed that discussions on genotype by environment interaction should be continued on the basis of a paper to be prepared by Finland and Italy, taking into consideration other types of characteristics and not only measured quantitative characteristics. The TC agreed that discussions on this matter should continue independently from the adoption of guidance on data processing for the assessment of distinctness and for producing variety descriptions.

*Method for more than one single test (year)*

230. The TC considered document TC/54/19.

231. The TC is considered the proposal for the revision of guidance in document TGP/8/2: Part II: Section 8: Subsection 8.1.7: "Method for more than one single test (year)", on the basis of the draft set out in document TC/54/19, Annex II, and in conjunction with the comments by the TWPs, at their sessions in 2018.

232. The TC noted that guidance on the same matter had been developed for document TGP/10 and agreed that the current guidance in document TGP/8/2: Part II: Section 8: Subsection 8.1.7 should be replaced by a cross-reference to the guidance new on "Assessing uniformity by off-types on the basis of more than one growing cycle or on the basis of sub-samples" to be included in document TGP/10 "Examining Uniformity."

TGP/10: Examining uniformity

*Assessing Uniformity by Off-Types on the Basis of More than One Growing Cycle or on the Basis of Sub-Samples*

233. The TC considered document TC/54/20.

234. The TC agreed that the draft guidance presented in Annexes I and II to document TC/54/20 should be put forward for adoption by the Council for inclusion in a future revision of document TGP/10 "Examining Uniformity."

TGP/14: Glossary of Terms Used in UPOV Documents

*Illustrations for shape and ratio characteristics*

235. The TC considered document TC/54/21.

236. The TC noted that grids could be used to clarify the states of expression and the differences between states of expression and to describe the range of expression for shape characteristics.

237. The TC noted the discussions on whether to identify situations when grids should and should not be used to explain states of expression in shape characteristics and agreed that the TWPs should decide on a case-by-case for each Test Guidelines according to the guidance in TGP/14 "Glossary of Terms Used in UPOV Documents". The TC recalled that, if grids were not used, it was necessary for Test Guidelines to explain the differences between shapes by another clear and objective way.

238. The TC noted the discussions on whether to provide guidance on how grids can clarify how differences in notes can be used for the assessment of distinctness, in accordance with the guidance in the General Introduction and document TGP/9.

239. The TC noted that the GAIA software was an example on how differences in notes could be used for the assessment of distinctness. The TC agreed to request the UPOV Office to prepare a document for discussion at the TWPs providing explanations on QN and PQ characteristics from document TG/1/3 "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of new Varieties of Plants". The TC agreed that such discussions should be dissociated from the discussions on the use of grids to illustrate shape and ratio characteristics.



*UPOV color groups*

240. The TC considered document TC/54/22.

241. The TC considered the proposals for the revision of the list of UPOV Color Groups and consequential changes to document TGP/14, as set out in document TC/54/22, Annexes I and II. The TC agreed the guidance on UPOV color names should not be used for variety denomination purposes and agreed that the proposed guidance in document TC/54/22, Annex II, should be revised to remove the mention to variety denominations.

242. The TC agreed that the proposals should be considered by the TWPs and reported to the TC, at its fifty-fifth session.

243. The TC considered whether to keep the previous list of UPOV Color groups within document TGP/14 in order to avoid confusion and agreed to recommend keeping both versions of the list in the document.

244. The TC agreed to propose the revision of document TGP/14 to include guidance on the factors to be considered for creating color groups for grouping of varieties and organizing the growing trial, as follows:

“Factors to be considered for creating color groups

“When using the color of a plant part for grouping of varieties, a very clear and large difference between the colors is required. However, the color groups are also used in the Technical Questionnaire for applicants who have no RHS Colour Chart. Therefore the groups need to be small enough so that applicants are able to give an adequate state of expression for the characteristic.

“The following factors have to be considered when creating color groups for grouping:

- (a) range of variation of the color of the plant part within the species
- (b) difference between colors for varieties to be considered clearly distinguishable
- (c) possible influence of the environment on the color of the plant part.

“Depending on the species and the plant part observed the color groups for grouping can be different. Examples for color groups in grouping characteristics of different Test Guidelines are listed in the following table.

Test Guidelines	Campanula (TG/305/1)	Hosta (TG/299/1)	Cordyline (TG/317/1)	Osteospermum (TG/175/5)
Characteristic	Corolla: main color of inner side	Leaf blade: color covering the largest surface area	Leaf: secondary color	Ray floret: main color of middle part
Color groups for grouping	white pink red purple purple blue	white light yellow medium yellow dark yellow light green medium green dark green blue green	white yellow green red purple brown blackish	white yellow orange pink red purple violet

“It should be emphasized that not all groups are necessarily clearly distinct from each other when information is used that does not come from the same source (same location, same observer) and cannot always be used to exclude varieties from the trial. E.g. in Cordyline for the characteristic ‘Leaf: secondary color’ it might not be possible to clearly distinguish between ‘brown’ and ‘blackish’ when looking at photos on the internet or in a plant catalogue.”

245. The TC agreed that the following text in Annex II should be deleted:

<u>RHS Color Group</u> <u>(heading on each sheet)</u>	<u>29</u>	<u>Red Group</u>	<u>Used by the CPVO for checking</u> <u>colors in proposals for variety</u> <u>denominations.</u>
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*Possible future revisions of TGP documents*

TGP/7: Development of Test Guidelines

*Proprietary method of assessment for male sterility*

246. The TC considered whether to invite the TWV to revise the Test Guidelines for Broccoli to accept the use of any other method to assess male sterility in a DNA-marker test, including alternative markers for the DNA-marker test, where validated by the testing authorities in UPOV members.

247. The TC noted the importance of Test Guidelines for international harmonization and agreed that members should propose any alternative methods or markers for DNA-marker tests in Test Guidelines.

*Suitability of characteristics in previous versions of Test Guidelines*

248. The TC considered a situation where existing Test Guidelines characteristics did not meet the requirements set out in document TGP/7. The TC noted that the characteristics should meet the requirements for a characteristic set out in the General Introduction, which included provisions for characteristics observed in bulk samples, and agreed that it was the responsibility of the TWPs to assess whether these should be kept as DUS characteristics.

TGP/12: Guidance on Certain Physiological Characteristics

*Explanations on disease resistance characteristics*

249. The TC considered whether to invite the TWPs to develop further guidance on providing explanations for disease resistance characteristics in Test Guidelines using the Standard Resistance Protocol provided in document TGP/12 "Guidance on certain physiological characteristics", including the elements that would not need to be completed.

250. The TC noted that the use of disease resistance characteristics would be discussed at the TWP, at its next session, and agreed to wait for the outcome of those discussions before developing further guidance.

*Program for the development of TGP documents*

251. The TC agreed the program for the development of TGP documents, as set out in Annex IV to document TC/54/5 Rev., subject to its conclusions at this session.

Cooperation in examination

252. The TC considered document TC/54/25.

253. The TC considered the results of the survey of the current situation of members of the Union with regard to cooperation in examination, as set out in document TC/54/25, Annex.

254. The TC agreed that it would be useful for UPOV members to identify contact the persons for international cooperation in DUS examination and make this information available via the UPOV website.

255. The TC agreed to invite the TWPs to explore the technical concerns that prevented cooperation and to propose how to overcome the technical concerns raised.

256. The TC agreed that the topic of international cooperation should be included in the preparatory workshops for the TWPs to explain the existing possibilities for cooperation between UPOV members.

Approaches for obtaining plant material from breeders and on deciding on varieties whose existence is a matter of common knowledge

257. The TC considered document TC/54/26.

258. The TC considered the results of the survey on the approaches used by members of the Union for obtaining plant material from breeders and on deciding on varieties whose existence is a matter of common knowledge, as set out in document TC/54/26, Annex.

259. The TC noted the different approaches used by UPOV members in establishing whether varieties were a matter of common knowledge and recalled that document TGP/4 “Constitution and maintenance of variety collections” provided guidance on this matter.

Molecular techniques

260. The TC considered documents TC/54/11 and TC/54/11 Add..

*Developments at the Technical Working Parties in 2017*

261. The TC noted the developments at the Technical Working Parties in 2017.

*Developments at the sixteenth and seventeenth sessions of the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular*

Papers presented

262. The TC noted the papers presented under each of the agenda items of the sixteenth and seventeenth sessions of the BMT.

Review of document UPOV/INF/17 “Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction (‘BMT Guidelines’)

263. The TC noted the proposal by the BMT to introduce a new chapter concerning cooperation in the exchange of data and construction of databases in document UPOV/INF/17.

264. The TC noted that the BMT, at its seventeenth session, had considered proposals for the revision of document UPOV/INF/17. The TC agreed with the proposal by the BMT for the European Union, France and the Netherlands to prepare a new draft of document UPOV/INF/17 for consideration at the eighteenth session of the BMT, as set out in document TC/54/11 Add., paragraph 45.

International guidelines on molecular methodologies including cooperation between the OECD, UPOV, ISTA and ISO

265. The TC noted that practical workshops on “DNA Techniques and Variety Identification” had been held in Roelofarendsveen, Netherlands, from May 8 to 10, 2017, and from September 20 to 22, 2017.

266. The TC noted that the BMT had agreed that consideration of possible harmonization of terms and methodologies used for different crops and the possible development of standards, might be advanced through a further international practical workshop, to be jointly coordinated by OECD, UPOV and ISTA and supported by Naktuinbouw and/or another partner with the relevant facilities, as set out in document TC/54/11, paragraph 23.

267. The TC noted that ISTA was not in a position to agree to the proposed joint activities with UPOV and OECD at the seventeenth session of the BMT, as set out in document TC/54/11 Add., paragraph 49. The TC agreed to invite ISTA to join the initiatives when in a position to do so.

268. The TC agreed that UPOV and OECD should make progress on the matters previously agreed by the TC, as set out in document TC/54/11 Add., paragraph 49, namely:

(a) to develop a joint document explaining the principal features of the systems of the OECD, UPOV and ISTA;

(b) to develop an inventory on the use of molecular marker techniques, by crop, with a view to developing a joint OECD/UPOV/ISTA document containing that information, in a similar format to UPOV document UPOV/INF/16 “Exchangeable Software”, subject to the approval of the Council and in coordination with OECD and ISTA; and

(c) the proposal for the BMT to develop lists of possible joint initiatives with OECD and ISTA in relation to molecular techniques for consideration by the TC.

269. The TC agreed to invite the BMT and the TWPs to develop an inventory on the use of molecular marker techniques, by crop, with a view to developing a joint OECD/UPOV/ISTA document containing that information, in a similar format to UPOV document UPOV/INF/16 “Exchangeable Software.”

270. The TC agreed to request the BMT to develop a joint document explaining the principal features of the systems of the OECD, UPOV and ISTA.

271. The TC noted the information provided by the representative of OECD that a joint ISTA/UPOV/OECD workshop was anticipated to be organized in conjunction with the ISTA Seed Congress to be held in India in 2019.

#### Report of work on molecular techniques in relation to DUS examination

272. The TC agreed that the following text from document UPOV/INF/18/1 should be introduced in document TGP/15 to clarify that it was the responsibility of the authority to decide on the reliability of the link between the gene and the expression of the characteristic:

“3.1.4 In considering the model and example, as presented in Annex 1 of this document, the TC emphasized the importance of meeting the assumptions. In that regard, it clarified that it is a matter for the relevant authority to consider if the assumptions are met (see document TC/45/16 “Report”, paragraph 152).”

273. The TC considered the proposal by the BMT and agreed to include an explanation in document TGP/15 that it would be the responsibility of the respective TWP and the TC to assess whether the reliability of the link between the gene and the expression of the characteristic was satisfied in order to include a method in the Test Guidelines.

274. The TC noted that the BMT, at its seventeenth session, had considered document BMT/17/21 “Do resistance markers for tomato fulfil the requirements of TGP/15” and received a presentation by Ms. Amanda van Dijk-Veldhuizen (Netherlands), a copy of was provided as document BMT/17/21 Add..

275. The TC agreed with the proposal by the BMT that a new example be added to document TGP/15 to illustrate a situation where the characteristic-specific marker did not provide complete information on the state of expression of a characteristic, on the basis of the proposal by the Netherlands presented in document BMT/17/21. The TC agreed to invite the experts from the Netherlands to prepare a proposal to be presented to the TWPs and BMT and agreed that the resultant proposal should be presented to the TC, at its fifty-fifth session.

#### The use of molecular techniques in variety identification

276. The TC noted the offer from Mr. Barry Nelson (Corteva™ Agriscience) to explore the possibility to make available to others for further development a software tool for marker selection using the “traveling salesman” algorithm, as set out in document TC/54/11 Add., paragraph 53.

277. The TC noted that further developments on this matter would be reported to the BMT at its eighteenth session.

#### Session to facilitate cooperation

278. The TC noted that discussion groups had been formed at the sixteenth session of the BMT for: agricultural crops; fruit crops; ornamental plants and forest trees; and vegetables, for BMT participants to exchange information on their work and explore areas for cooperation.

279. The TC noted that, at the seventeenth session of the BMT, discussion groups had been formed for: maize and soybeans; other agricultural crops; fruit crops and forest trees; ornamental plants; and vegetables, for BMT participants to exchange information on their work and explore areas for cooperation.

280. The TC noted that the BMT had plans to discuss, at its eighteenth session, issues concerning cooperation between partners and service providers, including confidentiality, access to data and material, authorization for work to be performed and availability of results and information to partners.

281. The TC agreed that the results of the coordination session in the BMT be reported to the other Technical Working Parties (TWPs). The TC agreed to invite the TWPs to undertake a similar session to build on the BMT outcomes and feed into the future work of the BMT. The TC agreed that discussion groups should be formed for the main crops at each TWP to allow participants to exchange information on their work and explore areas for cooperation.

282. The TC further agreed that the discussion groups could also consider issues concerning cooperation in DUS examination, to explore technical concerns that prevented cooperation and to consider how to overcome the technical concerns raised, as discussed under agenda item 7 "Cooperation in Examination.

#### Future program

283. The TC agreed the draft agenda for the BMT at its eighteenth session, as set out in document TC/54/11 Add., paragraph 69.

284. The TC received the following proposal from the Chairpersons of the TWC and BMT for matters to be considered on Wednesday, September 16, 2019, in order to facilitate discussion and cooperation between the TWC and BMT. The TC noted that the TWC would meet on the morning of September 16 and the BMT would meet later that day and the items below would be considered at the TWC or BMT session as appropriate.

285. The TC agreed the following items for Wednesday, September 16, 2019:

Reports on developments in UPOV concerning biochemical and molecular techniques (document to be prepared by the Office of the Union)
Variety description databases (document to be prepared by the Office of the Union and documents invited)
Management of databases and exchange of data and material (papers invited)
Building a database with molecular marker information for the management of variety collections (documents invited)
Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction
Methods for analysis of molecular data (papers invited)
Exchange and use of software and equipment (document to be prepared by the Office of the Union and documents invited) - Report on developments of a software tool for marker selection using the traveling salesman algorithm
DNA markers as supporting information for DUS decisions in potatoes (document to be prepared by the Netherlands)
A single tool for DUS computation process (document to be prepared by France)

286. The TC noted that the exact timings for discussion of the items during that day would depend on the number of discussion papers received.

TGP/15: Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)

*Revision of document TGP/15*

287. The TC considered documents TC/54/23 and TGP/15/2 Draft 1.

*Revision of the model “Combining phenotypic and molecular distances in the management of variety collections”*

288. The TC noted the report of the BMT, at its seventeenth session, that the establishment of an additional threshold for genetic distance below GAIA distance 2 had not been implemented in France at that time. The TC recalled that the nature of document TGP/15 was to present examples of the use of molecular markers in DUS examination among UPOV members.

289. The TC agreed with the BMT that the Model “Combining Phenotypic and Molecular Distances in the Management of Variety Collections” of document TGP/15, Section 2.2, should be revised at a later stage once an additional threshold level has been implemented in France.

*Proposal for inclusion of a new model “genetic selection of similar varieties for the first growing cycle”*

290. The TC noted that the BMT and TWV had agreed to propose a new model “Genetic selection of similar varieties for the first growing cycle: example French Bean” for inclusion in document TGP/15 on the basis of a simplified version of the draft text presented in document TGP/15/2 Draft 1, as set out in document TC/54/23, paragraphs 24 and 26.

291. The TC agreed with the inclusion of a new model “Genetic selection of similar varieties for the first growing cycle: example French Bean” in document TGP/15 on the basis of the proposal by the Netherlands revised by the TC-EDC, as set out in Annex III to this Report.

Information and databases

*UPOV information databases*

292. The TC considered document TC/54/6.

UPOV code developments

293. The TC noted that 440 new UPOV codes had been created in 2017 and that a total of 8,589 UPOV codes are included in the GENIE database.

294. The TC noted that the Office of the Union had introduced in GENIE new UPOV codes for 191 forest tree species requested by the Directorate-General for Health and Food Safety of the European Commission (DG SANTE) , as set out in document TC/54/6, paragraph 8.

295. The TC noted that DG SANTE had proposed the establishment of an administrative arrangement between the Office of the Union and the European Commission to cover collaboration in scientific names of plant species present in each other’s databases and, in particular, regarding the attribution of UPOV codes to plant species in FOREMATIS, as set out in document TC/54/6, paragraph 9.

UPOV code amendments

*UPOV code “ZEAAA\_MAY\_SAC”, “ZEAAA\_MAY\_EVE” and “ZEAAA\_MAY\_MIC”*

296. The TC considered the deletion of the UPOV Codes for the subspecies sweet corn and popcorn, following their reclassification as synonyms of maize by GRIN.

297. The TC noted the requests of the TWA, at its forty-seventh session, and the TWV, at its fifty-second session, and agreed not to delete the UPOV Codes for sweet corn and popcorn, therefore creating an exception to the “Guide to the UPOV Code System”. It agreed that this exception should be presented in an amendment to the “Guide to the UPOV Code System”

*Mucuna* genus

298. The TC agreed to amend the UPOV codes for subspecies in the *Mucuna* genus, as follows:

Current			Proposal		
UPOV code	Principal botanical name	Other botanical names	UPOV code	Principal botanical name	Other botanical names
n.a.	n.a.	n.a.	MUCUN_PRU_UTI	<i>Mucuna pruriens</i> (L.) DC. var. <i>utilis</i> (Wall. ex Wight) Baker ex Burck	<i>Mucuna aterrima</i> (Piper & Tracy) Holland; <i>Mucuna cochinchinensis</i> (Lour.) A. Chev.) ; <i>Mucuna deeringiana</i> (Bort) Merr.; <i>Stizolobium deeringianum</i> Bort
MUCUN_PRU_ATE	<i>Mucuna aterrima</i> (Piper & Tracy) Holland.	n.a.	[to delete]	n.a.	n.a.
MUCUN_PRU_COC	<i>Mucuna cochinchinensis</i> (Lour.) A. Chev.	n.a.	[to delete]	n.a.	n.a.
MUCUN_PRU_DEE	<i>Mucuna deeringiana</i> (Bort) Merr.	<i>Stizolobium deeringianum</i> Bort	[to delete]	n.a.	n.a.

*UPOV code for Sesbania sesban*

299. The TC agreed to correct the UPOV Codes for *Sesbania sesban*, as follows:

Current			Proposal		
UPOV code	Principal botanical name	Other botanical name(s)	UPOV code	Principal botanical name	Other botanical name(s)
SENNA_SES	<i>Sesbania sesban</i> (L.) Merr.	n.a.	SESBA_SES	<i>Sesbania sesban</i> (L.) Merr.	n.a.

*Brassica oleracea*

300. The TC considered the proposal to amend the UPOV codes for *Brassica oleracea* and agreed that no changes should be implemented

301. The TC noted the opinion provided by the TWV, at its fifty-second session, and agreed not to delete the UPOV Codes for *Brassica oleracea*, therefore creating an exception to the “Guide to the UPOV Code System”. It agreed that this exception should be presented in an amendment to the “Guide to the UPOV Code System”.

*UPOV codes for Epichloe species and Neotyphodium species*

302. The TC considered the UPOV codes for *Epichloe* species and *Neotyphodium* species, in conjunction with the comments by the TWV, at its fifty-second session, and agreed the changes as follows:

Current			Proposal		
UPOV code	Principal botanical name	Other botanical name(s)	UPOV code	Principal botanical name	Other botanical name(s)
NEOTY	<i>Neotyphodium</i>	n.a.	EPICH	<i>Epichloe</i> (Fr.) Tul. & C. Tul.	<i>Neotyphodium</i> Glenn, C.W. Bacon & Hanlin; <i>Cordyceps</i> subgen. <i>Epichloe</i> Fr.
NEOTY_ACR	<i>Neotyphodium acremonium</i>	<i>Acremonium</i>	[to delete]	n.a.	n.a.
NEOTY_COE	<i>Neotyphodium coenophialum</i>	n.a.	EPICH_COE	<i>Epichloe coenophiala</i> (Morgan-Jones & W. Gams) C.W. Bacon & Schardl	<i>Acremonium coenophialum</i> Morgan-Jones & W. Gams; <i>Neotyphodium coenophialum</i> (Morgan-Jones & W. Gams) Glenn, C.W. Bacon & Hanlin; <i>Epichloe typhina sensu</i> Neill
NEOTY_LOL	<i>Neotyphodium lolii</i>	n.a.	[ELSIN_LOL]	<i>Elsinoe lolii</i> [once published in a Code compliant form]	<i>Neotyphodium lolii</i> (Latch, M.J. Chr. & Samuels) Glenn, C.W. Bacon & Hanlin
NEOTY_UNC	<i>Neotyphodium uncinatum</i> (W. Gams, Petrini & D. Schmidt) Glenn, C.W. Bacon & Hanlin	n.a.	EPICH_UNC	<i>Epichloe uncinata</i> (W. Gams, Petrini & D. Schmidt) Leuchtm. & Schardl	<i>Acremonium uncinatum</i> W. Gams, Petrini & D. Schmidt; <i>Neotyphodium uncinatum</i> (W. Gams, Petrini & D. Schmidt) Glenn, C.W. Bacon & Hanlin

PLUTO database

303. The TC noted the summary of contributions to the PLUTO database from 2014 to 2017 and the current situation of members of the Union on data contribution, as presented in document TC/54/6, Annex II.

304. The TC noted that the WG-DEN, at its fourth meeting, had agreed that matters under agenda item 5 “Expansion of the content of the PLUTO database” would be considered at its fifth meeting.

*Electronic application form (UPOV PRISMA)*

305. The TC considered document TC/54/7 and received a presentation by the UPOV Office, a copy of which would be made available as an Addendum to document TC/54/7.

306. The TC noted that for UPOV members following the UPOV Test Guidelines, where there were no UPOV Test Guidelines for a particular crop/species, a generic TQ was available. Alternatively, UPOV members could link these crop/species to a suitable UPOV TG. It was explained that it would not be appropriate to use national TGs for such crops/species because of the high level of maintenance that would result, the translation burden and lack of harmonization. However, it would be possible for UPOV members participating in UPOV PRISMA to agree a common TQ and thereby to retain harmonization and minimize translation work.

307. The TC agreed that it would be helpful for the UPOV Office, upon request, to generate a report for participating authorities on the extent to which their forms were harmonized with other UPOV members and the UPOV model application form. The TC noted that this was a matter that should be reported to the CAJ.



*Exchange and use of software and equipment*

308. The TC considered document TC/54/8.

Document UPOV/INF/16 “Exchangeable Software”

*Adoption of document UPOV/INF/16/7*

309. The TC noted that the Council, at its fifty-first ordinary session, held in Geneva, on October 26, 2017, had adopted document UPOV/INF/16/7 “Exchangeable Software”.

*Revision of document UPOV/INF/16/7*

310. The TC agreed to propose a revision of document UPOV/INF/16/7 to incorporate the information on the use of GAIA software currently contained in document UPOV/INF/22/4, as presented in document UPOV/INF/16/8 Draft 1.

311. The TC noted that the comments of the TC, at its fifty-fourth session, concerning the use of software by members of the Union, would be reported to the CAJ at its seventy-fifth session, to be held in Geneva on October 31, 2018, and if agreed by the CAJ, a draft of document UPOV/INF/16/8 would be presented for adoption by the Council at its fifty-second ordinary session, to be held on November 2, 2018, on that basis.

Document UPOV/INF/22 “Software and equipment used by members of the Union”

*Adoption of document UPOV/INF/22/4*

312. The TC noted that the Council, at its fifty-first ordinary session, held in Geneva, on October 26, 2017, had adopted document UPOV/INF/22/4 “Software and equipment used by members of the Union”.

*Revision of document UPOV/INF/22/4*

313. The TC agreed to propose to include the information on the use of software by members of the Union, as presented in document UPOV/INF/22/5 Draft 1, in document UPOV/INF/22.

314. The TC noted that the proposals of the TC, at its fifty-fourth session, concerning the revision of document UPOV/INF/22 would be reported to the CAJ at its seventy-fifth session, and if agreed by the CAJ, a draft of document UPOV/INF/22/5 would be presented for adoption by the Council at its fifty-second ordinary session, to be held on November 2, 2018.

*Availability in a searchable form*

315. The TC recalled that, at its fifty-third session, it had agreed that the information in documents UPOV/INF/16 and UPOV/INF/22 should be made available in a searchable form on the UPOV website and that the Office of the Union would investigate a tool for that purpose.

316. The TC received a demonstration by the Office of the Union on how the information in documents UPOV/INF/16 and UPOV/INF/22 could be made available in a searchable format on the UPOV website and agreed that the approach demonstrated was a suitable basis.

*Variety description databases*

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

318. The TC noted the reports by Austria (Durum wheat), the European Union (Potato), France (Peach) and the Netherlands (Rose) on the existence of databases containing morphological and/or molecular data.

319. The TC considered the type of information that should be collected on existing databases containing morphological and/or molecular data for inclusion in the GENIE database, according to available resources for the modification of the GENIE database

320. The TC agreed with the TWF that the initial step before building any database should be to agree on the information to be shared, the format to exchange and store the information.

321. The TC agreed with the proposal by the BMT that, as a first step, discussions on databases should address the issues of how to overcome ownership matters, confidentiality, access to data and material, authorization for work to be performed and availability of results and information to partners, as reported in document TC/54/9, paragraph 19.

322. The TC recalled that the Office of the Union had been requested collect information on the type of information that should be collected on existing databases containing morphological and/or molecular data for inclusion in the GENIE database, according to available resources for the modification of the GENIE database. The TC agreed that this would not be a priority until further clarification had been received on the situation concerning confidentiality and accessibility of information in such databases.

#### Preparatory workshops

323. The TC considered document TC/54/13.

324. The TC noted the report of the preparatory workshops held in 2017 and in 2018.

325. The TC considered the proposed program for preparatory workshops for 2019, as set out in document TC/54/13, paragraphs 17 and 18. The TC agreed that the following contents should be added to the preparatory workshops:

- Procedure for the adoption of Test Guidelines by correspondence;
- Role of the leading expert drafting Test Guidelines and how to participate as an interested expert
- Possibilities for international cooperation in DUS examination

326. The TC agreed that the elements to be discussed during the preparatory workshop could be presented as an introduction to the respective agenda items during the normal program for the TWPs and BMT sessions. It further agreed that the group exercises should continue to take place and that a national workshop could take place on the day before the TWP sessions for local experts.

327. The TC agreed that the Chairpersons of the TWPs should discuss in conjunction with the organizers, the Chairperson of the TC and the UPOV Office on the procedure for individual cases.

#### Number of growing cycles

328. The TC considered document TC/54/27 and noted the discussions by the TWPs, at their sessions in 2017 and 2018, on the impact of using different numbers of growing cycles on DUS decisions using actual data.

#### Matters concerning variety descriptions

329. The TC considered document TC/54/28.

330. The TC considered the draft guidance in the Annex to document TC/54/28 as the basis for a future revision of document TGP/5 Section 6 "UPOV Report on Technical Examination and UPOV Variety Description".

331. The TC agreed to invite the drafter from the European Union to work with the Office of the Union to revise the draft guidance in line with UPOV guidance wording

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

332. The TC considered document TC/54/29.

333. The TC noted the developments reported at the thirty-fifth session of the TWC on the indications of COYD thresholds for excluding varieties of common knowledge from the second growing cycle on the basis of

data sets of meadow fescue, red clover, timothy, perennial ryegrass, pea (semi-leafless) and pea (conventional).

334. The TC noted that the conclusions of the TWC, at its thirty-fifth session, that the method was most applicable to crops with large numbers of varieties of common knowledge and where current trial sizes were large.

335. The TC noted the report made at the thirty-fifth session of the TWC that the United Kingdom planned to test the method on two large data sets of oilseed rape.

#### Statistical methods for visually observed characteristics

336. The TC considered document TC/54/30.

337. The TC recalled 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.

338. The TC noted that the TWC, at its thirty-sixth session, had not received a document for discussion under this agenda item and agreed to include an agenda item on this matter for discussion at its thirty-seventh session.

#### Variety denominations

339. The TC considered document TC/54/12.

340. 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/54/12, paragraphs 6 to 10.

341. The TC noted that the WG-DEN, at its fourth meeting, agreed that agenda item 4 "UPOV Denomination Similarity Search Tool" would be considered at a later meeting on the basis of the document presented at the second meeting.

342. The TC noted that the WG-DEN, at its fourth meeting, agreed that agenda item 5 "Expansion of the content of the PLUTO database" would be considered at a later meeting on the basis of the document presented at the second meeting.

343. The TC noted that the WG-DEN, at its fourth meeting, agreed that agenda item 6 "Non-acceptable terms" would be considered at a later meeting on the basis of the document presented at the second meeting.

344. The TC noted that the fifth meeting of the WG-DEN would be held in Geneva, on October 30, 2018.

345. The TC noted the agenda of the fifth meeting of the WG-DEN, as set out in document TC/54/12, paragraph 18.

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

346. The TC considered document TC/54/4 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 3,561 in 2017 to 3,732 in 2018 (+ 4.8%). The number of genera and species for which members of the Union had indicated their practical experience in the examination of DUS had increased from 3,416 in 2017 to 3,583 in 2018 (+ 4.9%). Information on members of the Union with practical experience in DUS examination is freely accessible via the GENIE database.

## Test Guidelines

347. The TC considered document TC/54/2 Rev..

### Test Guidelines adopted by correspondence

348. The TC noted that 4 new Test Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, 4 revised Test Guidelines and 5 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 had been adopted by correspondence:

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name
<b>NEW TEST GUIDELINES / NOUVEAUX PRINCIPES DIRECTEURS D'EXAMEN / NEUE PRÜFUNGSRICHTLINIEN / NUEVAS DIRECTRICES DE EXAMEN</b>							
AR	TWA	TG/ELYTR(PROJ.8)	Rush wheatgrass, Tall Wheatgrass	Élytrigie	pontische Quecke, stumpfblutige Quecke	Agropiro	Thinopyrum ponticum (Podp.) Barkworth & D. R. Dewey, Elytrigia pontica (Podp.) Holub
AU	TWO	TG/GREVI(PROJ.7)	Grevillea	Grevillea	Grevillea	Grevillea	Grevillea R. Br. corr. R. Br.
JP	TWV	TG/PEPIN(PROJ.4)	Melon-pear, Pepino	Poire-melon	Melonenbirne, Pepino	Pepino, pepino dulce Peramelón	Solanum muricatum Aiton
JP	TWO	TG/SOLEN_SCU (PROJ.4)	Coleus, Painted-nettle			El-nene	Plectranthus scutellarioides (L.) R. Br.
<b>REVISIONS OF TEST GUIDELINES / RÉVISIONS DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / REVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES DE DIRECTRICES DE EXAMEN ADOPTADAS</b>							
GB	TWA	TG/8/7	Field Bean	Féverole	Ackerbohne	Haboncillo	Vicia faba L. var. minor Harz
DE	TWA	TG/19/11	Barley	Orge	Gerste	Cebada	Hordeum vulgare L., Hordeum lagunculiforme (Bachteev) Bachteev ex Nikif.
NL	TWO	TG/182/4	Guzmania	Guzmania	Guzmania	Guzmania	Guzmania Ruiz et Pav.
QZ	TWV	TG/259/2	Agaricus Mushroom, Button Mushroom	Agaric, Champignon de Paris	Champignon	Champiñón	Agaricus bisporus (Lange.) Sing.
<b>PARTIAL REVISIONS OF TEST GUIDELINES / RÉVISIONS PARTIELLES DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / TEILREVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES PARCIALES DE DIRECTRICES DE EXAMEN ADOPTADAS</b>							
NL	TWV	TG/55/7 Rev. 5	Spinach	Épinard	Spinat	Espinaca	Spinacia oleracea L.
QZ	TWV	TG/76/8 Rev.2	Sweet Pepper, Hot Pepper, Paprika, Chili	Piment, Poivron	Paprika	Aji, Chile, Pimiento	Capsicum annum L.
QZ	TWF	TG/84/4 Corr. Rev.	Japanese Plum	Prunier japonais	Ostasiatische Pflaume	Ciruelo japonés	Prunus salicina Lindl.

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name
ES	TWV	TG/184/4 Rev.	Cardoon, Globe Artichoke, Cardoon	Artichaut, Cardon	Artischocke, Artichoke, Cardy, Gemüseartisch- ke-Cardy, Kardonenartisch- ocke	Alcachofa, Cardo	Cynara cardunculus L., Cynara scolymus L.
JP	TWO	TG/283/1 Rev.	Oncidium	Oncidium, Orchidée danseuse	Oncidium	Oncidium	Oncidium Sw.

*Test Guidelines for adoption*

349. According to the procedures established in document TGP/7, the TC adopted 4 new Test Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability, 3 revised Test Guidelines and 3 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>							
JP	TWV	TG/BRASS_JUN (proj.6)	Brown mustard, India mustard, Indian mustard, Oriental mustard	Moutarde brune	Sareptasenf	Mostaza de Sarepta; Mostaza india	Brassica juncea (L.) Czern.
DK	TWA	TG/CHENO(proj.6)	Quinoa	Quinoa, Chénopode quinoa	Getreidekraut	Quinoa, Quinoa	Chenopodium quinoa Willd.
GB	TWO	TG/GERAN(proj.4)	Hardy Geranium, Crane's Bill	Géranium	Storcheschnabel	Geranio	Geranium L.
ZA	TWA	TG/RICIN(proj.6)	Castorbean, Palmi-christi	Ricin	Palma Christi, Rizinus, Wunderbaum	Higuerilla, Ricino	Ricinus communis L.
<u>REVISIONS OF TEST GUIDELINES / RÉVISIONS DE PRINCIPES DIRECTEURS D'EXAMEN ADOPTÉS / REVISIONEN ANGENOMMENER PRÜFUNGSRICHTLINIEN / REVISIONES DE DIRECTRICES DE EXAMEN ADOPTADAS</u>							
ES	TWA	TG/20/11(proj.5)	Oats	Avoine	Hafer	Avena	Avena sativa L. & Avena nuda L.
ES	TWA	TG/88/7(proj.4)	Cotton	Cotonnier	Baumwolle	Algodón, Algodonero	Gossypium L.
NL	TWV	TG/151/5(proj.3)	Broccoli, Calabrese, Sprouting Broccoli, Winter broccoli	Broccoli, Chou brocoli	Brokkoli	Brécol, Brócoli, Bróculi	Brassica oleracea L. var italica Plenck, Brassica oleracea subvar. Cymosa Duchesne, Brassica oleracea var. cymosa (Duchesne) DC.
<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/7/10 Rev.1(proj.2)	Pea	Pois	Erbse	Guisante, Arveja	Pisum sativum L.

**	TWP	Document No. No. du document Dokument-Nr. No del documento	English	Français	Deutsch	Español	Botanical name
NL	TWV	TG/44/11 Rev.2(proj.3)	Tomato	Tomate	Tomate	Tomate	Solanum lycopersicum (L.) Karst. ex. Farw.
NL	TWV	TG/294/1 Corr. Rev.2	Tomato Rootstocks	Porte-greffe de tomate	Tomatenunterla gen	Portainjertos de tomate	Solanum habrochaites S. Knapp & D.M. Spooner; 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; Solanum pimpinellifolium L. x Solanum habrochaites S. Knapp & D.M. Spooner

350. The TC agreed that the technical issues identified in the draft Test Guidelines for Black Walnut (document TG/JUGLA(proj.4)) should be addressed by the TWF. The TC agreed that the resolution of the issues identified should be provided to the TC-EDC by February 4, 2019.

*Draft Test Guidelines discussed by the TWPs in 2017 and 2018*

351. The TC noted the draft Test Guidelines discussed by the TWPs at their sessions in 2017 and 2018, as listed in Annex III to document TC/54/2.

*Draft Test Guidelines to be discussed by the TWPs in 2018 and 2019*

352. The TC agreed the program for the development of new Test Guidelines and for the revision of adopted Test Guidelines, as shown in Annex IV to document TC/54/2.

353. The TC agreed that the program for the development of new Test Guidelines and for the revision of adopted Test Guidelines for the TWF in 2019 should be approved by correspondence if the TWF holds its fiftieth session before the TC session in 2019.

*Status of existing Test Guidelines or draft Test Guidelines*

354. The TC noted the list of superseded Test Guidelines, as presented in Annex VI to document TC/54/2.

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

*Superseded Test Guidelines*

356. The TC noted the list of superseded Test Guidelines, as presented in document TC/54/2 Rev., Annex VI; and that the superseded versions of Test Guidelines were available on the Test Guidelines page of the UPOV website.

*Additional characteristics*

357. The TC noted that no notifications of additional characteristics or states of expression had been notified to the Office of the Union since the fifty-third session of the Technical Committee.

358. The TC noted the plans by the European Union to report additional characteristics and additional states of expression to the UPOV Office.

Program for the fifty-fifth 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. 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)
5. Matters arising from the Technical Working Parties
6. TGP documents
7. Information and databases
  - (a) UPOV information databases
  - (b) UPOV PRISMA
  - (c) Exchange and use of software and equipment
  - (d) Variety description databases
8. Molecular techniques
9. Variety denominations
10. Preparatory workshops
11. International cooperation in examination
12. Matters concerning variety descriptions
13. Differences in notes for the assessment of distinctness
14. Discussion on: Minimum distances between varieties (presentations invited)
15. List of genera and species for which authorities have practical experience in the examination of distinctness, uniformity and stability
16. Test Guidelines
17. Program for the fifty-sixth session
18. Adoption of the report (if time permits)
19. Closing of the session

*359. The TC adopted this report at the close of its session on October 30, 2018.*

[Annex I follows]

ANNEXE I / ANNEX I / ANLAGE I / ANEXO I

LISTE DES PARTICIPANTS / LIST OF PARTICIPANTS /  
TEILNEHMERLISTE / LISTA DE PARTICIPANTES

(dans l'ordre alphabétique des noms français des membres /  
in the alphabetical order of the French names of the Members /  
in alphabetischer Reihenfolge der französischen Namen der Mitglieder /  
por orden alfabético de los nombres en francés de los miembros)

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[L'annexe II suit /  
Annex II follows /  
Anlage II folgt /  
Sigue el Anexo II]

## ANNEX II

## AMENDMENTS TO THE DRAFT TEST GUIDELINES

Test Guidelines adopted by correspondence*Partial revisions***TC-EDC/Mar18/2 Partial Revision of the Test Guidelines for Japanese Plum**

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TC-EDC/Mar18/2 and agreed that the partial revision of the Test Guidelines for Japanese Plum be circulated to the TC for adoption by correspondence.

**TC-EDC/Mar18/3 Partial Revision of the Test Guidelines for Oncidium**

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TC-EDC/Mar18/3 and agreed that the partial revision of the Test Guidelines for Oncidium be circulated to the TC for adoption by correspondence.

**TC-EDC/Mar18/4 Partial Revision of the Test Guidelines for Artichoke, Cardoon**

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TC-EDC/Mar18/4 and agreed that the partial revision of the Test Guidelines for Artichoke, Cardoon be circulated to the TC for adoption by correspondence.

**TC-EDC/Mar18/6 Partial Revision of the Test Guidelines for Pepper**

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TC-EDC/Mar18/6 and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Pepper should be circulated to the TC for adoption by correspondence.

Ad. 48, 4. Footnotes	to indicate e-mail and web address of the institutions instead of personal e-mail addresses			
Ad. 48, 6	to read “genetically defined pepper differentials ( <del>reference to</del> <u>see</u> ISFwebsite: <a href="http://www.worldseed.org/isf/differential_hosts.html">http://www.worldseed.org/isf/differential_hosts.html</a> )”			
Ad. 48, 8.1	to check whether to be deleted, because not applicable (according to 8.2, the virus is multiplied in living plants.) <i>Leading Expert: agreed with deletion</i>			
Ad. 48, 8.2	- to check whether to read “Multiplication on pepper varieties with susceptibility to the particular race.” <i>Leading Expert: agreed with proposed new wording</i> - For TMV: 0, is multiplication recommended on pepper, tomato or tobacco plants? Is ‘Samsun’ a tomato variety or a tobacco variety? <i>Leading Expert: to read:</i> <table border="1"><tr><td>8.2</td><td>Multiplication variety</td><td>tomato or pepper (e.g. Lamu) or <i>Nicotiana tabacum</i> (e.g. Samsung)</td></tr></table>	8.2	Multiplication variety	tomato or pepper (e.g. Lamu) or <i>Nicotiana tabacum</i> (e.g. Samsung)
8.2	Multiplication variety	tomato or pepper (e.g. Lamu) or <i>Nicotiana tabacum</i> (e.g. Samsung)		
Ad. 48	to delete 8.3 to 8.5			
Ad. 48, 8.8	to check whether to read: “Fresh < 1 day in fridge. Desiccated < 1 year in fridge. Juice < 1 year in freezer at -20°C.” <i>Leading Expert: Indeed it should be “&lt;” instead of “&gt;” for all three cases (i.e. “less than instead of “more than”)</i>			



Ad. 48, last line	<p>- to check whether to read "The dates of observation should be defined according to the expression of symptoms on the controls varieties. ..."</p> <p><i>Leading Expert: Leading Expert: agreed with proposed new wording</i></p> <p>- to clarify reference to a possible third observation (according to 10.5 to 10.7 three observations are mandatory)</p> <p><i>Leading Expert: To replace the last sentence by: "Environmental conditions can have an effect on the expression of symptoms over time. Two observations are sufficient if clear symptoms are observed, otherwise a third observation could be necessary."</i></p>
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#### TC-EDC/Mar18/7 Partial Revision of the Test Guidelines for Spinach

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TC-EDC/Mar18/7 and agreed that the partial revision of the Test Guidelines for Spinach be circulated to the TC for adoption by correspondence.

#### New Test Guidelines

Elytrigia ( <i>Thinopyrum ponticum</i> (Podp.) Barkworth & D. R. Dewey)	TG/ELYTR(proj.8)	Mr. Alberto Ballesteros (AR)	TWA	*
	<p>No. of chars.: 10</p> <p>No. of (*) chars.: 10</p>	(Interested experts: CZ, HU, MX, PL, QZ, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/ELYTR(proj.8) and made the recommendations presented in the table below.

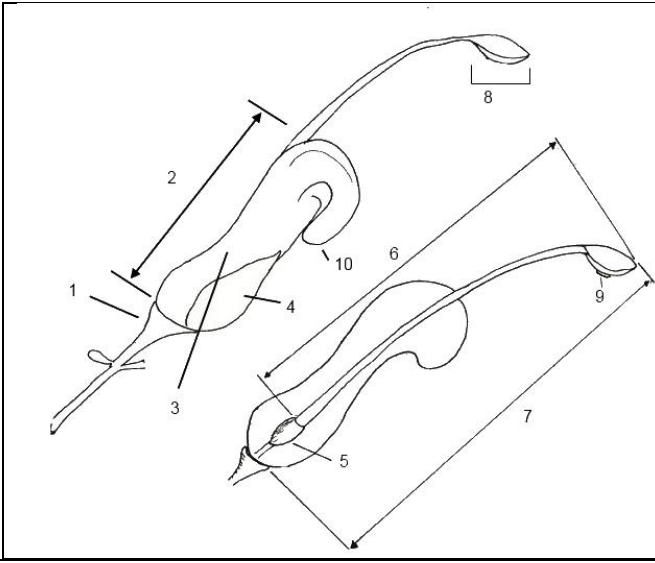
The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Elytrigia should be circulated to the TC for adoption by correspondence.

3.1.2	<p>to check whether to be deleted</p> <p><i>Leading Expert: yes, to be deleted</i></p>
3.3.4	<p>to be deleted</p> <p><i>Leading Expert: agreed</i></p>
Chars. 5 to 9	to delete states of expression 1 and 9 (no example varieties)
Ad. 10	<p>to check whether to read "The density is the ratio of the number of spikelets per inflorescence length."</p> <p><i>Leading Expert: agreed</i></p>
8.2	<p>- Stem Elongation DC31: spelling of "extension"</p> <p>- DC39: to read "Ligule / flag leaf collar just visible (state pre-swelling)"</p>
9.	<p>to read:</p> <p>Cabrera, A., <i>et al.</i>, 1970: Flora de la Provincia de Buenos Aires Parte II: Gramíneas. Colección Científica del INTA. Buenos Aires, AR, 169 pp.</p> <p>Dimitri, M. J., Parodi, L., 1972: Enciclopedia Argentina de Agricultura y Jardinería Vol. I. Descripción de plantas cultivadas 2º Edición. Editorial ACME S.A.C.I. Buenos Aires, AR, pp. 150-152.</p> <p>INASE, Descriptor provisorio de la especie <i>Agropyron</i> (<i>Elytrigia</i>) spp.</p> <p>Latour, M. C., <i>et al.</i>, 1970: Identificación de las principales gramíneas forrajeras del Noroeste de la Patagonia por sus caracteres vegetativos. Colección Científica del INTA. Buenos Aires, AR, pp. 30 to 77</p> <p>Meier, U., 1997: Growth stages of mono- and dicotyledonous plants. BBCH-Monograph. Blackwell Wissenschafts-Verlag. Berlin; Boston, 622 pp.</p>

Grevillea ( <i>Grevillea</i> R. Br. corr. R. Br.)	TG/GREVI(proj.7)	Mr. Nik Hulse (AU)	TWO	*
	No. of chars.: 59 No. of (*) chars.: 24	(Interested experts: GB, MX, NZ, QZ)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/GREVI(proj.7) and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for *Grevillea* should be circulated to the TC for adoption by correspondence.

4.2.2	to delete repeated word “varieties” in the first line
Char. 9	- to add underlining to “Only varieties with...” - to be moved after Char. 7
Char. 13	- to be moved after Char. 10 (depth of sinus / width of sinus) - to delete states 1 and 9
Char. 16	- to read “Only varieties with <u>Leaf: type of division of blade: entire: Leaf: shape of apex</u> ” - to be moved after Char. 9
Char. 34	to read “Inflorescence: length of rachis”
Char. 49	- state 2 to read “curved” - state 3 to read “reflexed”
Char. 53, 54	to be moved before Char. 47 (pistil characteristics to be moved before any of its parts)
8.1 (a)	to read “Observations should be made towards the end of active vegetative growth.”
8.1 (b)	- to be moved to 8.2- legend “a” to correctly spell “blade”
8.1 (c)	- to be moved to 8.2 - to improve image quality of letters on arrows <i>provided by Leading Expert</i>
8.1 (d)	to read “Observations should be made at the broadest part of a main flowering branch.”
8.1 (e)	to be moved to 8.2
8.1 (f)	- to check whether to invert index to read 9=pollen presenter; 10=stigma - to delete indication of 3 rachis - to check and remove indications not used in the Test Guidelines <i>Leading Expert: to remove “rachis” from illustrations and reverse indications for pollen presenter and stigma</i>
 <div data-bbox="1061 1355 1348 1680"> <p>1 pedicel 2 perianth 3 dorsal tepal 4 ventral tepal 5 ovary 6 style 7 pistil 8 pollen presenter 9 stigma 10 limb</p> </div>	
Ad. 16	- to delete sentence
Ad. 29	- state 6 “ovate” should to read “ovoid” (for coherence with wording in Char. 29)
Ad. 42	to spell “outer side” (two words)
TQ 1	to add an additional box for 1.3 for species

Pepino ( <i>Solanum muricatum</i> Aiton)	TG/PEPIN(proj.4)	Mr. Jun Araseki (JP)	TWV	*
	No. of chars.: 25 No. of (*) chars.: 17	(Interested experts: FR, NL, NZ, CropLife, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/PEPIN(proj.4) and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Pepino should be circulated to the TC for adoption by correspondence.

4.3.2	to delete reference to seeds
Char. 13	to replace (b) by (+) (explanation is only applicable for Char. 13 and should be removed to 8.2)
Char. 22	"Fruit: calyx size compared to diameter of fruit" (see Ad. 22)
8.1 (a)	to read "Observations <del>on the plant, stems, leaves and flowers</del> should be made at the time of flowering of the second inflorescence."
8.1 (b)	- to be deleted and moved to 8.2 as explanation Ad. 13 - to read "Observations should be made 20-30 days after the opening of the flower and before development of stripes."
8.1 (c)	to read "Observations <del>on the ground color and stripes of the fruit</del> should be made on fully developed fruits before the color change due to ripening."
8.1 (d)	to read "Observations <del>on the fruit</del> should be made <del>on fruits</del> at harvest maturity."
Ad. 14	to delete last sentence "For certain organs..."
Ads. 15 to 21	- sentence to read "The area of stripes should be recorded in relation to the total surface area of the fruit." - to be consistent on position of stalk and apex (bottom or top) according to TGP/14 (throughout TG) <i>Leading Expert: I agree to change the direction of the figure of Ad.15, Ad.20 and Ad.21 reversely to make the orientation of the fruit even. Please change these three figures (Ad.15, 20, 21) upside down.</i>

Coleus ( <i>Plectranthus scutellarioides</i> (L.) R. Br.)	TG/SOLEN_SCU(proj.4)	Mr. Takayuki Mikuni (JP)	TWO	*
	No. of chars.: 36 No. of (*) chars.: 23	(Interested experts: CA, DE, GB, KR, QZ, ZA, CIOPORA)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/SOLEN\_SCU(proj.4) and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Coleus should be circulated to the TC for adoption by correspondence.

1.	to remove extra space at end of sentence ([...] Br. .)
2.3, 3.4.1, 3.4.2, 4.1.4, 4.2.2, 4.2.3, 4.2.4	to have veg. varieties first (most varieties are vegetatively propagated)
5.3 (d), (e)	to check whether Gr. 5 "yellow" to read "medium yellow" or "dark yellow" (as Gr. 4 reads "light yellow") <i>Leading Expert: Gr. 5 "yellow" to read "medium yellow"</i>
5.3 (e)	to read "...second largest surface area..."
Chars. 9, 10, 11 and 36	to be grouped together and moved after "color" characteristics (these characteristics relate to details and individual parts of the leaf blade: apex, base and margin)
Chars. 30, 31, 33, 34, 35	to replace "of" by "on" on characteristics headers (e.g. to read: "pattern <u>on</u> lower side", instead of "pattern of lower side")
8.1 (a)	to read "Observations <del>on the leaf</del> should be made on the upper side of fully expanded leaves from the middle third of the stem, <del>unless otherwise specified.</del> "

8.1 (c), (d)	to add headers (color distribution and pattern)
9.	to display references in alphabetical order (Hartlage first)
TQ 4.2	to invert order of presentation between 4.2.1 and 4.2.2

### Revisions

Field Bean ( <i>Vicia faba</i> L. var. <i>Equina</i> St.-Amans)	TG/8/7(proj.4)	Ms. Cheryl Turnbull (GB)	TWA	*
	No. of chars.: 23 No. of (*) chars.: 12	(Interested experts: AR, AU, CA, CO, CZ, DE, DK, ES, FR, GB, IT, MX, NL, PL, QZ, ZA, CLI, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/8/7(proj.4) and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Field Bean should be circulated to the TC for adoption by correspondence.

Cover page	coverage to include both subspecies ( <i>V. faba equina</i> and <i>V. faba minor</i> )
Char. 10	"Flower Standard: ..."
Char. 13	state 1 to read "absent or weak"
Ads. 8, 9	to delete index a, but keep arrow
9.	to format in italics all mentions to <i>Vicia faba</i>

Barley ( <i>Hordeum vulgare</i> L.)	TG/19/11(proj.3)	Ms. Beate Rücker (DE)	TWA	*
	No. of chars.: 29 No. of (*) chars.: 18	(Interested experts: AU, AR, CA, CZ, DK, ES, FI, FR, GB, JP, IT, NL, NZ, KR, PL, QZ, SK, CLI, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/19/11(proj.3) and made the recommendations presented in the table below.


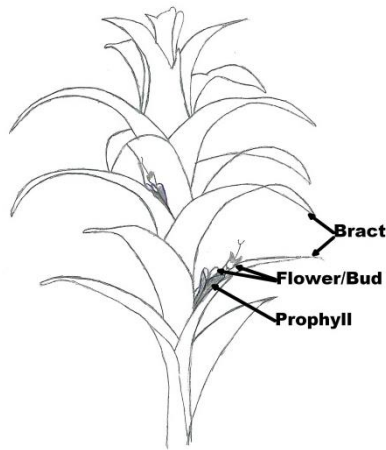
The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Barley should be circulated to the TC for adoption by correspondence.

name box	to read " <i>Hordeum vulgare</i> L."
Table of Chars.	- to delete states 1 and/or 9 in QN characteristics for which no example varieties are provided (Chars. 7, 10, 13, 19, 21, 22, 25, 29) - to delete all "(S) –", "(W) –"
Char. 3	to have states from "light" to "dark" (see TGP/14)
Char. 6	- state 7 to read "semi-reflexed" - state 9 to read "reflexed" (see TGP/14, Section 1.2)
Char. 29	to be placed before Char. 28 "Seasonal type"
Ad. 2	drawings should be placed in one line
8.2	to check whether to use complete scale from original publication <i>Leading Expert: The original scale does not mention all numbers with individual wording. The quotation is correct. Nevertheless it is of course a continuous plant development. If I remember correctly, the EDC commented because we use stage 51 and 80 in the table but don't give the numbers in 8.2. I suggest to follow the same approach as in TG wheat, i.e. to add 51 and 80 with hyphen (see 40, 70 and 80 in wheat).</i>
Annex 2.4.3	to correct sample unit ("micro" instead of "u" – [...Samples (10-20 ul)[...]])

Guzmania ( <i>Guzmania</i> Ruiz et Pav.)	TG/182/4(proj.4)	Mr. Henk de Greef (NL)	TWO	*
	No. of chars.: 42 No. of (*) chars.: 23	(Interested experts: BR, CN, JP, MX, MY, QZ)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/182/4(proj.4) and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for *Guzmania* should be circulated to the TC for adoption by correspondence.

2.3, 3.4.1, 3.4.1, 4.1.4, 4.2.2, 4.2.3, 4.2.4	to have veg. varieties first (most varieties are vegetatively propagated)
4.2.4	to read "...an acceptance probability of at least..."
5.3 (e)	to delete "with the following groups: Gr 1...Gr 6: purple"
Chars. 19, 20, 21	to be indicated as VG
Chars. 20, 38	to add (d)
8.1 (e)	to be deleted and move information to Ad.15 and Ad. 26
Ad. 1	to delete text
Ad. 15, 26	to add wording from 8.1 (e)
Ad. 35	to improve illustration by adding more than 1 flower per bract (to clarify what is below note 3) <i>provided by Leading Expert:</i> 
Ad. 36	to provide illustration <i>provided by Leading Expert:</i> 
TQ 1.	to add 1.3 for species

Agaricus ( <i>Agaricus bisporus</i> (Lange.) Sing.)	TG/259/2(proj.6)	Mr. Sergio Semon (QZ)	TWV	*
	No. of chars.: 26 No. of (*) chars.: 18	(Interested experts: FR, HU, JP, KR, ESA, ISF, Office)		

The TC-EDC, at its meeting held in Geneva, on March 26 and 27, 2018, considered document TG/259/2(proj.6) and made the recommendations presented in the table below.

The TC-EDC agreed that, subject to agreement by the Leading Expert on the recommendations provided, the Test Guidelines for Agaricus should be circulated to the TC for adoption by correspondence.

3.1.3	to delete "normally"
4.2.3	- to read "1 off-type is allowed" (delete "t") - to add sentence for a sample size of 120 fruit bodies with 3 off-types allowed
Char. 10	to check whether to read "Stipe: oxidation of cut surface". <i>Leading Expert: agreed with proposed new wording</i>
Char. 22	to check whether to read "Stipe: distance from base to annulus" <i>Leading Expert: agreed with proposed new wording</i>
Char. 26	to check whether state 2 to read "flattened" <i>Leading Expert: agreed with proposed new wording</i>
8.1	stage terminology (button, flat/fully spread) to be adjusted/harmonized with 8.3 <i>Leading Expert: to keep Chapter 8.1 unchanged and change Chapter 8.3 to read as follows:</i> "1 and 2 - Button stage, veil closed - Button stage, veil breaking 4 - Between button stage and fully open/flat stage, opening/gills visible 5 - Fully open/flat stage"
Ad. 1	to be deleted
Ad. 10	to change to "cutting surface" in the text, if change to Char. 10 is accepted
Ad. 13	- to delete photo for state 5 <i>Leading Expert: agreed</i> - to check whether to replace photos of states 3 and 7 with drawings <i>Leading Expert: to keep photos, since the explanation becomes more evident once the photo for state 5 is removed</i>
8.3	to delete life cycle of agaricus

Test Guidelines adopted at the fifty-fourth session of the Technical Committee

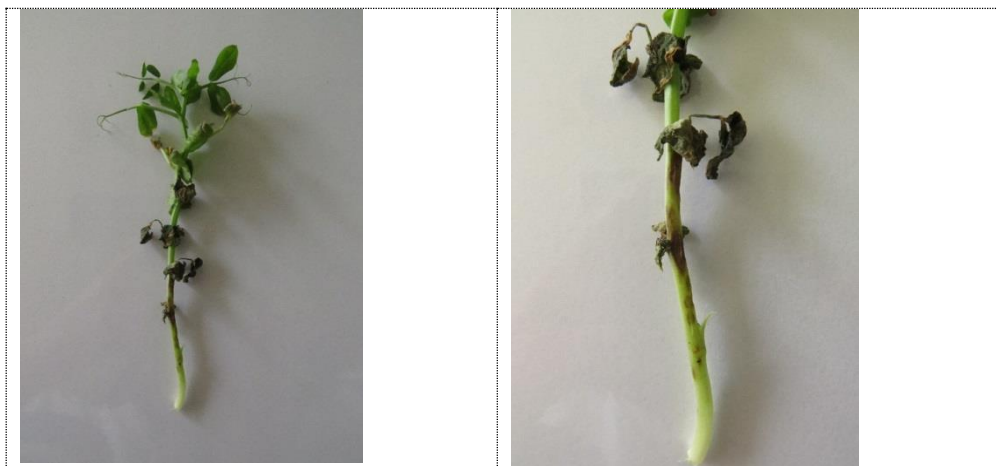
*Partial Revisions*

**TC-EDC/Oct18/5 Partial Revision of the Test Guidelines for Pea**

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TC-EDC/Oct18/5 and made the following recommendations:

Ad. 60	to magnify photos (Are the images large enough to see the detail required? If you zoom on the computer, they have very good resolution but are the details clear enough on the printed page?) <i>TWV: to read as follows (see also changes for Char. 60, Ad. 60, 11., below)</i> <i>(see document TWV/52/10 for pictures in original size)</i>
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Class 0: 	Class 1: 
Class 2: 	Details on Class 2: 
Class 3 : 	Details on Class 3: 



Ad. 60, 4. Footnotes 1, 2	to indicate e-mail and web address of the institutions instead of personal e-mail addresses <i>Leading Expert:</i> <a href="mailto:matref@geves.fr">matref@geves.fr</a> / <a href="http://www.geves.fr">www.geves.fr</a>																
Ad. 60, 5.	to read “ <i>Ascochyta pisi</i> race C strain 21A.13. (the test protocol has been validated <del>in a European CPVO co-funded project</del> <sup>3</sup> with this isolate)”																
Ad. 60, Footnote 3	to be moved to 9. Literature with standardized format of literature quotes.																
Ad. 60, 6.	to add “Gallais et Bannerot, 1992” to chapter 9. Literature																
Ad. 60	to delete 8.2, 8.3 and 8.5																
Ad. 60, 8.8	to clarify meaning of “4/8h” (does it mean “half hour”?) <i>Leading Expert:</i> <i>it means “between 4 and 8 hours”</i>																
Char. 60, Ad. 60, 11.	<p>- to provide clarification on type of expression: see explanation, doesn’t correspond to QL - the 4-notes scale in Ad. 60, 11.2 “observation scale” indicates QN) clarification by TWV needed - in order to avoid confusion, avoid the term notes <i>TWV: to replace “notes” with “classes”, to keep QL but delete illustration on Interpretation depending on controls</i> - to check whether to have separate characteristics for each strain (With this explanation it is very unlikely that notes absent/present are appropriate. In particular the photos and the drawing are confusing. Where is the clear gap between 1 and 9?) <i>TWV: to delete all other strains except the strain C as precised below:</i></p> <table border="1"> <tr> <td>Physiological race (Dr. Hubbeling)</td><td>C</td></tr> <tr> <td>Strains</td><td>Tézier 21A.13</td></tr> <tr> <td>Gullivert</td><td>S</td></tr> <tr> <td>Rondo</td><td>R</td></tr> <tr> <td>Finale</td><td>R</td></tr> <tr> <td>Kelvedon Wonder</td><td>S</td></tr> <tr> <td>Dark Skin Perfection</td><td>S</td></tr> <tr> <td>Arabal, Cobri, Starcovert, Sucovert, Vitalis</td><td>S</td></tr> </table> <p>R = resistant; S = susceptible</p> <p>- What means “necrosis at each level of the plant”? Clarification needed. <i>TWV: to read “necrosis on all parts of the plant”</i> <i>TC-EDC/Oct18: to add explanation that Classes 0 and 1 should be scored as note 9 (resistant) and Classes 2 and 3 are note 1 (susceptible)</i></p>	Physiological race (Dr. Hubbeling)	C	Strains	Tézier 21A.13	Gullivert	S	Rondo	R	Finale	R	Kelvedon Wonder	S	Dark Skin Perfection	S	Arabal, Cobri, Starcovert, Sucovert, Vitalis	S
Physiological race (Dr. Hubbeling)	C																
Strains	Tézier 21A.13																
Gullivert	S																
Rondo	R																
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Kelvedon Wonder	S																
Dark Skin Perfection	S																
Arabal, Cobri, Starcovert, Sucovert, Vitalis	S																



**TC-EDC/Oct18/6 Partial Revision of the Test Guidelines for Tomato**

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TC-EDC/Oct18/6 and made the following recommendations:

General remark	Control varieties in the DNA-test should also be indicated in the bio-test. Why are the control varieties not used as example varieties? <i>Leading Expert: The proposal can be improved by having the same set of varieties in DNA-test, bio-test and as example varieties. See Ad. 51 (ii) 4.2 and Ad. 58 (ii) 4.2.</i>
Chars. 51, 58	- to be kept as VG (VS not appropriate for DNA marker test, see TGP/9. In case of DNA markers, 20 plants are observed for uniformity. According to chapter 4.1.4 of TG/44/11 Rev., indication of VS is not appropriate.) - DNA marker test to be presented to the BMT to check whether method corresponds to TGP/15 <i>Leading Expert: I will participate in the BMT and the item will be discussed. I will report to the TWV accordingly</i> <i>The TWV noted that the method corresponds to TGP/15 and that document TGP/15 would be revised to include a relevant example</i>
Ad. 51 Ad. 58 (Ad. 48 was deleted- see paragraph 62 of this document)	to check whether to read "Resistance to race 0 (ex 1) and race 1 (ex 2) to be tested in a bio-assay (method i) or in a DNA marker test (method ii), if appropriate. Resistance to race 2 (ex 3) to be tested in a bio-assay (method i)." (to clarify whether it should be bio-essay only OR bio-essay in conjunction with DNA marker test where required. The gene-specific marker model anticipates a presence of a reliable link between presence of the marker and expression of the characteristic.)  <i>Leading Expert:</i> <i>Ad. 51</i> <i>To read "Resistance to strain 0, 1 and 2 to be tested in a bio-assay (method i) or in a DNA marker test (method ii), if appropriate." (and to delete last sentence on method of observation)</i> <i>Explanation: both a bio-assay and a DNA-marker test are always accepted. At Ad. 51 (ii) 8. is explained that a DNA marker test must confirm the declaration in the TQ, if not, a bio-assay should be performed.</i>  <i>Ad. 58</i> <i>To read "Resistance to strain 0 to be tested in a bio-assay (method i) or in a DNA marker test (method ii), if appropriate." (and to delete last sentence on method of observation)</i> <i>Explanation: both a bio-assay and a DNA-marker test are always accepted. At Ad. 58 (ii) 8. is explained that a DNA marker test must confirm the declaration in the TQ, if not, a bio-assay should be performed.</i>
Ad. 51 (ii) Ad. 58 (ii) (Ad. 48 was deleted- see paragraph 62 of this document)	- to clarify "often" (does not meet requirements for use of gene-specific marker model) (e.g. in Ad. 48 (ii) to confirm whether under (ii) DNA marker test there are always resistance alleles present in Gene I2 to both race 0 (ex 1) and race 1 (ex 2).) <i>Leading Expert:</i> <i>Ad. 51 (ii)</i> <i>To read "Resistance gene Tm2 gives resistance to ToMV. Gene Tm2 has two dominant resistance alleles: resistance allele Tm2 is always associated with resistance to strain 0 and 1, resistance allele Tm2<sup>2</sup> is always associated with resistance to strain 0, 1 and 2. The presence or absence of both resistance alleles can be detected by the co-dominant markers as described in Arens, P. et al (2010). Specific aspects:"</i>  <i>Ad. 58 (ii)</i> <i>To read "Dominant resistance gene Sw-5 is always associated with resistance to TSWV strain 0. The presence or absence of the resistance allele can be detected by the co-dominant marker as described in Dianese, E.C. et al (2010). Specific aspects: "</i>

Ad. 48 (ii) 4.2	<p>to check whether to add control varieties as example varieties in the table of characteristics  <i>Leading Expert: agreed</i>  <i>In order to be coherent, Ad. 51 (ii) 4.2 and Ad. 58 (ii) 4.2 should be modified as follows</i>  <b>Ad. 51 (ii) 4.2</b>  <i>homozygous allele for susceptibility tm2 present: Mobaci, Monalbo, Moneymaker</i>  <i>homozygous allele for resistance Tm2 present: Moperou</i>  <i>homozygous allele for resistance Tm2<sup>2</sup> present: Mocimor, Momor</i>  <b>51.1 strain 0, example varieties</b>  <i>absent [1] Monalbo, Moneymaker</i>  <i>present [9] Mobaci, Mocimor, Momor, Moperou</i>  <b>51.2 strain 1, example varieties</b>  <i>absent [1] Monalbo, Moneymaker</i>  <i>present [9] Mocimor, Momor, Moperou</i>  <b>51.3 strain 2, example varieties</b>  <i>absent [1] Monalbo, Moneymaker, Moperou</i>  <i>present [9] Mobaci, Mocimor, Momor</i></p> <p><b>Ad. 58 (ii) 4.2</b>  <i>homozygous allele 1 for susceptibility present: Moneymaker</i>  <i>homozygous allele 2 for susceptibility present: Mountain Magic</i>  <i>homozygous allele for resistance present: Montealto</i>  <i>heterozygous (allele for resistance and allele 1 for susceptibility present): Bodar</i>  <b>58, example varieties</b>  <i>absent [1] Montfavet H 63.5, Moneymaker, Mountain Magic</i>  <i>present [9] Bodar, Montealto</i>  <i>(Explanation: Lisboa is not available anymore)</i></p> <p><i>TWV: agreed, so to add extra example varieties to have controls and example varieties aligned between the characteristic and the method described in the Ad.</i></p>
Ad. 51 (i), 4. Footnotes	to indicate e-mail and web address of the institutions instead of personal e-mail addresses <i>Leading Expert: to use <a href="mailto:matref@geves.fr">matref@geves.fr</a> and <a href="mailto:resistencias@inia.es">resistencias@inia.es</a></i>
Ad. 51 (ii)	Arens, P. et al (2010) to be added to 9. Literature
Ad. 51 (ii) 2	to clarify that there are 3 alleles: 2 dominant ones for resistance and 1 susceptible <i>Leading Expert: Tm2/2<sup>2</sup> (with two resistance alleles Tm2 and Tm2<sup>2</sup> and one susceptibility allele tm2)</i>
Ad. 51 (ii) 3.2	to read "Assay 2 to check <del>susceptible or resistance</del> allele for susceptibility or resistance"
Ad. 51 (ii) 4.2	to clarify allelic basis for resistance <i>Leading Expert: See above, Ad. 51 (ii), where was asked for the meaning of 'often'. Not to repeat at Ad. 51 (ii) 4.2.</i>
Ad. 51 (ii) 8.	to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for</del> the variety <u>is resistant</u> (on another mechanism <u>like</u> gene Tm1)." <i>TC-EDC/Oct18: to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for</del> the variety <u>is resistant</u> (on <del>due to</del> another mechanism <u>like</u> gene Tm1)."</i>
Ad. 51 (ii)	table on test results (below 8.): to delete " <del>(occurs incidentally)</del> "
Ad. 58 (ii)	Dianese, E.C. et al (2010) to be added to 9. Literature
Ad. 58 (ii) 3.	to read <del>"Susceptible allele Allele for susceptibility"</del> <del>"Resistant allele Allele for resistance"</del>
Ad. 58 (ii) 8.	to read <del>"homozygous susceptible-susceptibility allele 1 present"</del> <del>"homozygous susceptible-susceptibility allele 2 present"</del> <del>"homozygous resistant resistance allele present."</del>
Ad. 58 (ii) 8.	to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for</del> the variety <u>is resistant</u> (on another mechanism)." <i>TC-EDC/Oct18: to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for</del> the variety <u>is resistant</u> (on <del>due to</del> another mechanism)."</i>

The TWV, at its fifty-first session, held in Roelofarendsveen, Netherlands, from July 3 to 7, 2017, noted that, after adoption of the partial revision of the Test Guidelines for Tomato (see document TC/53/27), a need for clarification was identified with regard to the explanation Ad. 57 “Resistance to Tomato yellow leaf curl virus (TYLCV)”, (i) agroinoculation method. The TWV agreed to consider this issue during the discussions of the subsequent partial revisions for the Test Guidelines of Tomato (see document TWV/51/10) and the Test Guidelines of Tomato Rootstocks (see document TWV/51/11) (see document TWV/51/16 “Report”, paragraph 95).

The TWV, at its fifty-second session, agreed the following with regard to the relevant items of the partial revision of Ad. 57 “Resistance to Tomato yellow leaf curl virus (TYLCV)” (see document TWV/52/20 “Report”, paragraph 65):

Ad. 57 (i) 9.5	to read “Glasshouse or climatic chamber with permission to confined use of LMO/GMO, confinement level 1 (N-1)”
Ad. 57 (i) 9.9	to read “Permission to confined use of LMO/GMO, at least level 1 (N-1)”
Ad. 57 (i) 9.5, 9.9	to add disclaimer as footnote to read “The transformed <i>Agrobacterium tumefaciens</i> is a living modified organism (LMO; or genetically modified organism (GMO)) and in many countries it requires to comply with Cartagena Protocol on Biosafety in case of transboundary movement, transit, handling and use that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health.”

#### TC-EDC/Oct18/7 Partial Revision of the Test Guidelines for Tomato Rootstocks

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TC-EDC/Oct18/7 and made the following recommendations:

Chars. 27, 31	<ul style="list-style-type: none"> <li>- to be kept as VG (VS not appropriate for DNA marker test, see TGP/9. In case of DNA markers, 20 plants are observed for uniformity. According to chapter 4.1.4 of TG/44/11 Rev., indication of VS is not appropriate.)</li> <li>- DNA marker test to be presented to the BMT to check whether method corresponds to TGP/15</li> </ul> <p><i>Leading Expert: I will participate in the BMT and the item will be discussed. I will report to the TWV accordingly</i></p> <p><i>The TWV noted that the method corresponds to TGP/15 and that document TGP/15 would be revised to include a relevant example</i></p>
Ads. 27, 31 (Ad. 24 was deleted- see paragraph 66 of this document)	<p>to clarify “often” (does not meet requirements for use of gene-specific marker model) (e.g. in Ad. 24 (ii) to confirm whether under (ii) DNA marker test there are always resistance alleles present in Gene I2 to both race 0 (ex 1) and race 1 (ex 2).)</p> <p><i>Leading Expert:</i></p> <p><i>Ad. 27 (ii)</i></p> <p><i>To read “Resistance gene Tm2 gives resistance to ToMV. Gene Tm2 has two dominant resistance alleles: resistance allele Tm2 is always associated with resistance to strain 0 and 1, resistance allele Tm2<sup>2</sup> is always associated with resistance to strain 0, 1 and 2. The presence or absence of both resistance alleles can be detected by the co-dominant markers as described in Arens, P. et al (2010). Specific aspects: “</i></p> <p><i>Ad. 31 (ii)</i></p> <p><i>To read “Dominant resistance gene Sw-5 is always associated with resistance to TSWV strain 0. The presence or absence of the resistance allele can be detected by the co-dominant marker as described in Dianese, E.C. et al (2010). Specific aspects: ”</i></p>

Ad. 24 (ii) 4.2	<p>to check whether to add control varieties as example varieties in the table of characteristics  <i>Leading Expert:</i> agreed  <i>In order to be coherent, Ad. 27 (ii) 4.2 and Ad. 31 (ii) 4.2 should be modified as follows:</i>  Ad. 27 (ii) 4.2  homozygous allele for susceptibility <i>tm2</i> present: (<i>Solanum lycopersicum</i>) Moneymaker  homozygous allele for resistance <i>Tm2</i> present: (<i>Solanum lycopersicum</i>) Moperou  homozygous allele for resistance <i>Tm2<sup>2</sup></i> present: Emperador  27.1 strain 0, example varieties  absent [1]  present [9] Emperador  27.2 strain 1, example varieties  absent [1]  present [9] Emperador  27.3 strain 2, example varieties  absent [1]  present [9] Emperador</p> <p>Ad. 31 (ii) 4.2  homozygous allele 1 for susceptibility present: Emperador  homozygous allele 2 for susceptibility present: (<i>Solanum lycopersicum</i>) Mountain Magic  homozygous allele for resistance present: Enpower  31, example varieties  absent [1] Emperador  present [9] Enpower  (Explanation: Big Power is not available anymore)</p>
Ad. 27 (i), 4. Footnotes	to indicate e-mail and web address of the institutions instead of personal e-mail addresses <i>Leading Expert:</i> to use <a href="mailto:matref@geves.fr">matref@geves.fr</a> and <a href="mailto:resistencias@inia.es">resistencias@inia.es</a>
Ad. 27 (ii)	Arens, P. et al (2010) to be added to 9. Literature
Ad. 27 (ii) 3.2	to read "Assay 2 to check <del>susceptible or resistance</del> allele for susceptibility or resistance"
Ad. 27 (ii) 4.2	Are the control varieties homozygous for <i>Tm2</i> and <i>Tm2<sup>2</sup></i> ? <i>Leading Expert:</i> See the updated lists of control varieties and example varieties
Ad. 27 (ii) 8.	to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for</del> the variety <u>is resistant</u> (on another mechanism <u>like</u> gene <i>Tm1</i> )." TC-EDC/Oct18: to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for</del> the variety <u>is resistant</u> (on due to another mechanism <u>like</u> gene <i>Tm1</i> )."
Ad. 27 (ii)	table on test results (below 8.): to delete "(occurs incidentally)"
Ad. 30 (i)	in footnotes 10, 11: to check whether to read "IHSM-UMA-CSIC" <i>Leading Expert:</i> For both footnote 10 and 11 it is to read "IHSM-UMA-CSIC" (mentioned e-mail addresses are correct)
Ad. 30 (i) (8.5)	to check wording of disclaimer. The use of a GMO as part of requirements for DUS examination must be worded according to internationally accepted terminology/Conventions concerning the transboundary movement of Living Modified Organisms and release of GMOs. Should be worded by relevant experts with experience implementing international regulations. <i>Leading Expert:</i> proposal for the disclaimer to read "The transformed <i>Agrobacterium tumefaciens</i> is a living modified organism (LMO; or genetically modified organism (GMO)) and in many countries it requires to comply with Cartagena Protocol on Biosafety in case of transboundary movement, transit, handling and use that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health." TWV: to change OGM at 9.5 and 9.9 into LMO/GMO.
Ad. 31	to add explanation below title of Ad. 31 to read the same as other Ad. <i>Leading Expert:</i> "Resistance to be tested in a bio-assay (method i) or in a DNA marker test (method ii), if appropriate."
Ad. 31 (ii)	Dianese, E.C. et al (2010) to be added to 9. Literature
Ad. 31 (ii) 3.	to read <del>"Susceptible allele Allele for susceptibility"</del> <del>"Resistant allele Allele for resistance"</del>

Ad. 31 (ii) 8.	to read "homozygous <del>susceptible-susceptibility</del> allele 1 present homozygous <del>susceptible-susceptibility</del> allele 2 present homozygous <del>resistant resistance</del> allele present."
Ad. 31 (ii) 8.	to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether the resistance is absent or present for the variety is resistant on another mechanism." <i>TC-EDC/Oct18: to read "In case the DNA marker test result does not confirm the declaration in the TQ, a bio-assay should be performed to observe whether <del>the resistance is absent or present for the variety is resistant (on due to another mechanism).</del>"</i>

## New Test Guidelines

### General

Table of contents	to correct page numbering
Ads.	to delete index/legend if only one indication
TQ 4.1	to invert order of 4.1.2 and 4.1.3 ("mutation" and "discovery and development")

Brown Mustard ( <i>Brassica juncea</i> (L.) Czern.)	TG/BRASS_JUN(proj.6), TC-EDC/Oct18/3	Mr. Takayuki Nishikawa (JP)	TWV	*
	No. of chars.: 33 No. of (*) chars.: 7	(Interested experts: TWA, CA, CZ, DE, FR, KR, NL, PL, QZ, ZA, CropLife, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered documents TG/BRASS\_JUN(proj.6) and TC-EDC/Oct18/3 and made the recommendations presented in the table below:

2.3	- to read "drilled plots" (see 3.4.2) - to clarify whether the two different seed samples are alternatives (add "or"?) <i>Leading Expert: Yes, please add "or" between the rows.</i>
3.4.2	to indicate 200 plants (as in proj.5, to be corrected)

5.3

</

Ad. 3	to replace “measurement” by “observation”
Ad. 5	to delete reference to ratio from the grid (in legend)
Ad. 11	See proposal under 5.3. “... In case of <u>divided leaves</u> <del>Type 2 leaf</del> , the shape of <u>the</u> terminal lobe ...” To replace Type 1 by lobed and type 2 by divided. - to review wording for sentence: Type 2 leaf, the shape of terminal lobes is similar to shape of near other lobes) <i>TWV: to delete this sentence</i> - to read the following sentence “the lateral lobes are the lobes excluding the terminal lobe (No 2,3,4.... in following figures)
Ad. 16	to check whether to be deleted (Drawing not useful. Reference to type 2 redundant (see proposal under 5.3)). <i>TWV: to delete Ad. 16</i>
Ad. 17	see proposal under 5.3. to read “Observations should be made on the distal part of the leaves, <del>excluding type 2.</del> ”
Ad. 18	to delete sentence
Ad. 28	to be deleted, if the correct stage of development is indicated (see comment on Char. 28)
Ad. 29	to check whether to read “Observations on the silique should be made on the middle third of the inflorescence of the main stem.”
Ad. 33	to read “The tendency to form inflorescences in the year of sowing should be observed in late summer sown trials. The observation of the growth stage reached should be made in autumn, when the development stagnates (proportion of plants before bud stage, in bud stage, in flowering stage, in stage of silique formation).” - to check whether to delete reference to season (“autumn” and “summer”) <i>TWV: agreed to keep it as it is</i> - to check whether to add “Time of flowering (under long day conditions)” as a new characteristic (observation of flowering date cannot be considered as alternative method. Both characteristics would need different scales) <i>TWV: agreed to keep it as it is</i>
8.3	- other names of the example varieties should become 8.4 - Principal growth stage 5: to correct spelling of “Opening”
9.	last reference to read “Meier, U.:...” and moved up according to alphabetical order
TQ	See comments on 5.3. The TQ 5. should be amended according to proposed grouping characteristics. TQ 7.3 (b) should be deleted.

Quinoa ( <i>Chenopodium quinoa</i> Willd.)	TG/CHENO(proj.6)	Mr. Erik Lawaetz (DK)	TWA	*
	No. of chars.: 20 No. of (*) chars.: 10	(Interested experts: AR, AU, BR, CA, CL, CO, ES, FR, IT, MX, NL, NZ, QZ, ZA, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TG/CHENO(proj.6) and made the recommendations presented in the table below:

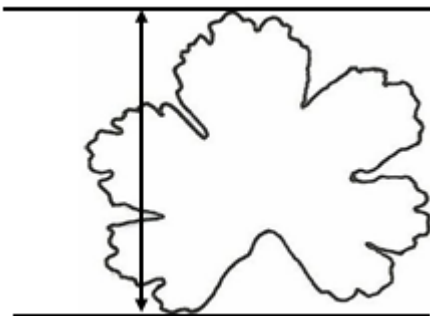
Cover page	to add “Quinoa” as German alternative name and deleted the other alternative names
4.2.2	to read “These Test Guidelines have been developed for the examination of self-pollinated varieties...”
Char. 14	- to read “Time of maturity” - to be moved before Char. 13
Ad. 1	- 8. to read “Measure the height of the foam.” - delete duplicated reference to Koziol at the bottom - spell Koziol in small letters at the top
Ad. 3	to be deleted
8.3	to add author of illustration

Hardy Geranium ( <i>Geranium</i> L.)	TG/GERAN(proj.4)	Ms. Elizabeth Scott (GB)	TWO	*
	No. of chars.: 48 No. of (*) chars.: 28	(Interested experts: CA, DE, GB, JP, KR, MX, NL, NZ, QZ, CIOPORA)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TG/GERAN(proj.4) and made the recommendations presented in the table below.

5.3 (c)	<ul style="list-style-type: none"> <li>- to check whether to delete Gr. 5 ("tinged" is not a main color, is it a secondary color?) and to check whether to add Char. 9 on secondary color as grouping characteristic</li> <li>- to clarify meaning of "tinged"</li> </ul> <p><i>Leading Expert: There are varieties with leaves that are slightly pigmented with brown or purple over the entire surface of the leaf, which is green underneath this pigment. The appearance is of a one colored leaf. Would it be acceptable to rename the state of expression "purplish or brownish green"</i></p>
Table of Chars.	<p>General comment: to check whether MG is appropriate (char. 19, 27, 28, 31)</p> <p><i>Leading Expert: Yes it is a method we would use for these characteristics so the MG needs to be kept.</i></p>
Char. 7	to add VG and MS (same as for length and width)
Char. 9	<ul style="list-style-type: none"> <li>- to check whether to be added as grouping char. to 5.3</li> </ul> <p><i>Leading Expert: No this is not suitable as a grouping characteristic. I would not consider the expression to be reliable enough.</i></p> <ul style="list-style-type: none"> <li>- to review order of colors according to TGP/14 (green/yellow; purple/brown)</li> </ul> <p><i>Leading Expert: agreed</i></p> <ul style="list-style-type: none"> <li>- to add example variety "Springtime" to note 6</li> </ul>
Chars. 10, 29, 30	to add example varieties indicated in TQ 5.5, 5.6, 5.7
Char. 12	to review order of colors according to TGP/14 (green/yellow; purple/brown)
Char. 15	to delete repeated table header under Char. 15
Char. 30	<p>to clarify whether state 2 to read "double" or "semi-double" and use accordingly throughout TG (currently semi-double and double are used)</p> <p><i>Leading Expert: the term double should be used throughout the document</i></p>
Char. 32	to read "Only varieties with flower type: single: ..."
Char. 37	to add VG and MS (same as for length and width)
8.1 (a)	to become a standalone paragraph at the beginning of Chapter 8.
8.1 (b)	to read "Observations <del>on the leaf</del> should be made on the upper side of fully expanded leaves from the middle third of a flowering stem, excluding the inflorescence." (The are no characteristics which should be observed on the lower side.)
8.1 (c)	to read <del>"When observing the color of the leaves any Any color effect caused by the leaf pubescence should be ignored. The main color..."</del>
8.1 (f)	to read "In double flowered varieties, observations should be made on the outer whorl of petals."
8.1 (g)	<ul style="list-style-type: none"> <li>- to read <del>"All petals colors to be observed"</del> Observations should be made on the inner surface. The color of the veins <del>are should be excluded from this observation</del>. The main color ..."</li> <li>- the "main area" should be replaced by the "main color"</li> </ul>



Ad. 5	<ul style="list-style-type: none"> <li>- indication of arrows to be improved (to add two lines on top and bottom of leaf to indicate length)</li> <li>- to remove label "a" from illustration and keep sentence without label</li> </ul> <p><i>provided by Leading Expert:</i></p>  <p>- to read "To observe the leaf length from ..."</p>
Ad 19	<ul style="list-style-type: none"> <li>- to remove label "a" from illustration and keep sentence without label</li> <li>- to read "To be observed ..."</li> </ul>
Ad. 22	<ul style="list-style-type: none"> <li>- to insert a space between the diagrams of characteristic 22 and the title for 23</li> <li>- to check whether to reverse order of states (overlapping to strongly diverging)</li> </ul> <p><i>Leading Expert: unsure why the states should need reversing, the example for relative position in TGP/14 is in the same order used in this characteristic. I would prefer this to remain as it is.</i></p>
Ad. 47 and 48	to read "The characteristic should only be observed when the conspicuousness of veins (characteristic 46) is weak or higher. Only the conspicuous part of the veins should be considered."
TQ 1.	<ul style="list-style-type: none"> <li>- to add botanical name and common name in relevant boxes</li> <li>- to add 1.3 for species name</li> </ul>
TQ 1.2	to replace "Crane's Bill" by "Hardy Geranium"
TQ 4.2.1	to be deleted and add new option "Seed" after "Vegetative propagation"
TQ 5.8	to add example variety "Philippe Vapelle" to note 9
TQ 6	<p>to change example (the characteristic proposed may not be suitable to illustrate difference with most similar variety – grouping characteristic)</p> <p><i>Leading Expert: I suggest the use of the following, if this is appropriate:</i></p> <p><i>Petal: conspicuousness of veins</i></p> <p><i>similar variety expression note 3</i></p> <p><i>candidate variety expression note 5</i></p>
9.	<p>to add number of pages for references used, if appropriate</p> <p><i>Leading Expert: all literature quoted are monographs for this genus so there is no need to limit them to selected pages.</i></p>

Black Walnut	TG/JUGLA(proj.4)	Ms. Victoria Colombo (ES)	TWF	
	No. of chars.: 20 No. of (*) chars.: 14	(Interested experts: CN, KR, QZ, ZA)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TG/JUGLA(proj.4) and made the recommendations presented in the table below.

The TC-EDC agreed that the Test Guidelines for Black Walnut should be referred back to the TWF in order to clarify the technical issues raised.

Cover page	<ul style="list-style-type: none"> <li>- to add "<i>Juglans xintermedia</i> Jacques" as synonym to "<i>Juglans nigra</i> x <i>Juglans regia</i>"</li> <li>- to check whether "<i>J. x paradox</i>" as hybrid binomial for "<i>Juglans hindsii</i> x <i>J. regia</i>"</li> </ul>
2.3	to read "5 trees (one-year-old grafts). The rootstock to be used is the progeny Ng209xRa or any other variety specified by the authority"
3.3.3	to be moved to 3.1
4.2.3	to be deleted

Char. 4	- state 1 to read "absent or rudimentary" - state 2 to read "fully developed"
Char. 5	to delete example variety "Eurowalnut B03"
Char. 11	to read "Catkin: presence of fully developed catkins"
Char. 13	to check wording and use same approach as in Walnut (lateral/ventral view) <i>Leading Expert: yes, it should read "ventral view" as in the Test Guidelines for Walnut</i>
Char. 15	to read "Nut: shape of apex <del>perpendicular to suture</del> " (see char. 14 and 8.2)
Ad. 2	to delete last sentence (covered by growth stage 2)
Ad. 3	to read "... High            17 < number of leaflets ≤ 21 Very high    21 > number of leaflets"
Ad. 6	to read "Female flower is considered conspicuous <u>if flowers are present</u> at stage D <sub>f</sub> (see 8.3). Female flower is considered non conspicuous when the flowers <u>appear only</u> <del>are observed</del> when the leaves are fully developed."
Ad. 11	to read "Observations on the presence of fully developed catkins should be made between stages B <sub>m</sub> and D <sub>m</sub> (see 8.3)." <i>Leading Expert: to keep it as it is</i> <i>TC-EDC/Oct18: What means fully developed, interaction between fully developed and growth stages/ phenological stages?</i>
Ad. 12	- to check whether to be observed at stage C <sub>m</sub> (B <sub>m</sub> too early?) - to check whether Chars 11 and 12 can be observed at the same time <i>Leading Expert: It is not that it has to be observed at stage B<sub>m</sub> or C<sub>m</sub>, it is in the interval from B<sub>m</sub> to C<sub>m</sub>. Ad 11: The expert explains that catkins sometimes can be seen badly developed at B<sub>m</sub>, but some other times it is necessary to wait until C<sub>m</sub> or even D<sub>m</sub> to observe them (when this happens, they usually fall very early). So then, the proposal for Ad. 12 is: "The shape of catkins should be observed between B<sub>m</sub> and C<sub>m</sub> stages."</i>
Ad. 13	relative width scale is upside down (invert "narrow" and "broad")
Ad. 15	to add "Observation should be made facing the suture."
Ads. 16, 17, 18	to read "Time of ... is reached when ..."
Ad. 19	to be deleted
Ad. 20	to read "Time of ... is reached when ..."
8.3	clarification needed on growth stages (age of trees for observation, does not correspond to growth stages) (to check whether they are needed, information covered in 3.1.3?) <i>Leading Expert: Point 3.1.3 only refers to the fruit and the expert considers that it is necessary to indicate when to begin to look at a characteristic to be representative. The age of flowering is very variable between varieties so, the expert consider it is good to indicate it.</i> <i>But as it is difficult to homogenize the intervals, if needed, Point 8.3 could be removed.</i> <i>In the English version of the guidelines should say only "Phenological stages".</i> <i>Point 8.3.3.in the English "and" should be said "or".</i> <i>TC-EDC/Oct18: to check whether growth stages (1), (2), (3) to be moved to Chapter 8.1 (no growth stages, time of observation) and to clarify when observations are made</i>

Castor Bean ( <i>Ricinus communis</i> L.)	TG/RICIN(proj.5)	Mr. Adriaan de Villiers (ZA)	TWA	*
	No. of chars.: 39 No. of (*) chars.: 22	(Interested experts: AR, AU, BG, BR, FR, IT, MX, QZ, UA, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TG/RICIN(proj.5) and made the recommendations presented in the table below:

Cover page	- to delete "Palma Christi" and "Wunderbaum" as German alternative name - to delete "Palmi-christi" as English alternative name
4.2.2	to correct spelling of "seed-propagated"
Chars. 2, 3	to replace "immature leaf" with "young leaf" (see explanation (a))
8.1 (b)	to be moved to Chapter 8.2 and become Ad. 6
8.1 (c)	to read "Observations should be made on fully developed leaves from the middle third of the plant."

Ad. 21	definition of gynomonoecious to read “A plant where female and hermaphrodite flowers occur in separate inflorescences on the same plant.”
Ad. 23	indication b to read “Female flowers / fruits”
Ad. 39	to spell “sponge like” (in two words)
8.3	5 to read “Inflorescence emergence” (small e)
9.	country code for United Kingdom to be indicated as GB

### Revisions

Oats ( <i>Avena sativa</i> L. & <i>Avena nuda</i> L.)	TG/20/11(Proj.5)	Mr. Antonio Escolano (ES)	TWA	*
	No. of chars.: 22 No. of (*) chars.: 10	(Interested experts: AR, AT, AU, BR, CA, CN, CO, CZ, DE, DK, ES, FI, FR, GB, HU, IT, JP, KR, NL, NZ, PL, QZ, RO, SK, US, UY, ZA, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered document TG/20/11(proj.5) and made the recommendations presented in the table below:

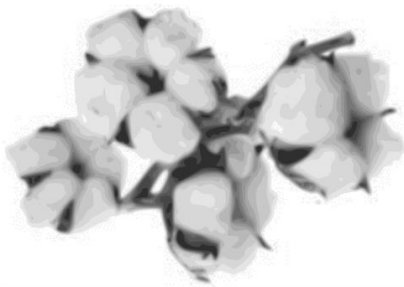
Cover page	to have <i>Avena sativa</i> L. before <i>Avena nuda</i> L. (throughout TG)
1.	to read “ <i>Avena nuda</i> L.” (add full stop)
6.4	(s) and (w) to be indicated in small letters
Char. 18	to reinstate Ad. 18 (see proj.4)
Ad. 4	to align illustrations with notes in F, G, S versions

Cotton ( <i>Gossypium</i> L.)	TG/88/7(proj.4) TC-EDC/Oct18/2	Mr. Jesús Mérida (ES)	TWA	*
	No. of chars.: 35 No. of (*) chars.: 13	(Interested experts: AR, AU, BR, CN, CO, ES, JP, KE, MX, QZ, TZ, US, VN, ZA, CLI, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered documents TG88/7(proj.4) and TC-EDC/Oct18/2 and made the recommendations presented in the table below:

4.2.4	to specify to which type of varieties this paragraph applies to (to check whether 1% population standard applies to all varieties or specific type of varieties) <i>Leading Expert: for all types of varieties, therefore, paragraph 4.2.3 should be excluded.</i>
Char. 6	to check whether to delete “clearly” <i>Leading Expert: Don’t delete because if it’s not clearly below or clearly above must be considered at the same level.</i>
Char. 23	“Tall” should be “tall”
Char. 28	to read “100 seed weight”
Char. 30 to 34	to clarify how the characteristics are assessed <i>Leading Expert: The characteristics “Fiber: length (30), strength (31), elongation (32), fineness (micronaire) (33), length uniformity (34)” are evaluated on samples of lint, without seeds. To see explanation Ad.29</i> <i>TWA: explanation to read</i> <i>“One sample of 500 grams of raw cotton is collected from each repetition. The sample is collected along the plot from capsules located in 1st and 2nd position of the lower fruit branches.</i> <i>“The sample of lint, without seed, is analyzed for length, resistance, elongation and fineness.”</i>
Char. 32	- to add explanation to define the characteristic (meaning of elongation) - to indicate how it is observed <i>Leading Expert: Elongation expresses the ability of the fiber to stretch before breaking</i> <i>TWA: agreed to add explanation as provided by Leading Expert</i>

Char. 34	<ul style="list-style-type: none"> <li>- to review wording of characteristic header (fiber length uniformity)</li> <li>- to add explanation to define the characteristic (meaning of length uniformity)</li> <li>- to indicate how it is observed</li> </ul> <p><i>Leading Expert: According to Classification of Upland Cotton:</i>  <i>Length uniformity is the ratio between the mean length and the upperhalf mean length of the fibers, expressed as a percentage. If all of the fibers in the bale were the same length, the mean length and the upperhalf mean length would be the same, and the uniformity would be 100 percent. However, because of natural variation in the length of cotton fibers, length uniformity will always be less than 100 percent.</i>  <i>TWA: to delete Char. 34</i></p>
8.1 (c)	<p>to check whether to be formatted with bullet points at the same alignment for both "Standard Test Methods" as follows:</p> <ul style="list-style-type: none"> <li>• Standard Test Methods for Measurement of Cotton Fibres by High Volume Instruments (HVI) (Motion Control Fiber Information System). Designation D-4604-95</li> <li>• Standard Test Methods for Measurement of Physical Properties of Cotton Fibers by High Volume Instruments (HVI). Designation D-5867-95</li> </ul> <p>"Established by the American Society for Testing and Materials (ASTM)"  <i>TWA: agreed</i></p>
Ad. 1	<ul style="list-style-type: none"> <li>- to improve illustrations (to clarify what clustering is; is clustered the appropriate term?) (density of flowers, distance between flowers?)</li> <li>- is it really PQ or QN (illustration looks like QN)</li> </ul> <p><i>Leading Expert: to be indicated as QN</i>  <i>TWA: agreed with new illustrations and to add explanation "Clustered refers to distance between flowers." New illustrations:</i></p>



1  
clustered



2  
semi-clustered



3  
non-clustered

Ad. 6	<p>to clearly display stigma (magnify plant part to be shown)</p> <p><i>Leading Expert: To see new illustrations</i>  <i>TWA: agreed with new illustrations</i></p>
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1  
clearly below



2  
same level



3  
clearly above

Ad. 28	"... on a sample of delinted seed."
Ad. 29	<p>to improve explanation (percentage of what?)</p> <p><i>Leading Expert: The procedure to be followed is as follows:</i></p> <ul style="list-style-type: none"> <li>- One sample of 500 grams of raw cotton is collected from each repetition. The sample is collected along the plot from capsules located in 1st and 2nd position of the lower fruit branches.</li> <li>- The lint is separated from the seeds. The content of lint expresses as the percentage of lint in relation to raw cotton.</li> <li>- The sample of lint, without seed, is sent to the laboratory for the realization of the analysis of length, resistance, elongation, fineness and uniformity.</li> </ul> <p><i>TWA: explanation to read:</i></p> <p>"One sample of 500 grams of raw cotton is collected from each repetition. The sample is collected along the plot from capsules located in 1st and 2nd position of the lower fruit branches.</p> <p>"The lint is separated from the seeds. The content of lint is expressed as the percentage of lint in relation to raw cotton."</p>
8.3	<p>to add literature reference</p> <p><i>Leading Expert: Meier U., 1997: Growth stages of mono- and dicotyledonous plants: BBCH-Monograph. Wien Federal Biological Research Center for Agriculture and Forestry, Blackwell Wissenschafts-Verlag, Berlin, DE.</i></p>
9.	<p>First two references should be amended according the usual way to present literature with all relevant information.</p> <p><i>Leading Expert: We propose the literature as in the CVPVO protocol.</i></p> <p>9. LITERATURE</p> <p>American Society for Testing and Materials (ASTM) (1995): Standard Test.</p> <p>Methods for Measurement of Cotton Fibres by High Volume Instruments (HVI). (Motion Control Fiber Information System) (Designation: D4604-95).</p> <p>American Society for Testing and Materials (ASTM) (1995), Standard Test Methods for Measurement of Physical Properties of Cotton Fibers by High Volume Instruments (Designation: D5867-95).</p> <p>Cotton", Ed. R.J. Kohel and C.F. Lewis, no. 24 in the series "Agronomy", American Society of Agronomy, Inc., Crop Science Society of America, Inc., Soil Science Society of America, Inc., Publishers Madison, Wisconsin, 1984, US.</p> <p>Cotton. Origin, History, Technology and Production." Ed C.W. Smith and J.T. Cothren. Wiley Series in Crop Science. John Wiley &amp; Sons, Inc.. 1999. US.</p> <p>Manual de Identificación de Variedades de Algodón, Ministerio de Agricultura, Pesca y Alimentación, Secretaria General de Agricultura y Alimentación, 1999, ES.</p> <p>Meier U., 1997: Growth stages of mono- and dicotyledonous plants: BBCH-Monograph. Wien Federal Biological Research Center for Agriculture and Forestry, Blackwell Wissenschafts-Verlag, Berlin, DE.</p>
TQ 1.	to add box for species as 1.3

Broccoli ( <i>Brassica oleracea</i> L. var. <i>italica</i> Plenck)	TG/151/5(proj.3) TC-EDC/Oct18/2	Ms. Marian van Leeuwen (NL)	TWV	*
	No. of chars.: 26 No. of (*) chars.: 12	(Interested experts: CZ, ES, FR, GB, IT, JP, PL, QZ, RO, CropLife, ESA, ISF)		

The TC-EDC, at its meeting held in Geneva, in October 2018, considered documents TG88/7(proj.4) and TC-EDC/Oct18/2 and made the recommendations presented in the table below:

Table of chars.	<ul style="list-style-type: none"> <li>- to check whether to add growth stages throughout table of characteristics (1 = before harvest maturity, 2 = at harvest maturity)</li> <li>- to complete table of characteristics with indication of type of variety for each example variety (autumn and spring)</li> </ul> <p><i>TWV:</i></p> <ul style="list-style-type: none"> <li>- agreed to have three growth stages:</li> <li>1 = just before harvest maturity, (Chars. 1 to 12)</li> <li>2 = at harvest maturity (Chars. 13 to 23)</li> <li>3 = at full flowering (Chars. 24 onwards)</li> <li>- 8.1 (a) to read "Observations should be made on fully developed leaves in the middle third of the plant."</li> <li>- to delete (b)</li> <li>- to indicate s (summer and autumn) and o (overwintering) varieties:</li> </ul> <p>The varieties that are o: Burbank, Ember, Cresta, Cardinal, Early White Sprouting, Red Fire, Claret, Red Arrow, Bonarda, Early Purple Sprouting, Mendocino, Broccoli di Natale</p> <p>All other example varieties are s</p> <ul style="list-style-type: none"> <li>- to add the following to Chapter 6.5 "Legend":</li> <li>(s): summer and autumn varieties</li> <li>(o): overwintering varieties</li> <li>- Example variety "Esquire" should be replaced by "Red Fire" because "Esquire" is an old denomination proposal for the variety "Red Fire". (Characteristic 4)</li> <li>- Example variety "Di Albenga precoce" should be deleted because this appears to be a green cauliflower (Characteristic 8)</li> <li>- In Characteristic 22, the example variety "Marathon" (note 7) should be deleted</li> </ul>
Char. 1	to check if (a) is correct (observation on fully developed leaves at the middle level of the plant?) <i>TWV: See above</i>
Chars. 14, 16, 20, 22	"Only Calabrese type varieties" should be indicated with underline
Char. 19	"Only varieties with Head: color: whitish, green, grey green or blue green" should be indicated with underline.
Chars. 23, 24	to combine chars. 23 and 24 with both types of example varieties (see general comment on table of chars.) <i>Leading Expert: provided combined characteristic</i>

23.	(*)	QN	MG	(+)	(c), (d)		
		Time of harvest maturity	Époque de maturité de récolte	Zeitpunkt der Erntereife	Época de madurez para la cosecha		
		very early	très précoce	sehr früh	muy temprana	Sibsey (s)	1
		early	précoce	früh	temprana	Monflor (s), Red Fire (o)	3
		medium	moyenne	mittel	media	Tinman (s), Mendocino (o)	5
		late	tardive	spät	tardía	Marathon (s), Burbank (o)	7
		very late	très tardive	sehr spät	muy tardía	Hallmark (s)	9

Char. 25	to be indicated as VG only
8.1	<p>It is proposed to use growth stages (e.g. 1 – just before harvest maturity, 2 – harvest maturity).</p> <p>(a) could be modified as follows : “Observations should be made on fully developed leaves at the middle of the plant”.</p> <p>(b) should be replaced by stage 2 <i>TWV: agreed, see above answer regarding the table of characteristics</i></p>
8.1 (c), (d)	move to 8.2 (only chars 23 and 24)
Ad. 25	<ul style="list-style-type: none"> <li>- replace “stay stucked to stamen” with “sticks to stamen”</li> <li>- to delete second sentence under field trial (“The observation on the presence of pollen...”</li> <li>- to delete sentences “In case of a field trial, type of observation is VG. In case of a DNA marker test, type of observation is MS.”</li> </ul>
8.3	<ul style="list-style-type: none"> <li>- to add title (Types of Broccoli)</li> <li>- “Sprouting type: <del>Only multiple</del> Multiple heads ...”</li> </ul>

[Annex III follows]

ANNEX III

PROPOSAL BY THE ENLARGED EDITORIAL COMMITTEE (TC-EDC) TO AMEND  
DOCUMENT TGP/15/2 DRAFT 1 "GUIDANCE ON THE USE OF BIOCHEMICAL AND MOLECULAR  
MARKERS IN THE EXAMINATION OF DISTINCTNESS, UNIFORMITY AND STABILITY (DUS)"  
NEW MODEL: "GENETIC SELECTION OF SIMILAR VARIETIES FOR THE FIRST GROWING CYCLE"

Genetic Selection of Similar Varieties for the First Growing Cycle

1. The Enlarged Editorial Committee (TC-EDC) at its meeting held in Geneva, on October 28, 2018, considered document TC-EDC/Oct18/8 "Genetic selection of similar varieties for the first growing cycle" and the revised text for inclusion in document TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)" to be put forward for approval by the Technical Committee, at its fifty-fourth session, to be held in Geneva on October 29 and 30, 2018.

2. The TC-EDC agreed to recommend the TC to consider the revised text as follows:

*New Section 2.3 "Genetic Selection of Similar Varieties for the First Growing Cycle"*

2.3 Genetic Selection of Similar Varieties for the First Growing Cycle (see Annex III)

2.3.1 This approach involves a step to check for genetic similarity before the first growing cycle.

2.3.2 In cases where the minimum duration of tests is normally two growing cycles, a selection of similar varieties in the variety collection for comparison with candidate varieties in the first growing cycle is made according to genetic similarity. As a next step, the information provided by the applicant in the Technical Questionnaire (TQ) is used to see if some of the genetically similar varieties do not have to be compared in a growing trial because of differences in DUS characteristics.

2.3.3 On the basis of the variety description of DUS characteristics produced in the first growing cycle, a further search is made of varieties in the variety collection to identify any similar varieties that were not compared in the first growing cycle and which should be compared with the candidate variety in the second growing cycle.

2.3.4 Annex III to this document "Genetic Selection of Similar Varieties for the First Growing Cycle" provides an example of the genetic selection of similar varieties for the first growing cycle.

ANNEX III "MODEL: GENETIC SELECTION OF SIMILAR VARIETIES FOR THE FIRST GROWING CYCLE"

EXAMPLE: FRENCH BEAN

*prepared by an expert from the Netherlands*

1. Introduction

1.1 This approach involves a step to check for genetic similarity before the first growing cycle.

1.2 In cases where the minimum duration of tests is normally two growing cycles, a selection of similar varieties in the variety collection for comparison with candidate varieties in the first growing cycle is made according to genetic similarity. As a next step, the information provided by the applicant in the Technical Questionnaire (TQ) is used to see if some of the genetically similar varieties do not have to be compared in a growing trial because of differences in DUS characteristics.

1.3 On the basis of the variety description of DUS characteristics produced in the first growing cycle, a further search is made of varieties in the variety collection to identify any similar varieties that were not compared in the first growing cycle and which should be compared with the candidate variety in the second growing cycle.



## 2. Procedure

### *Determine genetic similarity*

- 2.1 The DNA-profile of the candidate variety is produced as soon as plant material is received.
- 2.2 The DNA-profile is compared with the profiles of all varieties in the variety collection and genetically similar varieties are identified.

### *Technical Questionnaire information*

- 2.3 The information provided by the applicant in the Technical Questionnaire (TQ) is then used to see if there are clear differences in DUS characteristics from some of the genetically similar varieties so that they do not need to be compared with candidate varieties in a growing trial.

### *Field trial*

#### First growing cycle:

- 2.4 The candidate and the genetically similar varieties selected by the procedure above are grown in the same field trial. A complete description of the DUS characteristics of the candidate variety is produced and is compared to the descriptions of all varieties in the variety collection using a database containing descriptions produced at the same location in previous years.

- 2.5 Possible outcomes:

If the candidate variety is not distinct from the genetically similar varieties on the basis of DUS characteristics, the test will be continued for another growing cycle.

In any case, the description of the candidate variety produced in the first growing cycle is compared to the descriptions of the varieties in the variety collection using a database containing descriptions produced at the same location.

(a) If the candidate variety is found to be distinct from all varieties grown in the first growing cycle and to all other varieties in the variety collection at the end of the first growing cycle and it fulfills the uniformity and stability requirements the DUS test may be concluded after the first growing cycle.

(b) In all other cases a second growing cycle is performed.

#### Second growing cycle

- 2.6 In the second growing cycle, the candidate variety is grown with the all varieties in the variety collection from which it was not found to be distinct at the end of the first growing cycle.

- 2.7 At the end of the second growing cycle, an assessment of DUS is made. If it is not possible to reach a decision on DUS at the end of the second growing cycle, a further growing cycle may be conducted.

[End of Annex III and of document]