UPOV
International Union for the Protection of New Varieties of Plants

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Technical Working Party for Vegetables **TWV/51/16**

Fifty-First Session
Roelofarendsveen, Netherlands, July 3 to 7, 2017

Original: English
Date: July 7, 2017

REPORT

Adopted by the Technical Working Party for Vegetables (TWV)

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Opening of the session

1. The Technical Working Party for Vegetables (TWV) held its fifty-first session in Roelofarendsveen, Netherlands, from July 3 to 7, 2017. The list of participants is reproduced in Annex I to this report.

2. The session was opened by Ms. Swenja Tams (Germany), Chairperson of the TWV, who welcomed the participants and thanked the Netherlands for hosting the TWV session.

3. The TWV was welcomed by Mr. Marien Valstar, Senior Policy Officer, Seeds and Plant Propagation Material, Ministry of Economic Affairs.

4. The TWV received a presentation by Mr. John van Ruiten, Director, Naktuinbouw, on Plant Variety Protection in the Netherlands and the work of Naktuinbouw. A copy of the presentation is provided in Annex II to this report.

Adoption of the agenda

5. The TWV adopted the agenda as presented in document TWV/51/1 Rev.

Short Reports on Developments in Plant Variety Protection

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

6. The TWV noted the information on developments in plant variety protection from members and observers provided in document TWV/51/3 Prov. The TWV noted that reports submitted to the Office of the Union after June 27, 2017, would be included in the final version of document TWV/51/3.

7. The TWV noted the 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”, reproduced in document TWP/1/19.

8. The TWV 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. The TWV recommended the TC to consider investigating the following ideas:

- to discuss more technical and practical problems (e.g. practical exercise in the field or blind tests with same varieties grown in different DUS stations) to encourage the participation of experts who would be willing to join the TWV to share problems and solutions with other members;
- to shorten the guidance and technical documentation (e.g. TGP documents) to make it more understandable for new comers, and to invite TWPs to envisage the production of a “light” version of all UPOV documents/ collection (e.g. key summary) that could be presented during preparatory workshops;

- to encourage the mentoring between experienced experts and new comers, in order to facilitate their understanding of existing guidance and vocabulary;
- to organize, as far as possible, TWPs sessions in conjunction or back-to-back to other international meetings, such as OECD or ISTA, as experts involved in DUS matters are often involved in other plant variety matters related to seeds;
- to encourage interested experts to investigate support programs to facilitate their participation (e.g. resource partners, international cooperation funds, funds in trust…);
- to explain on other national, regional or international events, trainings or seminars what is being discussed in TWPs and the interest for experts all over the world to join the TWPs (i.e. as members or observers);
- to develop communication tools (PowerPoint or short videos) explaining the work of the TWPs including testimonials of experts attending TWPs (new comers and experienced experts) to be used in writing or on the UPOV Website to raise awareness on the technical work of UPOV and its benefits;
- to encourage an entrustment program of DUS examiners or DUS offices to increase harmonization and collaboration.

9. 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.

10. The TWV noted that not only for new members the participation is important but also for existing members.

(b) Reports on developments within UPOV

11. The TWV received a presentation from the Office of the Union on latest developments within UPOV, a copy of which is provided in document TWV/51/13 Rev.

Organization of the UPOV sessions

12. The TWV considered document TWP/1/24.

13. The TWV noted that the Council had decided:

(a) to organize a single set of sessions of the bodies that meet in Geneva from 2018, in the period of October/November;

(b) that the Enlarged Editorial Committee (TC-EDC) would meet twice a year, once in the period March/April and once in conjunction with the TC sessions later in the year;

(c) that Test Guidelines that could not be prepared in time for adoption by the TC at its session could be adopted by correspondence on the basis of the recommendations by the TC-EDC;

(d) to adopt the following contingency measures for 2018:

(i) for Test Guidelines proposed for adoption in 2018, to use a procedure for adoption by correspondence as follows:

- Draft Test Guidelines would be prepared as agreed by the TWPs and circulated with the recommendations of the TC-EDC;
- In the absence of any objections the Test Guidelines would be adopted;
- In the case of objections, the objections would be referred to the relevant TWP for consideration at their 2018 session, and the Test Guidelines considered for adoption by the TC at its fifty-fourth session, in 2018;
- TC-EDC to meet on March 26 and 27, 2018, and in conjunction with the TC at its fifty-fourth session, in 2018, if necessary.

(ii) for TGP documents, to invite the TC-EDC to consolidate comments made by the TWPs at their sessions in 2017 and, in the absence of consensus between the

TWPs, formulate proposals for further consideration by the TWPs at their sessions in 2018;

(iii) all other matters to be considered at the fifty-fourth session of the TC in 2018 in the normal way.

14. The TWV noted that the TC had agreed to propose that the meetings of the BMT be held on an annual basis.

15. The TWV 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.

16. The TWV noted that the TC had agreed that the preparatory workshops in 2018 should be organized on the Monday/Tuesday of the TWPs sessions to encourage participation by all TWP participants.

17. The TWV noted that from 2017, for certain documents, the TWPs would be invited to consider the same document on a particular topic, using a common document code.

TGP documents

18. The TWV considered documents TWP/1/1 Rev., TWP/1/9, TWP/1/11, TWP/1/12, TWP/1/13, TWP/1/15, TWP/1/17 Rev., TWP/1/18, and TWV/51/15.

19. The TWV noted the revisions to documents TGP/7, TGP/8 and TGP/14 agreed by the TC, as set out in document TWP/1/1 Rev., paragraphs 6 to 14 and Annexes I and II.

20. The TWV noted the proposals for future revisions of TGP documents to be discussed by the TWPs at their sessions in 2017 which would be dealt with under separate documents.

21. The TWV noted the program for the development of TGP documents, as set out in document TWP/1/1 Rev., Annex III.

TGP/5: Section 1: Model Administrative Agreement for International Cooperation in the Testing of Varieties

Confidentiality of molecular information

22. The TWV considered document TWP/1/9.

23. The TWV considered the proposed guidance on confidentiality of molecular information for inclusion in document TGP/5, Section 1, as set out in document TWP/1/9, paragraph 4 (reproduced below).

"4. It is proposed that Articles 4 and 6 of document TGP/5, Section 1 be revised to read as follows (proposed insertion of text indicated by highlighting and underlining):

'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 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.'"

24. The TWV 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.”

25. The TWV recalled the decision by the TC at its fifty-third session (reproduced below) (see document TC/53/31 “Report” paragraphs 180 and 182), and invited the TC to clarify its view in relation to inviting members to make molecular information available for inclusion in publicly available databases (e.g. GENIE), and on the other hand requesting to review existing guidance to increase the confidentiality of molecular information:

> “180. The TC agreed to request the Office of the Union to collect data on existing databases with morphological and/or molecular data. The TC agreed that the information collected should be included in the GENIE database and requested the Office of the Union to plan for the modification of the GENIE database according to available resources.”
>
> […]
>
> “182. The TC agreed that the guidance on plant material provided in document UPOV/TGP/5, Section 1 would be a suitable basis also for molecular data and requested the Office of the Union to propose guidance on confidentiality of molecular information for inclusion in document UPOV/TGP/5, Section 1, on that basis.”

TGP/7: Development of Test Guidelines

Duration of DUS tests

26. The TWV considered document TWP/1/11.

27. The TWV 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.
>
> “ASW 2(b):
>
> ‘3. Method of Examination
>
> ‘3.1 Number of Growing Cycles
>
> ‘The ~~minimum~~ duration of tests should [normally]/[typically] be two independent growing cycles.
>
> ‘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.’ ”

28. The TWV agreed with the TWA that the term “normally” was preferred and should be used throughout the guidance in ASW 2.

29. 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.

30. 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.

Characteristics which only apply to certain varieties

31. The TWV considered document TWP/1/12.

32. 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.

33. 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.

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

The Combined-Over-Years Uniformity Criterion (COYU)

34. The TWV noted the report on developments concerning the improved method of calculation of the Combined-Over-Years Uniformity Criterion (COYU), as set out in document TWP/1/13. The TWV noted that the expert from the United Kingdom would report on the progress of development of probability levels for the improved method of calculation of COYU to the TWC, at its thirty-fifth session.

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

35. The TWV considered document TWP/1/15.

36. The TWV considered the updated version of the “Comparison of methods used for producing variety descriptions: Results of the practical exercise” provided by experts from France, as set out in document TWP/1/15, Annex II.

37. The TWV noted that the TC had agreed to invite the experts from France to check the highlighted values in the table in document TWP/1/15, Annex II “Comparison of methods used for producing variety descriptions: results of the practical exercise”, paragraph 6, for possible data inconsistency. The TWV noted that the expert from France planned to provide further information to the TWC, at its thirty-fifth session.

38. The TWV noted that the TC agreed to invite participants in the practical exercise to provide a short description of their methods to transform measurements into notes and provide examples when these methods might be used, such as for particular characteristics, types of propagation or different situations, on the basis of the short descriptions provided by France and the United Kingdom, as set out in document TWP/1/15, Annexes III to V.

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

39. The TWV considered document TWP/1/17 Rev., and welcomed the participation by electronic means of Mr. Adrian Roberts, Chairperson of the TWC.

40. The TWV considered the draft guidance presented in Annexes I and II of document TWP/1/17 Rev. as amended by the TWPs, at their sessions in 2016, for inclusion in a future revision of document TGP/10.

41. The TWV considered information provided by members of the Union on the criteria for selecting the most suitable approach for the assessment of off-types on different types of crops.

42. The TWV agreed with the TWA to propose that the new sentence introduced in the draft guidance, Annex I, 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."

43. The TWV agreed to propose a further clarification to the new sentence introduced in the draft guidance, Annex I, for all approaches to read as follows:

"It is important to identify whether differences in number of off-types between growing cycles were not due to ~~biological~~ environmental reasons or sampling variation."

44. The TWV agreed to propose to modify the sentence for Approach 1 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.

45. The TWV agreed to recall that in the vegetable sector, Approach 1 was the most commonly used.

46. The TWV noted that a proposal for revision of guidance in document TGP/8/2: Part II: Section 8: "The method of uniformity assessment on the basis of off-types", would be considered in document TWP/1/1 Rev. "TGP Documents".

47. The TWV received a presentation on "Assessing Uniformity by Off-types on the Basis of More than One Growing Cycle: examples from NL" by an expert from the Netherlands. A copy of the presentation was provided in the Annex to document TWV/51/5.

TGP/14: Glossary of Terms Used in UPOV Documents

Illustrations for shape and ratio characteristics

48. The TWV considered document TWP/1/18.

49. 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.

Guidance for drafters of Test Guidelines

50. The TWV considered document TWP/1/8.

51. The TWV noted the items resolved in Version 1.0 of the web-based TG template, as set out in document TWP/1/8, paragraph 18.

52. The TWV noted that a general revision of the software code was underway to eliminate remaining reported malfunctioning issues and to stabilize the system.

53. The TWV noted the issues to be considered for inclusion in Version 2 of the web-based TG Template, as set out in document TWP/1/8, paragraph 21.

54. The TWV noted the issues on the web-based TG template agreed by the TC, at its fifty-third session, as set out in document TWP/1/8, paragraphs 25 to 27 (reproduced below).

> "25. The TC agreed that UPOV codes and botanical names in draft Test Guidelines should, in general, be displayed in alphabetical order. However, the TC agreed that the web-based TG Template should allow the Leading Expert to change the order, if appropriate.
>
> *"Order of methods of observation*
>
> "26. The TC agreed that the methods of observation of a characteristic should continue to be presented in alphabetical order, thereby avoiding any indication of order of preference.
>
> *"Subsequent explanations covering several characteristics*
>
> "27. The TC agreed that characteristics with the same explanation could be displayed in Chapter 8.2 "Explanations for individual characteristics" with subsequent explanations being cross-referenced to the first characteristic displaying the appropriate information, as follows (see document TC/53/31 "Report", paragraphs 107 to 110):
>
> e.g.: Ad. 10 "[explanation text/illustration]"
>
> Ad. 11 "See Ad. 10"
>
> […]
>
> Ad. 50 "See Ad. 10".

55. The TWV considered whether explanations covering all characteristics should be displayed before Chapter 8.1 "Explanations covering several characteristics" without a note in the Table of Chars, as set out in document TWP/1/8, paragraphs 28 and 29, and agreed that explanations covering all characteristics were not commonly used in Test Guidelines for vegetable.

56. The TWV noted that the following issues were currently addressed on the web-based TG template for inclusion during the second semester of 2017:

> Issues currently being addressed
>
> 30. Solutions for the following issues are currently being developed for inclusion on the web-based TG template during the second semester of 2017:
>
> - to specify information for more than one method of propagation in Chapter 3.4 "Test Design";
> - addition of new SW paragraph at Chapter 4.2 "Uniformity" to specify type of propagation considered in the Test Guidelines;
> - example variety master list: addition of a pop up window with related characteristics before confirming the deletion of a variety from the master list of example varieties;
> - improved functionality to move characteristics up and down in the table of characteristics (drag and drop);
> - addition of characteristics not contained in the table of characteristics at the end of the Technical Questionnaire (TQ);
> - separation of color characteristics in TQ to be indicated as RHS Colour Chart reference or color group;
> - addition of a possibility to edit the scope of the Test Guidelines on the cover page (e.g. for excluding species and UPOV Codes).

57. The TWV noted that training on the use of the web-based TG template would be offered to the TWPs at their sessions in 2017, during the preparatory workshops of the sessions and during discussions on agenda item "guidance for drafters of Test Guidelines".

58. The TWV received a demonstration by the Office of the Union on the use of the web-based TG Template for Leading and Interested Experts.

59. The TWV noted that feedback and questions could be provided directly to the Office of the Union via the web-based TG template using “Feedback” button on the dashboard.

60. The TWV requested the Office to check the possibility to give access to the database containing adopted characteristics also outside the web-based TG Template, for example on the TG drafters’ webpage.

61. The TWV appreciated the improvement of Version 1 and agreed on the importance of Version 2 of the web-based TG Template for the creation of national Test Guidelines.

Procedure for partial revision of UPOV Test Guidelines

62. The TWV considered document TWP/1/20.

63. The TWV noted the procedures for notification of new characteristics or states expression in document TGP/5, Section 10: “Notification of additional characteristics and states of expression”.

64. The TWV noted that the TC had encouraged authorities to notify the use of new characteristics or states expression using the procedure established in document TGP/5, Section 10.

65. The TWV noted the clarification given by the TC and the flexibility to use additional characteristics at the national or regional level before considering a revision of Test Guidelines. The TWV agreed on the importance to notify the use of new characteristics to all members of UPOV using the template provided in the Annex to document TWP/1/20. However, the TWV expressed some concerns about a possible lack of harmonization at the international level, due to this procedure.

Variety denominations

66. The TWV considered document TWP/1/6.

67. The TWV noted the developments concerning a possible revision of document UPOV/INF/12 “Explanatory Notes on Variety Denominations under the UPOV Convention”, as set out in document TWP/1/6, paragraphs 5 to 12.

68. The TWV noted the developments concerning a UPOV similarity search tool for variety denomination purposes, as set out in document TWP/1/6, paragraphs 13 to 20.

69. The TWV noted the developments concerning the possible expansion of the content of the PLUTO Database, as set out in document TWP/1/6, paragraphs 21 to 26.

70. The TWV noted the developments concerning non-acceptable terms, as set out in document TWP/1/6, paragraphs 27 to 32.

71. The TWV noted the agenda of the fourth meeting of the Working Group on Variety Denominations (WG-DEN), as set out in document TWP/1/6, and noted that the meeting would be held in Geneva, on October 27, 2017.

72. The TWV noted the request by the representatives from ISF, to include in the questionnaire to be issued by the Office of the Union on whether harmonization on variety denominations was required, a question on commercial impact, as proposed below:

- To authorities: Have you experienced that an applicant had to change its variety denomination, which was approved by your authority, whereby the variety had not been granted/listed yet, because it was not approved by another member state after your approval?

- To companies: Have you experienced having to change your variety denomination, which was already approved by one authority, whereby the variety had not been granted/listed yet, because it was not approved by another member state? If yes, was this denomination already in use on the market?

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

73. The TWV considered document TWP/1/22.

74. The TWV noted that further developments on calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD was used would be reported to the TWC at its thirty-fifth session, to be held in 2017.

Statistical methods for visually observed characteristics

75. The TWV considered document TWP/1/23.

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

77. The TWV noted that the TC, at its fifty-third session, had agreed that the appropriate naming and drafting of guidance on the method developed by experts from Denmark and Poland should be considered once further experience had been acquired and software had been made available to facilitate its use in DUS examination.

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

79. The TWV welcomed any further explanation and guidance provided by other TWPs on statistical methods for visually observed characteristics, to be reported at the next session of the TWV.

Image analysis

80. The TWV considered document TWP/1/10 and noted the invitation of China for experts to join its project for the improvement of software for image analysis and the plans of the TWC to discuss image analysis during its thirty-fifth session.

Management of variety collections

81. The TWV considered document TWP/1/14 and noted the developments reported to the TWC, at its thirty-fourth session in 2016, and the TC, at its fifty-third session in 2017, on management of variety collections.

Software for statistical analysis

82. The TWV considered document TWP/1/16 and noted the developments concerning software for statistical analysis in DUS examination, as set out in document TWP/1/16, paragraphs 3 to 7.

New issues arising for DUS examination

83. The TWV considered document TWV/51/12.

84. The TWV received a presentation on the “Use of disease and insect resistance characteristics in DUS examination” by an expert from France. A copy of the presentation is provided in Annex I to document TWV/51/12 Add..

85. 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.

86. The TWV received a presentation on the "Improvement of the assessment of the Squash resistance to 3 virus and CORKYRES project" by an expert from France. A copy of the presentation is provided in Annex II to document TWV/51/12 Add..

87. 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.

88. 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.

89. The TWV agreed on the importance to report on current work or projects done on disease resistance tests among expert 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.

Number of growing cycles in DUS examination

90. The TWV considered documents TWP/1/21 and TWV/51/14.

91. The TWV noted the presentations made to the TWPs at their sessions in 2016, simulating the impact of using different numbers of growing cycles on DUS decisions using actual data, as set out in the Annexes to document TWP/1/21.

92. The TWV noted that the TC had agreed that the number of growing cycles for DUS examination should be the minimum necessary for a robust DUS decision and the establishment of a reliable variety description.

93. The TWV noted that the TC had agreed that it was not appropriate to generalize that ornamental varieties should be examined in a single growing trial while other types of crops should be examined in two growing cycles. It noted further that the TC had agreed that the typical number of growing cycles should be established on a crop-by-crop basis.

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

Test Guidelines requiring approval of the TWV by correspondence

94. On the basis of the recommendations by the Enlarged Editorial Committee (TC-EDC), at its meetings on January 11 and 12, 2017, and April 3 and 4, 2017, the TC adopted the Test Guidelines for Cassava, Lettuce, Leaf Chicory and Witloof Chicory on the basis of the following issues having been approved by correspondence by the TWV (see Circular E-17/096) (see document TC/53/31 "Report", Annex II):

*Cassava (*Manihot esculenta *Crantz.)*

4.2	to be numbered 4.2.1 and add new paragraph as 4.2.2 (see document TGP/7/5): "These Test Guidelines have been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed." *to be approved by TWA and TWV by correspondence*

(see documents TG/CASSAV(proj.8) and TC/53/31)

*Lettuce (*Lactuca sativa *L.)*

4.2	to be numbered 4.2.1 and add new paragraph as 4.2.2 (see document TGP/7/5): "These Test Guidelines have been developed for the examination of seed propagated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed."
Char. 17	to check whether a 1, 2, 3 scale or 1, 2, 3, 4, 5 scale would be better? Leading Expert: *We propose to change to a 1-5 scale with 1 very thin, 2 thin, 3 medium, 4 thick, 5 very thick. We propose to add "Stefano" as example variety for note 1 (very thin).*

(see documents TG/13/11(proj.5) and TC/53/31)

*Leaf Chicory (*Cichorium intybus *L. var.* foliosum *Hegi)*

4.2	to be numbered 4.2.1 and add new paragraph as 4.2.2 (see document TGP/7/5): "These Test Guidelines have been developed for the examination of cross-pollinated varieties, hybrids and seed propagated inbred lines. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed."
Char. 16	to check wording of states of expression (state 3 doesn't correspond to illustration in TGP/14) and provide better illustrations or check whether to delete characteristic Leading Expert: to delete Characteristic 17

(see documents TG/154/4(proj.6) and TC/53/31)

*Witloof Chicory (*Cichorium intybus *L.)*

4.2	to be numbered 4.2.1 and add new paragraph as 4.2.2 (see document TGP/7/5): "These Test Guidelines have been developed for the examination of cross-pollinated varieties, hybrids and seed propagated inbred lines. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species", Section 4.5 "Testing Uniformity" should be followed."
Char. 7	- to check whether to be indicated as QL - to review example varieties to be coherent in Chars. 7 and 8 *Leading Expert: yes, to be indicated as QL and have the following example varieties:* **Leaf: color** only green — Excellence, Focus, Genie, Janus — 1 green and red — Festive — 2 only red — Carla, Redoria — 3
Char. 8	to check whether to be observed on varieties with red and green color only. (char. then to read "Only varieties….") *Leading Expert: The French Witloof chicory DUS examiner is in favor to evaluate the general intensity of color, whatever the color is (only green, green and red, only red).Up to now, the observations made on a green and red leaf show that the 2 colors have the same intensity, therefore there is no need to precise the type of color.* *The proposition is to keep it as it is.* *To have the following example varieties* **Leaf: intensity of color** light — 3 medium — Excellence, Festive, Janus, Redoria — 5 dark — Carla, Focus, Genie — 7

<table>
<tr><td>Char. 31</td><td>- to check whether to be indicated as QL
Leading Expert: yes, to be indicated as QL
- example varieties to read as follows:

Head: color of leaf blade
only yellow Flexine, Harmonie, Perfo, Takine 1
yellow and red 2
only red Festive, Selkis 3</td></tr>
<tr><td>Char. 32</td><td>- to check whether only applies for red and yellow varieties (char. then to read “Only varieties….”)
Leading Expert: The French Witloof chicory DUS examiner is in favor to evaluate the general intensity of color, whatever the color is (only green, green and red, only red).Up to now, the observations made on a green and red leaf show that the 2 colors have the same intensity, therefore there is no need to precise the type of color.
The proposition is to keep it as it is.
- example varieties to read as follows:

Head: intensity of color of leaf blade
light Elegance, Perfo 3
medium Baccara, Harmonie, Ombline, Selkis 5
dark Abellis, Ecrine, Festive, Takine 7</td></tr>
</table>

(see documents TG/173/4(proj.6) and TC/53/31)

*Tomato (*Solanum lycopersicum *L.)*

95. The TWV 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 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).

96. 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 Geneticaly Modified Organism and requires to comply with legislation concerning the protection of the environment, human and animal health.”

97. The TWV agreed that the partial revision of the Test Guidelines for Tomato adopted by the TC in 2017 would not be published on the UPOV website, but would be superseeded by the new partial revision to be submitted to the TC at its session in 2018.

Discussion on draft Test Guidelines

98. The TWV appreciated the opportunity, in conjunction with discussion of Test Guidelines, to visit field trials for Turnip, Brown Mustard, Tomato, tomato rootstock and broccoli and also the opportunity to see mushroom and Swiss chard samples brought to the meeting room.

99. 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.

*Agaricus (*Agaricus bisporus *(Lange.) Sing.*) *(Revision)*

100. The subgroup discussed document TG/2591/2(proj.5), presented by Mr. Sergio Semon (European Union), and agreed the following:

3.1.3	to read “The growing cycle is normally considered to be from spawn inoculation until the end of the first flush.”
3.4.2	to read “Each test should be designed to result in a total of at least 120 fruit bodies, which should be divided between at least 3 replicates.”
3.4.3	to be deleted

4.1.4	to read “Unless otherwise indicated, for the purposes of distinctness, all observations on single fruit bodies should be made on 30 fruit bodies or parts of fruit bodies taken from each of 30 fruit bodies and any other observations made on all fruit bodies in the test, disregarding any off-type fruit bodies.”
4.2	to add new Standard Wording paragraph as 4.2.2 (see document TGP/7/5): “These Test Guidelines have been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 “Guidance for new types and species”.
4.2.2	to read “For the assessment of uniformity of vegetatively propagated varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 30 fruit bodies, 1 off-type is allowed.”
5.3	to add Characteristics 3 and 13
Char. 4	to be deleted
Char. 6	to have states “small” to “large”
Char. 8	to keep characteristic unchanged as PQ with 3 states
Char. 19	growth stage to be indicated as 2
Char. 22	to delete growth stage 4 and not to indicate any growth stage for this characteristic
Char. 27	to be indicated as QN
Ad. 11	to read “The stipes are cut transversally in the middle. Oxidation of the cutting edge (observed visually as a yellowish to pink to red discoloration of the cut surface) should be observed 2 to 10 minutes after cutting.”
9.	to add reference to Singer (1986) (see Ad. 21)
TQ 5	to add Characteristic 3

*Artichoke, Cardoon (*Cynara cardunculus *L.) (Partial revision: addition of new characteristic for male sterility)*

101. The subgroup discussed document TWV/51/4, presented by Mr. David Calvache (Spain) and agreed the following:

New Char. 41	to delete underline for male sterility (same in TQ 5)
Ad. 41	to replace current wording below illustrations with the following wording: “Check presence of pollen on stamen: (a) if pollen on stamen is present then male sterility is absent; (b) if pollen on stamen is absent then male sterility is present.”

**Brown Mustard (*Brassica juncea *(L.) Czern.)*

102. The subgroup discussed document TG/BRASS_JUN(proj.5), presented by Mr. Takayuki Nishikawa (Japan), and agreed the following:

4.2	to add new Standard Wording paragraph as 4.2.2 (see document TGP/7/5): “These Test Guidelines have been developed for the examination of seed-propagated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 “Guidance for new types and species”.
4.2.3	to read “For the assessment of uniformity of seed-propagated varieties, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants, 3 off-types are allowed.”
5.3 (b)	to be deleted
5.3 table	to be updated according to changes to characteristics
Char. 1	- to be indicated as QL - state 2 to read “blackish brown” - to delete state 3 “black”
Char. 2	- to add example variety “Jarangi” for state 1 - to add example variety “Jarami” for state 2 - to check whether to add more example varieties
Char. 6	to add “Energy” and “Vitasso “as example varieties for state 1

Char. 7	- to delete (*) - to add “Terraplus” as example varieties for state 5 - to add “Vitasso” as example varieties for state 7
Char. 8	- to add “Terraplus” as example varieties for state 5 - to add “Vitasso” as example varieties for state 7
Char. 9	to delete example variety “Kigarashina” from state 9
Char. 11	- to read “Only varieties with leaf: type: type1 or 2: Leaf blade: size of terminal lobe” - to replace current example varieties for state 3 with “Akariasu”
Char. 12	to delete example variety “Etamine” from state 7
Char. 15	to delete current example variety “Minaret” for state 7 with “Terratop”
Chars. 16, 17, 18	to delete “(excluding type)” and move to 8.2
Char. 21	to check to which state to add “Kekkyu Takana” as example variety
Char. 22, 23	to check to which state to add “Unzen Kekkyu Takana” as example variety
Char. 25	to read “Main stem: shape”
Char. 26	to delete example vaiety “Katsuona” from state 5 and replace it with “Terraplus”
Char. 27	to check whether to add example varieties
Char. 31	to add example variety “Obatakana” for state 7
Char. 32	to add example variety “Minaret” for state 7
Char. 33	- to correct spelling of tendency and inflorescences - to move example varieties “Energy, Terrafit, Terratop” from state 7 to state 9 - to check whether to add example varieties
8.1 (a), (c), (d), (e)	to be moved to 8.2
8.1 (b), (e)	to add char. numbers to illustrations
Ad. 16	- to add “Observations should be made excluding type 2.” - to correct states according to Char. 16
Ad. 17	- to add “Observations should be made on the distal part of the leaves, excluding type 2.” - to correct states according to Char. 17
Ad. 18	to add “Observations should be made excluding type 2.”
Ad. 25	to read “Observations on the shape of the main stem should be made after removing the leaves, excluding lateral stems which are located at the base of main stem.” -to delete left hand photos and only photos without leaves
TQ 1.2	to deleted “India mustard” (appears twice)
TQ 4.1.1 (a), (b)	to delete request for indication of parent varieties
TQ 5	to complete condensed scales to full scales
TQ 5.4	to be deleted

**Calabrese, Sprouting Broccoli (Revision)*

103. The subgroup discussed document TG/151/5(proj.2), presented by Ms. Marian van Leeuwen (Netherlands), and agreed the following:

Cover page	to check and provide appropriate botanical name and alternative names of the Test Guidelines (only *Brassica oleracea* L.? and add Broccoli group?) and to update GENIE database accordingly
4.2	to add new Standard Wording paragraph as 4.2.2 (see document TGP/7/5): “These Test Guidelines have been developed for the examination of cross-pollinated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 “Guidance for new types and species”.
Char. 2	to add “Ember” as example variety for state 5
Char. 13	- to be indicated as QN - to read “Only Calabrese type varieties: Head: level of main head in relation to plant height”
Chars. 23, 24	to delete example varieties
Char. 27	to be deleted
Ad. 2	to be updated (see Char. 2)

Ad. 16	to be presented without grid
Ads. 23, 24	to read "In broccoli, Time of harvest maturity is strongly influenced by the temperature and the season of growing. Nevertheless, at the same place and for the same growing season, Time of harvest maturity is an important characteristic for the assessment of distinctness of varieties. For those reasons, no example varieties are provided in the Test Guidelines and the variety description should always state the place and the season of growing."
TQ 4.2.1	- to check whether to add three-way hybrids - to delete (d)
TQ 5	to complete condensed scales to full scales

*Pea (*Pisum sativum *L.) (Partial revision: disease resistance explanations for* Fusarium oxysporum *f. sp.* pisi *race 1 (Ad. 51),* Ascochyta pisi *race C (Ad. 60))*

104. The subgroup discussed document TWV/51/6, presented by Mr. Sergio Semon (European Union) and agreed that the proposal for a partial revision of Characteristic 60 "Resistance to *Ascochyta pisi* Race C" and its explanation Ad. 60 be submitted for adoption by the TC at its fifty-fourth session, to be held in Geneva on October 29 and 30, 2018.

105. The TWV also agreed that the proposed partial revision of Characteristic 58 "Resistance to *Fusarium oxysporum* f. sp. *pisi"* and its explanation Ad. 58 needed further clarification and therefore should be reconsidered by the TWV at its fifty-second session in 2018.

**Pepino (*Solanum muricatum *Aiton)*

106. The subgroup discussed document TG/PEPIN(proj.3), presented by Mr. Jun Araseki (Japan), and agreed the following:

4.2	to add new Standard Wording paragraph as 4.2.2 (see document TGP/7/5): "These Test Guidelines have been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species".
Table of Chars.	to spell example varieties in small letters, not in capitals
Char. 6	to check whether add more example varieties for simple and compound leaves
Char. 8	to check whether to add more example varieties
Char. 9	- to check whether to add more example varieties - to check whether to reduce scale
Char. 11	to check whether to add more example varieties or reduce scale
Char. 12	- to read "Flower: color of upper side" - to have states (1) white, (2) white and light purple, (3) white and medium purple with example variety "Gold No.1", (4) white and dark purple
Char. 13	to be deleted
Chars. 21, 22, 23	to be moved after Char. 14
Char. 24	to check order of colors (see TGP/14)
8.1 (a)	to read "Observations on the plant, stems, leaves and flowers should be made at the time of flowering of the second inflorescence."
8.1 (c), (d)	to be inverted
Ad. 8	to delete empty column
Ad. 12	to be deleted
Ad. 13	to be deleted
Ad. 17	to move illustration for state (3) one row down
Ad. 21	to check standard wording (TGP/14)
Ad. 22	to improve picture for state 5
Ad. 25	to read "The firmness should be assessed by hand by pressing the center of the flesh of the fruit which is cut to half horizontally."
9.	references to be presented in alphabetical order

*Pepper (*Capsicum annuum *L.) (Partial revision: characteristics 48.1, 48.2, 48.3, 49.1)*

107. The subgroup discussed document TWV/51/7, presented by Mr. Sergio Semon (European Union) and agreed that the proposal for a partial revision of Characteristic 48 "Resistance to Tobamovirus" and its explanation Ad. 48 be submitted for adoption by the TC at its fifty-fourth session, to be held in Geneva on October 29 and 30, 2018.

108. The TWV agreed that the following changes be incorporated in the proposed partial revision of Char. 48 "Resistance to Tobamovirus".

Char. 48.2	example variety for state 9 to read "PI152225" (triple 2)
Ad. 48 (5)	to replace "race" with "pathotype"
Ad. 48 (6)	to read …(reference to ISF website) to delete the table
Ad. 48 (9.3)	to delete last sentence "For PMMoV: 1.2.3…"

109. The TWV noted that, at the same time as the partial revision of Char. 48 "Resistance to Tobamovirus", a correction would be made to Characteristic 2 "Plant: habit" by adding the missing method of observation VG to Characteristic 2 (see documents TG/6/8(proj.6) and TC/42/11, Annex II).

110. The TWV also agreed that the proposed partial revision of Characteristic 49 "Resistance to Potato Y Virus (PVY) Pathotype 0" and its explanation Ad. 49 needed further clarification and therefore should be reconsidered by the TWV at its fifty-second session in 2018.

*Spinach (*Spinacia oleracea *L.) (Partial revision: Characteristic 18)*

111. The subgroup discussed document TWV/51/8, presented by Ms. Marian van Leeuwen (Netherlands) and agreed the following.

TQ 7	to add option "not tested" for new race Race Pfs: 16 and all races

*Vegetable Marrow, Squash (*Cucurbita pepo *L.) (Partial revision: characteristics 69 and 70)*

112. The subgroup discussed document TWV/51/9, presented by Ms. Chrystelle Jouy (France) and agreed that the proposed partial revision of Characteristics 69 and 70 should be discontinued.

*Swiss Chard, Leaf Beet (*Beta vulgaris *L. ssp.* vulgaris *var.* flavescens *DC. f.* crispa*) (Revision)*

113. The subgroup discussed document TG/106/5(proj.1), presented by Ms. Chrystelle Jouy (France), and agreed the following:

Cover page	- to add French common name "Blette" - to add "Other associated documents: TG/60 Beet Root"
2.2	to read "The material is to be supplied in the form of seed clusters."
2.3	- to read "The minimum quantity of plant material, to be supplied by the applicant, should be: 100g or 6000 seeds at least…" - to delete "The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease." already in 2.4 as standard wording
3.4.2	to read "Each test should be designed to result in a total of at least 60 plants, which should be divided between at least 2 replicates."
4.2	to review and check whether to use same approach on uniformity as in carrot
Table of Chars.	- to replace example variety "Red Chard" by "Rhubarb Chard" (throughout the TG) - to correct spelling of example variety "Verde de penca blanca larga" (throughout the TG)

Char. 1	- to be indicated as PQ - state “green” to be moved after “white” - to be indicated as VG - to add explanation “Observations on the seedling should be made after the appearance of the second true leaf.”
Char. 2	to be indicated as MS/VG
Char. 4	to be indicated as MS/VG
Char. 5	- to be indicated as MS/VG - to delete example variety “Lucullus” from state 3
Char. 6	- to add (b) - to have example varieties “Groene Gewone, Rhubarb Chard” for state 1
Char. 7	- to read “Only varieties with leaf blade: color: green: Leaf blade: intensity of color” - to add (b) - to add example variety “Groene Gewone” to state “medium”
Char. 8	- to read “Only varieties with leaf blade: color: purple: Leaf blade: intensity of color” - to add (b) - to have notes 1, 3, 5
Char. 9	to add illustrations/explanation
Char. 10	- to add (b) - to delete “of upper side”
Char. 12	- to be moved after Char. 7 - to read “Only varieties with leaf blade: color: green: Intensity of purple coloration”
Char. 13	- to be indicated as MS/VG - to read “Petiole: length”
Char. 14	- to read “Petiole: width” - to be indicated as MS/VG
Char. 15	- to read “Petiole: curvature of inner side in cross section” - to be indicated as VG - to have states (1) absent or weak with example variety " Groene Gewone”, (3) medium, (5) strong
Char. 16	- to read “Petiole: color” - state “green” to be moved after “white” - to add (b)
Char. 17	- to have states “light”, “medium”, “dark” - to have notes 1, 3, 5 - to read “Petiole: intensity of color” - to add explanation that not to be observed on white varieties
8.1	to add new explanation (b) to read “Observations on leaf blade color and petiole color should be made on the upper side of the leaf.”
8.1 (a)	to read “Observations on the leave, the leaf blade, and the petiole should be made when the foliage is fully developed.”
Ad. 8	to be deleted
Ad. 12	to be deleted
TQ 5	to complete full scales
TQ7.3	to delete reference to photograph

*Tomato (*Solanum lycopersicum *L.) (Partial revision: disease resistance characteristics and explanations: Chars. and Ads. 48, 51, 58)*

114. The subgroup discussed document TWV/51/10, presented by Ms. Amanda van Dijk (Netherlands) and received a presentation on “The use of DNA markers in the DUS of tomato and tomato rootstocks, proposal to revise the UPOV Test Guidelines”. a copy of the presentation is provided in document TWV/51/10 Add. The TWV agreed the following.

Char. 48.1	to delete Anabel and Marsol as example varieties for state 9
Char. 48.2	to delete Walter as example variety for state 9
Ad. 48 (i) (4)	country code for Spain to read “ES”
Ad. 48 (i) (9.3.1)	to delete Ranco as example variety

Ad. 48 (ii) (8)	- to read “48.1 Resistance to race 0 (ex 1)” and read “48.2 Resistance to race 1 (ex 2)” - to correct spelling of “marker”
Ad. 51 (i) (4)	country code for Spain to read “ES”
Ad. 51 (ii)	to add chapter 3 and 6 of Char. 48
Ad. 58 (ii)	to add chapter 3 and 6 of Char. 48

Tomato Rootstocks (Partial revision: disease resistance characteristics and explanations: Chars. and Ads. 24, 27, 30, 31)

115. The subgroup discussed document TWV/51/11, presented by Ms. Amanda van Dijk (Netherlands) and agreed the following.

Ad. 24 (i) (4)	country code for Spain to read “ES”
Ad. 27 (ii)	to add chapter 3 and 6 of Char. 24
Ad. 30 (i)	to add disclaimer to read “The transformed Agrobacterium tumefaciens is a Geneticaly Modified Organism and requires to comply with legislation concerning the protection of the environment, human and animal health”
Ad. 30 (i)	to replace “OGM” with “Genetically Modified Organism”
Ad. 31 (ii)	to add chapter 3 and 6 of Char. 24

*Turnip (*Brassica rapa *L. var.* rapa *(L.) Thell.) (Revision)*

116. The subgroup discussed document TG/37/11(proj.3), presented by Ms. Stéphanie Christien (France), and agreed the following:

Cover page	to change coverage of the Test Guidelines to *Brassica rapa* L. subsp. *rapa* and to update GENIE database accordingly
1.	to read “These Test Guidelines apply to all varieties of *Brassica rapa* L. subsp. *rapa*”
3.4.1	to spell “plants” with small p
Char. 7	to read “Leaf: number of lobes”
Char. 8	to read “Only varieties with leaf: type : entire: Leaf : depth of incisions of margin”
Char. 9	- to add new example variety for state 5 - to delete “Frisia” as example variety for state 5
Char. 10	to read “Leaf: dentation of margin”
Char. 11	- to add “Ordes” as example variety for state 7 - to delete “Tyfon” as example variety for state 7
Char. 12	- to add “Ordes” as example variety for state 7 - to delete “Tyfon” as example variety for state 7
Char. 13	to read “Only varieties with leaf: type: lobed: Leaf: length of terminal lobe”
Char. 14	to read “Only varieties with leaf: type: lobed: Leaf: width of terminal lobe”
Char. 16	- to be indicated as QN - to review growth stages (240-260?) - to have states from (1) absent or weak, (2) medium, (3) - to check example varieties - to add explanation
Char. 17	- to read “Only varieties with swollen root: medium and strong: Swollen Root: position in soil” - to review growth stage
Ad. 8	- sentence to read “Observations should be made below the broadest part of the leaf.” - to delete reference to Char. 10
Ad. 10	- to add illustrations of the two types (entire, lobed) - to add “Observations should be made above the broadest part of the leaf.”
Ad. 13	to be improved
Ad. 14	to be improved

Watercress

117. The subgroup discussed document TG/NASTU(proj.2), presented by Mr. Tom Christie (United Kingdom), and agreed the following:

1.	to add difference between species based on number of rows of seed
throughout document	to be consistent for seed-propagated (with hyphen) and vegetatively propagated (without hyphen)
Char. 3	to add example variety “Emerald” for state “medium”
Char. 4	to add example variety “Boldrewood” for state “short”
Char. 5	to delete (f)
Char. 6	- to be moved after Char. 7 - to have states “light”, “medium”, “dark” - to add example variety “Sophie” for state “strong”
Char. 9	to have states (1) absent or weak with example variety “Sophie”, (3) medium, (5) strong
Char. 12	to add example variety “Boldrewood” for state “medium”
Char. 13	to add example variety “Boldrewood” for state “medium”
Char. 14	- to be placed after Char. 15 - to have states (1) absent or weak with example variety “Emerald”, (3) medium, (5) strong
Char. 16	- to add example variety “Boldrewood” for state “short” - to add example variety “Emerald” for state “medium”
Char. 17	to add example variety “Emerald” for state “medium”
Char. 18	to reorder states of expression according to TGP/14 (see grid in Ad. 18): (1) ovate, (2) lanceolate, (3) circular, (4) medium elliptic, (5) narrow elliptic
Char. 21	- to add example variety “Emerald” for state “medium” - to add illustrations
Char. 26	- to add example variety “Sophie” for state “medium” - to add example variety “Emerald” for state “long”
Char. 27	- to add example variety “Sophie” for state “medium” - to add example variety “Emerald” for state “broad”
Char. 28	to be deleted
Char. 29	- to read “Seed: netting of surface” - state 3 to read “open” - state 7 to read “dense”
8.1	- to review wording of explanations (“Observations on…. should be made…”) - to review order of labels (to follow chronological order)
Ad. 3	to add illustration
Ad. 18	illustration for “ovate” to be moved one row down
Ad. 23	to be improved
Ad. 29	to delete sentence
TQ 4.1.1 (a), (b)	to delete request for indication of parent varieties
TQ 5	to complete full scales
TQ 7	to remove ASW requesting photograph

Recommendations on draft Test Guidelines

(a) Test Guidelines to be put forward for adoption by the Technical Committee

118. The TWV agreed that the following draft Test Guidelines should be submitted to the TC for adoption at its fifty-fourth session, to be held in Geneva on October 29 and 30, 2018, on the basis of the following documents and the comments in this report:

Subject	Basic Document(s) (2017)
Agaricus (*Agaricus* L.) (Revision)	TG/259/2(proj.5)
Artichoke, Cardoon (*Cynara cardunculus* L.) (Partial revision: addition of new characteristic for male sterility)	TG/184/4, TWV/51/4

*Brown Mustard (*Brassica juncea* (L.) Czern.)	TG/BRASS_JUN (proj.5)
*Calabrese, Sprouting Broccoli (*Brassica oleracea* L. convar. *botrytis* (L.) Alef. var. *cymosa* Duch.) (Revision)	TG/151/5(proj.2)
Pea (*Pisum sativum* L.) (Partial revision: disease resistance explanations for *Ascochyta pisi* race C (Ad. 60))	TG/7/10 Rev., TWV/51/6
*Pepino (*Solanum muricatum* Aiton)	TG/PEPIN(proj.2)
Pepper (*Capsicum annuum* L.) (Partial revision: characteristics 48.1, 48.2, 48.3)	TG/76/8 Rev., TWV/51/7
Spinach (*Spinacia oleracea* L.) (Partial revision: Characteristic 18)	TG/55/7 Rev.4, TWV/51/8
Tomato (*Solanum lycopersicum* L.) (Partial revision: disease resistance characteristics and explanations: Chars. and Ads. 48, 51, 58)	TG/44/11 Rev.
Tomato rootstock (Partial revision: disease resistance characteristics and explanations: Chars. and Ads. 24, 27, 30, 31)	TG/294/1 Corr. Rev., TWV/51/11

(b) Test Guidelines to be discussed at the fifty-second session

119. The TWV agreed to discuss the following draft Test Guidelines at its fifty-second session:

Subject
*Fennel (*Foeniculum vulgare* Miller) (Revision)
Lettuce (*Lactuca sativa* L.) (Partial revision: addition of 2 new *Bremia lactucae* races; adaptation of *Bremia lactucae* race names)
Pea (*Pisum sativum* L.) (Partial revision: example varieties for Char. 58; disease resistance explanation for *Fusarium oxysporum* f. sp. *pisi* race 1 (Ad. 58))
Pepper (*Capsicum annuum* L.) (Partial revision: characteristics 49.1, 49.2, 49.3; deletion of (*) from Characteristic 1, addition of (*) to Characteristic 20, replacement of Char. 1 with Char. 20 in 5.3 and TQ 5)
Spinach (*Spinacia oleracea* L.) (Partial revision: Characteristics 17, 18)
*Swiss Chard, Leaf Beet (*Beta vulgaris* L. ssp. *vulgaris* var. *flavescens* DC. f. *crispa*) (Revision)
Tomato (*Solanum lycopersicum* L.) (Partial revision: deletion of asterisk from Char. 48.1; addition of new morphological characteristics, add DNA marker as additional method in Ad. 48.3, revision of Ad. 53)
Tomato rootstock (Partial revision: deletion of (*) from Char. 24.1, addition of DNA marker for explanation Ad. 23, addition of (*) to Char. 28, revision of explanation Ad. 28)
*Turnip (*Brassica rapa* L. var. *rapa* L.) (Revision)
Watercress (*Nasturtium microphyllum* Boenn. ex Rchb.; *Nasturtium officinale* R. Br.; *Nasturtium xsterile* (Airy Shaw) Oefelein)
Watermelon (*Citrullus lanatus* (Thunb.) Matsum. et Nakai) (Partial revision: explanations for seed characteristics 34, 35, 36)

120. The leading experts, interested experts and timetables for the development of the Test Guidelines are set out in Annex IV to this report.

Information and databases

UPOV information databases

121. The TWV considered document TWP/1/4.

GENIE database

122. The TWV noted that a specification document explaining the data structure and functions of the GENIE database was being developed by the Office of the Union in order that IT related maintenance could be provided in the future.

UPOV code system

123. The TWV noted that:

(a) 173 new UPOV codes had been created in 2016 and that a total of 8,149 UPOV codes were included in the GENIE database.

(b) the Office of the Union had received a request from the OECD to create new UPOV codes for 191 forest-tree species moving in international trade under the OECD certification schemes.

(c) the TC, at its fifty-third session, had agreed that it would not be appropriate to revise the Guide to the UPOV Code System in relation to the principal botanical name for inter-generic and interspecific hybrids, as set out in document TWP/1/4, paragraph 18.

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

124. The TWV noted the invitation to check the amendments to UPOV codes, the new UPOV codes or new information added for existing UPOV codes, and the UPOV codes used in the PLUTO database for the first time, which were provided in Annex II of document TWP/1/4. The TWV noted that comments were to be submitted to the Office of the Union by October 31, 2017.

PLUTO database

125. The TWV noted the summary of contributions to the PLUTO database from 2013 to 2016 and the current situation of members of the Union on data contribution, as presented in document TWP/1/4, Annex I. The TWV requested the Office of the Union to check the accuracy of the data provided in Annex I of document TWP/1/4 as some numbers seem to be very low.

126. The TWV noted that the WG-DEN, at its third meeting, held in Geneva on April 7, 2017, 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 its second meeting.

Variety description databases

127. The TWV considered document TWP/1/2.

128. The TWV noted the information on presentations on databases made at the BMT, TWC and TWV at their sessions in 2016, and that the expert from Germany had offered to report on the potato database currently under development within European Union to the TWV, at its session in 2017.

129. The TWV noted that the TC had agreed that UPOV would be able to facilitate cooperation in the establishment of common databases containing molecular information by the provision of training and sharing of information. It further noted that the TC had agreed on the value of inviting the contribution of breeders and academic institutions to UPOV’s work on the constitution and maintenance of databases.

130. The TWV noted that the TC had agreed to request the Office of the Union to collect data on existing databases with morphological and/or molecular data. The TWV noted that information collected could be included in the GENIE database, subject to the availability of resources for the modification of the GENIE database.

Exchange and use of software and equipment

131. The TWV considered document TWP/1/5.

132. The TWV noted that the Council, at its fiftieth ordinary session, held in Geneva, on October 28, 2016, had adopted document UPOV/INF/16/6 “Exchangeable Software”, with the deletion of the SIVAVE software.

133. The TWV noted that the TC, at its fifty-third session, had agreed that the proposed revision of document UPOV/INF/16/6 in conjunction with the comments of the TC, as set out in Annex I of document TWP/1/5, be reported to the CAJ at its seventy-fourth session, on October 23 and 24, 2017 and, if agreed by the CAJ, that a draft document UPOV/INF/16/7 “Exchangeable Software” would be presented for adoption by the Council at its fifty-first ordinary session, on October 26, 2017, on that basis.

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

Electronic application systems

135. The TWV considered document TWP/1/3 and noted the developments concerning the development of an electronic application form.

136. The TWV received a presentation on the “UPOV PBR Application Tool - Electronic Application Form (EAF) - Report to Technical Working Parties” by the Office of the Union.

137. The TWV noted that Version 1 of the EAF had been available online since January 2017 at http://www.upov.int/upoveaf , and that a new Version 1.1 has been released in July 2017, offering the possibility for users to submit PBR application data in more authorities. The TWV noted that a future version (Version 2.0) would contain more functionalities (e.g. payment options and link to the Genie Database information) and would cover more authorities and more crops.

138. The TWV agreed on the need to communicate more about the UPOV PBR Application Tool and to invite the authorities in charge of DUS examination to publicize the EAF, using communication tools available (e.g. leaflet in different languages, posters, link to the EAF on their website).

139. The TWV noted the comment made by the representative from ISF on the added value of the EAF tool when using drop down menus where the information is already available, and in different languages. It noted the interest for the applicant to be able to select from existing data in term of accuracy of information and also saving time when completing an application. The TWV noted the comment made by the representative from ISF to encourage PVP offices to use, as far as possible, drop down menus functionalities in their application forms instead of free text boxes which require extra work and additional translation for the applicant.

140. The TWV noted the comment made by the representative from Crop Life International that for the time being the combination of crops and authorities covered by the EAF did not allow breeders to submit a lot of applications through the EAF. However the TWV noted the interest raised by members of Crop Life International about the EAF and its future developments especially in relation to languages available in the tool.

141. The TWV noted the comment made by the Netherlands on the UPOV EAF fee being paid by the Authority in charge of DUS examination in the Netherlands, for the time being, and especially that this measure would be done on a provisional basis to encourage the use of the EAF and until CPVO join the system as participating authoritiy.

Experiences with new types and species

142. No reports on experiences with new types and species were made during the fifty-first session of the TWV.

Molecular Techniques

143. The TWV considered document TWP/1/7.

Developments in the TC, the TWPs and the BMT in 2016

144. The TWV noted the report on developments in the TC, the TWPs and the BMT, as set out in document TWP/1/7, paragraphs 5 to 24.

OECD/UPOV/ISTA/AOSA Joint Workshop on Molecular Techniques

145. The TWV noted that a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods had been held in Paris on June 8, 2016, and that the recommendations of the Joint OECD/UPOV/ISTA/AOSA Workshop, as reproduced copied below, had been approved by the Annual Meeting of the OECD Seed Schemes, held in Paris on June 9 and 10, 2016:

(a) To develop a joint document explaining the principal features (e.g. DUS, variety identification, variety purity, etc.) of the systems of OECD, UPOV, AOSA and ISTA and, for mutual understanding, to repeat the joint workshop at relevant meetings of the OECD and ISTA;

(b) To carry out a joint inventory by UPOV, OECD, AOSA and ISTA of the use of molecular marker techniques, by crop, with a view to developing a document containing that information. The OECD will contribute to the document by sharing the ongoing list of molecular techniques used by National Designated Authorities (NDAs) and continuously collected by the Secretariat;

(c) To develop a list of terms and their definitions as used by OECD, UPOV, AOSA and ISTA and to make an attempt to harmonize these;

(d) To consider organizing another similar workshop in three years' time; and

(e) To consider replacing the term used in the OECD Seed Schemes for the status of DNA based techniques from "internationally validated" to another term such as "internationally harmonized."

Presentation of information on the situation in UPOV with regard to the use of molecular techniques

146. The TWV noted that the following question and answer (FAQ) concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, had been adopted by the Council, at its fiftieth ordinary session held in Geneva on October 28, 2016:

> Is it possible to obtain protection of a variety on the basis of its DNA-profile?
>
> For a variety to be protected, it needs to be clearly distinguishable from all existing varieties on the basis of characteristics that are physically expressed, e.g. plant height, time of flowering, fruit color, disease resistance etc. The DNA-profile is not the basis for obtaining the protection of a variety, although this information may be used as supporting information.
>
> A more detailed explanation is provided in the FAQ 'Does UPOV allow molecular techniques (DNA profiles) in the examination of Distinctness, Uniformity and Stability ('DUS')?
>
> See also: 'What are the requirements for protecting a new plant variety?'

147. The TWV noted that the TC, at its session in 2017, had agreed that possible future collaboration between UPOV, the Organization for Economic Co-operation and Development (OECD) and the International Seed Testing Association (ISTA) might include the harmonization of terms and methodologies used for different crops and the possible development of standards, after agreement by those organizations.

148. The TWV noted that a first practical workshop "DNA Techniques and Variety Identification" had been held in Roelofarendsveen, Netherlands, from May 8 to 10, 2017, and that a second practical workshop was planned for September 20 to 22, 2017.

149. The TWV noted that the TC had agreed that UPOV and the OECD should consider making progress in collaboration on the matters above if ISTA was unable to participate in the near future.

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

151. The TWV received the following presentations, as reproduced in the Annexes to document TWV/51/2 Rev. (in alphabetical order):

(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 (*Phaseolus vulgaris* L.) by using molecular data" presented by an expert from the Netherlands

Date and place of the next session

152. 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.

Chairperson

153. The TWV thanked Ms. Swenja Tams for her chairpersonship and noted that she was awarded a UPOV bronze medal in recognition of her chairpersonship of the TWV from 2015 to 2017.

Future program

154. 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

Visit

155. On the afternoon of July 5, 2017, the TWV visited the vegetable seed breeding company Bejo Zaden in Warmenhuizen. Bejo produces seeds of about 1.200 varieties covering about 50 crops. The TWV was welcomed Mr. Cor Glas, IP Officer, who gave a presentation introducing Bejo to the TWV, including their breeding and research activities as well as the company IP policy. A copy of this presentation is provided in Annex III to this document. The TWV visited the Bejo facilities and the seed processing plant, including the seed sample germination testing, seed counting, seed health testing, seed cleaning, seed coating and seed storage facilities. During the visit, the TWV was guided by Mr. Cor Glas, Mr. Gert Kromhout, IP Specialist, Mr. Mark Dekker, Quality and Safety, and Ms. Danielle Bruin, Marketing and Communication Advisor. Afterwards, the TWV visited Naktuinbouw in Roelofarendsveen, were it visited DUS trials, including Asparagus, Lettuce, Turnip, Spinach and Melon trials. The TWV also visited the laboratories of Naktuinbouw and received explanation on disease resistance testing in Lettuce for *Bremia lactucae* and on Spinach for *Peronospora farinosa* f. sp. *spinaciae*.

156. The TWV adopted this report at the close of its session.

[Annexes follow]

ANNEX I

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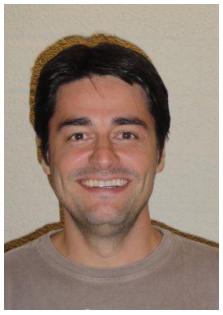

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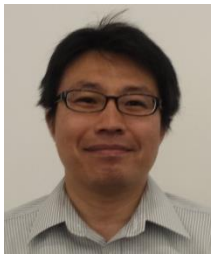

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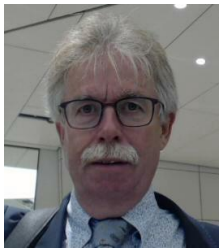

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[Annex II follows]

www.naktuinbouw.com

Naktuinbouw at a glance

TWV UPOV meeting
3 July 2017
Leiden
John van Ruiten,
Director Naktuinbouw

Naktuinbouw (1)

- is an independent quality service
- operates in horticultural propagating material
- Is regulated by the Ministry of Economic Affairs
- is supervised by Ministry EA and Netherlands Food and Consumer Product Safety Authority (NVWA)
- accredited ISO 17020/17025
- entrusted by CPVO

Naktuinbouw (2)

- has 3.000 registered companies
- does inspections, variety testing, laboratory testing. Three departments
- has 275 employees, turn over € 26 million
- is fully funded by (legal) tariffs/fees, no financial governmental support

Quality and phytosanitary control Plant Reproductive Material

Import inspections

Quality-plus-systems

Monitoring and surveillance

Variety testing

DNA fingerprinting

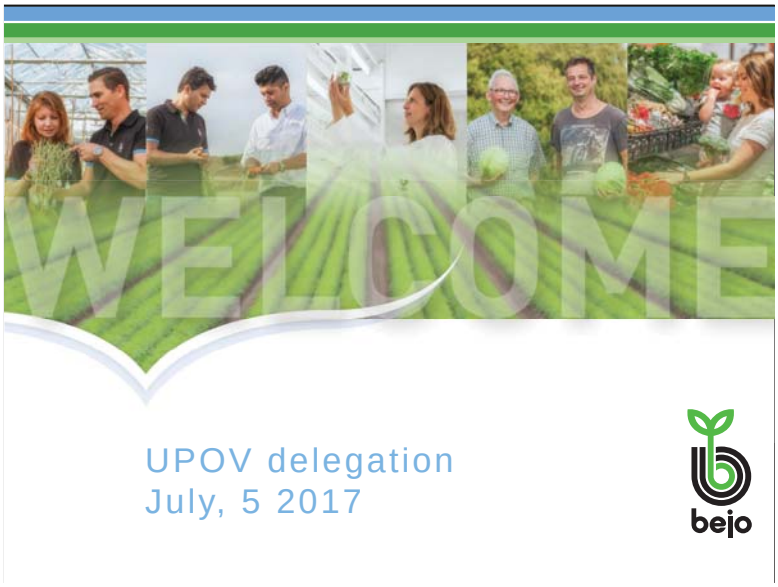
Diagnostics and disease testing

Virus free material

Germinating capacity seeds

Quality in Horticulture

[Annex III follows]

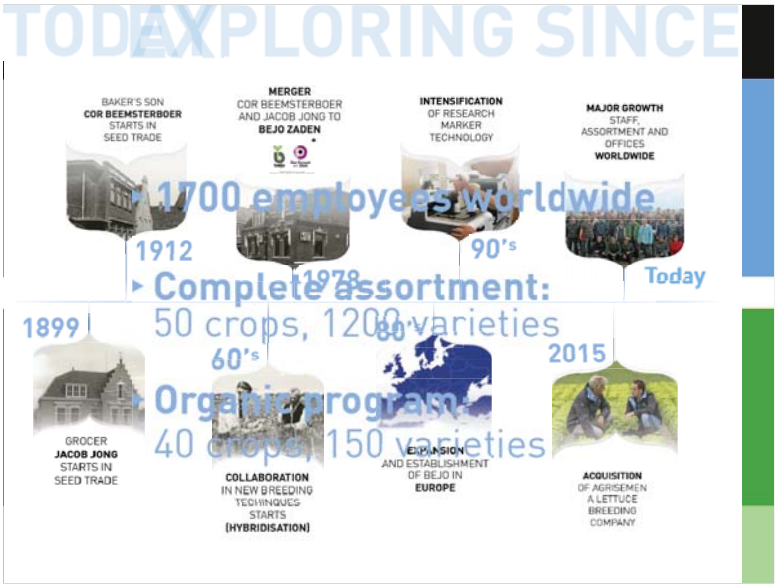


UPOV delegation
July, 5 2017

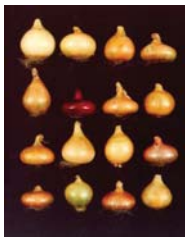
bejo

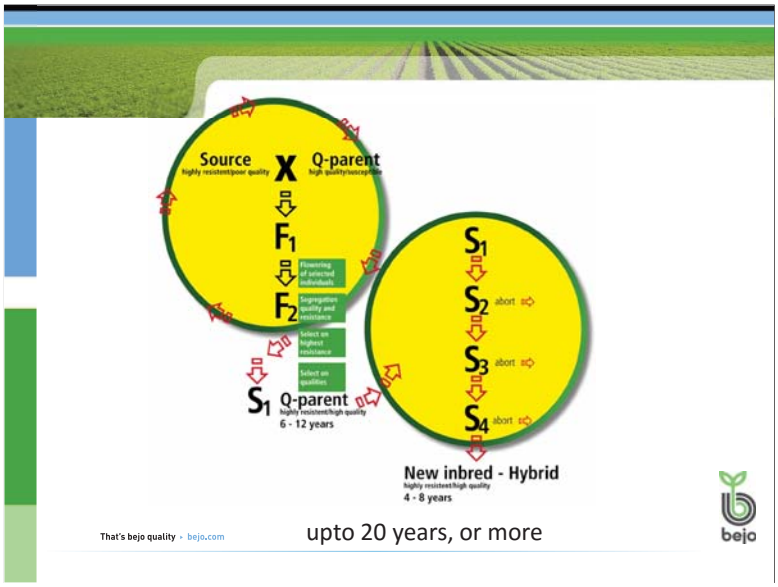
Topics visit UPOV delegation:

- Introduction Bejo Zaden BV
  - Production, sales and representation
- Breeding and research
  - New techniques applied in research
  - and for quality control
- IP protection
  - Breeders' rights
  - Patents
- Guided tour



<u>Integration</u> of:
- sales – marketing
- breeding
- cell biology/tissue culture
- phytopathology
- marker technology/genomics
- enhancing seed quality





upto 20 years, or more

Phytopathology

In this group colleagues work on:

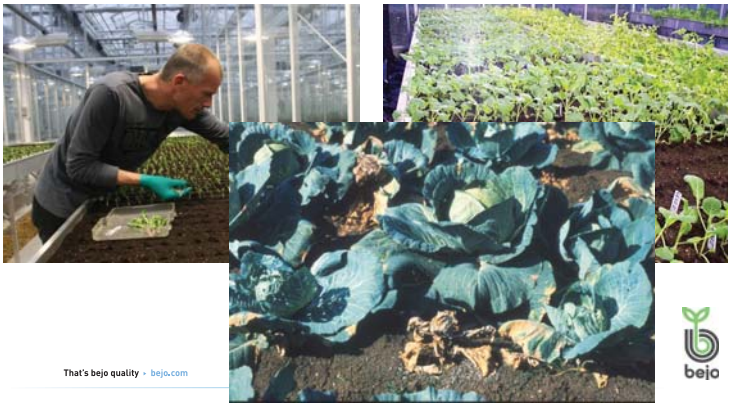
- Over 70 projects to improve Bejo varieties with respect to resistance against diseases and pests
- Environmental circumstances: drought, salinity….
- Measuring and improving the levels of important contents matters like vitamins, anti-oxidants, sugars etc. etc.

That's bejo quality • bejo.com

bejo

Example:

resistance test for *Fusarium oxysporum* in cabbage



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- Vegetative propagation
- Doubled haploid production
- Embryo rescue
- Production of virus-free plants
- Cell biological techniques

Example: vegetative propagation of virus-free leek and asparagus for seed production

That's bejo quality › bejo.com

RESEARCH TISSUE CULTURE AND CELL BIOLOGY

▸ Through selfing:

- AaBBCcDdEeffGg

Generation 1
- aaBBCcDdEEffGg

Generation 2
- aaBBCCDdEEffGG

Generation 3
- aaBBCCDDEEffGG

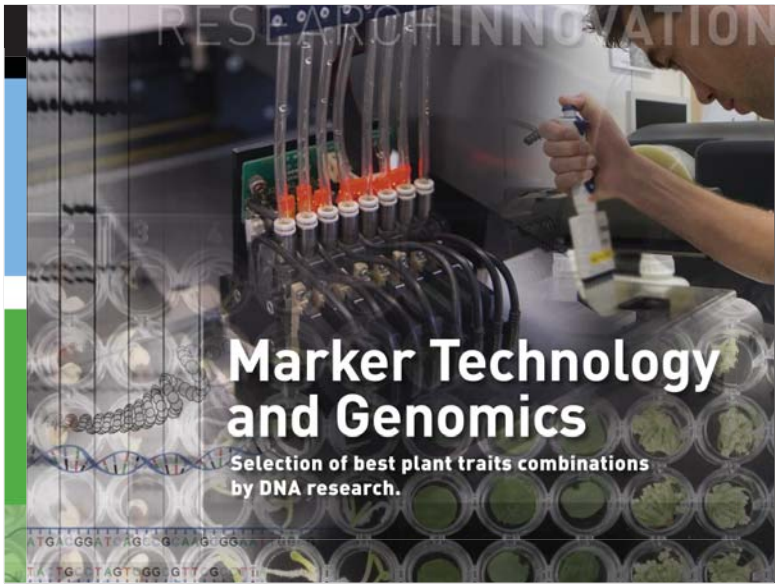
▸ Through DH:

- AaBBCcDdEeffGg

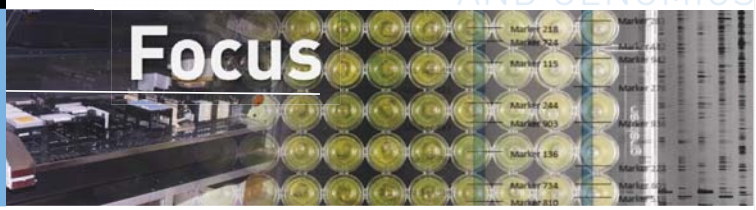
Generation 1!
- aaBBccDDEEffGG
- aaBBCCDDEEffGG
- AABBCCDDeeffgg

100's of combinations

Selection!
- aaBBCCDDEEffGG



RESEARCH MARKER TECHNOLOGY AND GENOMICS

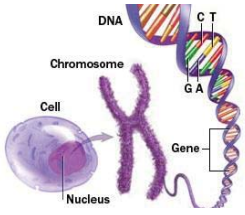


- ▸ Development of DNA markers
- ▸ Assembly of genetic maps
- ▸ Marker – phenotype association analysis
- ▸ Marker assisted breeding
- ▸ Bioinformatics
- ▸ Genetic identity & purity of seed lots

Development of DNA markers

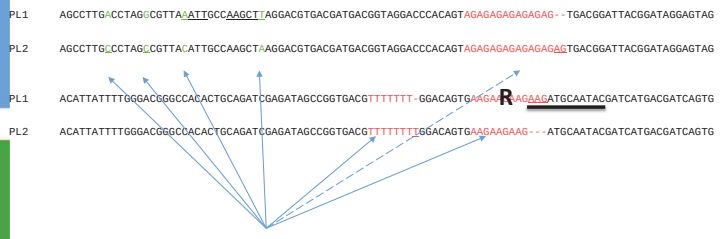
DNA is the carrier of all our heritable traits.

DNA is organized in chromosomes and ultimately traits are encoded by just 4 "letters" A, T, G or C



That's bejo quality › bejo.com

Markers: application of differences in DNA



Each difference can yield a useful marker
- 1 base different
- addition
- deletion

That's bejo quality › bejo.com

Types of markers

- AFLP
- RAPD
- RFLP
- RAMP
- SSR

PCR amplification of unique fragments, linked to the trait under study

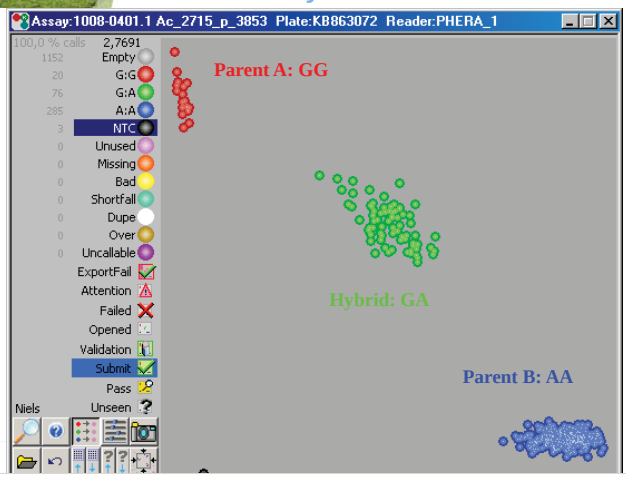
- SNP

1 basepair difference (!), alleles

- Whole genome sequencing

- "cheap", comparing types
- much in public domain

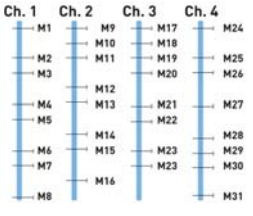
SNP-analysis

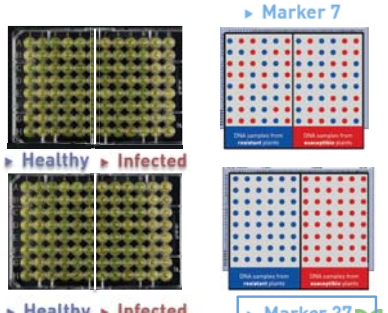


Examples of application in research

- Marker linked to *Mycosphaerella* resistance in cabbage
- Disease resistance test is very difficult, strongly depending on weather conditions
- One year very good test, all plants were sampled for DNA
- By comparing S and R plants a marker tightly linked to the resistance gene was identified
- Further breeding is not dependent
  whether a field-test succeeds,
  many years gained
- However, check with field test when
  conditions are favorable !!

Examples of application in research

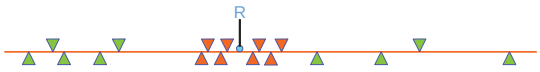




Examples of application in research

- Marker linked to fruit color in pepper
- By comparing e.g. red and green peppers a linked marker was developed.
- Now we can make a cross; harvest a few seeds from an *immature* fruit and proceed to the next generation
- Benefit: no need to wait until
  fruit development is complete
  and fruit is colored (4 months..)

Examples of application in research

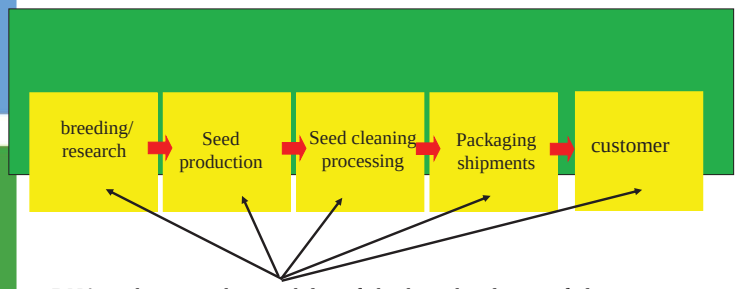


Result:
- many tightly linked markers, close to the “gene of interest”
- finally a genetic map of all chromosomes/linkage groups

Examples of applications in quality control

- Controlling of identity of produced seedlots
- Genetic purity of seedlots
- S factor control in cabbage (> 60 types, crossability)
- Sex determination in *Asparagus*
- Determining genotypes in case of
- - complaints
- - human error
- - contamination (own production or from colleagues)
- - infringement

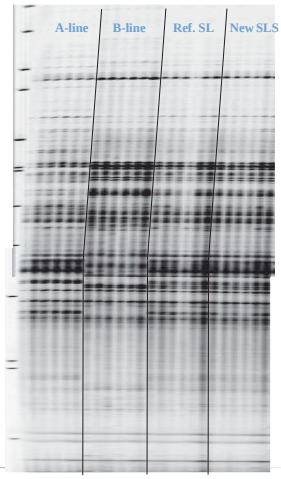
Genetic purity and purity of seedlots



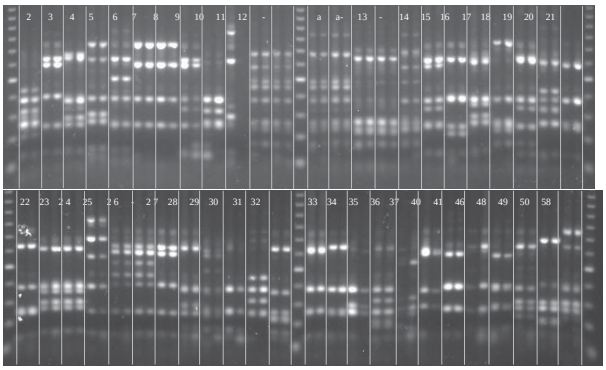
DNA markers give the possibility of checking the identity of plant material (seed, seedling, flower, leaf, root,…_) throughout the whole chain

New seedlots (SL)

- No QC in the field
- Trueness to type
- Variatal identity



ID of ~60 S-alleles of cabbage with a primerset and two digestions

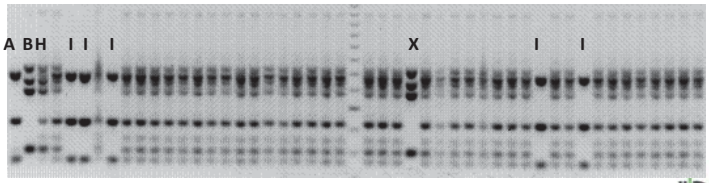


Quality control

To assist Stock- and Quality control each produced seedlot produced is checked for offtypes and inbred plants

I: self pollination, inbred

X: off type).



Fieldtest vs labtest: costs, reliability, speed and flexibility

Identification of parent lines

Parent line	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
cabbage parent line 1	GG	TT	CC	CC	GG	GG	TT	CC	GG	CC	TT	CC	GG	CC	AA	TT
cabbage parent line 2	CC	TT	GG	CC	GG	GG	CC	GG	GG	CC	TT	GG	CC	CC	AA	GG
cabbage parent line 3	GG	TT	CC	CC	GG	GG	TT	GG	AA	CC	CC	CC	GG	TT	GG	TT
cabbage parent line 4	CC	GG	CC	CC	CC	AA	CC	CC	AA	GG	TT	GG	CC	TT	GG	GG
cabbage parent line 5	GG	GG	CC	CC	CC	AA	TT	CC	AA	GG	CC	GG	CC	TT	GG	GG
cabbage parent line 6	GG	TT	GG	CC	GG	AA	TT	CC	AA	CC	CC	CC	GG	TT	GG	TT
cabbage parent line 7	GG	TT	GG	TT	CC	AA	CC	GG	GG	CC	u	GG	CC	CC	AA	GG
cabbage parent line 364	GG	GG	CC	CC	GG	AA	CC	CC	AA	GG	TT	GG	CC	TT	AA	GG
cabbage parent line 365	GG	GG	CC	TT	GG	GG	CC	GG	AA	CC	CC	GG	GG	TT	GG	TT
cabbage parent line 366	GG	TT	GG	CC	CC	GG	TT	GG	GG	CC	CC	CC	CC	TT	GG	TT
cabbage parent line 367	CC	TT	GG	u	CC	AA	CC	GG	AA	GG	TT	GG	CC	TT	AA	TT
cabbage parent line 368	GG	TT	CC	CC	GG	AA	CC	GG	GG	CC	CC	GG	CC	TT	AA	GG
cabbage parent line 369	GG	GG	GG	CC	CC	GG	TT	CC	AA	CC	TT	GG	GG	TT	AA	GG
cabbage parent line 370	GG	TT	CC	CC	GG	AA	CC	CC	GG	CC	CC	GG	CC	TT	AA	GG
cabbage parent line 371	GG	TT	CC	TT	GG	AA	CC	GG	GG	GG	TT	GG	GG	TT	GG	TT
cabbage parent line 372	GG	GG	CC	TT	CC	GG	CC	GG	GG	GG	TT	GG	GG	TT	AA	GG
cabbage parent line 373	CC	GG	GG	TT	GG	AA	TT	GG	AA	CC	CC	CC	CC	CC	GG	TT
cabbage parent line 374	GG	TT	CC	TT	GG	AA	CC	GG	GG	CC	CC	GG	CC	TT	AA	GG
cabbage parent line 375	CC	GG	GG	TT	CC	AA	TT	CC	GG	CC	CC	GG	CC	CC	AA	TT
cabbage parent line 376	CC	GG	CG	TT	GG	AG	TT	GG	AA	CC	CT	CC	CC	CC	AA	TT
cabbage parent line 377	CC	GG	CC	TT	GG	AA	TT	CC	AA	CC	CC	GG	GG	TT	GG	TT
cabbage parent line 378	GG	GG	CC	TT	CC	AA	TT	GG	GG	CC	CC	GG	GG	TT	AA	TT
cabbage parent line 379	GG	TT	GG	CC	CC	GG	CC	GG	GG	GG	u	GG	CC	CC	AA	GG
cabbage parent line 380	CC	TT	CC	CC	GG	GG	CC	CC	AA	GG	CC	CC	CC	TT	GG	GG
cabbage parent line 381	GG	TT	GG	TT	CC	AA	CC	CC	GG	CC	CC	CC	CC	CC	AA	TT
cabbage parent line 382	CC	TT	CC	CC	GG	AA	CC	CC	AA	GG	TT	GG	CC	TT	AA	GG
cabbage parent line 383	GG	TT	GG	CC	GG	AA	CC	CC	GG	GG	TT	GG	CC	TT	AA	GG
cabbage parent line 384	GG	TT	GG	TT	CG	GG	CC	CC	AA	CG	CC	CC	GG	TT	AA	TT
cabbage parent line 385	CC	TT	CC	CC	CC	AA	CC	CC	AA	CC	TT	GG	CC	CC	GG	TT
cabbage parent line 386	CC	TT	CC	CC	GG	AA	CC	CC	GG	CC	CC	GG	CC	TT	AA	GG
cabbage parent line 387	CC	GG	CC	CC	GG	GG	CC	CC	AA	GG	TT	GG	GG	TT	AG	GG

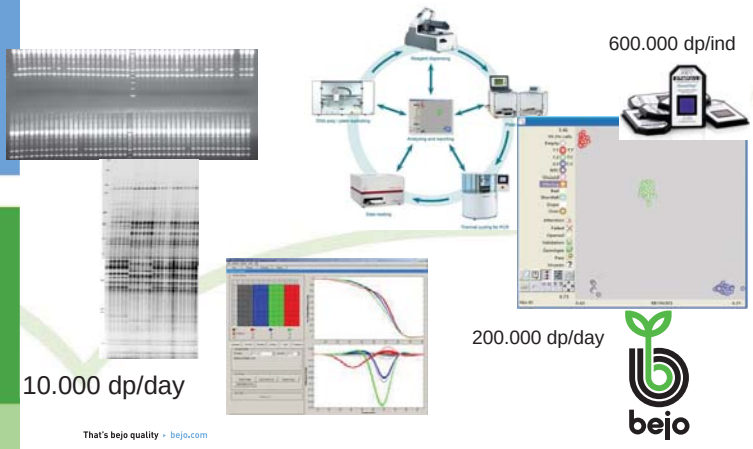
387 parent lines, 16 SNP markers discriminate!

Quality control individuals

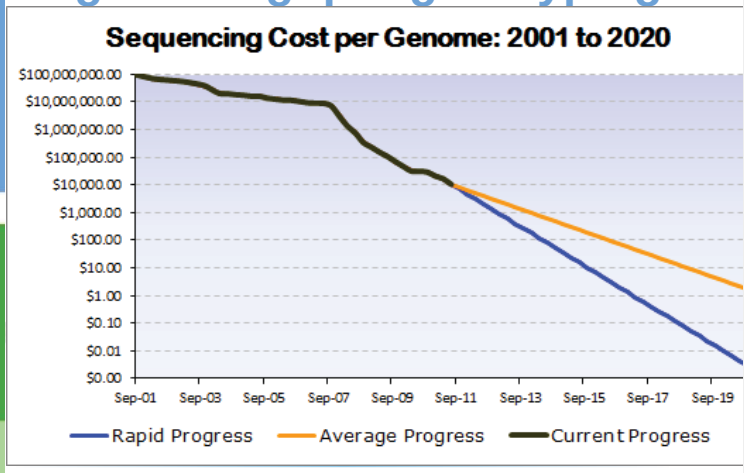
	hybrid/ paren	Remarks	1	2	3	5	6	7	10	11	12	14	16	
1														
2	parent 1		G:G	G:G	A:A	G:G	G:G	C:C	C:C	G:G	C:C	G:G	T:T	
3	parent 2		G:G	G:G	C:C	A:A	C:C	C:C	C:C	G:G	C:C	G:G	G:G	
5	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
42	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
43	hybrid 1	inbred	G:G	G:G	A:A	G:G	G:G	C:C	C:C	G:G	C:C	G:G	T:T	
44	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
83	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
84	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
85	hybrid 1	off type	G:C	G:G	C:A	G:G	G:G	C:C	G:C	G:G	C:C	G:C	T:T	parent 1 * parent 3
86	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
87	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
88	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
89	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
90	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
91	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
92	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
93	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
94	hybrid 1		G:G	G:C	C:A	G:A	G:C	C:A	C:C	G:C	T:C	G:G	T:G	
95	hybrid 1	off type	G:C	G:G	C:A	G:G	G:G	C:C	G:C	G:G	C:C	G:C	T:T	parent 1 * parent 3
96														
97														

At 2 km distance production of other hybrid, pollen was however introduced (wind)

High throughput genotyping

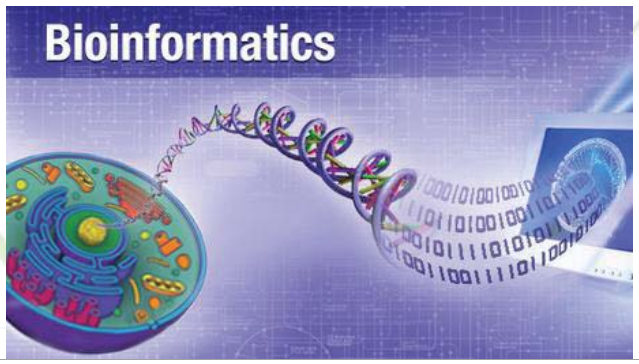


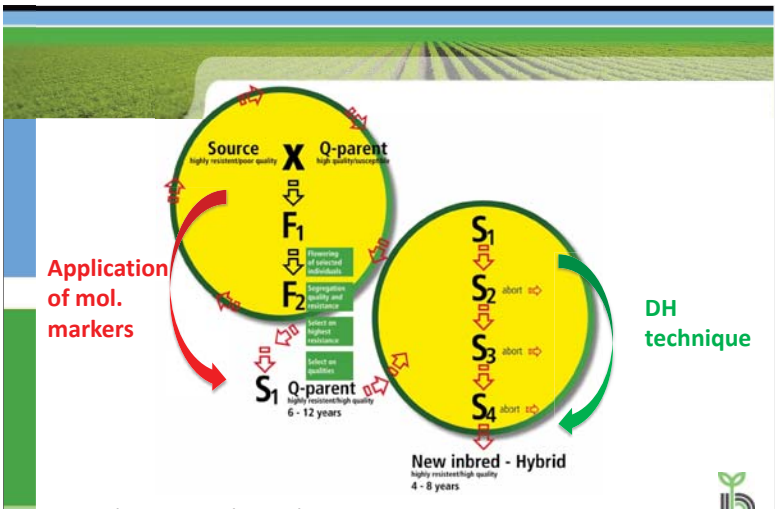
High throughput genotyping



High throughput genotyping

- We experience a "data tsunami"
- Bio-informatics is a new discipline needed to extract useful data from the huge amount of ATGC's
- Also statistics are of growing importance





Shortening the cycle: 20 years – 4 yrs – 4 yrs = 12 years

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RESEARCHSEED TECHNOLOGY
PHYSIOLOGY AND SEED PATHOLOGY

- Seed quality during production research
- Optimizing seed upgrading
- Storability research
- Quality (prediction) testing research
- Optimizing seed priming
- Analysis of field vigour

RESEARCHSEED TECHNOLOGY
PHYSIOLOGY AND SEED PATHOLOGY

- Development of detection methods for seed transmissible pathogens
- Epidemiologic research
- Development of seed disinfection methods
- Development of seed upgrade methods

Protection of Intellectual Property**

- ownership of parent lines
- ownership of varieties
- names of varieties
- breeders' rights
- patents
- trademark(s)
- logo
- copyright

bejo zaden

Quality inside

And, upon any breach of rights: action**

- Anti Infringement Bureau AIB
- (external) lawyers
- Market Access and Compliance
- … (local opportunities)

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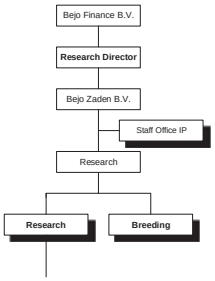
**any order here is random

bejo

Staff office IP

- Gert Kromhout, Cor Glas, vacancy
- Breeders' rights, registration
- Patents
  - Watching competitors
  - Apply for own patents (key traits, methods)
- Plus all related administration, timelines, payments etc.
- Registration of contracts of all kinds
- Nagoya documents, ABS obligations



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[Annex IV follows]

Annex IV

LIST OF LEADING EXPERTS

DRAFT TEST GUIDELINES TO BE SUBMITTED TO THE TECHNICAL COMMITTEE IN 2018

All requested information to be submitted to the Office of the Union

before August 18, 2017

Species	Basic Document	Leading Expert(s)
Agaricus (*Agaricus* L.) (Revision)	TG/259/2(proj.5)	Mr. Sergio Semon (QZ)
Artichoke, Cardoon (*Cynara cardunculus* L.) (Partial revision: addition of new characteristic for male sterility)	TG/184/4, TWV/51/4	Mr. David Calvache (ES)
*Brown Mustard (*Brassica juncea* (L.) Czern.)	TG/BRASS_JUN (proj.5)	Mr. Takayuki Nishikawa (JP)
*Calabrese, Sprouting Broccoli (*Brassica oleracea* L. convar. *botrytis* (L.) Alef. var. *cymosa* Duch.) (Revision)	TG/151/5(proj.2)	Ms. Marian van Leeuwen (NL)
Pea (*Pisum sativum* L.) (Partial revision: example varieties for Char. 58; disease resistance explanations for *Ascochyta pisi* race C (Ad. 60))	TG/7/10 Rev., TWV/51/6	Mr. Sergio Semon (QZ)
*Pepino (*Solanum muricatum* Aiton)	TG/PEPIN(proj.2)	Mr. Jun Araseki (JP)
Pepper (*Capsicum annuum* L.) (Partial revision: characteristics 48.1, 48.2, 48.3)	TG/76/8 Rev., TWV/51/7	Mr. Sergio Semon (QZ)
Spinach (*Spinacia oleracea* L.) (Partial revision: Characteristic 18)	TG/55/7 Rev.4, TWV/51/8	Ms. Marian van Leeuwen (NL)
Tomato (*Solanum lycopersicum* L.) (Partial revision: disease resistance characteristics and explanations: Chars. and Ads. 48, 51, 58)	TG/44/11 Rev.	Ms. Amanda van Dijk (NL)
Tomato rootstock (Partial revision: disease resistance characteristics and explanations: Chars. and Ads. 24, 27, 30, 31)	TG/294/1 Corr. Rev., TWV/51/11	Ms. Amanda van Dijk (NL)

DRAFT TEST GUIDELINES TO BE DISCUSSED AT TWV/52
(* indicates possible final draft Test Guidelines)

**(Guideline date for Subgroup draft to be circulated by Leading Expert: June 9, 2018
Guideline date for comments to Leading Expert by Subgroup: July 7, 2018)**

New draft to be submitted to the Office of the Union
by August 5, 2018

Species	Basic Document	Leading Expert(s)	Interested Experts (State / Organization) [1]
*Fennel (*Foeniculum vulgare* Miller) (Revision)	TG/183/3	Ms. Marian van Leeuwen (NL)	CZ, DE, FR, IT, QZ, CLI, ESA, ISF, Office
Lettuce (*Lactuca sativa* L.) (Partial revision: addition of 2 new *Bremia lactucae* races; adaptation of *Bremia lactucae* race names)	TG/13/10 Rev. 2	Ms. Amanda van Dijk (NL)	BR, FR, DE, ES, IT, IS, JP, RO, QZ, ESA, CLI, ISF, Office
Pea (*Pisum sativum* L.) (Partial revision: disease resistance explanation for *Fusarium oxysporum* f. sp. *pisi* race 1 (Ad. 58))	TG/7/10 Rev.	Mr. Sergio Semon (QZ)	AR, CZ, DE, ES, FR, GB, HU, IT, JP, NL, CropLife, ESA, ISF, Office
Pepper (*Capsicum annuum* L.) (Partial revision: characteristics 49.1, 49.2, 49.3; deletion of (*) from Characteristic 1, addition of (*) to Characteristic 20, replacement of Char. 1 with Char. 20 in 5.3 and TQ 5)	TG/76/8 Rev., TWV/51/7	Mr. Sergio Semon (QZ)	AR, BR, ES, FR, HU, IT, IS, JP, KR, NL, PL, RO, RU, SK, ESA, CLI, ISF, Office
Spinach (*Spinacia oleracea* L.) (Partial revision: Characteristics 17, 18)	TG/55/7 Rev. 4	Ms. Marian van Leeuwen (NL)	AR, ES, FR, IT, JP, PL, DE, QZ, ESA, CLI, Office, ISF
*Swiss Chard, Leaf Beet (*Beta vulgaris* L. ssp. *vulgaris* var. *flavescens* DC. f. *crispa*) (Revision)	TG/106/5(proj.1)	Ms. Chrystelle Jouy (FR)	CZ, DE, ES, GB, JP, KR, NL, QZ, CropLife, ESA, ISF, Office
Tomato (*Solanum lycopersicum* L.) (Partial revision: deletion of asterisk from Char. 48.1; addition of new morphological characteristics, add DNA marker as additional method in Ad. 48.3, revision of Ad. 53)	TG/44/11 Rev.	Ms. Amanda van Dijk (NL)	CZ, FR, HU, IT, IS, JP, PL, KR, RO, RU, ES, QZ, ESA, CLI, ISF, Office
Tomato rootstock (Partial revision: deletion of (*) from Char. 24.1, addition of DNA marker for explanation Ad. 23, addition of (*) to Char. 28, revision of explanation Ad. 28)	TG/294/1 Corr. Rev. 2	Ms. Amanda van Dijk (NL)	FR, HU, IT, IS, JP, KR, RO, RU, ES, QZ, ESA, CLI, ISF, Office
*Turnip (*Brassica rapa* L. var. *rapa* L.) (Revision)	TG/37/11(proj.3)	Ms. Stéphanie Christien (FR)	TWA, CA, CZ, DE, ES, GB, IT, JP, KR, NL,PL, QZ, ZA, CropLife, ESA, ISF, Office
Watercress (*Nasturtium microphyllum* Boenn. ex Rchb.; *Nasturtium officinale* R. Br.; *Nasturtium xsterile* (Airy Shaw) Oefelein)	TG/NASTU(proj.2)	Mr. Tom Christie (GB)	FR, JP, NL, QZ, US, ESA, ISF, Office
Watermelon (*Citrullus lanatus* (Thunb.) Matsum. et Nakai) (Partial revision: explanations for seed characteristics 34, 35, 36)	TG/142/5	Ms. Marian van Leeuwen (NL)	BR, FR, HU, IT, IS, JP, KR, RO, RU, ES, QZ, ESA, ISF, CLI, Office

[End of Annex IV and of Report]

[1] for name of experts, see list of participants