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|  |  | ETWF/45/32**ORIGINAL:**  EnglishDATE:  May 30, 2014 |
| INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS  |
| Geneva |

Technical working party for fruit cropS

Forty-Fifth Session
Marrakesh, Morocco, May 26 to 30, 2014

REPORT

adopted by the Technical Working Party for Fruit Crops

Disclaimer: this document does not represent UPOV policies or guidance

 The Technical Working Party for Fruit Crops (TWF) held its forty-fifth session in Marrakesh, Morocco, from May 26 to 30, 2014. The list of participants is reproduced in Annex I to this report.

 The session was opened by Mrs. Carensa Petzer (South Africa), Chairperson of the TWF, who welcomed the participants and thanked Morocco for hosting the TWF session.

 The TWF was welcomed by Mr. Mohammed Sadiki, Secretary General, Ministry of Agriculture and Marine Fisheries of Morocco. A copy of the welcome address of Mr. Sadiki is provided in Annex II to this report.

 The TWF was welcomed by Mr. Amar Tahiri, Chief, Division of Seeds and Plant Control, National Office of Sanitary Food Safety (ONSSA), who made a presentation on plant variety protection in Morocco. A copy of the presentation made by Mr. Tahiri is provided in Annex III to this report.

 The TWF expressed its condolences for the sad loss of Mr. François Boulineau, Chairman of the Technical Working Party for Vegetables (TWV), who had died on December 23, 2013. It was recalled that, in addition to being Chairman of the TWV, Mr. Boulineau had brought great experience and expert knowledge to UPOV’s technical work and was a leading expert for a number of important UPOV Test Guidelines.

## Adoption of the Agenda

 The TWF adopted the agenda as reproduced in document TWF/45/1.

## Short Reports on Developments in Plant Variety Protection

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

 The TWF noted the information on developments in plant variety protection from members and observers provided in document TWF/45/25 Prov. The TWF noted that reports submitted to the Office of the Union after May 23, 2014, would be included in the final version of document TWF/45/25.

### (b) Reports on developments within UPOV

 The TWF received a presentation from the Office of the Union on the latest developments within UPOV, a copy of which is provided in document TWF/45/24. The TWF noted that the designated contact person to the Technical Committee had been copied in the Circular requesting information for document C/48/5 “Cooperation in examination”.

## Improving the effectiveness of the Technical Committee, Technical Working Parties and Preparatory Workshops

 The TWF considered the proposals concerning possible means of improving the effectiveness of the TWPs and the Preparatory Workshops, and made the following comments:

| **Proposal** | **Comment** |
| --- | --- |
| Technical Working Parties |
| General |
| (a) | conduct a survey of TWP participants in 2014 in order to identify further areas for improvement and to obtain feedback on the effectiveness of measures already taken | * To make the survey available during the meeting
* To encourage a higher response rate
* To add a question on “How to encourage participants to be prepared for the meeting”
 |
| (b) | review the TWP invitations in order to ensure that information is disseminated to all appropriate persons | * To be sent by email at least 3 months before the meeting
* To post the invitation on the UPOV website
* To mention in the invitation the participants at the previous session
* To improve distribution of the invitation but it must go through the UPOV representatives as it is a matter for the UPOV member and the relevant national authority to disseminate to the appropriate persons
* The list of designated persons for the relevant TWP should be checked on a frequent basis
 |
| (c) | in order to encourage greater participation by all participants in the TWP sessions, to request participants at the beginning of the session to introduce themselves and to briefly (in 30 seconds) report the most important issue they faced at that time. Matters of broad interest could then be considered for further discussion at an appropriate time | * Agreed with the 2 proposals
* Need to allocate time in the agenda
* Should be voluntary not mandatory
* Should be just before coffee break to allow time for further discussion during the break
 |
| (d) | organize presentations by experts of members of the Union on topical and relevant matters | * The matters need to be identified and seen as relevant for the TWP
* Should be in the agenda
* Was already implemented in 2014 and brought some interesting technical discussions
* Useful to share experiences
 |
| (e) | request hosts to provide:* name badges for all participants (including local participants),
* a large poster board with the participant names and photographs and a space for each participant to indicate their area of particular interest (specifically including local participants),
* a notice board for host announcements (e.g. visits),
* 2 projector screens in large rooms (at opposite ends of room)
 | * Name badges are already implemented
* To elaborate the list of participants, including areas of expertise
* Announcement board would be welcomed
* Additional changes should not have additional costs for the host
* Guidance should not be too prescriptive on the requirements for the host
 |
| TWP documents |
| (f) | provide a summary of the purpose and proposed decisions at the beginning of TWP documents | * Agreed with the idea of an executive summary
* Would be a great improvement
 |
| (g) | post documents sufficiently in advance of the meetings | * To define sufficient time (e.g. 2 weeks to 1 month)
* Constitute a key for proper preparation of participants
 |
| (h) | continue to include decision paragraphs in TWP documents | * Considered to be very helpful
 |
| (i) | minimize the time for presentation of documents, particularly where presented for information only | * Documents need sufficient time to allow discussion
* Need to find a good balance under the governance of the Chairperson
 |
| Test guidelines |
| (j) | request TWP designated persons to make proposals for new or revised Test Guidelines in advance of the TWP session | * Should be complementary to proposals made during the course of the meeting
* Could be interesting to share first proposals before the session in order to consult experts in authorities
 |
| (k) | circulate the proposed schedule of TG to be discussed during the session to TWP participants one week before the TWP session | * Good proposal in order to avoid conflict and allow experts to join the relevant subgroup
* Should be circulated at least one week before the meeting
 |
| (l) | improve preparation of Test Guidelines and presentation of Test Guidelines at TWPs by the Leading expert by:* training (e.g. electronic training workshops, including the use of the Web-based TG template, and guidance on the presentation of Test Guidelines at the sessions),
 | * Support needed on the web-based TG template training which would improve the preparation and probably the presentation of Test Guidelines
* Document TGP/7 contains also Guidance Notes which could be useful in the training of the LE and should be included in the training
 |
|  | * providing UPOV comments in advance
 | * As soon as possible (e.g. 2 weeks before the session) in order to collect the proposal and study the proposal
* The discussion at the TWP should be just to agree on the draft and not to have new proposals
 |
| TGP documents |
| (m) | request participants to provide their comments on TGP documents in advance of the TWP session, according to a specified date | * This should not avoid discussion during the session
* Should not be mandatory
* Should be complementary with comments during the session
 |
| (n) | organize a separate, annual meeting of a working group to discuss TGP documents in the week before the TC sessions in Geneva. The meetings would be open to all TC and TWP designated persons and consideration would be given to the possibility to view the meeting electronically | * Would have a big impact on cost
* Could disconnect the experts with technical matters contained in TGP documents and disconnect TGP documents from the reality in the fields
* Could be appropriate in a particular case on relevant matters (e.g. special working group)
 |
| (o) | in conjunction with this approach, to report on significant developments at TWPs, without detailed discussion of individual TGP documents | * Not supported
 |
| Technical visit |
| (p) | conduct a survey of TWP participants of their requirements for technical visits | * The technical visit should
	+ be largely determined by the host, with some guidance provided
	+ focus on DUS examination trial if possible
	+ include practical exercises for examination of varieties to share experience and knowledge
	+ be relevant for the interest of the TWPs and participants
 |
| Preparatory Workshops |
| (a) | if the length of time spent on TGP and information documents is reduced, to hold the preparatory workshops on Monday in order to encourage all TWP participants to attend the Preparatory Workshop | * Approach not supported
* Would have a negative impact of the time left in the week as it would reduce time for discussion on other technical matters
 |
| (b) | to use more, shorter presentations and use experts from members of the Union as presenters | * Agreed
* Would need participation from the expert during the Preparatory Workshop
 |
| (c) | to continually renew exercises for existing topics | * Agreed with examples relevant for the TWP
 |
| (d) | to organize small groups of participants with different levels of experience for the group exercises | * Agreed
 |

## Molecular Techniques

 The TWF considered document TWF/45/2.

 The TWF noted the report on developments concerning the use of biochemical and molecular markers in the examination of Distinctness, Uniformity and Stability (DUS).

 The TWF noted the report on developments concerning the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT).

 The TWF noted the report on developments concerning the presentation of information on the situation in UPOV with regard to the use of molecular techniques to a wider audience, including breeders and the public in general.

 The TWF agreed that it would be useful to receive more information on the use of molecular techniques in DUS examination and, in that regard, invited the experts from Spain to provide information on the use of such tools by the *Oficina Española de Variedades Vegetales* (OEVV). The TWF also invited other participants to present their experience on the use of biochemical and molecular techniques in fruit crops at the TWF session in 2015.

 The TWF received a presentation by the expert from France on the study concerning molecular techniques and DUS testing made by the Group for Study and Control of Varieties and Seeds (GEVES), explaining how those techniques are being used in France and especially in relation to the detection of resistance genes, as well as the use of molecular tools on fruit trees. A copy of the presentation made by the expert from France is provided in document TWF/45/2 Add.

## TGP documents

 The TWF considered document TWF/45/3.

### Matters for adoption by the Council in 2014

 The TWF noted the revisions to documents TGP/0, TGP/2, TGP/5, TGP/7 and TGP/8 to be put forward for adoption by the Council at its forty‑eighth ordinary session, as set out in document TWF/45/3, paragraphs 5 to 21.

### Program for the development of TGP documents

 The TWF noted the program for the development of TGP documents, as set out in Annex II to document TWF/45/3.

### Future revision of TGP documents

 The TWF noted that the proposals for future revisions of TGP documents to be discussed by the Technical Working Parties (TWPs) at their sessions in 2014, and considered the TGP documents below on the basis of document TWF/47/3 “TGP documents” and other documents, as indicated.

## Revision of document TGP/7: Plant Material Submitted for Examination

 The TWF considered document TWF/45/12.

 The TWF considered the examples presented by the experts from the European Union and Germany, on their experiences with regard to plant material submitted for examination, and the solutions that had been developed to address problems. The TWF noted in case of the examination of fruit species, the “cyclophysis” effect, which means the effect of the place where the scion is taken from within the mother plant, due to different degrees of maturity, that may have a specific impact on the expression of a particular characteristic. If for example, graftwood material is taken from older trees of one authority's reference collection, in order to produce young trees for comparing them with the plants of a new candidate variety at same age, the fresh grafting, the scion of which represents generative but not vegetative material, subsequently needs removing their immediately occurring inflorescences. This needs to be done during the establishment period, in order to produce a proper tree, with a central leader and sufficient side shoots attached to it.

 The TWF noted the actions taken to avoid the influence of the method of propagation on the outcome of the DUS examination in certain crops. It was also noted that, in the case of blueberry and grapevine, plant material resulting from meristematic tissue could not be accepted for examination due to the risk of somaclonal variation.

 The TWF agreed that authorities in charge of receiving plant material for examination should provide guidance on the requirements of material submitted such as quality and age.

## Revision of document TGP/7: Coverage of the Test Guidelines

 The TWF considered document TWF/45/13 and agreed that Approach 3 “Specify existing type of propagation and anticipate future developments” was the most appropriate guidance for Test Guidelines that are developed on the basis of varieties with one type of propagation when varieties may be developed in the future with other types of propagation. The TWF, therefore, agreed that ASW 8 should be amended to read as follows:

“ASW 8 (TG Template: Chapter 4.2) – Uniformity assessment

1. *“Cross-pollinated varieties*
2. *“Test Guidelines covering only cross-pollinated varieties*

“‘The assessment of uniformity should be according to the recommendations for cross‑pollinated varieties in the General Introduction.’

“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”, Section 4.5: “Testing Uniformity” should be followed.”

[…]

*“(c) Uniformity assessment by off-types (all characteristics observed on the same sample size)*

 *~~(i) Test Guidelines covering only varieties with uniformity assessed by off-types~~*

~~“For the assessment of uniformity, a population standard of { x }% and an acceptance probability of at least { y } % should be applied. In the case of a sample size of { a } plants, [{ b } off-types are] / [1 off-type is] allowed.”~~

 *~~(ii) Test Guidelines covering varieties with uniformity assessed by off-types and other types of varieties~~*

“‘For the assessment of uniformity of [self‑pollinated] [vegetatively propagated] [seed‑propagated] varieties, a population standard of { x }% and an acceptance probability of at least { y } % should be applied. In the case of a sample size of { a } plants, [{ b } off-types are] / [1 off-type is] allowed.’

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

## Revision of document TGP/7: Drafter’s Kit for Test Guidelines

 The TWF considered document TWF/45/14, and noted the plans for a revision of document TGP/7 and the TG Drafter’s webpage for consistency with the introduction of the web-based TG Template in 2014, as set out in document TWF/45/14, paragraphs 6 to 8.

## Revision of document TGP/8: Part I: DUS Trial Design and Data Analysis, New Section: Minimizing the Variation due to Different Observers

 The TWF considered document TWF/45/15.

 The TWF agreed that the draft guidance in the Annex to document TWF/45/15, should continue to be developed for inclusion in a future revision of document TGP/8 on minimizing the variation due to different observers, including guidance on PQ and QN/MG characteristics, taking into account the points raised by the expert from Australia in document TWF/45/15, paragraph 21.

 The TWF received a presentation from the experts from Germany and New Zealand on the previous work done on harmonized variety descriptions for apple for an agreed set of varieties, as reproduced in document TWF/45/28.

 The TWF received information from an expert from the European Union on a ring test project on Apple for the management of variety description to be launched in 2015. The aim of the project will be to identify the reason for differences in variety description between offices in Europe, when using similar varieties and the same rootstock. The TWF requested an expert from the European Union to report on progress with this project at its forty‑sixth session.

 The TWF agreed on the importance on minimizing the variation between different observers and also between authorities and therefore suggested to consider a study on the possibility to start a new project on harmonized variety description for an agreed set of varieties. The expert from Germany proposed to present to the TWF, at its forty-sixth session, a protocol for the project with an agreed list of varieties to be examined, in order to consider if it could be relevant to further develop the study.

 The TWF also noted the importance of the quality of the Test Guidelines in providing clear guidance for DUS examiners and in ensuring the consistency of observations, and the importance of the continuous training of examiners.

 The TWF invited the expert from Australia to report at its forty-sixth session, on the effect of location, observer and year on the conformity of a characteristic for a specific crop.

## Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, Section 3: Method of Calculation of COYU

 The TWF considered document TWF/45/16 and noted the developments concerning the method of calculation of COYU, including the development of a demonstration module in DUST and the practical exercise that would be conducted using real data to compare decisions made using the current and the proposed improved method.

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

 The TWF considered document TWF/45/17.

 The TWF considered the example of a bulk characteristic from the Netherlands and agreed with the TWO at its forty-seventh session that the scale used should have non-overlapping notes (0-5; ~~5~~6-10; ~~10~~11‑15; …).

 The TWF agreed on the development of guidance on the development of characteristics examined on the basis of bulk samples.

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

 The TWF considered document TWF/45/18.

 The TWF received a presentation from an expert from New Zealand on the project for “apple reference varieties”, as reproduced in Annex II to document TWF/45/18. The TWF noted the importance of the quality of the Test Guidelines in providing good consistent characteristics, and a complete set of example varieties ensuring harmonized variety descriptions.

 The TWF noted the explanation of the different forms that variety descriptions could take and the relevance of scale levels in that regard, as presented in Annex III to document TWF/45/18.

 The TWF noted the guidance for producing variety description in Italy, as presented in Annex IV to document TWF/45/18.

 The TWF noted that the results of the practical exercise with a common data set would be presented to the TWC at its thirty-second session.

## Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Guidance of Data Analysis for Blind Randomized Trials

 The TWF considered document TWF/45/19.

 The TWF noted the information provided by the TWO at its forty-seventh session on the use of blind randomized trials in Brazil, New Zealand and in the United Kingdom, including the circumstances under which blind randomized trials are used.

 The TWF noted that the expert of the International Community of Breeders of Asexually Reproduced Ornamental and Fruit Varieties (CIOPORA) was not in favor of the use of Blind Randomized Trials.

 The TWF noted the proposal from the expert from France to continue to work on a new draft incorporating comments from other experts, for consideration by the Technical Committee (TC) and the TWPs at their sessions in 2015.

## Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Examining Characteristics using Image Analysis

 The TWF considered document TWF/45/20 and noted the proposal from the expert from the European Union to prepare a new draft for consideration by the TC and the TWPs at their sessions in 2015.

## Revision of document TGP/8: Part II: New Section: Statistical Methods for Visually Observed Characteristics

 The TWF considered document TWF/45/21.

 The TWF noted the developments concerning a possible New Section: “Statistical Methods for Visually Observed Characteristics” to be introduced in document TGP/8: Part II: Techniques Used in DUS Examination, in a future revision of document TGP/8.

 The TWF agreed with the comment made by the TWO at its forty-seventh session that it should be clarified that the new proposed method was used for the visual observation of individual plants or parts of plants (VS).

## Revision of document TGP/9: Schematic Overview of TGP Documents Concerning Distinctness

 The TWF considered document TWF/45/22 and agreed with the revision of the flow diagram in TGP/9, Section 1.6 “Schematic overview of TGP documents concerning distinctness”, as set out in Annex I to document TWF/45/22. With regard to the Annex II to document TWF/45/22, the TWF proposed to extend the box for TGP/5 to supplementary procedures.

## Revision of document TGP/9: Section 2.5: Photographs

 The TWF considered document TWF/45/22 and agreed with the proposed guidance on photographs for inclusion in document TGP/9, Section 2.5 “Photographs”, as follows:

“2.5.3 The suitability of photographs for the identification of similar varieties is strongly influenced by the quality of the photographs taken by the authority for the varieties in the reference collection and the photograph of the candidate variety provided by the applicant with the Technical Questionnaire. Comprehensive guidance for taking suitable photographs is provided in TGP/7, GN 35 (new). The guidance was developed in particular for the applicants to provide suitable photographs of the candidate variety. The same instructions are important and useful for the authorities to take photographs of the varieties in the variety collection under standardized conditions.”

## Revision of document TGP/9: Method of Observation (Single Measurement – MG)

 The TWF considered document TWF/45/22 and proposed example of a single record for a group of plants (MG) taken on plant parts for inclusion in a future revision of document TGP/9, Subsections 4.3.2 “Single record for a group of plants or part of plants (G)” and 4.3.4 “Schematic summary”, as set out in document TWF/45/22, paragraphs 16 and 17.

 The TWF agreed with the comment made by the TWO at its forty-seventh session, that the example of a single record for a group of plants (MG) taken on plant parts for inclusion in a future revision of document TGP/9, Section 4.3.2 “Single record for a group of plants or parts of plants (G)” and Section 4.3.4 “Schematic Summary” should read as follows:

“Example (MG)

“Measurement (MG): “Leaf blade: width” in Hosta (vegetatively propagated): a representative measurement in the plot.”

 The TWF also agreed with the comment made by TWO at its forty-seventh session that a suitable illustration should be provided for inclusion in document TGP/7, Subsection 4.3.4.

 The TWF noted the comment from the expert from Germany in relation to the method of observation MG in current adopted Test Guidelines for fruit species, where all morphological characteristics are indicated as VG/MS, while phenological characteristics indicated as MG. In the case of assessments made on organs taken from all over the plot without noting the individual plants, (e.g. taking a representative fruit sample after harvest), the method of observation should be indicated as MG. In a number of existing Test Guidelines for fruit crops, the method of observation should therefore be reconsidered.

 The TWF agreed that the comment made by the TWO at its forty-seventh session, to declare a single plant as representative for the entire plot, as soon as uniformity aspects has been found sufficiently fulfilled, is not so applicable in the fruit sector.

 The TWF agreed that MS should only be considered where each individual plant is measured. In case of several measurements taken for a group of plants or a few groups of plants within the same sample, it should be considered as MG.

## Revision of document TGP/14: Section 2.4: Apex/Tip Characteristics

 The TWF considered document TWF/45/23.

 The TWF considered the proposal to develop an explanation on the inclusion of a state of expression based on a differentiated tip in shape of apex characteristics, and agreed with the proposal made by the TWO at its forty-seventh session, to amend document TGP/14, section 2.4 as follows:

“2.4.1 The apex of an organ or plant part is the end furthest from the point of attachment. In some cases, the distal extremity of the apex may be differentiated into a “TIP”.

“2.4.2 In considering the approach to describe the apex, the size of the organ and the number of apex shapes should be taken into account. Apex characteristics can be described in simple terms and if a differentiated tip is present it could be further described as a separate characteristic. Generally, it is not necessary to separate the apex shape characteristic.

“2.4.3 In cases where it is appropriate to separate into differentiated tip and apex characteristics, the shape of the apex is taken as the general shape, excluding any differentiated tip. For example: […]”

 The TWF also agreed with the comment made by TWO at its forty-seventh session that the approach in document TGP/14 for shape of apex and tip characteristics was most suitable for leaves or larger structures and should be used in particular cases only.

## Variety denominations

 The TWF considered document TWF/45/4.

### Possible revision of document UPOV/INF/12 “Explanatory Notes on Variety Denominations under the UPOV Convention”

 The TWF noted the plans to revise document UPOV/INF/12 “Explanatory Notes on Variety Denominations under the UPOV Convention”.

### Possible development of a UPOV similarity search tool for variety denomination purposes

 The TWF noted the report concerning the possible development of a UPOV similarity search tool for variety denomination purposes and that the first meeting of the working group would be arranged for June/July, 2014.

### Developments concerning potential areas for cooperation with the IUBS Commission and the ISHS Commission

 The TWF noted the developments concerning potential areas for cooperation between the International Commission for the Nomenclature of Cultivated Plants of the International Union for Biological Sciences (IUBS Commission), the International Society for Horticultural Science Commission for Nomenclature and Cultivar Registration (ISHS Commission) and UPOV, as set out in document TWF/45/4.

Management of variety collections for DUS examination

 The TWF received a presentation by the expert from the European Union on “Management of variety collection for DUS examination” as reproduced in document TWF/45/26.

## Uniformity assessment

 The TWF considered document TWF/45/9 and the situations described in the Annexes I to IV as a basis to develop guidance in document TGP/10.

 The TWF agreed with the comment made by the TWO at its forty-seventh session that clarification should be provided on the decision to be taken in Situation B, Alternative (a) “the trial is repeated at both locations for a second year”, in case after repeating a trial for the second year a variety is within the uniformity standard in one growing location or year but is not within the uniformity standard in the other growing location or year.

 The TWF, agreed that the approaches were not relevant for the fruit sector, because vegetatively propagated varieties did not appear to be in the scope of the document.

## Experience with new Types and Species

 The TWF was informed by the expert from Spain about testing of *Diospyros kaki* (common name: Persimmon), *Punica granatum* (common name: Pomegranate) and *Eriobotrya japonica* (common name: Loquat). The expert from Spain agreed to make a presentation about those species at the TWF session in 2015.

 The TWF was informed by the expert from Germany about testing of *Lycium barbarum* (common name: Chinese Wolfberry, Goji berry). The expert from Germany agreed to make a presentation about that species at the TWF session in 2015.

 The TWF was informed by the expert from the European Union about testing of blueberry medium chilling type. The expert from the European Union agreed to make a presentation about that type at the TWF session in 2015.

 The TWF was informed by the expert from Mexico about testing of *Jatropha curcas* L. The expert from Mexico agreed to make a presentation about that species at the TWF session in 2015.

 The TWF received a presentation on date palm (*Phoenix dactylifera*) from an expert from Oman, as reproduced in Annex IV of this document.

## Duration of DUS tests in the fruit sector

 The TWF considered document TWF/45/27 presented by an expert from the European Union in relation to the duration of DUS test in the fruit sector.

 The TWF received a presentation from an expert from the European Union on a CPVO project on “Reducing the number of obligatory observation periods in DUS testing for candidate varieties in the fruit sector”. A copy of the presentation is reproduced in document TWF/45/27 Ad.

 The TWF agreed that the standard wording currently used in some fruit Test Guidelines with regard to minimum duration period and the number of growing cycles, might be improved in some cases. It therefore requested the leading experts to propose suitable wording for their draft Test Guidelines in 2015 and requested the expert from the European Union to collate the options developed by the leading experts and to seek to develop possible new standard wording options.

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

 The TWF considered document TWF/45/29 “Partial Revision of the Test Guidelines for Peach (Document TG/53/7)” presented by the Leading expert Mr. Richard Brand (France).

 The TWF agreed to the proposals for revision of the Test Guidelines for Peach, as requested by the TC at its fiftieth session, and as reproduced in the Annex to document TWF/45/29, subject to the following amendment for Chapter 5.3 “Grouping Characteristics”:

1. Tree: size (characteristic 1)
2. Flower: type (characteristic 9)
3. Leaf blade: red mid-vein on the lower side (characteristic 28)
4. Petiole: nectaries (characteristic 30)
5. Petiole: shape of nectaries (characteristic 31)
6. Fruit: shape (in ventral view) (characteristic 33)
7. Fruit: pubescence of skin (characteristic 44)
8. Fruit: carotenoid coloration of flesh (characteristic 51)
9. Fruit: acidity (characteristic 57) with the following groups:

- low

- medium

- high

1. Fruit: flesh type (TQ characteristic), with the following groups:

- melting

- non-melting

- stony hard

1. Time of beginning of flowering (characteristic 67)

(l) Time of maturity (characteristic 68)

## Discussion on draft Test Guidelines (Subgroups)

### \*Acca (Acca sellowiana (Berg) Burret)

 The subgroup discussed document TG/ACCA(proj.3), presented by Mr. Chris Barnaby (New Zealand), and agreed the following:

|  |  |
| --- | --- |
| Alternative names | to read “Feijoa” in FR, DE, ES and to provide other Spanish name(s) |
| 2.2 | to read: “The material is to be supplied in the form of one-year-old trees. The trees can be propagated by cuttings or grafted on a rootstock as specified by the testing authority” |
| 3.1.3 | to read: “In particular, it is essential that the trees produce a satisfactory crop of fruit in each of the two growing cycles.” |
| 3.3.1 | to delete last sentence of paragraph |
| 4.2.2 | to read “…, no off-types are allowed.” |
| T.o.C. | example variety “Alcantara” to become “SCS411 Alcantara”example variety “Helena” to become “SCS412 Helena”example variety “Mattos” to become “SCS4114 Mattosexample variety “Nonante” to become “SCS415 Nonante” |
| Char. 1 | to be indicated as QNto read: “semi-upright” |
| Char. 6 | to read (1) “very low”, (2) “low”, (3) “medium”, (4) “high” |
| Char. 8 | to read state (1) “below middle”to read state (3) “above middle” |
| Char. 10 | to check name of state (1) |
| Char. 18 | to be indicated as VG |
| Char. 22 | to read: “Style: color of upper half” |
| Char. 23 | to read: “Stigma: position in relation to anthers”to read state (1) “slightly above” |
| Char. 24 | to delete (+) |
| Char. 25 | to add state (1) “very short” |
| Char. 28 | to read: “Fruit: shape” |
| Char. 31 | to have states (1), (2), (3) |
| Char. 32 | to read state (2) “semi-erect”to delete (+) |
| Char. 34 | to read: “Fruit: rugosity of skin”to read states (1) “absent or very slight”, (2) “slight”, (3) “moderate”, (4) “strong” |
| Char. 36 | to have states (1), (2), (3)to add (+) and to add to existing Ad. 37 and Ad. 39 to check whether to provide example varieties |
| Char. 37 | to check whether to provide example varietiesto have states (1), (2), (3) |
| Char. 40 | to read state (1) “transparent”to provide example varieties for state (1) |
| Char. 41 | to be indicated as VGto delete (+) and explanation |
| Char. 42 | to replace example variety “Kakariki” with “Waitui” |
| 8.1 | to read “(b) Observations on the flower should be made when approximately 50% of flowers on a tree are open.”“(c) Observations on the fruit should be made when harvested.” |
| Ad. 2 | to read: “Observation should be made during active vegetative growth. The vigor of the tree should be considered as the overall abundance of vegetative growth.” |
| Ad. 6, 7, 8 | to read: “low 🡨 width (ratio length/width) 🡪 high” |
| Ad. 10 | to improve illustration for state (1) (see TGP/14, 3.2) |
| Ad. 25, 26 | to delete “(diameter)” from the illustration |
| Ad. 27, 28 | to read “low 🡨 width (ratio length/width) 🡪 high” |
| Ad. 29 | to add dotted line indicating symmetry |
| Ad. 31 | to improve illustration |
| Ad. 37, 39 | to add “Ad. 36: Fruit: thickness of skin”to read “individual locule” in the legend to read: “The thickness of the pericarp is the broadest width of flesh from the edge of the locule to the skin.”to indicate where to observe the skin  |
| TQ 1.2 | to add common name “Pineapple Guava” |

### Apple Rootstock (Partial revision: example varieties)

 The subgroup discussed document TG/163/4(proj.5), presented by Mrs. Carensa Petzer on behalf of the leading expert Mr. Hennie Venter (South Africa), and agreed the following:

|  |  |
| --- | --- |
| 4.2.2 | to read “…, no off-types are allowed.” |
| 6.4 | to specify that example varieties in the Table of characteristics are from the South African’s set |
| T.o.C. | to check example varietiesto read example varieties CG 934 and CG 202 throughout  |
| Char. 5 | to read: “Plant: number of spines” |
| Char. 23, 25, 42 | to add (+) and illustration |
| Char. 36 | to read state (1) “none or few” |
| Ad. 34 | to delete “amount of” |
| 11. Annex | to check and review example varieties  |

### Avocado rootstock (Persea Mill.)

 The subgroup discussed document TG/PERSE(proj.1), presented by Mr. Alejandro F. Barrientos‑Priego (Mexico), and agreed the following:

|  |  |
| --- | --- |
| Cover pageName box | to specify species (*Persea americana* Mill. and *P. schiedeana* Nees) |
| Associated documents | to add Avocado TGs TG/97/4 as associated document |
| 2.3 | to read: “5 trees.” |
| 4.1.4 | to read “varieties” instead of “trees” |
| T.o.C. | to review example varieties |
| Char. 2 | to be indicated as PQ |
| Char. 6 | to read: “Shoot: pubescence on internodes” |
| Char. 8 | to be indicated as PQ |
| Char. 9 | to read: “Vegetative lateral bud: position in relation to shoot” |
| Char. 10 | to read: “Vegetative lateral bud: size”to have states (1), (2), (3) |
| Char. 11 | to read: “Vegetative lateral bud: shape” |
| Char. 12 | to read: “Shoot: size of terminal bud” |
| Char. 13 | to read: “Shoot: shape of terminal bud” |
| Char. 14 | to read: “Shoot: pubescence of terminal bud”to add state (2) “weak” and state (4) “strong” |
| Char. 15 | to add (+) |
| Char. 16 | to move char. 16 after char. 3to add state (2) “weak” and state (4) “strong” |
| Char. 17 | to read: “Young leaf: coloration of pubescence on petiole” |
| Char. 22 | to be indicated as VG/MG |
| Char. 24 | to read: “Leaf blade: shape of apex (excluding tip)”to read states (1) “acute”, (2) “obtuse”, (3) “rounded” |
| Char. 27 | to read: “Leaf blade: twisting along length” |
| Char. 30 | to read: “Leaf blade: venation on upper side”to delete example variety “Merensky 2” in state (3) |
| Char. 31 | to have states (1), (2), (3)to read state (2) “medium” |
| Char. 33 | to add (+) to read state (3) “strong” |
| Char. 36 | to read: “Petiole: groove” |
| Char. 37 | to read: “Petiole: cross section”to be indicated as VGto read state (1) “broader than tall”, (2) “as broad as tall”, (3) “taller than broad” |
| Char. 38 | to be indicated as VG/MG |
| 8.1 (a) | to read: “Shoot / leaf: Observations on mature leaves and shoots should be made on branches or stems which are not showing signs of new flush on the outside of the tree. They should be made in the middle third of the last current season's growth and close to next budbreak.” |
| 8.1 (b) (new) | Leading expert to provide explanation on lateral shoots and to provide illustration on lateral bud versus terminal bud |
| Ad. 16 | to read: “Should be assessed on the upper third of the shoot and without considering the color of lenticels on the stem. “ |
| Ad. 22, 23 | to review grid |
| Ad. 24 | to add a dotted line to exclude the tip |
| Ad. 29 | to improve illustration for state (1) |
| Ad. 33 | to provide method |
| 9. | to complete |
| TQ 1.3 | to update and add species (see Prunus rootstocks TG/187/2(proj.3)) |

### Chestnut (Castanea sativa Mill.) (Revision)

 The subgroup discussed document TG/124/4(proj.1), presented by Mr. Takeshi Esaki and Mr. Katsumi Yamaguchi (Japan), and agreed the following:

|  |  |
| --- | --- |
| Cover pageName box | to read: “…; *Castanea crenata* Siebold & Zucc.; …” |
| Alternative names | to read: Botanical names “*Castanea sativa* Mill.*Castanea crenata* Siebold & Zucc.*Castanea mollissima* Blume”to read: English: “Sweet chestnutJapanese chestnutChinese Chestnut”to read: French: “ChâtaignierChâtaignier du JaponChâtaignier de Chine”to read: German: “Edelkastanie; EsskastanieJapanische KastanieChinesische Kastanie”to read: Spanish: “CastañoCastaño del JapónCastaño de China” |
| 1. | to read: “These Test Guidelines apply to all varieties of *Castanea sativa* Mill., *Castanea crenata* Siebold & Zucc., *Castanea mollissima* Blume and hybrids among these species. |
| 2.2 | to read: “The material is to be supplied in the form of dormant shoots for grafting or two-year-old trees grafted on a rootstock selected by the testing authority.” |
| 2.3 | to read:“- 10 dormant shootsor- 6 two-year-old trees.” |
| 4.2.2 | to read: “…, no off-types are allowed.” |
| 6.4 | to delete “Example varieties are separated into four groups:“Group A: Castanea sativa Mill.“Group B: Castanea crenata Siebold & Zucc.“Group C: Castanea mollissima Bl.“Group D: Hybrids among above three species”to provide information on example varieties in a table under new chapter 8.3 |
| T.o.C. | to move indication next to example varieties (A), (B), (C) in the table in new chapter 8.3to review example varieties and to decide on regional sets to review all method of observation (MG, VG, MS, …) |
| Char. 1 | to delete |
| Char. 1 new | to add (+)  |
| Char. 2 | to read state (1) “upright”to read state (2) “semi-upright” |
| Char. 5 | to review |
| Char. 6 | to be indicated as QL |
| Char. 9, 12, 13, 29 | to be moved towards end according to TGP/7 |
| Char. 10 | to consider reducing number of states |
| Char. 14 | to check whether to be indicated as QL |
| Char. 15 | to add (+) and explanation |
| Char. 16 | to read “Leaf: profile in cross section”to add (+) and explanation on how to assess`to be indicated as QNto read state (3) “strongly concave” |
| Char. 17 | to be indicated as QNto read state (3) “strongly asymmetric” |
| Char. 18 | to have states (3) “low”, (5) “medium”, (7) “high” to add (+) and illustration in a grid |
| Char. 19 | to have states (1), (2), (3)to add (+) and illustration/explanation referring to the attitude |
| Char. 20 | to read: “Leaf: intensity of green color of upper side” |
| Char. 21 | to check whether to be indicated as QL |
| Char. 22 (new) | to read: “Leaf: shape”to read state (3) “broad elliptic” |
| Char. 23 (new) | to read state (1) “narrow acuminate”to read state (2) “broad acuminate” |
| Char. 25 | to be indicated as QLto check whether different types of serrate according to TG/14/9 (apple) could be applicable |
| Char. 26 | to read “Leaf: symmetry of base”to be indicated as QNto add (+) and illustration |
| Char. 27 | to check whether to be indicated as PQ with 3 states |
| Char. 28 | to read “Leaf: ratio length of leaf blade/ length of petiole”to read states (3) “low”, (5) “medium”, (7) “high” |
| Char. 29 | to read “Time of maturity for consumption” |
| Char. 30 (new) | to be indicated as PQto read states (1) “globose”, (2) “obloid”, (3) “cylindric” |
| Char. 31 (new) | to delete (+) |
| Char. 32 | to be indicated as QLto add (+) and explanation/illustration (ref. to TG/124/3 Ad. 27)to check whether suitable characteristic for DUS examination  |
| Char. 33 | to add (+) and explanation (ref. to TG/124/3)to check whether suitable characteristic for DUS examination |
| Char. 34, 35 | to add (+) and explanation/illustration |
| Char. 36 | to read: “Nut: shape” |
| Char. 37 | to read: “Nut: distribution of pubescence” |
| Char. 38 | to read: “Nut: size of hilum” |
| Char. 39 | to read: “Nut: shape of border line of hilum and pericarp” |
| Char. 40 | to read: “Nut: contrast of hilum to pericarp” |
| Char. 41 | to read: “Nut: glossiness (immediately after opening of involucre) |
| Char. 42 | to read: “Nut: color of skin” |
| Char. 43 | to read: “Nut: size” |
| Char. 36 | to be indicated as PQto read states (1) “medium ovate”, (2) “broad ovate”, (3) “circular”, (4) “broad oblate”, (5) “medium oblate” |
| Char. 37 (new) | to read: “Nut: extent of pubescence on upper part”to read states (1) “small”, (3) “medium”, (5) “large” |
| Char. 39 | to be indicated as PQto read state (2) “curved”to read state (3) “wavy” |
| Char. 40 | to read: “Nut: conspicuousness of hilum”to read states (1) “inconspicuous”, (2) “moderately conspicuous”, (3) “strongly conspicuous” |
| Char. 41 | to consider increasing the number of states |
| Char. 42 | to read state (2) “medium brown” |
| Char. 45 | to read state (2) “whitish yellow” |
| Char. 46 | to be indicated as QL |
| 8.1 | to add note: “All observations on the leaf should be made on the leaf blade” |
| Ad. 1 (new) | to add explanation “Overall abundance of vegetative growth” (standard wording) |
| Ad. 15 | to add explanation “To be assessed by leaf area” |
| Ad. 24 | to add explanation on where to observe on the shoot |
| Ad. 44 | to read: “The adherence to kernel should be determined by observation of easiness of peeling seed coat by hand after just harvested fruits are steamed for 50 minutes or roasted for 10 to 15 minutes at 200-230 oC.” |

### Coconut (Cocos nucifera L.)

 The subgroup discussed document TG/COCOS(proj.3), presented by Mrs. Vera Machado (Brazil), and agreed the following:

|  |  |
| --- | --- |
| 1. | to read: “These Test Guidelines apply to all varieties of *Cocos nucifera* L. |
| 2.2 | to read: “The material is to be supplied in the form of mature fruits.” |
| 2.3 | to read: “20 mature fruits.” |
| 3.1.1 | to read: “The minimum duration of tests should normally be two independent growing cycles.” |
| 3.1.2 | to read: “The growing cycle is considered to be the period ranging from the beginning of development of an inflorescence, through fruit development and concluding with the harvesting of fruit from the corresponding individual inflorescence.” |
| 3.1.3 (new) | to read: “In particular, it is essential that the tree produce a satisfactory crop of fruit in each of the two growing cycles.” |
| 3.3 | to read: “The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.” |
| 3.4.1 | to read: “Each test should be designed to result in a total of at least 12 plants.” |
| 4.1.1 | to check standard wording for second paragraph: “Further guidance is provided in documents …” |
| 4.2.2 | to read: “For the assessment of uniformity, a population standard of 1% …” |
| 5.3 | to be consistent with TQ 5 |
| T.o.C. | to check example varieties |
| Char. 1 | to delete |
| Char. 3 | to read: “Young plant: time of leaf splitting” |
| Char. 7 | to read: “Stem: diameter of bole” |
| Char. 8 | to update example varieties |
| Char. 11 | to read: “Petiole: thickness in cross section” |
| Char. 16 | to read: “Leaflet: length” |
| Char. 17 | to read: “Leaflet: width” |
| Char. 18 | to read “Leaflet: intensity of green color”  |
| Char. 19 | to read: “Peduncle: length” |
| Char. 20 | to read: “Peduncle: width” |
| Char. 21 | to read: “Inflorescence: length of central axis” |
| Char. 21 a  | to delete |
| Char. 23 | to provide example varieties |
| Char. 24 | to read: “Inflorescence: length of first spikelet with female flowers” |
| Char. 25 | to delete (+)to check example varieties |
| Char. 26 | to have states (1), (2), (3), (4) |
| Char. 27 | to be indicated as VG |
| Char. 28 | to read: “Fruit: size”to read states (3) “small”, (5) “medium”, (7) “large”to update example varieties |
| Char. 29 | to delete |
| Char. 30 | to update example varietiesto add (+) |
| Char. 31 | to read state (1): “obovate” |
| Char. 35 | to add (+) |
| 8.1(a) | to read: “Palm, stem, petiole and leaf: Observations should be made at the time when the eleventh leaf scars appears (see photo Ad. 5 to 9: leaf scars). Observations on leaf and petiole should be made at 14th mature leaf.” |
| 8.1(c) (new) | to read: “Leaflet: Observations on the leaflet should be done at the middle of the rachis taking two opposite leaflets.” |
| 8.1(d) (old (c)) | to read: “Bunch, peduncle and fruit color: Observations on the bunch, peduncle and fruit color should be made at the time of consumption as coconut water (at 6-7 months age fruit), after the appearance of the sixth bunch onwards.” |
| 8.1(e) (old (d)) | to read: “Fruit, nut, shell and meat: Observations on the fruit, nut, shell and meat should be made at maturity for consumption as fresh meat (at 11-12 months age fruit), after the appearance of the sixth bunch onwards.” |
| Ad. 3 | to delete picture 1 |
| Ad. 8 | to read: “The stem height should be observed from the ground to the top of the 11th scar (see photo Ad. 5 to 9: leaf scars).” |
| Ad. 9 | to read: “The stem width should be measured halfway from the ground to the top of the 11th scar.” |
| Ad. 10 | to read: “The petiole length should be observed from base to the most proximal leaflet of the rachis.” |
| Ad. 11  | to improve illustration |
| Ad. 11, 12 | to read: “The petiole thickness and the petiole width should be observed at the insertion of the first leaflet.” |
| Ad. 14 | to add illustration: to correct spelling imagemRACHIS LENGHT |
| Ad. 19, 20 | to add illlustration: to correct spellingimagem**MEASURE PEDUNCLE WIDTH AT THE POINT OF THE FIRST SPIKELET INSERTION** |
| Ad. 21 a | to delete |
| Ad. 23 | to update illustration |
| Ad. 24 | to add illustration:Imagem 057 |
| Ad. 26 | to delete Ad. |
| Ad. 27 | to improve grid  |
| Ad. 28 | to clarify method of observation; to be assessed on 24 fruits (12x2) |
| Ad. 29, 31, 33, 34 | to delete Ad. 29 |
| Ad. 30 | to read: “Fruit: aroma of coconut water“The aroma is assessed by smelling the water at the maturity stage for consumption as water.” |
| Ad. 31 | to improve grid |
| 9. | to be updated |

### Black Walnut (Juglans nigra L.)

 The subgroup discussed document TG/JUGLA(proj.1), presented by Mr. Pedro Miguel Chomé Fuster (Spain), and agreed the following:

|  |  |
| --- | --- |
| Cover page Name box | to add “*Juglans major* (Torr.) A. Heller*”*, “*Juglans hindsii* (Jeps) Jeps”to provide UPOV codes  |
| Alternative names | to read: Botanical names:*Juglans nigra* L.*Juglans major* (Torr.) A. Heller*Juglans hindsii* (Jeps) JepsEnglish:Black WalnutArizona WalnutNorthern California WalnutFrench:Noyer--German:Schwarznuß--Spanish:Nogal negroNogal de ArizonaNogal negro de Californiato complete common names |
| 1. | to read (b) *Juglans major* (Arizona Walnut)(c) *Juglans hindsii* (Northern California Walnut) |
| 3.1.1 | to read: “The minimum duration of tests should normally be two independent growing cycles. In particular, it is essential that the trees produce a satisfactory crop of fruit in each of the two growing cycles.” |
| 3.1.2 | to read: “The growing cycle is considered …” |
| 3.3 | to delete last sentence |
| 4.1.4 | to delete: “, disregarding any off-type plants” |
| 5.3 | to align with T.o.C. (char. 13 and 14 to be indicated as (\*))to delete “(f) Time of leaf drop (characteristic 19)” |
| T.o.C. | to move all “BM, CM, Ff, etc.” indications of phenotypical stages to first or second column as for TG/grapevineto consider adding characteristics from TG/125/7 and TG/25/6 (and Pecan Nut)to delete example variety “*J. regia* …”to delete (G) in second column |
| Char. 1 | to be indicated as PQ |
| Char. 2 | to be indicated as VG |
| Char. 3 | to read: “Leaf: presence of terminal leaflet”to be indicated as VGto check example varietiesto delete state (2)to read states (1) “absent” and (9) “present” |
| Char. 3.a (new) | to read: “Leaf: size of terminal leaflet in relation to lateral leaflet”to check whether to be reworded “Only varieties with terminal leaflet: present: Leaf: size of terminal leaflet in relation to lateral leaflet”to be indicated as QNto be indicated as VGto have key (1) (in second column)to have state (1) “smaller” and to check example varietiesto have state (2) “as large as” with example variety “Mj2-2, 722”to have state (3) “larger” and to check example varieties |
| Char. 4 | to add (+) and explanation  |
| Char. 5 | to read: “Female flower: conspicuousness before the Df stage”to check whether in correlation with char. 17to check how to reword states if char. remains |
| Char. 6 | to check possible combinations of flower arrangementsto be indicated as VGto have states (1) to (5) |
| Char. 7 | to read: “Stigma: intensity of anthocyanin coloration” and move “Ff2” to first or second columnto have states (1) “absent or very weak”, (2) “weak”, (3) “medium”, (4) “strong”, (5)  “very strong”to be indicated as VG |
| Char. 8 | to read: “Stigma: length”to be indicated as VGto have states (1) “very short”, (2) “short”, (3) “medium”, (4) “long”, (5) “very long” |
| Char. 9 | to read: “Stigma: attitude”to check whether to have states (1) “upright”, (2 “spreading”, (3) “drooping”to be indicated as VG |
| Char. 10 | to check whether QLto read: “Male flower: presence of well developed catkins”to have states (1) “absent”, (9) “present” |
| Char. 11 | to read: “Catkin: shape”to read states (1) “broad obovate”, (2) “narrow obovate”, (3) “oblong”to be indicated as PQ |
| Char. 12 | to read: “Nut: shape in longitudinal section perpendicular to suture” |
| Char. 13 | to be indicated as PQto add (\*)to read: “Nut: shape of base perpendicular to suture”to check wording for state (6) |
| Char. 14 | to read: “Nut: shape of apex perpendicular to suture”to be indicated as PQto add (\*) |
| Chars. 15, 16, 17, 19  | to be indicated as MG |
| Char. 16 | to read: “Time of male flowering” |
| Char. 17 | to read: “Time of female flowering” |
| Char. 18 | to be indicated as VGto refer to TG/125/6, char. 35 both for wording and for states |
| Char. 19 | to delete (\*) |
| 8.1 | to clarify stages (Ff2/ Df/ Cf…): to add table of stagesto clarify explanations |
| Ad. 4 | to read: “Juvenile phase means that the tree is less than five years old.” |
| Ad. 11 | to show illustrations upside down and to show pedicelto have states (1) “broad obovate”, (2) “narrow obovate” (3) “oblong” and to swap drawings 2 and 3 |
| Ad. 12 | to provide photos for all states |
| 9. | to be updated |
| TQ 1.1 and 1.2 | to update as for section 1. |
| TQ 1. | to check whether to add 1.3 “Species” and boxto check whether to add 1.4 “Hybrids” and box |
| T.Q. 5.6 (19) | to be deleted |

### Mandarins (Citrus L. - Group 1) (Partial revision)

 The TWF received a presentation from Mr. Jean Maison (European Union), the coordinator of the Subgroup as presented in document TWF/45/31 Rev.

 The Leading expert presented the proposal for the partial revision of the Test Guidelines for Mandarin (TG/201/1) as presented in document TWF/45/30.

 The TWF noted that the results from Spain were presented at its forty fourth session, as provided in the Annex to document TWF/44/30.

 The experts from Morocco and South Africa reported on their results of the ring test as provided in document TWF/45/31 Ad. and document TWF/45/31 Ad. 2 Rev., respectively.

 On the basis of the results of the ring test:

* + - the Delegation of Morocco is of the opinion that the characteristic ‘*Fruit: number of seeds (controlled manual cross-pollination)*’ does not fulfill the requirements for UPOV characteristic since it is not sufficiently repeatable;
		- the Delegations of Spain and South Africa are of the opinion that the characteristic ‘*Fruit: number of seeds (controlled manual cross-pollination)*’ does fulfill the requirements for a UPOV characteristic with the methodology defined in the ring test.

Therefore, the TWF noted that there was no consensus to modify characteristic 99 or to add a new characteristic 98.

 The TWF noted the consensus to amend characteristic 25 “Anther: viable pollen”” of the Test Guidelines for Mandarin (TG/201/1) as presented in document TWF/45/30.

 The TWF noted the absence of consensus for further amendment of the Test Guidelines for Mandarin (TG/201/1).

 The TWF noted the information provided by the expert from Spain on the use at national level of the characteristic ‘Fruit: number of seeds (manual pollination)’ as a QN characteristic with a range of stages of expression from 1 to 9.

 The TWF noted the intention of the delegation from Spain to notify the utilization of this characteristic at national level and the notification as an additional characteristic to the Office of the Union according to the procedure set out in document TGP/5 section 10.

 The TWF noted the reservations from the delegation of Morocco on the use of this characteristic in the absence of consensus.

 The TWF expressed its appreciation for the work done by Mr. Jean Maison (European Union), as coordinator of the subgroup.

### \*Papaya (Carica papaya L.) (Revision)

 The subgroup discussed document TG/264/2(proj.7), presented by Mr. Alejandro F. Barrientos‑Priego (Mexico), and agreed the following:

|  |  |
| --- | --- |
| 3.1.3 (new) | to read: “In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles.” |
| 3.3 | to delete last sentence (moved to 3.1.3) |
| 3.4.1 | to read “varieties” instead of “plants”to be redrafted: to mention at least 15 hermaphrodite plants and at least 15 female plants if exist |
| 4.1.4 | to be amended according to the changes to be made in 3.4.1 |
| 4.2.2 | to read “…, no off-types are allowed.” |
| 4.2.3 | to check the uniformity for seed-propagated hybrids varieties |
| Char. 11 | to add (b) and to amend explanation in (b): Leaf + leaf blade + petiole |
| Char. 12 | to delete (+) |
| Char. 13 | to add (+) |
| Char. 16 | to delete (\*) |
| Chars. 17, 19, 21 | to be deleted |
| new Char. | to read: “Peduncle: length in female plants”to provide example varieties  |
| new Char. | to read: “Fruit: length in female plants” to provide example varieties |
| new Char. | to read: “Fruit: shape in female plants” to provide example varieties |
| Char. 26 | to read: “Fruit: width”to add (+) to read: “To be assessed at the broadest part.” |
| Char. 27 | to read: “Fruit: ratio length/width” |
| Char. 41 | to read states (3): “weakly stellate”, (4): “strongly stellate” |
| Char. 48 | to read states (1) “low”, (2) “medium”, (3) “high”to be indicated as MG |
| 8.1 (b) | to read: “Leaf, leaf blade and petiole: Observations on the leaf blade and petiole should be made on mature leaves. Leaves should be taken from the middle third of the current season’s growth when the first inflorescence or single flower has appeared.” |
| 8.1 (c) | to be clarified |
| 8.1 (d) | to read: “Fruit: Observations should be on a fruit taken from the middle of the fruiting area. A fruit is considered ripe when the color change is complete.” |
| Ad. 7, 8, 9 | to use illustration from Ad.10 to indicate length/width |
| Ad. 16 to 21 | to delete Ad. 17 |
| Ad. 28 | to review order of states |
| Ad. 47 | to improve illustration |
| Ad. 48 | to read: “The amount of mucilage is determined visually by hand separating the mucilage from the seed.” |

### \*Pecan nut (Carya illinoinensis (Wangenh.) K. Koch)

 The subgroup discussed document TG/PECAN(proj.10), presented by Mr. Alejandro F. Barrientos‑Priego (Mexico), and agreed the following:

|  |  |
| --- | --- |
| 3.1.3 (new) | to read: “In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles.” |
| 3.3 | to delete last sentence (moved to 3.1.3) |
| Char. 4 | to read state (2): “reddish brown” |
| Char. 8 | to read: “Leaf: terminal leaflet: ratio length/width”to have an illustration |
| Char. 9 | to be indicated as VG/MS |
| Char. 12 | to delete (+) |
| Char. 18 | to clarify when to observe and provide illustration on each different states |
| Char. 21 | to read “Nut: width in lateral view facing the suture” |
| Char. 22 | to read “Nut: shape in lateral view facing the suture” |
| Char. 23 | to add (\*) |
| Char. 24 | to read “Nut: shape in ventral view facing the attachment”to be indicated as PQto read state (1) “broad oblate” |
| Char. 25 | to read: “Nut: shape of apex in lateral view (excluding tip)”to reverse order of states |
| Char. 29 | to be indicated as VG/MSto add (+) and explanation |
| Char. 30 | to read: “Kernel: size of the kernel in relation to the size of the nut”to add (+) and illustrationto add (c)to have states (1) “small”, (2) “medium”, (3) “large” |
| Char. 31 | to be indicated as MS |
| Chars. 33, 34, 35 | to be indicated as MG |
| 8.1 | to read:“(a) Leaf/Leaflet: observations should be made at the end of leaflet expansion on fully developed leaflets. Leaves on the middle section of a one year old shoot.“(b) Flower: observations should be made at full receptivity of stigma when stigma is turgid and sticky. Observation must be done on the terminal section of a one-year-old shoot.“(c) Husk nut: observations should be made at husk opening stage, 24 weeks after pollination. At Full development of the nut. Observation must be done on the terminal section of a one-year-old shoot.” |
| Ad. 6 to 12 | to delete Ad. 12 |
| Ad. 22 | to improve grid |
| Ad. 29 (new) | to read: “To be observed with the help of a Vernier calliper.” |
| Ad. 31 | to read: “The weight of the kernel should be assessed as the average weight of 10 kernels when ready for consumption.” |
| Ad. 33 | to read: “The time of leaf burst should be considered when 75% of the buds are open.” |
| Ad. 34 | to read: “The time of leaf fall should be considered when 75% of the leaves have fallen.” |
| Ad. 35 | to read: “The time of husk opening should be considered when 75% of the husks are split.” |
| 8.3 | to be deleted |

### Walnut (Juglans regia L.) (Revision)

 The subgroup discussed document TG/125/7(proj.2), presented by Mr. Qing-guo Ma (China), and agreed the following:

|  |  |
| --- | --- |
| Alternative names | to check whether “English walnut” as common name as well |
| 1. | to read “These Test Guidelines apply to all varieties of *Juglans regia* L. for fruit production.”  |
| 2.2 | to read: “The material is to be supplied in the form of dormant shoots sufficient for grafting 5 plants or in the form of grafted plants on a rootstock specified by the testing authority.” |
| 2.3 | to read:“10 dormant shoots for graftingor5 one-year-old grafted plants.” |
| 3.1 | to read: “The minimum duration of tests should normally be two independent growing cycles with sufficient fruit set each.” |
| 3.4.1 | to read: “Each test should be designed to result in a total of at least 5 plants.” |
| 4.1.4 | to read: “Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 5 plants or parts taken from each of 5 plants and any other observations made on all plants in the test, disregarding any off-type plants. In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 2.” |
| 4.2.2 | to read: “For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 5 plants, no off-types are allowed” |
| Char.1 | to be indicated as QN |
| Char. 2 | to add (+) and illustrationto check whether to be deleted |
| Char. 3 | to read “Tree: branching”  |
| Char. 4 | to check whether to be indicated as QNto check whether to add an intermediate stateto check whether to change wording of existing states to “mostly …” or “predominantly …” |
| Char. 6 | to read: “Leaflet: glandular hair”to be indicated as VGto add (+) and explanation on observation “to use magnifying glasses” |
| Char. 7 | to have states (1) and (2) |
| Char. 8 | to read: “Female flower: number per cluster”to check whether additional information can be obtained from assessing both char. 8 and 10 |
| Char. 9 | to read: “Female flower: intensity of color of stigma”to check chart for color |
| Char. 10 | to read: “Fruit: setting type”to be indicated as PQ if kept |
| Char. 11 | to read: “Nut: shape in ventral view”to read states (1) “narrow elliptic”, (2) “medium elliptic”, (3) “broad elliptic” to check whether example variety exists for state (3) |
| Char. 17 | to have states (1), (2), (3) |
| Char. 19 | to be indicated as VG/MGto have states (1), (3), (5) |
| Char. 20 | to have states (1), (3), (5) |
| Char. 21 | to add (+) and illustrationto add example varieties from other countries to provide as regional setsto be indicated as PQ |
| Char. 23 | to be deleted |
| Char. 24 | to reword information under (f) if char. 24 indicated as MSto check whether example variety Hartley really represents state (7) |
| Char. 25 | to be indicated as VGto have states (1), (2), (3), (4) |
| Char. 26 | to be indicated as PQto add (+) |
| Char. 27 | to read: “Kernel: color of endopleura”to add (+) and explanation on endopleurato read state (4) “red”to delete (b) (also under 8.1) |
| Char. 28 | to delete: “(%)” in titleto add (f)to reword information under (f) if char. 28 indicated as MS |
| Char. 29 | to add (+) and explanation on how to assessto have states (1), (2), (3), (4) |
| Char. 30 | to be indicated as VG/MSto have states (1), (2) , (3), (4), (5) to read state (5) “very thick” |
| Char. 32 | to be deleted |
| Char. 33 | to read: “Time of beginning of female flowering”to add (+) and explanation: “Should be assessed when 10% of the flowers are opened” |
| Char. 34 | to read: “Time of beginning of male flowering”to add (+) and explanation: “Should be assessed when 10% of the flowers are opened”to delete “,” after “Parisienne” |
| Char. 35 | to read “Time of harvest maturity” |
| 8.1(a) | to consider adding an indication referring to dormant season |
| 8.1(b) | to be deleted |
| 8.1(f) (new (e)) | to be reworded if characteristics 24 and 28 indicated as MS  |
| Ad. 1 | to improve illustration (to present drawings without leaves) |
| Ad. 5 | to amend drawings for states (1) and (2) |
| Ad. 11 | to read: “Observed in ventral view”to improve figure for state (3): shape must be different and pads must be indicated |
| Ad. 13 | to improve illustration (to remove arrow sign from screen shot) |
| Ad. 16 | to indicate the tip with arrow |
| Ad. 23 | to be deleted |
| Ad. 25 | to add “Ad. 26: Nut: inner pleat wall of shell”to improve resolution of illustration |
| 9. | to update |
| TQ 4.2.1 | to delete (d) |

## Guidance for drafters of Test Guidelines

 The TWF considered document TWF/45/10 and received a presentation on the web-based TG Template by electronic means, a copy of which is presented in the Annex to document TWF/45/10.

 The TWF noted the features of Version 1 of the web‑based TG Template, as set out in document TWF/45/10, paragraph 10.

 The TWF noted the request for Leading Experts to participate in the testing of Version 1 of the web‑based TG Template.

 The TWF noted the exclusive use of the web-based TG Template for the development of all Test Guidelines from 2015.

## Information and databases

### (a) UPOV information databases

#### GENIE Database

 The TWF considered document TWF/45/5.

 The TWF noted the plan to provide information for type of crop for each UPOV code in the GENIE database, as set out in document TWF/45/5, paragraph 8.

#### UPOV Code System

 The TWF checked the amendments to UPOV codes.

 The TWF checked the new UPOV codes or new information added for existing UPOV codes, which are provided in Annex III to document TWF/45/5, and agreed to submit any comments to the Office of the Union by July 31, 2014.

#### PLUTO Database

 The TWF noted the developments concerning the program for improvements to the Plant Variety Database, as reported in document TWF/45/5, paragraphs 17 to 33.

 The TWF received information from an expert from the European Union on a proposal for a development of UPOV codes to indicate different types within a species (e.g. rootstock, mutation) and agreed to invite the expert from the European Union to make a proposal at its forty sixth session.

### (b) Variety description databases

 The TWF considered document TWF/45/6.

 The TWF noted the developments on variety description databases, as set out in document TWF/45/6.

 The TWF considered the proposal of the expert from Australia, not to develop a database at the moment.

 The TWF noted the matters raised by the ISF in relation to variety descriptions.

 The TWF noted the conclusion of the CAJ on matters concerning variety descriptions, as set out in document TWF/45/6, paragraph 29.

### (c) Exchangeable software

 The TWF considered document TWF/45/7.

 The TWF noted that document UPOV/INF/22 “Software and equipment used by members of the Union” would be presented for adoption by the Council at its forty-eighth ordinary session, to be held in Geneva on October 16, 2014, as set out in document TWF/45/7, paragraph 5.

 The TWF noted that, subject to adoption of document UPOV/INF/22 by the Council at its forty-eighth ordinary session, a circular would be issued to the designated persons of the members of the Union in the Technical Committee (TC), inviting them to provide information regarding non-customized software and equipment used by members of the Union, as appropriate.

 The TWF noted that a revision of document UPOV/INF/16/3 concerning the inclusion of the SIVAVE software would be presented for adoption by the Council at its forty-eighth ordinary session, to be held on October 16, 2014.

 The TWF noted that Mexico had been invited to provide further information on the SISNAVA software at the thirty-second session of the Technical Working Party on Automation and Computer Programs (TWC).

 The TWF noted that the TC and CAJ had agreed with the proposed revision of document UPOV/INF/16 concerning the inclusion of information on the use of software by members of the Union.

 The TWF noted that an expert from France would make a presentation on the AIM software at the thirty‑second session of the TWC, based on the English translation of the software.

 The TWF noted that the explanation of the software “Information System (IS) used for Test and Protection of Plant Varieties in the Russian Federation” was provided in the Annex to document TWF/45/7.

### (d) Electronic application systems

 The TWF considered document TWF/45/8.

 The TWF noted the developments concerning the development of a prototype electronic form as set out in document TWF/45/8

 The TWF noted the results of the survey of members of the Union on their use of databases for plant variety protection purposes and also on their use of electronic application systems, as presented in Annex II to document TWF/45/8.

## Recommendations on draft Test Guidelines

1. *Test Guidelines to be put forward for adoption by the Technical Committee*

 The TWF agreed that the following draft Test Guidelines should be submitted to the TC for adoption at its fifty-first session, to be held in Geneva on March 23 to 25, 2015, on the basis of the following documents and the comments in this report:

|  |  |
| --- | --- |
| Subject | Relevant document |
| \*Acca (*Acca sellowiana* (Berg) Burret) | TG/ACCA(proj.3) |
| Apple rootstocks (*Malus* Mill.) (Revision) | TG/163/4(proj.3) |
| \*Mandarins (*Citrus L*. - Group 1) (Partial revision) | TG/201/1 |
| \*Pecan nut (*Carya illinoinensis* (Wangenh.) K. Koch) | TG/PECAN(proj.10) |

*(b) Test Guidelines to be discussed at the forty‑sixth session*

 The TWF agreed to discuss the following draft Test Guidelines at its forty‑sixth session:

|  |
| --- |
| \*Apricot (*Prunus armeniaca* L.) (Partial revision: example varieties) |
| Argania (*Argania spinosa*) (New) |
| Avocado rootstock (*Persea* Mill.) |
| Blueberry (*Vaccinium angustifolium* Aiton; *V. corymbosum* L.; *V. formosum* Andrews; *V. myrtilloides* Michx.; *V. myrtillus* L.; *V. virgatum* Aiton; *V. simulatum* Small) (Revision) |
| Chestnut (*Castanea sativa* Mill.) (Revision) |
| \*Coconut (*Cocos nucifera* L.) |
| Chestnut (*Castanea sativa* Mill.) (Revision) |
| Black Walnut (*Juglans nigra* L.) |
| Date palm (*Phoenix dactylifera* ) (New) |
| Macadamia *(Macadamia integrifolia* Maiden et Betche, *Macadamia tetraphylla* L.A.S. Johnson) (Revision) |
| Papaya (*Carica papaya* L.) (Revision) |
| Pear, Japanese Pear (*Pyrus communis* L.; P. xbretschneideri Rehder, P. pyrifolia (Burm. f.) Nakai; P. xlecontei Rehde, P. Pyrifolia (Burm.f.) Nakai var. *culta* (Mak.) Nakai, P. *ussuriensis* Maxim. and hybrids between) (Revision) |
| Walnut (*Juglans regia* L.) (Revision) |

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

## Date and place of the next session

 At the invitation of South Africa, the TWF agreed to hold its forty-sixth session in Mpumalanga, South Africa, from August 24 to 28, 2015, with the preparatory workshop on August 23.

## Future program

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

1. Opening of the Session

2. Adoption of the agenda

3. Short reports on developments in plant variety protection

(a) Reports from members and observers (written reports to be prepared by members and observers

(b) Reports on developments within UPOV (oral report by the Office of the Union)

4. Improving the effectiveness of the Technical Committee, the Technical Working Parties and the Preparatory Workshops (document to be prepared by the Office of the Union)

5. Molecular Techniques (document to be prepared by the Office of the Union)

6. TGP documents (documents to be prepared by the Office of the Union and by Israel)

7. Variety denominations (document to be prepared by the Office of the Union)

8. Information and databases

(a) UPOV information databases (documents to be prepared by the Office of the Union and by the European Union)

(b) Variety description databases (documents to be prepared by the Office of the Union and by the European Union)

(c) Exchangeable software (document to be prepared by the Office of the Union)

(d) Electronic application systems (document to be prepared by the Office of the Union)

9. Uniformity assessment (document to be prepared by the Office of the Union)

10. Experiences with new types and species (oral reports invited)

11. Management of variety collections for DUS examination (oral reports invited)

12. Duration of DUS tests in the fruit sector (document to be prepared by the European Union)

13. Harmonized example varieties for Apple: historical data and possible new developments (document to be prepared by Germany)

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

15. Proposals for partial revision/corrections of Test Guidelines

16. Discussion on draft Test Guidelines (Subgroups)

17. Recommendations on draft Test Guidelines

18. Guidance for drafters of Test Guidelines

19. Date and place of the next session

20. Future program

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

22. Closing of the session

## Visit

 On May 29, the TWF visited the Domain Tabouhanit, a 425 hectares’ orchard cultivated with citrus (mainly oranges, lemons and clementines), nectarines, olives and grapevine, in the neighborhood of Marrakesh. The TWF was welcomed by Mr. Ben Arirou Lahcen, Manager. The TWF further visited the Essnoussi Nurseries, founded by Mr. Essnoussi, and managed by his son Noureddine Essnoussi, who welcomed the TWF. The Essnoussi Nurseries produce certified plants of olive trees and almonds as well as carob and pomegranate plantlets. The owner explained the procedure for producing certified plants. The TWF visited then the Laboratory of Plant Biotechnology of the Regional Center of the Institut National de Recherche Agronomique (INRA) in Marrakesh. It was welcomed by Mr. Mohamed Anjarne, Deputy Director, who explained the main task of the Laboratory for multiplication of date palm tree using organogenesis techniques (somatic embryogenesis and flowering techniques used for research), and the breeding program for disease resistance.

 *The TWF adopted this report at the close of the session.*

[Annexes follow]

TWF/45/32

ANNEXES I TO IV

[Annexes I to IV only available in the pdf version of the document]

[Annex V follows]

TWF/45/32

ANNEX V

LIST OF LEADING EXPERTS

**DRAFT TEST GUIDELINES TO BE SUBMITTED
TO THE TECHNICAL COMMITTEE IN 2015**

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

**by July 11, 2014**

| Species | Basic Document(s) | Leading expert(s) | Interested experts (States/Organizations)[[1]](#footnote-2) |
| --- | --- | --- | --- |
| \*Acca (*Acca sellowiana* (Berg) Burret) | TG/ACCA(proj.3) | Mr. Barnaby (NZ) | BR, ZA, CIOPORA, Office |
| \*Mandarins (Citrus L. - Group 1) (Partial revision) | TG/201/1TWF/45/30TWF/45/31 Rev. | Mr. Chomé Fuster (ES) | AU, CN, CO, IL, JP, KR, MA, MX, NZ, OM, QZ, ZA, CIOPORA, Office  |
| \*Pecan nut (*Carya illinoinensis* (Wangenh.) K. Koch) | TG/PECAN(proj.10) | Mr. Barrientos-Priego (MX) | BR, IL, KR, ZA, Office |
| Apple Rootstock (Malus Mill.) (Revision) | TG/163/4(proj.5) | Mr. Venter (ZA) | AU, CN, DE, FR, QZ, BR, JP, KR, NZ, RO, CIOPORA, Office |

**DRAFT TEST GUIDELINES TO BE DISCUSSED AT TWF/46**

(\* indicates possible final draft Test Guidelines)

New draft to be submitted to the Office of the Union

**before July 13, 2015**

**(Guideline date for Subgroup draft to be circulated by Leading Expert: May 18, 2015**

**Guideline date for comments to Leading Expert by Subgroup: June 15, 2015)**

| Species | Basic Document(s) | Leading expert(s) | Interested experts (States/Organizations) [[2]](#footnote-3) |
| --- | --- | --- | --- |
| \*Apricot (*Prunus armeniaca* L.) (Partial revision: example varieties) | TG/70/4 Rev. | Mr. Venter (ZA) | CN, ES, FR, HU, JP, KR, MA, NZ, RO, QZ, Office |
| Argania (*Argania spinosa*) | New | Mrs. Belmehdi (MA) | IL, Office |
| Avocado rootstock (*Persea* Mill.) | TG/PERSE(proj.1) | Mr. Barrientos-Priego (MX) | AU, BR, IL, NZ, QZ, ZA, Office |
| Blueberry (*Vaccinium angustifolium* Aiton; *V. corymbosum* L.; *V. formosum* Andrews; *V. myrtilloides* Michx.; *V. myrtillus* L.; *V. virgatum* Aiton; *V. simulatum* Small) (Revision) | TG/137/4 | Mr. Hulse (AU) | BR, JP, NZ, QZ, RO, ZA, Office |
| Chestnut (*Castanea sativa* Mill.) (Revision) | TG/124/4(proj.1) | Mr. Esaki (JP) | CN, ES, HU, KR, NZ, QZ, ZA, Office |
| Black Walnut (*Juglans nigra* L.) | TG/JUGLA(proj.1) | Mr. Chomé Fuster (ES) | CN, KR, QZ, ZA, Office |
| \*Coconut (Cocos nucifera L.) | TG/COCOS(proj.3) | Mrs. Machado (BR) | CN, ID, MX, MY, OM, PH, TH, VN, Office |
| Date palm (*Phoenix dactylifera* ) | New | Mr. Al-Yahyai (OM) | AU, BR, MA, MX, TN, Office  |
| Macadamia *(Macadamia integrifolia* Maiden et Betche, *Macadamia tetraphylla* L.A.S. Johnson)(Revision) | TG/111/3 | Mr. Hulse (AU) | BR, KE, MX, ZA, Office |
| Papaya (*Carica papaya* L.) (Revision) | TG/264/2(proj.7) | Mr. Barrientos-Priego (MX) | BR, CN, IL, JP, KE, MY, OM, PH, QZ, TH, VN, ZA, CIOPORA, Office |
| Pear, Japanese Pear (*Pyrus communis* L.; P. xbretschneideri Rehder, P. pyrifolia (Burm. f.) Nakai; P. xlecontei Rehde, P. Pyrifolia (Burm.f.) Nakai var. *culta* (Mak.) Nakai, P. *ussuriensis* Maxim. and hybrids between) (Revision) | TG/15/3TG/149/2 | Mr. Barnaby (NZ) | AU, BR, CN, DE, ES, FR, HU, JP, MA, QZ, RO, ZA, Office |
| Walnut (*Juglans regia* L.) (Revision) | TG/125/7(proj.2) | Ms. Dong Pei (CN) | ES, HU, JP, KR, QZ, ZA, Office |

[End of Annex V and of document]

1. for name of experts, see List of Participants [↑](#footnote-ref-2)
2. for name of experts, see List of Participants [↑](#footnote-ref-3)