



TWF/44/31

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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**

Geneva

**TECHNICAL WORKING PARTY FOR FRUIT CROPS****Forty-fourth Session  
Napier, New Zealand, April 29 to May 3, 2013**

## REPORT

*adopted by the  
Technical Working Party for Fruit Crops*

1. The Technical Working Party for Fruit Crops (TWF) held its forty-fourth session in Napier, New Zealand, from April 29 to May 3, 2013. The list of participants is reproduced in Annex I to this report.
2. The TWF was welcomed by Mr. Chris Barnaby, Assistant Commissioner/Principal Examiner, Plant Variety Rights Office of New Zealand, who made a presentation on plant variety protection in New Zealand. A copy of the presentation made by Mr. Barnaby is provided in Annex II to this report.
3. The session was opened by Mrs. Carensa Petzer (South Africa), Chairperson of the TWF, who welcomed the participants and thanked New Zealand for hosting the TWF session.

Adoption of the Agenda

4. The TWF adopted the agenda as reproduced in document TWF/44/1 Rev.

Short Reports on Developments in Plant Variety Protection

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

5. The TWF noted the information on developments in plant variety protection from members and observers provided in document TWF/44/28 Prov. The TWF noted that reports submitted to the Office of the Union after April 12, 2013, would be included in the final version of document TWF/44/28.

(b) *Reports on developments within UPOV*

6. 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/44/27.
7. The TWF received a presentation from the Office of the Union on the results of the survey to seek views on the effectiveness of the Technical Working Parties from 2012, as requested by the TC at its forty-ninth session, a copy of which is provided in document TWF/44/27 Add.

Molecular Techniques

8. The TWF considered document TWF/44/2.
9. The TWF noted the program for the adoption of document TGP/15/1 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)".
10. The TWF noted the discussion on molecular techniques at the forty-ninth session of the TC.
11. The TWF noted that the TC had proposed to hold a coordinated meeting of the BMT with ISO, ISTA and OECD and including breeders; and that if it was not possible to organize a coordinated meeting in 2014, a meeting of the BMT would be organized in the meantime.
12. The TWF strongly agreed with the TC that there was a need to provide suitable 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.
13. 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 2014.
14. The TWF received a presentation by the expert from France on the study concerning Peach and molecular markers made by the Group for Study and Control of Varieties and Seeds (GEVES), a copy of which is provided in document TWF/44/2 Add.

TGP documents

15. The TWF considered the TGP documents below on the basis of documents TWF/44/3 and TWF/44/3 Add.
16. The TWF noted the agreement of the TC and the CAJ to submit document TGP/15/1 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)" for adoption by the Council, at its forty-seventh session, to be held on October 24, 2013.
17. The TWF noted the agreement of the TC and the CAJ to invite the Council to adopt document TGP/14/2 "Glossary of Terms Used in UPOV Documents" at its forty-seventh session, to be held on October 24, 2013, and noted that the Council would be invited to adopt document TGP/0/6, in order to reflect the adoption of documents TGP/15/1 and TGP/14/2. The TWF received a presentation, made by the Office, on the main changes and key features on TGP/14, proposed by the TC at its forty-ninth session in 2013.
18. The TWF noted the matters approved by TC for future revision of documents TGP/7, TGP/8 and TGP/9, as set out below:
  - (a) *TGP/7: Development of Test Guidelines*
    - (i) *Coverage of Types of Varieties in Test Guidelines*
    - (ii) *Selection of Asterisked Characteristics*
    - (iii) *Standard References in the Technical Questionnaire*
    - (iv) *Applications for Varieties with Low Germination*
    - (v) *Procedure for the Development of Test Guidelines*
    - (vi) *Quantity of Plant Material Required*
    - (vii) *Minimum Quantity of Plant Material*
    - (viii) *Guidance on Number of Plants to be Examined (for Distinctness)*
    - (ix) *Guidance for Method of Observation*
    - (x) *Example Varieties*
    - (xi) *Providing Photographs with the Technical Questionnaire*
    - (xii) *Duration of Test*
    - (xiii) *Number of Plants Required for Description*

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

## Part I: DUS Trial Design and Data Analysis

- (i) *New Section 2: "Data to be recorded"*
- (ii) *New Section: "Reduction of Size of Trials"*

## Part II: Techniques Used in DUS Examination

- (i) *Section 3: "The Combined-Over-Years Criteria for Distinctness (COYD)"*
- (ii) *Section 3, Subsection 3.6: "Adapting COYD to special circumstances"*
- (iii) *Section 4: "2x1% Method-Minimum Number of Degrees of Freedom for the 2x1% Method"*

(c) *TGP/9: Examining Distinctness*

- (i) *Guidance on Number of Plants to be Examined (for Distinctness)*
- (ii) *Providing Photographs with the Technical Questionnaire*

19. The TWF noted the agreement of the TC that a draft revision of document TGP/5 Section 10 "Notification of Additional Characteristics and States of Expression" be presented for consideration by the TC at its fiftieth session, subject to the conclusion of discussions on disclaimers on UPOV documents in the Consultative Committee.

20. The TWF also noted the matters for discussion on future revision of documents TGP/7, TGP/8 and TGP/14 that would be considered on basis of documents TWF/44/9 to TWF/44/21 and TWF/44/23.

21. The TWF noted the program for the development of TGP documents, as set out in the Annex to document TWF/44/3.

22. The TWF considered the TGP documents below on the basis of documents TWF/44/3 and TWF/44/3 Add "Comments by the Technical Working Party for Ornamental Plants and Forest Trees on TGP documents".

*TGP/7: Development of Test Guidelines*

- (i) *Revision of document TGP/7: Additional Standard Wording for Growing Cycle for Tropical Species*

23. The TWF considered document TWF/44/9, which was presented by an expert from New Zealand.

24. The TWF considered the proposed Additional Standard Wording (ASW) for growing cycle of tropical species and proposed the following wording:

*New (after (b)): ~~Tropical fruit species~~ Evergreen species with indeterminate growth*

*The growing cycle is considered to be the period ranging from the beginning of flowering of an individual flower or inflorescence, through active flowering and fruit development, and concluding with the harvesting of fruit.*

- (ii) *Revision of document TGP/7: Source of Propagating Material*

25. The TWF considered the proposed guidance on source of propagating material, as presented in Section IV "Guidance for drafting Test Guidelines" of the Annex to document TWF/44/10, which was presented by an expert from the European Union.

26. The TWF noted that the document provided useful information on the effects of the source of propagating material as a source of general guidance for drafters of Test Guidelines, for inclusion in document TGP/7, and requested the expert from the European Union to prepare a condensed version of the wording to be presented to the TWF at its forty-fifth session in 2014.

27. The TWF invited an expert from Spain to make a presentation at the forty-fifth session of the TWF, on practical experience in the use of *in vitro* propagated material when submitted for DUS testing or certification schemes.

(iii) *Revision of document TGP/7: Indication of Growth Stage in Test Guidelines*

28. The TWF considered document TWF/44/11 and considered that there was no need to amend the existing guidance in document TGP/7 with regard to the indication of the growth stage at which to observe characteristics in the Test Guidelines. The TWF noted that the existing guidance provided sufficient information and that the indication of growth stages in Test Guidelines should remain optional and to be used where appropriate.

29. The TWF noted that the expert from Germany would provide an updated link for “Growth stages of mono-and dicotyledonous plants – BBCH Monograph” in GN9.

GN 9 (TG Template: Chapter 3.3) – Growth stage key

In cases where it is appropriate to provide a growth stage key for the observation of characteristics, the following is a useful guide:

“Growth stages of mono-and dicotyledonous plants - BBCH Monograph”  
(Federal Biological Research Centre for Agriculture and Forestry)  
ISBN Number: 3-8263-3152-4

<http://www.bba.de/veroeff/bbch/bbcheng.pdf>

(iv) *Revision of document TGP/7: Providing Illustrations of Color in Test Guidelines*

30. The TWF considered document TWF/44/12.

31. The TWF agreed with the proposal of the TWO at its forty-sixth session, to include the following guidance in a future revision of document TGP/7, with the addition of the wording “, as such,” in the first sentence:

~~Particular caution is needed when considering the~~ **It is generally not appropriate to** use of illustrations of color, **as such,** in the Test Guidelines because the color in photographs can be affected by the technology of the camera, ~~and the facilities used to display the photograph (including printer, computer and screen, etc.) and lighting conditions under which the photograph is taken.~~ Furthermore, the expression of color may vary according to the environment in which the variety is grown. For example, a photograph of a “~~light weak~~ **light** intensity” of anthocyanin coloration provided by the Leading Expert in one UPOV member may not represent a “~~weak light~~ **light** intensity” of anthocyanin coloration in another UPOV member.”

(v) *Revision of document TGP/7: Presence of Leading Expert at Technical Working Party Sessions*

32. The TWF considered document TWF/44/13 and agreed with the proposed guidance on the presence of a Leading Expert at a Technical Working Party session, for inclusion in a future revision of document TGP/7, section 2.2.5.3, as set out below:

“2.2.5.3 Requirements for draft Test Guidelines to be considered by the Technical Working Parties

“Unless otherwise agreed at the TWP session, or thereafter by the TWP Chairperson, the timetable for the consideration of draft Test Guidelines by the Technical Working Parties is as follows:

Action	Latest date before the TWP session
Circulation of Subgroup draft by Leading Expert:	14 weeks
Comments to be received from Subgroup:	10 weeks
Sending of draft to the Office by the Leading Expert:	6 weeks
Posting of draft on the website by the Office:	4 weeks

“In cases where *either* of the deadlines for circulation of the Subgroup draft or for the sending of the draft to the Office by the Leading Expert is not met, the Test Guidelines would be withdrawn from the TWP agenda and the Office would inform the TWP accordingly at the earliest opportunity (i.e. not later than 4 weeks before the TWP session). In those cases where draft Test Guidelines are withdrawn from the TWP agenda because of failure by the Leading Expert to meet the relevant dates, it would be possible for specific matters concerning those Test Guidelines to be discussed at the TWP session. However, to consider specific matters it would be necessary for a document to be provided to the Office at least 6 weeks before the TWP session.”

“In order to be considered by a Technical Working Party, the Leading Expert of the draft Test Guidelines should be present at the session, unless a suitable alternative expert can be arranged to act as the Leading Expert sufficiently in advance of the session, or unless the Leading Expert is able to participate in an effective way by electronic means.”

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

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

33. The TWF considered document TWF/44/14.

34. The TWF agreed that the variation due to different observers was not relevant in fruit DUS testing as observations were usually made by a single observer, and therefore the TWF considered it unnecessary to provide experts to develop further guidance on the proposed text to be included in TGP/8 part I: DUS Trial and Design and Data Analysis, New Section: Minimizing the Variation due to Different Observers, in a future revision of document TGP/8.

35. The TWF noted, however, the importance of the quality of the Test Guidelines in providing clear guidance for DUS examiners and in ensuring the consistency of observations. In that regard, the TWF recalled the work done previously on the consistency of variety descriptions in strawberry and apple (see document TWF/35/4). The TWF proposed that the expert from New Zealand report at the forty-fifth session, on the work done on the:” Publication of harmonized variety description for apple for an agreed set of varieties”, in order to consider if it could be relevant to further develop the study.

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

36. The TWF considered document TWF/44/15.

37. The TWF noted that:

(a) the TC had requested the TWC to continue its work with the aim of developing recommendations to the TC concerning the proposals to address the bias in the present method of calculation of COYU, and that

(b) a document on possible proposals for improvements to COYU would be prepared for the TWC session in 2013.

(iii) *Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section 10: Minimum Number of Comparable Varieties for the Relative Variance Method*

38. The TWF considered document TWF/44/16.

39. The TWF noted the comments made by the TWPs at their sessions in 2012 and the TC, at its forty-ninth session in 2013. The TWF agreed with the proposed amendments for revision of Section 10 of document TGP/8 and the new proposed guidance in paragraphs 10.2.2 and 10.6 to specify the minimum

number of comparable varieties in the relative variance method as set out in the Annex to document TWF/44/16.

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

40. The TWF considered document TWF/44/17.

41. The TWF noted that the TC had agreed to replace the proposed text for new Section 11 "Examining DUS in Bulk Samples" in the Annex to document TC/49/28 with guidance on the use of characteristics examined on the basis of bulk samples, in order to ensure that the characteristics fulfill the basic requirements for a characteristic.

42. The TWF agreed that Leading Experts of Test Guidelines could be requested to provide data from different years to demonstrate that the expression of the characteristic is "sufficiently consistent and repeatable in a particular environment".

*(v) 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*

43. The TWF considered document TWF/44/18.

44. The TWF considered the developments on a practical exercise with a common data set to produce variety descriptions of self-pollinated and/or vegetatively propagated varieties, in order to determine the aspects in common and divergence between methods, with a view to developing general guidance.

45. The TWF agreed that the COY method is working well for cross pollinated crops and highlighted the importance of developing guidance for producing variety descriptions for self-pollinated and/or vegetatively propagated varieties. The TWF invited the expert from New Zealand to make a presentation at the forty-fifth session of the TWF in 2014, on the project for "apple reference varieties" that began in New Zealand in 2011, and how this work would contribute to developing improved example varieties and variety descriptions.

46. The TWF agreed with the value of a practical exercise and requested the development of guidance on data processing for the assessment of distinctness and for producing variety descriptions of vegetatively propagated crops.

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

47. The TWF considered document TWF/44/19.

48. The TWF noted the comments made by the TWPs at their sessions in 2012 and the TC-EDC in 2013, and considered the draft new Section on "Guidance for Data Analysis for Blind Randomized Trials."

49. The TWF agreed that the drafter should further develop the guidance as set out in Annex II to document TWF/44/19 on draft guidance on data analysis for blind randomized trials for inclusion in a future revision of document TGP/8.

*(vii) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Examining characteristics using image analysis*

50. The TWF considered document TWF/44/20.

51. The TWF noted the information on software and hardware used for image analysis, as set out in Annex I to document TWF/44/20.

52. The TWF noted that the AIM software for image analysis would be considered in document TWF/44/7 "Exchangeable software".

53. The TWF noted that a draft of the new section "Examining Characteristics Using Image Analysis" for document TGP/8 would be presented to the TWC in 2013.

*(viii) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Statistical methods for visually observed characteristics*

54. The TWF considered document TWF/44/23.

55. The TWF noted that:

(a) the TC had agreed that it would not be appropriate to continue the development of a section on "Statistical Methods for Visually Observed Characteristics", unless new guidance was provided beyond the methods already provided in document TGP/8; and

(b) requested the TWC to clarify if it proposed to modify an existing method or provide a new additional method.

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

*(i) Revision of document TGP/14: Section 2: Botanical Terms, Subsection 3: Color, Definition of "Dot"*

56. The TWF considered document TWF/44/21.

57. The TWF agreed with the proposal of the TWO at its forty-sixth session, that "dot" was a small "spot" and that only the term "spot" should be used in the future, according to the guidance provided in document TGP/14: Section 2: Botanical Terms, Subsection 3: Color. The TWF proposed that the Test Guidelines should be revised whenever the use of these terms could cause confusion.

#### Variety denominations

58. The TWF considered document TWF/44/4.

59. The TWF noted the developments concerning the International Commission for the Nomenclature of Cultivated Plants of the International Union for Biological Sciences (IUBS Commission) and the International Society for Horticultural Science Commission for Nomenclature and Cultivar Registration (ISHS Commission), of relevance for UPOV.

60. The TWF noted the latest developments as reported by the Office of the Union with regard to the relationship between UPOV and the IUBS, and noted the contribution from the UPOV Office to the Draft Joint Notice for publication in the *Hanburyana Journal* and the participation of UPOV in the IUBS Commission, to be held on July 19 and 20, 2013 in Beijing.

#### Uniformity assessment

*(a) Assessing uniformity by off-types on the basis of more than one sample or sub-samples*

61. The TWF considered document TWF/44/22 and noted that:

(a) the TWC had agreed that more detailed information and further analysis were needed in order to give guidance on consequences on the use of the different approaches presented in Annex I to IV of document TWF/44/22, and that France, Germany and the Netherlands would present one or more concrete situations in their countries and the statistical basis of their analysis for its next session;

(b) the TWC had agreed that the statistical basis for the acceptable number of off-types in the subsample of 20 plants used in the context of a sample size of 100 plants (situation D) would be assessed by experts from France and Germany; and

(c) with regard to the approach combining the results from two growing cycles, as set out in Annexes I and II of document TWF/44/22, Situation A and B, the TC had agreed that care would be needed

when considering results that were very different in each of the growing cycles, such as when a type of off-type was observed at a high level in one growing cycle and was absent in another growing cycle.

(b) *Testing uniformity of apple varieties arising from mutation*

62. The TWF considered document TWF/44/26, which was presented by an expert from New Zealand.

63. The TWF noted the current practice for the assessment of uniformity and stability by off-types on the basis of two samples for apple varieties originating as mutations in New Zealand and noted that South Africa followed the same practice.

Experiences with new types and species

64. No new experiences with new types and species were reported.

Discussion on draft Test Guidelines

*Acca (Acca sellowiana (Berg) Burret)*

65. The subgroup discussed document TG/ACCA(proj.2), presented by Mr. Chris Barnaby (New Zealand) and agreed the following:

Cover page	to add alternative names in French, German, Spanish to check in GRIN (Feijoa in German and Spanish)
2.2	to read [...] one-year-old trees
3.1.1	to move second sentence to Chapter 3.3 [in particular...]
3.1.2	to check wording
3.4.1	to underline <u>at least</u>
5.3	to check
T.O.C	to review example varieties to replace note (d) by (c)
Char. 1	to move example variety "Alcantara" to state (2) to add "Helena" to state (3) to check whether to delete state (4)
Char. 6	to have notes: 1, 2, 3, 4
Char. 10	to keep states and improve diagram in Ad. 10 state (1)
Char. 14	to delete
Char. 15	state (4) to read greyish green
Char. 16	to add (+) and provide explanation or illustration to consider a third state: lateral or to indicate as QL
Char. 17	to read "Petal: length"
Char. 18	to read "Petal: color of upper side"
Char. 19	to read "Stamens: number"
Char. 20	to read "Filaments: color"
Char. 21	to read "Anthers: color"
New Char. Before Char. 22	to read "Style: color of upper half" with states green (1), reddish green (2), red (3) with example varieties: Alacantara (2), Helena, Apollo (3)
Char. 24	to read "Fruit: width"
Char. 25	to read "Fruit: ratio length/width"
Char. 27	to add (+) and provide illustration
Char. 29	to read "Fruit: shape at point of attachment of stalk" to add (+) and provide illustration
Char. 30	to delete
Char. 33	to read "Fruit: texture of skin" state (1) to read "smooth or very slightly rugose"
Char. 35	to have notes 1, 2, 3
Char. 39	to read "Time of harvest maturity"



8.1	to delete "All" in (a) to (c) to read "(c) Observations on fruit should be made when harvested." to delete (d)
Ad.6, 7, 8	to change all capital letter to lower case letters
Ad. 10	to improve illustration of state (1)
Ad.12	to have explanation of main color according TGP/14;
Ad.25, 26	to read width instead of diameter to update according TGP/14 to improve grid (format)
Ad.30	to delete
Ad.34	to move bottom illustration to Ad.38 after text
Ad.38	to add heading: <u>Ad. 37: Fruit: thickness of pericarp</u> (keep explanation) to delete explanation for Ad. 38
Ad.39	to read "Harvest maturity is reached when fruit naturally drops from the tree or is picked when readily detached from the tree with minimal effort. The harvest period begins when the first few fruit have naturally dropped. Maturity of the fruit cannot be determined by observation of external fruit characteristics only."
TQ 1.2	to replace "Acca" with "Feijoa"
TQ 5	to update according to changes to T.o.C.

*Apple rootstocks (Malus Mill.) (Revision)*

66. The subgroup discussed document TG/163/4(proj.3), presented by Mr. Hennie Venter (South Africa) and agreed the following:

2.4	to read "The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease. It should not be obtained directly from <i>in vitro</i> propagation."
3.4.1	to read "Each test should be designed to result in a total of at least 5 plants for trees and 10 plants for stoolbeds."
4.1.4	to read "Unless otherwise indicated, all observations for the purposes of distinctness should be made on 5 plants or parts taken from each of 5 plants for trees and 9 plants for stoolbeds disregarding any off-type plants. In the case of observations of parts of plants, the number of parts to be taken from each of the plants should be 2."
4.2.2	to delete last sentence (see 4.1.4)
6.4	to maintain Example Varieties as indicated to add additional sentence to read "The example varieties provided for a particular region are not exclusive and might also be applicable in other regions."
6.5	additional sentence to read "AB – Applies to stoolbed plants and fully grown trees and to update T.o.C."
T.o.C.	to change example variety "CG202" to "G202" throughout to change example variety "P22(Last Minute)" to "Last Minute" throughout to change example variety "P16(Lizzy)" to "Lizzy" throughout
Char. 2	to reduce to 5 states 1, 2, 3, 4, 5
Char. 3	to check example varieties
Char. 4	to delete state (5) to delete example variety "CG202" from state (1) to indicate as AB
Char.5	to read (a) instead of (b)
Char.6	to read (b) instead of (a)
Char. 13	to delete example variety MM106 in state (4)
Char. 19	to read "Young shoot:..."
Char. 20	to delete
Char. 24	to update according TGP/14 (ratio: low- high), to check example varieties
Char. 25	to add (+) and provide illustration
Char. 26	to add example varieties "M27" for state (1) and "M9" for state (2)
Char. 29, 31	to have notes 1,2,3,4
Char. 34	to read "Leaf: length of petiole relative to length of blade"

	to delete "P 2" from state (5)
Char. 37	to read "Plant: number of flowers" to add note B
Char. 38	to delete states (1) and (2) and to renumber notes: 1, 2, 3, 4, 5
Char. 43	to delete (+)
Char. 44	to read state (1): conic waisted and state (4): oblong
Chars. 45, 46	to have notes: 1, 2, 3, 4
Char.48	to read "Fruit: over color"
Char. 49	to read: "B 9" for example variety for state (9) to delete example variety "B 6" state (9) to delete (+)
8.1	to delete "All" in (a) to (f) (b) to read " <u>One-year-old shoot</u> : Unless otherwise indicated, observations on the shoot should be made on the middle third of the one-year-old shoot in the dormant season." (c) to read " <u>Young shoot</u> : Observation of the young shoot should be made on the upper third of the one-year-old shoot during rapid growth."
Ad. 4	to delete sentence to add B before illustration to delete "weeping" from illustration
Ad.18	to delete the first sentence
Ad. 43, 44	to delete "Ad. 43: Fruit: ratio length/width" to be amended (see TGP/14)
Ad. 49	to delete
Ad. 53	to read "To be assessed when 10% of the flowers on the 5 trees are fully open."
9	to amend as follows: "USA" replaced by "US" "Germany" replaced by "DE" "United Kingdom" replaced by "GB"
TQ 4	to add standard wording on propagation method
TQ 6	to delete sentence in Comments
TQ 7	to delete sentence under 7.3

*Coconut (Cocos nucifera L.)*

67. The subgroup discussed document TG/COCOS(proj.2), presented by Mrs. Vera Machado (Brazil) and agreed the following:

3.1.1	to delete the last sentence
3.3	to read for last sentence "In particular, it is essential that the palm produce a satisfactory crop of fruit in each of the two growing cycles."
T.o.C	to check example varieties
Char. 3	to read "Young plant: Leaf: time of splitting" to have notes 1, 2, 3
Char. 7	to read "Only varieties with bole: Stem: circumference of the bole"
Char. 8	to add explanation to add in chapter 5.3 as grouping characteristic
Char. 9	to read "Stem: width"
Char. 13	to check whether to delete this characteristic to check order of the states according new TGP14
Char. 20	to read "Inflorescence: peduncle width"
Char. 23	to provide example varieties
Char. 24	to read "Inflorescence: length of first spikelet with female flower"
Char. 25	to add (+)
Chars. 26	to delete
Char. 27	to check order of the states according new TGP14 and scale to be reviewed
Char. 28	to delete (+);

Char. 29	to move after char. 27 to reverse state 1 and state 2 to delete state 5 to add (c)
Char. 30	to read "Fruit: ratio weight of fruit/ weight of husk"
Char. 31	to delete MS to reverse note 2 and 4
Char. 33	to have note 1, 2, 3
Chars.34	to delete VG
Char. 35	to move after Char. 33 to have note 1,2,3
Char. 36	to delete
New Char. (after Char. 27)	to read "Fruit: aroma of coconut water" to have state absent (1), present (9) to be indicated as QL and VG to provide example variety: "Aromatic coconut" (9) to have note(c) to add (+): "The aroma is assessed by smelling the water at the maturity stage for consumption as water"
8.1	to read: (a) <u>Palm, stem, petiole and leaf</u> : Observations should be made at the time when the eleventh leaf scar appears (see photo Ad. 5 to 9: leaf scars). Observations on the leaf and the petiole should be made on the 3 <sup>rd</sup> leaf from the eleventh scar. (b) <u>Inflorescence</u> : Observations on inflorescence should be taken after the appearance of the fifth inflorescence, when female flowers are receptive. (c) <u>Bunch, peduncle and fruit color</u> : 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 (d) <u>Fruit, nut, shell and meat</u> . 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. to read before picture: (a) Leaf scars (Ad. 5 to 9) to add picture from Ad. 27 and to read (c) and (d): Fruit: time harvest maturity
Ad. 3	to read "The leaf begins splitting into leaflets when the plants are around 6 months old."
Ad. 4	to improve explanation
Ad. 7	to read "The circumference of the bole should be measured at 0.2 m from ground level."
Ad. 8; 9	to read "The stem height and width should be measured halfway from the ground to the top of the 11th scar." to delete picture
Ad. 10	to read "The petiole length should be measured from the base to the most proximal leaflet of the rachis."
Ad. 11; 12	to read "The petiole thickness and the petiole width should be measured at the insertion of the first leaflet."
Ad. 14	to read "The length of rachis should be measured from the most proximal leaflet to the tip of the rachis."
Ad.16, Ad.17	to read "The leaflet length and the leaflet width should be measured at the middle of the rachis."
Ad. 22	to read "The number of spikelets is assessed by counting after removing them from the inflorescence."
Ad. 24	to read "Should be evaluated after the appearance of the fifth inflorescence, on the first spikelet with female flowers counting from the base of the inflorescence."
Ad. 27	to keep only explanation on "stage of maturity for consumption as water"
Ad. 29	to update according to changes in Char. 29
Ad. 30	to read "Fruit: ratio weight of fruit/ weight of husk"
Ad. 31	to update grid according TGP/14 (ratio: low to high); To update grid according to changes in Char. 31
Ad. 34	to read "Meat"

9	to review alphabetical order of the literature to delete "The Minimum list ..." and "Ribeiro, 2011..." reference
TQ 6	to read "Example" instead of name of variety

\* *Litchi* (*Litchi chinensis* Sonn.)

68. The subgroup discussed document TG/LITCHI(proj.3), presented by Ms. Lu Xin (China) and agreed the following:

Alternative names	to read "Litchi" for Spanish
1	to read "These Test Guidelines apply to all varieties of <i>Litchi chinensis</i> Sonn."
3.1.3	to move sentence to Chapter 3.3
3.3	to add second sentence to read "In particular, it is essential that the plants produce a satisfactory crop of fruit in each of the two growing cycles."
Char.2	to delete state (4)
Char. 8	to reduce to notes 1, 2, 3
Char. 10	to read "Leaf: arrangement of leaflets" to have states: opposite (1), slightly alternate (2), strongly alternate (3);
Chars.19, 30	to reverse order and to read have low (1), medium (3), high (5) (according to TGP/14) to check example varieties
Char. 21	to read "Leaflet: shape of apex" to check states according to TGP/14
Char. 23	to have states: acute (1), obtuse (2), nearly rounded (3)
Char. 31; 32	to delete (+)
Char. 33	to replace "on" by "of"
Char. 36	to have state (4): cordiform (see TGP/14)
Chars.37	to read state (1): rounded
Char. 38	to read "Fruit: depth at stalkend"
Char. 40	to have states: green (1), green and red (2), yellow and red (3), pink red (4), medium red (5), dark red (6), purplish red (7)
Char. 41	to read "Fruit: surface" to have states: smooth or slightly raised protuberance (1), moderately raised protuberance (2), strongly raised protuberance (3)
Char. 42	to delete
Char. 44	to change example variety for state (3)
Char. 45	to read "Fruit: weight of flesh compared to weight of fruit"
Chars. 46, 47	to add (e)
Char. 49	to read "Fruit: sweetness of flesh"
Char. 51	to move before Char. 49
Char. 53	to add (+) for Char. 53
8.1	to delete "All" in (a) to (e)
Ad. 3	to read "Plant vigor is determined by the overall abundance of vegetative growth."
Ad. 10	to reverse illustration for states (2) and (3), and to have states: opposite (1), slightly alternate (2), strongly alternate (3);
Ad. 11	to improve illustration and to read: leaflet, petiolule, petiole, shoot
Ad. 13	to improve grid
Ad. 21	to read "Leaflet blade: shape of apex"
Ad. 22	to read "Leaflet blade: symmetry of base"
Ad. 23	to improve illustration for state (3)
Ad.28, 29	to improve position of arrows
Ad. 31	to delete
Ad.36	to update according TGP/14, to improve grid
Ad. 38	to read "Fruit: depth at stalkend"
Ad. 41	to move boxes in order to clarify the illustration
Ad. 45	to improve explanation

\* Indicates possible final draft Test Guidelines

Ad. 46	to improve the grid (orientation of illustrations- base at bottom)
Ad. 50	second sentence to read "Afterwards, the flesh is wrapped with four layers of absorbent paper (A5 paper size) for 5 seconds to observe the following:"
Ad. 52	to read "The beginning of flowering is considered when 10% of the inflorescences on 5 plants have started to flower."
TQ 6	to delete "e.g."

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

69. The TWF received a presentation from Mr. Jean Maison (European Union), the coordinator of the subgroup. The experts from Spain, Morocco and South Africa reported on their progress to date, copies of those presentations are provided in the Annex to document TWF/44/30.

70. Some countries felt that the results as presented so far are sufficient to approve this characteristic as fulfilling the UPOV definition of a characteristic, that a clear methodology could be set up and that they will at national level already use this characteristic in their protocol.

71. Other countries found that it is premature to take a decision at this stage and that a second year is necessary, especially in order to establish the repeatability of this characteristic and because the results are deemed to be incomplete.

72. The TWF noted that field visits between partners of the subgroup might be organized.

73. The TWF agreed that the decision as to the suitability of this characteristic for the purpose of inclusion in the UPOV guidelines is expected after the results of the second year are known.

*Papaya (Carica papaya L.)*

74. The subgroup discussed document TG/264/2(proj.6), presented by Mr. Barrientos-Priego (Mexico) and agreed the following:

3.4.1	to read "50 plants"
4.1.4.1	to read "50 plants ... parts taken from 50 plants"
Char. 9	to have states: low, medium, high
Char. 11	to add (+)
Char. 15	to read "Time of beginning of flowering" to review wording of explanation
Char. 17	to add example varieties to delete (*)
Char. 27, 46	to have states: low, medium, high
Chars. 9, 27, 46	to check example varieties
Ad. 9	to reverse images (1) and (3) and have states: low; medium; high
Ad. 15	to read "Time of beginning of flowering" to provide new explanation
Ad 16 to 21	to read "The characteristics should be observed regardless of the presence or not of hermaphrodite or female plants in seedling varieties. For the case of vegetative propagated varieties the characteristics should be observed regardless of the sex of the variety."
Ad. 27	to reverse image states (1) and (5) and have states: low; medium, high
Ad. 46	to read: low, medium, high

\* *Peach (Prunus persica (L.) Batsch) (Partial revision)*

75. The subgroup considered document TWF/44/29, presented by Mr. Richard Brand (France), and agreed with the proposed revisions, subject to the following modifications:

Ad. 3	to correct spelling of state (1): fastigate
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Ad. 55	to read “The flesh fiber is evaluated by biting into the flesh to determine the extent of fiber.”																									
Char. 63	to delete actual Char. 63 and keep Char. Stone: adherence to flesh																									
Char. 64	to remove underling																									
Char. 67	to read state (1): extremely late																									
Ad. 67	to read “The time of harvest maturity is when the overall appearance, firmness and taste indicate that the fruit is ready for consumption.”																									
8.1 new proposal	<p>to be moved to TQ 7.1 to read “Fruit: flesh type” with states: melting; non-melting; stony hard to read “endo-type” to read “present” instead of “exist” to correct the spelling of “dose” to “does” under explanation for stony hard (others) to delete text in brackets to read “The table below illustrates the principle in greater detail:”</p> <table border="1"> <thead> <tr> <th rowspan="3">type</th> <th colspan="3">activity</th> <th rowspan="3">explanation</th> </tr> <tr> <th rowspan="2">ethylene</th> <th colspan="2">polygalacturonase</th> </tr> <tr> <th>endo-type</th> <th>exo-type</th> </tr> </thead> <tbody> <tr> <td>melting</td> <td>present</td> <td>present</td> <td>present</td> <td>Activity both ethylene and polygalacturonase exists in the flesh. Therefore flesh begins melting quickly after harvest.</td> </tr> <tr> <td>non-melting</td> <td>present</td> <td>present</td> <td>absent</td> <td>Activity of exo-type polygalacturonase is absent in the flesh. Therefore melting speed of flesh is very slow.</td> </tr> <tr> <td>stony hard</td> <td>absent</td> <td>absent</td> <td>absent</td> <td>Activity both ethylene and polygalacturonase are absent in the flesh. Therefore flesh does not begin to melt. Ex. varieties: Odoroki, Yumyeong</td> </tr> </tbody> </table>	type	activity			explanation	ethylene	polygalacturonase		endo-type	exo-type	melting	present	present	present	Activity both ethylene and polygalacturonase exists in the flesh. Therefore flesh begins melting quickly after harvest.	non-melting	present	present	absent	Activity of exo-type polygalacturonase is absent in the flesh. Therefore melting speed of flesh is very slow.	stony hard	absent	absent	absent	Activity both ethylene and polygalacturonase are absent in the flesh. Therefore flesh does not begin to melt. Ex. varieties: Odoroki, Yumyeong
type	activity			explanation																						
	ethylene		polygalacturonase																							
		endo-type	exo-type																							
melting	present	present	present	Activity both ethylene and polygalacturonase exists in the flesh. Therefore flesh begins melting quickly after harvest.																						
non-melting	present	present	absent	Activity of exo-type polygalacturonase is absent in the flesh. Therefore melting speed of flesh is very slow.																						
stony hard	absent	absent	absent	Activity both ethylene and polygalacturonase are absent in the flesh. Therefore flesh does not begin to melt. Ex. varieties: Odoroki, Yumyeong																						
Ad. 8	to read “The density of flower buds is determined by assessing the number of flower buds along the length of the current years shoot.”																									
Ad. 9	to review picture for state 1																									
Ad. 41	to provide new illustration for state (1)																									
Ad. 48	to delete and to remove (+) from Char. 48																									
Ad. 67	to delete “for consumption” after “The time of maturity...”																									
TQ 10	to delete “Ovary: pubescence (characteristic 19)” from proposed characteristics to be added to Chapter 5.																									

*Pecan nut (Carya illinoensis (Wangenh.) K. Koch)*

76. The subgroup discussed document TG/PECAN(proj.9), presented by Mr. Barrientos-Priego (Mexico) and agreed the following:

UPOV code	to update GENIE and to read <i>Carya illinoensis</i> (Wangenh.) K. Koch
3.1.1	to delete second sentence and to move it to chapter 3.3
4.1.2	to update according to the standard wording
4.1.4	to update according to the standard wording
4.2.2	to read for the last sentence “In the case of a sample size of 5 trees, no off-types are allowed”
5.3	to check grouping characteristics vs. TQ 5
T.o.C	to provide example varieties
Char. 2	to read “Tree: density of canopy”
Char. 4	to read “brown” for state 2
Char. 5	to remove (+) and to add (a)
Char. 8	to reverse and to read: ratio with states low , medium, high (according new TGP/14)
Char. 10	to indicate lateral leaflet in the illustration
Char. 24	to have circular (3), narrow oblate (2), medium oblate (1)

Char. 25	to change the order (new TGP/14) and change Ad.25 accordingly
Char. 27	to read "Ground color" and to delete state 5
Char. 30	to read "Nut: thickness of partition"
Char. 34, 35	to have VG as method of observation
Char. 36	to be deleted
Char. 37	to read: <u>Time of husk opening</u>
8.1	to read: (a) Phenological state (V9) – end of leaflet expansion – fully developed leaflets. Leaves on the middle section of a one year old shoot. (b) Phenological state (R6) – full receptivity of stigma – Stigma is turgid and sticky. Observation must be done on the terminal section of a one year old shoot. (c) Phenological state (R14) – husk opening – 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. 2	to read " <u>Tree: density of canopy</u> The density of the canopy of the plant should be considered as the overall abundance of branches during the dormant period."
Ad. 5	to be deleted
Ad. 6 to 12	to read "terminal leaflet" in the illustration to indicate lateral leaflet in the illustration
Ad. 18	to provide new illustration
Ad.19, 20,21	to indicate length and width; to indicate lateral view and ventral view under drawing
Ad.22, 23	to improve pictures in the grid
Ad. 24, 25	to be amended according to the changes in Char. 24, 25
Ad. 27	to read "the color is observed on the surface of the nut, disregarding the spots"
Ad. 30	to read "Nut: thickness of partition and to update illustration."
Ad. 32	to read "Crack 10 nuts that are ready for consumption and then remove and weigh the kernels. Then take the average weight."
Ad. 34	to read "The time of leaf burst should be considered when 75% of the plants show bud burst."
Ad. 35	to read "The time of leaf fall should be considered when 75% of the plants have shed their leaves."
Ad. 36	to be deleted
Ad. 37	to read " <u>Time of husk opening</u> Husk opening is when 75% of the husks are split in each of the 5 trees. Individual valves of the husk are separated to allow visibility of the nut."
Ad.38	to read "The persistence of the husk is its retention on the infructescence on the shoot after the fall of the nuts. The observation is made during late winter."
9	to read "Instituto Nacional de Semillas"
TQ 5.	to be updated according to characteristics in chapter 5.3

*\*Prunus rootstocks (Prunus L.) (Revision)*

77. The subgroup discussed document TG/187/2(proj.2), presented by Mr. Erik Schulte (Germany) and agreed the following:

Cover page	to read <i>Prunus L.</i> (to remove brackets)
1	to have the first sentence as chapter 1.1 to have second sentence as chapter 1.2
2.3	to read (b) 40 one-year-old seedlings or 40 two-year-old seedlings for seed propagated varieties, and/or sufficient seeds ready for germinating into 40 seedlings. to delete letter (c)
4.1.4	to read: "...In the case of vegetatively propagated plants, observations should be made on 5 plants or parts taken from each of the 5 plants. In the case of seed propagated plants, observations should be made on 10 plants or parts taken from each of the 10 plants..."

5.3	to read: (d) Leaf blade: color of upper side (Char. 22) (e) Leaf blade: incision of margin (Char. 25)
6.4	to add at the end of the sentence: "(see explanations on the example varieties under 8.3)"
6.5	to read "(PE): for the use as rootstock for peach and almond varieties"
Char. 2	to delete states (2) and (4) to add (+) and provide illustration
Char. 3	to delete "To check:" in example varieties
Chars. 4, 7	to add (+) with explanation to read "To be observed at the middle third of the shoot."
Char. 8	to add example varieties to state (5): Citation (AP, PE), Rubira (AP, PE) to delete "To check:" in example varieties
Char. 13	to delete (d)
Char. 17	to add (+)
Char. 18	to have states: ovate (1); broad ovate (2); narrow elliptic (3); medium elliptic (4); circular (5); obovate (6)
Char. 22	to read state (1): medium green to add (*)
Char. 24	to read "Leaf blade: pubescence of lower side at distal part"
Char. 25	to have states: crenate (1), crenate and serrate (2), serrate (3)
Char. 26	to have states: very shallow (1); shallow (2); medium (3); deep (4) to move example characteristics from (1) to (2)
Char. 27	to delete "To check:" in example varieties
Char. 28	to read "Petiole: pubescence on upper side" to have state (1) absent or very sparse
Char. 31	to have states: (1) very short, medium (3), very long (5)
Char. 32	to check whether example variety "Ferienain" has any nectaries – if it does have nectaries – delete Char. 32 to delete example variety "Hamyra"
Char. 33	to delete "Varieties with nectaries only" to delete (*)
Char. 37	to delete
8.1	to remove "All" from (a) and (b) to read "(c) Observations on the young shoot should be made on the upper third of the one-year-old shoot during rapid growth."
Ad. 3	to read "Modern Prunus rootstock varieties are mostly propagated by in-vitro propagation. This type of propagation may affect, in particular, the expression of the respective variety in this characteristic. Special attention should be given to this aspect when establishing distinctness."
Ad. 5	to read "Should be assessed at the middle third on the sunny side of the shoot."
Ad.13	to read "Feathering is the presence of secondary shoots on current year shoots. Should be assessed at the end of summer."



Ad. 18	to add title: Ad. 17 Leaf blade: ratio length/width to add new illustration as follows:
Ad. 20	to provide new illustration indicating by line or arrows where to measure the tip
Ad. 25	to read: crenate (1); crenate and serrate (2); serrate (3)
8.3	to add chapter number
TQ 1	to indicate 1.1 Genus (standard wording)
TQ 1.2 (species)	to indicate as 1.3 and as 1.3.1, 1.3.2, 1.3.3.. to 1.3.11 for each species
TQ 5	to update according to changes in T.o.C. to delete 5.4(37) to include Chars. 22, 25
TQ 6	to add number 6. to change example to: One-year-old shoot: pubescence absent/present
TQ 7.3	to be deleted (already in TQ1)

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

78. The subgroup discussed document TG/125/7(proj.1), presented by Ms. Dong Pei (China) and agreed the following:

2.2	to read: "scions or grafted plants"
2.3	to read "10 scions" to read "6 grafted plants"
3.3.2	to delete
3.4.1	to read "Each test should be designed to result in a total of at least 6 plants."
3.4.2	to consider to read: "The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle."
3.4.3	to delete
4.1.4	to read "6 plants or parts taken from each of 6 plants..... 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 6 plants, 1 off-type is allowed."
5.3	to delete (b) and (d)
Table of Chars.	to delete (data of all measurements in brackets)

Chars. 1, 5, 6, 9, 10, 11, 20, 22, 23, 25, 26, 33, 39, 49, 50, 51	to delete
Char. 3	to have states : circular (1) ; semi-circular (2) ; conical (3)
Char.7	to read "Bud: shape" to check whether truly QL
Chars. 8 to 12	to read "Leaflet" instead of "Leaf"
Char. 8	to read state (2): ovate
Char.12	to read "Leaflet: glandular hair" to have states: absent or few (1); medium (2); many (3) to check which state for example variety "Xiangling"
Char.13	to delete "Flower"; to move Chars. 13, 14, 15, 16, 21 to move to end of T.o.C to be indicated as QN to change "Lvbo" to "Lübo"
Char.14	to explain and check whether to reword or to delete; (not PQ)
Char.15	to read "Time of female flowering" to be indicated as VG/MG
Char.16	to read "Time of male flowering" to be indicated as VG/MG
Char.17	to read "Plant: number of flowering times"
Char.18	to have states: 1-2 (1); 3-4 (2); 5-10(3); 11-20 (4); more than 21 (5) to rearrange example varieties
Char.19	to read "Female flower stigma: intensity of color" to have states: light (1); medium (2); dark (3) to be indicated as QN
Char.21	to read "Time of maturity" to be moved to end of T.o.C. to indicate as VG/MG
Char. 24	to consider the correlation, if any, with Char. 18 if correlation – to delete
Char. 25	to check whether to read "pubescence" instead of "fuzz" with states weak (1), medium (2), strong (3); to add (+) and explanation
Char. 27	to check wording to read "Nut: shape" to update illustration in form of grid and examples as in TGP/14;
Char. 28	to reword according to TGP/14 to have illustration of Chars. 27 and 28 in form of grid and examples in TGP/14
Char. 29	to have state (1): reniform
Char. 30	to read "Nut: shape of base in lateral view" to have states: cuneate (1); oblate (2); rounded (3); truncate (4)
Char. 31	to read "Nut: shape of apex in lateral view (excluding tip)" to have: states: obtuse (1); rounded (2); truncate (3); emarginate (4) to be indicated as PQ to rearrange example varieties
Char. 32	to read "Nut: length of tip" to have states: absent or short (1); medium (2); long (3)
Char. 34	to read "Nut: extent of pad around suture"
Char. 35	to have states: weak (1); medium (2); strong (3)
Char. 36	to read "Nut: width of pad on suture in lateral view"
Char. 38	to read "Nut: structure of surface of shell" to have states: slightly grooved (1); moderately grooved (2); strongly grooved (3); embossed (4)
Char. 40	to read "Nut: color of shell" to have states: yellow (1); light brown (2); brown (3)
Char. 41	to check whether QL; to improve wording
Char. 42	to read "Nut: size" to have states: small (3); medium (5); large (7) to rearrange example varieties

Char. 43	to check to add (+) and provide explanation
Char. 44	to read "Nut: inner pleat wall of shell" with states: papery (1), leathery (2), bony (3)
Char. 45	to have states: white (1), yellowish white (2), yellow (3), dark red (4), purple (5), yellow brown (6), light brown (7), medium brown (8), dark brown (9)
Char. 48	to delete measurements in brackets to be indicated as MG/VG
8.1	to delete "All" before observations to delete explanation about Leaves to add: Leaflet Observations should be made on the terminal leaflet.
8.2	to update illustrations in accordance with changes to T.o.C.
Ad. 27	to read "Nut: shape" to update illustration in form of grid and examples in TGP/14 to add explanation to read "Observed in longitudinal section through suture."
9.	to delete UPOV documents as references

*Vanilla* (*Vanilla planifolia* Jacks)

79. The subgroup discussed document TG/VANIL(proj.3), presented by Mr. Barrientos-Priego (Mexico) and agreed the following:

Alternative Names	to be checked (vs. GENIE and GRIN for botanical name and German translation)
1.	to read "These Test Guidelines apply to all varieties of <i>Vanilla planifolia</i> Jacks. and interspecific hybrids."
2.2	to read "The material is to be supplied in the form of cuttings with 2 nodes minimum or one year old plants."
2.3	to read "10 cuttings or plants"
3,1,1	to read "The minimum duration of tests should normally be a single growing cycle. In particular, it is essential that the plants produce a satisfactory crop of fruit in for the growing cycle."
Char.1	to read "Stem: intensity of green color" to add (*)
Char. 3	to be indicated as PQ
Char. 8	to have states weak (1), medium (2), strong (3)
Char. 9	to check wording according TGP/14 and improve illustration
Char. 10	to have notes 1, 2,3
Char. 12	to read "Only varieties without variegation: Leaf blade: Intensity of green color" to add (+) and to have states: light (1); medium (2); dark (3) to be indicated as QN
Char. 13	to move before Char. 12, to add in chapter 5.# as grouping characteristic
Char.16	to update according TGP/14; to have ratio: with states: low (3), medium (5), high (7)
Char. 18, 26, 27, 28	to have notes 1, 2, 3
Char. 20	to reverse states (4) and (5)
Char. 21	to be indicated as VG/MG
Chars. 22, 33	to delete
Char. 23, 24, 25, 29	to check whether to delete
Char. 23	to read "Flower: color of sepals"
Char. 24	to read "Flower: color of labellum" to delete (+) to be indicated as PQ
New Char. 35	to read "Fruit: vanillin content" with states: very low (1), low (3), medium (5), high (7), very high (9) to have variety examples: Parahurahu (3), Tahiti (2), Ordinaire (5), Manitra ampotony (9) to be indicated as QN, MS and to add (c)

New Char. 36	to read "Fruit: anisic alcohol content" with states: very low (1), low (3), medium (5). high (7) to have variety examples: Ordinaire (1); Parahurahu (5); Tahiti (7); to be indicated as QN, MS and to add (c)
8.1	to read: (a) <u>Stem and leaf</u> : observations on stem and fully developed leaves should be made, when the first fruit is fully developed. The observations on stem should be taken at mid-length of the stem. Observations on the leaf blade should be from the middle third of the stem.  (b) <u>Inflorescence and flower</u> : observations should be made on fully expanded inflorescence and from the first freshly opened flower.  (c) <u>Fruit</u> : observations should be made on fruit at physiological maturity
Ad. 8	to improve picture for state (3)
Ad.16	to update according Char.16 in form of a grid
Ad. 20	to read: oblong (4) and obovate (5)
Ad. 26	to add explanation: "Observation should be made on the first flower."
Ad. 30	to reverse pictures to show base at the bottom of image
Ad. 31	to improve grid
Ad. 35, 36	to read "Protocol for the analysis of aroma compounds in vanilla mature pods.  1. Sample collection At least five mature pods (about 8 month post pollination, green/yellow color) collected on 5 distinct vines are collected from the vines and analyzed separately. The pods are weighted before storage at -80°C. They are then freeze-dried and weighted again in order to evaluate the water content.  2. Extraction Five hundred milligrams of dry powder is suspended in 10 mL of water. After addition of 0.5 mL of sulfuric acid (18M), the suspension is thoroughly mixed and placed in a steam bath at 60°C for 2h. The mixture is cooled to room temperature and 1mL KOH (9.4M) is added to neutralize the mixture. Ethanol (20 mL) is added, and the mixture is thoroughly mixed and macerated for 4 hours. Subsequently, the mixture is poured through a sintered filter and the filtrate collected in a 50 mL flask. The filter cake is washed with ethanol until the total volume of filtrate and washings came up to 50 mL. The ethanolic solution is then extracted exhaustively with diethyl ether/pentane (1:1; total volume = 100 mL) and dried over anhydrous sodium sulfate prior to GC analysis.  3. GC analysis Each extract is subjected to triple measurement using Gas Chromatography. Quantification of the compounds (vanillin, 4-hydroxybenzyl alcohol, vanillic acid, 4-hydroxybenzaldehyde, anisic alcohol, anisic acid and 4-hydroxybenzoic acid) can be for instance as in Kaunzinger et al. (1997)."
9	to move "Lubinsky 2006" before "Lubinsky 2008" to add: Kaunzinger, A., Juchelka, D., Mosandl, A., 1997. Progress in the Authenticity Assessment of Vanilla. 1. Initiation of Authenticity Profiles. J. Agric. Food Chem. 45, 1752-1757
TQ 6	to delete "note 1" and "note 4"

### Recommendations on draft Test Guidelines

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

80. The TWF agreed that the following draft Test Guidelines should be submitted to the TC for adoption at its fiftieth session, to be held in Geneva in March 2014, on the basis of the following documents and the comments in this report:

Subject	Relevant document
Apple rootstocks ( <i>Malus</i> Mill.) (Revision)	TG/163/4(proj.3)
Litchi ( <i>Litchi chinensis</i> Sonn.)	TG/LITCHI(proj.3)
Peach ( <i>Prunus persica</i> (L.) Batsch) (Partial revision)	TG/53/7 and TWF/44/29
Prunus rootstocks ( <i>Prunus</i> L.) (Revision)	TG/187/2(proj.2)
Vanilla ( <i>Vanilla planifolia</i> Jacks)	TG/VANIL(proj.3)

(b) *Test Guidelines to be discussed at the forty-fifth session*

81. The TWF agreed to discuss the following draft Test Guidelines at its forty-fifth session:

*Acca ( <i>Acca sellowiana</i> (Berg) Burret)
Apricot ( <i>Prunus armeniaca</i> L.) (Partial revision: example varieties)
Avocado rootstock ( <i>Persea</i> Mill.)
*Coconut ( <i>Cocos nucifera</i> L.)
Chestnut ( <i>Castanea sativa</i> Mill.) (Revision)
Date palm ( <i>Phoenix dactylifera</i> )
Juglans rootstock
*Mandarins ( <i>Citrus</i> L. - Group 1) (Partial revision)
*Papaya ( <i>Carica papaya</i> L.)
*Pecan nut ( <i>Carya illinoensis</i> (Wangenh.) K. Koch)
Walnut ( <i>Juglans regia</i> L.) (Revision)

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

#### Guidance for drafters of Test Guidelines

83. The TWF considered document TWF/44/24.

84. The TWF noted the information content in the TG Drafters' webpage of the UPOV website, including the Revised Practical Guide for Drafters (Leading Experts) of UPOV Test Guidelines.

85. The TWF noted:

(a) the plan for the development of a prototype web-based TG Template for testing by interested experts by the end of 2013;

(b) that the template would provide sufficient flexibility for drafters of Test Guidelines to introduce proposals that were not covered by existing standard wording and would retain flexibility in the structure for further development of Test Guidelines by UPOV members.

86. The TWF proposed to include a template for a grid for shape and ratio in the future web-based TG Template that leading experts might use when drafting Test Guidelines.

87. The TWF noted the file "Summary information on quantity of plant material required on adopted Test Guidelines" available on the TG Drafters' webpage of the UPOV website.

Information and databases*(a) UPOV information databases*

88. The TWF considered document TWF/44/5.

89. The TWF experts were invited to check the amendments to UPOV codes and the new UPOV codes or new information added for existing UPOV codes by July 31, 2013.

90. The TWF noted the developments concerning the program for improvements to the Plant Variety Database since the forty-third session of the TWF.

91. The TWF noted that an introduction to the PLUTO database would be included in the Preparatory Workshop of future TWP sessions.

92. The TWF noted the plans of the Office of the Union to conduct a survey of members of the Union on their use of databases for plant variety protection purposes and on their use of electronic application systems.

93. The TWF requested that information be made available to TWP participants containing the dates of existing Test Guidelines, sorted by crop sector, and the names of crops for which no Test Guidelines exist, for which there are significant numbers of applications, to enable TWP participants to see which Test Guidelines should be developed or revised.

*(b) Variety description databases*

94. The TWF considered documents TWF/44/6 and TWF/44/25.

95. The TWF noted the report on the Pea Database study as presented in document TWF/44/25.

96. The TWF noted the approach for managing variety collections as presented in the Annex to document TWF/44/25.

97. The TWF noted and that an expert from the European Union would prepare a document on the development of a database for Peach, in a similar way to the database being developed for Pea, which would be presented at the forty-fifth session of the TWF in 2014. The TWF noted that it would be necessary to clarify in the study the different objectives of creating databases, in order to identify the characteristics for which information was required, with a view to limiting costs and work load.

*(c) Exchangeable software*

98. The TWF considered document TWF/44/7.

99. The TWF noted that the TC had concluded that the title of document UPOV/INF/16 "Exchangeable Software" and Section 1 "Requirements for exchangeable software" should remain unchanged, but that it would be useful to develop a separate information document that would allow members of the Union to provide information on the use of non-customized software and equipment that was used by members of the Union.

100. The TWF noted that the TC had:

(a) agreed with the inclusion of "Information System (IS) used for Test and Protection of Plant Varieties in the Russian Federation" and the AIM software from France in document UPOV/INF/16;

(b) requested the Office of the Union to investigate the possibility of the translation of "Information System (IS) used for Test and Protection of Plant Varieties in the Russian Federation" into English on the basis that the Russian Federation would verify the translation provided by the Office of the Union; and

(c) requested the Office of the Union to translate the AIM software to English on the basis that France would verify the translation provided by the Office of the Union.

101. The TWF noted that the TC had agreed with inclusion of the information contained in the Annex II to document TWF/44/7 for a revision of document UPOV/INF/16 by the Council at its forty-seventh session, to be held in Geneva on October 24, 2013.

102. The TWF noted that the TWC would be invited to consider the software proposed by Mexico for inclusion in document UPOV/INF/6 "Exchangeable software", as presented in Annex III to document TWF/44/7, at its thirty-first session, to be held in Seoul, from June 4 to 7, 2013.

*(d) Electronic application systems*

103. The TWF considered document TWF/44/8.

104. The TWF noted the developments concerning a prototype electronic form.

Date and Place of the Next Session

105. At the invitation of Morocco, the TWF agreed to hold its forty-fifth session in Marrakesh, Morocco, from May 26 to 30, 2014, with the preparatory workshop on May 25, 2014.

Chairperson

106. The TWF agreed to propose to the TC that it recommend to the Council to elect Mr. Katsumi Yamaguchi (Japan), as the next chairperson of the TWF.

Matters for future consideration

107. The TWF proposed that a suitable agenda item be added to the program of its forty-fifth session, under which the following items would be discussed:

- (a) Management of reference collections for DUS examination (document to be prepared by France and the European Union);
- (b) Duration of DUS tests in the fruit sector (document to be prepared by the European Union);
- (c) Harmonized example varieties for Apple: historical data and possible new developments (document to be prepared by Germany, New Zealand and the Office of the Union).

Future program

108. 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
  - (b) Reports on developments within UPOV (oral report by the Office of the Union)
4. Molecular Techniques (document to be prepared by the Office of the Union)
5. TGP documents
6. Variety denominations (document to be prepared by the Office of the Union)
7. Information and databases
  - (a) UPOV information databases (document to be prepared by the Office of the Union)
  - (b) Variety description databases (document to be prepared by the Office of the Union and documents invited)
  - (c) Exchangeable software (documents to be prepared by the Office of the Union)
  - (d) Electronic application systems (document to be prepared by the Office of the Union)

8. Uniformity assessment
9. Management of reference collections for DUS examination (document to be prepared by France and the European Union)
10. Duration of DUS tests in the fruit sector (document to be prepared by the European Union)
11. Harmonized example varieties for Apple: historical data and possible new developments (document to be prepared by Germany, New Zealand and the Office of the Union)
12. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
13. Discussion on draft Test Guidelines (Subgroups)
14. Recommendations on draft Test Guidelines
15. Guidance for drafters of Test Guidelines
16. Date and place of the next session
17. Future program
18. Report on the session (if time permits)
19. Closing of the session

#### Visit

109. On the morning of May 1, the TWF visited the ENZA™ PAK fruit cool storage and packing facility, in Whakatu, near Hastings, followed by a visit to the New Zealand Institute for Plant and Food Research (Plant and Food Research), Hawke's Bay Research Center, near Havelock North Village, where they received presentations from Ms. Cath Kingston, Portfolio Manager, Food Innovation Portfolio and Mr. Satish Kumar, Senior Scientist, Breeding & Genetics, copies of which are provided in Annex III to this document. The TWF also visited one of the orchards containing an apple variety collection, where they were accompanied by Mr. Ben van Hooijdonk, Scientist, Sustainable Production - Crop & Fruit Production Systems, and Mr. Mike Malone, Scientist, Breeding & Genomics - Premium Crops.

*110. The TWF adopted this report at the end of its session.*

[Annexes follow]



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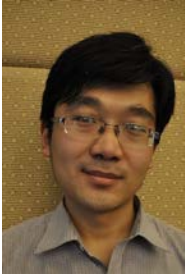
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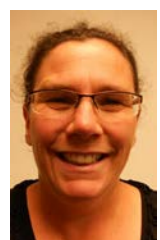


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[Annex II follows]


# Plant Variety Rights in New Zealand




TWF 44  
Napier,  
New Zealand





## Ministry of Business, Innovation & Employment



- **Christchurch**  
Southern Business Centre  
Plant Variety Rights Office & MBIE Personnel.

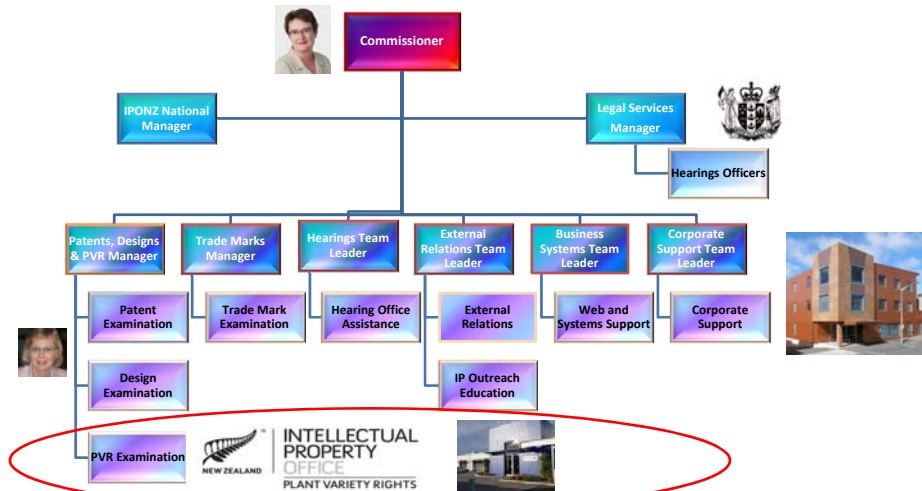


- **Wellington**  
Intellectual Property Office Headquarters








## Organisation

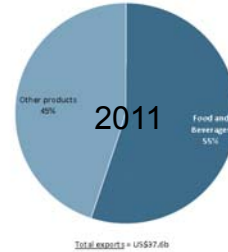


## History

- 1861 NZ Patent No. 1 granted for:  
“An Invention for the preparation of the fibre of the *Phormium tenax* (flax) and other plants for manufacturing purposes”  

- 1973 1<sup>st</sup> NZ Plant Variety Rights (PVR) Act
- 1976 1<sup>st</sup> NZ PVR granted  
Rose variety ‘**Matangi**’  

- 1981 UPOV membership  

- 1987 Current NZ PVR Act, complies with UPOV 1978

## NZ Market

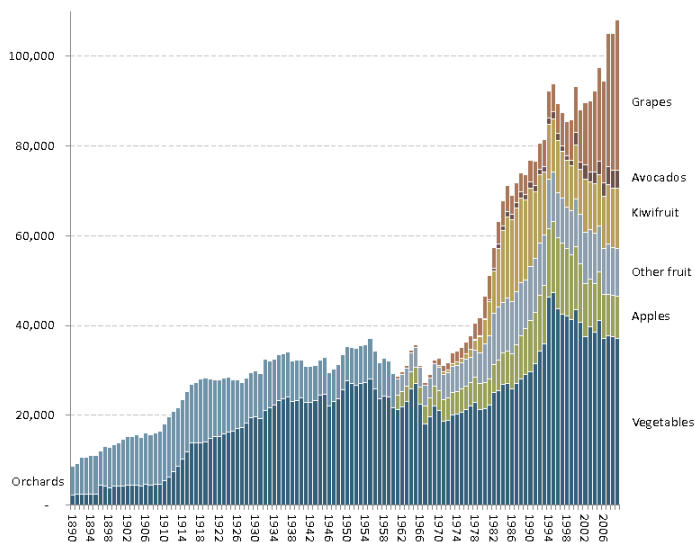
- Small domestic market
- Agriculture & Horticulture is a major export earner



2012 Kiwifruit canopy area 12,820 hectares  
New forestry planting 11, 600 hectares

2013 10% of Hawke's Bay region pip & stone fruit crops damaged by hail. Estimate: 500,000 – 1 million cartons of export fruit loss.

120 years of area in fruit and vegetables in New Zealand  
(ha; actual; 1890-2009)





## DUS field trials



## Testing Approach

PROCEDURE	SPECIES
Central testing by the Office	Most agricultural varieties; ryegrass, clover, cereals, peas, potatoes, fungal endophytes
Central testing by another organisation or institute	Fruit crops; apples, pears, <i>Prunus</i> , blueberry, avocado
PVR Office testing on applicants property	Ornamentals and some fruit
Breeder testing	Most vegetables and minor agricultural crops
Foreign test reports	As required and according to PVRO practice

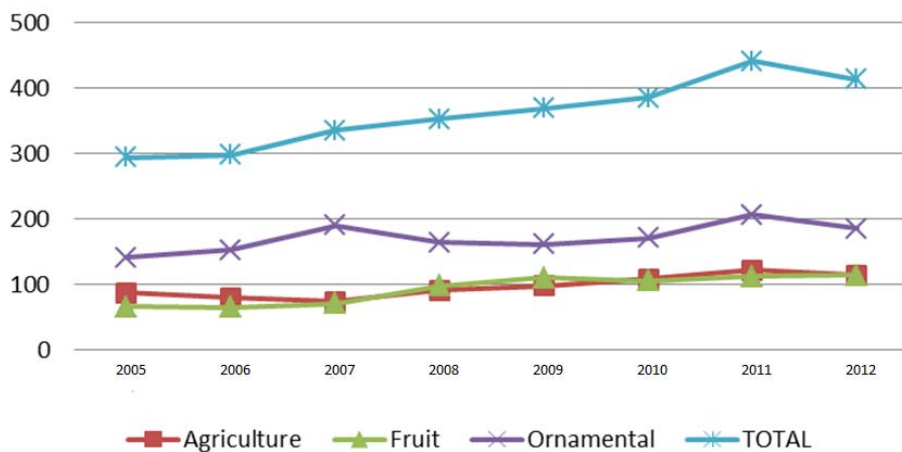
## Use of Experts

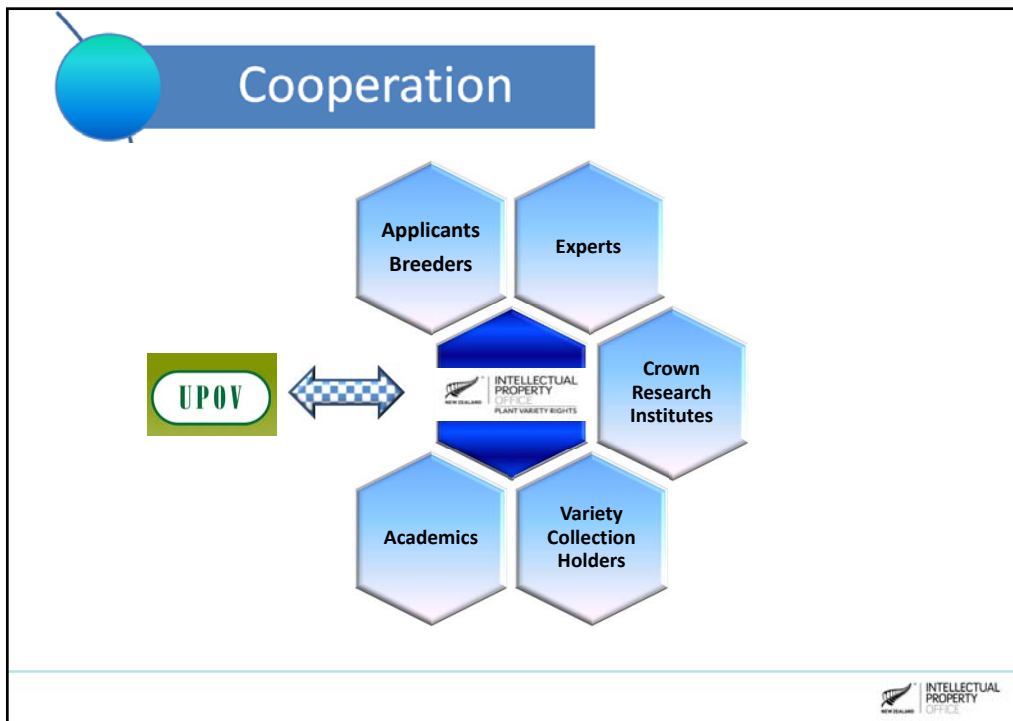
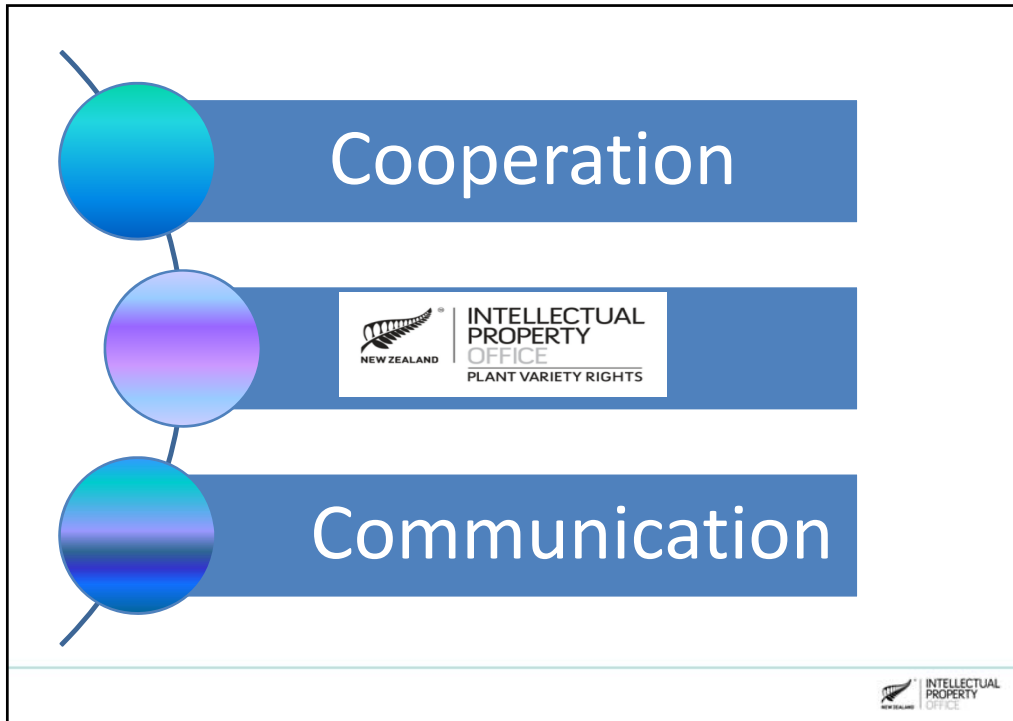
- Expert advisors: provide advice & opinion  
Experts: do not make any decisions

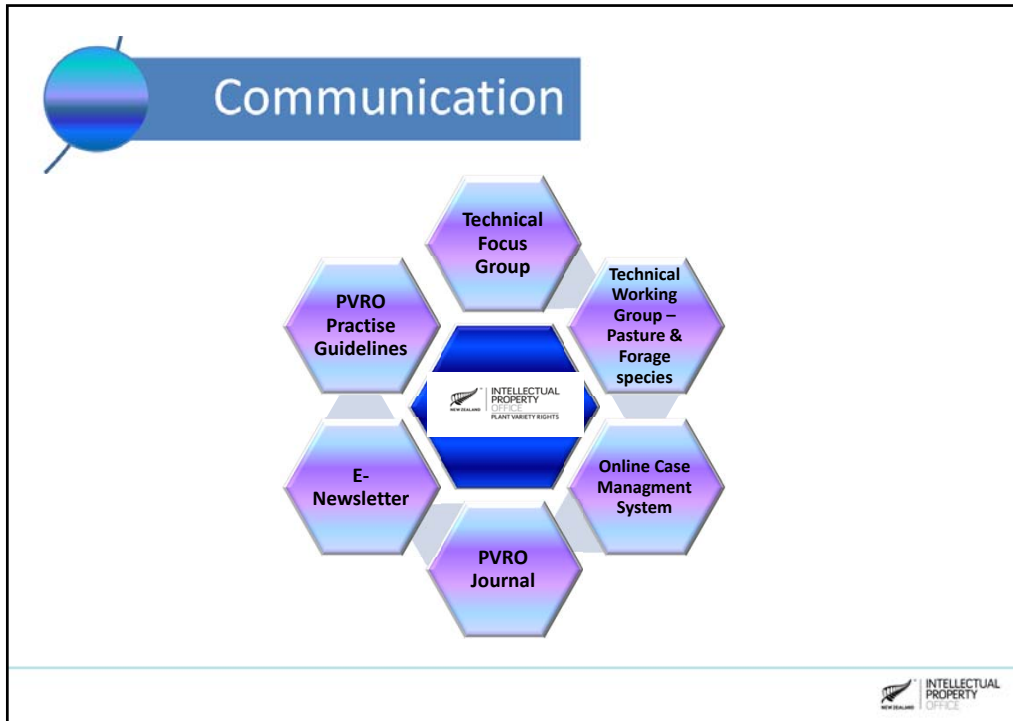
- Talent pool:  
Researchers  
Breeders  
Species enthusiasts



## Varieties Under Test







[www.iponz.govt.nz](http://www.iponz.govt.nz)

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**PLANT VARIETY RIGHTS. PROTECTING NEW PLANT VARIETIES.**

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**PVR**

- > What is a plant variety right (PVR)?
- > Why register a plant variety right?
- > How to check for existing plant variety rights
- > The plant variety right process
- > How to apply for a PVR
- > Maintain a PVR
- > Forms and fees
- > Legislation
- > Technical notes & guidelines
- > New Zealand plant variety rights journal
- > FAQs

**What is a plant variety right?**  
Exclusive commercial rights to a registered variety.  
[FIND OUT MORE](#)

**Search for plant variety rights**  
This will take you to our online database of plant variety rights.  
[SEARCH NOW](#)

**Apply for/Maintain a plant variety right**  
Grant of a plant variety right gives you the exclusive rights to use it.  
[APPLY FOR](#)  
[MAINTAIN](#)

**The process**  
This is the process of applying for, and the granting of a plant variety right. [Read more...](#)

**What's New**

- > **Extended maintenance outage - 17 April 2013**  
15 Apr 2013
- > **NZIPA - World IP Day Event**  
09 Apr 2013
- > **The Plant Variety Rights Journal**  
02 Apr 2013
- > **Trade Mark Law Reform - Trade Marks Amendment Regulations 2013**  
02 Apr 2013

INTELLECTUAL PROPERTY OFFICE

# Online Case Management System

## Agent Account Inbox

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- Patent
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- Plant Variety Right
- Proceeding
- Information Requests

**Tasks**

Search Tasks

8 Task(s)

Task	Case Number	Case Title	Case Type	Owner	Case Contact	Client Reference	Task Due Date
<a href="#">Respond to TM Compliance Report</a>	950776	Tawana	Trade Mark	IPONZ Nurseries	BSC Lawyers	Tawana	27 Mar 2013
<a href="#">Pay Fee</a>	31149	Green Shadow	PVR	IPONZ Nurseries	BSC Lawyers	JReference1	29 Apr 2013
<a href="#">File Certified English Translation</a>	603854	2-PYRIDYL SUBSTITUTED IMIDAZOLES AS THERAPEUTIC AGENTS AND/OR ALK4 INHIBITORS	National Entry PCT	EWHA UNIVERSITY-INDUSTRY COLLABORATION FOUNDATION	BSC Lawyers	J123	21 May 2013
<a href="#">Respond to Examination Status</a>	31149	Green Shadow	PVR	IPONZ Nurseries	BSC Lawyers	JReference1	28 Jun 2013
<a href="#">Respond to Examination Report</a>	415821	A hand basin	Design	Great Wall Airlines Company Limited	BSC Lawyers	SIPA1	03 Aug 2013
<a href="#">Respond to Examination Report</a>	415822	New Basin	Design	Great Wall Airlines Company Limited	BSC Lawyers	SIPA Delegation	04 Aug 2013
<a href="#">Respond to Examination Report</a>	602749	Mechanism for Joint on Robotic Arm	Complete Patent	Arnold Schwarzenegger	BSC Lawyers	mechanism for joint on robotic arm	08 Jul 2014
<a href="#">Respond to Examination Report</a>	602723	Mechanism for Joint on Robotic Arm	Complete Patent	Arnold Schwarzenegger	BSC Lawyers	Mechanism for Joint on Robotic Arm	08 Jul 2014


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**Discussions**

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1 Discussion(s)

Title	Case Number	Case Title	Case Contact	Update Date	Creation date	Status
<a href="#">PVR Application Validated</a>	31149	Green Shadow	BSC Lawyers	11 Apr 2013 11:53:01 a.m.	11 Apr 2013	Closed



## e-filing

**Reference**

Enter your reference for this application here.

**Contact**

Identify who the applicant is for this application. If you or your organisation are the applicant then select that one and apply to your own rights. If not then you are acting as an agent.

I am acting in:  In my own right  As an Agent

**PVR Information**

Enter the details of your Plant Variety Right application here.

Plant Botanical Name UPDV-A1: 3(X)	Plant Common Name UPDV-A1: 3(N)	No selection
---------------------------------------	------------------------------------	--------------

Please ensure that you have entered either the proposed denomination or Breeder's reference. At least one of these must be entered in order to submit your application.

Proposed Denomination  
UPDV-A1: 4(X)

Breeder Reference  
UPDV-A1: 4(N)

Commercial Programme

If applications for plant variety protection have been made in other countries please select Add to provide the details.

Technical Examination already completed  
UPDV-A1: 5(X)(1) State Completed

Technical Examination already in progress  
UPDV-A1: 5(X)(2) State Started

Sold  
UPDV-A1: 6(X)(1) Add

Offered for sale  
UPDV-A1: 6(X)(2) Add

I/we declare that the material provided with the first application is representative of the variety and relevant to this application.

Authorization is hereby given to the Authority to exchange with the competent authorities of any UPDV member all necessary information and material related to the variety, provided that the rights of the applicant are safeguarded.


Please select Add to upload your completed technical questionnaires. A list of commonly used technical questionnaires can be found and downloaded from our [website](#). If the one you require is not listed please Contact Us.

Specialised Specific Technical Questionnaire Add

Generation Certificate Add

### Account Menu

- Plant Variety Right
  - [Search the PVR Register](#)
  - [Apply for Plant Variety Right](#)
  - [Maintain a Plant Variety Right](#)
  - [Renew Plant Variety Right](#)







- Legislative review
- Case management development
- Management of testing and collections
- Increasing expectations

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Plant & Food  
**RESEARCH**  
RANGAHAU AHUMĀRA KAI 



## An Introduction to Plant & Food Research

**UPOV TWF technical visit – Wednesday 01 May**  
**Hawkes Bay Research Centre**

### Value from fresh ideas

Plant & Food Research is a New Zealand-based science company providing research and development that adds value to fruit, vegetable, crop and food products.



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## Plant & Food Research: A quick snapshot

### Incorporated December 2008

- » Based in New Zealand
- » Government-owned Crown Research Institute
- » Revenue NZ\$121 million (2011/12)
- » Merger of Crop & Food Research and HortResearch
  - » Established in 1992

### Over 900 employees

- » 650 research staff
- » 15 sites in New Zealand
- » Representatives in USA, Australia

### Income

- » 50% private contracts and royalties
- » 50% NZ Government contracts

## Our locations



## Our science

We undertake scientific discovery and innovation to grow the prosperity, health and sustainability from New Zealand's food plants and seafood resources in partnership with industry



Building knowledge of key traits at the molecular level to inform the development of new elite cultivars



Effective control of pest and disease to protect market access



Systems that increase efficiency and retain quality across the supply chain



Identifying intrinsic health benefits in natural produce to develop new foods and beverages



Optimising the value and quality of seafood and aquaculture

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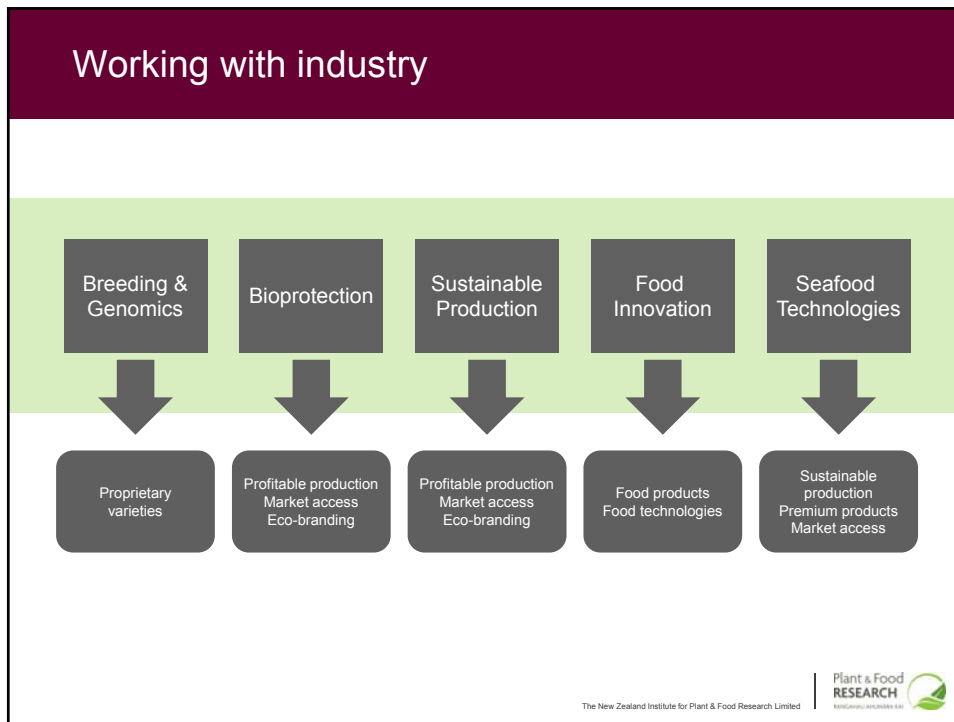


## Our key industries



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## Hawkes Bay Research Centre

- Plant Breeding (Pipfruit, Summerfruit)**  
Science Group Leader: Dr Vincent Bus
- Plant Physiology (Tree fruits)**  
Science Group Leader: Dr Stuart Tustin
- Crop Physiology (Annual crops)**  
Team Leader: Dr Bruce Searle
- Postharvest Physiology (Tree fruits)**  
Science Group Leader: Dr Jason Johnston
- Entomology (Tree fruits, Vines)**  
Team Leader: Dr Jim Walker
- Plant Pathology (Tree fruits, Annual crops, Vines)**  
Team Leader: Dr Ian Horner
- Land Use Management**  
Team Leader: Dr Paul Johnstone

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## Breeding & Genomics

### Better Cultivars Faster

New cultivar development from smart breeding of elite germplasm



## Breeding & Genomics

Breeding & Genomics



Proprietary varieties

- » New breeding tools to accelerate development of cultivars
- » New cultivars which:
  - » address international consumer trends
  - » are adapted to climatic change
  - » are resistant to key pests and diseases

## Breeding & Genomics

### Strategy:

- » New cultivars with identified consumer and producer traits
- » Identified molecular mechanisms controlling key traits
- » Breeding programmes using integrated genomics tools

### Main research themes:

- » Identifying molecular mechanisms controlling key traits
- » Developing molecular markers for key traits
- » Genotyping and phenotyping of germplasm collections
- » Developing new technologies to support breeding programmes
- » Breeding of new cultivars with defined commercial traits

## Breeding & Genomics

### ZESPRI® GOLD Kiwifruit

- » Sweet, yellow-fleshed kiwifruit
- » More than 26 million trays sold in 2009

### JAZZ™ apples

- » Tangy, crunchy, juicy apples with flavour
- » Rated by consumers in Europe and US as outstanding
- » Excellent shelf life

### Moonlight potato

- » Smooth white skinned, white fleshed general purpose potato
- » High yield, good eating

### Conquest wheat

- » Improved milling wheat variety
- » Competitive as an import replacement variety

## Breeding & Genomics: Activities in Hawkes Bay

- » Pipfruit breeding programme (Dr Richard Volz, Dr Vincent Bus)
  - » Disease Resistance breeding (Dr Vincent Bus)
  - » Mapping/ Whole Genome Selection (Dr Satish Kumar)
  - » Apple rootstock breeding (Mike Malone)
- » Stonefruit breeding programme (Mike Malone)
- » National Cultivar Centre (Mike Malone, Shayna Ward, Kylie Miller)
- » Plant Variety Management Team
  - » (Wendy Cashmore, Andrew Mackenzie, Emma Brown, Peter Jones)

## Your chance to ask...

- » Did we miss something you wanted to know?
- » Any other questions?





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[www.plantandfood.co.nz](http://www.plantandfood.co.nz)

[Cath.Kingston@plantandfood.co.nz](mailto:Cath.Kingston@plantandfood.co.nz)

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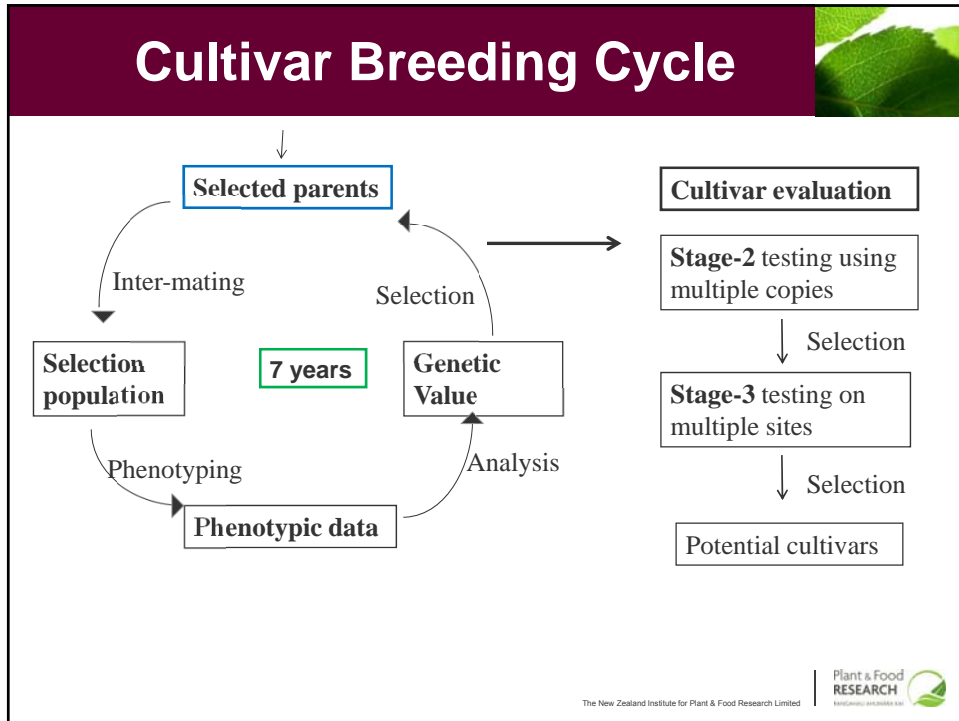
# Apple Genetic Diversity & Fast Breeding Techniques

Satish Kumar  
Senior Scientist, Breeding & Genomics  
Satish.Kumar@plantandfood.co.nz

## Outline

- Conventional Breeding
- Germplasm & Genetic Diversity
- Fast Breeding


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## Breeding Objectives

- HortResearch (now PFR) has successfully developed a number of commercial cultivars over the last three decades
- Historical breeding objectives: texture, appearance, storage, size, etc.
- New breeding objectives: Red flesh, Novel flavour, Durable disease resistance.
- Broadening the genetic base

The diagram shows the lineage of apple cultivars. At the top, a heart shape contains the names 'Gala', 'Braeburn', and 'Splendour'. An arrow points down to a red apple, which is surrounded by four ovals representing other cultivars: 'Pacific Rose™ ('Sciros')', 'Pacific Beauty™ ('Sciearly')', 'Envy™ ('Scilate')', and 'Jazz™ ('Scifresh')'.

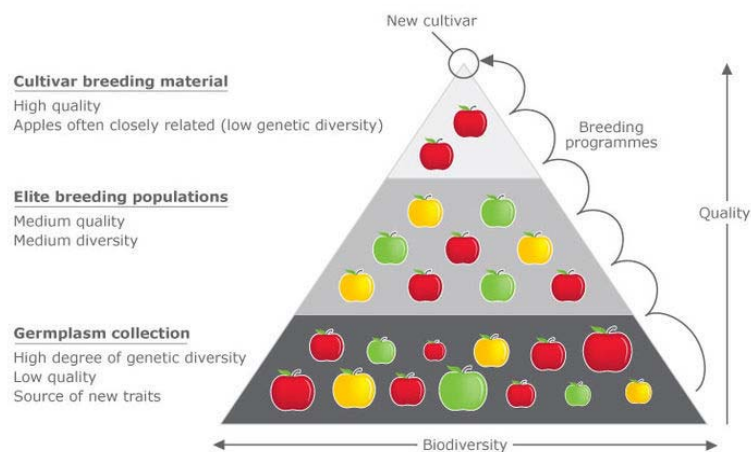
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## Germplasm Collection

- During 1960's: Collection of ~400 cultivars & *Malus sp*
- During 1990- 1996

Provenance / Country	# Families
North America	53
UK	48
Western Europe	117
Eastern Europe	42
Central Asia	83
Unknown	174

## Genetic Populations



## Germplasm Characterisation



- Phenotypic
  - Skin and flesh colour
  - Disease resistance
  - Flavour volatiles
  - Appetite-related phytochemicals
- DNA-level profiling
  - Phenotype-Genotype relationship
  - Gene conservation strategy

## Fast Breeding

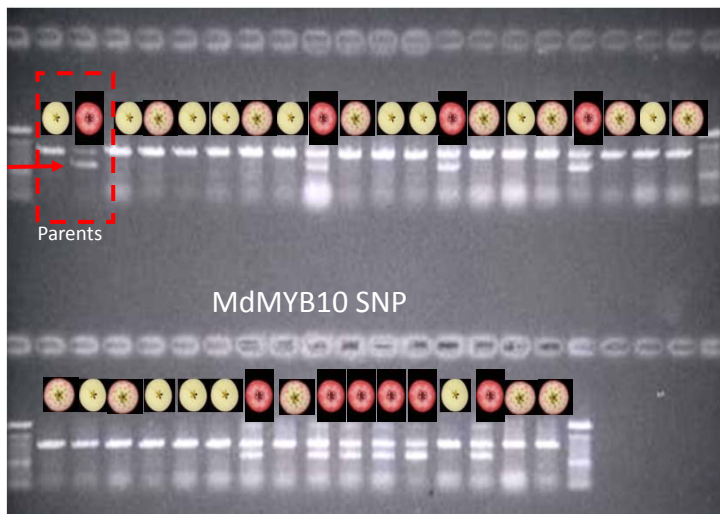


- Fast-forward the reproduction cycle
  - Genetic engineering
  - Climate-controlled growth chambers
- Obviate the need of phenotypic evaluation
  - DNA markers based selection

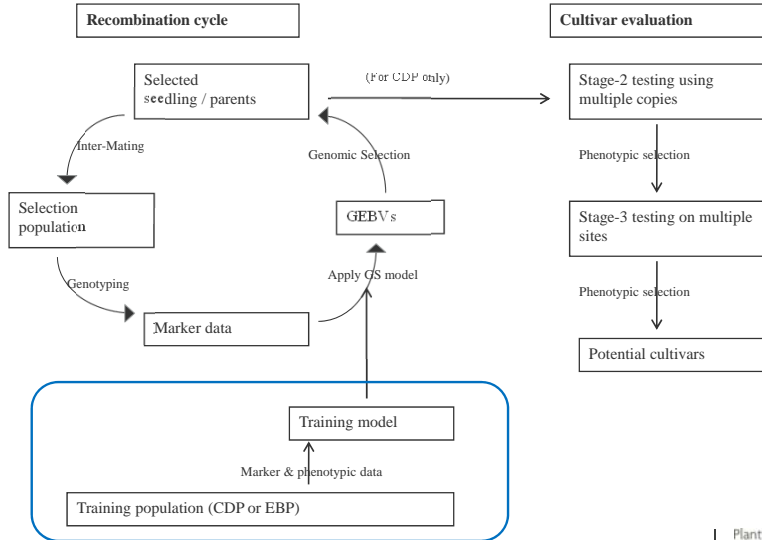
## Genetic Architecture

- Magnitude of Genetic Control (i.e. Heritability)
- Complexity of Genetic Control
  - Monogenic
  - Oligogenic
  - Polygenic

## Marker-assisted Selection (MAS) (e.g. Red flesh apple)

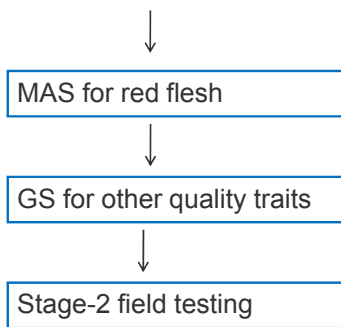


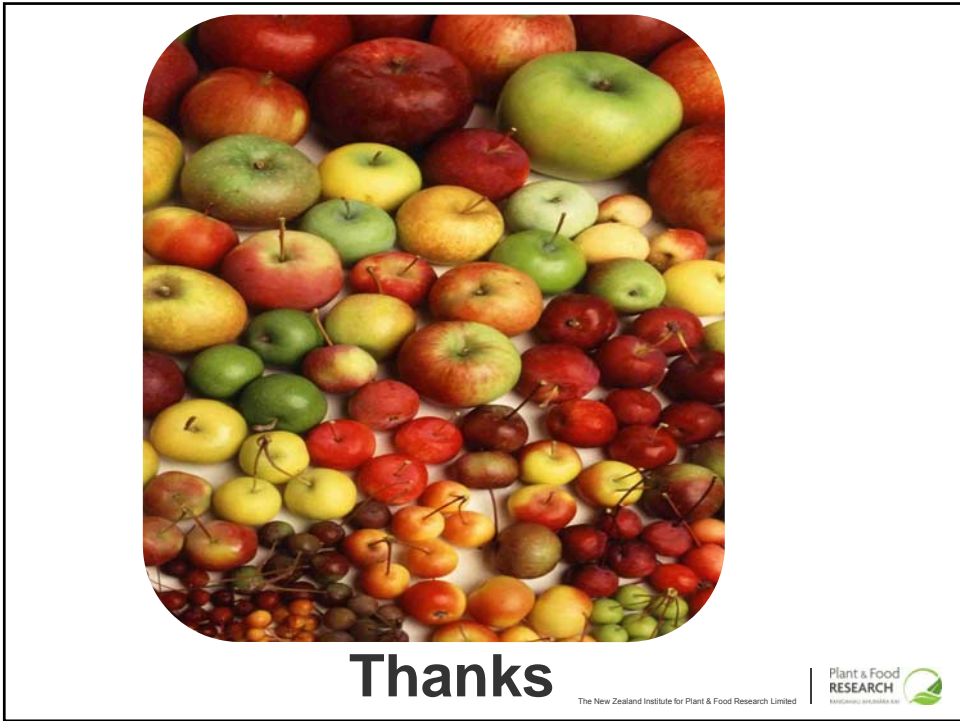
# Genomic Selection



# GS Implementation

Selection Population (10 Families)





[Annex IV follows]



## LIST OF LEADING EXPERTS

**DRAFT TEST GUIDELINES TO BE SUBMITTED  
TO THE TECHNICAL COMMITTEE IN 2014**

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

**before June 14, 2013**

Species	Basic Document(s)	Leading expert(s)	Interested experts (States/Organizations) <sup>1</sup>
Apple rootstocks ( <i>Malus</i> Mill.) (Revision)	TG/163/4(proj.3)	Mr. Venter (ZA)	AU, CN, DE, FR, QZ, BR, JP, KR, NZ, RO, CIOFORA, Office
Litchi ( <i>Litchi chinensis</i> Sonn.)	TG/LITCHI(proj.3)	Mrs. Lu Xin (CN)	IL, JP, KR, ZA, Office
Peach ( <i>Prunus persica</i> (L.) Batsch) (Partial revision)	TWF/44/29	Mr. Brand (FR)	AU, BR, CA, CN, ES, IL, JP, KR, MX, NZ, SK, RO, QZ, ZA, CIOFORA, Office
Prunus rootstocks ( <i>Prunus</i> L.) (Revision)	TG/187/2(proj.2)	Mr. Schulte (DE)	AU, BR, CN, ES, FR, KR, NZ, RO, QZ, ZA, CIOFORA, Office
Vanilla ( <i>Vanilla planifolia</i> Jacks.)	TG/VANIL(proj.3)	Mr. Barrientos-Priego (MX)	CN, FR, QZ, Office

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<sup>1</sup> for name of experts, see List of Participants

**DRAFT TEST GUIDELINES TO BE DISCUSSED AT TWF/45**

(\* indicates possible final draft Test Guidelines)

New draft to be submitted to the Office of the Union  
**before April 11, 2014**

**(Guideline date for Subgroup draft to be circulated by Leading Expert: February 14, 2014  
Guideline date for comments to Leading Expert by Subgroup: March 14, 2014)**

Species	Basic Document(s)	Leading expert(s)	Interested experts (States/Organizations) <sup>2</sup>
*Acca ( <i>Acca sellowiana</i> (Berg) Burret)	TG/ACCA(proj.2)	Mr. Barnaby (NZ)	BR, ZA, CIOFORA, Office
Apricot ( <i>Prunus armeniaca</i> L.) (Partial revision: example varieties)	TG/70/4 Rev.	Mr. Venter (ZA)	ES, FR, JP, KR, MA, NZ, QZ, Office
Avocado rootstock ( <i>Persea</i> Mill.)	New	Mr. Barrientos-Priego (MX)	AU, BR, IL, NZ, QZ, ZA, Office
Chestnut ( <i>Castanea sativa</i> Mill.) (Revision)	TG/124/3	Mr. Ishi (JP)	ES, KR, NZ, QZ, ZA, Office
*Coconut ( <i>Cocos nucifera</i> L.)	TG/COCOS(proj.2)	Mrs. Machado (BR)	CN, ID, MX, MY, OM, PH, TH, VN, Office
Date palm ( <i>Phoenix dactylifera</i> )	New	Mr. Al-Yahyai (OM)	BR, MA, MX, Office
Juglans rootstock	New	Mr. Chomé Fuster (ES)	CN, KR, QZ, ZA, Office
*Mandarins (Citrus L. - Group 1) (Partial revision)	TG/201/1	Mr. Chomé Fuster (ES)	AU, CN, CO, IL, JP, KR, MA, MX, NZ, OM, QZ, ZA, CIOFORA, Office
*Papaya ( <i>Carica papaya</i> L.) (Revision)	TG/264/2(proj.6)	Mr. Barrientos-Priego (MX)	BR, CN, IL, JP, MY, OM, PH, ZA, CIOFORA, Office
*Pecan nut ( <i>Carya illinoensis</i> (Wangenh.) K. Koch)	TG/PECAN(proj.9)	Mr. Barrientos-Priego (MX)	BR, IL, KR, ZA, Office
Walnut ( <i>Juglans regia</i> L.) (Revision)	TG/125/7(proj.1)	Ms. Dong Pei (CN)	JP, KR, QZ, ZA, Office

[End of Annex IV and of document]

<sup>2</sup> for name of experts, see List of Participants