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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS

Forty-Third Session
Mar del Plata, Argentina, November 17 to 21, 2014

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

Document prepared by the Office of the Union

Disclaimer: this document does not represent UPOV policies or guidance

1. The purpose of this document is to present developments concerning a possible new section for document TGP/8 "Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions".

2. The following abbreviations are used in this document:

CAJ:	Administrative and Legal Committee
TC:	Technical Committee
TC-EDC:	Enlarged Editorial Committee
TWA:	Technical Working Party for Agricultural Crops
TWC:	Technical Working Party on Automation and Computer Programs
TWF:	Technical Working Party for Fruit Crops
TWO:	Technical Working Party for Ornamental Plants and Forest Trees
TWV:	Technical Working Party for Vegetables
TWPs:	Technical Working Parties

3. The structure of this document is as follows:

BACKGROUND 2
DEVELOPMENTS IN 2013 2
TECHNICAL COMMITTEE 2
CONSIDERATION BY THE TECHNICAL WORKING PARTIES IN 2013 2
DEVELOPMENTS IN 2014 3
TECHNICAL COMMITTEE 3
PRACTICAL EXERCISE WITH A COMMON DATA SET 4
ANNEX I SUMMARY OF DIFFERENT APPROACHES OF TRANSFORMATION OF MEASUREMENTS INTO NOTES FOR VARIETY DESCRIPTION
ANNEX II APPLE VARIETY REFERENCE PROJECT (PREPARED BY AN EXPERT FROM NEW ZEALAND)
ANNEX III DIFFERENT FORMS THAT VARIETY DESCRIPTIONS COULD TAKE AND THE RELEVANCE OF SCALE LEVELS (PREPARED BY AN EXPERT FROM GERMANY)
ANNEX IV GUIDANCE FOR DEVELOPMENT OF VARIETIES DESCRIPTIONS IN ITALY

BACKGROUND

4. The Technical Committee (TC), at its forty-eighth session, held in Geneva from March 26 to 28, 2012, considered Annex III: "TGP/8 PART I: DUS Trial Design and data analysis, New Section 6 – Data processing for the assessment of distinctness and for producing variety Descriptions" in conjunction with Annex VIII: "TGP/8 PART II: Techniques used in DUS Examination, New Section 13 - Methods for data processing for the assessment of distinctness and for producing variety descriptions" of document TC/48/19 Rev. It agreed that the information provided in Annex VIII of document TC/48/19 Rev. and at the UPOV DUS Seminar, held in Geneva in March 2010, together with the method provided by Japan and the method used in France for producing variety descriptions for herbage crops, as presented at the TWC at its twenty-sixth session (see document TWC/26/15, TWC/26/15 Add. and TWC/26/24), provided a very important first step in developing common guidance on data processing for the assessment of distinctness and for producing variety descriptions, but concluded that the information as presented in Annex VIII of document TC/48/19 Rev. would not be appropriate for inclusion in document TGP/8. It agreed that the Office of the Union should summarize the different approaches set out in Annex VIII of document TC/48/19 Rev. with regard to aspects in common and aspects where there was divergence. As a next step, on the basis of that summary, consideration could be given to developing general guidance. The TC agreed that the section should include examples to cover the range of variation of characteristics. It further agreed that the detailed information on the methods should be made available via the UPOV website, with references in document TGP/8 (see document TC/48/22 "Report on the Conclusions" paragraph 52).

5. At their sessions in 2012, the TWPs received a presentation prepared by the Office of the Union on "Summary of different approaches of transformation of measurements into notes for Variety Description", as reproduced in the Annex I of this document.

6. The TWC, at its thirtieth session, agreed that the experts from Finland, Italy and the United Kingdom would support the Office of the Union to summarize the different approaches for further developing common guidance on data processing for the assessment of distinctness and for producing variety descriptions (see document TWC/30/41 "Report", paragraph 42). It also agreed that experts from the United Kingdom in cooperation with experts from France and Germany should conduct a practical exercise. The exercise would be to process a common data set to produce variety descriptions in order to determine the aspects in common and where there was divergence among the methods (see document TWC/30/41 "Report", paragraph 43)

DEVELOPMENTS IN 2013

Technical Committee

7. The Technical Committee (TC), at its forty-ninth session held in Geneva from March 18 to 20, 2013, considered document TC/49/29 "Revision of document TGP/8: Part II: Techniques Used in DUS Examination, New Section: Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions".

8. The TC requested the Office of the Union to request experts from the United Kingdom, France and Germany, or other members of the Union, to provide a common data set of self-pollinated and/or vegetatively propagated varieties for performing a practical exercise (see document TC/49/41 "Report on the Conclusions", paragraph 66).

Consideration by the Technical Working Parties in 2013

9. The TWO, TWF, TWV, TWC and TWA considered documents TWO/46/18, TWF/44/18, TWV/47/18, TWC/31/18 and TWA/42/18, respectively (see document TWO/46/29 "Report", paragraphs 40 to 42, document TWF/44/31 "Report", paragraphs 43 to 46, document TWV/47/34 "Report", paragraphs 43 to 46, document TWC/31/32 "Report", paragraphs 40 to 45, and document TWA/42/31 "Report", paragraphs 44 to 49).

10. The TWO agreed with the 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 (see document TWO/46/29 "Report", paragraph 42).

11. The TWF and the TWV 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 (see document TWF/44/31 “Report”, paragraph 45 and document TWV/47/34 “Report”, paragraph 45).

12. The TWF and the TWV 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 (see document TWF/44/31 “Report”, paragraph 46 and document TWV/47/34 “Report”, paragraph 46).

13. The TWC received a presentation by an expert from the United Kingdom on a preliminary use of the Flax data set to illustrate two different methods from the United Kingdom, as contained in document TWC/31/18 Add.. The TWC welcomed the data set of Flax varieties offered by the experts from France for the practical exercise. The TWC noted that the document had been prepared to illustrate the way in which the different methods could be applied and noted that in the United Kingdom one of the methods is currently applied to herbage crops, and so might not be suitable for Flax, and would need to be evaluated (see document TWC/31/32 “Report”, paragraphs 41 and 42).

14. The TWC noted that there was no guidance on the production of variety descriptions for cross-pollinated, self-pollinated or vegetatively propagated crops (see document TWC/31/32 “Report”, paragraph 43).

15. The TWC agreed that the Office of the Union should seek to ensure that the crops and data in the practical exercise would enable all methods for self-pollinated and/or vegetatively propagated varieties mentioned to be included (see document TWC/31/32 “Report”, paragraph 45).

16. The TWA highlighted the importance of producing guidance for variety descriptions in general and agreed that the COY method was not used for producing variety descriptions but for assessing distinctness and uniformity (see document TWA/42/31 “Report”, paragraph 46).

17. The TWA agreed with the TWC that there was no guidance on data processing for the assessment of distinctness and for producing variety descriptions. The TWA supported the continuation of the practical exercise and the further steps agreed by the TWC (see document TWA/42/31 “Report”, paragraph 47).

18. The TWA agreed that, in parallel to the practical exercise, the expert from Germany should develop a text to explain the different forms that variety descriptions could take and the relevance of scale levels in that regard (see document TWA/42/31 “Report”, paragraph 48).

19. The TWA noted the interest of Italy to participate in the practical exercise with use of a common data set (see document TWA/42/31 “Report”, paragraph 49).

DEVELOPMENTS IN 2014

Technical Committee

20. The TC at its fiftieth session, held in Geneva from April 7 to 9, 2014 considered document TC/50/25 “Revision of document TGP/8: Part II: New Section: Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions”.

21. The TC, noted the invitation by the TWF to an expert from New Zealand to make a presentation at its forty-fifth session, on the project for “apple reference varieties” that began in New Zealand in 2011, and how that work would contribute to developing improved example varieties and variety descriptions (see document TC/50/36 “Report on the Conclusions”, paragraph 55). The expert from New Zealand made a presentation on “Apple variety reference project” at the forty-fifth session of the TWF in 2014, as reproduced in Annex II to this document.

22. The TC, agreed to invite an expert from Germany to develop a text to explain the different forms that variety descriptions could take and the relevance of scale levels in that regard (see document TC/50/36 “Report on the Conclusions”, paragraph 56).

23. In response to the request of the TC, the expert from Germany provided a text on the different forms that variety descriptions could take and the relevance of scale levels which is presented in Annex III to this document.

24. An expert from Italy has provided a presentation on “Guidance for development of Variety Descriptions in Italy”, as reproduced in the Annex IV of this document.

Practical exercise with a common data set

25. In response to the request for a common data set (see paragraph 8 of this document), the Office of the Union received data sets of Chrysanthemum, Pea and Flax from Japan, the Netherlands and France respectively. In the first instance, it was concluded that the practical exercise should be conducted with a data set for flax, provided by experts from France, on the basis that the data was sufficiently comprehensive and structured in a way that should allow the exercise to be completed by all interested UPOV members.

26. On December 20, 2013, a request was issued to France, Germany, Italy, Japan, Netherlands, Republic of Korea and United Kingdom, inviting them to apply their methods to the flax data provided for a single characteristic (Stem: length from cotyledon scar to top boll) for the years 2002-2012.

27. The TC, at its fiftieth session, agreed that the experts from France, Germany, Italy, Japan, Netherlands, Republic of Korea and United Kingdom should provide the results on the practical exercise to the Office of the Union and noted the plans for a summary of aspects in common and divergences between the methods to be presented to the TWPs in 2014 and to the TC at its fifty-first session (see document TC/50/36 “Report on the Conclusions”, paragraph 57).

28. The TC, on the basis of the results of the practical exercise, will be invited to consider whether to develop guidance on data processing for the assessment of distinctness and for producing variety descriptions that would be relevant for different types of propagation (see document TC/50/36 “Report on the Conclusions”, paragraph 58).

29. Results were received from France, Germany, Italy and United Kingdom. All available results were presented to the TWC at its thirty-second session, held in Helsinki, Finland from June 3 to 6, 2014 (see document TWC/32/18 Add.).

30. The TWA is invited to note:

(a) that an expert from New Zealand made a presentation at the forty-fifth session of the TWF, on the project for “apple reference varieties”, as reproduced in Annex II to this document;

(b) 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 this document;

(c) the guidance for variety description in Italy, as presented in Annex IV to this document; and

(d) that the results of the practical exercise with a common data set were presented to the TWC at its thirty-second session.

[Annexes follow]

Technical Working Party on
Automation and Computer Programs

Thirtieth Session

TRANSFORMATION OF MEASUREMENTS INTO NOTES FOR VARIETY DESCRIPTIONS

SUMMARY OF DIFFERENT APPROACHES

Chisinau, Republic of Moldova
June 26 to 29, 2012

1

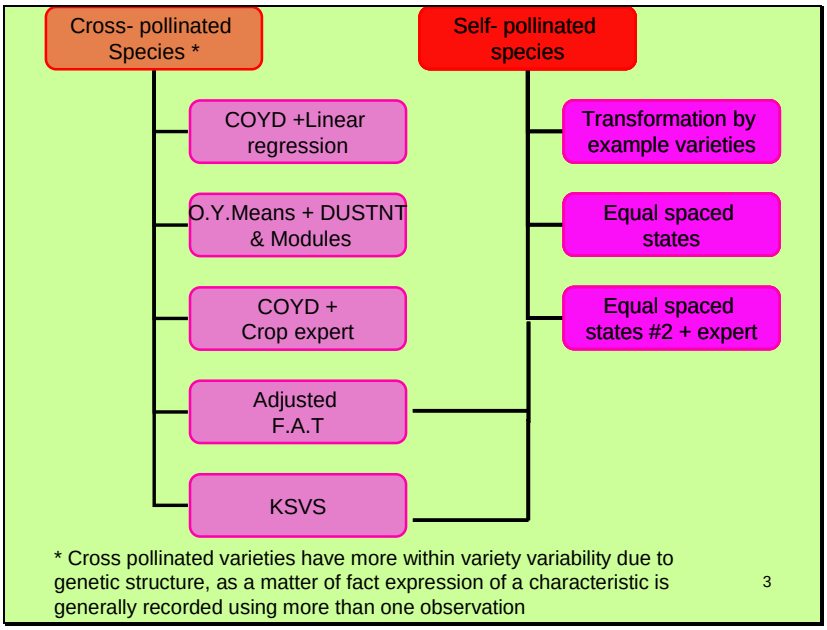
OVERVIEW/ CONTEXT/ BACKGROUND

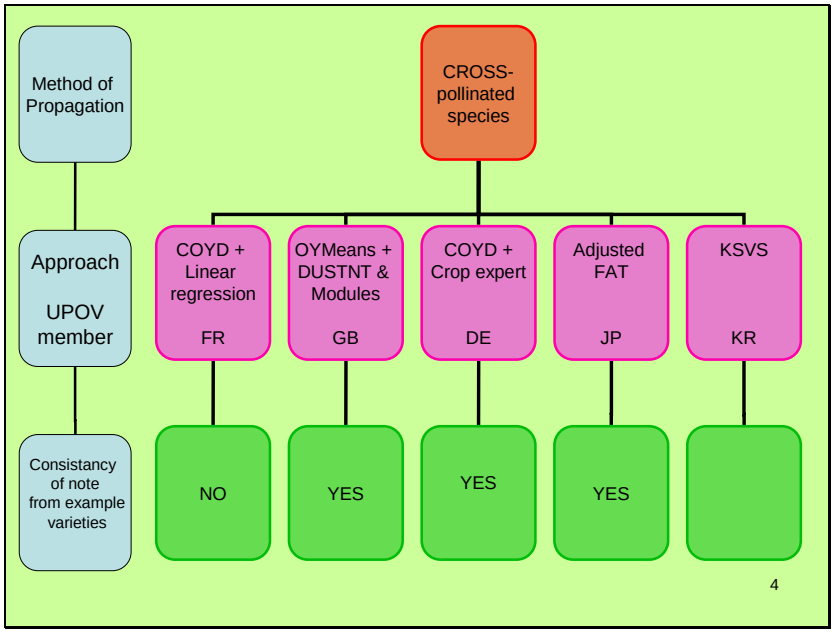
- In order to produce a summary of different approaches on data processing

  (see document TC/48/22 "Report on conclusions", paragraph 52)

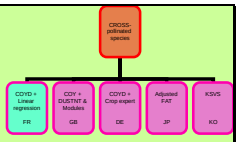
- For transforming means into notes
- For Quantitative (QN) characteristics recorded by measurements (M)
- In order to develop a common guidance and harmonized processes

2


Cross- pollinated Species *
Self- pollinated species
COYD +Linear regression
O.Y.Means + DUSTNT & Modules
COYD + Crop expert
Adjusted F.A.T
KSVS
Transformation by example varieties
Equal spaced states
Equal spaced states #2 + expert
* Cross pollinated varieties have more within variety variability due to genetic structure, as a matter of fact expression of a characteristic is generally recorded using more than one observation
3


Method of Propagation
Approach
UPOV member
Consistancy of note from example varieties
CROSS-pollinated species
COYD + Linear regression
FR
OYMeans + DUSTNT & Modules
GB
COYD + Crop expert
DE
Adjusted FAT
JP
KSVS
KR
NO
YES
YES
YES
4

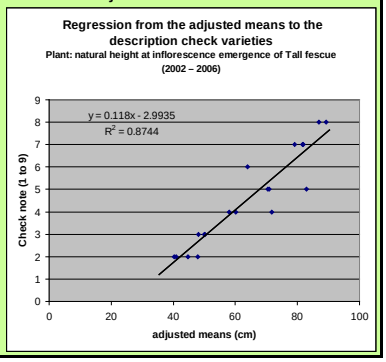
COYD + Linear regression <France>



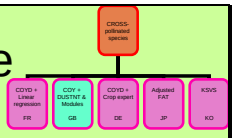
Use of COYD that provides adjusted means for each characteristics for example varieties & candidate varieties

Transformation into notes by using linear regression (generate a formula) in order to provide the predicted note based on the adjusted mean

Example: Festuca / Grass



Means + DUSTNT software <United Kingdom>



Using over year variety means are calculated on the original scale of characteristics (DUSTNT module FITC in conjonction with module FIND)

Transformations into notes by using DUSTNT module VDES by use of delineating varieties to divide the range into states

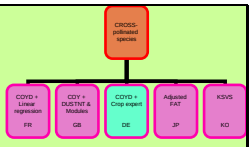
DUSTNT module SAME + MOST+ SSQR + DIST

Example: Herbage crops

Figure 1: Example illustrating how Variety Descriptions are developed in Herbage crops using delineating varieties in United Kingdom

Reference variety	Yearly means										Over-year mean	Note
	1	2	3	4	5	6	7	8	9	10		
R1	*	*	*	22.44	23.09	20.40	22.03	23.71	20.79	22.33	21.95	1
R2	*	*	*	23.36	22.88	21.65	21.39	24.23	19.49	23.27	**22.05**	1
R3	*	*	*	*	*	22.26	21.35	24.57	20.13	23.14	22.2	2
R4	19.77	22.05	22.17	25.33	21.84	20.57	22.57	23.55	21.80	23.55	22.32	2
R5	21.15	23.13	23.75	24.74	23.74	23.67	23.80	25.25	21.71	24.55	**23.55**	3
R6	*	*	*	*	24.64	23.00	23.76	25.02	22.16	24.25	23.62	3
R7	*	*	*	*	*	21.47	25.93	24.85	23.07	25.24	23.98	3
R8	*	*	25.00	24.92	24.97	23.51	24.55	26.03	22.31	25.88	24.34	3
R9	*	24.33	25.43	24.18	25.73	23.13	24.74	26.19	23.59	25.90	24.56	3
R10	*	*	*	*	*	22.22	24.82	26.28	25.14	25.56	**24.72**	3
R11	*	*	*	*	*	*	25.35	27.77	24.60	27.11	25.83	4
R12	25.13	27.58	28.67	27.01	27.98	25.42	28.52	27.88	27.30	27.27	27.27	4
R13	*	*	*	*	28.34	26.31	27.68	30.01	26.63	28.41	27.71	4
R14	26.77	27.49	28.65	28.90	29.33	28.19	28.22	29.76	27.91	28.00	**28.32**	5
R15	*	*	*	*	29.49	28.4	30.34	29.95	27.49	29.5	28.99	5
Candidate variety												
C1	*	*	*	*	*	*	*	22.93	22.65	23.36	22.57	2
C2	*	*	*	*	*	*	*	24.84	22.25	23.17	23.01	2

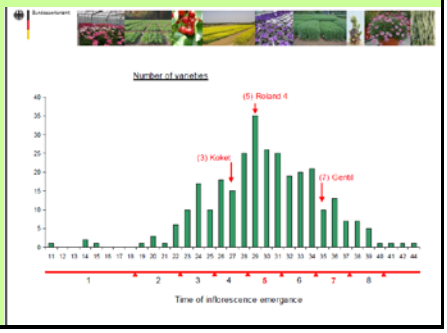
COYD + crop expert <Germany>

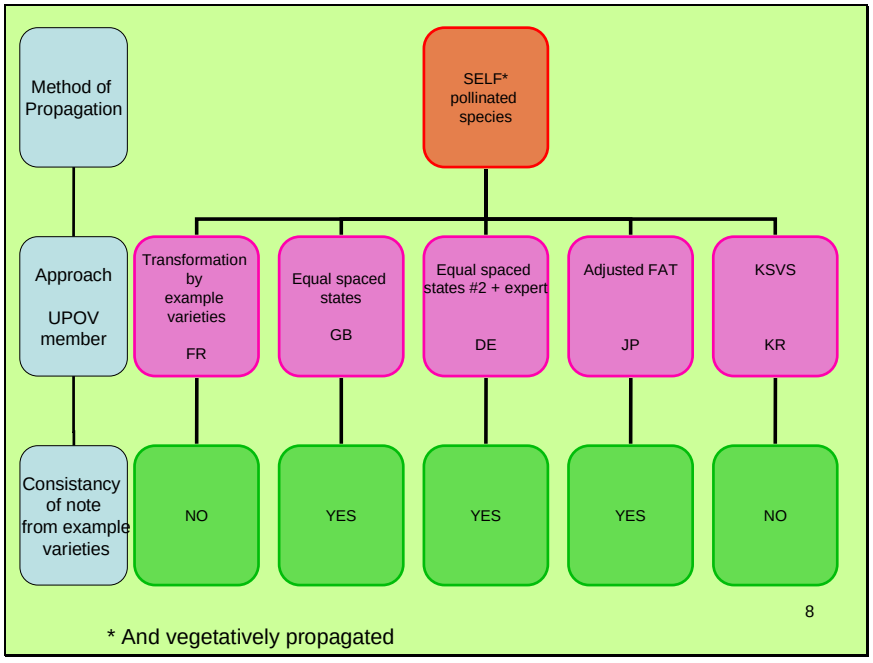


Use of COYD that provides adjusted means for each characteristics for example varieties & candidate varieties

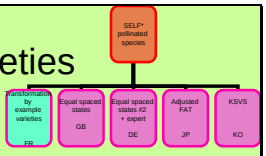
Transformation into notes according to example varieties & crop expert judgement

Example: Festuca / Grass





Transformation by example varieties <France>



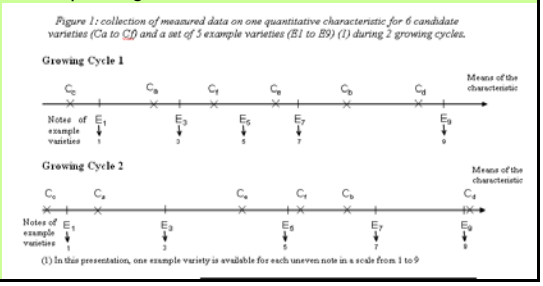
Adjustment on the basis of example varieties

Values are distributed on a axis with example (EV) & candidates varieties

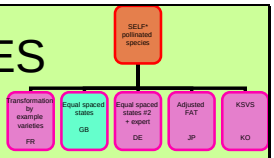
Transformation into notes are given in relation to the EV in each growing cycle

Distribution on the axis of the Candidate is made in relation to the Example varieties and the corresponding notes

No clear example



Means + DUSTNT + VDES <United Kingdom>



Division of the range of expression of the over-year means for the reference collection varieties into equal spaced states

Transformations into notes by using DUSTNT module VDES by division of the range into equal spaced states

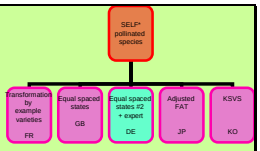
Range of notes can be expanded from a 5 to 9 scale

Example: Pea

Figure 2: Example illustrating how Variety Descriptions are developed in Peas by division of the range of expression into equal-spaced states in United Kingdom

Reference variety	Yearly means 1	2	3	4	5	6	7	8	9	Over-year mean	Note
R1	*	*	*	*	*	21	36	22	24	30.0	3
R2	*	*	*	29	39	29	39	25	28	35.4	3
R3	*	55	65	68	48	44	59	56	28	54.7	4
R4	72	61	73	45	59	52	68	56	53	59.9	4
R5	*	*	*	*	*	68	70	58	60	68.4	4
R7	*	*	77	61	73	72	80	64	61	72.2	4
R8	*	*	*	*	96	107	102	101	91	102.7	6
R9	121	120	113	78	117	102	109	105	79	104.7	6
R10	*	97	112	95	124	110	117	112	88	108.7	6
R11	*	*	*	122	121	128	105	102	85	117.7	7
R12	*	*	*	*	110	130	129	106	97	114.6	7
R13	*	*	*	*	*	132	133	130	112	131.2	7
R15	*	*	*	*	*	121	155	157	106	139.0	7
Candidate variety											
C1	*	*	*	*	*	*	55	32	27	43.3	3
C2	*	*	*	*	*	*	55	58	25	51.2	3
C3	*	*	*	*	*	*	*	46	44	55.7	4

Equal spaced states #2 <Germany>

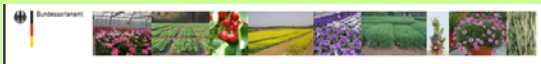


Division of the range of expression of the over-year means for the reference collection varieties into equal spaced states

Adjustment of notes is done by reference to example varieties

Range of variation can be adjusted (expert judgement)

Example: Barley



- Range 38.3 cm / 7 Notes = 5.5 cm width of states

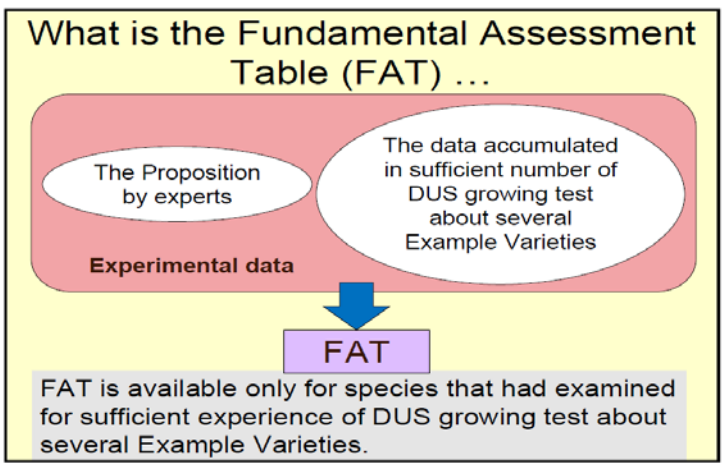
State	from	to	Example varieties
1		≤ 87.4	
2	> 87.4	≤ 92.8	
3	> 92.8	≤ 98.3	3 – Spectrum (93.8)
4	> 98.3	≤ 103.8	
5	> 103.8	≤ 109.2	5 – Reni (111.0)
6	> 109.2	≤ 114.7	
7	> 114.7	≤ 120.2	7 – Stephanie (118.6)
8	> 120.2	≤ 125.7	
9	> 125.7		

Adjusted Full Assesement Table (FAT) <Japan>

- FAT is a table to evaluate the notes from the datas of QN characteristics
- The notes are based on example variety's data from ONE growing trial + historical datas
- (Mainly use for ornamental & veg. crops)
- Same method for self and cross,
- The adjustable range changes according to dispersion of Historical data of the Example variety

12

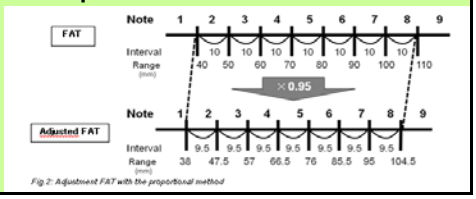
<Japan (cont.)>



FAT proportional method

<Japan (cont.)>

- Range & interval of notes are adjusted once
- Calculate by the proportion of the measured data to Mean of the historical data about Example Varieties.
- The interval of notes is adjusted accordingly in equal spaced states



FAT Sliding method

<Japan (cont.)>

- Range is adjusted- interval is not changed
- Calculate by the subtraction of Mean of the historical data from the measured data about Example Varieties (EV).
- Adjustment based on the least variable EV

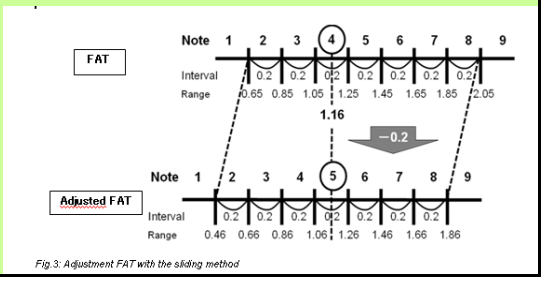
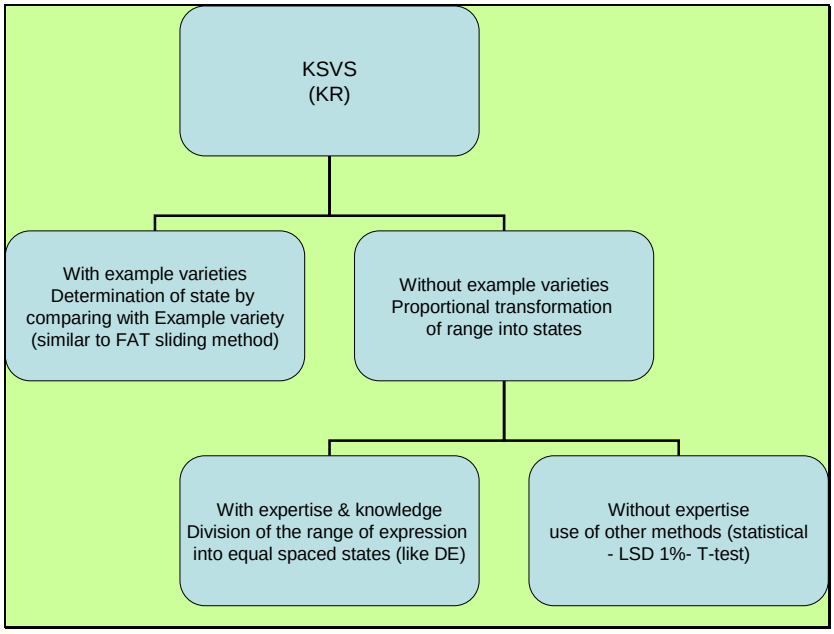


Fig.3: Adjustment FAT with the sliding method



NEXT STEPS

- Check if summary is correct
- Check how the stability of descriptions of reference varieties is representative and stable over years

17

[Annex II follows]

APPLE VARIETY REFERENCE PROJECT

New Zealand Plant Variety Rights Office and Plant and Food Research

NEW ZEALAND | INTELLECTUAL PROPERTY OFFICE
PLANT VARIETY RIGHTS

FIRST OBJECTIVE

To review the expression of 14 QN characters for 11 varieties routinely used for reference and example purposes.

All characteristics were taken from TG/14/9 2005 and varieties were selected on the basis of global availability, commercial significance in New Zealand and broad distribution with respect to time of harvest

CHARACTERISTICS

- Petiole length
- Leaf length
- Leaf width
- Leaf length/width ratio
- Flower diameter
- Time of beginning of flowering
- Time of fruit harvest
- Fruit size
- Fruit height
- Fruit width (diameter)
- Fruit height/width ratio
- Stalk length
- Depth of stalk cavity
- Width of stalk cavity
- Depth of eye basin
- Width of eye basin

INTELLECTUAL PROPERTY OFFICE

VARIETIES

- Sunrise
- Cox's Orange Pippin
- Royal Gala (Tenroy)
- Pinova (Corail)
- Mariri Red
- Honeycrisp (Minnesota Crunch)
- Granny Smith
- Delblush
- Cripps Pink
- Burkitt Gala
- Aztec

INTELLECTUAL PROPERTY OFFICE

METHODOLOGY

- Data was collected over three growing seasons beginning in spring 2011 and recently concluding in autumn 2014
- Each variety was represented by five trees in the variety collection
- Five samples for measurement were taken from each of the five trees
- The same principles used for DUS evaluation were applied to the assessment and data collection

PRELIMINARY RESULTS

With more to do.....

Vegetative Characteristics

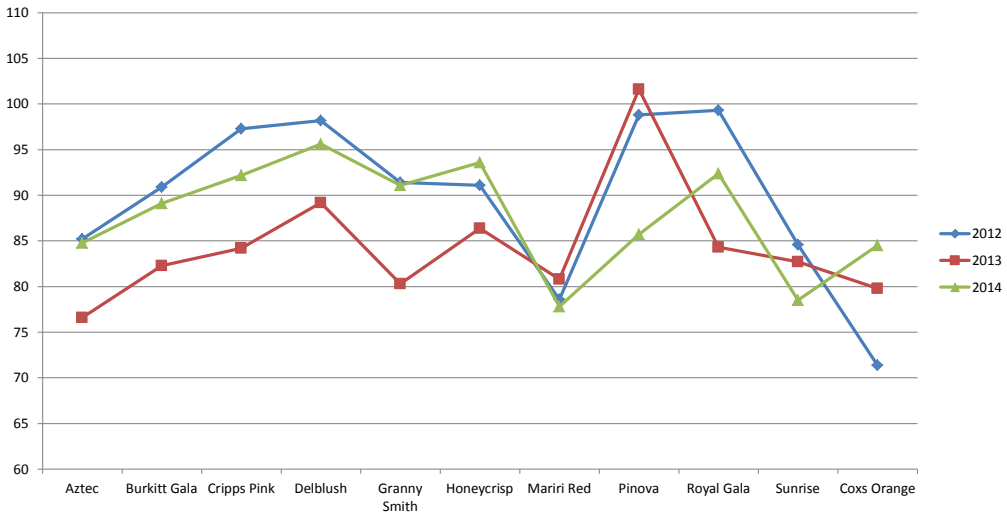
Petiole length, leaf width and leaf length/width ratio

Consistent between years for most varieties and compatible with previous data.

Leaf length Inconsistency between years for most varieties.

- Questionable reliability of expression for a number of varieties

Leaf blade: length 2012-2014



Fruit Characteristics

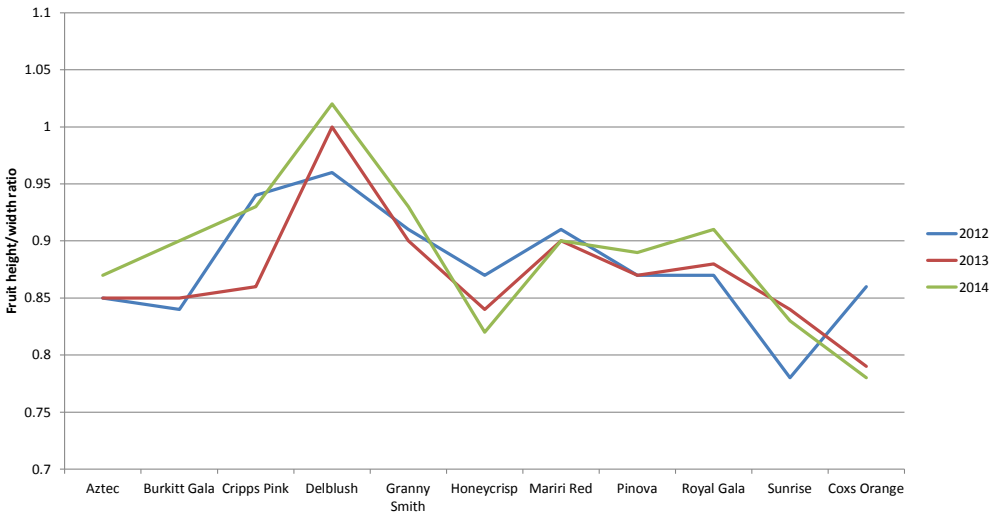
Height, width and height/width ratio

Consistent between years for most varieties and compatible with previous data.

Indicates a review of range of expression values

Size: Inconsistency between years for half the varieties. Requires further consideration and review range of expression values.

Fruit: height/width ratio 2012-2014



Stalk and Eye Basin Characteristics

Stalk length

Consistent between years for most varieties and compatible with previous data, however not fully compatible with TG/14/9

Stalk and eye basin depth and width

Consistent between years for most varieties

Reference to example varieties in TG/14/9

Overall the results were compatible with the example variety ‘Cox’s Orange’ used in leaf width and flower diameter.

The results question the overall suitability of ‘Granny Smith’ and ‘Pinova’ as example varieties.

SECOND OBJECTIVE

To complete and improve variety descriptions for 10 significant non protected varieties .

The descriptions were drafted using TG/14/9 2005

VARIETIES

- Braeburn
- Cox's Orange Pippin
- Royal Gala
- Red Delicious Aversang
- Red Delicious Imperial
- Elstar
- Jonagold
- Golden Delicious
- Fuji
- Granny Smith

Why describe older varieties?

The ten varieties described are not and have never been protected in New Zealand and as a result had not been fully described using a UPOV TG

Their use continues as reference/example varieties and full descriptions now can be included in the database, providing more effective characteristic comparisons

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AS STATED EARLIER

There is still more to do……..

- Further analysis of characteristic and variety consistency
- Development of improved scales for range of expression and calibration of characteristics
- Updating the variety description database for apple
- Full review of example varieties and usage

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[Annex III follows]

ANNEX III

DIFFERENT FORMS THAT VARIETY DESCRIPTIONS COULD TAKE AND THE RELEVANCE OF SCALE LEVELS

Document prepared by an expert from Germany

Variety descriptions can be based on different data depending on the purpose of the description. Different variety descriptions may be used for the assessment of distinctness or in the official document which forms the basis for granting protection. When variety descriptions are used for the assessment of distinctness it is important to take into account on which data the descriptions for different varieties are based. Special attention has to be given to the potential influence of years and locations.

The different forms of variety descriptions and their relevance for the assessment of distinctness can be classified according to the different process levels to look at a characteristic. The process levels are defined in document TGP/8: Part I: DUS trial design and data analysis. Section 2 (New): Data to be recorded (see TC/50/5, Annex II) as follows:

Table 5: Definition of different process levels to consider characteristics

Process level	Description of the process level
1	characteristics as expressed in trial
2	data for evaluation of characteristics
3	variety description

The process levels relevant for the assessment of distinctness are level 2 and 3. Any comparison between varieties in the same trial (same year(s), same location) is carried out on the actual data recorded in the trial. This approach relates to process level 2. If varieties are not grown in the same trial, they have to be compared on the basis of variety descriptions which relates to process level 3. In general, the identification of similar varieties to be included in the growing trial ("Management of variety collection") relates to process level 3, whereas data evaluation within the growing trial relates to process level 2.

Process level	Measurements (QN)	Visual assessment (QN/QL/PQ)	Remark
2	Values	Notes	Basis for comparison within the same trial
3	Transformation into notes Notes	Same Notes as in Process level 1 Notes	Notes resulting from one year and location
	"**Mean variety description**" If varieties are assessed in several trials/years/locations mean descriptions can be established.		Basis for management of variety collection

In general, quantitative characteristics are influenced by the environment. An efficient way to reduce the environmental influence is the transformation of actual measurements into notes. The notes represent a standardized description of varieties in relation to example varieties (see TGP/7). In addition, the comparability of variety descriptions for varieties not tested in the same trial can be improved by calculating a mean description over several growing cycles. In particular, the mean description over several growing

cycles at the same location can provide a representative description related to the location. The calculation of a mean description over different locations should only be considered if the effects of the locations are very well known and variety x location interactions can be excluded for all characteristics. The calculation of mean descriptions over locations should be restricted to the cases where these conditions are fulfilled.

If variety descriptions from different growing trials are used for the assessment of distinctness - that means for the management of variety collections - it is important to take into account the origin of the different variety descriptions of the candidate variety and the varieties of common knowledge. The comparability of variety descriptions is influenced by many factors, for example:

- Description based on a single year or a mean over several years?
- Description based on the same location or different locations?
- Are the effects of the different location known?
- Varieties described in relation to the same variety collection or a variety collection which might cover a different range of variation?

The potential bias of variety descriptions due to environmental effects between candidate varieties and varieties in the variety collection have to be taken into account in the process of distinctness testing, and in particular, for the identification of varieties of common knowledge to be included in the growing trial.

[Annex IV follows]

CRA SCS - Council for Agricultural Research

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CONSIGLIO PER LA RICERCA
E LA SPERIMENTAZIONE
IN AGRICOLTURA

Guidance for Development of Varieties Descriptions

The Italian experience

Drafter: M. Giolo

Method:

Progressive partitioning of expression range into states

(Turfgrass and Forage varieties)

The Italian experience

This presentation is based on our esperience that is in progress.

At present this method is used together with the previous one based on experience and reference varieties.

Contents

1. Total range of expression
2. Total range of historical averages
3. Mid reference
4. Partitioning into notes
5. Basic rules to divide the range
6. Transformation of varieties means into notes
7. Example
8. Update of total range

Total range of historical averages

Reference and candidates varieties can be tested over two or more years, producing two or more means.

Because each variety must contribute equally only the average of its past means must be used.

Range of historical averages covers the mid part of total range of expression. Using averages is easier than using a large amount of data.

6

Total Range of Expression

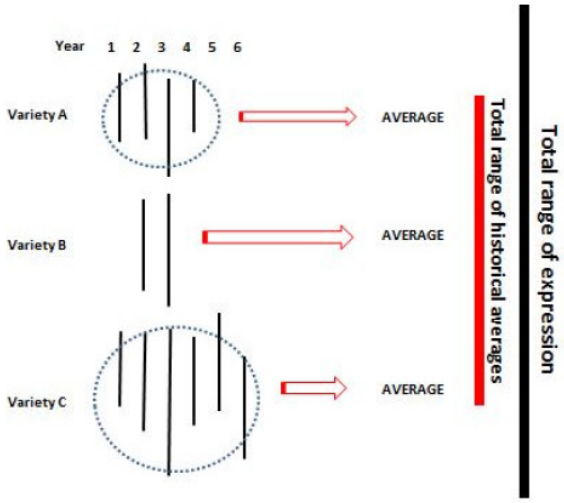
The total range of expression of a quantitative characteristic includes the range of values seen during past trials.

It is the difference between the largest and the smallest item in past data and it gives the possibility of knowing the dispersion of observations.

Historical data do not cover all the possible range and different phenological characteristics could be expected in the future.

5

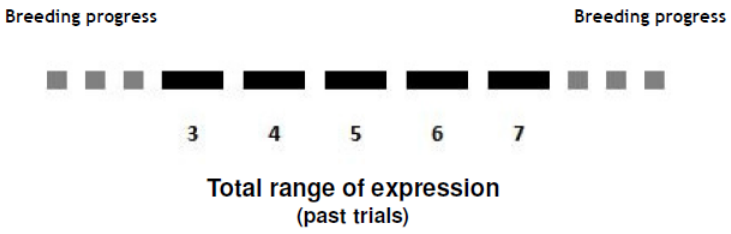
Total range: equal contribution of each variety



7

Total range: future expansion

The partitioning into notes of the total expression range, calculated from historical data, is in accord with leaving free space to extremes of the range for a possible future expansion because of breeding progress.

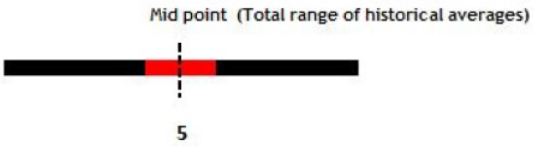


8

Mid reference

The midpoint of total range of historical averages for each characteristic is considered a good reference for the purpose of dividing all the range.

Midpoint of note 5 coincides with midpoint of historical averages range.



9

Partitioning of total expression range into notes

The goal of the method is to divide the total range into spaces of equal width (notes).

The first step is the division of total range calculated into notes; it is an arbitrary choice since the operation can lead to different intervals (3 notes ... 9 notes).

10

Basic rules to divide total range into notes

- Midpoint (note 5)
- Equal spaces for each note
- Notes for possible future expansion
- (Past varietal descriptions)

Problem: how to calculate width of notes
(experience)

11

Transformation of varieties means into notes

For each quantitative characteristic the average of past trials means of each variety is transformed into note in accord with values that limit each note.

12

Example of equal contribution of CEBIOS variety

Ryegrass

(UPOV car. 14 - Flag length)

(Trials Data 2009-2013)

Variety	Trial plants	Year	Mean (cm)
CEBIOS	80	2009	22,6
CEBIOS	80	2010	22,0
CEBIOS	80	2011	17,6
CEBIOS	80	2012	21,6
CEBIOS	80	2013	24,4
		Average	**21,6**

Equal contribution to total range of historical averages

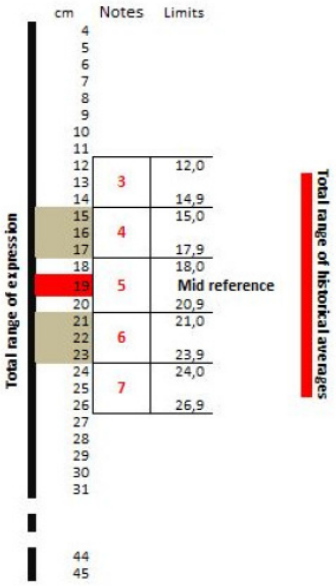
13

Example of partitioning of total range of historical averages into notes

Ryegrass

(UPOV car. 14 - Flag length)

(Trials Data 2009-2013)



14

Example of transformation of varieties means into notes

Ryegrass

(UPOV car. 14 - Flag length)

(Trials Data 2009-2013)

RYEGRASS: Car. 14: Flag length

	Type	Variety	Averages of 2 or more years	Note
	LMW	SARLT	13,9	3
	LMW	NUSPRINT	14,4	3
	LMW	GREENLINK	15,1	4
	LMW	FLYING A	16,7	4
	LM	ALTAIR	17,2	4
	LM	NIBBIO	17,4	4
	LM	CERTO	18,0	5
	LMW	LIFLORIA (F)	18,5	5
	LMW	DIAMOND D	18,5	5
	LMW	ESMERALDA	18,5	5
	LM	KARTETRA	19,1	5
	LM	GALACTICO	19,1	5
•	LM	OCALA	19,2	5
	LMW	TAMTBO	19,6	5
	LM	DAYTONA	21,1	6
	LM	CEBIOS	21,6	6
•	LMW	DS MARINA	21,6	6
	LMW	TAURO	22,5	6
•	LMW	ATTAIN	22,7	6
	LM	BARMULTRA	23,7	6
•	LM	JUNGLE	24,5	7

• new entries

LM Italian ryegrass
LMW Westerwolds ryegrass

15

Update of total range

The total range of expression and the total range of historical averages could be **updated** (for example every "n" years).

In this case the mid reference (midpoint) and some varietal descriptions could change slightly.

16

[End of Annex IV and of document]