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TC/50/25
ORIGINAL: English
DATE: February 12, 2014

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL COMMITTEE

Fiftieth Session
Geneva, April 7 to 9, 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 the 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

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).

CONSIDERATION BY THE TWPS IN 2012

5. At their sessions in 2012, the TWA, TWV, TWC, TWF and TWO, considered documents TWA/41/30, TWV/46/30, TWC/30/30, TWF/43/30 and TWO/45/30 respectively, which contained a presentation on "Summary of different approaches of transformation of measurements into notes for Variety Description", as reproduced in the Annex of this document.

6. The TWPs, at their sessions in 2012, made the following comments:

General	The TWA noted the information that a summary of different approaches used for data processing for the assessment of distinctness and for producing variety descriptions would be developed by the Office of the Union (see document TWA/41/34 "Report", paragraph 44).	TWA
	The TWV considered document TWV/46/30 and received a presentation made by the Office containing a summary of different approaches for transforming means into notes for variety descriptions. The TWV was informed that the summary would be presented to the TWC at its thirtieth session and that it would be further developed (see document TWV/46/41 "Report", paragraphs 43 and 44).	TWV
	The TWC noted information provided in documents TWC/30/30 and TWC/30/30 Add. and 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). The TWC 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).	TWC

	The TWF considered documents TWF/43/30 and TWF/43/30 Add. and received a presentation made by the Office containing a summary of different approaches for transforming means into notes for variety descriptions. The TWF expressed concern that a specific country may have difficulty in describing the full range of states of expression of a characteristic because some varieties might not be available. A universal set of example varieties, the use of historical data and experience of the experts could be a way to address this issue. The TWF recommended that consideration be given to the construction of a meaningful range of expression in the case of a limited range of available varieties. (see document TWF/43/38 "Report", paragraphs 29 to 31)	TWF
	The TWO agreed with the recommendations of the TWF that consideration be given to the construction of a meaningful scale of expression in the case of a limited range of available example varieties (see document TWO/45/37 "Report", paragraph 32).	TWO

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).

Comments 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).

PRACTICAL EXERCISE WITH A COMMON DATA SET

20. The TC at its at its forty-ninth session held in Geneva from March 18 to 20, 2013, requested the organization of a practical exercise, as set out in paragraph 8 of this document, to determine the aspects in common and divergence between methods, with a view to developing general guidance. The Office of the Union received data sets of Chrysanthemum, Pea and Flax from Japan, the Netherlands and France respectively. In the first instance, the practical exercise will be conducted with a data set for flax, provided by experts from France, on the basis that the data is sufficiently comprehensive and structured in a way that should allow the exercise to be completed by all interested UPOV members.

21. Experts from the following UPOV members expressed interest to participate in the practical exercise: France; Germany; Italy; Japan; Netherlands; Republic of Korea; and United Kingdom. A summary of the results will be presented to the TC at its fiftieth session, to be held in Geneva, from April 7 to 9, 2014, comparing the aspects in common and divergence between methods. On the basis of those results, the TC may wish to consider, if appropriate, how to develop general guidance on data processing for the assessment of distinctness and for producing variety descriptions.

22. The TC is invited to:

(a) note 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 this work would contribute to developing improved example varieties and variety descriptions, as set out in paragraph 11 of this document;

(b) consider the proposal from the TWA to ask 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, as set out in paragraph 18 of this document;

(c) note that the results of the practical exercise will be presented in an Addendum to this document, as set out in paragraph 21 of this document;

(d) consider, on the basis of the results of the practical exercise, 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.

[Annex follows]

Technical Working Party on
Automation and Computer Programs

Thirtieth Session

TRANSFORMATION OF MEASUREMENTS INTO NOTES FOR VARIETY DESCRIPTIONS

SUMMARY OF DIFFERENT APPROACHES

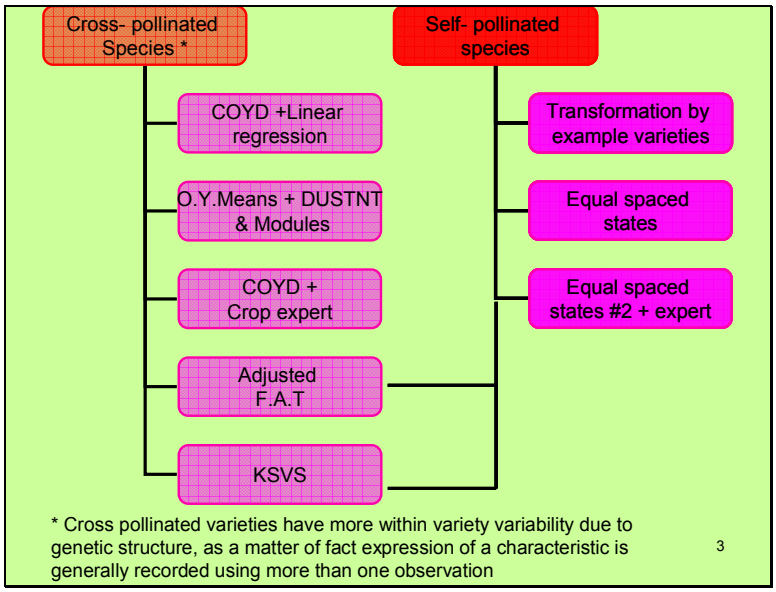
Chisinau, Republic of Moldova
June 26 to 29, 2012

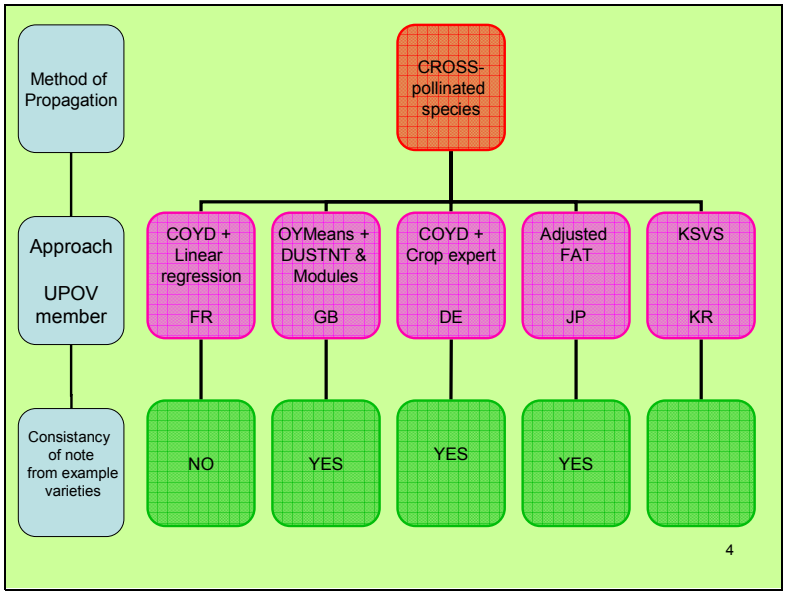
1

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

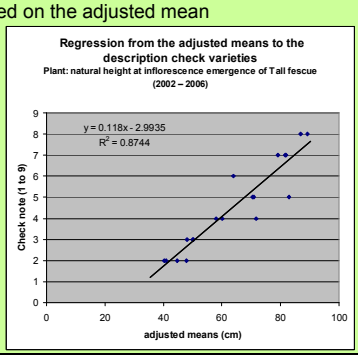

Method of Propagation
CROSS-pollinated species
Approach
UPOV member
Consistancy of note from example varieties
COYD + Linear regression
FR
OYMeans + DUSTNT & Modules
GB
COYD + Crop expert
DE
Adjusted FAT
JP
KSVS
KR
NO
YES
YES
YES
4

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

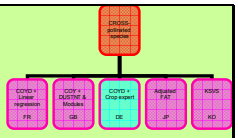
DUSTNT module SAME + MOST+ SSQR + DIST

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	22.83	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	24.65	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	28.57	27.01	27.98	25.42	28.52	27.88	27.30	27.27	27.27	4
R13	*	*	*	*	28.34	26.31	27.88	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	*	*	*	*	29.48	28.4	30.34	29.85	27.48	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

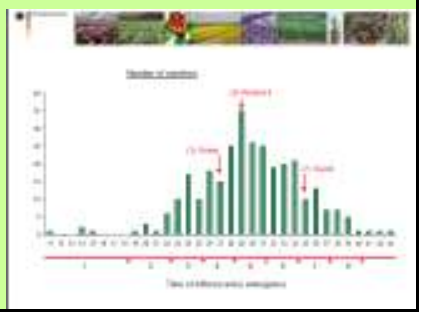
COYD + crop expert <Germany>

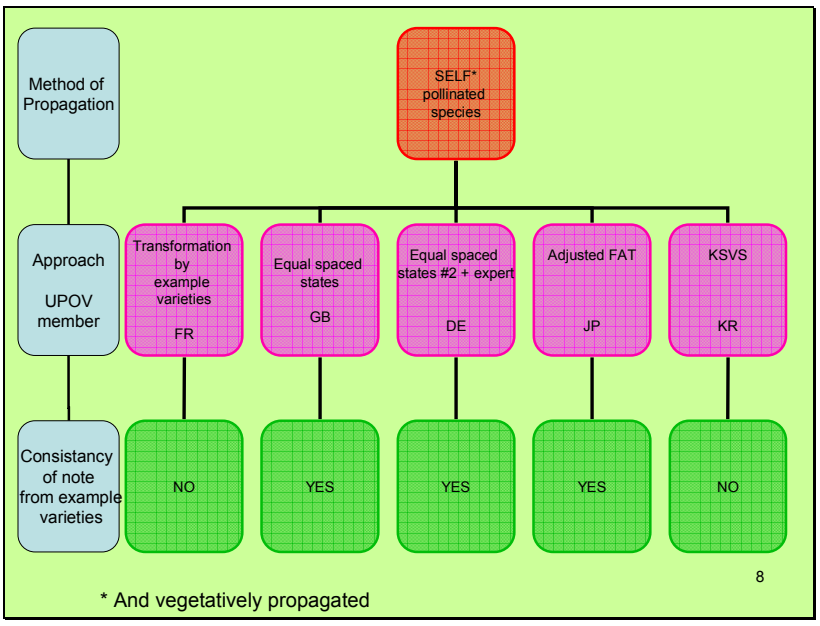


Use of COYD that provides adjusted means for each characteristics for example varieties & candidate varieties

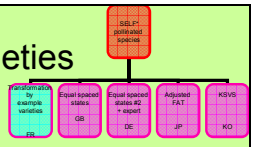
Transformation into notes according to example varieties & crop expert judgement

Example: Festuca / Grass





Transformation by example varieties <France>



Adjustment on the basis of example varieties

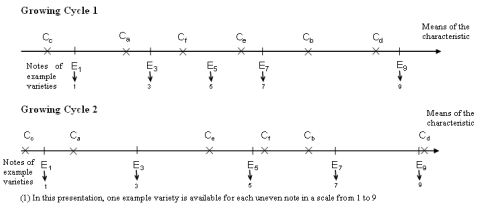
Values are distributed on a axis with example (EV) & candidates varieties

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

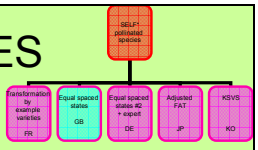
No clear example

Figure 1: collection of measured data on one quantitative characteristic for 6 candidate varieties (Ca to Cf) and a set of 5 example varieties (E1 to E9) (1) during 2 growing cycles.



(1) In this presentation, one example variety is available for each uneven note in a scale from 1 to 9

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

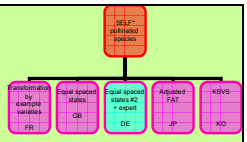
Range of notes can be expanded from a 5 to 9 scale

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									Over-year mean	Note
	1	2	3	4	5	6	7	8	9		
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	108	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)

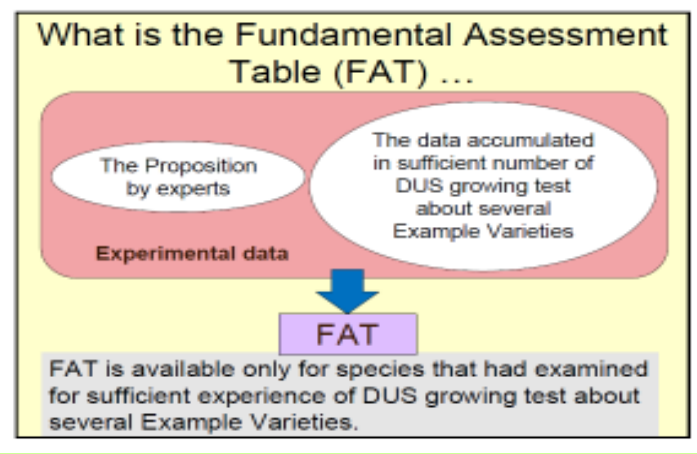
Example: Barley

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

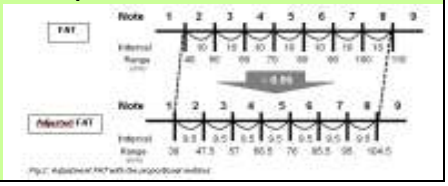
<Japan (cont.)>



FAT proportional method

<Japan (cont.)>

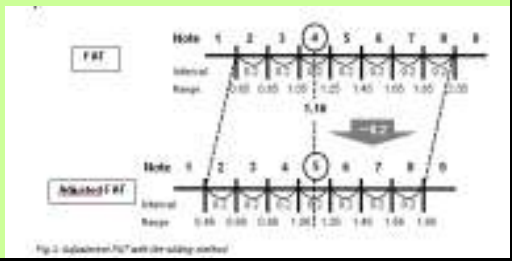
- Range & interval of notes are adjusted once
- Calculate by the proportion of the measured data to Mean of the historical data about Example Varieties.
- The interval of notes is adjusted accordingly in equal spaced states

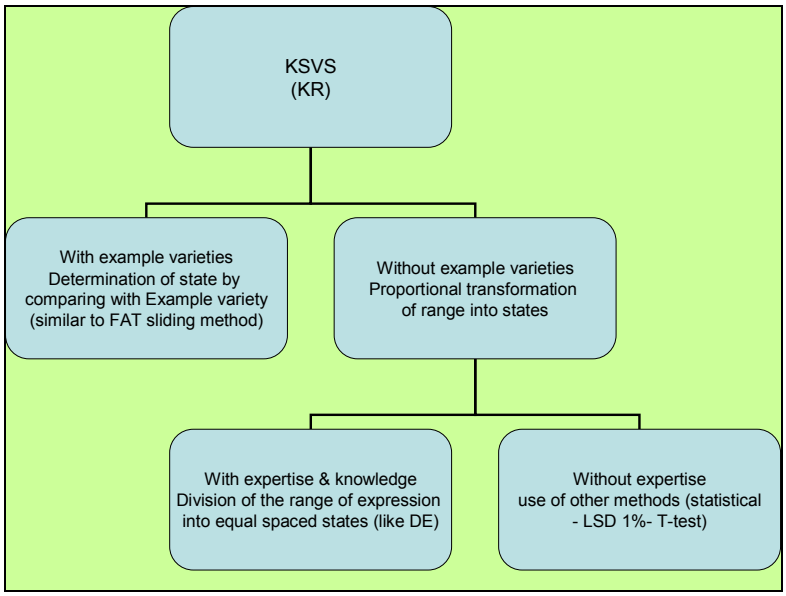


FAT Sliding method

<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





NEXT STEPS

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

17

[End of Annex and of document]