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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

TECHNICAL WORKING PARTY ON AUTOMATION AND COMPUTER PROGRAMS

Twentieth Session
Mexico City, June 17 to 20, 2002

REPORT ON THE CONCLUSIONS

adopted by the Technical Working Party on Automation and Computer Programs

Opening of the Session

1. The Technical Working Party on Automation and Computer Programs (hereinafter referred to as "the Working Party") held its twentieth session in Texcoco, Mexico, from June 17 to 20, 2002. The list of participants is reproduced in Annex I to this report.

2. The Working Party was welcomed by the Deputy Secretary of Agriculture, Mr. Francisco Lopez Tostado, by the Director General of the College of Postgraduates, Mr. Benjamin Figueroa Sandoval, and by the Director of the National Service of Seed Inspection and Certification (SNICS), Mr. Eduardo Benítez Paulín.

3. The session was opened by Mr. Wieslaw Pilarczyk (Poland) who welcomed the participants, and in particular new participants, to the Working Party.

Adoption of the Agenda

4. The Working Party adopted the agenda as reproduced in document TWC/20/1 Rev., after having agreed to follow the work plan proposed by the Chairman.

Short Reports on Developments on Plant Variety Protection

5. Reports from members and observers: The Working Party received oral reports from the participants on developments in plant variety protection in their respective countries.

6. Reports on developments within UPOV: The Working Party received an oral report from the Office of the Union on the latest developments on plant variety protection at the Technical Committee and at the Technical Working Parties.

Molecular Techniques

7. The Working Party received an oral report from the Office of the Union on the latest developments at the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT), the *Ad Hoc* Crop Subgroups on Molecular Techniques and the BMT Review Group.

UPOV Databases

8. The Working Party received an oral report from the Office of the Union on the latest developments in the UPOV databases. Some experts considered that the documents prepared for the development of the UPOV databases should be made available to the Working Party experts.

9. Conclusion: The Working Party considered that an expert from the Working Party should attend the Working Group on databases and it leave it to the next Chairman to decide about this possibility.

TGP Documents

(a). TGP Documents to which the Technical Committee has given highest priority for discussion

TGP/9.3.2 Use of 'Phenotypic Distance' for Examining Distinctness

10. Mr. Sylvain Grégoire (France) introduced the document. He noted that the program is being rewritten and that a pre/test version would be available for member States by the end of the year.

11. Conclusions: The Working Party noted that the proposed program had been used by one member State only and considered that it should be tested by more member States before being recommended by UPOV in document TGP/9.3.2. The Working Party further agreed to keep the introduction as part of document TGP/9.3.2 and the program GAIA to be presented in a TWC paper the following session.

TGP/9.4.1 Examining Distinctness in Different Types of Variety: General

12. Mrs. Beate Rücker (Germany) introduced the document. She wondered where should be the proper place for this chapter of TGP/9.

13. Conclusions: The Working Party agreed to have references to the features of propagation in this chapter and not in the chapters describing the statistical method for distinctness. The Working Party also agreed the following modifications in the text of document TGP/9.4.1 (additional text underlined and deleted text strikethrough):

Paragraph 1 to read:

"1. The appropriate method for examining distinctness depends on the methods of recording the expression of a characteristic in a specific crop and the resulting set of data (see TGP/8). …."

Paragraph 3 and 4 to read:

"3. Vegetatively propagated, truly self-pollinated and mainly self-pollinated varieties normally have very little variation within varieties. The same situation may occur in qualitative characteristics in cross-pollinated varieties (including synthetic varieties). A lack of significant variation within varieties allows examination of distinctness based on a single observation per variety, year and location. Guidance for the assessment of Distinctness in such cases is provided in (TGP/9. ~~In general, a minimum distance of one or more than one states is recommended to consider a variety to be distinct. In the case of a single observation for each variety, the application of a statistical analysis is not possible or necessary.~~"

"4. Within variety variation is normally greater for quantitative characteristics in cross-pollinated varieties, including synthetic varieties, due to genotypic variation. In this case, the expression of a variety should be recorded using ~~more than one~~ observations~~. Usually, records are taken from a~~ on number of individual plants. Distinctness can then be assessed by comparing the differences in variety means with a measure of random variation inherent in the variety means (see TGP/9.7 "Recommended Statistical Methods"). If a characteristic in a vegetatively propagated, truly self-pollinated or mainly self-pollinated variety is recorded by observation of individual plants, the same methods can be applied. This situation might occur where there is considerable plant to plant variation within varieties due to environmental effects is observed. However, in general, ~~a~~ one single observation per plot for each variety is sufficient in vegetatively propagated, truly self-pollinated and mainly self-pollinated varieties."

To add new paragraph at the end:

"The assessment of distinctness for hybrid varieties should follow the same rules independently of the degree of within variety variation on the level of the hybrid or of the parental lines. Specific guidance for the assessment of distinctness using the parental formula is provided in TGP/9."

TGP/9.6 Use of Multiple Locations in the Examination of Distinctness

14. Mr. Sylvain Grégoire (France) introduced the document.

15. Conclusions: The Working Party agreed the following modifications in the text of document TGP/9.6 (additional text underlined and deleted text strikethrough)

Paragraph 4 to read as follows:

"4. For some crops, such as fruit trees, the same plants are examined over successive years. In this case, the condition of independence of growing cycles is not ~~also~~ satisfied. But, as it would be impossible in practice to plant successive trials, this is accepted"

To reword the second sentence of paragraph 7 or to remove the whole paragraph.

The last point of paragraph 8 to read as follows:

- "Some offices systematically grow varieties in more than one location (usually 2). They do this in order to provide a double check for consistency in crops for which they experience difficulties in proving distinctness and uniformity."

16. The Working Party did not accept to modify the fifth point of paragraph 8 as proposed by Australia because it considered it necessary to check the consistency of the DUS test by sampling different environments.

TGP/9.7 Recommended Statistical Methods - COYD

17. Mrs. Sally Watson (United Kingdom) introduced the document.

Conclusion: The Working Party agreed to add an example of long term COYD and to put in the name of the Annex in paragraph 14. It also agreed to include other possibilities than "fitted constants" in paragraph 10 of Appendix A. The Working Party also agreed to include the following modifications in the text of document TGP/9.7 (additional text underlined and deleted text strikethrough):

Paragraph 1, first sentence to read:

"1. To distinguish varieties on the basis of a ~~measured~~ quantitative characteristic we need to establish a minimum allowable distance between varieties so that a pair of varieties showing a difference greater than the minimum might be regarded as "distinct" in respect of that characteristic…"

Paragraph 12 to read as follows:

"12. COYD is recommended for use in assessing distinctness of varieties

– when observations are made on a plant (or plot) basis over two or more years;

– when the characteristic is quantitative

– when there are some differences between plants (or plots) of a variety ~~but, nevertheless, this variation is sufficiently small to allow us to distinguish between varieties;~~

– ~~in general COYD is recommended for use in the testing of allogamous (cross fertilized) varieties~~."

Paragraph 16: to replace "present" by "common".

TGP/10.2 Assessing Uniformity According the Features of Propagation

18. Mrs. Beate Rücker (Germany) introduced the document.

19. Conclusions: The Working Party did not accept the proposal from Australia to modify paragraph 6, sentence 2 because it considered that the COYU is the only recommended method. The Working Party also agreed to have references to the features of propagation in this chapter and not in the chapters describing the statistical method for uniformity, and to make the following modifications in the text of document TGP/10.2 (additional text underlined and deleted text strikethrough):

Paragraph 1 (b) to read as follows:

"(b). Variation within mainly self-pollinated varieties should also result, predominantly, from environmental influences but a low level of genotypical variation caused by some cross pollination is accepted. Therefore~~, the tolerance limit for uniformity may be higher~~ more variation may be tolerated than for vegetatively propagated and truly self-pollinated varieties."

Paragraph 2: to read as follows and to add a new one:

"2. As a result of the above, appropriate uniformity standards for the different types of varieties must be developed according to the features of propagation (specific population standards)."

"2.a The variation within varieties in a characteristic determines how that characteristic is used to determine uniformity in the crop (off-types in case of discontinuous variation or variances in case of continuous variation of characteristics). Thus, the uniformity of the crop may be determined by off-types alone, by variances of the characteristics alone, or by off-types for some characteristics and by variances for other characteristics."

Paragraph 4 (b), last sentence to read as follows:

"(b). … An appropriate fixed population standard ~~should~~ may also be applied in the case of a very low number of comparable varieties."

Paragraph 6 to read as follows:

"6. If the detection of off-types is not possible because of considerable genotypic and/or environmental variation within varieties, uniformity should be assessed after taking this variation into account. The variability of a candidate variety should not exceed the variability of comparable varieties or types already known. The comparison between a candidate variety and comparable varieties is carried out on the basis of variances calculated from individual plant observations. The COYU procedure is the recommended statistical method for this comparison (see Section 10.3.1). This procedure calculates the tolerance limit on the basis of comparable varieties already known i.e. uniformity is assessed using a relative tolerance limit."

Paragraph 8 to read as follows:

> "8. If the inheritance of a clear-cut segregating characteristic is not known, the ~~expression of the characteristic is treated in the same way as other characteristics in cross-pollinated varieties (including synthetic varieties). The~~ observed segregation ratio should be described. An assessment of uniformity is not possible for these characteristics. (The rules outlined for predictable segregation ratios in Chapter 10.3.3 should be used for testing stability.)"

TGP/10.3.1 Recommended Statistical Methods: COYU

20. Mr. Adrian Roberts (United Kingdom) introduced the document.

21. Conclusions: The Working Party agreed to include a paragraph clarifying that the same number of plants, measurements and replications as in COYD are used. It also agreed a paper to be prepared for the next TWC meeting proposing an alternative method to COYU when the requirements on degrees of freedom for COYU are not fulfilled. The Working Party also agreed the following modifications in the text of document TGP/10.3.1 (additional text underlined and deleted text strikethrough)

Paragraph 1, first sentence to read:

> "1. When the uniformity of plants of a variety is to be judged on the basis of ~~measurements~~ quantitative characteristics then the standard deviation (SD) can be used to summarise the spread of the observations."

Paragraph 11: to include an extra point "when the characteristic is quantitative"

Paragraph 14: to amend the second formula.

Paragraph 30: reference to "Table B2" should be to "Table A 2"

To check the format of Table A 2.

TGP/10.3.2 Recommended Statistical Methods: Offtypes

22. Mr. Adrian Roberts (United Kingdom) introduced the document.

23. Conclusions: The Working Party considered that the tables and figures included in the document from pages 14 to 36 should be improved. It was agreed that Denmark would send the drafter the program to create new ones.

24. The Working Party also considered it necessary to include advice for the assessment of Uniformity by relative tolerances in the number of off-types in TGP/10. It was agreed that experts from Germany and the United Kingdom would prepare a document for the next session of the Working Party.

25. Several experts wondered whether the term "heterogeneous" included in the table of paragraph 11 was properly used or could be replaced by "non-uniform". It was also considered whether the chapter " Definition of Statistical Terms and Symbols" (paragraph 54) should be deleted and its content included in TGP/14. The Working Party agreed to request the opinion of

the other Technical Working Parties in relation to the use of the term "heterogeneous" and it also decided to keep paragraph 54.

26. The Working Party agreed the following modifications in the text of TGP/10.3.2 (additional text underlined and deleted text strikethrough)

> "2. ~~Uniformity of candidate varieties of self-pollinated and vegetatively propagated crops is normally assessed on the basis of the number of off-types recorded in tests~~. The maximum number of off-types that is acceptable should be chosen so that the probability of rejecting a candidate variety that should meet the crop standard is small. On the other hand the probability of accepting a candidate variety that has many more off-types than the standard of that crop should also be low."
>
> "8. This method is recommended for use in assessing the uniformity by number of off-types ~~in self-pollinated and vegetatively propagated crops~~ with a fixed population standard."

(b) Other TGP documents

TGP/4.1 General Guidance for the Management of Variety Collections

27. The Office of the Union introduced the document.

28. Conclusions: Some experts considered that the wording of paragraph 14 was confusing, particularly the second part. The expert from Germany clarified that the aim of this part of paragraph 14 was to stress the need for and importance of having a variety collection.

29. The Working Party agreed the following modifications in the text of paragraph 14 of document TGP/4.1 (additional text underlined and deleted text strikethrough):

> Paragraph 14 to read:
>
> "14. As a conclusion, it is important to underline that whatever the situation adopted to establish a variety collection, it is impossible and not necessary to have a full collection of varieties of common knowledge~~, but also to have a working variety collection with all varieties which would have to be included~~. Nevertheless, it is important that there should be an inclusive and relevant working variety collection"

TGP/14.3 Glossary of Statistical Terms

30. The Office of UPOV introduced the document and recalled that this document had been considered by the Working Party previously as document TWA/29/9.

31. An expert from the United Kingdom considered that reference textbooks on statistics should be included, and he had concerns about including some terms in the glossary. The expert from Denmark proposed to check the consistency between the definitions included in document TGP/14.3 and the ISO definitions. Following the proposal of the expert from France, the Working Party agreed to keep the way it is written in the future version because it makes the glossary easy to read for non-statisticians.

32. Conclusions: The Working Party agreed that the document should be modified following the discussions at the meeting and that an expert from the United Kingdom would prepare an

updated version in consultation with other experts. It also requested the Office of the Union to seek the opinion of the initial drafter from Australia about this proposal.

TGP/8.6 Examining DUS in Bulk Samples

33. Mr. Kristian Kristensen (Denmark) introduced document TGP/8.6. He explained that the document was based on document TWC/19/7, which had been discussed by the Working Party the year before, and that the new version had been specially prepared in order to be understood by non-statisticians.

34. Some experts considered that it would be necessary to include more examples to show the reaction to bulking in different characteristics. An expert from the United Kingdom proposed that the components of the formula in paragraph 3 should be considered as "sources of variation" instead of "variance caused by".

35. Conclusion: The TWC also agreed the following modifications in the text of TGP/8.6 (additional text underlined and deleted text strikethrough):

Paragraph 4 to read:

"4. In cases where the data are not bulked the variance ~~on~~ of the difference between two variety means, σ^2_{diff}, becomes:"

Paragraph 10 the explanation to the formula to read:

$Var(Z_{vy}) = \sigma^2_{vy} + \sigma^2_f$

where

σ^2_{vy} is the total variance caused by the year in which the variety is measured

σ^2_f is the variance ~~caused~~ influenced by the number of degrees of freedom

σ^2_f is approximately $\frac{1}{2\nu}\left(\frac{\sigma}{\sigma+1}\right)^2$ when the recorded variable is normally distributed and the variances are not too variable. This last expression reduces to $0.5/\nu$ when $\sigma >> 1$. Here σ is the mean value of the s_{vy} values and ν is the number of degrees of freedom used in the estimation of s_{vy}.

TGP/8.1 Use of Statistical Procedures in DUS Testing: Introduction

36. Mr. Paul (Netherlands) introduced document TGP/8.1. He explained that the document was an introduction, that it was not intended to be an exhaustive document and that reference to other TGP documents should be included.

37. Several experts considered that the document included a too extensive part devoted to experimental design, a subject to be covered in document TGP/8.3 ("Experimental Design Practices".) Other experts supported its inclusion because they thought that this would raise awareness on the importance of having a good experimental design, and was also an attractive

issue that would encourage crop experts to read it. Experts from the United Kingdom proposed that the document should be presented in a more structured way. The expert from Germany noted that the document referred to candidate varieties as "new varieties", which might cause confusion with the notion of Novelty in the UPOV Convention. Furthermore she considered that the use of the terms "internal factors" and "external factors" was confusing for crop experts. Finally she proposed to use the term "candidate variety" as for other TGP documents and to refer to "genetic effects" and "environmental effects" respectively. Other confusing terms identified were: "over the years" instead of "generations", "maternal effects", "sowing" instead of "growing cycle" and "replication" to designate each single vegetatively propagated plant.

38. The Working Party proposed to use a wording consistent with the other TGP documents to avoid confusing crop experts. It considered that testing a variety over more than one growing cycle did not check stability as mentioned in paragraph 9.

39. The Working Party considered that the inclusion of other methods for partitioning the error as proposed by Australia was in too much detail for an introduction to TGP/8. It also considered that data should be observed on plants in good growing conditions and that consistent results was an aim laid down in the General Introduction (see paragraph 5.3.3.1 of TG/1/3).

40. Conclusion: The Working Party requested the drafter to reduce the reference to experimental design and to modify the document following the proposal raised during the discussion. The Working Party also agreed the following modifications in the text of document TGP/8.1 (additional text underlined and deleted text strikethrough):

Paragraphs 10 and 11 to read:

"10. A fourth key element is the specific set of considerations that holds for a crop. There can be no general set of experiments and/or characteristics given, that will fulfil the UPOV requirements for DUS-testing. It will depend on the crop and the considerations are diverse, but general information is provided in this document. For most crops, the characteristics and requirements are defined in the Test Guidelines. But sometimes other characteristics can be used as a complement for the 'agreed' characteristics. Observations can be made at all different stages of development of the crop, so it is imperative that all aspects of recording a characteristic are described properly and exhaustively to ensure that they can be compared in the long run but also understood by a novice."

"11. During or at the end of the study, the data, on the same set of characteristics ~~between~~ for all varieties, are used by the experts of the crop for DUS testing. The use of and the need for computations may differ considerably. In some cases the notes recorded and the knowledge of the expert are sufficient, while in other cases there is a need to compute a large set of data from more than one ~~sowing~~ growing cycle in order to obtain objective values on which to base the final expert decision."

TGP/8.2 Validation of Data Assumptions

41. Mr. Kristian Kristensen from Denmark introduced document TGP/8.2 Rev.

42. The expert from the United Kingdom proposed to include additivity of blocks and variety effects under item 8.2.3 Assumptions. It was also clarified that examples of ANOVA would be included in document TGP/8.5 "Statistical Methods for DUS Examination." The drafter

requested the participants to provide examples when transformation of data had been used to be included in future versions of document TGP/8.2

43. Conclusion: The Working Party agreed the following modifications in the text of TGP/8.2 (additional text underlined and deleted text strikethrough):

Paragraphs 6 and 7 to read:

"6. First of all, it is very important to design experiments in a proper way. The most important assumptions of analysis of variance methods are:

- independent observations
- variance homogeneity
- normal distributed observations (residuals).
- additivity of blocks and variety effects"

"7. In addition, one could state that there should be no ~~errors~~ mistakes in the data. However, most ~~errors~~ mistakes (at least the biggest) will usually also mean that the observations are not normally distributed and that they have different variances."

Paragraph 9 to read:

"9. This is a very important assumption. It means that no records may depend on other records in the same analysis (dependence between observations may be built into the model, but this is not so in the COYD and COYU or other UPOV recommended methods). Dependency may be caused e.g. by competitions between neighbouring plots, by lack of randomisation or by improper randomisation. More details ~~on independent~~ on ensuring independence of observations may be found in TGP/8.3 "Experimental Design Practices.""

Paragraph 10, second bullet point to read:

- "The variance ……. has a variance of 5, whereas varieties I and J each has a variance of 10. ~~Some results of comparing~~ The real probability of detecting differences between these varieties when they ~~are~~ in fact ~~identical~~ have the same mean are shown in Table 1. In Table 1, the variety comparisons are based on the pooled variance as is normal in traditional ANOVA. If they are compared using the 1% level of significance, the probability that the two varieties with a variance of 10 become significantly different from each other is almost 5 times larger (4.6%) than it should be. On the other hand, the probability of significant differences between two varieties with a variance of 5 decreases to 0.5%, when it should be 1%. This means that it becomes more difficult to detect differences between two varieties with small variances and easier between varieties with large variances."

Explanation of Table 1 to read:

"Table 1. Probability of significant difference between two identical varieties in the case where variance ~~heterogenity~~ homogeneity is assumed but not fulfilled (varieties A to H have a variance of 5 and varieties I and J have a variance of 10.)"

Paragraph 11 to read:

"11. The data should be approximately ~~normal~~ normally distributed. The ideal normal distribution means that the distribution of the data is symmetric around the mean value and with the characteristic bell-shaped form (see Figure 2). If the data are not approximately normally distributed, the actual level of significance may deviate from the nominal level. The deviation may be in both directions depending on the way the actual distribution of the data deviates from the normal distribution.. However, deviation from normality is usually not as serious as deviations from the previous two assumptions."

Paragraph 12 to replace "error" by "mistake".

Paragraph 12 to replace "outliners" by "outliers".

TGP/8.3 Experimental Design Practices

44. Mr. Jack Thissen from the Netherlands introduced the document. He particularly requested the Working Party to comment on the structure of the document.

45. Conclusion: The Working Party agreed to delete the following paragraphs: 2, 4 to 10, 12 to 33; to reword paragraph 11 because the use of the term "plots of the population" was confusing and to include the use of grouping characteristics in the trial design. The Working Party also agreed the following modifications in the text of document TGP/8.3 (additional text underlined and deleted text strikethrough):

Paragraph 44 to delete the comma in the first sentence and to replace "so" by a comma in the last sentence.

Paragraph 69 to read:

"69. The comparison between candidate and reference varieties is mostly based on observations from 1 to 3 years or cycles. Therefore, the number of replicates and the number of plants per plot in a single trial have an indirect effect on the variability which is used in the COYD and COYU analyses. Before performing these analyses the means of the variety means and (log) standard deviations per year or cycle are calculated and then the analysis is performed on these means in the two-way variety by year or cycle layout. The residual variation in these analyses is the variety by year or cycle interaction. More refined techniques ~~based in~~ such as fitted constant and REML can be used, which allow for, e.g., between-trial heterogeneity in error variance."

TGP/8.4 Types of Characteristics and their Scale Levels

46. Mr. Uwe Meyer from Germany introduced the document. He clarified that this document was an updated version of a previous document discussed at the TWC that included linguistic improvements, and recent developments in the Technical Committee had been taken into account.

47. Conclusions: The Working Party agreed to replace "level of view" by "level of process" throughout the whole document and also the following modifications in the text of TGP/8.4 (additional text underlined and deleted text strikethrough):

Page 4, second paragraph to read:

The continuous quantitative data for the characteristic “Plant length” are measured on a continuous scale with defined units of assessment. It depends only on the costs and the necessity to get any value in cm or in mm. ~~Changing of measure~~ A change of unit of measurement e.g. from cm into mm is only a question of precision and not a change of type of scale.

Page 4, last paragraph to read:

The definition of an absolute zero point makes it possible to define ~~additional constant~~ meaningful ratios. This is also a requirement for the construction of index numbers (e.g. the ratio of length to width). An index is the combination of at least two characteristics. In UPOV terms this special case is defined as a combined characteristic.

Page 5, second paragraph to read:

“ The interval scale is ~~higher classified than the ordinal scale but~~ lower classified than the ratio scale (Table 2). That means that it is possible to use more statistical procedures. Fewer statistical procedures can be used with interval scaled data than with ratio scaled data (Chapter 7). The interval scale is theoretically the minimum scale level to calculate arithmetic mean values.”

Page 5, last paragraph to read:

“ The ordinal scale is ~~higher classified than the nominal scale but~~ lower classified than the interval scale (Table 2). ~~It is possible to use more statistical procedures than for nominal scaled data but less than for interval scaled data~~ Less statistical procedures can be used for ordinal scale than for all of the higher classified scale data (Chapter 7).”

Page 6, third paragraph

Characteristics with only two categories (dichotomous ~~alternative~~ characteristic) are a special form of nominal scales.

Page 6, Table 2

To replace “exact zero” by “absolute zero” in the column Description.

Page 7, the third paragraph and the remark to read:

“ For quantitative characteristics the scale level of data depends on the method of assessment. They can be recorded on a quantitative or ordinal scale. For example, "Length of plant" is usually recorded by measurements resulting in ratio scaled continuous quantitative data. Under specific circumstances, visual assessment on a 1 to 9 scale may be appropriate. In this case, the recorded data are qualitatively scaled (ordinal scale) because the ~~size~~ interval between the midpoint of categories is not exactly the same.

Remark: In some cases visually assessed data on quantitative characteristics may be handled as ~~quantitative data~~ measurements. The possibility to apply statistical methods for quantitative data depends on the precision of the assessment and the robustness of the statistical procedures. In case of very precise visually assessed

quantitative characteristics the usually ordinal data may reach the level of discrete interval scaled data or of discrete ratio scaled data."

Table 4 and 5: to merge the columns Type/Procedure and Further Conditions and to delete "Recommended" from the titles of these tables. To replace "alternative" by "dichotomous" in table 5.

48. The Working Party furthermore agreed that a paper on Chi Square distribution should be prepared for the following session by experts from France and United Kingdom.

TGP/8.5 Statistical Method for DUS Examination

49. Mrs. Sally Watson (United Kingdom) introduced the document. She asked for information on other methods used for DUS testing to be included in the document.

50. Conclusions: The Working Party agreed that the bibliography should be included in the document and the drafter would contact the national expert to get that information and to include another example of randomized block design, another example of completely randomized design and a section on paired t-test. As the document would become more voluminous with the inclusion of more methods, the Working Party considered that special care should be taken in its structure. It was agreed that experts from Denmark and Poland would prepare a document on incomplete block design and experts from France and the United Kingdom would prepare a document on Chi Square for discussion at the next session of the Working Party.

51. Procedure for recommending statistical methods in TGP documents: The Working Party received several comments suggesting that the statistical procedures and methods included in the TGP documents were not the only ones that could be used in DUS testing. Even though the Working Party considered that it might be the case, it also considered that, to be recommended by UPOV in a TGP document, the Working Party and the Technical Committee should examine any statistical method as follows:

(a) a working paper ("TWC document") should be presented to the consideration of the Working Party, explaining the statistical principles applied including examples of its practical use in DUS testing.

(b) the Working Party to examine the proposal and to decide whether it could be put to the Technical Committee as a recommended statistical method or whether further development is necessary.

(c) if considered suitable, the proposal to be put to the Technical Committee to be included as a TGP document.

52. TGP documents to be redrafted before further consideration by other Technical Working Parties: The Working Party considered that the following TGP documents should be redrafted and reconsidered by the Working Party before being sent to other Technical Working Parties for further consideration:

TGP/8.1 Introduction

TGP/8.2 Validation of Data and Assumptions

TGP/8.3 Experimental Design Practices

TGP/8.5 Statistical Methods for DUS Examination

TGP/14.3 Statistical Terms

Statistical Methods for Data Produced by Biochemical and Molecular Methods

53. Mr. Sylvain Grégoire (France) introduced document TWC/20/2. Some experts proposed that the information related to databases should be included in a separate document. One expert considered that the measurement of distances in morphological characteristics could not be as easy as from molecular markers and therefore correlation between these two variables could present some difficulties. Some amendments in the wording were proposed.

54. Conclusion: The Working Party agreed that the proposed amendments be incorporated in future versions of this document.

Uniformity Standards for COY

55. The Working Party noted document TWC/20/3, which included the information on the standards used for COYU and COYD sent in reply to Circular U 3216. An expert from the Netherlands proposed to include information on the LSD value in the table. An expert from Germany informed the Working Party that some work had been done at the Technical Working Party for Agricultural Crops (TWA) in relation to the harmonization of plant variety descriptions and further development of these investigation could include the analysis of the LSD used in different countries and its impact on the descriptions obtained.

56. Conclusion: The Working Party agreed that further information was necessary to be able to propose a recommendation. It decided to repeat the survey and to have a new edition of the document for the following session and to improve the layout of the table as follows:

Probability levels							
		COYU			COYD		
		+2	(3)	+3	+2	(3)	+3
Species	Country 1						
	Country 2						
	Country 3						

+2 : Acceptance after 2 years

(3) : Go to 3rd year test

+3 : Acceptance after 3 years

Efficiency of Incomplete Block Design in DUS Herbage Trials

57. Mrs. Sally Watson (United Kingdom) introduced document TWC/20/4 Preliminary Report on the Efficiency of Incomplete Block Designs in DUS Herbage Trials.

58. Conclusion: The Working Party agreed that a new paper should be presented at the next session showing the efficiency of incomplete block design in a new set of data.

Telecommunications, Exchangeable Software and Contacts:

59. The Working Party welcomed document TWC/20/5, which was an update of the previous version (see document TWC/19/9).

60. Conclusion: The Working Party requested the Office of the Union to include the e-mail list in the restricted area of the UPOV Web page.

Future Program, Date and Place of the Next Session

61. At the invitation of the expert from Denmark, the Working Party agreed to hold its twenty-first session in Tjele, Denmark, from June 10 to 13, 2003. During the twenty-first session, the Working Party planned to discuss or re-discuss the following items:

1. Short reports on developments in plant variety protection

    (a) Reports from members and observers (oral reports by the participants)

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

2. Molecular Techniques

    (a) Report on developments

    (b) *Ad hoc* Crop Subgroups

    (c) Statistical data for method produced by biochemical and molecular methods

3. Project to consider the Publication of Variety Descriptions

4. UPOV Databases

5. Chi Square distribution (a document to be prepared by experts from France and the United Kingdom)

6. Alternative method to COYU when the requirements on degrees of freedom for COYU are not fulfilled

7. Relative tolerances in the number of off-types (document to be prepared by experts from Germany and United Kingdom)

8. Incomplete block design (document to be prepared by experts from Poland and Denmark)

9. Glossary on Statistical Terms (a new document to be prepared by experts from the United Kingdom in consultation with other experts)

10. Efficiency of Incomplete Block Design in DUS Herbage Trials (a new document to be prepared by experts from the United Kingdom)

11. Calculation of phenotypic distances (a new document to be prepared by experts from France)

12. TGP documents

13. List of statistical documents prepared by the TWC

14. Telecommunications, exchangeable software and contacts

15. Date and place of the next session

16. Future program

17. Report on the conclusions of the session

[Annex follows]

ANNEX

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[End of Annex and of document]