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GENEVA

TECHNICAL COMMITTEE

Twenty-Fourth Session

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MATTERS ARISING FROM THE 1988 SESSIONS OF THE TECHNICAL WORKING PARTIES
TO BE DEALT WITH BY THE TECHNICAL COMMITTEE

Document prepared by the Office of the Union

This document summarizes, in its Annex, matters arising from the 1988 sessions of the Technical Working Parties which have to be dealt with by the Technical Committee (hereinafter referred to as "the Committee"). They comprise: (i) questions presented by the Technical Working Parties to the Committee; (ii) important decisions taken by the Technical Working Parties and communicated to the Committee for information; (iii) matters dealt with by the Technical Working Parties on the instructions of the Committee or in preparation for discussions planned in the Committee under separate agenda items. The headings of the different items are listed on page 1 of the Annex.

To shorten references in this document to the various Technical Working Parties, use is made of the codes that designate their documents, namely:

- 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.

[Annex follows]

TC/XXIV/3

ANNEX

MATTERS ARISING FROM THE 1988 SESSIONS OF THE TECHNICAL WORKING PARTIES
TO BE DEALT WITH BY THE TECHNICAL COMMITTEE

<u>List of Contents</u>	<u>Paragraphs</u>
New Methods, Techniques and Equipment	1 - 25
Electrophoresis	1 - 11
Machine Vision Technique	12 - 17
Expert System Method	18 - 19
Physical Analysis of Colors	20 - 21
Chemical Fingerprinting	22 - 23
Creation of a New Technical Working Party	24 - 25
Items for or from the Technical Working Party on	26 - 57
Automation and Computer Programs	
Objections to New Statistical Methods	28 - 29
Invitation of Statisticians to Other TWP's Sessions	30 - 31
Review on Statistical Practices	32 - 34
Pairwise Comparisons	35 - 37
Non-parametric Methods	38 - 39
Similar Variety	40 - 45
Stabilized Variety Description	46 - 47
Existing Data Base Management Systems	48 - 49
Programs Easily to be Assimilated in Other Computers	50 - 51
Testing of Homogeneity	52 - 55
Changes in Variety Descriptions	56 - 57
Combined Over-Years(COY) Analysis	58 - 80
Evaluation of the COY Analysis	59 - 64
Further Refinement of the COY Analysis	65
Application of the COY Analysis to Crops other than Grasses	66 - 80
Invitations to Sessions of TWP's	81 - 85
Invitation to Sessions in Japan	81 - 82
Invitation of Technical Experts from Professional Organizations	83 - 85
Color Observations	86 - 90
Color Pictures as a Supplement to Applications and Variety Descriptions	86 - 87
Grouping of Colors	88 - 90

Resistances	91 - 98
Use of the Term Resistance	91 - 93
Resistances in Melon and Lettuce	94 - 96
Tests for Resistance Compared with Electrophoresis Tests	97 - 98
States of Expression in Test Guidelines	99 -102
List of Reference Books and Documents	103-104
Hilum Color in Broad Beans and Field Beans	105-106
Micropropagation	107-108
Pilot Testing Project in Denmark	109-110
Improving Efficiency	111-112
Additional Lists of Characteristics in Test Guidelines	113-116
Definition and Examination of Hybrid Varieties	117-119
Minimum Distances Between Varieties	120-124
Revision of the UPOV Model for a Report on Technical Examination	125-127

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New Methods, Techniques and Equipment

Electrophoresis

1. The TWA noted that in several member States studies were made on the usefulness of electrophoresis. Depending on the species concerned, these studies would comprise the possible use of electrophoresis for: variety control; checking seed lots; help in registration; purity tests; identification; detection of mixtures; checking of inbred lines, whether they are true parents; control of genetic shifts; stability; preliminary test for an optimum layout of the field test; grouping of varieties; distinguishing parental lines of hybrids; help in distinguishing varieties. Also, depending on the species concerned, efforts would concentrate more on the seed proteins or more on the enzymes.

2. The TWA further noted statements made that:

(i) The results of the electrophoresis were independent of environmental conditions inasmuch as the same protein profile is obtained. The laboratory procedure itself was inevitably affected by the quality of the chemicals and by the design of the equipment used, however, the influence could be eliminated by precise specification of the method, the sources of the chemicals and the equipment.

(ii) The application of electrophoresis to DUS testing might be useful for comparing the "discrimination power" of characteristics. The suitability of characteristics for detecting heterogeneity within a variety needed to be investigated. In any case, the method of electrophoresis needed to be strictly defined.

(iii) Electrophoresis of protein and enzyme for identification had been reported in many species. Electrophoresis of seed storage protein was a very successful way of distinguishing between varieties of self-pollinated cereals. Vegetatively propagated species could also be fairly readily distinguished. However, cross-pollinated species presented more problems concerning the way that the discrimination between varieties was achieved. A list of species for which the application of electrophoresis has been studied was supplied by Dr. Cooke after the session of the TWA and has been reproduced in Annex III to document TWA/XVII/9 Prov., (see TWA/XVII/9 Prov., paragraph 21).

3. The discussions in the TWA can be summarized as follows:

4. Technical Aspects: The problems of the technical nature of the electrophoresis method for distinctness purposes seemed to be possible to solve without great difficulty. Results were very similar even if the gels looked different when different equipment and chemicals were used. A solution had to be found species by species. For wheat, the method selected by the International Seed Testing Association (ISTA) seemed to be a good, stable and repeatable method for seed storage protein. However, to reach an agreed method for Plant Variety Protection (PVP) purposes, some further parameters of the method should be defined and the nomenclature of the bands should be harmonized by giving them agreed numbers. Also the question of homogeneity would require further study.

5. Non-Technical Aspects: The reluctance to use electrophoresis for distinguishing varieties for Plant Variety Protection purposes was not mainly due to shortcomings of the technique, but due to the consequences such use would have for the whole system of Plant Variety Protection. The main obstacle was that very small differences could be detected which, if accepted, could destroy the breeding work or lead to an erosion of the whole system of Plant Variety Protection. Therefore, it was not enough to have a good and reliable method (as the ISTA method for wheat) which worked for the seed trade, UPOV had to agree on more, especially how to interpret the results and what differences would be sufficient to justify a separate protection right which would be legally defensible. UPOV would also have to keep in mind whether the breeder would be able to maintain a given difference.

6. Definition of Required Difference for Distinctness: The TWA agreed that the most important and most difficult task was that of interpreting the results and of defining the required difference. It agreed that differences in the quantity of a certain band were not enough, neither was the absence or presence of one single band, for example, in the case of wheat. All depended on the knowledge of the genetic background for each band. Some alleles would count for certain groups of bands. Thus, before being able to fix a certain difference, for example, an agreed combination of bands, the genetic difference shown by that combination should be known. This would require quite detailed studies. Electrophoresis could only be used for Plant Variety Protection purposes if it presented an objective measurement of a sufficient genetic difference.

7. Replacement of Other Characteristics: Not all traditional characteristics present in the UPOV Test Guidelines are really a good measurement of genetic difference. Some of them show a higher variation than some of those obtained by means of electrophoresis. Once the other above requirements are fulfilled, some minor characteristics of doubtful importance in the present Test Guidelines could be replaced by characteristics obtained by means of electrophoresis.

8. Views of Breeders: Before introducing electrophoresis for distinguishing purposes for PVP, the views of the breeders should also be heard. The grass breeders present during the session expressed their opposition to electrophoresis for distinctness purposes at the present time although in grasses there was a lack of good distinguishing characteristics. Other breeders present preferred resistance characteristics to those of electrophoresis, despite the more complicated and costly tests, and asked that the Committee be informed of their views in this respect.

9. Conclusion of the TWA: The TWA concluded that electrophoresis was a useful means for testing varieties for distinctness if it could be assured that sufficient minimum differences between varieties were maintained, either by a clear definition of the method and the interpretation of the results themselves or otherwise. How to reach that assurance depended on the case and the species concerned. For varieties of species which had to pass a VCU test before being able to be commercialized, the VCU test already considerably reduced the risk of too small differences.

10. Proposal of the TWA to the Committee: Having noted the studies made in the different member States with respect to electrophoresis, being aware of the fact that in a few years it would no longer be possible to refuse electrophoresis as a tool for testing varieties for distinctness purposes, and in order to avoid different member States developing different methods and different interpretations of the results, the TWA proposed to the Committee that UPOV should study this question in more detail and give it higher priority. One possibility could be to create an additional Technical Working Party on New Technologies (see also paragraph 35) which would deal with the harmonization of the application of electrophoresis for DUS purposes and try to reach an agreed interpretation of the results with respect to minimum distances. In the meantime, however, member States should not use characteristics obtained with the help of electrophoresis as the only one to establish distinctness for the purpose of granting a new plant variety right.

(see TWA/XVII/9 Prov., paragraphs 21 to 30)

11. The Committee is invited to take the necessary decisions.

Machine Vision Technique

12. Mrs. Silvey (United Kingdom) reported in the TWC on the progress made with the study on machine vision techniques, as reported upon during the last session of the Committee. She further informed the TWC that this subject will form a special item during the coming session of the Workshop on the Use of New Technology in the Examination of Varieties, scheduled to be held on September 27 and 28, 1988, at Cambridge, United Kingdom. It was expected that, at the end of June 1988, a prototype would be available at the NIAB at Cambridge, United Kingdom, which could identify wheat varieties in three minutes. For the future, it was planned to study the application to barley to assist the grain trade. Further study would concern the application for statutory purposes.

13. Mr. Evans (United Kingdom) reported in the TWC on the study to apply the above method to identify onion varieties. The first results of a test involving the photographing of onion bulbs of a certain group of varieties and then evaluating the picture with that method, concentrating on height, diameter and width of widest point to base, were very promising. The results obtained by the machine were exactly the same as those obtained by actual measurement of these characteristics. The method would allow an accurate recording and a fast decision. This year, if possible, all onion varieties will be checked with that method. Mr. Evans promised to prepare a written report on the results before the end of January 1989 for distribution to the TWC.

14. Mr. Bar-Tel reported in the TWC on discussions on the measuring of petals of carnations with that method held during the last meeting of the Subgroup on Carnation of the TWO. He will prepare a report on the measurements by the end of December 1988.

15. The TWC considered that the above method

(a) might be used in the future as an automated system for data capturing, eliminating the need for data entering of otherwise recorded data;

(b) could allow the observation of several additional characteristics, and

(c) would enable the development of a system to allow the computer to make the decision on whether a candidate variety was distinct or not. All experts would study at home the development in their country with respect to that method.

16. On the basis of the report on the use of video images for the testing of varieties, as now partly reproduced in document TWO/XXI/17, the TWO agreed that the possibility for testing should be further investigated. It was considered to be useful for the recording of characteristics in the Test Guidelines. The experts from France and the Netherlands will study the application of this method to carnations further.

(see TWC/VI/13 Prov., paragraphs 51 to 53, TWO/XXI/16 Prov., paragraph 32)

17. The Committee is invited to note the above information and to consider possible steps to be taken.

Expert System Method

18. The TWO noted the "Expert System" Method explained in document TWO/XXI/17 and discussed its possible use for the selection of similar varieties for the testing of new candidate varieties. The expert from Israel explained his method of choosing those similar varieties which consisted in the progressive elimination of varieties up to a small number of 3 to 4 similar ones. He will prepare a paper on this method for discussion during the next session of the TWO.

(see TWO/XXI/16 Prov., paragraph 33)

19. The Committee is invited to note the above information and to consider possible steps to be taken.

Physical Analysis of Colors

20. The method for the physical analysis of colors also considered in document TWO/XXI/17 was briefly discussed by the TWO. The discussions will be continued during the coming session.

(see TWO/XXI/16 Prov., paragraph 34)

21. The Committee is invited to note the above information and to consider possible steps to be taken.

Chemical Fingerprinting

22. Chemical fingerprinting with the HPLC method explained in document TWO/XXI/17 was noted by the TWO. The TWO agreed that it might be interesting for identifying an existing variety or for its control, but not for distinguishing a new variety for the recognition of plant breeders rights.

(see TWO/XXI/16 Prov., paragraph 35)

23. The Committee is invited to note the above information and to consider possible steps to be taken.

Creation of a New Technical Working Party

24. The TWA noted that new technologies, e.g. electrophoresis, machine vision and chromatography, would become more and more important for DUS testing in the near future and that the offices of several member States were studying and working on developing new methods for the testing of varieties: The TWA considered it important that a separate working party should be established to study these new technologies intensively and systematically to prevent different member States from going different ways and developing different methods which at a later stage would be more difficult to harmonize. It therefore proposed to the Technical Committee to establish a new Technical Working Party on New Technologies (TWT) which should follow these developments and make proposals for common use and/or application of those methods used inside UPOV.

(see also paragraph 10 above and TWA/XVII/9 Prov., paragraph 35)

25. The Committee is invited to take the necessary decisions.

Items for or from the Technical Working Party on Automation and Computer Programs

26. The TWF had no further special problems to be presented to the TWC.

(see TWF/XIX/11 Prov., paragraph 14)

27. The Committee is invited to note the above information.

Objections to New Statistical Methods

28. The TWC noted the fact that the other Technical Working Parties had raised certain criticisms regarding the work of the TWC and had warned of the danger of proposing new methods too fast without taking into account the modalities of testing presently applied by the technical services of different member States. The TWC pointed out that most of the new methods were simply at the study stage and that this fact should be stated more clearly. On the other hand, however, discussions and close cooperation between statisticians, crop experts and organizations would have to take place at the national level so as to understand better each other's wishes and needs.

(see TWC/VI/13 Prov., paragraphs 5 and 6)

29. The Committee is invited to note the above information.

Invitation of Statisticians to Other TWP's Sessions

30. The TWA, TWO and TWV agreed to the recommendation of the TWC to reserve some time at its coming session to allow a statistician to explain certain statistical methods which might be applicable to variety testing in species within their field of competence: if possible, the statistician should be from the country where the session was taking place. Some possible items to be studied in the TWO could be the use of statistics in the testing of differences in colors between clones of apples or the sampling of apples on a tree to obtain a representative sample. The TWF did not find it necessary to foresee a report by a statistician on selected items on the agenda for its next session. It will do so when it feels the need for such a report.

(see TWA/XVII/9 Prov., paragraph 6ii, TWC/VI/13 Prov., paragraph 38, TWF/XIX/11 Prov., paragraph 11, TWO/XXI/16 Prov., paragraph 11, TWV/XXI/23 Prov., paragraph 17ii)

31. The Committee is invited to note the above information.

Review on Statistical Practices

32. The TWC noted document TWC/VI/2 on the promotion of statistics in the testing of distinctness, homogeneity, and stability of new varieties of plants. Limitations on the use of statistical methods could have their cause in the different groups of crops (ornamentals, vegetables, agricultural crops), in the lack of randomization of the layout of the trials prepared, for example, to facilitate visual observations, or in the lack of understanding of new methods by the technical experts. It was necessary to explain these methods better to the technical experts, to take more time to listen to the problems the technical experts had and whether possible statistical methods could help solve them, and to develop more non-parametric methods. The TWC also noted several problems with respect to qualitative visually observed characteristics. However, before being able to define the problems which are of real practical significance, the TWC wanted to draw the attention of the crop experts to these problems and ask for their advice.

33. Dr. Laidig (Federal Republic of Germany) will prepare, by the end of December 1988, a report on the possibilities of analyzing with the computer data obtained from the application of electrophoresis. Mr. Grégoire (France) will also prepare by the same date a short report on how he sees these possibilities. The TWA was informed of the planned study and was invited to inform Dr. F. Laidig of any question it might wish to be taken up in that report.

(see TWA/XVII/9 Prov., paragraph 6ii, TWC/VI/13 Prov., paragraphs 36 to 39)

34. The Committee is invited to note the above information.

Pairwise Comparisons

35. Dr. G. Fuchs (Federal Republic of Germany) introduced to the TWC a paper on the use of close-pair comparisons for testing distinctness distributed during the last session and reproduced in Annex V to document TWC/VI/13 Prov. The introduction was followed by a survey of the methods used in the different member States. This survey showed that, for measured characteristics, no real pairwise comparisons were made and, except for the forming of groups, the normal UPOV criteria were used. For visually assessed characteristics, no special features were applied. It was specially stressed that an increase in the number of replications would not be fair as another yardstick would be used. The TWC asked the other Technical Working Parties to note the above results and to inform it in case it saw any problems in the pairwise comparison of varieties for distinctness.

36. The TWA and TWV stated that, contrary to the opinion of the TWC, for measured characteristics real pairwise comparisons were made very frequently and there were no specific problems in pairwise comparison of varieties for distinctness. Pairwise comparisons were considered useful and necessary for testing distinctness of varieties. The TWF also disagreed with the TWC that no real pairwise comparisons of varieties were made. In the field of fruit crops, pairwise comparisons would be made in many cases.

(see TWA/XVII/9 Prov., paragraph 6i, TWC/VI/13 Prov., paragraphs 34 and 35, TWF/XIX/11 Prov., paragraph 10, TWV/XXI/23 Prov., paragraph 17i)

37. The Committee is invited to note the above information and to consider possible steps to be taken.

Non-parametric Methods

38. The TWV noted that non-parametric statistics, e.g. sign tests, are very simple and therefore very useful for DUS testing and that in practice they are used continuously.

(see TWV/XXI/23 Prov., paragraph 17iii)

39. The Committee is invited to note the above information.

Similar Variety

40. The TWC noted document TWC/VI/5 containing the following possible definitions of the term "similar variety.":

- (a) the variety with the smallest maximum t-value,
- (b) the variety with the smallest distance D^2 , and
- (c) the variety with the smallest D^2 value of the varieties having a t-value less than a defined amount.

41. During the session of the TWC, a short survey on how the similar variety was at present found in the member States revealed large differences. Some countries did not indicate them at all in their variety descriptions or only in certain cases where the difference in that variety was really very small. Some grouped the varieties, looked for those differing only in one characteristic from the new variety and selected one variety with the smallest difference. This was considered by some experts to be comparable to the maximum t-value method proposed by Dr. Weatherup (United Kingdom). The method applied also varied depending on the species. Some considered it to be impossible for ornamental varieties to indicate which characteristic made the new variety distinct and thus they could not also indicate a similar variety.

42. Dr. Weatherup (United Kingdom) offered to evaluate the proposals in document TWC/VI/5 and to compare them with the previous method applied in the United Kingdom. He would also include scores in the evaluation, which would be sent to the Office of UPOV before the end of December 1988. The TWC furthermore asked that the other Technical Working Parties should be informed of the results of the above discussion and be asked what they understood by a similar variety. If they then considered that they needed help in understanding the definition, they should say so and indicate in which respect help was needed.

43. The TWA, TWF, and TWO noted that there were differences in what was understood by the term "similar-variety" as used in the UPOV Variety Description Form. While some member States indicated only varieties which had posed difficulties during examination because differences were rather small and might lead to confusion if not indicated, others considered as similar varieties all those which were different in one characteristic only. While in the first case, similar varieties would be indicated only if confusion was otherwise possible, other member States would indicate similar varieties in most of the variety descriptions.

44. The TWV agreed to discuss the question of "similar varieties" at its next session. Members of the TWV were requested to prepare short discussion papers and send them to the Office of UPOV by the end of December 1988.

(see TWA/XVII/9 Prov., paragraph 6iii, TWC/VI/13 Prov., paragraphs 43 to 46, TWF/XIX/11 Prov., paragraph 12, TWO/XXI/16 Prov., paragraph 12, TWV/XXI/23 Prov., paragraph 17iv)

45. The Committee is invited to note the above information and to consider possible steps to be taken.

Stabilized Variety Description

46. The TWC asked Mr. Talbot (United Kingdom) to circulate once more the program for arriving at a stabilized variety description. Results should be sent to Mr. Talbot before March 1, 1989, and a summary of the results to the Office of UPOV by the end of March 1989.

(see TWC/VI/13 Prov., paragraph 42)

47. The Committee is invited to note the above information.

Existing Data Base Management Systems

48. The TWC noted the results of the survey made of the data base management systems used in the different member States. The summary is reproduced in Annex VII to document TWC/VI/13 Prov. In future, there would be increased need for data exchange and it would be important to set up systems that would facilitate access by other member States to Data Bases. The TWC agreed that it was necessary to be aware of the data bases in the other member States and that it should work towards a common query language. As the Structure Query Language (SQL) was already used in several member States, offices should, when buying new data base systems, try to ensure that they use SQL. As more and more micro computers are connected to main frame computers, efforts should also be made to ensure that both used the same language.

(see TWC/VI/13 Prov., paragraphs 47 and 48)

49. The Committee is invited to note the above information.

Programs Easily to be Assimilated in Other Computers

50. The TWC noted the results of a request for information on exchangeable software, as reproduced in Annex VIII to document TWC/VI/13 Prov. It agreed to continue updating it. Changes occurring in the member States should be reported to Mrs. Campbell (United Kingdom) to enable her to prepare a further updated version by the end of December 1988. The TWC considered it useful also to include in that library the General Statistical Programme Package (GENSTAT).

(see TWC/VI/13 Prov., paragraph 49)

51. The Committee is invited to note the above information.

Testing of Homogeneity

52. The TWC noted document TWC/VI/9, containing an updated version of a program for the testing of homogeneity in cross-fertilized plants. With the introduction of the moving average, the method would use the average of the nearest two reference varieties to measure the uniformity of the candidate variety. The advantages of the method would mainly be that

- (a) all reference varieties could be used as a uniformity standard;
- (b) a single criterion for uniformity would be used, and
- (c) a comparison would be made against the most similar varieties.

53. The TWC further noted document TWC/VI/12 containing an evaluation of the above criterion made in the United Kingdom, in Denmark and in the Federal Republic of Germany, as well as a comparison of the actual uniformity decisions and those found by the over-years uniformity criterion as distributed during the session and reproduced in Annex IV to document TWC/VI/13 Prov. The above criterion was considered by the TWC to offer a great advantage over the present uniformity criterion. It would, however, have to be studied further. The study should include the study on the appropriate levels which so far had been different in the Federal Republic of Germany, Denmark and the United Kingdom. It should also reflect on how to handle cases where only data on less than nine varieties were available.

54. The TWC noted document TWC/VI/4 on the calculation of maximum tolerable off-type numbers for sample sizes of 1000, 2000, 3000, 4000, and 5000, which contained the same nominal standard as that used in the General Introduction to the Test Guidelines (document TG/1/2, paragraph 20(a)). In practice, for certain crops, quite different maximal tolerable off-type numbers are used. The Committee had also asked the Technical Working Parties to fix in the individual Test Guidelines the sample size and the tolerated off-types. The TWC agreed that it was not possible to prepare one table of maximal tolerable off-type numbers for all crops. In order to help the Technical Working Parties to find the right tolerances in their Test Guidelines for each species, the Working Party agreed to prepare different sets of different nominal standards (e.g. 0.1%, 1%, 2%, 5%) and of different percentages of acceptance probability (e.g. 95%, 99%), and to also give some information on the parameters for the description of the sampling scheme, namely, on the nominal standard, the acceptance probability, the sample size and the maximum number of off-types. Dr. Laidig and Dr. Weatherup will prepare that paper by September 15, 1988, to enable it to be submitted to the Committee before being distributed to the Technical Working Parties.

(see TWC/VI/13 Prov., paragraphs 27 to 33)

55. The Committee is invited to note the above information and to consider possible steps to be taken.

Changes in Variety Descriptions

56. Regarding the desire for a program which, on the occasion of revision of a given UPOV Test Guidelines document, would automatically change all existing variety descriptions to follow the revised version of that Test Guidelines document, the TWC replied that this was in principle possible. It would, however, first of all require a suitable transformation of each old characteristic into the new characteristic and then a computer program that would execute that information. In certain cases, the transformation might, however, not be easy, as was shown by the example in which a color characteristic with the states "white" and "black" was enlarged by a third state "yellow." For the transformation, technical experts could best discuss their wishes with their national computer experts.

(see TWC/VI/13 Prov., paragraph 57)

57. The Committee is invited to note the above information.

Combined Over-Years(COY) Analysis

58. The TWC noted document TC/XXIII/4 Rev. containing a revised version of the description of the combined over-years (COY) criterion for distinctness in DUS trials, prepared according to a suggestion made during the twenty-third session of the Committee. The TWC further noted documents TWC/VI/6, TWC/VI/7, TWC/VI/8, TWC/VI/10 and TWC/VI/11, as well as further papers prepared by experts from Denmark and the Netherlands and distributed during the session. These documents are reproduced as Annexes II and III to document TWC/VI/13 Prov. It recalled that the COY analysis had now been under study for several years and that, in addition to the proposed possible adjustment through the Modified Joint Regression Analysis (MJRA), another possible adjustment through the close-pair comparison had been proposed.

Evaluation of the COY Analysis

59. The TWC noted document TWC/VI/6, giving an evaluation of the COY criterion modified by the regression in the United Kingdom. While the unmodified COY criterion showed similar stringency as the t-score criterion, modified by the regression, the number of varieties that could be distinguished was increased (in the given case from 85 to 91).

60. The TWC noted document TWC/VI/7, giving the evaluation of the COY distinctness criterion using data from the Federal Republic of Germany for the years 1985 to 1987. The results of this evaluation show that, for grasses the two-year COY decisions distinguished more varieties than the 2 x 1% decisions, while the three-year COY decisions distinguished less varieties than the 2 x 1% decisions. For maize, after three years, considerably less varieties could be distinguished with the COY analysis (at 5%) than with the 2 x 1% method. The difference between these results and those from the United Kingdom might partly be explained by the different environmental conditions in the Federal Republic of Germany compared to those in the United Kingdom, leading to higher values of Δ in the Federal Republic of Germany. The use of the MJR analysis reduced the Δ -values for certain characteristics and increased the number of distinct varieties. Continuous decisions could be reached in the Federal Republic of Germany when applying the COY analysis at the 5% level.

61. The TWC noted document TWC/VI/8. In Denmark, at present, recording of characteristics would be stopped when a specific variety had proved to be distinct from all other candidates. Therefore it had been difficult to find sufficient data to apply the COY analysis. The COY analysis without adjustment led to less varieties being found distinct than at present. The COY analysis modified by the MJR analysis led to results close to those reached at present. In certain cases, however, the modified COY analysis led to less distinct varieties. The reason might be that the regression coefficient might not have been significant.

62. The TWC noted that in the Netherlands the COY analysis had been applied to only a few grass varieties. The results had been similar to those of the second or third method without the application of the MJR analysis. It would, however, have to be determined what would be the minimum number of varieties to allow meaningful application of the COY analysis.

63. The TWC noted that the routine application of the COY analysis in France will only start for 1988 data. The results so far received showed that, for Festuca varieties the COY analysis allowed more varieties to be distinguished than the 2 x 1% method, while for Dactylis varieties it was the contrary.

64. The TWC agreed that the possible modification of COY analysis by the MJR analysis should be amended by the calculation of the significance of the joint regression. Only when the regression was significant, the MJR analysis should be applied. Dr. Weatherup will include that calculation in the COY analysis program.

Further Refinement of the COY Analysis

65. The TWC noted document TWC/VI/10, proposing further refinement of the COY analysis in the form of the close-pair comparisons. It considered the fact that the range of variation differed in different years, that the difference between similar varieties tended to vary less than between dissimilar varieties, and that in distinctness testing the tester was only interested in comparing close varieties. The method would start from what the expert wanted and would give him an estimate of the difference. It would rank the varieties by their over-years mean, calculate the variance of differences between variety means for varieties ranked 1 and 2, 2 and 3 etc., and average the paired variances to give a close-pair variance for the testing of differences between similar varieties. Having gone through the above document, the TWC considered the method to be a useful procedure and one that it was not too difficult to explain to the technical experts since it closely followed, and simply improved upon what the technical expert was doing at present when comparing two varieties. The members of the TWC were asked to discuss the results with their national experts. Dr. Weatherup (United Kingdom) will, in cooperation with Mr. Talbot (United Kingdom), incorporate that refinement in the program of the COY analysis as a further possible refinement. The amended program would be circulated to the experts from Denmark, France, the Federal Republic of Germany, the Netherlands and Spain by the end of September 1988. Results of the application of that refinement would be sent by these experts to Mr. Talbot by March 1, 1989.

Application of the COY Analysis to Crops Other than Grasses

66. The TWC noted a paper on the comparison between the 2 x 1% rule, the t-score, the COY analysis without adjustment and the COY analysis with adjustment with the MJR analysis for varieties of sugar beet and summer rape in Denmark distributed during the session and reproduced in Annex II to document TWC/VI/13 Prov. The COY analysis sometimes allowed more varieties to be distinguished than the t-score. The COY analysis adjusted by the MJR analysis sometimes distinguished more varieties than the unmodified COY analysis. The whole study suffered, however, from the fact that only the results of few varieties could be used.

67. The TWC noted document TWC/VI/11 containing results of the application of the COY analysis to data of onion varieties from the Federal Republic of Germany. The document showed that the application of the COY analysis at 5% level to two years of data allowed a few more varieties to be distinguished than the 2 x 1% method. For three years, the COY analysis allowed less varieties to be distinguished. Dr. Laidig concluded that the COY analysis was also applicable to varieties of vegetable species. Two problems have, however, become apparent:

- (a) not all varieties were really measured but only the comparable ones, and
- (b) the LSD was calculated each year from a different set of reference varieties.

68. The TWC noted a paper on some experience gained with the COY analysis in red beet, mainly prepared for the coming session of the TWV but also distributed during the session and reproduced in Annex III to document TWC/VI/13 Prov. The paper showed that, with the COY analysis at 1% level, more varieties could be distinguished than with the two out of three method, and that the adjustment with the MJR analysis allowed even more varieties to be distinguished than with the not adjusted COY analysis. But here again the problem of the low number of varieties arose.

69. The TWC agreed that in cases where the values of λ were very small, there was no use in applying the MJR analysis. It concluded that, in general, it would need to study further and gain experience in the application of the COY analysis to vegetable varieties and that the analysis had to be studied species by species.

70. The discussions in the TWC on a minimum number of varieties necessary to enable LSD values which are not too large led to a figure of 10 varieties in three years. This figure will, however, be checked by Dr. Laidig (Federal Republic of Germany) for the next session.

71. The problem of the few candidate varieties for some vegetable species, the few reference varieties and incomplete data led the TWC to discuss, on the proposal of Mr. Talbot, the possibility of producing estimates for minimum distances and variances and information on whether those estimates are consistent from long range data of preceding years. Mr. Talbot offered to study this proposal on data from carrots, onions and faba beans, and prepare a report on his findings by the end of December 1988.

72. The above study should, however, not prevent application of the COY analysis where sufficient data are available. Experts from the Netherlands would thus study the application of the COY analysis to leek varieties and experts from the Federal Republic of Germany to onion varieties and they would send their results to the UPOV Office by the end of December 1988. Mr. Law (United Kingdom) will send his results of the application of the COY analysis to sugar beet varieties to the UPOV Office by the end of March 1989.

73. The TWC also recommended discussing at the national level the possibility of increasing the number of varieties in the trials to reach at least 10 degrees of freedom, allowing application of the COY analysis and/or keeping a number of (extra) varieties in the trials throughout the years in addition to the close control varieties, irrespective of the candidate varieties under test, in order to link the years together.

74. The TWC finally recalled that, in 1989, it had to fix a level for the application of the COY analysis to grasses and that that study had therefore also to be continued at the national level.

75. The TWA noted that, in 1989, the TWC would fix a significance level for the application of the COY analysis to grasses. The TWA agreed to introduce the COY analysis to grasses definitely if no problem arose as a result of the discussion by the TWC.

76. The TWF took note of document TC/XXIII/4 Rev. and also noted that in South Africa that method had been applied to some data of banana varieties with promising results and that it will be applied to varieties of pineapple. The TWF will thus await the outcome before discussing further the application of the COY analysis.

77. The TWO noted document TC/XXIII/4 Rev., but repeated that, in its field of competence, the application of that analysis would be rather limited as 99% of the varieties would be tested only for one year.

78. The TWV noted a paper on some experience gained with the COY-analysis in red beet, which was distributed during the session and is reproduced in Annex II to document TWV/XXI/23 Prov. It noted that, with the COY-analysis, at a 1% level, more varieties could be distinguished than with the 2 out of 3 method and that the COY analysis of the results of two years, modified by the Modified Joint Regression Analysis (MJRA), had more discriminatory power than the COY analysis. The high discriminatory power of the COY analysis modified by MJRA might, however, be due to the low number of varieties used and the minimum number of varieties necessary to use the method should be studied in more detail. The TWV noted that the COY analysis would require a larger number of varieties in the test.

79. The TWV also noted a paper on a methodological study for DUS testing on carrot (in French only), which was distributed during the session and is reproduced in Annex III to document TWV/XXI/23 Prov. The study analyses the main characteristics used in the DUS testing of carrots with respect to their reliability and discriminating power.

(see TWA/XVII/9 Prov., paragraph 5iii, TWC/VI/13 Prov., paragraphs 7 to 26, TWF/XIX/11 Prov., paragraph 9, TWO/XXI/16 Prov., paragraph 7, TWV/XXI/23 Prov., paragraphs 15 and 16)

80. The Committee is invited to note the above information and to consider possible steps to be taken.

Invitations to Sessions of TWP's

Invitation to Sessions in Japan

81. The TWF, TWO and TWV noted the invitation from Japan to hold their sessions in 1989 in Japan. The TWF and TWO regretted that time had been too short to collect the necessary information to enable them to take a positive decision on that invitation during their current session. They showed their interest in holding a session in Japan and will collect further information on the relevant financial aspects should an invitation be made for 1990 or a later date. The TWV partly sharing the same difficulties, finally agreed to hold its next session, preferably in Japan, starting on August 21, 1989. However, it decided to inform the Japanese authorities that if the session could be postponed to 1990, more experts might be able to attend.

(see TWF/XIX/11 Prov., paragraph 29, TWO/XXI/16 Prov., paragraph 43, TWV/XXI/23 Prov., paragraph 35)

82. The Committee is invited to note the above information and to consider possible steps to be taken.

Invitation of Technical Experts from Professional Organizations

83. The TWA and TWF noted that the participation of technical experts in the Working Party was very useful when discussing not only Test Guidelines but also other items. They further noted the difficulties professional organizations face when they have to name technical experts for each species, from which the chairman then has to select those to be invited for a given subject at a given session. If, after the invitations have been sent, experts are confronted with difficulties that prevent their attendance, the professional organizations, due to lack of time, no longer have the choice of replacing the expert as time no longer permits repetition of the whole invitation procedure.

84. The Working Parties therefore agreed to the wish of the professional organizations and proposed to the Committee that the professional organizations be asked to name technical experts to attend part of a given session of the Technical Working Party for certain species or subjects on the understanding that the experts named by the organizations are definitively invited without having to be selected and approved by the chairman of the respective Technical Working Party. This procedure should apply until it leads to too many technical experts attending Technical Working Party sessions.

(see TWA/XVII/9 Prov., paragraph 34, TWF/XIX/11 Prov., paragraph 7)

85. The Committee is invited to take the necessary decisions.

Color Observations

Color Pictures as a Supplement to Applications and Variety Descriptions

86. The TWF was informed that, in the Netherlands, applications for breeders' rights for ornamental varieties would have to be completed by a representative color picture of the variety. In the Agenda of the coming session, an item on the use of pictures in variety applications will be included.

(see TWF/XIX/11 Prov., paragraph 6)

87. The Committee is invited to note the above information.

Grouping of Colors

88. The TWO noted the report of the expert from the Federal Republic of Germany on the progress made in the empirical grouping of the RHS Colour Chart with the aim of facilitating the screening of varieties by computer. A paper on that grouping will be prepared by Mrs. Löscher (Federal Republic of Germany) before the end of the current year for distribution to the member States.

89. The TWO also noted a report by the expert from the Federal Republic of Germany on joint trials with the Registration Group of the Permanent Judgement Committee (VKC) of the Royal Society for Horticulture and Plant Science (KMTP) of the Netherlands on the use of chromameter for the measuring of colors. The first results looked rather promising. Trials will be continued in the Federal Republic of Germany and in the Netherlands. It was, however, stated that color charts would not be replaceable completely as mixed colors could not be measured. The size of the colored part of the plant might also be decisive, especially if it became too small.

(see TWO/XXI/16 Prov., paragraphs 21 and 22)

90. The Committee is invited to note the above information.

Resistances

Use of the Term Resistance

91. The TWV noted document TWV/XXI/13 on resistance characteristics for varieties of melon. After discussion on resistance, tolerance and hypersensitivity in plant pathology, the TWV recommend to the Committee that characteristics on "resistance" preferably be used in the UPOV Test Guidelines. It recommended further that the terms "resistance" and "tolerance" be defined as follows:

"Resistance is the ability of a plant to prevent infection or slow down the infection and subsequent development of a pathogen, by the use of host defense mechanisms."

"Tolerance is the ability of a plant to endure infection by a pathogen with little or no reaction, as shown by the more or less absence of symptoms or by the lack of an effect on yield or quality."

92. The TWV noted document TWV/XXI/21 containing results of the inventory of diseases and races of disease for which obligatory testing for resistant varieties was required in individual member States.

(see TWV/XXI/23 Prov., paragraphs 20 and 23)

93. The Committee is invited to take the necessary decisions.

Resistances in Melon and Lettuce

94. The TWV agreed to present document TWV/XXI/13 to the Committee for approval and publication as an addendum to the Test Guidelines for Melon, after having agreed to make several changes. The new version of the document is reproduced in document TC/XXIV/5.

95. The TWV noted document TWV/XXI/14 containing a report on the meeting of the Subgroup on Bremia lactucae held on November 4, 1987, in Cambridge (United Kingdom). Experts from France, the Netherlands and the Federal Republic of Germany introduced papers containing some comments on the report, which were distributed during the session and are reproduced in Annex IV to document TWV/XXI/23 Prov. The TWV noted that, for identifying the resistance genes in lettuce varieties, it was meaningful to use Bremia lactucae, however, regretted that agreement on some items, e.g. kinds of useful R-genes and Bremia races, could so far not be obtained among member States of the Working Party. It agreed to establish, as a minimum position, a basic list of R-genes and Bremia races which all member States would use. The list should not be exclusive, but could be freely enlarged by each member State. A first draft of the list would be prepared by experts from the United Kingdom and circulated to experts from France, the Netherlands and the Federal Republic of Germany, and thereafter sent to the Office of UPOV by the end of December 1988, for distribution to all member States for comments by March 15, 1989.

(see TWV/XXI/23 Prov., paragraphs 18, 19 and 21)

96. The Committee is invited to take the necessary decisions.

Tests for Resistance Compared with Electrophoresis Tests

97. The TWA discussed the possibility of including further resistance characteristics in the Test Guidelines for Lucerne (e.g. Resistant to Anthracnose, Bacterial Wilt, Phytophthora Root Rot, Fusarium Wilt, Nematode). During these discussions the experts from the breeders' side asked that the Committee should be informed that they would prefer the use of resistance characteristics for distinctness testing to the use of electrophoresis, even if the test is more difficult and costly.

(see TWA/XVII/9 Prov., paragraph 7vi)

98. The Committee is invited to note the above information.

States of Expression in Test Guidelines

99. The Working Parties noted documents TC/XXIII/5 and TC/XXIII/7. They went through document TC/XXIII/5 and discussed each of the examples given. The TWF in most cases could agree with the proposals made, but in certain cases, for example, in 8.1, 12.6 and 12.7, it stated that it would depend on the expression of the characteristic in the species concerned whether it had to be handled in the quantitative or the qualitative way. It left the choice of preference on the order of the states in examples 13.8 and 13.9 to the Committee.

100. The TWV made the following comments: (i) It could not follow the states and/or Notes in Examples 14.3, 16.3, 16.4; (ii) It would not use the states and/or Notes in Examples 9.2, 9.4, 9.5, 11.4, 13.1, 14.1; (iii) The states and/or Notes in Examples 8.1, 12.4 to 12.7 depended on the species concerned; (iv) The order of states of Example 12.8 was preferred to that of 12.9; (v) The possibility of using the states/or Notes in Example 16.1 should not be excluded.

101. The TWO noted documents TC/XXIII/5 and TC/XXIII/7. It expressed the view that the possibilities of expression should not be limited too much. It will take that document into account and consider certain proposals during the discussion of the individual Test Guidelines.

(see TWF/XIX/11 Prov., paragraph 15, TWO/XXI/16 Prov., paragraph 8, TWV/XXI/23 Prov., paragraph 12)

102. The Committee is invited to note the above information and to consider possible steps to be taken.

List of Reference Books and Documents

103. The Working Parties noted document TWV/XXI/3, which contains additional information to that included in document TC/XXII/4. They invited their members to inform the Office of UPOV of any additional information or corrections which might be necessary in that document.

(see TWF/XIX/11 Prov., paragraph 17, TWV/XXI/23 Prov., paragraph 13)

104. The Committee is invited to note the above information.

Hilum Color in Broad Beans and Field Beans

105. The TWA noted paragraph 24 of document TC/XXIII/6. Many members of the Working Party stated that hilum color was not an important characteristic in testing homogeneity of field bean varieties. Finally, the TWA agreed that the compromise of the Committee (TC/XXI/7, paragraphs 23 to 25) should not be changed.

(see TWA/XVII/9 Prov., paragraph 5i)

106. The Committee is invited to note the above information and to consider possible steps to be taken.

Micropropagation

107. The TWF had a lengthy discussion on the effect of micropropagation on the expression of characteristics in the tests for distinctness. It finally added in the Technical Questionnaire of some Test Guidelines a request to indicate whether the plant material has been obtained by micropropagation. It asked the Committee to discuss how to handle the fact that nowadays some plant material submitted might be obtained by micropropagation. A simple sentence on the treatment of plant material by micropropagation submitted might not be enough. For some varieties, micropropagation might be the only possibility of propagation, thus a prohibition might also not be possible.

(see TWF/XIX/11 Prov., paragraph 16)

108. The Committee is invited to take the necessary decisions.

Pilot Testing Project in Denmark

109. The TWO received short reports from some of the experts on further recent developments in their countries. It noted with special interest the report from the Danish expert on the preliminary results of a pilot project in Denmark involving tests done by breeders, and from the expert from the United Kingdom on the review of the variety testing system in that country. The preliminary report on the Danish pilot project is reproduced in Annex II to document TWO/XXI/16 Prov.

(see TWO/XXI/16 Prov., paragraph 4)

110. The Committee is invited to note the above information.

Improving Efficiency

111. The TWO noted some general ideas from the expert from Israel on possibilities to reduce costs and required time through better cooperation and exchange of data on variety description and further information on varieties, in order to reduce considerably the number of reference varieties necessary to be grown together with candidate varieties. The Working Party encouraged that exchange on a bilateral level. It noted at the same time that central testing had already played an important role in the reduction of costs for individual offices. It will continue its discussion during its next session on the basis of a document to be prepared by the expert from Israel.

(see TWO/XXI/16 Prov., paragraph 23)

112. The Committee is invited to note the above information.

Additional Lists of Characteristics in Test Guidelines

113. The TWO discussed the possibility of establishing a list of characteristics for carnations which would normally not be used as a routine and thus would not be included in the UPOV Test Guidelines, but which might be used occasionally if needed. It finally concluded that such an idea should not be followed up.

114. The TWV discussed the possibility of indicating, for all example varieties, their states of expression in the grouping characteristics and to add that information to the UPOV Test Guidelines as the special annex in order to facilitate the assessment of distinctness. Although the advantages of such a procedure were seen, the workload and the difficulties involved led the TWV finally not to adopt the proposal.

115. The TWV discussed a proposal to indicate example varieties in the UPOV Test Guidelines separately from the Table of Characteristics and to add them to the Test Guidelines as a special annex to be revised periodically, because some example varieties might, after some time, no longer be in trade and have to be replaced by others. The TWV agreed to recommend to the Committee that, if necessary, example varieties in the Test Guidelines could be replaced by others if they were no longer available in the trade and that, in case many changes should take place for one given Test Guidelines document, a revised list of example varieties should be established. This, however, should not happen more frequently than every 3 or 5 years, after establishing the last version of the Test Guidelines. However, right from the start, a special annex should not be prepared, but the example varieties should, as at present, be incorporated in the Table of Characteristics.

(see TWO/XXI/16 Prov., paragraph 36, TWV/XXI/23 Prov., paragraphs 6 and 7)

116. The Committee is invited to note the above information and to consider possible steps to be taken.

Definition and Examination of Hybrid Varieties

117. This subject forms item 8 of the draft Agenda. In 1988, only the TWA had a short discussion on this subject.

118. The TWA took note of document CAJ/XX/7 containing the procedure for distinctness decisions in the case of hybrid maize varieties studied in France and noted the advantages of the procedure. Some experts noted that there would be no problem if the procedure was used to screen candidate varieties, however, more discussion and experience would be needed to accept the procedure as the formal method of DUS testing. The TWA agreed to discuss this item again at its next session. The same subject will also be discussed at the Workshop on Maize at Versailles, France, on October 3 and 4, 1989, [date changed to October 2 and 3, 1989].

(see TWA/XVII/9 Prov., paragraph 11)

119. The Committee is invited to note the above information and to consider possible steps to be taken.

Minimum Distances Between Varieties

120. This subject forms item 9 of the draft Agenda.

121. The TWC noted that this subject had been rediscussed in several bodies of UPOV during last year's autumn sessions. The TWC specially noted paragraphs 14 to 17 of Annex V of document TC/XXIII/6. Having had a long discussion on how it could be of help in the given problems, it finally agreed to ask the other Technical Working Parties to select two species each and certain characteristics within these species which posed special problems. For these selected characteristics, data of the whole collection of varieties for more than two years should be listed, together with an explanation of the problems encountered for which they would ask advice, together with the present practice or rules applied or the present solutions used to solve the problems, and any other information on desired solutions. The information from the Technical Working Parties should reach Mr. Law (United Kingdom) before the end of September 1988. Mr. Law would study it to see whether it could be circulated directly to members of the TWC or whether certain additional information might be required from the Technical Working Parties beforehand.

122. According to the proposal of the TWC, the Working Parties agreed, although the TWA and TWO only reluctantly, to select some species and certain characteristics within these species which posed special problems on minimum distances and to collect data on these characteristics, together with the other required information as mentioned above. The species selected by the Working Parties and the countries supplying the information were as follows:

<u>TWA</u> :	Ryegrass	United Kingdom
	Sunflower	Spain
	Kentucky Bluegrass	Federal Republic of Germany
<u>TWF</u> :	Banana	South Africa
	Apple	United Kingdom
	Strawberry	Federal Republic of Germany
<u>TWO</u> :	Gerbera	Netherlands
	Pelargonium or	
	African Violet	Federal Republic of Germany
<u>TWV</u> :	Carrot	France
	Faba bean	United Kingdom
	Onion	United Kingdom

123. The TWC and TWV noted that already now for certain species a significant difference between a candidate variety and another variety would not necessarily lead to the candidate variety being accepted as a distinct new variety. For reasons which were not necessarily connected with the growing test, authorities often demanded a minimum distance which, for certain characteristics, would be considerable higher than that demanded according to the statistical evaluation of the test results. An example mentioned by the TWC was the difference in earliness of at least one day for certain species.

(see TWA/XVII/9 Prov., paragraph 6iv, TWC/VI/13 Prov., paragraphs 54 and 55, TWF/XIX/11 Prov., paragraph 13, TWO/XXI/16 Prov., paragraph 13, TWV/XXI/23 Prov., paragraph 17v)

124. The Committee is invited to note the above information and to consider possible steps to be taken.

Revision of the UPOV Model for a Report on Technical Examination

125. This subject forms item 10 of the draft Agenda.

126. Information on this item is reproduced in documents TWV/XXI/15 and TC/XXIV/4.

127. The Committee is invited to take the necessary decisions.

[End of Annex and of document]