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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

TECHNICAL COMMITTEE**Thirty-second Session
Geneva, October 18 to 20, 1995**

MATTERS ARISING FROM THE 1995 SESSIONS OF THE
TECHNICAL WORKING PARTIES, INCLUDING THE BMT,
TO BE DEALT WITH BY THE TECHNICAL COMMITTEE

Addendum prepared by the Office of the Union

1. This document summarizes, in its Annex, matters arising from the 1995 sessions of the Technical Working Parties for Fruit Crops (TWF), for Ornamental Plants and Forest Trees (TWO), and of the Technical Working Group on Biochemical and Molecular Techniques and DNA-Profiling in Particular (BMT), which took place in September 1995. They comprise important subjects discussed or decisions taken by the Technical Working Parties and the BMT, which are communicated to the Technical Committee (hereinafter referred to as "the Committee"):

- (i) for information;
- (ii) for information and for a possible decision to be taken by the Committee;
- (iii) for a decision to be taken by the Committee;

The headings of the different items are listed on page 1 of the Annex.

2. To shorten references to the various Technical Working Parties and the BMT in this document, use is made of the following codes that designate their documents:

TWF: Technical Working Party for Fruit Crops;
TWO: Technical Working Party for Ornamental Plants and Forest Trees;
BMT: Working Group on Biochemical and Molecular Techniques and DNA-Profiling in Particular.

[Annex follows]

ANNEX

MATTERS ARISING FROM THE 1995 SESSIONS OF THE
TECHNICAL WORKING PARTIES, INCLUDING THE BMT,
TO BE DEALT WITH BY THE TECHNICAL COMMITTEE

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MATTERS ARISING FROM THE 1995 SESSIONS OF THE
TECHNICAL WORKING PARTIES, INCLUDING THE BMT,
TO BE DEALT WITH BY THE TECHNICAL COMMITTEE

I. MATTERS FOR INFORMATION

Cooperation with Breeders in the Testing of Varieties

1. The TWF and TWO noted that the Technical Committee had asked that the survey on the involvement of breeders or applicants in the testing of varieties be repeated so as to cover also non-agricultural species in order to have full details of the testing systems of the individual member States and that a new questionnaire (U2268) had been circulated for completion leading to the updated document TC/32/4. The experts from Canada and Japan explained in further detail the involvement of the applicant in their testing. In both countries the applicant would grow the plants and the examiner from the office would visit the trials at a time when most of the characteristics could be observed. In both cases the examiner would observe all characteristics possible at the given time. In Canada the applicant would also have to make the same observations and the remaining ones which then would be compared by the office with its own observations. If both agreed, a decision would be taken and published giving a period of 6 months for objections. The office would also check whether the comparable varieties were correct, and if not, ask for further testing. The testing of uniformity would be left to the applicant. In Japan, in addition to the observations of the examiner, the applicant would have only to test the characteristics that had not been possible to be observed during the visit. The Japanese Office would have already at the start given the applicant detailed descriptions of the lay-out and on similar varieties. In case of doubts or when a candidate variety was too close to a candidate of another applicant, the Office would do own tests in one of the 11 stations or in an institute or a regional authority (especially for rice). In addition to these growing tests performed by the office itself, a third possibility existed for varieties bred by public institutes where sufficient data would be available in order to rely on a written report.

2. The experts from Hungary and Norway reported to the TWF that for fruit species the competent authority did not have its own collections and would have to rely on the plants grown by the applicant. All observations would, however, be made by the competent authorities even if that required several visits to the trial grounds. Moreover in Chile, the competent authority would rely on plants grown by the applicant, should he have a collection of varieties. In Israel it was also possible that the plants were grown by the applicant and the expert would observe them there. In New Zealand the observations on the premises of the applicant had been abolished and all fruit applications were now grown and tested centrally.

(See TWO/28/13 Prov., paragraph 22, and TWF/26/12 Prov., paragraphs 16 and 17).

3. *The Committee is invited to note the above information.*

List of Species of Which Practical Technical Knowledge has Been Acquired

4. The TWF noted that the Technical Committee had requested that the present document TWO/27/13 comprising a list of species of ornamental plants tested in the UPOV member States should be extended to cover all species of which practical knowledge has been acquired in the member States and that a new questionnaire (U 2229) had been sent out and the answers to that questionnaire had been included in document TWO/28/10.

(See TWF/26/12 Prov., paragraph 44).

5. *The Committee is invited to note the above information.*

UPOV Central Computerized Database

6. The TWF and TWO welcomed the progress made and hoped to receive the first results of the testing of the Demonstration Disc as well as information on the steps to be taken on the basis of those results at its next session. As the Demonstration Disc would be sent to the Council Representatives of each member State, the Working Parties invited all to contact their respective colleagues at national level to see and appreciate the information on the Disc themselves.

(See TWO/28/13 Prov., paragraph 38 and TWF/26/12 Prov., paragraph 41).

7. *The Committee is invited to note the above information.*

Uniformity of Vegetatively Propagated Species

8. The TWO noted documents TWC/11/16 and TWC/26/19. It also noted that its decision to use in general a population standard of 1% and an acceptance probability of 95% for ornamental varieties had been upheld in the Technical Committee to give more time for clarification of still open questions. A standard paragraph with these figures has therefore not been included in the Test Guidelines adopted last year. After further discussions it reconfirmed its decision of last year to indicate in each Test Guidelines document for vegetatively propagated varieties the population standard, the acceptance probability and the total number of off-types for a given sample size. It agreed to decide on these figures crop by crop. In most cases a population standard of 1 per cent with an acceptance probability of 95 per cent would be applicable which would allow one off-type in sample sizes between six and 35. Some experts expressed their concern that in most cases the sample size would be at the lower end of that range leading to a high beta risk.

9. The expert from the United Kingdom in the TWC gave to the TWF a new introduction to document TWC/11/16 explaining the main aims of the document and the limitations with respect to small samples. Several experts stated that there was a clear difference between the method developed for self-pollinated species and the situation in vegetatively propagated

varieties. While in the first case there was genetic variation between the individual plants, there was no genetic difference between the plants in the second case. Unfortunately in UPOV both cases were placed into one single group in the General Introduction to Test Guidelines and thus also in document TWC/11/16. In addition, a high mutation rate in vegetatively propagated material was often not caused by the material itself but by the breeder or applicant who had not done his work properly and applied too early for protection.

10. Other experts of the TWF wondered whether the fact that some plants had few flowers and others many would have to enter into the statistical calculations. The situation may also have to be looked at differently from characteristic to characteristic and it was not possible to apply one single population standard equally to all characteristics in the same way but certain characteristics could justify a different population standard in the same way, as inside a species different types of varieties could justify different population standards (e.g. apple rootstock varieties and fruit varieties, vegetatively propagated and seed propagated varieties).

11. While the TWF accepted that in principle it was possible to judge characteristic by characteristic, however, in practice that was not possible and one single population standard should be selected for one species or at least for one group inside a species (e.g. all fruit varieties, all vegetatively propagated species). In principle that population standard should be 1 per cent with an acceptance probability of 95 per cent unless special reasons (e.g. a different source of the material) justified a different percentage (e.g. a high mutation rate). The question was considered to be also connected with the definition of an off-type. As already stated above, it was not possible that any difference in the tree of an apple variety was considered to be an off-type. A tree would in general show many small differences and almost all leaves would be slightly different. It was necessary to observe an overall view. The leaves on a tree were almost a population inside the tree and it was more the question of how much variation inside a tree was acceptable before one would speak of off-types. In order to get a better understanding of the problem, the TWF asked the expert from the United Kingdom to compile some data of mutations of apple varieties and submit them to his colleague in the TWC for calculations in order to inform all the experts in the TWC better and to make them more aware of the special situation.

12. The Chairman of the TWF also explained that the fact that the application of the method in TWC/11/16 could lead to a high β -risk which was far from reality was partly explained by the fact that of the total curve in question only the first part was relevant. It was unlikely that the number of off-types would be higher than a very low number since the variety was normally derived from a single clone. In the relevant range of the curve, the β -risks would, however, not differ too much from that of a larger sample. The TWF also made it clear that while in agricultural varieties the variety had only to be uniform in characteristics routinely used for distinctness, in ornamental and fruit varieties it was not possible to ignore off-types in characteristics which so far had not been used for distinctness purposes. In its area of crops uniformity would thus be looked at differently.

13. The TWF finally appreciated the presence of the expert from the TWC and its explanations to document TWC/11/16. The dialogue now taking place between the crop working parties and the TWC was very much appreciated. They now tried to understand each other's problems which was a sound basis for finding solutions to the outstanding problems.

(See TWO/28/13 Prov., paragraph 39, and TWF/26/12 Prov., paragraphs 32 to 39).

14. *The Committee is invited to note the above information.*

Uniformity in Roses

15. The expert from France gave the TWO a short report on a project between experts from France, Germany, the Netherlands and the United Kingdom on the checking of rose mutations. In that project the four countries had agreed on an exchange of a list of mutant candidate varieties of roses for which applications for protection had been filed, on an exchange of rejections of applications for lack of distinctness of those mutants, on an exchange of all mutations under examination, of all candidates tested for a second year and on a multilateral test of material of several mutants distributed centrally. The main aim was to detect the influence of different climates on the results of the testing. Further results would be reported upon during the next session.

(See TWO/28/13 Prov., paragraph 40).

16. *The Committee is invited to note the above information.*

Uniformity of Species/Varieties Which are Propagated Both by Seed and Vegetatively

17. The TWO noted certain difficulties arising in *Bromeliaceae* in the Netherlands where different standards had to be applied to cross-fertilized varieties, self-fertilized varieties, vegetatively propagated varieties (by tissue culture), inbred lines, half hybrids and F1 crosses. In Israel, *Ranunculus* varieties propagated by seed were not in an equilibrium. In the United Kingdom in the beginning, seed propagated varieties had varied a lot. That situation had, however, been improved in the meantime. In *Pelargonium* in Germany seed propagated varieties showed two types. One type was almost as uniform as clonal varieties while the other type showed some variation. In *Lobelia* next to mainly seed propagated varieties also some vegetatively propagated varieties were produced. In this genus it had so far not been possible to propagate vegetatively a selection of a seed propagated variety.

18. The TWO recalled the requirement for each variety to be judged according to its method of propagation. It had agreed to accept two different requirements on uniformity within one species, provided that it was not possible to propagate a given seed propagated variety vegetatively. In case it was possible to propagate a given seed propagated variety vegetatively, it foresaw difficulties once the variety was protected. It thus only reluctantly and after long discussions agreed to the basic principle that each variety had to be judged according to its way of propagation and therefore different degrees of uniformity depending on the way of propagation have to be accepted inside one genus or species.

(See TWO/28/13 Prov., paragraphs 41 and 42).

19. *The Committee is invited to note the above information.*

Example Varieties

20. The TWF and TWO noted that the Technical Committee had asked all Technical Working Parties to rediscuss the handling of example varieties and report to it during its next session. The TWO agreed that under special circumstances it was more important to complete a given Test Guidelines document even without or only few example varieties than to delay it for several years just to await the search for those example varieties. The completion of the Test Guidelines for Norway Spruce with few example varieties demonstrated that position.

(See TWF/26/12 Prov., paragraph 13, and TWO/28/13 Prov., paragraph 28).

21. *The Committee is invited to note the above information.*

Working Paper on Draft Test Guidelines for Hevea

22. The Subgroup of the TWO noted a draft for Test Guidelines for Hevea prepared by experts from New Zealand in cooperation with the Indonesian Rubber Research Institute at Sungei Putih, North Sumatra, Indonesia, as distributed during the session. The Subgroup made several amendments to that document which were reported to the session in a summarized form by the expert from New Zealand. The resulting new draft is reproduced in document TWO/28/12.

(See TWO/28/13 Prov., paragraph 55).

23. *The Committee is invited to note the above information.*

Bibliography of Published Papers on New Techniques

24. The TWF noted document TWF/24/8 and new information collected by the expert from the United Kingdom and distributed on diskettes. It was mainly extracted from the Commonwealth Agriculture Bureau International in Oxford and also contained abstracts. Some further information received from member States was also included. The expert from the United Kingdom offered to remain the contact person for further updating of that list. Copies of that diskette could be requested from the Office of UPOV.

(See TWF/26/12 Prov., paragraph 27).

25. *The Committee is invited to note the above information.*

RHS Colour Chart

26. The expert from the United Kingdom informed the session of the TWO of the reprint of the RHS Colour Chart which would be available from the Royal Horticultural Society in the United Kingdom.

(See TWO/28/13 Prov., paragraph 19).

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

Protection Between Application and Granting of Rights

28. The TWF discussed the different procedures in the individual member States with respect to the period between the date of application and the granting of rights. Some member states granted protection during that period but under different conditions. In the United Kingdom, the applicant could be granted, on request, protective direction as long as he abstained from marketing the varieties; in others the applicant received protection as of the date of application, could sell his variety immediately after application and could collect royalties. Because of the short life, of many varieties the possibility of immediate sales was very important. In other States, even though the variety was only protected after the grant of rights, the applicant would already ask in advance for license fees. He would obtain them mainly because of the pressure to keep commercial relations with him because of his other varieties. It was left open whether the license fees paid could be recovered if the candidate variety had been rejected. In order to get a clear picture of the different practices and rules in the individual member States on provisional protection but also on whether a compulsory or facultative variety list existed and the requirements for inclusion in such a list, the TWF established a list of questions for a questionnaire to be circulated inside its group.

(See TWF/26/12 Prov., paragraphs 6 and 7).

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

New Methods, Techniques and Equipment in the Examination of Varieties

30. Several experts of the TWO stated that in the past interest in these methods had been higher but in the last years it had decreased as had the financing of research on these methods. The TWO reconfirmed the possible usefulness for identification purposes but saw little possibilities for distinctness purposes. The methods may be helpful in screening reference collections for similar varieties and thus could help to reduce the workload and costs of testing. The screening of sport varieties was, however, difficult. They could also help in checking whether the correct material had been received (e.g. when imported). Thus the TWO was interested in the methods but would await further progress in knowledge. For the testing of distinctness in the ornamental field the new methods were not needed as sufficient morphological and physiological characteristics were available.

31. The TWF objected to the term fingerprinting applied to DNA-profiling. A human fingerprint was unique, a DNA-profile, however, was not unique. The TWF discussed the term "identification" compared to "distinctness." Identification meant tracing existing varieties. DNA-profiles may allow fast tracing of a given variety, e.g. when plant material falling under the scope of variety protection was imported.

32. The TWF discussed whether the possibility of identification with DNA-profiles could also be used to facilitate screening of varieties, e.g. for similar varieties to a candidate variety for their selection for the growing test. The TWF noted that in certain crops similar varieties would be selected in that way, however, not in fruit crops. DNA-profiling would also not be used for grouping varieties. In order to get a better overview of what was happening with electrophoresis and DNA-profiling in the individual member States, the TWF agreed to collect information on the use of these methods for identification, tracing of varieties and for screening them. The expert from the Netherlands will collect the information to be sent to him by all experts before the end of January 1996. The information should not be limited to fruit species only; information on other vegetatively propagated species would be welcome. The Office of UPOV was asked to send a reminder to all experts.

(See TWO/28/13 Prov., paragraph 34, and TWF/26/12 Prov., paragraphs 25 and 26).

33. *The Committee is invited to note the above information.*

II. MATTERS FOR INFORMATION AND FOR A POSSIBLE DECISION TO BE TAKEN BY THE COMMITTEE

Genetically Modified Organism (GMO) Varieties

34. The TWF and TWO noted the position of the Technical Committee vis-à-vis the handling of GMO varieties. They considered it, however, important to know when a candidate variety was a GMO. They therefore proposed to include in the Technical Questionnaire under paragraph 4 or paragraph 7 a sentence which could read: "The candidate variety represents a Genetically Modified Organism [] Yes, [] No." They asked the Technical Committee to find the final wording and to discuss whether a definition on what was considered a GMO needed to be also included as had been done in the Technical Questionnaire of the EU PBR Office.

(See TWO/28/13 Prov., paragraph 29, and TWF/26/12 Prov., paragraph 12).

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

UPOV Documents in Electronic Form

36. The TWF and TWO noted that the Technical Committee had requested that a survey should be made in order to inquire who would be interested in documents in electronic form

and for which purpose they would be needed, before asking the Office of UPOV to keep the electronic version of documents in full agreement with the printed versions. The TWO strongly supported making available the UPOV documents in electronic form. This should not be restricted to Test Guidelines but should cover several other documents, especially reports of meetings and other more important documents. Several experts considered availability via e-mail or on-line to be the best possibility. Availability in electronic form would especially facilitate searches for certain subjects in existing documents or taking over parts for new documents.

37. The TWF, having discussed different possibilities of availability on diskettes, on-line, etc., and what kind of documents should be made available (all Test Guidelines, all reports of meetings, all documents for meetings, etc.), finally proposed to start with a firm but limited trial to place the report of the session and the agenda and if possible the same for all other Technical Working Parties and the Technical Committee on one diskette to be distributed to the TWF. The documents should be recorded in parallel in Word for Windows and in ASCII. During its next session it would then report on the use made with that diskette.

(See TWO/28/13 Prov., paragraph 24, and TWF/26/12 Prov., paragraph 18).

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

Definition of Off-Type

39. The TWF noted that the Technical Committee had agreed to the conclusion of the TWO that each plant which showed a mutation in parts of its organs was considered to be an off-type. For fruit species, the TWF could not follow that proposal as it would lead to a rejection of most applications. In fruit species the situation was different. An apple tree could not be considered an off-type if only one leaf of the tree or one apple was an off-type, which was impossible. On the other side, if a whole branch was an off-type, the tree had to be considered to be an off-type. The problem was to define the border, as from when it had to be considered to be an off-type. Some experts proposed as border line whether the mutated organ could be used to produce another variety or whether the mutation could be perpetuated. However, with the help of new methods and tissue culture, presently too small parts could already fulfill that requirement. The TWF finally agreed to propose to the Technical Committee to amend the definition of the TWO that each plant which showed a mutation in parts of its organs was considered an off-type, to that not all mutations but only "significant" mutations of part of an organ should be considered an off-type.

(See TWF/26/12 Prov., paragraphs 14 and 15).

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

The Use of Image Analysis in the DUS Testing of Ornamental Plants.

41. The TWF and TWO noted that the Technical Committee had requested that a survey should be made of what had already been done in the field of image analysis and what problems had been encountered with that tool in variety testing. The TWF and TWO recalled that the expert from the Netherlands had been asked to prepare a questionnaire (Circular U2218) for distribution to the experts and for answers to be returned before January 31, 1995. The following items had already been identified as aims of the study of image analysis:

- (a) Faster measuring of characteristics;
- (b) Storage of data collected with image analysis;
- (c) Finding of similar varieties through checking of stored data on image analysis;
- (d) Digitalized storage of photos.

42. The TWF and TWO also noted information on a research proposal for the European Communities written as a result of a Questionnaire on Image Analysis in Variety Testing (Circular U 2220). The project was submitted to the FAIR-program of the European Communities in March 1995 under the acronym VISOR. The objectives of the project were to:

- (a) establish best practice guidelines in applying image analysis to testing for distinctness, uniformity and stability;
- (b) develop computer systems which automate the production of scores for characteristics that are currently visually assessed;
- (c) develop an image database system for plant varieties which can take an image of one variety and compare it with other images of varieties of the same species in order to identify the closest visual match.

43. The TWF and TWO noted that although the VISOR project was restricted to European Union member States its approaches could be beneficial to all UPOV member States.

44. The Chairman of the TWO stressed that it was necessary to avoid that the methods under study in the different member States deviated too much, that aims should be collated and that it should be discussed how closer cooperation and harmonization could be achieved.

45. The TWO noted different reports on the stage of study of image analysis in the different member States.

46. Mr. David Warren (United Kingdom) reported on the research done at the NIAB at Cambridge where over the past few years image analysis techniques had been successfully applied to DUS related work in several crops. There were now PC-based systems in routine use that measured the length and breadth of oil seed rape cotyledons, *Faba* bean leaves and *Faba* bean pods. The Image Analysis Section was currently working to build a more ambitious

system which would automate the DUS assessment of chrysanthemum leaves. The system would generate leaf descriptions in terms of the characters defined in the current UPOV Guidelines. It would assess all but four of the leaf characteristics, print a report sheet and a sheet of leaf silhouettes for each variety and transfer the data directly into the chrysanthemum DUS database. The office was also experimenting with more objective, more accurate descriptions of the leaf shapes which would be extremely tedious to generate by hand. The system would generate leaf shape descriptions of this kind in addition to the standard assessments. They would be used to search the database for known varieties whose leaves were similar to a given candidate and may prove useful in identifying new characteristics which could be measured accurately by machine but still be assessed easily by eye. Mr. Warren explained in detail the different steps, image acquisition, measurement of each of 10 leaves of a variety, generation of the report, transfer of data and archiving of the image. He pointed to problems, e.g. the overlapping of the sinus of the lobed leaf, the measuring of the apex and the base with the difficulty to define how far the apex or base reached and the difficulty in interpretation in case of differences observed inside the 10 leaves (e.g. what to do if five leaves were acute and five rounded).

47. Mrs. Marie Hélène Gandelin (France) reported on the examination of flowers and petals of roses through scanner images, measuring global parameters as area and color images. She also pointed out the difficulties caused by the variation of shape and color distribution. One single method was therefore considered insufficient. Several methods as human measurement, image analysis and spectroradiometric observations had to be used together. Annex II to document TWO/28/13 Prov. reproduces a more detailed summary of her report. Mrs. Kathrin Siebert (Germany) reported on the plans of the Bundessortenamt on the research of image analysis. Work had started rather late and most research was just at the beginning stage. She gave an overview on the differences between image recording and image analysis, referred to the main characteristics that could be recorded via image (length, width, area, perimeter, shape, color) and explained the set-up of hardware used in Germany. The storage of images was, different to the other reporting states, done not in digital but analogue form on a WORM (Write Once Read Many) disk and would be converted by a Frame Grabber into digital form when needed. Research would be done on *Pelagonium* (leaf, flower, petals) and on rye (number of grains). A more detailed summary of her report is reproduced in Annex III to document TWO/28/13 Prov.

48. Mr. Gerie van der Heijden (Netherlands) reported on the study of image analysis in the Netherlands with the view of its possible use in DUS testing. He started his report with the observation of mushrooms, continuing with flax seed (length and width), French bean (pod, beak), cucumber (size of neck, presence of bud), carrots (EU trials), onions (bulb) and the separation of *Solanum* species with the help of the cross-section of the corolla. He concluded that image analysis was a useful tool for simple measurements, and that it was not expensive. Attention had to be paid to avoid errors in recording and analysis (e.g. broken seed). He further remarked that the measurements were accurate and needed no improvements; it was possible to form classes of shapes to link or combine characteristics on texture, color, etc. Data could easily be stored in a database and be used as a reference collection.

49. Mr. Jan Wouter Van Eck (Netherlands) reported on the observation of width, length, shape, texture and color of vegetables and gave demonstrations on observations on shapes of differently colored parts of leaves of *Ficus* (white, light green, dark green) and the calculation

of the histogram of each of the three different parts, the calculation of the relative distance of the first occurrence of each of the different colors and the outside. It was stressed again that the correct sampling was the most important part of the observation (Annex IV to document TWO/28/13 Prov. gives more details on the above measuring).

50. Mr. Ton Kwakkenbos (Netherlands) gave a demonstration of the photo database set up by the Dutch authorities. He reported on the search for a database easy to handle, with large storage capacity (e.g. 1000 pictures per year), easy to search for pictures with possibilities of also scanning pictures from publications. He explained the hardware and software and some of the difficulties encountered in certain colors (e.g. dark red or dark green). The aim was to obtain pictures which match as well as possible the impression of the human eye.

51. Having noted all the reports, the TWO discussed the need for more harmonization and cooperation. While some experts felt little need for harmonization, others considered it as important to reach some kind of harmonization, maybe less in the hardware, but more in the software, at least at a certain level to avoid that any progress in a country would have to be redone by another country as it could not be taken over directly. It was not necessary to have exactly the same package of hardware and software, but at least some common ground and aim.

52. Having discussed at length how to reach that harmonization and whether to set up a subgroup on image analysis on its own or together with other Technical Working Parties, the TWO finally concluded that it was more appropriate to continue discussing the subject in the whole Working Party, thus giving all member States the chance of participation and not only those four States which at present did research on that method. Similar to what had been done during the present session, a whole day should be reserved for discussions on image analysis during the next session. The TWO agreed that it was important that also breeders participated in the discussions on image analysis, especially breeders from countries with a breeders' testing system, as they would need to be able to follow in case new characteristics were included in the Test Guidelines. It was important to get their views on these methods.

53. The TWO finally stressed that in preparation of the discussions during the next session emphasis should be laid on the observation of shape, size and color distribution of leaves and flowers. All countries doing research on image analysis were invited to report on their experience gained and on the problems encountered.

54. The TWF noted that the TWO had reserved during its session the previous week a whole day on image analysis and would reserve half a day for that purpose during its next session. The questions under study were replacement of measuring of characteristics, the development of new characteristics and the observation of colors. During its visit to the Brogdale Farm the experts from the United Kingdom explained in detail their project of measuring of apples by image analysis through the scanning half of the profile of an apple and the calculation of 18 coordinates and the relative position of the coordinates to each other. It was planned to measure with this method the whole apple collection to obtain comparable data on all about 2,200 varieties. More details on that project are produced in Annex IV to document TWF/26/12 Prov.

55. The TWF also noted information from New Zealand on research on image analysis to determine red color (an abstract which is reproduced in Annex VI to document TWF/26/12 Prov.), on digital imaging (an extract which is reproduced in Annex VII to document TWF/26/12 Prov.), and on the differentiation of apple sports by pollen ultrastructure (a summary which is reproduced in Annex VIII to document TWF/26/12 Prov.). It finally agreed to collect for its next session more detailed information on use of research on image analysis. The expert from Germany offered to compile all information sent to him before the end of January 1996. The Office of UPOV was asked to send a reminder to all experts.

(See TWO/28/13 Prov., paragraphs 4 to 16, and TWF/26/12 Prov., paragraphs 20 to 23).

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

Handling of Visually Assessed Characteristics

57. The TWF and TWO noted document TWC/11/12 on the handling of visually assessed characteristics introduced by experts from Germany. They agreed that the method described in that document was very useful for the crop expert in helping him (i) to judge whether the number of states of expression used for each characteristic was justified or needed an amendment; (ii) to note which characteristics were correlated and could be reviewed with a view of possibly eliminating one of them and (iii) to check whether the minimum distance applied was correct or had to be adjusted. In the beginning the TWF had a certain reluctance to follow all conclusions of the document. I asked to be cautious with characteristics which were market oriented. All breeders would breed in that characteristic for certain states of expression which would therefore lead to changes in the normal distribution of the states of a quantitative characteristic (e.g. breeding for very early and very late varieties) or would lead to most varieties being found in one or two states of a qualitative characteristic like color. Both Working Parties insisted that the method should just help the crop expert but not force him to changes. The final decision had to remain with the crop expert. They recommended that the method be considered at every revision of an existing Test Guidelines document, although in practice at present the same review of the existing characteristics would already take place automatically without the application of statistics.

(See TWO/28/13 Prov., paragraph 36, and TWF/26/12 Prov., paragraph 29 and 30).

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

Indication of Species as Example Varieties

59. With respect to the Working Paper on Test Guidelines for Firelily (*Cyrtanthus*), the TWO agreed to insert in that document an additional paragraph stating that instead of example varieties at present in most cases because of a lack of varieties only species had been indicated

which would be replaced by example varieties as and when they became available. The expert from South Africa would indicate the species in question.

(See TWO/28/13 Prov., paragraph 50(iv)).

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

Indication of the Trade Name in the Technical Questionnaire

61. The TWO requested to include in the Technical Questionnaire a request for the applicant to indicate not only the variety denomination but also the intended trade name (if already known) as it was the experience that in commerce nobody and often even not the breeder himself would know the variety denomination and everybody would, when making inquiries to the Office, request information on the variety "x" whereby "x" would be the trade name. The TWO stressed to the Technical Committee that the above information was very important. It would be illusionary to assume that, by not requesting it, one could reinforce the broader acceptance of the use of variety denominations.

(See TWO/28/13 Prov., paragraph 47).

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

Recommendations on Variety Denominations

63. The TWO also expressed its concern that the recommendations on variety denominations had been worded in many respects very vaguely which led to the fact that they had been differently interpreted by each State and had often completely missed their intended aim of harmonizing variety denomination between the individual member States. Nowadays some member States accepted different series of long denominations all starting with a prefix referring to a given breeder or even with the full name of the breeder sometimes only followed by a qualifying adjective (e.g. "yellow"). Other series were based on the variety denomination of the first variety to which in the case of a mutant only another color was added. That was considered to be very unfortunate. Moreover, it was felt that this was partly resulting from the fact that the technical experts were less involved in the acceptance of variety denominations. The TWO recommended that the administration of the offices should take more seriously the concerns raised by the technical experts. Experts from countries far away from Europe also often received applications for a variety for which in Europe two different variety denominations have been approved leaving them in a difficult position in deciding which of the denomination to accept.

(See TWO/28/13 Prov., paragraph 48).

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

Characteristics on Oil Content

65. The TWO noted that one fifth of the characteristics in the Working Paper on Test Guidelines for Lavender and Lavendine referred to oil and oil content. It agreed to consider the inclusion of these characteristics in the Test Guidelines of a standardized method was available and if the uniformity could be assured through the right sampling. The TWO considered that in future more industrial crops would come up for protection with similar characteristics of the content of certain substances. These characteristics should not be rejected only because they were performance characteristics.

(See TWO/28/13 Prov., paragraph 49(viii)).

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

Request for Photos in the Technical Questionnaire

67. The TWF noted that the Technical Committee had supported the request for a representative color photo of the candidate variety in the Technical Questionnaires, however, limiting the obligation to ornamental species only. It saw no reason why the same rules should not also apply to fruit species and asked the Technical Committee to extend that rule also to fruit species.

(See TWF/26/12 Prov., paragraph 11).

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

III. MATTERS FROM THE BMT (Item 5 of the Draft Agenda)

New Methods, Techniques and Equipment in the Examination of Varieties including the Progress Report on the Work of the BMT

69. The report on the last session of the BMT is reproduced in document BMT/3/18 Prov. In order to avoid unnecessary repetition of most of the report in this document, reference is made to document BMT/3/18 Prov. for parts which only have to be noted by the Committee.

Definition and Nomenclature of Methods of DNA-Profiling

70. See documents BMT/3/3 and BMT/3/18 Prov., paragraphs 7 and 8, on the definitions and nomenclature of different methods of DNA-profiling.

71. *The Committee is invited to note the above information.*

Short Presentation of Research Results of Different Species

72. See documents BMT/3/3, BMT/3/4, BMT/3/5, BMT/3/5 Add., BMT/3/9, BMT/3/10, BMT/3/11, BMT/3/12, BMT/3/13, BMT/3/14, BMT/3/15 and BMT/3/18 Prov. paragraph 9 on the reports on ryegrass, oilseed rape, lucerne, sunflower, potato, tomato, strawberry, peach, hydrangea and *Pinus pinaster*.

73. *The Committee is invited to note the above information.*

Statistical Aspects of DNA-Profiling Including Analysis of Distance

74. See documents BMT/3/6 and BMT/3/18 Prov., paragraphs 11 to 13.

75. *The Committee is invited to note the above information.*

Position of Breeders vis-à-vis DNA-Profiling

76. See documents BMT/3/8 and BMT/3/18 Prov., paragraphs 14 to 16.

77. *The Committee is invited to note the above information.*

The Use of DNA-Profiling Methods by Expert Witnesses in Disputes on Essential Derivation

78. See document BMT/3/18 Prov., paragraphs 17 to 20.

79. *The Committee is invited to note the above information.*

Possibilities and Consequences of the Introduction of DNA-Profiling Methods for DUS Testing

80. See document BMT/3/18 Prov., paragraphs 21 to 35.

81. *The Committee is invited to note the above information.*

Final Conclusions

82. The Working Group agreed that the new techniques for DNA-profiling were a powerful tool to provide detailed information on the relationship between varieties. They supplied considerable background on a variety and were also very useful for the identification of existing varieties. They would be very useful for the estimation of essential derivation together with other sources of data (e.g. breeding history). The Working Group was, however, not in a position to recommend its use for distinctness purposes. Many questions emerged, especially concerning the genetic map, the link between markers and genes, the link between markers and possible expression of a gene in the phenotype, and the whole question of uniformity. It therefore finally proposed that the Technical Committee not recommend the use of DNA-profiling for DUS purposes before all these open points had been clarified or before harmonized protocols had been established for the use of DNA-profiling (if its use was ever accepted for DUS testing).

83. One expert proposed not to be too strict and to allow their use in very special cases where good genetic knowledge was available and a link of the marker to another traditional characteristic existed (as with the polymorphism of isoenzymes). The majority was, however, opposed to such an advanced step. It stated that in the case mentioned distinctness could be judged on the difference in a traditional characteristic.

84. The Working Group favored the approach of ASSINSEL which was to keep the judgment of essential derivation as far as possible separate from the DUS testing and that the criteria of essential derivation had to be judged species by species. At present information on DNA-profiling should only be complementary information which may help the expert in the testing but which would not be used for distinctness testing.

85. The Working Group agreed that UPOV should not feel under pressure to accept the new methods just for fear of being regarded as old-fashioned. It had the task of defending the efficacy of the plant variety protection system and of defending it against the introduction of unsuitable tools which might affect its functioning. It had also to remind itself that not all States were on the same level of development in these methods or had the same experience. Non acceptance of methods for DUS testing at the present time was not negativism but was in the interests of the users of the system. It was hoped that before the next session more research into the methods, especially on microsatellites would be completed. Other laboratory methods should also be studied which may be more readily acceptable, for example methods to observe the contents or composition of starch, oil, etc. or other metabolites.

(See BMT/3/18 Prov., paragraphs 21 to 35).

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

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