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GENEVA

TECHNICAL COMMITTEE

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MATTERS ARISING FROM THE 2001 SESSIONS
OF THE TECHNICAL WORKING PARTIES

Document prepared by the Office of the Union

1. This document summarizes matters arising from the 2001 sessions of the Technical Working Parties (hereinafter referred to as “the TWPs”) which require consideration by the Technical Committee (hereinafter referred to as “the Committee”).
2. The matters arising are detailed in the Annex to this document and are contained in two sections. The first section, “Matters for information and for a possible decision to be taken by the Committee,” identifies matters raised by the TWPs, which may require a decision to be taken by the Committee. The Office of the Union (hereinafter referred to as “the Office”) has highlighted aspects where the Committee may wish to take a decision by introducing a proposed decision paragraph shown in italics. The second section, “Matters for information,” is provided for the information of the Committee but does not require decisions at this stage.
3. A table of contents, specifying the items covered, is provided in the Annex.

4. The following codes are used in this document:

CAJ:	Administrative and Legal Committee
TWA:	Technical Working Party for Agricultural Crops
TWC:	Technical Working Party on Automation and Computer Programs
TWF:	Technical Working Party for Fruit Crops
TWO:	Technical Working Party for Ornamental Plants and Forest Trees
TWV:	Technical Working Party for Vegetables
BMT:	Working Group on Biochemical and Molecular Techniques and DNA-Profiling in Particular

[Annex follows]

**MATTERS ARISING FROM THE 2001 SESSIONS
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I. MATTERS FOR INFORMATION AND FOR A POSSIBLE DECISION TO BE TAKEN BY THE COMMITTEE	2
CHAIRMANSHIP OF THE TWPS.....	2
REVISION OF THE GENERAL INTRODUCTION.....	2
DEVELOPMENT OF TGP DOCUMENTS.....	2
DRAFTING OF DOCUMENT TGP/7, “DEVELOPMENT OF TEST GUIDELINES”.....	3
BIOCHEMICAL AND MOLECULAR TECHNIQUES.....	3
FUTURE ROLE OF THE BMT.....	6
PROTECTION OF “IMPROVED” VARIETIES.....	7
PROTECTING HYBRID VARIETIES THROUGH PROTECTION OF SELECTED PARENT LINES.....	7
DISEASE RESISTANCE CHARACTERISTICS.....	7
SCENT AND FLAVOR CHARACTERISTICS.....	7
II. MATTERS FOR INFORMATION.....	8
MANAGEMENT OF VARIETY COLLECTIONS.....	8
<i>Relationship between varieties of common knowledge and variety (reference) collections.....</i>	<i>8</i>
<i>Plant variety descriptions and environmental effects.....</i>	<i>8</i>
<i>Software using phenotypic distance for distinctness.....</i>	<i>9</i>
QUESTIONNAIRE ON THE LEVEL OF INVOLVEMENT OF THE APPLICANT IN THE GROWING TEST.....	9
TESTING OF SEED-PROPAGATED ORNAMENTALS.....	9
<i>Number of growing cycles.....</i>	<i>9</i>
<i>Information on testing arrangements and experience.....</i>	<i>10</i>
DETERMINATION OF OPTIMUM TRIAL SIZE.....	10
TRIAL DESIGN.....	10
<i>Alpha block design.....</i>	<i>10</i>
<i>Spatial dependency and block design.....</i>	<i>11</i>
REVIEW OF UNIFORMITY STANDARDS FOR GRASSES.....	12
IMAGE ANALYSIS.....	12
RHS COLOUR CHART.....	13

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

Chairmanship of the TWPs

1. The TWPs noted that the terms of office for their Chairmen would expire with the ordinary session of the Council in 2002. It was noted that the last session of the Committee before the 2002 Council session will be the Committee session in April 2002, and it would, therefore, be necessary for each TWP to make a proposal for a candidate for chairmanship during their sessions in 2001. The respective TWPs suggested to the Committee that it propose to the Council that it elect the following persons as chairmen:

TWA: Mr. Carlos Gomez-Etchebarne, Uruguay
TWC: Mr. Uwe Meyer, Germany
TWF: Mr. Erik Schulte, Germany
TWO: Mr. Chris Barnaby, New Zealand
T WV: Mr. Kees van Ettehoven, Netherlands

2. The Committee is invited to make proposals, to the Council, for the Chairmanship of the TWPs.

Revision of the General Introduction

3. All TWPs reviewed and commented on document TC/37/9(a), developed by the Committee as the latest draft of document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants." The proposed changes arising from discussions in the TWPs are contained in document TC/38/5.

4. The Committee is invited to note that the comments from the TWPs are reflected in document TC/38/5 and will be considered under agenda item 3.

Development of TGP Documents

5. All the TWPs considered the list of TGP documents. Suggestions were made regarding sections which should be contained within the individual TGP documents and each TWP identified which documents, or sections of documents, it should be involved in drafting. The input from all TWPs is contained in document TC/38/7.

6. The Committee is invited to note that the comments from the TWPs are contained in document TC/38/7 and will be considered under agenda item 7.

Drafting of Document TGP/7, “Development of Test Guidelines”

7. The TWPs raised a number of issues regarding the drafting of document TGP/7, “Development of Test Guidelines,” and these have been included in document TC/38/8 for discussion under agenda item 8.

8. *The Committee is invited to note that the comments from the TWPs are reflected in document TC/38/8, which will be considered under agenda item 8.*

Biochemical and Molecular Techniques

9. The TWA received reports from the Chairmen of the Maize, Oilseed Rape and Wheat *Ad hoc* Crop Subgroups on Molecular Techniques (hereinafter referred to as “Crop Subgroups”). The TWV and TWO received reports from the Tomato and Rose Crop Subgroups, respectively.

10. The TWV recommended that the work of the Tomato Crop Subgroup should be continued and extended to cover vegetable species, other than tomato, where work is being undertaken. The TWA considered it would be useful to introduce a Crop Subgroup for a vegetatively propagated agricultural crop and suggested either sugar cane or potatoes might be appropriate. The TWF reaffirmed its support for the establishment of a Crop Subgroup for peach and also wished to consider the possibility of establishing a Crop Subgroup for citrus and suggested this might be combined with the peach Crop Subgroup under a single Chairman. It decided to nominate Mr. Erik Schulte (Germany) as Chairman of the peach, or combined peach and citrus, Crop Subgroup if this was established.

11. The BMT considered that it was important for the *Ad hoc* Subgroup of Technical and Legal Experts on Biochemical and Molecular Techniques (hereinafter referred to as “the BMT Review Group”), of Technical Committee and Administrative and Legal Committee members, to consider models for the use of biochemical and molecular techniques in DUS testing and make recommendations on the acceptability of these models, before the Crop Subgroups take their work further.

12. The BMT proposed that recommendations be sought on the basis of selected proposals developed in the Crop Subgroups, as reported in document BMT/7/3, Annex III. In particular, it suggested that the models should be proposed for:

Option 1: “Molecular Characteristics as Predictors of Traditional Characteristics”

(a) Gene specific markers: the BMT Review Group would be asked to consider the acceptability of gene specific markers for predicting individual phenotypic characteristics. The characteristic of herbicide tolerance, introduced by genetic modification, is to be given as the example. The recommendation would need to be on the basis that there was reliable linkage between the marker and the expression of the characteristic. In considering this proposal, the BMT Review Group would be requested to make a recommendation on the acceptability of differences arising from different markers developed for the same expression of a characteristic.

(b) The use of a set of molecular characteristics to estimate a traditional characteristic: a model based on this approach would not be proposed at this time but it was emphasized that work on this approach was ongoing.

Option 2: "Calibration of Molecular Characteristics against Traditional Characteristics"

A model would be presented on the basis of information from oilseed rape, maize and rose. This option would be proposed on the basis of a genetic distance assessment, rather than a characteristic by characteristic approach, and would be presented for use in the management of reference collections.

Option 3: "Development of a New System"

This option would be presented on the basis of the model proposed in the Rose Crop Subgroup and a model that will be developed on the basis of the information available from wheat. This option will be based on the use of molecular characteristics in the same way as existing non-molecular characteristics.

13. It was clarified that the three options developed by the Crop Subgroups related to the options for distinctness, including management of reference collections, and that it was equally important for the BMT Review Group to consider the uniformity and stability issues outlined in document BMT/7/3, Annex III.

14. The BMT Review Group would be asked to consider these models on the basis of certain assumptions, regarding information which is not yet available for the crops used in the illustrations.

15. The BMT emphasized that the use of biochemical and molecular techniques in any of these proposals should not be interpreted as the complete replacement of non-molecular characteristics and that these methods should be considered in conjunction with non-molecular characteristics, for example, in the management of reference collections.

16. The following general schedule was then envisaged:

(a) The BMT Review Group to make recommendations to the Technical Committee and CAJ, on the models outlined above.

(b) The Office to produce a document, containing these recommendations and the considerations of the Technical Committee, for circulation to the TWPs.

(c) The TWPs to consider this document and to consider detailed reports of the work of Crop Subgroups.

(d) Where possible, the Crop Subgroups to meet after the next meeting of the relevant TWP to enable the views of the relevant TWP to be presented at the meeting.

17. The BMT recommended that the Crop Subgroup meetings should, in general, be held in association with meetings of relevant TWPs.

18. The BMT suggested the following approach for the existing Crop Subgroups:
- (a) Maize: no future meeting planned at this stage, subject to consideration by the TWA;
 - (b) Oilseed Rape: to meet sometime before the next TWA meeting, not necessarily at the same time as the TWA meeting;
 - (c) Rose: to meet before the next TWO meeting;
 - (d) Tomato: no future meeting planned at this stage, subject to consideration by the TWV;
 - (e) Wheat: to meet immediately after, and in association with, the next TWA meeting.
19. The BMT suggested the establishment of new Crop Subgroups as follows:
- (a) Sugarcane: to hold its first meeting immediately after, and in association with, the next TWA meeting;
 - (b) Potato: to hold its first meeting immediately after, and in association with, the next TWA meeting;
 - (c) Mushroom: to hold its first meeting immediately after, and in association with, the next TWV meeting;
 - (d) Soybean: to hold its first meeting immediately after, and in association with, the next TWA meeting, if there is sufficient interest amongst experts.
20. The BMT noted the large number of Crop Subgroups associated with the TWA and recognized the time pressures this would place on this TWP.
21. The proposed Chairman of a Peach/Citrus Crop Subgroup (Mr. Schulte, Germany), concluded that, on the basis of presentations at the session, there was insufficient basis for the creation of such a Crop Subgroup at this time. However, he would report on the BMT session to the next TWF to ensure that it was fully informed of the current situation, since the TWF wished to be involved in this work.

22. The Committee is invited to note that, as explained in circular U 3178, a meeting of the BMT Review Group has been arranged during the week of its thirty-eighth session and that the Vice Secretary-General will make a verbal report of this meeting to the Committee, under agenda item 11.

23. *The Committee is invited to approve the proposals from the BMT regarding:*

(a) the schedule for reporting the outcome of the BMT Review Group meeting as set out in paragraph [16] (a)-(d);

(b) the approach for existing and new Crop Subgroups as set out in paragraphs [17] to [21].

Future Role of the BMT

24. In response to developments in UPOV, regarding biochemical and molecular techniques, and in particular the establishment of the BMT Review Group and Crop Subgroups, the BMT clarified its understanding of the role it should perform. This proposal is set out in Box 1.

25. *The Committee is invited to consider the proposed future role of the BMT as presented in Box 1.*

Box 1

PROPOSED ROLE OF THE BMT

The BMT is a group open to DUS experts, biochemical and molecular specialists and plant breeders, which considers its role to be to:

- (i) Review general developments in biochemical and molecular techniques;
- (ii) Maintain an awareness of relevant applications of biochemical and molecular techniques in plant breeding;
- (iii) Consider the possible application of biochemical and molecular techniques in DUS testing and report its considerations to the Technical Committee;
- (iv) If appropriate, establish guidelines for biochemical and molecular methodologies and their harmonization and, in particular, contribute to the preparation of document TGP/15, "New Types of Characteristics." These guidelines to include methods for analysis of data resulting from such methods, to be developed in conjunction with the TWC;
- (v) Consider initiatives from TWPs, for the establishment of crop specific subgroups, taking into account available information and the need for biochemical and molecular methods;
- (vi) Develop guidelines regarding the management and harmonization of databases of biochemical and molecular information, in conjunction with the TWC;
- (vii) Receive reports from Crop Subgroups and the BMT Review Group;
- (viii) Provide a forum for discussion on the use of biochemical and molecular techniques in the consideration of essential derivation and variety identification.

Protection of “Improved” Varieties

26. At the TWO, the representative of the International Seed Trade Federation (FIS) expressed the view that, under the 1991 Act of the UPOV Convention, breeders of varieties who develop “improved” forms of their protected varieties would have protection for these improved varieties, if these were considered to be essentially derived varieties.

27. The Committee is invited to refer this view to the CAJ for comment.

Protecting Hybrid Varieties Through Protection of Selected Parent Lines

28. The representative of FIS expressed the view that the protection of selected parent lines, used in different hybrid varieties, might be the most cost-effective method of achieving protection for a series of hybrid varieties.

29. The Committee is invited to refer this view to the CAJ for comment.

Disease Resistance Characteristics

30. The TWV agreed to propose to the Committee that the issue of disease resistance should be dealt with by a section within document TGP/12, “Special Characteristics,” with a view to the standardization of disease resistance tests and the inclusion of intermediate states of disease resistance in the Test Guidelines (see document TC/38/7, Annex I: section 12.1.1).

31. The Committee is invited to consider this proposal in document TC/38/7, Annex I: section 12.1.1, under agenda item 7.

Scent and Flavor Characteristics

32. The TWV agreed to propose to the Committee that a section on the examination of scent and flavor characteristics should be included in document TGP/12, “Special Characteristics” (see document TC/38/7, Annex I: section 12.4).

33. The Committee is invited to consider this proposal in document TC/38/7 Annex I: section 12.4, under agenda item 7.

II. MATTERS FOR INFORMATION

Management of Variety Collections

34. The TWA reviewed the following matters regarding the management of variety collections:

Relationship between varieties of common knowledge and variety (reference) collections

35. It was agreed that document TWA/30/17 should be revised to clarify that the technical examination could not always produce a complete examination of distinctness and explain that other measures could be taken in these circumstances. It was also proposed that it should take into account the use of variety descriptions produced using non-UPOV descriptors. Mr. Guiard (France) agreed to revise the document and, after consultation with Mr. Green (TWV) and the nominated representative for the TWO, will present this document as a draft for document TGP/4.1, "General Guidance for the Management of Variety Collections." This would then be sent to the Office for circulation to the other TWPs in 2002.

36. Mrs. Rücker (Germany) will draft a paper for document TGP/3.2, "Developments and Explanations regarding Varieties of Common Knowledge" for consideration at the next TWA.

Plant variety descriptions and environmental effects

(Please note that this issue is also considered in document TC/38/8, Annex II: section I, "Example Varieties.")

37. The TWA considered that the study on barley (document TWA/30/16), in particular, demonstrated the need to re-examine the procedure for selecting asterisked characteristics to achieve useful harmonized descriptions. It also raised the need to consider a wider range of example varieties and the need for more regular updating of example varieties. A presentation on wheat suggested that the selection of grouping characteristics needed further consideration since many appeared to have variable states of expression for the same variety.

38. Mr. Deneken (Denmark) advised that he will be investigating whether it is possible to develop a statistical procedure to eliminate the variation in descriptions due to "country effects." It was noted that one country effect is likely to be due to variation in recording the characteristics and there was recognition of the need to improve the illustration of characteristics in the Test Guidelines to minimize this. In particular, it was suggested that photographs or diagrams should be used to illustrate characteristics, rather than reliance on example varieties for this purpose. However, it was noted that the example varieties were important for standardization of descriptions.

39. It was proposed that further studies should be undertaken on other crops and that, furthermore, a recommendation should be made to the Committee that such a study should always be undertaken as a part of the process of revising Test Guidelines. It was agreed that the Office, in consultation with Mr. Deneken (Denmark), should draft a model questionnaire for use in any further studies.

40. Germany agreed to undertake a study on winter oilseed rape (building on a related study presented in document TWA/30/12), Australia agreed to do the same for spring wheat and the United Kingdom will further develop its study on winter wheat. Reports will be presented at the TWA in 2002.

41. The TWA decided to set up a project for exchanging seed of selected varieties between interested countries, with descriptions to be produced by each or most participants in their countries. These descriptions would then be sent to a coordinator for a report to be produced. Projects were proposed for spring oats (coordinator: Sweden), lupins (coordinator: South Africa) and white clover (coordinator: New Zealand). A project for rice may be established if a coordinator can be identified. The Office will prepare a circular to identify all possible participants for these crops and then prepare a protocol in conjunction with the coordinators.

Software using phenotypic distance for distinctness

42. The “GAÏA” system of pre-screening varieties in the examination of distinctness, as developed by France, was presented in document TWA/30/15. The meeting was advised that France will make this software available for UPOV members.

43. It was noted that the system would need to be adapted for each species or plant variety type and that it was important for an “impact analysis” to be undertaken, to study if different decisions would have been taken, in the past, using such a process.

44. It was agreed that the process should be explained and developed as a draft for document TGP/9.3, “Consideration of All Varieties of Common Knowledge in the Examination of Distinctness” for circulation to all TWPs in 2002.

Questionnaire on the Level of Involvement of the Applicant in the Growing Test

45. The TWA had some concerns that the interim report of the results of the questionnaire on the level of involvement of the applicant in the growing test (document TC/37/7 Rev.) did not reflect the degree of involvement of the breeder in DUS testing and, in particular, that breeder involvement in some countries was only for minor species. It was suggested that there should be a form of weighting based on the level of use in each country.

Testing of Seed-Propagated Ornamentals

Number of growing cycles

46. At the TWO, it was clarified that the number of growing cycles required for DUS examination should be considered on a case-by-case basis and there was no rule that, for example, all seed-propagated varieties required two independent growing cycles. In particular, a single growing cycle might be appropriate for those seed-propagated ornamental varieties where there could be confidence that differences observed between varieties would be sufficiently consistent. It was also noted that, even where a single growing cycle was considered sufficient in the first instance, a second growing cycle might still be necessary to examine distinctness, uniformity or stability problems encountered in the first growing cycle.

Information on testing arrangements and experience

47. There was agreement that the Office should prepare a questionnaire to identify Testing Authorities with experience in DUS testing of seed-propagated ornamentals. This would seek information on species which had been tested, the arrangements for testing (official testing, breeder testing or a combination), the number of growing cycles and years required for the tests and the uniformity criteria. The results would be circulated to all members of the TWO, with the aim of improving international harmonization in DUS testing and providing information on sources of expertise. The results would also be discussed at the thirty-fifth session of the TWO to be held in 2002.

Determination of Optimum Trial Size

48. The TWC considered proposals for optimizing the size of trials. One expert from Poland explained that DUS testing in Poland was usually conducted in three-year series and presented a paper which applied a three-stage method of checking uniformity of rye varieties (inbred lines) to find a sample size guaranteeing the smallest probability of error of the 2nd kind (error of accepting a non-uniform variety) whilst simultaneously controlling the level of probability of the error of 1st kind (error of rejecting a uniform variety). The final aim was to reduce the costs of trials by means of the reduction of the sample size. The expert concluded that the calculated number of measured plants would be lower for the case of a three-stage test than for traditional annual DUS tests.

49. The expert from France referred to Qualstat, a multi-purpose software to determine the efficiency of a given procedure and its decision rule, to find the optimum procedure for some given quality objectives for single or multiple steps procedures and which allowed different solutions to be easily compared. He clarified that working with samples, instead of the whole population, meant there was a zone between the situations of clear acceptance or rejection, where the efficiency of the test was unknown. He considered the use of Qualstat to address some issues, such as the possibility to reduce the number of years, to estimate the loss of precision of a test if the same number of plants was kept, or to determine the number of plants that should be included in a test in order to maintain the level of precision. He concluded that Qualstat made it possible to calculate the optimum sample size for every population standard and acceptance probability and could also give the sample size for every year. However, it was noted that this could be different from year to year, which reduced its potential for practical application.

Trial Design

50. The TWC reviewed various papers on improving trial design:

Alpha block design

51. The expert from Poland considered the efficiency of different designs in pea trials for DUS purposes. He mentioned that the experiment had been conducted in a row-column design. For the analysis, the variances of the experimental error had been compared for different factors (rows, columns or both) including the mathematical models of observation. The expert concluded that randomized complete blocks and completely randomized design, attained the same level of efficiency as incomplete blocks for some characteristics and were

slightly better for other characteristics. He observed that, after three years of research with peas, randomized complete blocks and completely randomized designs proved to be better methods than incomplete block design.

52. The expert from Denmark said that they used incomplete block design for a matter of simplification but that they recovered the intra-block information. The expert from Germany considered that experts lost the possibility of doing pair-wise comparison. He added that in his country incomplete block design was used for testing maize but he clarified that it was not generally recommended. He also mentioned that the kind of randomization required by the crop experts was not suitable for incomplete block design. One expert considered that there is no difference in the possibility of doing pair-wise comparisons using the COY approach even with incomplete block design.

53. The TWC concluded that, for the cases studied, alpha design did not prove to be very beneficial, probably due to the low genotype/environment interaction in the characteristics considered in the paper.

Spatial dependency and block design

54. The expert from the United Kingdom reported on data from nine herbage DUS trials which were investigated for evidence of spatial dependence. Spatial dependence was most evident in variates measuring the overall dimensions of the plants, especially late season variates. On average, 45% of the residual variation in the plot means of the spatially dependent variates was estimated to be of a spatial nature. Consequently, it is likely that the efficiency of analysis of these variates would be improved by using spatial analysis instead of non-spatial analysis, or by using alpha (incomplete block) designs instead of complete block designs. The spatial information was used to determine the optimal incomplete block sizes and the likely increase in efficiency due to using alpha designs instead of complete block designs. The expert concluded that the results showed that the use of spatial analysis would improve the efficiency of the trial. She added that designs to address spatial dependency could be complex but noted that the use of incomplete block design might help to decrease the cost of the trial.

55. Some experts of the TWC expressed their surprise about the size of the blocks that had been used, which could be considered rather small. One expert of the Office asked whether this method would reduce the minimum distance between varieties and, if this is the case, what was the opinion of the breeders. The expert from the United Kingdom clarified that the objective is to maintain the stringency of the examinations and that the following year there would be more results to examine this point. The expert from France considered that, even though spatial dependency was not considered in a typical DUS field trial, crop experts are working with a good degree of security as they grow similar varieties next to each other in the field.

56. The TWC concluded that spatial dependency will improve the efficiency of the trial when there is sufficient spatial dependence in enough characteristics. It might cause some additional complications in the interpretation of the data.

Review of Uniformity Standards for Grasses

57. Experts from the United Kingdom reported to the TWC (see document TWC/19/5) on an analysis of the recommended UPOV uniformity standard of COYU $P=0.002$ for grasses, which had been undertaken because of increasing problems with refusal of varieties using this standard. It was noted that the current recommended UPOV standard for COYU of $P=0.002$ was known to be more strict than the previous 2 x 1% within-year standard and, therefore, a five-year transitional period of operation at the more lenient $P=0.001$ standard had been permitted. The expert observed that the COYD standard at $P=0.001$ had given closer agreement with the 2 x 1% within-year standard, whilst noting that this also appeared to be more stringent than the 2 x 1% within-year standard.

58. An expert from France noted the same problem in his country. Several experts at the meeting recalled that, when it had been decided to change for a new uniformity standard, the aim had been to keep the same stringency as before. One expert suggested that it was probably necessary for each country to have its own probability level to achieve the same level of stringency. It was observed that the interaction between the genotype and the environment was an important factor in the level of stringency.

59. The TWC agreed that the expert from the United Kingdom would collect information and prepare a new paper for its next session.

Image Analysis

60. The Office reported on the questionnaire on image analysis which had been sent to the TWC and TWO. The first part, to be completed by crop experts, related to the use of image analysis, and the second part related to specific technical information about the hardware and software used and how the information was filed. The completed questionnaires had been collected by experts from France and the Netherlands. The TWC noted that 14 countries had replied to the questionnaire: Australia, Denmark, Finland, France, Germany, Hungary, Ireland, Netherlands, New Zealand, Poland, Russian Federation, South Africa, Switzerland and United Kingdom. Eight of these, namely Australia, Denmark, Finland, Ireland, New Zealand, Poland, Russian Federation and Switzerland declared that they were not using image analysis at that time (February 2000). However, Australia, Poland and the Russian Federation expressed interest in the possible use of image analysis in the future. It was agreed that the questionnaire on image analysis should be circulated to the other TWPs.

61. The TWC noted the potential of image analysis in the process of “pre-screening.” However, it noted that until now, it had only been investigated for the assessment of distinctness and that it was also necessary to investigate how it would be able to consider uniformity.

62. The TWO received a presentation from Mr. Joost Barendrecht (Netherlands) on recent developments of the Photodata Project (FLORES). In the context of an image database for variety testing, the use of different techniques was discussed. Digital images received a lot of interest due to their potential for measuring characteristics automatically. It was noted that some characteristics are difficult to measure manually, e.g. length and width of small seeds, and in these cases digital images provide an opportunity to measure the characteristics instead of having to score them visually. The use of digital images to compare candidate varieties with a stored base of reference varieties was also discussed; however, it was noted that

images needed to be calibrated for use in an internationally exchangeable reference collection of ornamental varieties. Furthermore, image matching required highly standardized image-recording conditions, which was difficult with rapid technological development. A pilot study on a few rose varieties showed large differences between the final images recorded for the same variety. It was concluded that the TWO would monitor the development of the technology which, it considered, might be useful in the future.

RHS Colour Chart

63. The TWO received a report on recent developments with the RHS Colour Chart, which is used as a reference standard in UPOV Test Guidelines. Until recently, there had been three versions of the Chart (1966, 1985 with the Flower Council of the Netherlands, and 1995) but, a fourth version was introduced in May 2001. The new version had an expanded range of colors (76 new chips) to fill some of the gaps in the coverage, especially in green, grey, bronze, deep purple and orange. It was noted that it was important for the TWO experts, as users of the Chart, to be aware of the differences between the versions. It was agreed that all descriptions should make reference to the version of the RHS Colour Chart which had been used for their preparation, to avoid erroneous conclusions. The Community Plant Variety Office (CPVO) also agreed to update the UPOV color card (document TWO/27/3, "Grouping of Colors of the RHS Colour Chart").

[End of Annex and of document]