



TWC/22/17

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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

**TECHNICAL WORKING PARTY
ON
AUTOMATION AND COMPUTER PROGRAMS**

**Twenty-Second Session
Tsukuba, Japan, June 14 to 17, 2004**

REPORT

adopted by the Technical Working Party on Automation and Computer Programs

Opening of the Session

1.* The Technical Working Party on Automation and Computer Programs (TWC) held its twenty-second session in Tsukuba, Japan, from June 14 to 17, 2004. The list of participants is reproduced in Annex I to this report.

2.* The TWC was welcomed by Mr. Sanji Takemori, Director, Seed and Seedlings Division (SSD), Ministry of Agriculture, Forestry and Fisheries (MAFF), and by Mr. Kiyohumi Kuwana, President, National Center for Seed and Seedlings (NCSS). Copies of the welcome speeches are reproduced in Annex II to this document.

3.* The session was opened by Mr. Uwe Meyer (Germany), Chairman of the TWC, who welcomed the participants and, in particular, new participants to the TWC.

Adoption of the Agenda

4.* The TWC adopted the revised agenda as reproduced in document TWC/22/1 Rev., after having agreed to follow the work plan proposed by the Chairman.

* The asterisked paragraphs in this report are reproduced from document TWC/22/16 (Report on the Conclusions).

Short Reports on Developments in Plant Variety Protection

(a) Reports from members and observers

5. The TWC received oral reports from the participants on developments in plant variety protection in their respective countries. Experts from the United Kingdom reported that, from 2004, image analysis was to be used for DUS testing in peas and that the impact of the use of incomplete block design in DUS testing for grasses was being studied. An expert noted that the use of these developments were aimed at reducing the number of observations whilst maintaining the efficiency of the testing. Another expert reported that the potential use of molecular techniques in DUS testing was also being investigated. Experts from France reported that within the “*Groupe d'étude et de contrôle des variétés et des semences (GEVES)*”, a division between international and national activities had taken place during 2004. It was also reported that a quality assurance scheme in conformity with ISO 9001 had been put in place for DUS testing and that DUS results had been placed on the GEVES website. In relation to software developments, they reported their change to a newer version of Windows (2003), to the Oracle 10 database system and to a new software for data handling of laboratory seed testing data which would enable the handling of a wider range of information than previously possible. The expert from Hungary noted that the recent accession of Hungary to the European Union had involved the development of several programs within the seed sector. He particularly noted the assistance received from the *Bundessortenamt* (BSA – Germany). The expert from the Czech Republic reported the development of new national DUS testing guidelines in conformity with the CPVO technical protocols. Experts from Denmark reported the use of incomplete block design in DUS testing, in order to increase the number of varieties under test, and also for VCU testing. They were examining the GAIA program provided by France. Experts from the Republic of Korea reported the development of DUS testing for ornamental species and the creation of a software to manage databases. The expert from the Netherlands reported that there had been a reduction in the number of species tested in his country. He explained that DUS activity in the Netherlands was focussed on ornamental species and potato. The expert from Kenya reported that, at that time, 611 applications for plant breeders' rights had been filed and 196 titles had been granted. Experts from Germany reported that a process to calculate the optimum number of testing stations for VCU was taking place and one DUS testing center was being closed. Experts from France and Germany reported that a joint project for cooperation in the establishment of a database of maize variety descriptions with France, Germany, Spain and the CPVO was under development.

(b) Reports on developments within UPOV

6.* The TWC received an oral report from the Office of the Union (the Office) on the latest developments in the Council of UPOV, Administrative and Legal Committee (CAJ), Technical Committee (TC) and Technical Working Parties (TWPs).

Molecular Techniques

(a) Report on developments

7. The TWC took note of document TWC/22/2 and received an oral report from the Office on the latest developments concerning the Working Group on Biochemical and Molecular Techniques and DNA-Profiling in Particular (BMT), the *Ad Hoc* Crop Subgroups on

Molecular Techniques and the BMT Review Group. An expert from the United Kingdom considered that the TWC could provide assistance to the BMT, e.g. to develop a sampling scheme (number of seeds, leaves, bulk sampling, individual plants, etc.,) and observed that Option 3 needed further development. Another expert from the United Kingdom noted that there were many researchers in molecular techniques, but few of them were involved in DUS testing. An expert from France considered that it was difficult to follow the developments in molecular techniques without attending the BMT meetings regularly and that it would be better to look for data to work with in the first instance. The Chairman noted that the TWC and BMT meetings would be scheduled back-to-back in 2005, which would provide a good opportunity for TWC members to attend the BMT meeting.

8.* The TWC also received a progress report on the use of molecular techniques for the assessment of essential derivation in rose varieties, presented by the expert from the Netherlands. The TWC agreed that a new document should be prepared for the following TWC session.

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

9.* The TWC heard suggestions from Mr. John Law (United Kingdom) concerning possible work that the TWC might carry out to provide assistance to molecular and crop experts in processing the large amount of data produced by biochemical and molecular techniques. He considered that the TWC could: develop tools to examine the residual heterogeneity of varieties; help in the development of appropriate sampling schemes (number of samples, part of the plant to be sampled, deciding on bulk samples or individual plants); and help in the development of the options for the use of molecular techniques. He noted that it was planned that the BMT and the TWC would have back-to-back meetings in 2005 which would give a good opportunity for interaction between experts from both groups.

10.* The TWC agreed that its Chairman, the Chairman of the BMT and the Office should consider possible content for the agendas of the TWC and BMT.

Project to Consider the Publication of Variety Descriptions

11. The TWC considered document TWC/22/4, Project to Consider the Publication of Variety Descriptions, introduced by the Office, which reported on the development of the project during 2003. An expert from France asked for some clarification on the objectives of the project. The Office explained that the aim of the project was:

- (a) to increase the availability of variety description information to interested parties (i.e. DUS examiners, breeders and maintainers of varieties of common knowledge) and thereby to maximize the effectiveness of the examination of distinctness; and
- (b) to use appropriate elements of the variety description, in the process of examining distinctness, to eliminate varieties which do not require further comparison and to identify those varieties against which a further comparison is required.”

The Chairman clarified that the project was in an early stage of development, that more developments on how to present information were necessary and that there were several legal and administrative aspects which would be considered by other UPOV bodies.

12. The TWC also discussed document TWC/22/12, presented by the Chairman, who proposed to explore to what extent the GAIA program could be used in connection with the publication of variety descriptions. An expert from France explained that it could be used in the model study for the publication of variety descriptions but further study would be needed. Discussions focused on table 5, “Frequency table for different varieties (fictitious) for characteristic Leaf: color (1 – green, 2 – yellow, 3 – red)”, and on the way in which varieties had been grouped by a crop expert into classes according to the variation in the description and the use of the standard deviation as a measurement of the variation for the case of nominal scales data. The expert from the Netherlands noted the possibility of having different descriptions for a given variety due to environmental effects. Experts from the United Kingdom considered that statistical methods could help in identifying regional groups or clusters and in determining whether a particular country tended to have a systematic deviation from other countries within the same group. Experts from France considered that, for DUS purposes, it was not necessary to obtain one single description per variety but to identify which characteristics from which countries were relevant for the examination.

13.* The TWC agreed to add a column entitled “Number of frequencies different to zero” to the three tables proposed in the recommendations and included in the Annex to document TWC/22/12, with an explanation on the data to be given in these columns and an example. It further agreed to add a header to each table, including the number and wording of the characteristic presented. The TWC considered that future analysis might indicate possible trends in different countries. Annex III to this document contains the revised version of the recommendations.

UPOV Information Databases

14.* The TWC took note of the information provided in document TWC/22/3, presented by the Office.

15. The TWC highlighted the importance of keeping both forms of the Plant Variety Database (the CD-ROM and the web-based version) available for a certain period of time to allow authorities to update their system to the new developments. It also noted possible consequences of the use of the UPOV Code if used as a key for a database; in particular, to consider the way the UPOV Code would be incorporated into the members’ databases and the need to notify all users of any change in the code.

TGP Documents

16.* The TWC noted the information on the development of TGP documents included in document TC/40/5 Add., presented by the Office.

(a) TGP Documents to which the Technical Committee has given highest priority:*TGP/4 Draft 1 Constitution and Management of Variety Collections*

17.* The document was introduced by the Office.

18.* The TWC considered that the paragraph numbering was too complicated, in particular when it contained more than four figures. It proposed that another numbering should be considered. It also considered that the term “Address” in the title of section 1 was too vague; it agreed that it should be replaced by another word.

19.* The TWC proposed the following modifications in the text:

“1.2.1 The criteria to establish the list of varieties of common knowledge must be defined in a way which limits, as far as possible, the *risk of wrongly declaring a variety to be distinct*.....”

“1.2.2 Hence, there is some risk of making a wrong decision because of the absence of a variety of common knowledge. *The risk of making such a wrong decision should be as low as possible and the criteria described below are intended to help each authority to limit this risk. It is recognized that it will never be zero.*”

“1.3.1.3 *When considering varieties of common knowledge in other territories, the selection of varieties to be included in the variety collection should first consider the countries with which the UPOV member has a relationship for breeding activities, seed trade or any exchange of plant products and which have similar climatic and growing conditions.*”

“1.3.2.1 In the case of a *UPOV* member....”

“1.3.4.1 There are several

(ii) Type of species: in annual species it is necessary either to store propagating material or renew it every year. In such species the whole collection is not necessarily grown every year. *Instead, only those varieties*”

“2.1.1.1.2 The above list of situations should not be considered as an exhaustive or limiting list. On the contrary, it *gives* several possible sources of plant material for different situations and can be used as an orientation by any authority. Other situations may exist: for example, it might be possible that, apart from what is mentioned in 2.1.1.1.1 (v), the breeder could be a good source to obtain plant material of a foreign variety, especially if he has offices or a local representative in the territory of the authority requesting the material; or for some vegetative propagated varieties, apart from what is mentioned in 2.1.1.1.1 (iv), a gene bank might be the unique source of plant material.”

“2.1.1.2.2 The verification of the identity of the plant material is a very important subject in the maintenance of a variety collection. It should be included in the routine of tests to be made *on* the plant material before it is introduced into the collection. *An incorrect* verification of the identity of the material will lead to wrong or misleading examinations of distinctness, with negative consequences for the plant breeder’s rights *granted.*”

“2.1.1.2.3 For seed propagated varieties, one way of verifying the identity
..... In the case of some vegetatively propagated

species, *or where very similar varieties have to be compared*, the new material should be tested against the variety description before the removal of the old plants. In some cases,..... In the case of temporary variety collections (see section 2.2.3 Management of Temporary Variety Collections).....”

“2.1.1.2.4 The routine tests for verifying the plant material before its introduction into the variety collection may be intended to check other features apart of the identity. Plant material is usually tested for its phytosanitary *status*, and when.....”

“2.1.1.3.2 *Seed is* usually stored in cold chambers. *It is* usually cleaned and divided into subsamples and placed in special containers for final long-term storage. In general,.....”

“2.1.1.3.3 In [*other*] variety collections of trees and *non-seed-propagated* perennial varieties, the plants will become over-mature and will need to be replaced by rejuvenated ones.”

“2.1.1.4.2 With respect to the material already

(iii) in the case of tree and [*vegetatively propagated*] perennial collections, once the plant has reached the maximum *plant age* (see section 4.2.1.1.3 *Maintenance*)

“2.1.2.1 The maintenance of a variety collection implies the management of different *information [descriptive, administrative] stored, relating to verification* of the plant material ...”

Paragraph 2.1.2.2: subparagraph (ii) *to delete the reference to “walking reference collections” and subparagraph (iv) to read:*

“(iv) a collection of digitalized images of specific parts of plants *representing* each variety: this solution is presently being considered within UPOV. It is an interesting way to obtain information for the grouping of varieties.”

“2.2.2 Management of Permanent Collections

Permanent collections are those in which the perennial plants are maintained under cultivation. When planning a growing trial it is not usually possible to design a trial *using* new plant material every....”

“2.2.3 Management of Temporary Variety Collections

Permanent variety collections can be important resources for
..... A variety collection could exist as a list and the necessary plant material *be* assembled when required, *so* establishing a temporary collection.”

“2.2.4 Use for DUS Testing

2.2.4.1 When

..... All are at fruiting maturity. *The approach is based on a clear definition of the growth stage or level of maturity at which* testing in a tree or perennial species can proceed. *It overcomes the difficulty* of using variety collections containing plants of different ages. This approach is particularly relevant for vegetatively propagated varieties, which examination of distinctness is *often made with very little use* of statistical methods.”

20.* Further to the changes above, the TWC considered that the title of section 2.1.1 should be reworded to be consistent with the titles of the subsections.

21.* The TWC also agreed that the information related to variety collections maintained by tissue culture should be added and that paragraph 2.1.1.3.3 should be reworded to show that the examination of hybrid varieties based on its components and the formula of the hybrid is one option, but that there are other ways to examine DUS in hybrid varieties.

TGP/9 Draft 1 Examining Distinctness

22.* The document was introduced by the Office of the Union.

23.* The TWC proposed the following modifications in the text:

To check the footnotes throughout the document.

First paragraph of section 2: to replace the word “means” by “methods” in the last sentence.

Section 2.1.2: to take away the reference to paragraph 4 in the quotation from the General Introduction.

Paragraph 2.1.3.2: the sentence that introduces the example on wheat to read: “An example for wheat *is presented* using the grouping characteristics *from* TG/3/11.”

“2.1.3.3 At the end
..... Thus, in a second growing cycle the candidate variety can be placed close *to*, or even next to, those varieties which are the most similar or not distinct from the candidate variety after the first growing cycle.”

Table 1 Wheat: to be rotated to clarify in its reading.

The TWC considered that GAIA is a methodology and not simply software. It agreed on the spelling “GAIA” instead of “GAĬA” and the following wording: “2.2.4.1 The GAIA method”.

3.1.2.4 For some perennial crops, such as fruit trees, the same plants are examined over successive years. In this case, the condition of independence of growing cycles is also considered *to be* satisfied.

3.2.1.6 Some Offices use more than one location in order to obtain independent trials in a given year. This situation is still to be investigated. The current “recommendations” include that the locations should be chosen so that the variety-by-location interaction is as large as the variety-by-cycle (year) interaction in any characteristic used for distinctness.

3.2.2.1 As described in the previous section, there are several reasons for using trials in more than one location.....

(b) The variety-by-year interaction *and the variety-by-location interaction*

(c) How to use the information obtained in these centers; whether it will be averaging over centers or each center would be considered individually.

(d) Is consistency *over cycles (years) necessary between the testing places?*

(f) To set up the standard probability and the LSD year Testing Center (*Comment: to remove this item*).

The title of section 4 to read: “SECTION 4: FACTORS IN THE CHOICE OF METHODS FOR THE ASSESSMENT OF DISTINCTNESS”

“4.1.1 The appropriate
In the case of greater plant to plant variation, it is *advisable* to take records from individual plants and to calculate the mean expression of the variety in order to assess distinctness between varieties and to describe a variety. “

“4.2.1.1 In cases where there is very little variation within varieties, the determination of distinctness is usually on the *basis* of visual assessment, rather than by statistical methods.”

“4.2.2 Vegetatively propagated varieties

See section 4.2.1.”

“4.2.3 Cross-pollinated varieties

Within variety variation
 Distinctness can then be assessed by comparing the differences in variety means with a measure of random variation inherent in the variety means (see TGP/9.5.3 “Statistical Methods”).”

“4.2.4.2.4 Assumptions of the method

(i) A compulsory declaration”

“4.2.4.2.6 The difference between lines must

(A x C): having *characteristic* C1 “present”

(B x C): having *characteristic* C1 “present””

“4.2.4.2.10 Such approaches have been developed on different species in France using *methodologies* with which

“5.2.3.6 At the end of the “blind” testing the variety can be declared as distinct:

if the expert and the breeder always *identify the variety*,

the *difference can* be considered as a clear difference for that characteristic”

24.* Further to the changes above, the TWC:

considered that the content of section 2.2 related specifically to GAIA;

proposed that the content of sections 2.2.1 and 2.2.2 should be moved to section 2.2.4 and that a new text explaining a more general notion of phenotypic distance should be developed;

in relation to section 2.2.3, considered that the references to GAIA should be moved to section 2.2.4 and that those parts of section 2.2.3.2 which refer to similar varieties

should be moved to section 3 of TGP/9 because they are relevant for the trial organization and not for selecting varieties for the growing trial;

agreed that an explanation in Diagram 2 be added to explain the reason for having two options in the first box NO;

agreed that section 4.3 should refer to the definition of types of characteristics in the General Introduction and not to the way they are used;

to have “blind” within inverted commas the first time the term appears in section 5.2.3 and not the successive ones;

a chapter providing further details about “blind” testing should be developed in future;

to have section 5.3.2.5 Adapting COYD to special situations relocated as section 5.3.3, including in that Long-term COYD, section 5.3.2.7 to read: “5.3.4 References for COYD” and “5.3.5 Others”;

to move the content of section 6 to document TGP/6. The TWC considered that, as the content of section 6 of TGP/9 was not presented following the structure of the document, it was difficult to establish the relation between that section and the rest of the document and thus considered it appropriate to include it in a different TGP document, and

the section Alternative Criteria included in Annex IV to be moved to section 5.3.4 Others.

TGP/9 Draft 1 Add. Examining Distinctness

25.* The TWC agreed to the proposal from the Chairman to wait for comments from the other TWPs before considering possible changes in the structure of TGP/9.

(b) Other TGP documents:

TGP/8.2 Draft 2 Experimental Design Practices

26.* The Chairman noted that there was no new document and invited Mr. Kristian Kristensen (Denmark) to cooperate in the development of TGP/8.2, in particular taking into account the document prepared by Mr. Kristensen for the Workshop on Data Handling, held in Beijing, from June 9 to 11, 2004, prior to the twenty-second session of the TWC.

TGP/8.3 Draft 3 Types of Characteristics and Their Scale Levels

27. The Chairman introduced document TGP/8.3 Draft 3.

28.* The TWC agreed the following changes:

Page 3

second paragraph of page 3, the penultimate sentence should read: “The continuous variation of a characteristic is assigned to appropriate states of expression which are recorded by notes”;

in the third paragraph on page 3, “process level 3” should be included in a sentence at the end the same way as process level 1 and 2 in the previous paragraphs and not within brackets.

Page 5,

the first paragraph of section 4.1.1 to read:

“4.1.1 Ratio scale

A ratio scale is a quantitative scale with a defined absolute zero point. There is always a constant, *non-zero distance* between two adjacent expressions. Ratio-scaled data may be continuous or discrete.”

the first paragraph of the example for absolute zero point should read:

“The absolute zero point:

In the characteristic ‘Plant length’ assessed in cm, *there is a lower limit* for the expression which is ‘0 cm’ (zero). It is possible to calculate the ratio of length of plant *of variety* ‘A’ to length of plant *of variety* ‘B’ by division:

Length of plant *of variety* ‘A’ = 80 cm

Length of plant *of variety* ‘B’ = 40 cm”

to include the example “Time of beginning of flowering” in the relevant section and to delete the last three sentences of the last paragraph.

Page 6

to take the last paragraph of section “The absolute zero point” as the *basis for developing* an introduction of the section.

the first paragraph of section 4.1.2 to read:

“4.1.2 Interval scale

An *interval scale* is a quantitative scale without a defined absolute zero point. There is always a constant, *non-zero distance* between two adjacent expressions. Interval scaled data may be distributed continuously or discretely. An example for a discrete interval scaled characteristic is time of beginning of flowering measured as date which is given in chapter 4.1.1 (see also example 6 in Table 12).”

Page 13

to modify the lines separating distinctness and uniformity in table 6 in order to make the differences between these two columns more clear.

P/8.4 Draft 3 Validation of Data and Assumptions

29. Mr. Kristian Kristensen (Denmark) introduced document TGP/8.4 Draft 3. An expert from France considered that examples of a first inspection of the data (e.g. of its consistency with prior data) should be provided in paragraph 2. Experts from Finland and the United Kingdom considered that guidance on dealing with data errors should be included. Mr. Kristensen replied that it would not be possible to provide general guidance. An expert from the United Kingdom considered that the only possible recommendation was to request advice from a statistician. The expert from Kenya noted that tests for non-additivity were missing. Mr. Kristensen recalled that it had previously been agreed not to include those tests in the document.

30.* The TWC agreed that examples should be added to illustrate the inspection of data referred to in paragraph 2. Several experts considered that, whilst it was necessary to mention action to be taken when discrepant observations were found, these actions should be considered on a case-by-case basis. The TWC agreed to include in paragraph 6 a reference to the need for expert advice in such cases.

31.* The TWC agreed to: include larger diagrams and figures; delete the text “(pseudo-qualitative characteristics)” at the end of paragraph 1; and propose linguistic amendments to the document.

TGP/8.5 Draft 3 Statistical Methods for DUS Examination

32.* Mrs. Sally Watson (United Kingdom) introduced document TGP/8.5 Draft 3, and highlighted the changes incorporated in relation to the previous version of the document.

33.* The TWC agreed that the acronym “ANOVA” and the references to publications in paragraph 9 should be spelt in a way consistent with other TGP documents. It finally agreed that the relation between the F test and the LSD in the COYU method should be clarified in paragraph 29 of the document.

TGP/8.6 Draft 2 Examining DUS in Bulk Samples

34. Mr. Kristian Kristensen (Denmark) introduced document TGP/8.6 Draft 2. The TWC proposed some editorial amendments and noted that some references within the document should be checked.

TGP/10.2 Draft 3 Assessing uniformity according to the features of propagation

35.* Mr. Uwe Meyer (Germany) introduced document TGP/10.2 Draft 3. The TWC noted that the TWO has issued a questionnaire to seek information about the assessment of off-types for variegated varieties and varieties obtained from mutations.

36.* The TWC agreed the following changes:

Paragraph 3, last sentence to read:

“ ... Thus, the uniformity of the crop may be determined by off-types alone, by variances of the characteristics alone, or by off-types for some characteristics and by *standard deviations* for other characteristics.”

Section 10.2.1:

To add a sentence for COYU in the case of a need of the method.

Paragraph 5 (b), fifth sentence to read:

“ ... Comparable varieties are varieties of the same type *within the same [or closely related]* species that have been previously examined and considered to be *[sufficient]* uniform.”

Title of Section 10.2.2 to read:

“10.2.2 Uniformity Assessment on the Basis of Standard Deviations”

37.* The TWC considered that the references to the assessment of uniformity by relative tolerances in paragraphs 5(b) and 10 should be developed for the sake of clarity. It also agreed that it would like to receive information on the result and discussions about the questionnaire issued by the TWO.

TGP/10.3.1 Draft 3 Recommended Statistical Methods: COYU

38.* Mr. Adrian Roberts (United Kingdom) introduced document TGP/10.3.1 Draft 3.

39.* The TWC agreed the following changes:

Paragraph 10 to read:

“10. The advantages of the COYU criterion are:

- It provides a method for assessing uniformity that is largely independent of the varieties that are under test.
- The method combines information from several trials to form a single criterion for uniformity.
- *Decisions* based on the method are likely to be stable over time.
- The statistical model on which it is based reflects the main sources of variation that influence uniformity.
- *Standards are based on the variability within varieties.*”

Paragraph 11 to read:

- “11. COYU is recommended for use in assessing the uniformity of varieties
- For quantitative characteristics.
 - When observations are made on a *plant basis* over two or more years.
 - When there are some differences between *plants of* a variety, representing quantitative variation rather than presence of off-types.”

Paragraph 14 to read:

“14. The uniformity test may be made over *two or three years*. If the test is normally applied over three years, it is possible to choose to make an early acceptance or rejection of a variety using an appropriate selection of probability values.”

Paragraph 23 to add “(V)” after the word “variance” at the end of the paragraph.

TGP/10.3.2 Draft 3 Recommended Statistical Methods: Off-Types

40.* Mr. Adrian Roberts (United Kingdom) introduced document TGP/10.3.2 Draft 3.

41.* The expert from the Czech Republic wondered whether, when applying the method of off-types in cereals, the same population standard should be used in trials conducted in ear-row plots and in trials conducted in drill plots. The TWC agreed that the Chairman, in conjunction with Mr. Roberts and the Office, would issue a questionnaire to seek information about the population standards used in the assessment of uniformity by off-types, in particular when tests from more than one year are used.

42.* The TWC agreed the following changes:

Paragraph 12:

to replace the term “heterogeneous” by “non-uniform” and the same to be done throughout the whole document as far as possible.

43.* The TWC considered that the last sentence of paragraph 54 should be expanded to bring to the notice of crop experts the consequences of using the smallest sample size in the range of sample sizes with a given maximum number of off-types. It also considered that the definitions presented in paragraph 55 should be reconsidered jointly with the new draft of TGP/14.3.

44.* The TWC noted that the different sections and subsections of TGP documents should be numbered in a consistent manner. It further noted that it found too complicated the numbering of paragraphs in documents TGP/4 Draft 1 and TGP/9 Draft 1.

Development of TGP documents by the TWC

45. Taking into account the program for the development of TGP documents presented in Annex II to document TC/40/5 Add., the TWC developed the following approach:

TGP/8 Use of Statistical Procedures in DUS Testing

46.* The TWC agreed that new drafts of TGP/8.1 and TGP/8.2, of which no draft was presented at the session, should be prepared by the end of September 2004 and circulated to a subgroup formed by the drafters of these sections, including Mr. Roberts and Mrs. Watson, with the aim of advancing their development. It further agreed that, once the new draft for these two sections had been agreed by the subgroup and the amendments agreed by the TWC had been incorporated into the other sections, a compiled version of document TGP/8 could be prepared for consideration by all the TWPs during the year 2005, as proposed in document TC/40/5 Add.

TGP/10 Examining Uniformity

47.* The TWC agreed to merge sections TGP/10.1 and TGP/10.2 in one single section for introduction and that the remaining sections should be renumbered accordingly. It also agreed that section TGP/10.3.3 Segregation ratios should be incorporated into document TGP/8. Finally, the TWC agreed that, subject to the incorporation of the comments of the TWC and the above-mentioned amendments, a compiled version of document TGP/10 could be prepared for consideration by all the TWPs during year 2005 as proposed in document TC/40/5 Add.

TGP/12.3 Examination of Combined Characteristics Using Image Analysis

48.* The TWC agreed that there was enough information available for the preparation of a first draft of this document. It also agreed that Mr. John Law (United Kingdom) would be the drafter of document TGP/12.3 and the first draft should be prepared for discussion by the TWC during its next session. It was finally agreed that the title of document TGP/12.3 should be modified to reflect more accurately the content of the document.

TGP/14.3 Statistical Terms

49. The TWC agreed that experts from the Netherlands should prepare a new draft for the following TWC session.

50.* The TWC proposed that changes in future versions of TGP documents be highlighted to ease their checking and reading.

Information to be Considered for the Development of TGP/10: Examining Uniformity

51. The TWC considered the information in document TWC/22/11 and the explanations provided by Mr. Sylvain Grégoire (France). Mr. Grégoire clarified that the document had originally been prepared for the Workshop on Data Handling, which had taken place in Beijing, from June 9 to 11, 2004, and reported that there was a powerpoint presentation to complement the text. An expert from the United Kingdom considered that the use of powerpoint presentations and the inclusion of color pictures would help to clarify the content of TGP documents. However, some experts noted that color pictures would increase the byte size of the documents.

52. The TWC welcomed the proposal to use the content of the document in the development of TGP/10. It agreed that drafters of TGP/10 could incorporate the relevant

information into the appropriate sections. It also agreed to extend the use of color illustrations and photographs to facilitate the comprehension of the documents but agreed that they should be produced in such a way as to be meaningful for black-and-white printouts. The TWC agreed that powerpoint presentations might help readers to understand the content of TGP documents and proposed that consideration should be given to the possibility of posting powerpoint presentations in conjunction with the relevant TGP documents on the UPOV website. It was recommended to avoid the development of very large files, which would be difficult to download.

COYU: Moving Average

53.* Mr. Uwe Meyer (Germany) introduced document TWC/22/14. The influence of variation in the moving average within COYU was discussed.

54.* The TWC concluded that the document confirmed the robustness of the method used at present and requested the Chairman to get in contact with Mr. Hans-Peter Piepho (Germany), who had sent comments the previous year, to get his opinion and comments on the document.

Standard Probability Levels for COY

55. The TWC took note of the information in document TWC/22/10 and the explanations provided by Mrs. Sally Watson (United Kingdom). Some experts considered that it would be advisable to contact the relevant crop experts for verification of some of the information submitted to the Office. The TWC agreed that all experts should re-check whether the information submitted to the Office was correct.

56. The TWC agreed that future versions of the document should include the diagrams of the four cases in an annex and proposed that, once the information had been checked, the questionnaire could be sent to other TWPs for consideration of whether the information obtained might be included in the relevant TGP documents.

Calculation of Relative Tolerances in the Number of Off-types

57. The Chairman introduced document TWC/22/15. Some experts wondered how to deal with cases in which the average number of off-types was a decimal figure, e.g. 1.5. Experts from France and the United Kingdom considered that more information, in particular on the different procedures used in different crops, was necessary to develop a recommendation.

58.* The TWC agreed to have a new version of the document for the following session. It requested the participants to contact crop experts for information on the implementation of relative tolerances in the number of off-types in their countries and to send this information to the drafter for incorporation in the next version of the document.

Incomplete Block Design

59.* Mr. Kristian Kristensen (Denmark) introduced document TWC/22/6.

60.* The TWC considered that the effectiveness of the trial is also dependent on the place and that the last sentence of paragraph 20 should read:

“As one can see, the effectiveness is dependent on the year, the place and the characteristic.”

61. The TWC considered that paragraphs 9 and 28 should be modified to refer, in a consistent way, to the precision of incomplete block designs in relation to randomized complete block designs. An expert from the United Kingdom considered that the application of one-step procedures would increase the efficiency of the analysis. The Chairman considered that a one-step procedure was important for incomplete block design. Some experts requested clarification on the meaning of “marginally negative” in paragraph 28. The expert from Kenya wondered whether it was correct to use the adjusted mean of incomplete block designs for COY when the effect of the incomplete block was not significant. The expert from Denmark explained that in practice there was no difference in the results in relation to randomized complete block designs data.

62.* The TWC agreed that a section about incomplete block design should be incorporated into TGP/8.2 Experimental design practices.

Assessment of Distinctness for Segregating Characteristics

63. Mr. Vincent Gensollen (France) introduced document TWC/22/8. An expert from the United Kingdom noted that Chi-square and Fisher exact tests were methods of analysis that were based on different hypotheses. The expert from Denmark explained that the assumptions for both methods were fulfilled in the case presented in the document. The Chairman considered that more information about further alternative methods should be included in the document.

64.* The TWC agreed that a new document be prepared for the following session containing more information about the alternative hypothesis of Chi-square and Fisher exact tests and to explore the possibility if using other tests. It was also agreed that Mr. Roberts (United Kingdom) and Mr. Kristensen (Denmark) would cooperate with Mr. Gensollen.

Replies to the Questionnaire on the Use of the GAIA Software

65. The TWC took note of the information provided in document TWC/22/13. Mr. Sylvain Grégoire (France) explained that, once loaded, the program had to be calibrated. He added that loading data was easier if the data already existed in electronic format within a database. It was explained that the calibration of the program should be made by the crop experts and that the process was time consuming. Mr. Grégoire reported that experts from GEVES could provide assistance. The Chairman noted that the program was easy to install but confirmed that loading data was very time-consuming. Some experts proposed that example data should be included to guide new users in the use of the program.

66.* Following the suggestion made by experts from France, the TWC agreed that the GAIA software could be loaded with standard data as examples in order to guide the crop experts when using the software for the first time.

Automatic Measurement of Pea Characteristics

67.* The TWC took note of the information provided in document TWC/22/7 presented by Mr. Adrian Roberts (United Kingdom).

Image Analysis in DUS Testing in NIAB

68.* The TWC took note of the information provided in document TWC/22/9 presented by Mr. John Law (United Kingdom).

Variety Denomination Classes

69.* The TWC took note of the information provided in document TWC/22/3 presented by the Office.

Generalized Linear Models

70.* The TWC took note of information presented by the expert from Kenya and agreed that a document be prepared for the following TWC session.

Chairmanship

71.* The TWC agreed to propose to the TC that it recommend to the Council to elect Mrs. Sally Watson (United Kingdom) as the next chairperson of the TWC.

Future Program, Date and Place of the Next Session

72.* The TWC agreed to have a document on exchangeable software and a list of TWC documents as in the past. It further agreed that the list of TWC documents be presented in the form of a database, the structure of which would be developed by the Chairman. Finally it proposed that consideration should be given to the possibility to post it on the UPOV website. The TWC noted the interest expressed by the expert from Kenya to host the TWC session in his country in 2006.

73.* At the invitation of the Commissioner from the Plant Breeders' Rights Office, Canada, the TWC agreed to hold its twenty-third session in Ottawa, from June 13 to 16, 2005. During the twenty-third session, the TWC planned to discuss or re-discuss the following items:

1. Opening of the session
2. Adoption of the agenda
3. Short reports on developments in plant variety protection
 - (a) Reports from members and observers (oral reports by the participants)

- (b) Reports on developments within UPOV (oral report by the Office of the Union)
- 4. Molecular Techniques
 - (a) Report on developments (oral report by the Office of the Union)
 - (b) Statistical methods for data produced by biochemical and molecular methods
- 5. Project to consider the Publication of Variety Descriptions (document to be prepared by the Office of the Union)
- 6. UPOV information databases (document to be prepared by the Office of the Union)
- 7. TGP documents
- 8. Assessment of distinctness for segregating characteristics (document to be produced by experts from France and the United Kingdom)
- 9. Efficiency of incomplete block designs in DUS herbage trials (document to be produced by the expert from the United Kingdom)
- 10. Generalized linear models (logistic regression approach) (document to be produced by the expert from Kenya)
- 11. COY: the selection of the optimum number of plants (document to be prepared by experts from Denmark and Germany)
- 12. COYU Methodology (document to be prepared by an expert from Germany)
- 13. Image analysis in parsnip (document to be prepared by the expert from the United Kingdom)
- 14. Standard probability levels (document to be produced by the Office of the Union)
- 15. Calculation of relative tolerances in the number of off-types (document to be prepared by experts from Germany)
- 16. Exchangeable software and TWC documents
- 17. Date and place of the next session
- 18. Future program
- 19. Report on the conclusions of the session (if time permits)

74. This report has been adopted by correspondence.

[Annexes follow]

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[Annex II follows]

ANNEX II

Welcome Speech by Mr. Sanji Takemori, Director, Seeds and Seedlings Division,
Ministry of Agriculture, Forestry and Fisheries (MAFF)

Thank you, Chairperson.

Good morning, Ladies and Gentlemen.

My name is Sanji Takemori, Director of Seeds and Seedlings Division of the Ministry of Agriculture, Forestry and Fisheries (MAFF). It is my honor to make the opening address of the TWC in front of experts from all over the world.

First of all, let me express my feelings: Welcome to Japan! I am really happy to see you here although Japan is a far away country for most of you.

I believe that it is very important to protect a newly bred variety among all countries for agricultural development. From this point of view, Japan has been supporting several activities run by UPOV to harmonize world PBR protection systems.

Thus, we have decided to assist by holding Technical Working Parties in Japan, because test guidelines are essential issues for international harmonization. Last year, we assisted BMT and TWA in Tsukuba. I am sure that discussions in this session will be fruitful, and I hope that you enjoy your stay in this city.

Let me explain briefly the present situation of the Japanese plant variety protection system.

The number of applications has been increasing year by year since Japan joined UPOV in 1982. There were 1,280 last year, 2003, and this is the third largest in number among all the UPOV members and CPVO. 85% of applications were for ornamentals, and the second largest category, vegetables, comprised 4% of them. Almost 90% of the applications were from the private sector, approximately 10% were from the public sector which covers mainly food and fodder crops. I think it is worth noting that the applications of foreign bred varieties are also expanding and they comprised almost 35% among all the applications last year.

I believe such an active registration and internationalization in Japan is a consequence of being a UPOV member country.

In order to cope with such an increase in applications, we need a more efficient managing system. In Japan, the average time taken from the beginning of an application until it is registered has been shortened, but it still took 3.1 years in 2003. Breeders and seed companies have requested us to make it as short as possible.

Thus, we started the Internet Application System in April this year. To carry out DUS tests rapidly and accurately, we have to utilize efficient statistical methods more and improve the data handling system. So I believe TWC's activities are very important for all member countries, especially for us.

In conclusion, let me state my expectation: I am looking forward to the fruitful outcome of the session, not only for a good advancement of TG related discussions, but also the chance to exchange views with experts from member countries.

Thank you for your attention.

Welcome speech by Mr. Kiyohumi Kuwana, President,
National Center for Seeds and Seedlings (NCSS)

Thank you, Chairman.

Good morning everyone, the distinguished delegates of UPOV member countries.

My name is Kiyohumi Kuwana, President of the National Center for Seeds and Seedlings, the Incorporated Administrative Agency.

It is my great pleasure to have you in Tsukuba, where the headquarters of our center exists.

I am really delighted to have a chance to meet all of you, the experts from all over the world. And, I am sure that having a chance to exchange views with such honorable members will have a great meaning for the development of our activities in relation to plant breeders' rights.

The NCSS was established in 1986 as the administrative body to execute five tasks on seeds and seedlings, namely, DUS testing, seed testing, research on seeds technology, foundation seedlings production and conservation of plant genetic resources. Especially for the DUS testing, NCSS is the only organization to carry this out in Japan.

To ensure all the tasks, the NCSS has built 14 stations which cover various climatic conditions from the northern part to the southern part of Japan.

NCSS assists this TWC meeting with its personnel. If there are any inconvenient things, please point them out to my staff, and we'll try to solve them.

In conclusion, I would like to express my belief that this meeting will achieve a great success.

Thank you for your attention.

[Annex III follows]

Recommendations for coordinators for the *Ad hoc* crop subgroups for the publication of variety descriptions

Following the request made by the Technical Committee during its fortieth session, held in Geneva, from March 29 to 31, 2004, the TWC recommended that the coordinators of the Model Studies for the Publication of Variety Descriptions use the following tables and information to present and analyze the data.

Table 1: Qualitative Characteristics (QL) (e.g. Ploidy type)

Characteristic: Ploidy type (UPOV-Number: xx)													
Variety	Provided descriptions	Notes								Number of frequencies			
			2		4		6						
A	5		4		1						2		
B	4				4						1		
....													
....													
....													

Table 2: Pseudo-Qualitative Characteristics (PQ) (e.g. Flower color)

Characteristic: Flower color (UPOV-Number: yy)													
Variety	Provided descriptions	Notes								Number of frequencies			
		1	2	3	4	5	6						
A	5	4	1								2		
B	4				3		1				2		
C	5		1	4							2		
....													
....													

Table 3: Quantitative Characteristics (QN) (e.g. Leaf length)

Characteristic: Leaf length (UPOV-Number: zz)													
Variety	Provided descriptions	Notes									Number of frequencies	Range	Standard deviation
		1	2	3	4	5	6	7	8	9			
A	5					2	1	2			3	2	1.00
B	5				1	2		2			3	3	1.34
C	5	1								4	2	8	3.58
....													
....													
Average											u	v	w

Explanations

Number of frequencies

The number of frequencies for a variety is equal to the number of non-zero frequencies for that variety. If the frequencies were presented as bars in a histogram, the number of different notes appearing in a variety would be equal to the number of bars which were non-zero.

The corresponding mathematical function in 'MS-Excel' is 'count'. This function counts cells which contain numbers. Empty cells are ignored.

The number of frequencies can be computed for all kinds of characteristics (QL, PQ, QN).

Range

The 'Range' is the difference between the maximum and minimum notes.

There is no separate function in 'MS-Excel' for the range. The 'MS-Excel' functions 'max' and 'min' can be used.

The range can only be computed for quantitative characteristics (QN).

Standard deviation

The standard deviation is given by the following formula:

$$SD = \sqrt{\frac{1}{n-1} * \sum_{i=1}^n (x_i - \bar{x})^2}$$

- x_i note for a characteristic for the i^{th} country,
 n number of countries,
 i varies from 1 to n and
 \bar{x} arithmetic mean of this characteristic over all countries

The corresponding function in 'MS-Excel' is 'STDEV'.

The standard deviation can only be computed for quantitative characteristics (QN).

Further information:

- For easier comprehension of the tables and for correct use of the 'MS-Excel' function 'count', it is necessary not to include zeros for notes which do not appear for that variety
- Tables are intended to show variation of a variety over notes, provided by different countries, characteristic-by-characteristic
- Depending on the number of varieties, graphical presentations like histograms could be added
- The TWC will check the application of further methods (GAIA and other).