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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

**TECHNICAL COMMITTEE**

**Forty-Second Session**  
**Geneva, April 3 to 5, 2006**

MATTERS ARISING FROM THE TECHNICAL WORKING PARTIES

*Document prepared by the Office of the Union*

1. This document summarizes certain matters arising from the 2005 sessions of the Technical Working Parties (TWPs) which are not expressly covered by specific agenda items. The matters arising are presented in two sections. The first section, "Matters for information and for a possible decision to be taken by the Technical Committee (TC)", identifies matters raised by the TWPs, which may require a decision to be taken by the TC. The Office of the Union (Office) has highlighted aspects where the TC 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 TC but does not require decisions at this stage.

2. The following abbreviations 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

3. The following table of contents specifies the items covered in this document:

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

Probability Levels for COY

4. At its twenty-third session, held in Ottawa, Canada, from June 13 to 16, 2005, the TWC discussed document TWC/23/10. The document contained information provided by members of the Union responding to a questionnaire, on probability levels used in COY. The document also presented diagrams of the four cases representing the different situations which may arise where COYD and COYU were used in DUS testing. The Chairman noted that there were some differences in the levels of probabilities used and considered that that could cause some problems, in particular in the case of countries which exchange DUS reports. An expert from the United Kingdom noted that the probability levels in the United Kingdom had been chosen with the aim of obtaining similar results to those obtained with the method used previously.

5. The TWC agreed that the results of the questionnaire should be submitted to other TWPs for consideration and proposed that, in the meantime, the TWC participants should consult with their crop experts concerning the differences in probability levels. It also agreed that, after two or three years, a new document should be prepared.

*6. The TC is invited to request the relevant Technical Working Parties to consider the results of the questionnaire presented in document TWC/23/10.*

Population Standards Used for Assessing Uniformity of Off-types

7. At its twenty-third session, the TWC considered document TWC/23/14, introduced by the Chairman. He explained that the purpose of the document was to present a draft questionnaire seeking information on the population standards used in the assessment of uniformity by off-types, in particular when tests from more than one year were used.

8. The TWC agreed to circulate a revised draft of the questionnaire to the TWC by September 1, 2005, with a deadline for comments of November 1, 2005. The questionnaire would then be issued at the beginning of January, 2006. The TWC also agreed that, in conjunction with the presentation of the results in document TWC/23/10, the TWP members should be informed that the TWC was working on a questionnaire on the population standards used for assessing uniformity of off-types.

*9. The TC is invited to note the developments in the TWC and to inform the Technical Working Parties that the TWC is working on a questionnaire on the population standards used for assessing uniformity of off-types.*

## II. MATTERS FOR INFORMATION

### Preparation of Documents for the Technical Working Party Sessions

10. At its thirty-fourth session, held in Christchurch, New Zealand, from October 31 to November 4, 2005, the TWA recalled the importance of respecting the deadlines for the submission of documents to the Office of the Union and, thereafter, to the TWA and agreed that any documents received after the deadline for submission to the Office should not be considered at the TWA session. All draft Test Guidelines and TGP documents would be required to be made available to the members of the TWA at least four weeks prior to its session. Therefore, the Office was requested not to prepare any drafts received after the deadline. The Office confirmed that it would continue to work on the basis of two weeks for the preparation of Test Guidelines between receipt and issue to the TWA. The TWA further agreed, where considered appropriate by the subgroup concerned, to suggest deadlines for interim draft Test Guidelines to be prepared by the leading expert for circulation to the subgroup of interested experts and for comments to be received from the subgroup. Those deadlines would be set suitably in advance of the deadline for the submission of Test Guidelines to the Office. It was noted that the circulation of interim drafts within the subgroup was a matter for the leading expert.

11. The TWA agreed that, with regard to any future revision of TGP/7/1, consideration should be given to introducing deadlines for the submission of non-final draft Test Guidelines to the Technical Working Parties. The TC is invited to note that that proposal is included as one of the proposals made with regard to the revision of document TGP/7/1 (see document TC/42/5, paragraphs 22 and 23 and Annex I).

### Criteria for Determining Off-type Plants

12. At its twenty-third session, held in Ottawa, Canada, from June 13 to 16, 2005, the TWC received a report from the Office on the background and contents of document TWO/37/7-TWF/35/7, which explored possible criteria for determining off-type plants. It was agreed that a further report should be made at the next session of the TWC.

13. An expert from France noted that the difficulty to decide whether a plant is an off-type or not could be looked at in the light of robustness for false positive and false negative results. In that respect he reported that ISTA provided an interactive tool on its website (<http://www.seedtest.org/en/content---1--1143.html>) to assess the impact on alpha and beta values. He suggested that that consideration might be included in TGP/10.

14. At its thirty-sixth session, held in Kôfu, Japan, from September 5 to 9, 2005, the TWF considered document TWF/36/7-TWO/38/9, introduced by the expert from New Zealand, which sought to provide guidance on the criteria for determining off-type plants.

15. It was agreed that it was necessary to ensure that any atypical expression had a genetic origin and was not an exclusively environmental effect. It was also noted that the DUS trial environment might trigger the development of atypical expression, which might not occur in the normal propagation environment.

16. The TWF discussed whether parts of plants showing atypical expression (e.g. one branch of a tree bearing atypical fruit, some leaves of a variegated plant without

variegation etc.) might be considered to be an off-type or to be lacking stability. It was noted that particular care would need to be taken with regard to considering whether a variety was unstable. For example, the method of propagation might ensure that atypical parts of the plant would not be propagated and, therefore, the characteristics of the variety would remain unchanged after repeated propagation.

17. Discussions took place on whether it would be appropriate to define a proportion of the plant having atypical expression which could be disregarded in the consideration of whether a plant was an off-type. It was noted that caution would be needed with such an approach because the proportion of the atypical part of the plant might increase over time.

18. The TWF noted that the type of off-types under discussion only occurred rarely and had not caused any significant problems when taking an overall perspective of the DUS examination. However, whilst the difficult situations were rare, it was recognized that when such situations occurred it could be beneficial to have some practical guidance available. On that basis, it was agreed to seek to develop guidance as far as possible and to propose to include that guidance in TGP/10 "Examining Uniformity". As a next step, it was agreed that France, New Zealand and other members of the Union would prepare presentations on their experiences of plants with partial off-type expression for discussion at the thirty-seventh session of the TWF.

19. At its thirty-eighth session, held in Seoul from September 12 to 16, 2005, the TWO considered document TWF/36/7-TWO/38/9, introduced by the Chairman, as also presented to the TWF (see above). The TWO also considered document TWO/38/10, introduced by an expert from the European Community with an additional presentation, which explored transposon-induced coloration patterns in ornamentals.

20. The TWO noted that the presence of transposons in some varieties resulted in all the plants of a variety having a similar range of variation (including no phenotypic effect), even after repeated propagation, whereas in other cases the presence of transposons could result in different ranges of expression in different plants and in different generations. Therefore, it was not possible to develop a single recommendation on whether to accept or reject varieties where transposons were known to be present. It was also noted that, at least in some respects, similar effects to those produced by transposons could be seen with aneuploids and chimaeras. The TWO agreed that any guidance or criteria for determining off-types should seek to address the effects resulting from the presence of transposons.

21. The TWO agreed that guidance on the determination of off-types would be an important part of TGP/10 "Examining Uniformity" and agreed to try to develop such guidance. With regard to the "Guide for identifying off-types (for consideration)" in paragraph 13 of document TWF/36/7-TWO/38/9, the TWO proposed as follows:

(i) there should be an introduction to the guide, including the definition of an off-type from the General Introduction (document TG/1/3), which should explain the issues and the value of harmonization;

(ii) the guide should provide examples of different types of off-types in different circumstances, in order to try to identify where harmonization was achievable;

(iii) to have an item on how to verify whether the cause of atypical plants was genetic or environmental (including disease), e.g. by propagating the atypical plants, requesting more plants from the breeder, visiting the breeder to view a larger number of plants etc.;

(iv) item 8: to be placed before item 2

22. The TWO also agreed that the guide might be extended to cover the number of plants to be examined. That aspect would, for example, cover whether more plants might be appropriate for the examination of varieties which were more likely to contain off-types (e.g. varieties resulting from mutation, variegated varieties, varieties known to contain transposons), in order to allow a suitable assessment of potential off-types. It might also address the selection of the number of plants in relation to the number of off-types allowed in different sample size ranges.

23. In order to incorporate guidance within TGP/10, it was recognized that the document would need to be substantially advanced before the thirty-ninth session of the TWO and that that would only be possible by the establishment of a sub-group (Off-type Subgroup) which would comment on interim drafts. The TWO agreed that Mr. Chris Barnaby (New Zealand) should be responsible for preparing drafts with the assistance of the Office where requested. A first draft would be circulated to the Off-type Subgroup before the end of 2005, with comments to be made by the end of January 2006. A second draft would then be circulated by the end of May 2006 with comments to be made by the end of June 2006, followed by preparation of a draft for the thirty-eighth session of the TWO. Offers to participate in the Off-type Subgroup were received from Australia, Canada, Denmark, European Community, France, Germany, Israel, the Netherlands and the United Kingdom. Mr. Barnaby invited all participants to send comments on document TWF/36/7-TWO/38/9 to assist in the preparation of the first draft.

24. The TC may wish to note that criteria for determining off-type plants will be considered in discussions on document TGP/10 Examining Uniformity (see document TGP/10/1 Draft 3: Section 4.2 “Determination of Off-types”).

#### Calculation of Relative Tolerances in the Number of Off-types

25. The Chairman introduced document TWC/23/11 at the twenty-third session of the TWC. The document considered the possibility of defining a population standard on the basis of existing varieties. Because it would be calculated in relation to other varieties, such population standards could be called “Relative population standards”. On the basis of specific acceptance probabilities, relative tolerance limits could be calculated for a specific sample size. A relative population standard could be calculated for the assessment of uniformity in cross-pollinated varieties if the number of comparable varieties was sufficiently high to give a representative mean number of off-types.

26. Several experts questioned the need to use relative population standards and considered that it would be necessary to identify the components of the variance, in particular the environment-by-variety interaction, to clarify the situation, whilst recognizing the need for more data for that purpose. The Chairman noted that fodder radish was the only crop in which it was known that relative tolerances in the number of off-types was applied.

27. The TWC considered that it was necessary to study more cases to decide on a recommendation and that, whenever possible, fixed population standard values to calculate the acceptable number of off-types should be used.

28. The TC may wish to note that this matter will be considered with regard to the development of TGP/10 Examining Uniformity (see document TGP/10/1 Draft 3: Section 4.3.2 “Cross-pollinated varieties”).

### Development of COY

#### *Possibility of reducing the number of plants for quantitative characteristics for reference varieties*

29. At its twenty-third session, the TWC considered document TWC/23/12, introduced by an expert from Denmark. That document presented a method for calculating the number of plants to be assessed if a small reduction of the discrimination power could be accepted. An expert from France noted that it was the first time that a document on that subject had been presented in the TWC. He considered that, on the one hand, it was necessary to explore possibilities to reduce the number of plants to be able to reduce the costs of the trial, but on the other hand, reduction in the number of plants would have an impact on the components of the variance. It was agreed that it would be useful, as a next stage, to consider the different decisions which would result from such changes.

#### *Influence of the number of plants per plot on uniformity and distinctness for quantitative characteristics in rapeseed.*

30. An expert from Germany introduced document TWC/23/15, which examined the influence of the number of plants per plot on uniformity and distinctness for quantitative characteristics in rapeseed. An expert from France considered that a requirement to observe different numbers of plants for different characteristics could be impractical. The expert from Poland noted that some characteristics were more important than others for DUS purposes and suggested that it could be possible to have, for example, two groups of characteristics with different numbers of plants to be observed.

31. The TWC agreed that a new combined version of documents TWC/23/12 and TWC/23/15, including information on the impact on the decisions on distinctness and uniformity, should be prepared for the twenty-fourth session of the TWC.

#### *A proposal for an adjustment to the COYD method when varieties are grouped within the DUS trial*

32. The TWC considered document TWC/23/8, introduced by an expert from the United Kingdom. The document explained that, when grouping was possible such that all the varieties within a group were distinct from all varieties of any other group, comparisons were only necessary between varieties in the same group. It noted that, in principle, it would be possible to analyze groups separately but, in practice, some groups had too few varieties. It was proposed that the over-years analysis of variance (COYD) be adjusted to take into account the group-by-year interaction. The expert from Poland proposed, taking into account that the COY method assumed that all varieties have the same variation, to use the largest group residual sum of squares for the calculations.

33. The TWC agreed that a new document should be prepared for the twenty-fourth session.

*A comparison of COYU and a method based on Bennett's Test for coefficients of variation*

34. The TWC considered document TWC/23/9, introduced by the expert from Poland. The document compared decisions concerning uniformity of varieties based on COYU and a method based on the application of Bennett's test for coefficients of variation. It was clarified that the reference to "COYU" in the document should be replaced by reference to "UNIF".

35. An expert from Denmark noted that it would not be possible to use the approach outlined in the document for some characteristics, e.g. those such as heading date, which did not have a logical zero point.

36. The expert from Poland explained that an important advantage of the Bennett's method was its transparency, because the data was not subject to a series of transformations. An expert from Denmark observed that he was very satisfied with the COYU method, particularly now that the method was clearly explained in TGP/9. He reported that, as a crop expert, he would view the actual data directly in cases where there were problems.

37. The TWC Chairman noted that a key difference in the Bennett's method, as compared to COYU, was the use of coefficients of variation instead of standard deviations. He noted that in cases where, for example, two characteristics with different means needed to be compared, it would be advantageous to use the coefficients of variation. However, in the UPOV situation, the requirement was to compare varieties.

38. It was agreed that it was important to consider possible new methods in the TWC and that a new document should be prepared for consideration by the TWC at its twenty-fourth session. In that new document it was proposed that the method should be applied over years to allow a comparison with COYU. It was also agreed that it would be useful to avoid restricting the exercise to real data and to look at data sets which would allow an examination of how the method diverged from COYU.

*Examination of statistical procedures for checking uniformity in variety trials*

39. The TWC Chairman introduced document TWC/23/13. The document explained that, to account for a dependency between standard deviation and mean in the COYU method, a moving average procedure was used. Standard deviations were transformed and adjusted by the moving averages and new varieties were compared to the mean transformed standard deviations of reference varieties by a one-tailed t-test. The document examined the current moving-average procedure and the test against the mean of transformed standard deviations and compared it to an alternative method, using analysis of covariance and the estimation of quantiles.

40. Experts from the United Kingdom considered that the document presented a good analysis of potential weaknesses of using moving average. They recalled that when COYU had been introduced the moving average method was easy to accept and incorporate and noted that there were other methods to smooth data, some of which, for example Cubic splines, also allowed the calculation of the degree of smoothness. They further noted that the third paragraph on page 15 of document TWC/23/13 should be reworded because the COY

approach did not make assumptions. An expert from Denmark noted that on page 15, in the second sentence of the fifth paragraph, the term “below” should be replaced by “equal to” and that the following sentences should be reworded accordingly. The expert from the Netherlands was in favor of exploring the use of more simple techniques, such as that proposed in document TWC/23/9, and to use mixed models only when there was no other option.

41. The TWC agreed that a revised version of the document should be prepared for the following session.

#### Use of Generalized Linear Models in DUS: Logistic Regression Approach

42. At its twenty-third session, the TWC received a presentation by the expert from Kenya, based on document TWC/23/18, exploring the use of generalized linear models in DUS testing based on a logistic regression approach. One expert from United Kingdom suggested to study the effect of variety-by-year interaction. An expert from Denmark noted that the results already suggested the existence of some variety-by-year interaction. The Chairman proposed to include an example of a quantitative characteristic in future versions of the document to allow comparison with COYD.

43. The TWC agreed that a new document should be prepared for the twenty-fourth session which should consider the variety-by-year interaction and quantitative characteristics.

#### Project for Exchanging Seed of Selected Varieties Between Interested Countries

44. At its thirty-fourth session, the TWA received a report from the expert from Japan who explained that the project concerning the exchange of seed of varieties of rice had, as reported at the previous session, been completed. The TWA was informed of developments concerning ring-tests involving various members of the Union.

#### Development of Regional Sets of Example Varieties for the Test Guidelines for Rice

45. At its thirty-fourth session, the TWA noted document TWA/34/12, introduced by the expert from Japan. That document provided information on the project involving Japan, the People’s Republic of China and the Republic of Korea in the development of a regional set of example varieties for East Asia. It heard that a new document would be produced for the thirty-fifth session by experts from China, Japan or the Republic of Korea.

#### Phytoplasma in Poinsettia

46. At its thirty-eighth session, the TWO received a presentation from an expert from Denmark and an expert from the European Community on a Community Plant Variety Office (CPVO), Danish Institute of Agricultural Sciences in Arslev and Poinsettia breeders co-financed research project on the impact of phytoplasma strains on the phenotypical expression of poinsettia varieties, conducted in Denmark. It was noted that a full report of that project would be made available on the CPVO website.

### Database of Images for Ornamental Species

47. At its twenty-third session, the TWC received a presentation from the expert from the Netherlands on a project for the development of a database for images of ornamental varieties.

### Database to Search for TWC Documents

48. At its twenty-third session, the TWC received a presentation from an expert from Germany based on document TWC/23/16 and received a demonstration of a prototype Access database. The TWC was invited to consider a proposal for the development of a database of TWC documents, providing the possibility to store all documents with additional information and to search for documents and their history.

49. It was clarified that the database would, in the first instance, contain the TWC documents plus draft TGP documents and other Technical Working Party documents which were of relevance for the TWC.

50. The Office explained that the UPOV website would only support Oracle databases. It was agreed that the database should only be made available in the form of a CD-ROM and should only be available to members of the TWC.

51. It was agreed that Germany would be responsible for the maintenance of the database, but support from other members of the TWC was encouraged. The Office offered to provide Word and pdf versions of TWC documents to assist in the building of the database.

[End of document]