



CAJ/69/4

ORIGINAL: English

DATE: March 13, 2014

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

Geneva

**ADMINISTRATIVE AND LEGAL COMMITTEE****Sixty-Ninth Session  
Geneva, April 10, 2014**

## MOLECULAR TECHNIQUES

*Document prepared by the Office of the Union**Disclaimer: this document does not represent UPOV policies or guidance*

1. The purpose of this document is to report on developments concerning the:
  - (a) use of biochemical and molecular markers in the examination of Distinctness, Uniformity and Stability (DUS);
  - (b) Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT); and
  - (c) presentation of information on the situation in UPOV with regard to the use of molecular techniques to a wider audience, including breeders and the public in general.
2. The following abbreviations are used in this document:

BMT:	Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular
CAJ:	Administrative and Legal Committee
TC:	Technical Committee
TC-EDC:	Enlarged Editorial Committee

## USE OF BIOCHEMICAL AND MOLECULAR MARKERS IN THE EXAMINATION OF DISTINCTNESS, UNIFORMITY AND STABILITY (DUS)

3. The Council, at its forty-seventh ordinary session, held in Geneva on October 24, 2013, adopted document TGP/15/1 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)" (see document C/47/19 "Report on the decisions", paragraph 23).

## WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES, AND DNA-PROFILING IN PARTICULAR (BMT)

Background

4. The role of the BMT is reproduced in Annex II to this document.
5. The BMT, at its thirteenth session, held in Brasilia, from November 22 to 24, 2011, planned to discuss the following items during its fourteenth session (see document BMT/13/36 "Report", paragraph 72):
  1. Opening of the session
  2. Adoption of the agenda
  3. Reports on developments in UPOV concerning biochemical and molecular techniques
  4. Reports on the work of the *Ad Hoc* Crop Subgroups on molecular techniques (Crop Subgroups)
  5. Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations
  6. Report of work on molecular techniques on a crop-by-crop basis:
    - (a) vegetatively propagated crops
    - (b) self-pollinated crops
    - (c) cross-pollinated crops
  7. International guidelines on molecular methodologies
  8. Variety description databases
  9. Methods for analysis of molecular data
  10. The use of molecular techniques in examining essential derivation
  11. The use of molecular techniques in variety identification
  12. Recommendations on the establishment of new crop specific subgroups
  13. Date and place of next session
  14. Future program
  15. Report of the session (if time permits)
  16. Closing of the session
6. The TC, at its forty-eighth session, held from March 26 to 28, 2012, approved the program for the fourteenth session of the BMT to be held in 2014, including the dedication of a particular date ("Breeders' Day"), for the items on the use of molecular techniques in the consideration essential derivation and in variety identification, as set out in paragraphs 32 and 33 of document TC/48/7 (see document TC/48/23 "Report", paragraph 222).
7. The TC further agreed that it would be appropriate for the Office of the Union to investigate the possibility of a coordinated meeting of the BMT and the Working Group on DNA Methods of the Variety Committee of ISTA, for the fourteenth session of the BMT (see document TC/48/23 "Report", paragraph 221).

8. The CAJ, at its sixty-fifth session, held in Geneva on March 29, 2012, noted the following conclusions of the TC at its forty-eighth session, held in Geneva from March 26 to 28, 2012 (see document CAJ/65/13 "Report", paragraph 78):

(a) The TC agreed that it would be appropriate for the Office of the Union to investigate the possibility of a coordinated meeting of the BMT and the Working Group on DNA Methods of the Variety Committee of the International Seed Testing Association (ISTA), for the fourteenth session of the BMT;

(b) The TC approved the program for the fourteenth session of the BMT, including the dedication of a particular date ("Breeders' Day"), for the items on the use of molecular techniques in the consideration of essential derivation and in variety identification, as set out in paragraphs 32 and 33 of document TC/48/7.

9. The TC, at its forty-ninth session, held in Geneva, from March 18 to 20, 2013, received the following presentations from relevant international organizations (see document TC/49/41 "Report on the Conclusions", paragraphs 131 to 133), copies of which are posted on the UPOV website at [http://upov.int/meetings/en/details.jsp?meeting\\_id=28343](http://upov.int/meetings/en/details.jsp?meeting_id=28343):

Situation with regard to the use of molecular techniques in relation to seeds in the International Organization for Standardization (ISO)	Presented by Mr. Paul Zankowski (United States of America) (Prepared by Mr. Michael Sussman (ISO))
Situation with regard to the use of molecular techniques in the International Seed Testing Association (ISTA)	Ms. Rita Zecchinelli (ISTA)
Situation with regard to the use of molecular techniques in the Organisation for Economic Co-operation and Development (OECD)	Mr. Michael Ryan (OECD)

10. The TC, at its forty-ninth session, recalled that the BMT is a group open to DUS experts, biochemical and molecular specialists and plant breeders, whose role is as reproduced in Annex II to this document. In that regard, it endorsed the initiative for a joint meeting with ISO, ISTA and OECD and including breeders, as a means of supporting the role of the BMT in relation to (i), (ii), (iv), (vi) and particularly (viii) of the role of the BMT (see document TC/49/41 "Report on the Conclusions", paragraphs 134 and 135, and the Annex II to this document).

11. The CAJ, at its sixty-seventh session, held on March 21, 2013, noted that the TC had agreed to the possibility of holding a coordinated meeting of the fourteenth session of the BMT with meetings of other relevant international organizations, as set out in paragraphs 8 and 9 of document CAJ/67/4. It further noted that the TC had also agreed that, if it was not possible to organize a joint meeting with other organizations in 2014, a meeting of the BMT should be organized in the meantime (see document CAJ/67/14 "Report on the Conclusions", paragraph 42).

12. On May 3, 2013, the Office of the Union issued a letter to Mr. Michael Sussman, Chairperson of ISO/TC 34/SC 16, Mr. Heinz Schmid, Secretary General *ad interim*, ISTA, and Mr. Michael Ryan, Head of Unit, Agricultural Codes and Schemes, OECD, respectively, requesting their consideration of the possibility to hold a coordinated meeting in conjunction with the fourteenth session of the BMT. In reply to the letter, the Office of the Union received a positive response from ISTA and OECD. Mr. Michael Sussman (ISO) reported that ISO had formal requirements to establish liaisons and a framework with other international organizations with respect to its work, and that it might not be possible to establish such liaisons and a framework between the ISO/TC 34/SC 16 and UPOV before the planned date of the coordinated meeting. Mr. Sussman expressed his willingness to continue the current practice in which he or his colleagues would attend the BMT upon invitation to provide presentations on their work.

13. After consultation with the Republic of Korea, ISTA and OECD, it was proposed that the fourteenth session of the BMT be held from November 11 to 14, 2014, in Seoul, Republic of Korea, with its preparatory workshop on November 10, 2014. In consultation with ISTA and OECD, and as appropriate, the fourteenth session of the BMT will be coordinated with meetings of those international organizations.

14. The Council, at its forty-seventh ordinary session, held in Geneva, on October 24, 2013, approved the calendar of meetings in 2014, as set out in document C/47/8 "Calendar of meetings in 2014", with the following change (see document C/47/19 "Report on the decisions", paragraph 52):

"Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT)

BMT/14 November ~~11 to 14~~ 10 to 13, Seoul, Republic of Korea  
(Preparatory workshop on November ~~10-9~~)"

15. With regard to the program of the fourteenth session of the BMT, it is recalled that:

a) the TC, at its forty-eighth session, held in Geneva, from March 26 to 28, 2012, agreed to discontinue separate meetings of the Ad-hoc Crop Subgroups and to include the discussions within the BMT sessions, as set out in paragraph 26 of document TC/48/7 (see document TC/48/23 "Report", paragraph 219); and

b) the BMT, at its thirteenth session, held in Brasilia, from November 22 to 24, 2011, requested the TC to consider the possibility to arrange the order of the agenda items to reflect the organization of the meeting, in particular, the items for the 'Breeders' Day' to be placed after agenda item 5 (see document BMT/13/36 "Report", paragraph 73).

16. In that regard, it has been proposed to the TC to delete agenda items 4 "Reports on the work of the Ad Hoc Crop Subgroups on molecular techniques (Crop Subgroups)" and 12 "Recommendations on the establishment of new crop specific subgroups" from the program, as follows:

1. Opening of the session
2. Adoption of the agenda
3. Reports on developments in UPOV concerning biochemical and molecular techniques
4. Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations
5. Report of work on molecular techniques on a crop-by-crop basis:
  - (a) vegetatively propagated crops
  - (b) self-pollinated crops
  - (c) cross-pollinated crops
6. International guidelines on molecular methodologies
7. Variety description databases
8. Methods for analysis of molecular data
9. The use of molecular techniques in examining essential derivation
10. The use of molecular techniques in variety identification
11. Date and place of next session
12. Future program
13. Report of the session (if time permits)
14. Closing of the session

17. With regard to the organization of the coordinated meeting with ISTA and OECD, it is proposed to hold a joint workshop with ISTA and OECD on the morning and early afternoon of November 12, 2014. The proposed title for this event is planned for, "OECD, UPOV, ISTA Joint Workshop on Molecular Techniques" (the Joint Workshop). The proposed program for the Joint Workshop is as follows:

1. Welcome and opening
2. Introduction to the OECD Seed Schemes and the situation with regard to molecular techniques
3. Introduction to UPOV and the situation with regard to molecular techniques
4. Introduction to ISTA and the situation with regard to molecular techniques
5. Existing areas of cooperation between OECD, UPOV and ISTA
6. Opportunities for cooperation between OECD, UPOV and ISTA with regard to molecular techniques (Discussion)
7. Closing

18. A provisional workplan of the fourteenth session of the BMT, its preparatory workshop and the Joint Workshop is attached as Annex II to this document.

19. *The CAJ is invited to note:*

*(a) that the fourteenth session of the BMT will be held in Seoul, the Republic of Korea, from November 10 to 13, 2014;*

*(b) the proposed amendment of the program of the fourteenth session of the BMT, as set out in paragraph 15 of this document; and*

*(c) the proposed plan that the fourteenth session of the BMT will be coincided with the Joint Workshop with ISTA and OECD to be held on November 12, 2014, as set out in paragraph 17 of this document.*

## PRESENTATION OF INFORMATION ON THE SITUATION IN UPOV WITH REGARD TO THE USE OF MOLECULAR TECHNIQUES TO A WIDER AUDIENCE, INCLUDING BREEDERS AND THE PUBLIC IN GENERAL

### Background

20. The TC, at its forty-ninth session, held in Geneva from March 18 to 20, 2013, agreed that there was a need to provide suitable information on the situation in UPOV with regard to the use of molecular techniques to a wider audience, including breeders and the public in general. That information should explain the potential advantages and disadvantages of the techniques, and the relationship between genotype and phenotype, which lay behind the situation in UPOV (see document TC/49/41 "Report on the Conclusions", paragraph 136).

21. The Consultative Committee, at its eighty-sixth session, held in Geneva on October 23 and 24, 2013, considered a series of answers to frequently asked questions. One of the questions included was "does UPOV allow molecular techniques (DNA profiles) in the DUS examination?" In that regard the Consultative Committee agreed that the answer should be developed via the Technical Committee. The Consultative Committee agreed to consider draft answers to this and other frequently asked questions at its eighty-seventh session, to be held in Geneva on April 11, 2014.

Proposal

22. The TC-EDC, at its meeting held in Geneva on January 8 and 9, 2014, considered document TC-EDC/Jan14/24 "Molecular Techniques" and proposed the following text to provide information on the situation in UPOV with regard to the use of molecular techniques (highlighted text indicates the text taken from documents TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)" and UPOV/INF/18 "Possible use of Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)"):

Question: Does UPOV allow molecular techniques (DNA profiles) in the DUS examination?

Answer: "It is important to note that, in some cases, varieties may have a different DNA profile but be morphologically identical, whilst, in other cases, varieties which have a large phenotypic difference may have the same DNA profile for a particular set of molecular markers (e.g. some mutations).

"In relation to the use of molecular markers that are not related to phenotypic differences, the concern is that it might be possible to use a limitless number of markers to find differences between varieties. In particular, differences could be found at the genetic level that are not reflected in morphological characteristics.

"On the above basis, UPOV has agreed the following uses of molecular markers in relation to DUS examination:

"(a) Molecular markers can be used as a method of examining DUS characteristics that satisfy the criteria for characteristics set out in the General Introduction if there is a reliable link between the marker and the characteristic.

"(b) A combination of phenotypic differences and molecular distances can be used to improve the selection of varieties to be compared in the growing trial if the molecular distances are sufficiently related to phenotypic differences and the method does not create an increased risk of not selecting a variety in the variety collection which should be compared to candidate varieties in the DUS growing trial.

"The situation in UPOV is explained in documents TGP/15 "Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)" and UPOV/INF/18 "Possible use of Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)".

23. The TC, at its fiftieth session, to be held in Geneva from April 7 to 9, 2014, will be invited to consider the proposed explanation of the situation in UPOV with regard to the use of molecular techniques, as set out in paragraph 22 of this document. The comments of the TC, at its fiftieth session, will be reported to the CAJ, at its sixty-ninth session, to be held in Geneva, on April 10, 2014 (see document CAJ/69/11 "Report on developments in the Technical Committee").

*24. The CAJ is invited to consider the proposed explanation of the situation in UPOV with regard to the use of molecular techniques in the DUS examination, as set out in paragraph 22 of this document, in conjunction with any comments of the TC at its fiftieth session.*

[Annexes follow]

ROLE OF THE WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES,  
AND DNA-PROFILING IN PARTICULAR (BMT)

*(as agreed by the Technical Committee at its thirty-eighth session, held in Geneva,  
from April 15 to 17, 2002 (see document TC/38/16, paragraph 204))*

The BMT is a group open to DUS experts, biochemical and molecular specialists and plant breeders, whose role is 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 TC;
- (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 be developed in conjunction with the Technical Working Parties;
- (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.

[Annex II follows]

**WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES, AND DNA-PROFILING IN PARTICULAR (BMT)**

Fourteenth Session, Seoul, Republic of Korea, November 10 to 13, 2014 / Preparatory Workshop, November 9, 2014 / Joint Workshop, November 12, 2014

	Sunday, Nov. 9	Monday, Nov. 10	Tuesday, Nov. 11	Wednesday, Nov. 12	Thursday, Nov. 13
09.00	X	<b>BMT MEETING</b> <u>Item 1: Opening of the session</u> <u>Item 2: Adoption of the agenda</u> <u>Item 3: Reports on developments in UPOV</u> <u>Item 4: Short presentations by participants</u>	<b>[Breeders' Day]</b> <u>Item 10: Variety identification</u>	<b>OECD, UPOV, ISTA JOINT WORKSHOP ON MOLECULAR TECHNIQUES</b> 9:00 <u>Item 1: Welcome and opening</u> 9:10 <u>Item 2: Introduction to the OECD Seed Schemes and the situation with regard to molecular techniques</u> 9:50 <u>Item 3: Introduction to UPOV and the situation with regard to molecular techniques</u> * <i>Item 2-4: 30min presentation + 10min Q&amp;A session</i> * <i>Item 5: 30min presentation + 20min Q&amp;A session</i>	<u>Item 5: Report of work on molecular techniques on a crop-by-crop basis (ctnd.)</u> <u>Item 6: International Guidelines</u> <u>Item 11: Date/Place of next session</u> <u>Item 12: Future program</u>
10.30		COFFEE	COFFEE	COFFEE	COFFEE
11.00		<u>Item 5: Report of work on molecular techniques on a crop-by-crop basis</u> (a) <u>vegetatively propagated crops</u> (b) <u>self-pollinated crops</u> (c) <u>cross-pollinated crops</u>	<u>Item 10: Variety identification (ctnd.)</u>	11:00 <u>Item 4: Introduction to ISTA and the situation with regard to molecular techniques</u> 11:40 <u>Item 5: Existing areas of cooperation between OECD, UPOV and ISTA</u>	<u>Item 13: Report of the session</u> <u>Item 14: Closing of the session</u>
12.30		LUNCH	LUNCH	LUNCH	SESSIONS END
14.00		<b>PREPARATORY WORKSHOP</b>	<u>Item 5: Report of work on molecular techniques on a crop-by-crop basis (ctnd.)</u>	<u>Item 10: Variety identification (ctnd.)</u> <u>Item 9: Examining essential derivation</u>	14:00 <u>Item 6: Opportunities for cooperation between OECD, UPOV and ISTA with regard to molecular techniques (Discussion)</u> 14:25 <u>Item 7: Closing</u>
14.30				<u>Item 7: Variety description databases</u>	
15.30	COFFEE		COFFEE	COFFEE	
16.00	<u>(ctnd.)</u>		<u>Item 9: Examining essential derivation (ctnd.)</u> <u>Item 8: Methods for analysis of molecular data</u>	<u>Item 5: Report of work on molecular techniques on a crop-by-crop basis (ctnd.)</u>	
18.00					