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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

ADMINISTRATIVE AND LEGAL COMMITTEE**Seventy-Third Session
Geneva, October 25, 2016**

MOLECULAR TECHNIQUES

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

EXECUTIVE SUMMARY

1. The purpose of this document is to report on developments concerning molecular techniques since the seventy-second session of the Administrative and Legal Committee (CAJ) in relation to the:

- (a) Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT);
- (b) OECD/UPOV/ISTA Joint Workshop on Molecular Techniques; and
- (c) Presentation of information on the situation in UPOV with regard to the use of molecular techniques.

2. The CAJ will be invited to:

- (a) note the report on developments in the BMT, as set out in paragraphs 6 to 9 of this document;
- (b) note that the developments of a OECD/UPOV/ISTA Joint Workshop on Molecular Techniques will be considered by the TC, at its fifty-third session, as set out in paragraphs 11 to 19 of this document;
- (c) consider a draft question and answer concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, as set out in paragraph 22 of this document; and
- (d) note that, if agreed by the CAJ, a draft question and answer concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, will be presented for adoption by the Council at its fiftieth ordinary session, to be held on October 28, 2016.

3. 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
- TWPs: Technical Working Parties
- AOSA: Association of Official Seed Analysts
- OECD: Organization for Economic Co-operation and Development

ISO: International Organization for Standardization

ISTA: International Seed Testing Association

4. The structure of this document is as follows:

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PURPOSE

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- (a) Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT);
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FIFTEENTH SESSION OF THE WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES, AND DNA-PROFILING IN PARTICULAR

6. The role of the BMT is reproduced in the Annex to this document.

7. The fifteenth session of the BMT was held in Moscow, Russian Federation, from May 24 to 27, 2016, with the preparatory workshop on May 23, 2016. The specific day for the agenda items "Report of work on molecular techniques in relation to DUS examination" and "The use of molecular techniques in variety identification" (the "Breeders' Day") was May 25, 2016.

8. The papers presented under each of the agenda items of the fifteenth session of the BMT were as follows:

Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations

CPVO Report to UPOV BMT (document BMT/15/27)

Report of work on molecular techniques in relation to DUS examination

Work on molecular techniques in relation to DUS examination of different fruit species (document BMT/15/11)

Molecular Marker use in the PVP Application Process - A Joint Project between the US PVP Office and the American Seed Trade Association Mapping (document BMT/15/12)

Evaluation of Soybean Molecular Marker Public Resources for Potential Application in Plant Breeders' Rights (document BMT/15/13)

Comparison of Genotypic and Expression Data to Determine Distinctness among Inbred Lines of Maize for Granting Plant Breeders' Rights (document BMT/15/14)

Efficient DUS test in French bean by using molecular data (document BMT/15/21)

Can molecular distance be used as characteristic? (document BMT/15/22)

International guidelines

International Guidelines on molecular methodologies (document BMT/15/3 Rev.)

UPOV and ISO TC 34/SC 16 – From the US Technical Advisory Group and ANSI led host of ISO TC 34/SC 16: Food Products; horizontal methods for molecular biomarker analysis (document BMT/15/7)

DNA-based method for variety testing: ISTA approach (document BMT/15/19)

Methods for analysis of molecular data

Molecular Data analysis capacity (document BMT/15/10)

The use of molecular techniques in variety identification

Variety identification of barley using KASP genotypes (document BMT/15/6)

Fast Single-step Detection and Identification of Multiple Phytopathogens and GMO with real-time PCR-matrix Technique (document BMT/15/9)

New developments concerning biochemical and molecular techniques in Belarus (document BMT/15/15)

Gene and genome editing with CRISPR-cas9 (document BMT/15/17)

Using of DNA – marker based techniques for varietal identification and fingerprinting of fruit crops and grape genetic resources (document BMT/15/18)

Green Forensics: Whole Genome Sequencing approach for PBR enforcement (document BMT/15/23)

Application of DNA marker technologies in Vegetable Breeding (document BMT/15/24)

Laboratory seed control of barley (document BMT/15/25)

Assessment and classification of breeding accessions of vegetable plants with the use of DNA markers (document BMT/15/26)

Cooperation between OECD, UPOV, ISTA and ISO (document BMT/15/5)

Databases containing molecular data

Towards durable DNA databases to support DUS testing (document BMT/15/16)

Advances in the Construction and Application of DNA Fingerprint Databases in Maize (document BMT/15/20)

9. The BMT agreed to an invitation from France to hold its sixteenth session in France at the end of September or beginning of October 2017, with the preparatory workshop to be held the day before the BMT session. The BMT planned to discuss the following items¹:

1. Opening of the session
2. Adoption of the agenda

¹ See document BMT/15/28 "Report", paragraph 48

3. Reports on developments in UPOV concerning biochemical and molecular techniques (document to be prepared by the Office of the Union)
4. Short presentations on new developments in biochemical and molecular techniques by DUS experts, biochemical and molecular specialists, plant breeders and relevant international organizations (oral reports by participants)
5. Report of work on molecular techniques in relation to DUS examination (papers invited)
6. International guidelines on molecular methodologies including cooperation between OECD, UPOV, ISTA and ISO (document to be prepared by the Office of the Union)
7. Variety description databases including databases containing molecular data (papers invited)
8. Methods for analysis of molecular data (papers invited)
9. The use of molecular techniques in examining essential derivation (papers invited)²
10. The use of molecular techniques in variety identification (papers invited)³
11. Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction ('BMT Guidelines')"
12. Date and place of next session
13. Future program
14. Report of the session (if time permits)
15. Closing of the session

OECD/UPOV/ISTA JOINT WORKSHOP ON MOLECULAR TECHNIQUES

10. The background to this matter is provided in document CAJ/71/8 "Molecular Techniques".
11. The TC, at its fifty-second session⁴, noted the plans for the OECD Seed Schemes to organize a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Techniques and received an oral report from the representative of OECD that the joint workshop would be held in Paris, France, on June 8, 2016.
12. The TC, at its fifty-second session, noted that, at its fifty-first session⁵, it had agreed:
 - (a) to develop a joint document explaining the principal features of the systems of the OECD, UPOV and ISTA;
 - (b) to develop an inventory on the use of molecular marker techniques, by crop, with a view to developing a joint OECD/UPOV/ISTA document containing that information, in a similar format to UPOV document UPOV/INF/16 "Exchangeable Software", subject to the approval of the Council and in coordination with OECD and ISTA; and
 - (c) the proposal for the BMT, at its fifteenth session, to develop lists of possible joint initiatives with OECD and ISTA in relation to molecular techniques for consideration by the TC to be presented at the TC, at its fifty-third session.
13. The TC, at its fifty-second session, agreed that the BMT should include the development of a list of terminology (definitions) used by OECD, UPOV and ISTA in the list of joint initiatives in relation to molecular techniques, for consideration by the TC, at its fifty-third session⁶.

² Breeder's Day

³ Breeder's Day

⁴ Held in Geneva, from March 14 to 16, 2016

⁵ Held in Geneva. From March 23 to 25, 2015

14. The BMT, at its fifteenth session, noted that the development of a joint document explaining the principal features of the systems of the OECD, UPOV and ISTA could only start after agreement by OECD and ISTA.

15. The BMT, at its fifteenth session, noted that the development of a joint OECD/UPOV/ISTA document containing an inventory of molecular marker techniques used by crop could only start after agreement by OECD and ISTA.

16. The BMT, at its fifteenth session, noted that OECD, ISTA and UPOV had different objectives and cooperation between the organizations in the use of molecular techniques would need to reflect that. However, the BMT agreed that it would be important to explore circumstances in which the same techniques and information could be used. In the first instance, it agreed that it would be more effective to explore such possibilities on the basis of real situations rather than at a theoretical and institutional level.

17. The BMT, at its fifteenth session, welcomed the proposal by the Netherlands to organize a practical workshop in 2017, with support from UPOV, OECD and ISTA, to explore how molecular techniques might be applied in an efficient way for UPOV, OECD and ISTA purposes.

18. The BMT, at its fifteenth session, agreed that possible future collaboration between UPOV, OECD and ISTA might include the harmonization of terms and methodologies used for different crops and the possible development of standards, after the agreement by these organizations⁷.

19. The TC, at its fifty-third session, will consider the developments in the BMT, at its fifteenth session, as set out in paragraphs 14 to 18 of this document.

PRESENTATION OF INFORMATION ON THE SITUATION IN UPOV WITH REGARD TO THE USE OF MOLECULAR TECHNIQUES

20. The background of this matter is provided in document CAJ/71/8 "Molecular Techniques".

21. The TC, at its fifty-second session, agreed a draft question and answer concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, to read as follows⁸:

"Is it possible to obtain protection of a variety on the basis of its DNA-profile?"

"For a variety to be protected, it needs to be clearly distinguishable from all existing varieties on the basis of characteristics that are physically expressed, e.g. plant height, time of flowering, fruit color, disease resistance etc. The DNA-profile is not the basis for obtaining the protection of a variety, although this information may be used as supporting information.

"A more detailed explanation is provided in the FAQ 'Does UPOV allow molecular techniques (DNA profiles) in the examination of Distinctness, Uniformity and Stability ("DUS")?'

"See also:

"What are the requirements for protecting a new plant variety?"

22. Subject to agreement by the CAJ, at its seventy-third session, a draft question and answer concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, will be presented for adoption by the Council at its fiftieth ordinary session, to be held in Geneva on October 28, 2016.

⁶ See document TC/52/29 Rev. "Revised Report", paragraphs 128 to 130

⁷ See document BMT/15/28 "Report", paragraphs 39 to 43

⁸ See document TC/52/29 Rev. "Revised Report", paragraph 131

23. *The CAJ is invited to:*

(a) note the report on developments in the BMT, as set out in paragraphs 6 to 9 of this document;

(b) note that the developments concerning the OECD/UPOV/ISTA Joint Workshop on Molecular Techniques will be considered by the TC, at its fifty-third session, as set out in paragraphs 11 to 19 of this document;

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[Annex follows]

ANNEX

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.

[End of Annex and of document]