

**Working Group on Biochemical and Molecular Techniques
and DNA-Profiling in Particular**

BMT/19/9

**Nineteenth Session
Alexandria, United States of America, September 23 to 25, 2020**

Original: English
Date: September 3, 2020

COOPERATION BETWEEN INTERNATIONAL ORGANIZATIONS

Document prepared by the Office of the Union

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EXECUTIVE SUMMARY

1. The purpose of this document is to report on developments concerning cooperation between international organizations on molecular techniques.

2. The BMT is invited to note that the TC, at its fifty-fifth session, agreed:

(a) the elements for the inventory on the use of molecular marker techniques, by crop, as set out paragraph 7 of this document;

(b) that a circular will be issued to request members of the Union to complete a survey as a basis to develop an inventory on the use of molecular marker techniques, by crop, in coordination with the OECD;

(c) for joint OECD, UPOV, ISTA workshops to be repeated in future, as a possible joint initiative in relation to molecular techniques;

(d) to propose a joint initiative that each organization inform the others about use of molecular markers in their work; and

(e) that information from the survey on the techniques could help to clarify techniques that were considered to be biochemical or molecular.

(f) that relevant elements from the World Seed Partnership and the FAQ on the use of molecular techniques in the examination of DUS, would be a suitable basis for the Office of the Union to develop a draft of a joint document explaining the principal features of the systems of OECD, UPOV and ISTA, in consultation with OECD.

3. The structure of this document is as follows:

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4. The following abbreviations are used in this document:

BMT:	Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular
ISTA:	International Seed Testing Association
OECD:	Organization for Economic Co-operation and Development
TC:	Technical Committee
TWPs:	Technical Working Parties

BACKGROUND

5. The background to this matter is provided in document BMT/18/4 "Cooperation between international organizations".

Inventory on the use of molecular marker techniques, by crop

Consideration by the Technical Committee

6. The TC, at its fifty-fifth session¹, agreed that the question "whether the molecular technique is validated" should be amended to read "Whether the molecular technique is validated/recognized/authorized" (see document TC/55/25 "Report", paragraphs 184 to 188).

7. The TC agreed the following elements for the inventory on the use of molecular marker techniques, by crop:

- Country or Intergovernmental Organization using molecular marker technique
- Whether the Authority uses molecular marker techniques
- Source [name of the Authority] and Contact details [email address]
- Type of molecular marker technique [AFLP, Capillary electrophoresis fragment analysis, MNP, RAPD-STs, SSR, SNPs, Taqman, Whole genome sequencing, other technique (please specify)] [more than one answer allowed]
- Source of the molecular marker and contact details [email address]
- Availability of the marker [publicly available or a proprietary marker]
- Status (i.e. in current use or under development)
- Crop(s) for which the molecular marker technique is used and characteristic concerned [botanical name(s) and UPOV code(s) to be provided]
- Purpose of the use of the molecular technique [UPOV model "Characteristic-Specific Molecular Markers", UPOV model "Combining Phenotypic and Molecular Distances in the Management of Variety Collections", Purity, Identity, Verification of conformity of plant material to a protected variety for the exercise of breeders' rights, Verification of hybridity]
- Whether the molecular marker technique was used as part of Seed Certification in the last two years [National certification, OECD certification] [relevant for OECD seed schemes]
- Number of times the Authority used the molecular marker technique in the last 2 years [routine, occasional] [e.g. 1 to 5, 6 to 20, 21 to 100, more than 100]
- Whether the molecular marker technique is covered by [UPOV Test Guideline(s), UPOV TGP document(s), other UPOV document(s)] (please specify)
- Whether the molecular marker technique is validated/recognized/authorized [yes to specify a particular organization or authority] [relevant for OECD seed schemes]
- Whether the Authority created databases with information obtained from use of the molecular marker technique

8. The TC agreed that a circular should be issued to request members of the Union to complete a survey as a basis to develop an inventory on the use of molecular marker techniques, by crop, in coordination with the OECD.

¹ Held in Geneva on October 26 and 27, 2019

9. The TC agreed with the BMT that the survey should have structured answers to allow the comparison of results, as much as possible.
10. The TC agreed that the Office of the Union should conduct a test survey with experts from the United Kingdom.
11. A report on developments concerning the survey will be made at the fifty-sixth session of the TC.

12. *The BMT is invited to note:*

(a) *that the TC, at its fifty-fifth session, agreed the elements for the inventory on the use of molecular marker techniques, by crop, as set out paragraph 7 of this document; and*

(b) *that a circular will be issued to request members of the Union to complete a survey as a basis to develop an inventory on the use of molecular marker techniques, by crop, in coordination with the OECD.*

Lists of possible joint initiatives with OECD and ISTA in relation to molecular techniques

13. The BMT, at its eighteenth session, considered document BMT/18/4 "Cooperation between International Organizations" and the request to develop lists of possible joint initiatives with OECD and ISTA, in relation to molecular techniques. The BMT agreed to propose the repeating of joint workshops with ISTA and OECD in future. The BMT agreed to propose a joint initiative that each organization inform the others about use of molecular markers in their work (see document BMT/18/21 "Report", paragraph 34).

14. The TC, at its fifty-fifth session, considered possible joint initiatives with OECD and ISTA in relation to molecular techniques and agreed with the proposal made by the BMT, at its eighteenth session, for joint workshops to be repeated in future (see document TC/55/25 "Report", paragraphs 189 to 191).

15. The TC agreed with the BMT to propose a joint initiative that each organization inform the others about use of molecular markers in their work.

16. The TC noted there were no definitions on biochemical and molecular techniques in UPOV. The TC agreed that information from the survey on the techniques could help to clarify techniques that were considered to be biochemical or molecular.

17. *The BMT is invited to note that the TC, at its fifty fifth session, agreed:*

(a) *for joint OECD, UPOV, ISTA workshops to be repeated in future, as a possible joint initiative in relation to molecular techniques;*

(b) *to propose a joint initiative that each organization inform the others about use of molecular markers in their work; and*

(c) *that information from the survey on the techniques could help to clarify techniques that were considered to be biochemical or molecular.*

Joint document explaining the principal features of the systems of OECD, UPOV and ISTA

18. The BMT, at its eighteenth session, considered document BMT/18/4 "Cooperation between International Organizations". The BMT agreed that relevant elements from the World Seed Partnership and the FAQ on the use of molecular techniques in the examination of DUS, as reproduced in the Annex to this document, would be a suitable basis for the Office of the Union to develop a draft of a joint document explaining the principal features of the systems of OECD, UPOV and ISTA, in consultation with OECD (see document BMT/18/21 "Report", paragraphs 22 and 23).

19. The TC, at its fifty-fifth session, agreed with the BMT, at its eighteenth session, that relevant elements from the World Seed Partnership and the FAQ on the use of molecular techniques in the examination of DUS, would be a suitable basis for the Office of the Union to develop a draft of a joint document explaining the principal features of the systems of OECD, UPOV and ISTA, in consultation with OECD (see document TC/55/25 "Report", paragraph 182).

20. The Office of the Union has been in contact with the OECD Seed Schemes and will report on developments on the draft of a joint document to the TC, at its fifty-sixth session.

21. The BMT is invited to note that the TC, at its fifty-fifth session, agreed that relevant elements from the World Seed Partnership and the FAQ on the use of molecular techniques in the examination of DUS, would be a suitable basis for the Office of the Union to develop a draft of a joint document explaining the principal features of the systems of OECD, UPOV and ISTA, in consultation with OECD.

[Annex follows]

ELEMENTS FROM THE WORLD SEED PARTNERSHIP AND FAQ ON THE USE OF MOLECULAR TECHNIQUES IN THE EXAMINATION OF DUS

The Organisation for Economic Co-operation and Development (OECD)

Type of Organization
intergovernmental

OECD Seed Schemes
Participating countries

Mission

The OECD Seed Schemes provide an international framework for the varietal certification of agricultural seed moving in international trade. The Schemes were established in 1958 driven by a combination of factors including a fast growing seed trade, regulatory harmonisation in Europe, the development of off season production, the seed breeding and production potential of large exporting countries in America (North and South) and Europe, and the support of private industry. Membership of the Schemes is voluntary and participation varies. There are eight agricultural Seed Schemes.

Objectives

- to encourage the production and use of “quality-guaranteed” seed in participating countries. The Schemes authorise the use of labels and certificates for seed produced and processed for international trade according to agreed principles ensuring varietal identity and purity.
- to facilitate the import and export of seed, by the removal of technical barriers to trade by assuring identification and origin through internationally recognised labels (“passports”) for trade. They also lay down guidelines for seed multiplication abroad, as well as for the delegation of some control activities to the private sector (“authorisation”). The quantity of seed certified through the OECD Schemes has grown rapidly in recent years and now exceeds 1 million tonnes.

How do the Seed Schemes operate

The success of international certification depends upon close co-operation between maintainers, seed producers, traders and the designated authority (appointed by the government) in each participating country. Frequent meetings allow for a multi-stakeholder dialogue to exchange information, discuss case studies, revise rules and update the Schemes. A wide range of international and non-governmental organisations as well as seed industry networks participate actively in the Schemes.

Benefits of the Schemes

- To facilitate international trade by using harmonised certification procedures, crop inspection techniques and use of control plots. The varietal purity standards for the appropriate species are also agreed and standardised by all member states.
- To provide a framework to develop seed production with other countries or companies.
- To participate in the elaboration of international rules for seed certification.
- To develop collaboration between the public and private sectors.
- To benefit from regular exchanges of information with other national certification agencies and Observer organisations.

The Annual List of Varieties eligible for OECD certification includes varieties which are officially recognized as distinct, uniform and stable, and possess an acceptable value in one or more participating country. The List contains the seed varieties internationally traded using the OECD seed Schemes. The number of varieties included has grown steadily over the last thirty years.

International Union for the Protection of New Varieties of Plants (UPOV)

Type of Organization
Intergovernmental

Membership

[List of UPOV members](#) / [Situation in UPOV](#)

What is UPOV?

The International Union for the Protection of New Varieties of Plants (UPOV) is an intergovernmental organization based in Geneva, Switzerland. UPOV was established in 1961 by the International Convention for the Protection of New Varieties of Plants (the "UPOV Convention").

The mission of UPOV is to provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society.

The UPOV Convention provides the basis for members to encourage plant breeding by granting breeders of new plant varieties an intellectual property right: the breeder's right.

What does UPOV do?

UPOV's mission is to provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society. The main objectives of UPOV are, in accordance with the UPOV Convention, to:

- provide and develop the legal, administrative and technical basis for international cooperation in plant variety protection;
- assist States and organizations in the development of legislation and the implementation of an effective plant variety protection system; and
- enhance public awareness and understanding of the UPOV system of plant variety protection.

What are the benefits of plant variety protection and UPOV membership?

The UPOV Report on the Impact of Plant Variety Protection demonstrated that in order to enjoy the full benefits which plant variety protection is able to generate, both implementation of the UPOV Convention and membership of UPOV are important. The introduction of the UPOV system of plant variety protection and UPOV membership were found to be associated with:

- (a) increased breeding activities,
- (b) greater availability of improved varieties,
- (c) increased number of new varieties,
- (d) diversification of types of breeders (e.g. private breeders, researchers),
- (e) increased number of foreign new varieties,
- (f) encouraging the development of a new industry competitiveness on foreign markets, and
- (g) improved access to foreign plant varieties and enhanced domestic breeding programs.

In order to become a UPOV member the advice of the UPOV Council in respect of the conformity of the law of a future member with the provisions of the UPOV Convention is required. This procedure leads, in itself, to a high degree of harmony in those laws, thus facilitating cooperation between members in the implementation of the system.

International Seed Testing Association (ISTA)

Type of Organization

Non-profit and non-political association

ISTA Profile

ISTA is an international association that represents the seed quality sampling and testing organizations and laboratories at the world level.

ISTA Members

[List of ISTA Members](#)

Mission

ISTA was founded in 1924 with the aim of developing and publishing standard procedures in the field of seed testing. ISTA members work together to achieve their vision of uniformity in seed quality evaluation worldwide.

Core tasks

1. Development and maintenance of the ISTA International Rules for Seed Testing

The International Rules for Seed Testing (ISTA Rules), adopted and updated on an annual basis, today contain seed sampling and quality analysis methodologies for more than 900 different agricultural, forest, vegetable and flower species. The ISTA Rules are reviewed and updated on an annual basis by 18 technical committees. The technical committees comprise seed scientists and technologists from the public and the private sectors from all over the world.

2. Accreditation of seed testing laboratories worldwide

The ISTA accreditation program ensures that seed testing laboratories achieve accurate and reproducible results in their daily analysis work. The basis for the accreditation programme is the ISTA Accreditation Standard. Every third year, an accredited laboratory is audited by two ISTA auditors. Monitoring of laboratory performance through the ISTA Proficiency Test Programme ensures that the quality of ISTA-accredited laboratories remains high between audits. Each year between five and ten workshops, run by the technical committees, provide training and professional development for seed analysts.

3. Distribution of uniform certificates of seed-testing results to facilitate international seed trade

Only ISTA-accredited laboratories are authorized to issue ISTA Certificates for seed analysis. The ISTA certificates provide the user with a seed analysis result they can trust is reproducible, true and, and for the Orange International Seed Lot Certificate represents the quality of the seed lot from which the sample tested was drawn.

4. Exchange and dissemination of results of scientific research in various seed symposia, seminars and scientific journals

ISTA serves as a platform for seed scientists around the world to compare the results of their research and discuss important developments in seed science and technology, through both regular seed symposia and its own scientific journal, *Seed Science and Technology*.

FAQ ON THE USE OF MOLECULAR TECHNIQUES IN THE EXAMINATION OF DUS

Does UPOV allow molecular techniques (DNA profiles) in the examination of Distinctness, Uniformity and Stability ("DUS")?

It is important to note that, in some cases, varieties may have a different DNA profile but be phenotypically 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 at the genetic level that are not reflected in phenotypic 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)".

<https://www.upov.int/about/en/faq.html#QB80>