UPOV

International Union for the Protection of New Varieties of Plants

E

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

BMT/18/5

Eighteenth Session
Hangzhou, China, October 16 to 18, 2019

Original: English
Date: October 9, 2019

SESSION TO FACILITATE COOPERATION

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 the outcomes of discussions held by the TWPs, at their sessions in 2019, on cooperation in relation to the use of molecular techniques.

2. The BMT is invited to consider how the outcomes of the discussions held at the TWPs, at their sessions in 2019, on cooperation in relation to the use of molecular techniques, as set out in paragraphs 19 to 23 of this document, might feed into the work of the BMT.

3. The following abbreviations are used in this document:

BMT:	Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular
TC:	Technical 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
TWPs:	Technical Working Parties

4. The structure of this document is as follows:

BACKGROUND

5. The background to this matter is provided in document BMT/17/5 “Session to facilitate cooperation in relation to the use of molecular techniques”.

6. The Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT), at its seventeenth session, considered document BMT/17/5 “Session to facilitate cooperation in relation to the use of molecular techniques” (see document BMT/17/25 “Report”, paragraphs 68 to 78).

7. Discussion groups were formed for: maize and soybeans; other agricultural crops; fruit crops and forest trees; ornamental plants; and vegetables, for BMT participants to exchange information on their work and explore areas for cooperation.

8. The BMT was informed of the following outcomes of the discussions:

Maize and Soybean

Summary of crop interest

Maize	United States of America
Soybean	Argentina, Brazil, Canada, United States of America, CropLife

Plans for cooperation

- Argentina to consult whether the selected subset of markers from the 6K Illumina chip could be shared with Brazil and United States of America. In case possible, United States of America would test the discriminating power of the subset on a different variety collection. Argentina and United States of America would also consider establishing a common subset of markers suitable for different technologies (e.g. Genotyping by Sequencing).
- United States of America breeders to coordinate with Brazilian breeders to formulate a proposal to be presented to the Brazilian Plant Variety Protection Office (SNPC) for a study on the use of molecular markers in DUS examination for soybeans (e.g. similar to the study conducted in Argentina).
- CropLife to collaborate with the initiative from the United States of America for the establishment of marker sets and methods to support DUS examination.

Proposals for UPOV initiatives

9. The coordination group on maize and soybeans agreed that the UPOV Office should follow up with participants on the possible test of discriminating power of the subset of molecular markers selected by Argentina and the possible establishment of a common subset of markers suitable for different technologies.

Other agricultural crops

Summary of crop interest

Barley	Canada, Czech Republic, France, Germany, United Kingdom
Cotton	Brazil
Durum wheat	Italy, European Union
Hemp	Netherlands
Lucerne	France
Oats	Canada
Oilseed Rape	Canada, France, Germany, United Kingdom, Corteva
Potato	Canada, European Union, Finland, Germany, Netherlands, United Kingdom
Rice	Japan, Republic of Korea
Ryegrass	Belgium, Netherlands, United Kingdom
Sorghum	France
Sunflower	France
Wheat	Canada, Czech Republic, Estonia, France, Italy, United Kingdom, Corteva

Plans for cooperation

- Potato: Canada and the Republic of Korea to approach the partners in the European Potato Database to discuss their possible involvement in the database.
- Rice: Japan and the Republic of Korea to discuss cooperation between China, Japan and the Republic of Korea in the East Asia Plant Variety Protection Forum.
- Ryegrass: Belgium, Czech Republic and the Netherlands to share information on their work and plans.

Proposals for UPOV initiatives

10. The coordination group on other agricultural crops agreed that it would be useful to introduce an item at the eighteenth session of the BMT for participants to provide information on how they managed cooperation between partners and service providers, including confidentiality, access to data and material, authorization for work to be performed and availability of results and information to partners.

Vegetables

Summary of crop interest

Cabbage	Republic of Korea
Chinese cabbage	China, Republic of Korea
Cucumber	Netherlands, Republic of Korea, BASF
Eggplant	Italy
French bean	Netherlands
Lettuce	Australia, Canada, Netherlands, Republic of Korea, BASF, Croplife International, Sakata Seed Sudamerica
Melon	China, Netherlands, Republic of Korea, BASF, Sakata Seed Sudamerica
Onion	Italy, Netherlands, BASF
Oriental melon	Republic of Korea
Pea	Netherlands, United Kingdom
Pepper	China, Italy, Netherlands, Republic of Korea, BASF, Croplife International, Sakata Seed Sudamerica
Pumpkin	Republic of Korea, Sakata Seed Sudamerica
Radish	Republic of Korea, BASF
Shallot	Netherlands
Squash	Italy, Sakata Seed Sudamerica
Tomato	China, Italy, Netherlands, Republic of Korea, BASF, Croplife International, Sakata Seed Sudamerica
Water melon	China, Italy, Republic of Korea, BASF, Croplife International

Proposals for UPOV initiatives

11. The coordination group on vegetable crops agreed that it would be useful to introduce an item at the BMT, inviting breeders, lawyers and policy makers to discuss ownership matters, and establish criteria to make possible for exchanging materials and DNA information among UPOV members.

Fruit crops and forest trees

Summary of crop interest

Apple	Canada, European Union, France, Netherlands, Republic of Korea, CIOPORA
Apricot	France
Blueberry	Netherlands, Republic of Korea, United Kingdom
Cherry	France
Citrus	CIOPORA
Elm (Ulmus)	Netherlands
Fraxinus	Netherlands
Japanese Plum	France
Peach	France, Republic of Korea
Pear	France
Raspberry	Netherlands, United Kingdom
Strawberry	China, France, Netherlands

Proposals for UPOV initiatives

12. The coordination group on fruit crops and forest trees agreed the importance of ownership matters in order to facilitate international cooperation in relation to the use of molecular techniques.

Ornamental plants

Summary of crop interest

Chrysanthemum	Netherlands
Gypsophila	Netherlands
Helleborus	Netherlands
Hydrangea	France
Lilium	Netherlands
Phalaenopsis	Netherlands
Rose	China, Netherlands, CIOPORA
Tree Peony	China

Plans for cooperation

- Rose: After finalizing cooperation between the Netherlands and CIOPORA, China could explore the possibility to cooperate on validating between labs.

Proposals for UPOV initiatives

13. The coordination group on ornamental plants, at its second round, agreed that it would be useful to organize sessions to share experiences on how to overcome the ownership matters in order to facilitate international cooperation in relation to the use of molecular techniques.

14. The coordination group on ornamental plants agreed that it would be useful to establish common databases to facilitate international cooperation in relation to the use of molecular techniques.

Conclusions of the BMT

15. Taking into account the reports of the cooperation sessions, the BMT noted the common interest to address issues concerning cooperation between partners and service providers, including confidentiality, access to data and material, authorization for work to be performed and availability of results and information to partners and agreed to add this as an agenda item for it eighteenth session in order for experts, including breeders, to present information on their experiences (see proposed agenda item 8 “Management of databases and exchange of data and material” for the eighteenth session of the BMT).

16. The BMT agreed to propose to the Technical Committee (TC) that the results of the coordination session in the BMT be reported to the other Technical Working Parties (TWPs) and that the TWPs be invited to undertake a similar session to build on the BMT outcomes and feed into the future work of the BMT. The BMT agreed that the information on crop interest by participants at the sixteenth session of the BMT should be added to the above in the document to be prepared for the TWPs and the eighteenth session of the BMT.

DEVELOPMENTS AT THE FIFTY-FOURTH SESSION OF THE TECHNICAL COMMITTEE

17. The TC, at its fifty-fourth session, held in Geneva, on October 29 and 30, 2018, agreed that the results of the coordination session in the BMT, at its seventeenth session, as set out in paragraphs 7 to 16 of this document, be reported to the other TWPs. The TC agreed to invite the TWPs to undertake a similar session to build on the BMT outcomes and feed into the future work of the BMT. The TC agreed that discussion groups should be formed for the main crops at each TWP to allow participants to exchange information on their work on biochemical and molecular techniques and explore areas for cooperation (see document TC/54/31 “Report”, paragraph 281).

DEVELOPMENTS AT TECHNICAL WORKING PARTIES IN 2019

18. At their sessions in 2019, the Technical Working Party for Ornamental Plants and Forest Trees (TWO), the Technical Working Party for Vegetables (TWV), theTechnical Working Party for Fruit Crops (TWF) and the Technical Working Party for Agricultural Crops (TWA) considered document TWP/3/7 “Molecular Techniques” (see documents TWO/51/12 “Report”, paragraphs 36 and 51, TWV/53/14 “Report”, paragraphs 40 and 56, TWF/50/13 “Report”, paragraphs 56 and 74 and TWA/48/9 “Report”, paragraphs 50 and 72).

Technical Working Party for Ornamental Plants and Forest Trees

19. The following information on their work on biochemical and molecular techniques and possible areas for cooperation was provided by TWO participants (see document TWO/51/12 “Report”, paragraphs 52 and 53):

Australia	• DNA information may be used in some cases of infringement action; • currently considering constituting DNA collection for native species
China	• crop interest: forestry sector and woody ornamentals, *Fraxinus* in particular; • currently developing databases with DNA information for Rose, Poplar and Tree Peony
European Union:	• applicants for new varieties of Rose can request for a fee to have a DNA sample extracted and stored; similar procedure for fruit crops under consideration
France	• crop interest: Hydrangea; • currently testing a set of molecular markers for Hydrangea varieties
Netherlands	• crop interest: *Chrysanthemum*, *Gypsophila, Helleborus*, *Lilium, Phalaenopsis* and Rose; • currently building a DNA database for *Fraxinus* and *Ulmus*; • DNA information used for varietal identity; • possible future development of databases with DNA information for ornamental plants

20. The TWO agreed that possible UPOV initiatives on international cooperation in relation to the use of molecular techniques could include the development of guidance on collecting DNA samples, ownership of material collected and how to facilitate the use of material or information.

Technical Working Party for Vegetables

21. Following subgroup discussions, the following information on their work on biochemical and molecular techniques and possible areas for cooperation was provided by TWV participants (see document TWV/53/14 “Report”, paragraph 57):

Summary of crops and authorities currently using (or under development) biochemical and molecular techniques in the vegetable sector

Tomato	China, European Union, (France), (Italy), Netherlands, Republic of Korea
Pepper	China, (France), Republic of Korea
Watermelon	Republic of Korea
Melon	(France), Republic of Korea
Lettuce	France, (Italy), Japan, (Netherlands), Republic of Korea
Cabbage	European Union, Netherlands, Republic of Korea
Mushroom	Japan
French bean	Netherlands
Pea	(Netherlands), (United Kingdom)
Onion	Netherlands
Eggplant	(China)

Summary of current use of biochemical and molecular techniques in the vegetable sector

Use:
Management of reference collections
Selection of similar varieties/ grouping characteristics
Variety identification
Enforcement of IP Rights/ infringement
Check specific characteristics (e.g. male sterility, disease resistance: as replacement or addition to bioassay)
Techniques:
SSRs
SNPs
Electrophoresis (Isoenzyme)

Summary of possible areas of cooperation for the use of biochemical and molecular techniques in the vegetable sector

Encourage sharing of data & techniques
Facilitate cooperation & training
Encourage exchange of DNA/market set (no living organisms) and seeds
Ensuring consistency among UPOV members in the use of BMT
Identify focal point for molecular techniques in DUS examination for each UPOV member and make this information available via the UPOV website
Develop guidance on collecting DNA samples, ownership of material exchanges (confidentiality)
Update guidance on how to use information and exchange DNA material
Explore the possibility to build a “UPOV” DNA database, “UPOV” marker set
Develop guidance and/or training for specialized courts/ experts
Set up comparative trials (e.g. Harmores project)
Encourage and promote the work of the BMT as platform to improve cooperation and encourage participation from members
Encourage and improve cooperation with breeders and their representatives

Technical Working Party for Fruit Crops

22. Following subgroup discussions, the following information on their work on biochemical and molecular techniques and possible areas for cooperation was provided by TWF participants (see document TWF/50/13 “Report”, paragraph 75):

Summary of crops and authorities currently using biochemical and molecular techniques in the fruit sector

Czech Republic	Grapevine
France	Apple, Peach, Pear, Sweet Cherry, Apricot, Japanese Plum
Germany	Pear, Apple, Strawberry, Sweet Cherry, Sour Cherry
Republic of Korea	Apple, Grapevine, Peach, Pear, Strawberry
Morocco	Citrus, Date Palm
Italy	Grapevine
Hungary	Grapevine, Peach, Cherry, Sour Cherry, Apricot, Plum,
Spain	Almond, Apricot, Avocado, Banana, Cherimoya, Citrus, Fig tree Grapevine, Hazelnut Mango, Peach, Pear, Pineapple, Strawberry, Sweet Cherry, Walnut,
Japan	Apple, Citrus, Pineapple, Japanese Pear, Sweet Cherry, Strawberry, Grapevine

Summary of current use of biochemical and molecular techniques in the fruit sector

Use:
Management and description of variety collections
Genetic distance and molecular profiling
Uniformity assessment
Research purposes
Enforcement
Identification of varieties for certification scheme purposes.
Techniques:
SSR
SNPs

Summary of possible areas of cooperation for the use of biochemical and molecular techniques in the fruit sector

Develop and share common databases (identifying a leading country and coordinator)
Sharing techniques
Harmonize projects/markers/methods/procedures
Exchange of knowledge and techniques
Encourage crop experts to attend BMT meetings

Technical Working Party for Agricultural Crops

23. Following subgroup discussions, the following information on their work on biochemical and molecular techniques and possible areas for cooperation was provided by TWA participants (see document TWA/48/9 “Report”, paragraphs 73):

Summary of crop and authorities currently using (or under development) molecular techniques in the agricultural sector

Argentina	Soya Bean, Cotton, Rice, Wheat, Barley
Australia	Sugarcane, Wheat, Cotton
Brazil	Soya Bean
Canada	Potato
China	Maize, Wheat, Cotton, Rape Seed, Sunflower, Potato, Sorghum, Rice, Soya Bean
Czech Republic	Maize, Wheat, Barley
Dominican Republic	Rice, Sugarcane, Cacao
European Union	Potato, Maize, Rape Seed
Germany	Potato, Maize, Rape Seed
Italy	Soya Bean, Rice, Khorasan Wheat
Japan	French bean, Adzuki Bean, Tea, Sunflower, Maize, Potato
Kenya	Tea, Tomato, Maize
Republic of Korea	30 crops
Slovakia	Potato
United Kingdom	Potato, Rape Seed
United States of America	Maize, Soya Bean
Uruguay	Soya Bean, Maize, Wheat

Summary of current use of molecular techniques in the agricultural sector

Techniques:	
	CAPS (JP)
	Elisa (IT, UY)
	MNP (CN)
	PCR (IT, KE, UY)
	QPCR (UY)
	RAPID STS (JP)
	SNP (AR, AU, CN, DE, GB, IT, JP, KR, QZ, US, UY)
	SSR (BR, CN, CZ, DK*, GB, IT, JP, KR, QZ, SK) *sporadic use
Use:	
	DUS examination, incl. selection of similar varieties and management of variety collections (CN, CZ, KR, QZ)
	complementary tool for uniformity (AR, IT)
	databases for Potato (CA, DE, GB, NL, QZ, SK)
	database for Maize, Rape Seed (QZ)
	sample authentication (GB)
	variety purity in certified seeds (IT, KR)
	GMO detection (AR, IT, KR, UY)
	Bt gene detection (AU)
	virus assessment (KR)
	variety identification (AR, BR, CN, DK, IT, UY)
	market control of seed trade (UY)
	enforcement (AR, JP)

Summary of possible areas of cooperation for the use of molecular techniques in the agricultural sector

International collaboration for the constitution of common databases
Addressing practical aspects such as access rights, financial issues, incl. benefit sharing and material transfer agreements
Provision of training to UPOV members on the use of BMTs in DUS examination
Sharing sets of markers and protocols to reduce size of variety collections
Cooperation on testing varieties with similar genetic background
Addressing confidentiality issues

24. The TWC, at its thirty-seventh session, to be held in Hangzhou, China, from October 14 to 16, 2019, will consider document TWP/3/7 “Molecular Techniques”.

25. The outcomes of discussion at the TWC, at its thirty-seventh session, to explore areas for cooperation on the use of molecular techniques, will be reported to the BMT, at its eighteenth session

PROPOSAL

26. The BMT may wish to develop proposals on next steps to explore areas for cooperation in the use of molecular techniques.

27. Proposals developed by the BMT, would be reported to the TC, at its fifty-fifth session, to be held in Geneva, on October 28 and 29, 2019.

28. The BMT is invited to consider how the outcomes of the discussions held at the TWPs, at their sessions in 2019, on cooperation in relation to the use of molecular techniques, as set out in paragraphs 19 to 23 of this document, might feed into the work of the BMT.

[End of document]