

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

**BMT/17/5**

**Seventeenth Session  
Montevideo, Uruguay, September 10 to 13, 2018**

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**SESSION TO FACILITATE COOPERATION IN RELATION TO THE USE OF 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 resulting from the discussion groups at the sixteenth session of the BMT to exchange information on their work and explore areas for cooperation in relation to the use of molecular techniques.

2. The BMT is invited to:

(a) note the information on developments resulting from the discussion groups at the sixteenth session of the BMT to exchange information on their work and explore areas for cooperation in relation to the use of molecular techniques, provided by the Netherlands and the United Kingdom, as set out in paragraph 11; and

(b) consider next steps on the basis of the outcomes of the discussion groups that will be held during the seventeenth session of the the BMT.

3. The following abbreviations are used in this document:

BMT: Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular  
CIOFORA: International Community of Breeders of Asexually Reproduced Ornamental and Fruit-Tree Varieties

4. The structure of this document is as follows:

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ANNEX I INFORMATION FROM THE NETHERLANDS

ANNEX II AGRICULTURAL DISCUSSION GROUP SUMMARY PREPARED BY THE UNITED KINGDOM

**BACKGROUND**

5. At the sixteenth session of the BMT, held in La Rochelle, France, from November 7 to 10, 2017, discussion groups were formed for: agricultural crops; fruit crops; ornamental plants and forest trees; and vegetables, for BMT participants to exchange information on their work and explore areas for cooperation. (see document BMT/16/29 “Report”, paragraphs 48 to 53).

6. The BMT noted the following outcomes of the discussions:

*Agricultural Crops*

7. The United Kingdom to compile a list of crops of interest to members of the Union.

*Fruit Crops*

8. The following interest in cooperation was identified:

- Apple: Australia, Canada, France, Republic of Korea, United Kingdom, CIOPORA
- Stone fruit: France, Republic of Korea, Spain, United Kingdom
- Berries: Austria, Germany, Netherlands, United Kingdom, CIOPORA
- Nuts: China, Spain

*Ornamental Plants and Forest Trees*

9. Opportunities for cooperation on Rose to be explored by Netherlands (coordinator), China, United Kingdom and CIOPORA.

*Vegetables*

10. The following UPOV members would share their criteria for selecting crops for work in relation to the use of molecular techniques: Canada; China; France; Germany; Netherlands (coordinator); Republic of Korea; United Kingdom.

DEVELOPMENTS SINCE THE SIXTEENTH SESSION

11. The Office of the Union received information from the Netherlands and the United Kingdom, copies of which are provided in document BMT/17/15 and the Annexes to this document as follows:

- Annex I Information from the Netherlands
- Annex II Agricultural discussion group summary prepared by the United Kingdom

12. The BMT, at its seventeenth session, will have a session for each discussion group, on the afternoons of September 11 and 12, 2018.

13. *The BMT is invited to:*

*(a) note the information on developments resulting from the discussion groups at the sixteenth session of the BMT to exchange information on their work and explore areas for cooperation in relation to the use of molecular techniques, provided by the Netherlands and the United Kingdom, as set out in paragraph 11; and*

*(b) consider next steps on the basis of the outcomes of the discussion groups that will be held during the seventeenth session of the the BMT.*

[Annexes follow]

## INFORMATION FROM THE NETHERLANDS

**Criteria for building variety databases based on SNPs**

For which crops do we (start to) build databases, based on SNP?

1. crops for which we have each year a large number of new candidates or the presence of other finance sources
2. crops for which the current set of morphological characteristics does not sufficiently discriminate distinct varieties
3. crops where in the process of selection of reference varieties for the growing trial efficiency and/or a higher level of reliability can be achieved
4. vegetatively propagated crops for which a living reference collection is needed
5. crops for which environmental, phytosanitary or legal regulations complicate building a living reference collection
6. crops for which the database may have multiple use: not only for the DUS test, but also for inspection, certification, quality control, health, assistance in enforcement?
7. crops where DNA markers correlated to characteristics are applied
8. crops where we experience discussions on identity (during DUS test, infringement, complaint)
9. crops where international cooperation or harmonization is wanted or needed
10. crops for which the development of a SNP marker set is expected within reasonable time within reasonable expenses/costs (reference genome, ploidy, propagation method, sequence data in public databases, availability of DNA from earlier projects)

**Situation at Naktuinbouw (The Netherlands) in 2018**

status	Crop group	crop	type	number of DUS tests per year	main criteria
In use	Ornamental	Phalaenopsis	SSR	130	1, 4, 9
In use	Agricultural	potato	SSR	50	1, 3, 4, 5, 9
In use	Fruit	Raspberry	SNP	0	6, 10
In development	Ornamental	Rose	SNP	140	1, 4
In development	Vegetable	tomato	SNP	120	1, 3, 7, 9, 10
In development	Agricultural	Perennial ryegrass (Lolium perenne)	SNP		1, 2
In development	Fruit	Blueberry		0	6
In development	Trees	Elm (Ulmus)	SNP	0	6
In development	Trees	Fraxinus	SNP	0	6
Expected 2024	Vegetable	French bean	SNP	15	3, 9
Expected 2024	Vegetable	Onion/shallot	SNP	30	3
Expected 2024	Vegetable	Lettuce	SNP	150	1, 3,, 6, 7, 8
Expected 2024	Vegetable	Cucumber	SNP	45	1, 3, 6, 10
Expected 2024	Ornamental	Chrysanthemum	SNP	100	1, 4
Expected 2024	Vegetable	Pepper	SNP	100	1, 3, 6
Expected 2024	Ornamental	Tulip	SNP	80	1, 8
Expected 2024	Agricultural	Cannabis	SNP	25	4, 5
Expected 2024	Vegetable	Melon	SNP	25	3, 6
Wishlist	Vegetable	Watermelon		12	
Wishlist	Ornamental	Helleborus		10	
Wishlist	Vegetable	Carrot		20	
Wishlist	Vegetable	Spinach		50	
Wishlist	Vegetable	Celery/celериac		8	
Wishlist	Vegetable	Bunching onion		1	
Wishlist	Ornamental	<i>Gypsophila</i>		3	
Wishlist	Ornamental	<i>Lilium</i>		70	

## AGRICULTURAL DISCUSSION GROUP SUMMARY PREPARED BY THE UNITED KINGDOM

The following technical platforms are used:

Technical Platform	Country
SSR (Capillary EP/DNA Barcoding)	UK, FR, BE, CZ,AT
SNP Kasp	FR, BE, CZ, UK
ISSR	FR
AFLP – Capillary	BE
NGS – RadSeq	AT
Large throughput	USA

The following crops are of interest:

Crop	Interested Party
Barley	Austria, Canada, Czech Republic, Finland, Poland, United Kingdom
Cereals	Belarus, Canada, Finland, Poland
Clover	(Belgium)
Cotton	China
Durum wheat	Austria
Field Beans	United Kingdom
Hemp	Austria
Maize	Argentina, China, Czech Republic, Germany, United States of America
Oats	Finland, Poland, United Kingdom
Oilseed Rape/ Canola	Belarus, Canada, Czech Republic, Germany, France, United Kingdom
Peas	Canada, United Kingdom
Perennial Ryegrass	(Belgium), Netherlands, United Kingdom
Potato	Belarus, Canada, Germany, Netherlands, United Kingdom
Rice	China, Republic of Korea
Runner Beans	Austria
Sorghum	France
Soybean	Argentina, (Belgium), China, United States of America
Triticale	Finland, Poland
Wheat	Argentina, Austria, Belarus, Canada, China, Czech Republic, Finland, Poland, United Kingdom

- Belgium was interested in data analysis only.
- Germany and France expressed an interested in all major EU agricultural crops, not just those listed above.

It was also suggested that ISF or ESA or similar breeders associations could be approached to request breeder co-operations.