

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

BMT/16/3

Sixteenth Session La Rochelle, France, November 7 to 10, 2017 Original: English Date: October 25, 2017

INTERNATIONAL GUIDELINES ON MOLECULAR METHODOLOGIES INCLUDING COOPERATION BETWEEN OECD, UPOV, ISTA AND ISO

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EXECUTIVE SUMMARY

This document reports on developments concerning the Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction ("BMT Guidelines") and cooperation between OECD, UPOV, ISTA and ISO.

2. The BMT is invited to note that:

- a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods was held in Paris on June 8, 2016, and that the recommendations of the Joint OECD/UPOV/ISTA/AOSA Workshop as reproduced in paragraph 9 of this document, were approved by the Annual Meeting of the OECD Seed Schemes, held in Paris on June 9 and 10, 2016;
- the TC, at its fifty-third 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 agreement by those organizations:
- practical workshops on "DNA Techniques and Variety Identification" were held in Roelofarendsveen, Netherlands, from May 8 to 10, 2017 and from September 20 to 22, 2017;
- the TC agreed that UPOV and OECD should consider making progress in the matters reported in this document if ISTA is unable to participate in the near future.
- 3. The structure of this document is as follows:

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IDENTIFICATION"

ANNEX II AGENDA OF INTERNATIONAL WORKSHOP ON DNA TECHNIQUES AND VARIETY **IDENTIFICATION**

4. The following abbreviations are used in this document:

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

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

BMT GUIDELINES

5. At its forty-fourth session, held in Geneva, Switzerland, October 21, 2010, the Council adopted document UPOV/INF/17/1 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction" ("BMT Guidelines") (see document C/44/17 "Report", paragraph 34).

6. It is recalled that the purpose of the BMT Guidelines is to provide guidance for developing harmonized methodologies with the aim of generating high quality molecular data for a range of applications as follows.

"A. INTRODUCTION

The purpose of this document (BMT Guidelines) is to provide guidance for developing harmonized methodologies with the aim of generating high quality molecular data for a range of applications. The BMT Guidelines are also intended to address the construction of databases containing molecular profiles of plant varieties, possibly produced in different laboratories using different technologies. In addition, the aim is to set high demands on the quality of the markers and on the desire for generating reproducible data using these markers in situations where equipment and/or reaction chemicals might change. Specific precautions need to be taken to ensure quality entry into a database."

7. The BMT Guidelines will be reviewed at the sixteenth session of the BMT (see agenda item 11, document BMT/16/4 "Review of document UPOV/INF/17 "Guidelines for DNA-Profiling: Molecular Marker Selection and Database Construction ('BMT Guidelines')").

COOPERATION BETWEEN OECD, UPOV, ISTA AND ISO

8. The background to this matter is provided in document BMT/15/5 "Cooperation between OECD, UPOV, ISO and ISTA".

OECD/UPOV/ISTA Joint Workshop on Molecular Techniques

- 9. A Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods was held in Paris, France, on June 8, 2016, and the following recommendations of the Joint OECD/UPOV/ISTA/AOSA Workshop were approved by the Annual Meeting of the OECD Seed Schemes, held in Paris, France, on June 9 and 10, 2016:
 - (a) To develop a joint document explaining the principal features (e.g. DUS, variety identification, variety purity, etc.) of the systems of OECD, UPOV, AOSA and ISTA and, for mutual understanding, to repeat the joint workshop at relevant meetings of the OECD and ISTA;
 - (b) To carry out a joint inventory by UPOV, OECD, AOSA and ISTA of the use of molecular marker techniques, by crop, with a view to developing a document containing that information. The OECD will contribute to the document by sharing the ongoing list of molecular techniques used by National Designated Authorities (NDAs) and continuously collected by the Secretariat;
 - (c) To develop a list of terms and their definitions as used by OECD, UPOV, AOSA and ISTA and to make an attempt to harmonize these;

- (d) To consider organizing another similar workshop in three years' time; and
- (e) To consider replacing the term used in the OECD Seed Schemes for the status of DNA based techniques from "internationally validated" to another term such as "internationally harmonized."
- 10. The Annual Meeting of the OECD Seed Schemes endorsed the proposal of the Netherlands to organize a practical workshop in 2017, with support of the OECD, UPOV and ISTA, to explore how molecular techniques might be applied in an efficient way for UPOV, OECD and ISTA purposes.

Developments at the fifty-third session of the TC

- 11. The TC, at its fifty-third 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 (see document TC/53/31, paragraph 199 to 203).
- 12. The TC 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.
- 13. The TC 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 agreement by those organizations.
- 14. The TC considered whether to explore circumstances in which the same techniques and information could be used by OECD, ISTA and UPOV, taking into account the different objectives of the organizations, and agreed that the organization by Naktuinbouw of a practical workshop in 2017, in Roelofarendsveen, Netherlands, from May 8 to 10, 2017, could explore such possibilities on the basis of real situations.
- 15. The TC agreed that UPOV and OECD should consider making progress in the matters above if ISTA was unable to participate in the near future.
- 16. The TC noted that a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods had been held in Paris on June 8, 2016, and that the recommendations of the Joint OECD/UPOV/ISTA/AOSA Workshop as reproduced in document TC/53/11, paragraph 25, had been approved by the Annual Meeting of the OECD Seed Schemes, held in Paris on June 9 and 10, 2016 (see document TC/53/31, paragraph 209).

Practical Workshops on "DNA Techniques and Variety Identification"

17. In relation to paragraph 14 of this document, a practical workshop "DNA Techniques and Variety Identification" was held in Roelofarendsveen, Netherlands, from May 8 to 10, 2017 and an "International Workshop on DNA Techniques and Variety Identification" was held in Roelofarendsveen, Netherlands, from September 20 to 22, 2017. The agendas of these workshops are reproduced in Annex I and II to this document, respectively.

18. The BMT is invited to note that:

(a) a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods was held in Paris on June 8, 2016, and that the recommendations of the Joint OECD/UPOV/ISTA/AOSA Workshop as reproduced in paragraph 9 of this document, were approved by the Annual Meeting of the OECD Seed Schemes, held in Paris on June 9 and 10, 2016;

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- (b) the TC, at its fifty-third 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 agreement by those organizations;
- (c) practical workshops on "DNA Techniques and Variety Identification" were held in Roelofarendsveen, Netherlands, from May 8 to 10, 2017 and from September 20 to 22, 2017; and
- (d) the TC agreed that UPOV and OECD should consider making progress in the matters reported in this document if ISTA is unable to participate in the near future.

[Annexes follow]

ANNEX I

AGENDA OF PRACTICAL WORKSHOP "DNA TECHNIQUES AND VARIETY IDENTIFICATION"

8 - 10 May, 2017, Naktuinbouw, Roelofarendsveen, Netherlands

AGENDA			DNA techniques and variety		parallel Program	
7.02.107.	\vdash	+	identification Group 1		Group 2	
Monday, May 8, 2017			Subject	By	Subject	By
focus: introduction and DNA basics		8:30	Transportation to Naktuinbouw	Bus		
	9:00 · 9:15	9:15	Registration	All		
	9:30	- 10:00	Introduction of participants Lecture: Introduction to Naktuinbouw	Bert Scholte		
Coffee	10:00	10:20	Film about Naktuinbouw coffee break	Bert Scholte		
Сопее	10:50	11:00	Agenda of the workshop	Bert Scholte		
	11:00	- 11:40 - 11:45	Lecture: DNA; the basics Video: sampling of potato	Hedwich Teunissen video		
	11:45	- 12:05	sample own potato	Menno Hoekstra / Alex Reid	make description of own potato and	Amanda van Dijk / Jan Kees
		_	make description of own potato and	Amanda van Dijk / Jan Kees	photographs of plants sample own potato and watch film of	Schipper
	12:05	- 12:25	photographs of plants	Schipper Schipper	Variety reseach at Naktuinbouw	Menno Hoekstra / Alex Reid
Lunch	12:30	- 13:30	Lecture: Introduction to ISTA and			Menno Hoekstra / Daniel
	13:30	- 14:00	developments on the use of DNA for	Chiara Delogu	Hands-on DNA extraction	Deinum / Alex Reid / Hedwich
		_	variety identification within ISTA system Lecture: introduction to OECD and			Teunissen Menno Hoekstra / Daniel
	14:00	- 14:30	developments on the use of DNA for	Gerry Hall	Hands-on DNA extraction	Deinum / Alex Reid / Hedwich
	 	_	certification within OECD system Lecture: introduction to UPOV and			Teunissen Menno Hoekstra / Daniel
	14:30	- 15:00	developments on the use of DNA for PVR	Leontino Traveira	Hands-on DNA extraction	Deinum / Alex Reid / Hedwich
Coffee	15:00	- 15:30	within UPOV system coffee break			Teunissen
				Menno Hoekstra / Daniel	Lecture: Introduction to ISTA and	
	15:30	- 16:00	Hands-on DNA extraction	Deinum / Alex Reid / Hedwich	developments on the use of DNA for	Chiara Delogu
		\perp		Teunissen	variety identification within ISTA system	
	16:00	- 16:30	Hands-on DNA extraction	Menno Hoekstra / Daniel Deinum / Alex Reid / Hedwich	Lecture: introduction to OECD and developments on the use of DNA for	Gerry Hall
	. 3.00	. 5.55		Teunissen	certification within OECD system	
	16:30	- 17:00	Hands-on DNA extraction	Menno Hoekstra / Daniel Deinum / Alex Reid / Hedwich	Lecture: introduction to UPOV and developments on the use of DNA for PVR	Leontino Traveira
				Teunissen	within UPOV system	
	17:00	- 21:00	Dinner in Kaag en Braassem Transportation to hotel	all Bus		
Tuesday, May 9, 2017 focus: genotyping		0.20	Group 1	B.vo	Group 2	
technologies	\vdash	8:30	Transportation to Naktuinbouw	Bus		
		0.45	video on DNA quanitification and discusion			
	9:00	9:15	on results DNA extraction previous day, compare different DNA extraction methods	video		
I			Lecture: DNA amplification by PCR, real-			
	9:15	- 10:00	time PCR and primer/probe design,	Alex Reid		
Coffee	9:15	- 10:00 - 10:30	time PCR and primer/probe design, optimization and validation	Alex Reid		
Coffee			time PCR and primer/probe design, optimization and validation coffee break Lecture: overview PCR based genotyping	Alex Reid Hedwich Teunissen / Alex Reid	Hands-on: performing SSR - PCR	Laboratory
Coffee	10:00	- 10:30	time PCR and primer/probe design, optimization and validation		Hands-on: performing SSR - PCR	Laboratory Laboratory
Coffee	10:00 10:30 11:30	- 10:30 - 11:30 12:00	time PCR and primer/probe design, optimization and validation coffee break Lecture: overview PCR based genotyping technologies Lecture: The potato system excursion: Naktuinbouw ISTA accreditated	Hedwich Teunissen / Alex Reid Alex Reid	Hands-on: performing SSR - PCR excursion: Naktuinbouw CPVO	Laboratory
	10:00 10:30 11:30	- 10:30 - 11:30 12:00 - 12:45	time PCR and primer/probe design, optimization and validation coffee break Lecture: overview PCR based genotyping technologies Lecture: The potato system	Hedwich Teunissen / Alex Reid	Hands-on: performing SSR - PCR	
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[Annex II follows]

ANNEX II

AGENDA OF INTERNATIONAL WORKSHOP ON DNA TECHNIQUES AND VARIETY IDENTIFICATION

20 – 22 September, 2017, Naktuinbouw, Roelofarendsveen, Netherlands

AGENDA			DNA techniques and variety			parallel Program		
			identification Group 1			Group 2		
Wednesday, September 20, focus: introduction and	2017	8:30	Subject Transportation to Naktuinbouw	Bus	Location R'veen	Subject	By	Location
DNA basics	9:00 -	9:10	Registration	All	Eik			
	9:10 9:15	9:15 9:30	Agenda of the workshop	Bert Scholte All	Eik Eik			
	9:30	9:40	Introduction of participants film to introduce Naktuinbouw	Bert Scholte	Eik			
	9:40	10:00	Lecture: Introduction to Naktuinbouw and Variety testing	Bert Scholte	Eik			
Coffee	10:00 - 10:30 -	10:30	coffee break Lecture: DNA; the basics	Hedwich Teunissen	Eik			
	11:15	11:30	Lecture: sampling and DNA extraction Video: sampling of potato and freeze-	Hedwich Teunissen	Eik			
	11:30 -	11:35	drying	Hedwich Teunissen	Eik			
	11:35 -	11:45	sample own potato	Sebastiaan Flanderhijn / Daniel Deinum	Eik	sample own potato	Hedwich Teunissen	kantine achterin
	11:45 - 12:15	12:15 12:45	make description of own potato Lecture: molecular markers: the basics	Amanda van Dijk Hedwich Teunissen	Eik Eik	make description of own potato	Jan Kees Schipper	kantine achterin
Lunch	12:45	13:30	buffet Lecture: Introduction to ISTA and					
	13:30 -	14:00	developments on the use of DNA for	Chiara Delogu	Eik	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	S25 lab
			variety identification within ISTA system Lecture: introduction to OECD and				Daniel Deinum / Sebastiaan	
	14:00	14:30	developments on the use of DNA for certification within OECD system	Gerry Hall	Eik	Hands-on DNA extraction	Flanderhijn	S25 lab
	14:30	15:00	Lecture: introduction to UPOV and developments on the use of DNA for PVR	Leontino Traveira	Eik	Hands-on DNA extraction	Daniel Deinum / Sebastiaan	S25 lab
			within UPOV system			Traine or brot oxidetion	Flanderhijn	OLO IGID
Coffee	15:00 15:10	15:10 15:30	Photo of the whole group coffee break	All	Outside?			
	45.00	40.00	Manufa an DNA automation	Daniel Deinum / Sebastiaan	COE I-h	Lecture: Introduction to ISTA and	Chiana Datana	Eii.
	15:30 -	16:00	Hands-on DNA extraction	Flanderhijn	S25 lab	developments on the use of DNA for variety identification within ISTA system	Chiara Delogu	Eik
	40.00	40.00	Manda an DMA autor :	Daniel Deinum / Sebastiaan	COE I-h	Lecture: introduction to OECD and	0	E#.
	16:00 -	16:30	Hands-on DNA extraction	Flanderhijn	S25 lab	developments on the use of DNA for certification within OECD system	Gerry Hall	Eik
	16:30 -	17:00	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	S25 lab	Lecture: introduction to UPOV and developments on the use of DNA for	Leontino Traveira	Eik
	17:00 -	21:00	Dinner in Kaag en Braasum	Flanderhijn all	restaurant	PVR within UPOV system		
			Transportation to hotel	Bus				
Thursday, September 21, 20	17		Group 1			Group 2		
focus: genotyping technologies		8:30	Transportation to Naktuinbouw	Bus	R'veen			
	9:00	9:10	video on DNA quantification and discusion on results DNA extraction	Hedwich Teunissen	Eik			
			previous day Lecture: DNA amplification by PCR, real-					
	9:10	10:00	time PCR and primer/probe design,	Hedwich Teunissen	Eik			
Coffee	10:00 -	10:30	optimization and validation coffee break					
	10:30	11:30	Lecture: overview PCR based genotyping technologies	Hedwich Teunissen	Eik	Hands-on: performing SSR - PCR	Laboratory	S25-lab
	11:30	12:00	Lecture: Harmonization between labs: The potato system	Hedwich Teunissen	Eik	Hands-on: performing SSR - PCR	Laboratory	S25-lab
	40.00	40.45	excursion: Naktuinbouw ISTA	Edition Francis	Lab S22	excursion: Naktuinbouw CPVO	A	Mariata Canta
	12:00 -	12:45	accreditated laboratory	Erik van Egmond	LaD 322	accreditated Examination office- variety centre	Amanda van Dijk	Variety Centre
Lunch	12:45 - 13:30	13:30	Hands-on: performing SSR - PCR	Laboratory	S25 lab	Lecture: overview PCR based	Hedwich Teunissen	Eik
				,		genotyping technologies Lecture: Harmonization between labs:		Fik
	14:30	15:00	Hands-on: performing SSR - PCR excursion: Naktuinbouw CPV0	Laboratory	S25 lab	The potato system	Hedwich Teunissen	EIK
	15:00 -	15:45	accreditated Examination office- variety	Amanda van Dijk	Variety Centre	excursion: Naktuinbouw ISTA accreditated laboratory	Erik van Egmond	Lab S22
Coffee	15:45 -	16:15	Coffee break			·		
	16:15	17:15 17:15	Lecture: DNA sequencing Transportation to hotel	Hedwich Teunissen Bus	Eik			
Friday, September 22, 2017			Group 1			Group 2		
focus: data analysis and		8:30	Transportation to Naktuinbouw	Bus	R\veen			
applications of genotyping		0.30		500				
	9:00 -	9:05	Video: Loading SSR reactions on LICOR gel and running	Hedwich Teunissen	Eik			
	9:05	9:40	Lecture: data analysis Hands-on exercise: translation of own	Hedwich Teunissen	Eik	Hands-on exercise: translation of own		
	9:40	10:30	potato fingerprint in allele scores, similarity values with whole group and	Sebastiaan Flanderhijn / Daniel Deinum	Eik	potato fingerprint in allele scores, similarity values with whole group and	Amanda van Dijk / Hedwich Teunissen	apple / paprika
C-#	40.00	44.00	visualisation in dendrogram	Daniel Dellan		visualisation in dendrogram		
Coffee	10:30 -	11:00	Coffee break Hands-on exercise: translation of own			Hands-on exercise: translation of own		
	11:00 -	11:30	potato fingerprint in allele scores, similarity values with whole group and	Sebastiaan Flanderhijn / Daniel Deinum	Eik	potato fingerprint in allele scores, similarity values with whole group and	Amanda van Dijk / Hedwich Teunissen	apple / paprika
			visualisation in dendrogram			visualisation in dendrogram		
	11:30 -	12:15	Discussion: results on potato analysis	Hedwich Teunissen / Amanda van Dijk / Sebastiaan	Eik			
			both groups	Flanderhijn / Daniel Deinum				
Lunch	12:15	13:00	Leeture: The Maize eveters	Muriel Thomasset	Eik			
	13:00	13:45	Lecture: The Maize system Lecture: databases containing DNA	(bioGEVES)				
	13:45	14:30	profiles in UPOV	Hend Madhour (UPOV)	Eik			
	14:30	15:00	Lecture: management of reference collection: example French Bean	Amanda van Dijk	Eik			
Coffee	15:00 -	15:30	Coffee break Lecture: Variety Tracer and Green	Hadwigh Touris	Eil.			
	15:30 -	16:00	Forensics Discussion: the future of genotyping for	Hedwich Teunissen	Eik			
	16:00 -	16:45	variety identification in certification, seeds testing and DUS testing	All	Eik			
	16:45	17:00	concluding remarks	Bert Scholte	Eik			
			Transportation to Schiphol Airport/Trainstation	Bus	Schiphol			
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