UPOV

International Union for the Protection of New Varieties of Plants

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

BMT/16/13

Sixteenth Session
La Rochelle, France, November 7 to 10, 2017

Original: English
Date: November 2, 2017

DNA TECHNIQUES AND VARIETY IDENTIFICATION – 2017 EVALUATION

Document prepared by experts from the Netherlands

Disclaimer: this document does not represent UPOV policies or guidance

The Annex to this document contains a copy of a presentation on "DNA techniques and Variety Identification – 2017 evaluation", prepared by experts from the Netherlands, to be made at the sixteenth session of the Working Group on Biochemical and Molecular Techniques and DNA-Profiling in Particular.

[Annex follows]

ANNEX

DNA TECHNIQUES AND VARIETY IDENTIFICATION – 2017 EVALUATION

Presentation prepared by experts from the Netherlands

International Workshop – DNA Techniques and Variety Identification – 2017 Evaluation

Bert Scholte
Hedwich Teunissen

UPOV BMT - November 2017

Background / Occasion

UPOV BMT
- Seoul (2014)
- Moscow (2016)
- La Rochelle (2017)

Joint workshops
- OECD (2015)
- ISTA (2017)

Purpose of the workshop

- Developments on the use of DNA in UPOV, ISTA and OECD
- Possibilities of DNA techniques for variety identification
- Overview of the various techniques for basic understanding
- Advantages and disadvantages – the do's and don'ts
- For people working in the field of variety testing (DUS, certification, enforcement etc..) without a lab background

Personal aim of the workshop

Challenge

world of scientists
molecular biologists
technical people

السّلام

peace

world of policy makers
crop specialists
PVP specialists
legal people

שָׁלוֹם

Set-up of the workshop

Three day workshop

- May 8, 9 and 10
- September 20, 21 and 22

Educational forms

-lectures (a lot of theoretical knowledge)

-hands-on exercises in the lab

-hands on exercises outside the lab

-video's / films

-excursions

Two groups; plenary and parallel sessions

Example Sept 20

AGENDA			DNA techniques and variety identification			parallel Program		
			Group 1			Group 2		
Wednesday, September 20, 2017			Subject	By	Location	Subject	By	Location
focus: introduction and DNA basics		8:30	Transportation to Naktuinbouw	Bus	Arkeen			
	9:00 -	9:10	Registration	All	Elk			
	9:10 -	9:15	Agenda of the workshop	Bert Schotte	Elk			
	9:15 -	9:30	Introduction of participants	All	Elk			
	9:30 -	9:40	Film to introduce Naktuinbouw	Bert Schotte	Elk			
	9:40	10:00	Lecture: introduction to Naktuinbouw and variety testing	Bert Schotte	Elk			
Coffee	10:00 -	10:30	coffee break					
	10:30 -	11:15	Lecture: DNA, the basics	Hedwich Teunissen	Elk			
	11:15 -	11:30	Lecture: sampling and DNA extraction	Hedwich Teunissen	Elk			
	11:30 -	11:35	Video: sampling of potato and freeze-drying	Hedwich Teunissen	Elk			
	11:35 -	11:45	sample own potato	Sebastiaan Flanderhijn / Daniel Deinum	Elk	sample own potato	Hedwich Teunissen	kantine achterin
	11:45 -	12:15	make description of own potato	Amanda van Dijk	Elk	make description of own potato	Jan Kees Schipper	kantine achterin
	12:15	12:45	Lecture: molecular markers: the basics	Hedwich Teunissen	Elk			
Lunch	12:45 -	13:30	buffet					
	13:30 -	14:00	Lecture: introduction to ISTA and developments on the use of DNA for variety identification within ISTA system	Chiara Delogu	Elk	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	525 lab
	14:00 -	14:30	Lecture: introduction to OECD and developments on the use of DNA for certification within OECD system	Gerry Hall	Elk	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	525 lab
	14:30 -	15:00	Lecture: introduction to UPOV and developments on the use of DNA for PVR within UPOV system	Leontino Traveira	Elk	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	525 lab
	15:00	15:10	Photo of the whole group	All	Outside?			
Coffee	15:10 -	15:30	coffee break					
	15:30 -	16:00	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	525 lab	Lecture: introduction to ISTA and developments on the use of DNA for variety identification within ISTA system	Chiara Delogu	Elk
	16:00 -	16:30	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	525 lab	Lecture: introduction to OECD and developments on the use of DNA for certification within OECD system	Gerry Hall	Elk
	16:30 -	17:00	Hands-on DNA extraction	Daniel Deinum / Sebastiaan Flanderhijn	525 lab	Lecture: introduction to UPOV and developments on the use of DNA for PVR within UPOV system	Leontino Traveira	Elk
	17:00 -	21:00	Dinner in Kaag en Braassum	all	restaurant			
			Transportation to hotel	Bus				

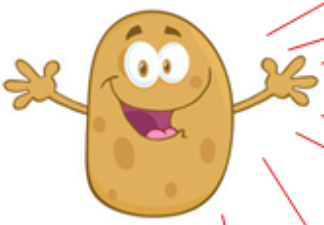
Day 1: Introduction and DNA basics

Day 2: Genotyping technologies

Day 3: Data analysis and applications of genotyping

Set-up of the workshop

Your compagnon during the workshop……



Morphological description CPVO TP 023/3

Sampling

DNA extraction Qiagen Plant mini kit

DNA quantification

DNA amplification of SSR markers (SSR-PCR)

DNA profiling (on Licor gel)

Analysis of the profiles (scoring the alleles)

Compare the profiles and find your match

Topics

1. Introduction to Naktuinbouw, ISTA, OECD and UPOV
2. DNA; the basics, sampling and DNA extraction
3. DNA amplification (PCR)
4. Overview of PCR based genotyping technologies
5. DNA sequencing
6. Data analysis
7. Applications….

Topics

7. Applications

- management of reference collections:
  - -potato system and harmonisation between labs
  - -maize system (Sept)
  - -French bean system
- -Databases containing DNA profiles in UPOV (Sept)
- -Workflow solutions by biotech service providers (May)
- -Genotyping for QC by breeding industry (May)
- -Variety tracer and enforcement of PBR

International DNA workshop – evaluation

2017	1st session May 8-10	2nd session September 20-22
Participants	37	34
Countries	17	20

The max number of participants was 32 due to limited space in the lab.

International DNA workshop – evaluation

2017	1st session May 8-10	2nd session September 20-22
Participants	37	34
- DUS background	8	8
- Certification	7	7
- Laboratory	6	4
- Company / Institute	9	12
- Lawyers / Enforcement	7	1

International DNA workshop – evaluation

2017	1st session May 8-10	2nd session September 20-22
Countries	17	20
- EU	AT, CZ, DE, DK, ES, FR, IRL, IT, NL, PL	AT, BE, CZ, DK, ES, FR, HU, IRL, IT, NL, SK, UK
- Europe (-EU)	N, SRB	N, RS, SRB, UA
- Americas	COL, MEX, UR, USA	MEX, BRA
- Africa	SA	SA
- Asia	-	MY

International DNA workshop – evaluation

2017	1st session May 8-10	2nd session September 20-22
How do you rate the workshop elements? Topics valuable addition to the program? Scale 1-5	4,4	4,4
Quality of the trainers and the instructions? Scale 1-5	4,4	4,6

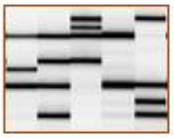
Discussion

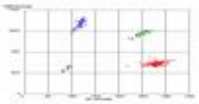
DNA techniques must be used

- In testing for Distinctness, Uniformity and Stability (DUS)
  (No correlation DNA - specific traits)
- Management Reference Collection
  (Selection varieties to be tested in the field)
- Decision on Distinctness

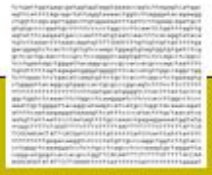
Phenotype vs Genotype

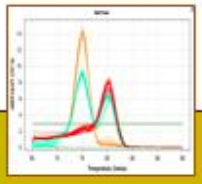
Or / And??





- Two kind of descriptions of the same material
- These descriptions act complementary
- Comparable challenges in both systems





Discussion

DNA techniques must be used

- In Certification
- ISTA (seed testing)
- OECD (varietal identity and purity)

Discussion

Variety description - Possibilities

- Phenotype.
- Phenotype **and** Genotype must be considered.
- Genotype.

Discussion

Future perspective - Big Data

- In future the phenotype of a variety can be predicted like the wheather by using DNA techniques.

And now?

- Prepare internal workshop to exchange information and knowledge between DUS experts and LAB experts of Naktuinbouw
- Why? To speak the same language and know what we might expect from each other
- Forseen for Oct or Nov 2018
- Is there a need for another international workshop?
- Are there other needs?

Acknowlegdements

All speakers/teachers:

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All preparations:

Ellen de Jongh, Esther Verdegaal, Bert Scholte, Amanda van Dijk, Hedwich Teunissen, Daniel Deinum, Sebastiaan Flanderhijn, Menno Hoekstra, Jan Kees Schipper

The logistics:

Ellen de jongh, Esther Verdegaal, the ladies from the catering, the busdrivers

nak tuinbouw

[End of Annex and of document]