|  |  |
| --- | --- |
|  | E |
| International Union for the Protection of New Varieties of Plants |  |

|  |  |
| --- | --- |
| Technical Working Party on Testing Methods and Techniques  Second Session Virtual meeting, April 8 to 11, 2024 | TWM/2/21  Original: English  Date: April 11, 2024 |

Report

Adopted by the Technical Working Party on Testing Methods and Techniques

Disclaimer: this document does not represent UPOV policies or guidance

## Opening of the session

1. The Technical Working Party on Testing Methods and Techniques (TWM) held its second session, organized by electronic means, from April 8 to 11, 2024. The list of participants is reproduced in Annex to this report.
2. The session was opened by Ms. Nuria Urquía (European Union), Chairperson of the TWM, who welcomed the participants.
3. The TWM was welcomed by Ms. Yolanda Huerta, Vice Secretary-General, via video message.

## Adoption of the agenda

1. The TWM adopted the agenda as reproduced in document TWM/2/1 Rev.2

## Guidance and information materials

1. The TWM noted the information provided in document TWP/8/1.

## Technical Committee subgroup on Test Guidelines

1. The TWM received an oral report from Ms. Margaret Wallace (United Kingdom).
2. The TWM noted progress on the individual consultations with subgroup members and the preliminary findings on the extent of use of Test Guidelines in printed format and digital versions. The TWM noted that the subgroup findings would be discussed at the TWPs in 2024 and reported to the TC, at its sixtieth session.

## Variety description databases including databases containing molecular data

### Implementation of Purdy’s notation for pedigrees in UPOV PRISMA

1. The TWM received a presentation from Mr. Emerson Limberger, International Seed Federation (ISF), on “Implementation of Purdy’s notation for pedigrees in UPOV PRISMA”, a copy of which is reproduced in document TWP/8/3.
2. The TWM agreed that it would be useful to have a guided interface to help users providing information and checking the correctness of information submitted using the Purdy’s notation (a “wizard”).
3. The TWM noted that UPOV members could have different requirements on providing parentage information in breeders’ rights application forms.
4. The TWM noted that the possibility to use Purdy’s notation in online application forms available in UPOV PRISMA would be useful for applicants due to the reduction of the number of data fields required to provide parentage information for authorities requesting that information.
5. The TWM agreed to invite the Office of the Union to provide information on any implications of utilizing the Purdy’s notation in the online application forms available in UPOV PRISMA or UPOV guidance.
6. The TWM noted that the same presentation would be made for the other TWPs, at their sessions in 2024, and reported to the Technical Committee (TC).

## Software and statistical analysis methods for DUS examination

### (a) Statistical tools and methods for DUS examination

#### The Combined-Over-Years Uniformity Criterion (COYU)

#### Development of software for the improved COYU method (splines)

#### Extrapolation in relation to COYU

1. The TWM considered document TWM/2/3 and received a presentation from Mr. Adrian Roberts (United Kingdom) on “The Combined-Over‑Years Uniformity Criterion (COYU)”, a copy of which was provided in document TWM/2/3 Add.
2. The TWM noted that the DUSTNT software had been improved to facilitate the introduction of the new COYU module with splines. The TWM noted that the new version of DUSTNT would be made available for UPOV members evaluation from May 2024, before its launch in May 2025. The TWM agreed to invite UPOV members to participate in the test campaign for the new DUSTNT software and to report outcomes to the expert from the United Kingdom.
3. The TWM agreed to invite the United Kingdom to report developments on the evaluation exercise for the new DUSTNT software, including the new COYU module, and the draft guidance on extrapolation at its third session.

#### Comparison of results obtained for COYD and COYU procedures using different software Extrapolation in relation to COYU

1. The TWM received a presentation from Mr. Frédéric Lafayette (France) on “Comparison of software for COYD”, a copy of which is reproduced in document TWM/2/20.
2. The TWM noted that the software compared produced the same results for COYD analysis. The TWM noted that the software comparison would continue and that the results of comparison for COYU would be presented to the TWM at its third session.
3. The TWM noted the invitation from China for the comparison exercise to be extended to other methods, such as the Fisher’s Exact Test.

#### Development of Big Data platform for DUS examination

1. No documents were received for this agenda item. The TWM agreed to invite China to report developments at its third session.

### (b) Exchange and use of software and equipment

##### Statistical Analysis Software used for DUS testing of Plant Variety (DUSCEL4.0)

1. The TWM received a presentation from Mr. Kun Yang (China) on “Statistical Analysis Software used for DUS testing of Plant Variety (DUSCEL4.0)”, a copy of the presentation is provided in document TWM/2/11.
2. The TWM noted that DUSCEL was used in China for the examination of chrysanthemum, gerbera, lily, maize, rice and wheat varieties.
3. The TWM noted that, in response to Circular E-24/006[[1]](#footnote-1), China had proposed the inclusion of the DUSCEL software in document UPOV/INF/16 “Exchangeable Software”, under section (d) DUS trial design and data analysis. The TWM noted the availability of a user’s manual and software interface in English.
4. The TWM agreed to recommend to the TC, at its sixtieth session, the inclusion of the DUSCEL software in document UPOV/INF/16.

## Phenotyping and image analysis

### (a) Assessment of color characteristics using image analysis

#### A method for calibration of size and color used in image analysis

1. The TWM received a presentation from Mr. Kun Yang (China) on “A method for calibration of size and color used in image analysis”, a copy of the presentation is provided in document TWM/2/10.
2. The TWM noted the research on color calibration using different light sources, beyond the standard provided in Test Guidelines (CIE Standard of Preferred Daylight D 6500).

### (b) Application of Imaging Analysis on DUS Testing

#### UAV-based field phenotyping in the United Kingdom agricultural DUS testing

1. The TWM received a presentation from Mr. Alex Talibudeen (United Kingdom) on “UAV-based field phenotyping in the United Kingdom agricultural DUS testing”, a copy of the presentation is provided in document TWM/2/8.
2. The TWM noted developments on the introduction of UAV-based field phenotyping in the United Kingdom and that a compared analysis using image analysis and manual observations was being conducted.
3. The TWM noted new types of characteristics assessed using image analysis, such as growth profiles and vegetative index.

1. The TWM noted that assessments using image analysis could provide in some cases higher precision levels than manual assessments. The TWM agreed that the consequences of increased precision levels on DUS examination should be further considered as characteristic assessments using image analysis were introduced in routine procedures.

#### Application of Imaging Analysis on DUS Test

1. The TWM received a presentation from Ms. Yanfang Liu (China) on “Application of Imaging Analysis on DUS Test”, a copy of the presentation is provided in document TWM/2/13.
2. The TWM noted the use of image analysis for the automation of assessments for several characteristics in Maize and the use of image analysis to assess additional characteristics, such as seed vigor.

## Developments in molecular techniques and bioinformatics

### (a) Latest developments in molecular techniques and bioinformatics

#### WIPO Standard ST.26 - WIPO Sequence

1. The TWM received a presentation from Ms. Emma Francis, World Intellectual Property Organization (WIPO) on “WIPO Standard ST.26 - WIPO Sequence”, a copy of the presentation is provided in document TWM/2/15.
2. The TWM noted that search algorithms could be developed for databases containing nucleotide or amino acid information using the WIPO Standard ST.26 data format, including plant variety data.

### Cooperation between international organizations

#### OECD

1. The TWM received a presentation from Mr. Csaba Gaspar, Organisation for Economic Co-operation and Development (OECD), on “Latest developments in the application of BMT under the OECD Seed Schemes”, a copy of the presentation is provided in document TWM/2/19.
2. The TWM noted the use of molecular techniques in the OECD Seed Schemes as a supplementary procedure for variety identification in field trials.
3. The TWM noted that OECD was considering the assessment of characteristics using image analysis and that the use of artificial intelligence algorithms was anticipated to be considered in the future.

#### ISTA

1. The TWM received a presentation from Ms. Ana Laura Vicario, International Seed Testing Association (ISTA), on “ISTA report on the use of molecular techniques”, a copy of the presentation is provided in document TWM/2/18.
2. The TWM noted the invitation for interested experts to join the activities of the ISTA Variety Committee.
3. The TWM thanked OECD and ISTA for reporting developments on the use of molecular techniques in their respective organizations.
4. The TWM noted the invitation from UPOV for the joint organization of an OECD, ISTA and UPOV workshop in the future to discuss the use of molecular techniques in each organization and explore further collaboration in this area.

### Report of work on molecular techniques in relation to DUS examination

#### Reference collection management using molecular markers: a new approach based on genomic prediction

1. The TWM considered document TWM/2/4 and received a presentation from Mr. Adrian Roberts (United Kingdom) on “Genomic prediction for reference collection management”, a copy of which is reproduced in document TWM/2/4 Add..
2. The TWM noted that the genomic prediction method was aimed at establishing links between molecular markers and phenotypic expression of characteristics in ryegrass varieties, and that it might potentially assist in the management of variety collections.
3. The TWM noted that the genomic prediction method had been developed using data from a single trial location and would be further evaluated on other crops where data was available from different locations.

#### Uniformity assessment using molecular markers

1. The TWM considered document TWM/2/5 and received a presentation from Mr. Adrian Roberts (United Kingdom) on “Uniformity assessment using molecular markers”, a copy of which is reproduced in document TWM/2/5 Add..
2. The TWM noted that the research had been conducted assessing the genetic variability of a cross pollinated crop (ryegrass) with measured characteristics and not tested on pseudo-qualitative characteristics.
3. The TWM noted that next steps of the research could investigate measurement error associated with the sequencing methodology through independent runs with the same pooled sample.

#### Molecular approaches to support DUS testing

1. The TWM considered document TWM/2/6 and received a presentation from Ms. Vanessa McMillan (United Kingdom) on “Molecular approaches to support DUS testing”, a copy of which is reproduced in document TWM/2/6 Add..
2. The TWM noted that up to 75% of marker-trait correlation had been achieved in barley varieties, although not in relation to DUS characteristics. The TWM noted the intention to publish the molecular markers identified in the project, which could also be used for authenticating new seedstock of varieties. The TWM agreed to invite the expert from the United Kingdom to report on progress at its third session.

#### CPVO R&D activities

1. The TWM received a presentation from Ms. Cécile Collonnier (European Union) on “CPVO R&D activities”, a copy of the presentation is provided in document TWM/2/12.
2. The TWM noted the contributions of the various projects presented, in particular the INVITE project, which would end in 2024.

#### Maize6H-60K: A genome-wide single nucleotide polymorphism array and its application

1. The TWM received a presentation from Ms. Hongli Tian (China) on “Maize6H-60K: A genome-wide single nucleotide polymorphism array and its application”, a copy of the presentation is provided in document TWM/2/16.
2. The TWM noted that 21% of SNPs in the array were located in coding regions of the genome although their link with the expression of characteristics had not yet been identified.

#### Guidelines for the validation of a new characteristic-specific molecular marker protocol for DUS studies as an alternative method for observation

1. The TWM received a presentation from Ms. Amandine LeVan (France) on “Guidelines for the validation of a new characteristic-specific molecular marker protocol for DUS studies as an alternative method for observation”, a copy of the presentation is provided in document TWM/2/17.
2. The TWM noted that the proposal would be considered by the TWV and reported to the TC, at their sessions in 2024.

### Methods for analysis of molecular data, management of databases and exchange of data and material

1. No documents were received for this agenda item.

### Confidentiality, ownership and access to molecular data, including model agreement template

#### Confidentiality of molecular information

1. The TWM received a presentation on “Confidentiality of Molecular Information” from Mr. Marcel Bruins, CropLife International, on behalf of the African Seed Trade Association (AFSTA), the Asia and Pacific Seed Association (APSA), the International Community of Breeders of Asexually Reproduced Horticultural Plants (CIOPORA), CropLife International, Euroseeds, the International Seed Federation (ISF) and the Seed Association of the Americas (SAA) (“breeders’ organizations”). A copy of the presentation is provided in document TWM/2/7.
2. The TWM noted the request from breeders’ organizations for the development of guidance in UPOV on confidentiality of molecular data and the offer to propose a draft model agreement template, to be presented at its third session.

#### Examples of policies on confidentiality and access to molecular information data

1. No documents were received for this agenda item.
2. The TWM noted that the European Union was expected to adopt a policy on access to plant variety samples, including DNA samples, which would be reported at the TWPs in 2024.
3. The TWM agreed to invite UPOV members to report on existing policies on confidentiality of molecular information at its third session.

### The use of molecular techniques in examining essential derivation

1. No documents were received for this agenda item.

### The use of molecular techniques in variety identification

#### Use of Artificial Intelligence-based Markers for Variety Traceability

1. The TWM received a presentation from Ms. Ana Laura Vicario (Argentina) on “Use of Artificial Intelligence-based Markers for Variety Traceability”, a copy of the presentation is provided in document TWM/2/9.
2. The TWM noted that the technology was used in routine procedures for market control and traceability of barley and wheat varieties in Argentina. The TWM noted that the technology was being developed for soybean varieties.
3. The TWM noted that the algorithm used established unique patterns for each variety based on seed morphology. The TWM noted that the thresholds for decision making and accepted error could be adjusted to enable the analysis of variety purity.

#### LociScan, a tool for screening genetic marker combinations for plant variety discrimination

1. The TWM received a presentation from Mr. Yang Yang (China) on “LociScan, a tool for screening genetic marker combinations for plant variety discrimination”, a copy of the presentation is provided in document TWM/2/14.
2. The TWM noted that the software tool LociScan identified marker set combinations to optimize the number of markers required to discriminate varieties. The TWM noted that the time of analysis required by the tool would be influenced by the number of samples processed and not by the number of markers used.
3. The TWM noted that the software tool LociScan was available for testing and agreed to invite interested experts to test the tool and report results to the expert from China.

### (h) The use of molecular techniques for enforcement

1. No documents were received for this agenda item.

## Matters for information

### Reports on developments in plant variety protection from members and observers

1. The TWM noted that the United Kingdom submitted a report and that further reports submitted until April 11, 2024, would be included in document TWM/2/2 “Reports from members and observers”.

### Reports on developments in UPOV

1. The TWM received a presentation from the Office of the Union on developments in UPOV, a copy of which is provided in document TWP/8/2.

## Date and place of the next session

1. The TWM agreed to hold its third session from April 7 to 10, 2025, by virtual means.
2. The TWM noted that no invitation to host the third session of the TWM had been received. The TWM noted the preference of holding a hybrid meeting at its future sessions. The TWM invited members to contact the Office of the Union to obtain information on the requirements for hosting a TWM session.

## Future program

1. The TWM agreed that documents for its third session should be submitted to the Office of the Union by February 21, 2025. The TWM noted that items would be deleted from the agenda if the planned documents did not reach the Office of the Union by the agreed deadline.
2. The TWM proposed to discuss the following items at its third session:
3. Opening of the Session
4. Adoption of the agenda
5. Matters for discussion
   1. Guidance and information materials (document to be prepared by the Office of the Union)

3.2 Technical Committee subgroup on Test Guidelines (document to be prepared by the United Kingdom)

3.3 Variety description databases including databases containing molecular data (papers invited)

3.4 Software and statistical analysis methods for DUS examination

(a) Statistical tools and methods for DUS examination (papers invited)

(i) The Combined-Over-Years Uniformity Criterion (COYU) (document to be prepared by the United Kingdom and papers invited)

(ii) Comparison of results obtained for COYD and COYU procedures using different software (document to be prepared by France)

(iii) Development of Big Data platform for DUS examination (document to be prepared by China)

(b) Exchange and use of software and equipment (papers invited)

3.5 Phenotyping and image analysis (papers invited)

3.6 Developments in molecular techniques and bioinformatics (papers invited)

(a) Latest developments in molecular techniques and bioinformatics (papers invited)

(b) Cooperation between international organizations (papers invited)

(c) Report of work on molecular techniques in relation to DUS examination (papers invited)

(d) Methods for analysis of molecular data, management of databases and exchange of data and material (papers invited)

(e) Confidentiality, ownership and access to molecular data, including model agreement template (papers invited)

- Examples of policies on confidentiality and access to molecular information data (papers invited)

(f) The use of molecular techniques in examining essential derivation (papers invited)

(g) The use of molecular techniques in variety identification (papers invited)

(h) The use of molecular techniques for enforcement(papers invited)

1. Matters for information

(a) Reports from members and observers (written reports to be prepared by members and observers)

(b) Report on developments in UPOV (general developments, including variety denominations, information databases, exchange and use of software and equipment)

1. Date and place of the next session
2. Future program
3. Adoption of the Report on the session (if time permits)
4. Closing of the session
5. *The TWM adopted this report at the end of the session.*

[Annex follows]

LIST OF PARTICIPANTS

I. mEMBERS

Albania

Eni BULLAJ (Ms.), Testing Specialist, Ministry of Agriculture and Rural Development, Tirana   
(e-mail: eni.bullaj@eshff.gov.al)

Argentina

Ana Laura VICARIO (Sra.), Ms.), National Director of Seed Development, National Seeds Institute (INASE), Secretary of Bioeconomy, Ministry of Economy, Buenos Aires  
(e-mail: [alvicario@inase.gob.ar](mailto:alvicario@inase.gob.ar))

Mariano Alejandro MANGIERI (Mr.), Director, Plant Variety Protection Office, National Seeds Institute (INASE), Secretary of Bioeconomy, Ministry of Economy, Buenos Aires  
(e-mail: mmangieri@inase.gob.ar)

Alberto BALLESTEROS (Mr.), Examier officer. Plant Variety Protection Office, National Seeds Institute (INASE), Secretary of Bioeconomy, Ministry of Economy, Buenos Aires   
(e-mail: aballesteros@inase.gob.ar)

armenia

Meruzhan ZADAYAN (Mr.), Head of Research Department, Center for Agriculture Research and Certification State Non-Commercial Organization, Ministry of Agriculture, Merdsavan   
(e-mail: meruzhanzadayan.carc@gmail.com)

Vagharsh MELKUMYAN (Mr.), Scientific Researcher, Center for Agricultural Research and Certification, Ministry of Agriculture, Merdzavan   
(e-mail: vagharshmelkumyan.carc@gmail.com)

Australia

Barkat MUSTAFA (Mr.), PBR Examiner, Plant Breeders Rights Section, IP Australia, Phillip Act   
(e-mail: Barkat.Mustafa@ipaustralia.gov.au)

Hai LE (Mr.), PBR Examiner, Plant Breeders Rights Section, IP Australia, Phillip Act   
(e-mail: hai.le@ipaustralia.gov.au)

Austria

Jakob SEEREITER (Mr.), DUS Expert, AGES - Austrian Agency for Health and Food Safety, Wien   
(e-mail: jakob.seereiter@ages.at)

Bulgaria

Diliyan Rousev DIMITROV (Mr.), Head of Variety Testing Department, Executive Agency for Variety Testing, Field Inspection and Seed Control (IASAS), Sofia   
(e-mail: ddimitrov@iasas.government.bg)

CANADA

Marie-Claude GAGNON (Ms.), Head, Genotyping/Botany Laboratory, Canadian Food Inspection Agency (CFIA), Ottawa   
(e-mail: marie-claude.gagnon@inspection.gc.ca)

Lisa LEDUC (Ms.), Examiner, Plant Breeders' Rights Office, Canadian Food Inspection Agency (CFIA), Ottawa   
(e-mail: lisa.leduc@inspection.gc.ca)

Graham THURSTON (Mr.), Examiner, Plant Breeders' Rights Office, Canadian Food Inspection Agency (CFIA), Ottawa   
(e-mail: graham.thurston2@inspection.gc.ca)

CHINA

Yehan CUI (Mr.), President of UPOV Council, Research Fellow, Development Center of Science and Technology (DCST), Ministry of Agriculture and Rural Affairs (MARA), Beijing   
(e-mail: cuiyehan@agri.gov.cn)

Kun YANG (Mr.), Deputy Director, Associate Researcher, Beijing Sub-Center of New Plant Variety Tests, Ministry of Agriculture and Rural Affairs, China, affiliated to Institute of Vegetables and Flowers under Chinese Academy of Agricultural Sciences, Beijing   
(e-mail: yangkun@caas.cn)

Ruixi HAN (Mr.), Deputy Divisional Director, Division of DUS Tests, Development Center of Science and Technology (DCST), Ministry of Agriculture and Rural Affairs (MARA), Beijing   
(e-mail: wudifeixue007@163.com)

Yanfang LIU (Ms.), Deputy Director General, Kunming Testing Sub-station of New Varieties of Plants, Kunming   
(e-mail: liuyf528@163.com)

Jun REN (Ms.), Leader of DNA Section, Research Assistant, Beijing Sub-Center of New Plant Variety Tests, Ministry of Agriculture and Rural Affairs, China, affiliated to Institute of Vegetables and Flowers under Chinese Academy of Agricultural Sciences, Beijing   
(e-mail: renjun@caas.cn)

Dongmei LI (Mr.), Reasearcher Associate, Institute of Crop Breeding, Heilongjang Academy of Agricultural Sciences, Harbin Sub-Center for New Plant VarietyTests, Harbin   
(e-mail: interli02@163.com)

Yongxing WANG (Mr.), Technical Director of sub center, Bayannur   
(e-mail: 545687560@qq.com)

Hankun CUI (Mr.), Information Administrator, Yizhuang Economic and Technological Development Zone, Beijing  
(e-mail: Cui2151916711@163.com)

Haitao ZHOU (Mr.), Technical Director, Gongzhuling Sub-center for New Plant Variety Test, Gongzhuling   
(e-mail: show19830623@aliyun.com)

Hongli TIAN (Ms.), Researcher, Maize Research Institute, Beijing Academy of Agriculture and Forestry Sciences, Beijing   
(e-mail: tianhongli9963@163.com)

Xuhong YANG (Ms.), Senior Examiner, Division of DUS Tests, Development Center of Science and Technology (DCST), Ministry of Agriculture and Rural Affairs (MARA), Beijing   
(e-mail: yangxuhong@agri.gov.cn)

Jian LI (Mr.), Research associate, National DUS testing center for plant varieties, Xuzhou  
(e-mail: lijianlab407@163.com)

Yang YANG (Mr.), Associate Researcher, Maize Research Institute, Beijing Academy of Agriculture and Forestry Sciences, Beijing   
(e-mail: caurwx@163.com)

Dandan DOU (Ms.), Research Assistant, New Plant Variety Testing (Yuanyang) sub-center, Henan   
(e-mail: 1663088940@qq.com)

Yiying ZHANG (Ms.), Research Assistant, Shanghai Sub-Center for Plant New Variety Tests, Shanghai   
(e-mail: zyy425zoey@163.com)

Hongxing WANG (Mr.), Research Assistant, Nanjing DUS Testing Center for New Plant Varieties, Nanjing   
(e-mail: whx821x@126.com)

Lilong LIU (Mr.), Research Assistant, Anhui Academy of Agricultural Sciences, Hefei   
(e-mail: xxlong98@163.com)

Cailing TENG (Ms.), Examiner, evelopment Center for Science and Technology, Beijing   
(e-mail: tengcailing@yaas.org.cn)

Renjing WAN (Mr.), Examiner, Development Center of Science and Technology (DCST), Beijing   
(e-mail: rjwan@jhun.edu.cn)

Xiansheng WANG (Mr.), DUS Examiner, Institute of Germplasm Resources and Biotechnology, Jiangsu Academy of Agricultural Sciences, Nanjing   
(e-mail: wangxiansheng80@126.com)

Caihuan HAO (Ms.), DUS Tester, Jilin Academy of Agricultural Sciences, Gongzhuling   
(e-mail: 123616532@qq.com)

Xinxing ZHOU (Mr.), Tester, Science and Technology Development Center, MARA, Beijing   
(e-mail: 20211012@jaas.ac.cn)

Wei LIU (Ms.), Tester, Gongzhuling Sub-center for New Plant Variety Test, Gongzhuling   
(e-mail: 920991358@qq.com)

Guimin XIN (Mr.), Tester, Gongzhuling Sub-center for New Plant Variety Test, Gongzhuling   
(e-mail: 18743337138@163.com)

Yuanling ZHAO (Ms.), Tester, Harbin Station for DUS testing Center of New Plant Varieties, Harbin   
(e-mail: zylspring@sina.com)

Hao XIE (Mr.), Tester, National DUS testing center for plant varieties, Xuzhou  
(e-mail: 20230065@jaas.ac.cn)

Chaohong DENG (Mr.), Institute of Crop variety Resources, Xinjiang Academy of Agricultural Sciences, Urumqi   
(e-mail: 554517229@qq.com)

Lina ZHANG (Ms.), Guiyang Sub-center for New Plant Variety Tests, Guiyang   
(e-mail: 283114962@qq.com)

Xiaohui DING (Ms.), Ministry of Agriculture and Rural Affairs (MARA), Beijing   
(e-mail: dingxiaohui0903@163.com)

Xingting WU (Ms.)   
(e-mail: wuxingting18@mails.ucas.ac.cn)

Croatia

Luka DRENJANCEVIC Mr.), Coordinator for Plant Variety Description and Post-registration trials, Croatian Agency for Agriculture and Food, Osijek   
(e-mail: luka.drenjancevic@hapih.hr)

Dragana DRKUŠIĆ (Ms.), Senior adviser, Croatian Agency for Agriculture and Food, Osijek   
(e-mail: dragana.drkusic@hapih.hr)

Zvonimir LALIC (Mr.), Senior Adviser, Croatian Agency for Agriculture and Food   
(e-mail: zvonimir.lalic@hapih.hr)

Antonia PETRIC (Ms.), Expert Associate, Croatian Agency for Agriculture and Food, Osijek   
(e-mail: antonia.petric@hapih.hr)

Dora PRPIC (Ms.), Expert associate, Croatian Agency for Agriculture and Food, Osijek   
(e-mail: dora.prpic@hapih.hr)

Ivan VARNICA (Mr.), VCU Examiner of small cereals, Croatian Agency for Agriculture and Food, Institute for Seed and Seedlings, Osijek   
(e-mail: ivan.varnica@hapih.hr)

Czech Republic

Martin TLÁSKAL (Mr.), Biometrician, Central Institute for Supervising and Testing in Agriculture (ÚKZÚZ), Brno   
(e-mail: martin.tlaskal@ukzuz.cz)

Jitka KLEMPOVA (Ms.), Molecular Genetics Diagnostician, Central Institute for supervising and testing in agriculture (ÚKZÚZ), Brno  
(e-mail: jitka.klempova@ukzuz.cz)

Katerina STANKOVA (Ms.), Molecular Genetics Diagnostician, Central Institute for Supervising and Testing in Agriculture (ÚKZÚZ), Brno   
(e-mail: Katerina.Stankova@ukzuz.cz)

EUROPEAN UNION

Nuria URQUÍA FERNÁNDEZ (Ms.), Vice President, Community Plant Variety Office (CPVO), Angers  
(e-mail: urquia@cpvo.europa.eu)

Jean MAISON (Mr.), Deputy Head, Technical Unit, Community Plant Variety Office (CPVO), Angers   
(e-mail: maison@cpvo.europa.eu)

Cécile COLLONNIER (Ms.), Technical Expert, Community Plant Variety Office (CPVO), Angers   
(e-mail: collonnier@cpvo.europa.eu)

Finland

Kaarina PAAVILAINEN (Ms.), Chief Specialist, Finnish Food Authority, Loimaa   
(e-mail: kaarina.paavilainen@ruokavirasto.fi)

Sami MARKKANEN (Mr.), Senior Officer, Seed unit, Finnish Food Authority, Loimaa   
(e-mail: sami.markkanen@ruokavirasto.fi)

FRANCE

Clarisse LECLAIR (Ms.), Head of DUS Testing, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Beaucouzé (e-mail: clarisse.leclair@geves.fr)

Frédéric LAFAILLETTE (Mr.), Head of DUS Fodder plant and Turf grasses, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Erdre-en-Anjou   
(e-mail: frederic.lafaillette@geves.fr)

René MATHIS (Mr.), BioGEVES Director, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Beaucouzé   
(e-mail: rene.mathis@geves.fr)

Arnaud REMAY (Mr.), BioGEVES, Head of Genotyping unit, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Guyancourt   
(e-mail: arnaud.remay@geves.fr)

Aurore PHILIBERT (Ms.), Head of biostatistics department, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Angers   
(e-mail: aurore.philibert@geves.fr)

Amandine LE VAN (Ms.), Head of Detection Pole, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Beaucouzé   
(e-mail: amandine.levan@geves.fr)

Anne BERNOLE (Ms.), Technical Manager Molecular Biology, BioGEVES, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Surgères   
(e-mail: anne.bernole@geves.fr)

Muriel THOMASSET (Ms.), Data Scientist, BioGEVES, Groupe d'étude et de contrôle des variétés et des semences (GEVES), Surgères   
(e-mail: muriel.thomasset@geves.fr)

GERMANY

Beate RÜCKER (Ms.), Head of Division, Bundessortenamt, Hanover   
(e-mail: beate.ruecker@bundessortenamt.de)

Swenja TAMS (Ms.), Head of Section General affairs of DUS testing, Bundessortenamt, Hanover   
(e-mail: Swenja.Tams@bundessortenamt.de)

Frauke LÜDDEKE (Ms.), Head of Section, Biochemical, Biophysical and Molecular Variety Testing, Bundessortenamt, Hanover   
(e-mail: frauke.lueddeke@bundessortenamt.de)

Thomas DROBEK (Mr.), Referat 101, Federal Plant Variety Office, Bundessortenamt, Hanover   
(e-mail: thomas.drobek@bundessortenamt.de)

Fruzsina SCHMIDT (Ms.), Referent, Bundessortenamt, Hanover   
(e-mail: fruzsina.schmidt@bundessortenamt.de)

HUNGARY

Márton PÉCS (Mr.), Agricultural IT Expert, Department of Agricultural Variety Trials, Directorate of Agricultural Genetic Resources, National Food Chain Safety Office (NÉBIH), Budapest   
(e-mail: pecsm@nebih.gov.hu)

ITALY

Fabio GERVASI (Mr.), Researcher and Head of the Examination Office, Council for Agricultural Research and Economics Research Centre for Olive, Fruit and Citrus Crops (CREA-OFA), Italian Patent and Trademarks Office, Ministero delle Imprese e del Made in Italy, Roma   
(e-mail: fabio.gervasi@crea.gov.it)

Giorgia SPATARO (Ms.), Researcher, Research Centre for Plant Protections and Certification (CREA-DC), Milano  
(e-mail: giorgia.spataro@crea.gov.it)

JAPAN

Masahiro SHIRAISHI (Mr.), Deputy Director, PVP office, Ministry of Agriculture, Forestry and Fisheries (MAFF), Tokyo  
(e-mail: masahiro\_shiraish220@maff.go.jp)

Toshiki YAMAMOTO (Mr.), Deputy Adviser, Plant Variety Protection Section, Center for Seeds ans Seedlings (NCSS), National Agriculture and Food Research Organization (NARO), Tsukuba   
(e-mail: yamamotot562@naro.affrc.go.jp)

Kenji KOBAYASHI (Mr.), Senior Staff, DUS Testing Section, Center for Seeds and Seedlings (NCSS), National Agriculture and Food Research Organization (NARO), Tsukuba   
(e-mail: kobayashikenji@affrc.go.jp)

Toshiya KOBAYASHI (Mr.), Senior Staff, Center for Seed and Seedlings (NCSS), National Agriculture and Food Research Organization (NARO), Ibaraki   
(e-mail: kobayashit819@affrc.go.jp)

Takeshi SUGISAWA (Mr.), Senior Examiner, Plant Variety Protection Office, Intellectual Property Division, Export and International Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), Tokyo  
(e-mail: takeshi\_sugisawa820@maff.go.jp)

Yoshiyuki OHNO (Mr.), Examiner, Intellectual Property Division, Export and International Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), Tokyo  
(e-mail: yoshiyuki\_ono300@maff.go.jp)

Hidemi OSHINO (Ms.), Staff, Plant Variety Protection Section, Department of DUS Test and Seed Inspection, Center for Seeds and Seedlings, NARO, Tsukuba   
(e-mail: oshino@affrc.go.jp)

NETHERLANDS (KINGDOM OF THE)

Sanchari SIRCAR (Ms.), Team Lead, Bioinformatics, Naktuinbouw, Roelofarendsveen   
(e-mail: S.Sircar@naktuinbouw.nl)

Cécile MARCHENAY-KOENRAADT (Ms.), DUS Vegetable Crops Specialist, Naktuinbouw, Roelofarendsveen   
(e-mail: c.marchenay@naktuinbouw.nl)

Claire KAMEI (Ms.), Molecular Markers Team Researcher, Naktuinbouw, Roelofarendsveen   
(e-mail: c.kamei@naktuinbouw.nl)

NEW ZEALAND

Cecilia REQUEJO-JACKMAN (Ms.), Senior PVR Examiner, Plant Variety Rights Office, Intellectual Property Office of New Zealand, Ministry of Business, Innovation and Employment, Christchurch   
(e-mail: Cecilia.R-Jackman@pvr.govt.nz)

Jacqueline BROADHEAD (Ms.), PVR Examiner, Plant Variety Rights Office, Intellectual Property Office of New Zealand, Ministry of Business, Innovation and Employment, Christchurch   
(e-mail: jacquie.broadhead@pvr.govt.nz)

Scott GREGAN (Mr.), PVR Examiner, Plant Variety Rights Office, Intellectual Property Office of New Zealand, Ministry of Business, Innovation and Employment, Christchurch   
(e-mail: scott.gregan@pvr.govt.nz)

Republic of Korea

EunHee JEON (Ms.), Agricultural Researcher, Plant Variety Protection Division, Korea Seed and Variety Service (KSVS), Gimcheon City  
(e-mail: ehjeon@korea.kr)

Jahyun LEE (Ms.), Agriculture Researcher, Korea Seed & Variety Service (KSVS), Gimcheon City  
(e-mail: leejahy@korea.kr)

Yongsu KIM (Mr.), Agricultural Researcher, Korea Seed & Variety Service (KSVS), Gimcheon City   
(e-mail: carota@korea.kr)

Romania

Teodor Dan ENESCU (Mr.), Counsellor, State Institute for Variety Testing and Registration (ISTIS), Bucarest   
(e-mail: enescu\_teodor@istis.ro)

Mirela Dana CINDEA (Ms.), Chief of Laboratories Department, State Institute for Variety Testing and Registration (ISTIS), Bucarest  
(e-mail: mirela\_cindea@istis.ro)

George TACCIU (Mr.), Senior Advisor, IT Department, State Institute for Variety Testing and Registration (ISTIS), Bucarest   
(e-mail: george\_tacciu@istis.ro)

Russian federation

Tatiana MAKEEVA (Ms.), Head, Department for Agricultural Crops, State Commission of the Russian Federation for Selection Achievements Test and Protection, Moscow  
(e-mail: zerno@gossortrf.ru)

Slovakia

Ľubomír BASTA (Mr.), Head of DUS testing, Department of Variety Testing, Central Control and Testing Institute in Agriculture (ÚKSÚP), Bratislava   
(e-mail: lubomir.basta@uksup.sk)

Miroslava FEKETOVA (Ms.), National Coordinator for the Cooperation of the Slovak Republic with UPOV, Senior Officer, Department of Molecular Biology NRL, Central Control and Testing Institute in Agriculture (ÚKSÚP), Bratislava   
(e-mail: miroslava.feketova@uksup.sk)

Veronika BOJDOVA (Ms.), Statistician, Central Control and Testing Institute in Agriculture (ÚKSÚP), Bratislava   
(e-mail: Veronika.Bojdova@uksup.sk)

South Africa

Lynette CROUKAMP (Ms.), Examiner, Division of Variety Control, Directorate: Genetic Resources, National Department of Agriculture, Land Reform & Rural Development, Pretoria   
(e-mail: Lynettecroukamp@gmail.com)

Adriaan Jakobus DE VILLIERS (Mr.), Examiner, Division of Variety Control, Directorate: Genetic Resources, Department of Agriculture, Land Reform & Rural Development, Pretoria   
(e-mail: riaandevill@gmail.com)

Donavon SONNENBERG (Mr.), Agricultural Scientist, Department of Agriculture, Land Reform and Rural development, Stellenbosch   
(e-mail: donavon1985@gmail.com)

Luvuyo Michael KHOZA (Mr.), Scientist Production, Department of Agriculture, Land Reform and Rural Development, Stellenbosch   
(e-mail: LuvuyoK@dalrrd.gov.za)

Xolani SIBOZA (Mr.), Scientist Production, Department of Agriculture, Land Reform and Rural Development, Pretoria   
(e-mail: XolaniSi@dalrrd.gov.za)

Spain

Carlos SANZ ZUDAIRE (Sr.), Consejero Técnico, Oficina Española de Variedades Vegetales (MPA y OEVV), Madrid   
(e-mail: csanz@mapa.es)

Türkiye

Mehmet Rifat ALDAG (Mr.), European Union Expert, Ministry of Agriculture and Forestry, Ankara  
(e-mail: mehmetrifat.aldag@tarimorman.gov.tr)

Deryacan AYGÜNES (Ms.), Food Engineer, Ministry of Agriculture and Forestry, Ankara   
(e-mail: deryacan.aygunes@tarimorman.gov.tr)

Ukraine

Larysa PRYSIAZHNIUK (Ms.), Deputy Director of Scientific Work, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: prysiazhniuk\_l@ukr.net)

Iryna DIKHTIAR (Ms.), Head of Department, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: irs2006@ukr.net)

Nataliya KOSTENKO (Mrs.), Head, TG Development Section, DUS-test department, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: kostenko\_np@ukr.net)

Valentyna MATUS (Ms.), Head of sector, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: matysv@ukr.net)

Svitlana LIKAR (Ms.), Expert, Development section of DUS Test Department, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: luzenko4991@ukr.net)

Larysa KOROL (Ms.), Senior Researcher, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: larysa\_korol@ukr.net)

Svitlana SLOBODIANIUK (Ms.), Researcher, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: svitlana2527@gmail.com)

Oksana PISKOVA (Ms.), Scientist, Ukrainian Institute for Plant Variety Examination, Kyiv   
(e-mail: piskova.oksana@gmail.com)

UNITED KINGDOM

Margaret WALLACE (Ms.), Head of Agricultural Crop Characterisation, NIAB, Cambridge   
(e-mail: margaret.wallace@niab.com)

Adrian ROBERTS (Mr.), Head of Operations, Biomathematics & Statistics Scotland (BioSS), Edinburgh   
(e-mail: a.roberts@bioss.ac.uk)

Haidee PHILPOTT (Ms.), Senior Statistician, NIAB, Cambridge   
(e-mail: haidee.philpott@niab.com)

Hilary PAPWORTH (Ms.), Senior Technical Manager, NIAB, Cambridge   
(e-mail: hilary.papworth@niab.com)

Alex TALIBUDEEN (Mr.), Senior Technical Manager - DUS, Agricultural Crops Characterisation, National Institute for Agricultural Botany (NIAB), Cambridge   
(e-mail: alex.talibudeen@niab.com)

Vanessa MCMILLAN (Ms.), Technical Manager, NIAB, Cambridge   
(e-mail: vanessa.mcmillan@niab.com)

Tess VERNON (Ms.), Statistician, Biomathematics & Statistics Scotland (BioSS), Edinburgh   
(e-mail: tess.vernon@bioss.ac.uk)

Trudyann KELLY (Ms.), Consultant Statistican, Agri-Food & Biosciences Institute (AFBI)   
(e-mail: trudyann.kelly@afbini.gov.uk)

UNITED STATES OF AMERICA

Brian IKENBERRY (Mr.), Plant Variety Protection Examiner, Plant Variety Protection Office, Washington D.C.   
(e-mail: brian.ikenberry@usda.gov)

Uruguay

Mariana MENONI (Ms.), Head of Molecualar and Plant Health Sector, Seed Quality Laboratory, Instituto Nacional de Semillas (INASE), Canelones   
(e-mail: mmenoni@inase.uy)

II. Observers

Greece

Alexandra CHATZIGEORGIOU (Ms.), Head, Variety Research Department of Cultivated Plants, Directorate of Propagating Material of Cultivated Plant Species and Plant Genetic Resources, Hellenic Ministry of Rural Development and Food, Sindos - Thessaloniki   
(e-mail: varinst@otenet.gr)

Vasiliki TACHMATZIDOU (Ms.), Variety Research Department of Cultivated Plants, Hellenic Ministry of Rural Development and Food, Sindos - Thessaloniki   
(e-mail: varinst@otenet.gr)

KAZAKHSTAN

Ademi GABDOLA (Ms.), Head of patentability examination department, State Commission for variety testing of agricultural crops, Nur-Sultan   
(e-mail: for\_work\_15@mail.ru)

Suriname

Rinette Ngatinem SOEROPAWIRO (Ms.), Acting Head Seed-Unit Division, Chair of the National Seed Board, Sub Directorate Agri-Health, Ministry of Agriculture, Animal Husbandry and Fisheries, Paramaribo   
(e-mail: rinettesoeropawiro.lvv@gmail.com)

Thailand

Orporn PHUEAKKHLAI (Ms.), Agricultural Research Officer, Practitioner Level, Plant Variety Protection Office, Ministry of Agriculture and Cooperatives, Bangkok   
(e-mail: orpornpk@gmail.com)

Napat SIRISUNTORNLAK (Mr.), Agricultural Research Officer, Horticultural Research Institute, Bangkok   
(e-mail: nabhadra2526tourkrab@gmail.com)

Juthamas FAKTHONGPHAN (Ms.), Agricultural researcher, Department of Agriculture, Bangkok   
(e-mail: Juthamadunl@gmail.com)

Pornpimol SUGANDHAVANIJA (Ms.), Deputy Permanent Representative, Permanent Mission of Thailand to the WTO, Geneva  
(e-mail: pornpimol@thaiwto.com)

III. organizations

AFRICAN SEED TRADE ASSOCIATION

Justin J. RAKOTOARISAONA (Mr.), Secretary General, African Seed Trade Association (AFSTA), Nairobi, Kenya  
(e-mail: justin@afsta.org)

CROPLIFE INTERNATIONAL

Marcel BRUINS (Mr.), Consultant, CropLife International, Bruxelles, Belgium   
(e-mail: marcel@bruinsseedconsultancy.com)

Jan KNOL (Mr.), Plant Variety Protection Officer, Crop Science Division, BASF Vegetable Seeds, Nunhems Netherlands B.V., Nunhem, Netherlands (Kingdom of the)   
(e-mail: jan.knol@basf.com)

EUROSEEDS

Claudius MARONDEDZE (Mr.), Technical Manager Plant Health and Seed Trade, Euroseeds, Bruxelles, Belgium  
(e-mail: claudiusmarondedze@euroseeds.eu)

Jared ONSANDO, Technical Manager Variety Testing and Registration, Bruxelles, Belgium   
(e-mail: JaredOnsando@euroseeds.eu)

INTERNATIONAL COMMUNITY OF BREEDERS OF ASEXUALLY REPRODUCED HORTICULTURAL PLANTS (CIOPORA)

Paulo PERALTA (Mr.), Technical Expert, International Community of Breeders of Asexually Reproduced Horticultural Plants (CIOPORA), Hamburg, Germany   
(e-mail: paulo.peralta@ciopora.org)

INTERNATIONAL SEED FEDERATION (ISF)

Emerson LIMBERGER (Mr.), Technical Manager (Corteva Agriscience), Corteva Agriscence, Aussonne, France   
(e-mail: emerson.limberger@corteva.com)

Barry K. NELSON (Mr.), Research Scientist, Corteva Agriscience, Johnston, United States of America  
(e-mail: barry.nelson@corteva.com)

Astrid M. SCHENKEVELD (Ms.), Specialist Plant breeder's rights & variety registration, Plant breeder's rights & variety registration | Legal, Rijk Zwaan Zaadteelt en Zaadhandel B.V., De Lier, Netherlands (Kingdom of the)   
(e-mail: a.schenkeveld@rijkzwaan.nl)

International Seed Testing Association (ISTA)

Ana Laura VICARIO (Sra.), ISTA Variety Committee Chair, National Seeds Institute (INASE), Secretary of Bioeconomy, Ministry of Economy, Buenos Aires  
(e-mail: [alvicario@inase.gob.ar](mailto:alvicario@inase.gob.ar))

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)

Csaba GASPAR (Mr.), Programme Manager, OECD Seed Schemes & OECD Forest Seed and Plant Scheme, Organisation for Economic Co-operation and Development (OECD), Paris, France   
(e-mail: csaba.gaspar@oecd.org)

SEED ASSOCIATION OF THE AMERICAS (SAA)

Diego A. RISSO DESIRELLO (Sr.), Director Ejecutivo, Seed Association of the Americas (SAA), Montevideo, Uruguay  
(e-mail: drisso@saaseed.org)

WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO)

Emma FRANCIS (Ms.), IP Data Expert, Geneva, Switzerland  
(e-mail: emma.francis@wipo.int)

IV. OfficerS

Nuria URQUÍA FERNÁNDEZ (Ms.), Vice President, Community Plant Variety Office (CPVO), Angers  
(e-mail: urquia@cpvo.europa.eu)

Beate RÜCKER (Ms.), Head of Division, Bundessortenamt, Hanover   
(e-mail: beate.ruecker@bundessortenamt.de)

V. OFFICE OF UPOV

Yolanda HUERTA (Ms.), Vice Secretary-General

Leontino TAVEIRA (Mr.), Director of Global Development and Technical Affairs

Manabu SUZUKI (Mr.), Technical/Regional Officer (Asia)

Kees VAN ETTEKOVEN (Mr.), Technical Expert

Jessica MAY (Ms.), Secretary I

[End of Annex and of document]

1. Circular E-24/006, issued on March 25, 2024, invited members of the Union to propose software for inclusion and information on use of software in document UPOV/INF/16 “Exchangeable Software”. [↑](#footnote-ref-1)