UPOV
International Union for the Protection of New Varieties of Plants

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Technical Working Party for Vegetables
Sixtieth Session
Pacific Grove, United States of America, May 18 to 21, 2026

Technical Working Party on Testing Methods and Techniques
Fourth Session
Cambridge, United Kingdom, June 2 to 5, 2026

Technical Working Party for Agricultural Crops
Fifty-Fifth Session
Seoul, Republic of Korea, June 15 to 18, 2026

Technical Working Party for Ornamental Plants and Forest Trees
Fifty-Eighth Session
Virtual meeting, July 6 to 9, 2026

Technical Working Party for Fruit Crops
Fifty-Seventh Session
Leipzig, Germany, September 7 to 10, 2026

TWP/10/4 Add.
Original: English
Date: May 12, 2026

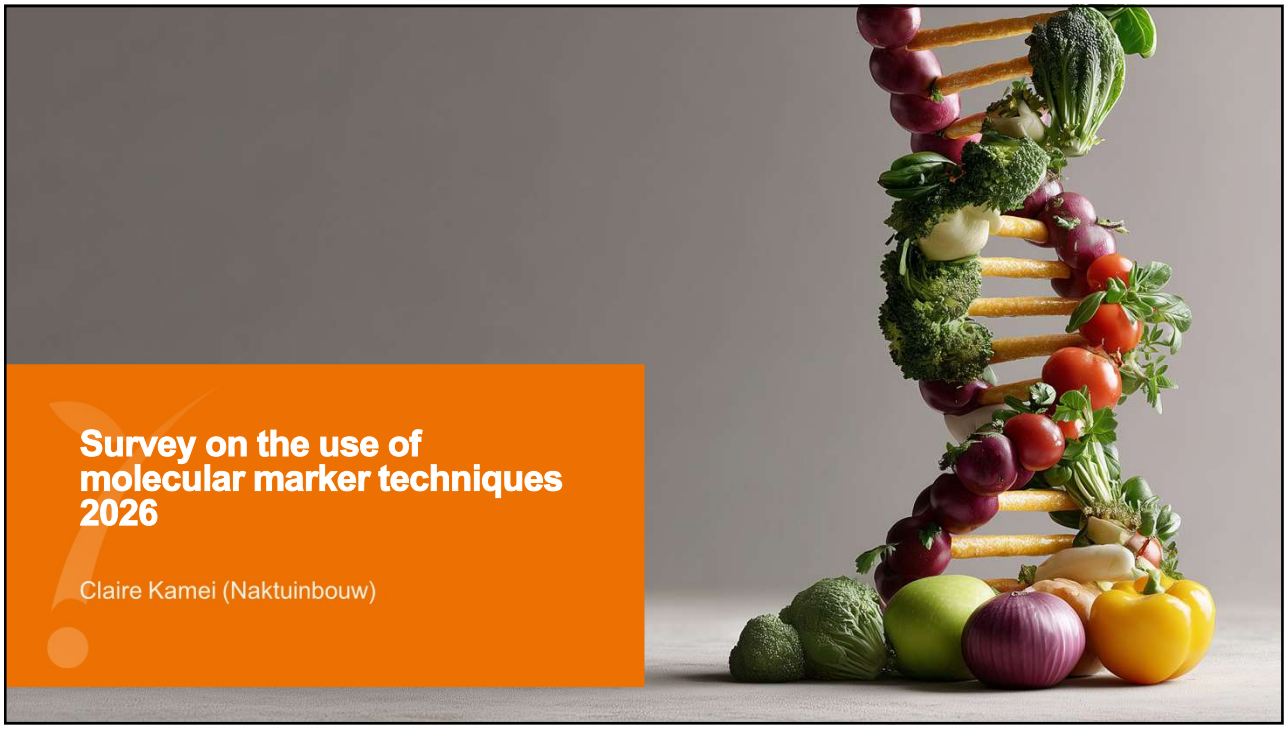
ADDENDUM TO:
MOLECULAR TECHNIQUES

Document prepared by an expert from the Netherlands (Kingdom of)

Disclaimer: this document does not represent UPOV policies or guidance

The annex to this document contains a presentation “Survey on the use of molecular marker techniques 2026”, to be made by an expert from the Netherlands (Kingdom of), at the Technical Working Parties in 2026.

[Annex follows]



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Survey on the use of molecular marker techniques

- *First survey (16 June 2021) – TC/57/8*
  - UPOV members: **74** countries + **2** intergovernmental organizations (EU and OAPI)
  - **Total: 23 replies – 14 YES/ 9 NO**
- *Second survey (6 October 2022) – TC/58/7*
  - UPOV members: **76** countries + **2** intergovernmental organizations (EU and OAPI)
  - First 23 members replied, with 8 providing further updates
  - 15 new members answered the survey (6 YES/ 9 NO)
  - **Total: 38 replies – 20 YES/ 18 NO**

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Survey on the use of molecular marker techniques

- *Third (current) survey (2026)*
  - UPOV members: **78** countries + **2** intergovernmental organizations (EU and OAPI)
  - Not all first 23 members replied (2 previous YES/ 9 previous NO)
  - 15 new members answered the survey (2 YES/ 13 NO)
  - **Total: 39 replies – 21 YES/ 18 NO**

In total, 53 members have once answered the survey from 2020 to 2026.

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What was new in the survey

- Tab **"YES or NO"** – helpful to visualize which UPOV members have answered the survey and if they are currently using or not molecular marker techniques.

- Tab **"Developmental goals"** – a shared space for authorities to highlight challenging DUS characteristics, express needs for marker development, and explore collaboration opportunities, to help align ambitions, stimulate joint efforts, and accelerate marker validation for inclusion in Test Guidelines.

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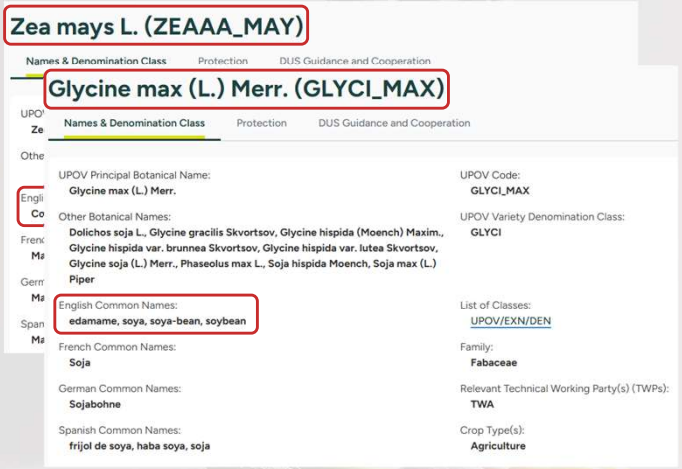
What was done as answers were received

- Confirmed if entries were complete.
- Removed duplicated entries.
- Harmonized terminologies.



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What was done as answers were received

- Confirmed if entries were complete.
- Removed duplicated entries.
- Harmonized terminologies.
- Adjusted where techniques should be placed.
- Expanded list of predefined answers.

Name of molecular marker technique	If you selected "Other technique", please specify

Input information this time	
Questions and Answers / Categories	
Name of molecular marker technique	What is this molecular marker technique used for?
AFLP	Identity
Capillary electrophoresis fragment analysis	Identify, Purity
ESR-SSR	Identity, Purity, Species identification
MNP	New genomic prediction model for variety collection management. Combines aspects of the UPOV characteristic specific model and molecular distances in management of Variety Collection model.
RAPD-SSR	Purity
RAPD-STS	UPOV model "Characteristic-Specific Molecular Markers"
SNP	UPOV model "Combining Phenotypic/ Molecular Distances in Mngmt of Var. Collections
SSR	UPOV model "Combining Phenotypic/ Molecular Distances in Mngmt of Var. Collections but also identity and purity
SSR, SNP	Varietal verification/varietal identity
Taqman	Verification of conformity of plant material to a protected var. for exercise of breeders' rights
Whole genome sequencing	Verification of conformity of plant material to a protected var. for exercise of breeders' rights but also identity
Other technique (please specify)	Verification of conformity of plant material to a protected var. for exercise of breeders' rights but also identity and purity
	Verification of conformity of plant material to a protected var. for exercise of breeders' rights but also identity, purity and verification of hybridity
	Verification of hybridity

Availability of the molecular marker	Stage of development of molecular marker?
DurdusTools: available only for European examination offices entrusted by CPVO	in current use
no longer in use	in use since (yyyy)
proprietary marker	in validation
publicly available	under development
*if marker is under development, this space remains empty	under development, study co-funded by CPVO
	under international validation

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What was done as answers were received

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- Harmonized terminologies.
- Adjusted where techniques should be placed.
- Expanded list of predefined answers.
- Harmonized collaborations.

Crop (botanical name; UPOV code)	Name of molecular marker technique	Country/ Intergovernmental organization	If you selected "Other technique", please specify	What is this molecular marker technique used for?	Characteristic concerned (if applicable)	Source of the molecular marker and contact details	Availability of the molecular marker	Stage of development of molecular marker(s)	Is the molecular marker technique used on routine or occasional basis?	Is the molecular marker validated/ recognized/ authorized?	If YES, by whom? Please provide a reference	Is the molecular marker technique covered by UPOV Test Guideline(s), UPOV TGP document, other UPOV document?	If yes, please specify	Was this molecular marker technique used as part of Seed Certification in the last two years?			Did your Authority create a database with information obtained from use of the molecular marker technique?
														National Certification	OECD certification	In the last 2 years, how many times did the NDA use this method for the purpose of certification	
Durum Wheat (Triticum durum Desf.; TRIT_TUR_DUR)	SNP	AT		UPOV model *Combining Phenotypic/ Molecular Distances in Mngmt of Var. Collections		Commercial chip, de.contact.traitgenetics@sgs.com and sortenwesen@ages.at	DurdusTools: available only for European examination offices entrusted by CPVO	current use	routine	Yes	AT, ES, IT, HU, CPVO	Yes	TGP 15	No	No		Yes, in collaboration with EOs (DurdusTools)
Durum Wheat (Triticum durum Desf.; TRIT_TUR_DUR)	SNP	IT		UPOV model *Combining Phenotypic/ Molecular Distances in Mngmt of Var. Collections		Commercial chip, de.contact.traitgenetics@sgs.com and sortenwesen@ages.at	DurdusTools: available only for European examination offices entrusted by CPVO	current use	routine	Yes	AT, ES, IT, HU, CPVO	Yes	TGP 15	No	No		Yes, in collaboration with EOs (DurdusTools)
Durum Wheat (Triticum durum Desf.; TRIT_TUR_DUR)	SNP	FR		UPOV model *Combining Phenotypic/ Molecular Distances in Mngmt of Var. Collections		Commercial chip, de.contact.traitgenetics@sgs.com and sortenwesen@ages.at	DurdusTools: available only for European examination offices entrusted by CPVO	current use	routine	Yes	AT, ES, IT, HU, CPVO, FR	Yes	TGP 15				Yes, in collaboration with EOs (DurdusTools)

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What was done as answers were received

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- Adjusted where techniques should be placed.
- Expanded list of predefined answers.
- Harmonized collaborations.

- Included gene name for characteristic-specific markers included in the UPOV TG and/or CPVO TP.

  Flower color (CCD4 gene)*

  *Male sterility (CMS** gene)*

  …

  **CCD4: Carotenoid Cleavage Dioxygenase 4*

  ***CMS: Cytoplasmic Male Sterility*

- Updated with latest UPOV TG document for characteristic-specific markers.

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Highlight answers from this survey

- Poland is the first UPOV member to move from not using molecular techniques in previous surveys to reporting updates in the current survey.
- The Republic of Korea has contributed for the first time, reporting 32 entries for 30 crops.
- 7 countries have used the tab "Developmental goals" to share ongoing molecular marker initiatives and collaboration interests, including marker development and validation, variety material exchange, and support for DUS testing and PBR infringement cases.

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On tab "Developmental goals"

- UPOV model 'Characteristic-specific Molecular Markers'

4 resistances (JP and NL)

- *Fol: 0EU/1US*
- *Fol: 1EU/2US (I-2 gene)*
- *Meloidogyne incognita*
- *Passalora fulva (Cf-2 gene)*

JP and NL: same marker goal!

- *Tobamovirus*

Morphological and resistances:

- *Wheat (FR): seed coloration with phenol*
- *Cabbage (NL): marker validation (Fusarium)*
- *Melon (JP): Fusarium races 0,1, 2, 1-2*
- *Maize (ZA): all QN characteristics*

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On tab "Developmental goals"

- UPOV model ' Combining Phenotypic And Molecular Distances In The Management Of Variety Collections'

Most entries looking for the same goal: develop a harmonized and validated set of molecular markers together with other authorities.

- *Avocado (PE)*
- *Cauliflower (NL)*
- *Cocksfoot (FR)*
- *Cucumber/gherkin (NL)*
- *Grapevine (JP and PE)*
- *Hemp (NL)*
- *Lettuce (JP)*
- *Melon (FR and NL)*
- *Oilseed rape (UA)*
- *Poplar (CN)*
- *Rye (UA)*
- *Strawberry (JP)*
- *Tall Fescue (FR)*
- *Tangerine (PE)*

Similar challenges – possible collaborations?

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- *Tall Fescue (FR)*
- *Tangerine (PE)*

Asking for varieties to help build a truly global and representative DNA collection.

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- *Tall Fescue (FR)*
- *Tangerine (PE)*

Ukraine seeks further validation and use of SNP markers, building on TWM/3 outcomes, to support DUS testing and variety assessment.

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What is next

- *The molecular markers list can still be improved and filled with missing information – not all feedback was received on time to finalize this work.*
- *If UPOV members didn't receive the request to answer the survey – please check your contact list with UPOV.*
- *There were many updates from 2022 to now – should we set a plan to update the survey every 2 years? Are there UPOV members interested to assist and take turns for this task?*
- *Tab "Developmental goals" – how to move forward? Should we have a reserved moment to discuss UPOV members new goals in the next TWPs?*

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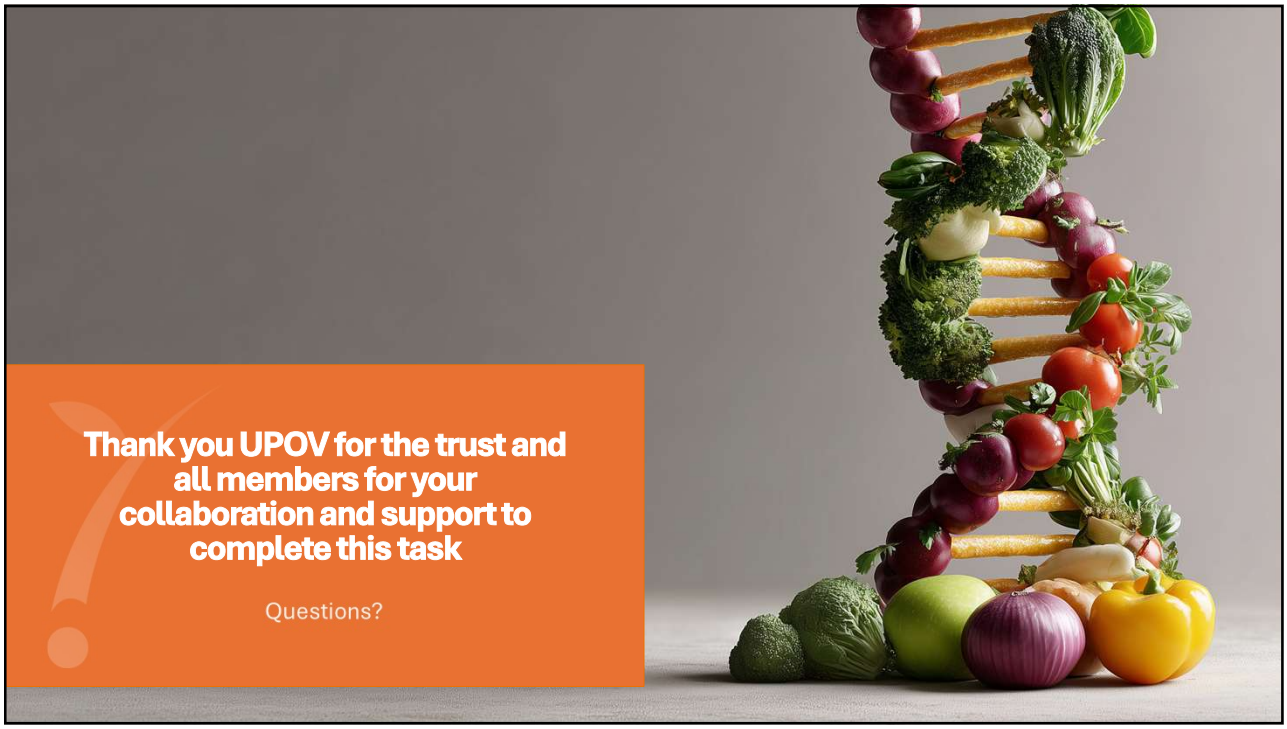

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[End of Annex and of document]