

Technical Working Party for Ornamental Plants and Forest Trees TWO/57/2

Fifty-Seventh Session  
Roelofarendsveen, Kingdom of the Netherlands,  
March 31 to April 3, 2025

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## REPORTS ON DEVELOPMENTS IN PLANT VARIETY PROTECTION FROM MEMBERS AND OBSERVERS

*Document prepared by the Office of the Union*

*Disclaimer: this document does not represent UPOV policies or guidance*

1. The Technical Committee (TC), at its forty-seventh session, held in Geneva from April 4 to 6, 2011, agreed to request the Office of the Union to invite experts to submit written reports to the Office of the Union in advance of the Technical Working Party (TWP) sessions in order that a document containing those reports could be prepared by the Office of the Union. The TC noted that TWP experts would be invited to make a brief oral summary of their written report at the session and would also be encouraged to make reports under the agenda item “Experiences with new types and species”, as appropriate. The TC also noted that TWP experts would have an opportunity to raise questions concerning matters of interest (see document TC/47/26 “Report on the Conclusions”, paragraphs 9 and 10).

2. Written reports were invited by the Office of the Union in Circular E-25/001 of January 21, 2025. The following reports were received in alphabetical order):

- ✓ Members of the Union: Annexes I to V: European Union, France, Japan, the Netherlands (Kingdom of) and the United Kingdom

[Annexes follow]

## EUROPEAN UNION

## 1. CPVO STATISTICS AND ACTIVITIES

Statistics

CPVO applications increased in 2024, with 3268 applications in total (previous year: 2866, +14%).

The distribution between crop sectors was as follows:

- **Ornamental, 1130 applications (34.58%), previous year (1088 applications, 38%),**
- Agricultural, 1132 applications (34.64%), previous year (841 applications, 29.5%),
- Vegetable, 748 applications (22.89%), previous year (670 applications, 23%),
- Fruit, 258 applications (7.89%), previous year (267 applications, 9.5%).

The increase in the number of applications was in the agricultural sector (+34.60%), in the ornamental sector (+3.86%) and in the vegetable sector (+11.64%) is contrasted by a slight decrease in application in the fruit sector last year (-9 applications; -3.37%).

In 2024, the Office granted 2 605 titles for Community protection; 31 317 titles were in force by the end of the year. National authorities from all over the world regularly base their decisions on applications for CPVRs on technical examinations carried out on behalf of the CPVO (international cooperation, takeover of reports). In 2024, the CPVO provided 588 technical reports to 34 countries (550 in 2022 and 1266 in 2023), among which 336 in the ornamental sector. The five countries from which most requests emanated were the United Kingdom, Colombia, Canada, Kenya, and Brazil. More statistics are available on the CPVO website: [Statistics | CPVO \(europa.eu\)](https://cpvo.europa.eu)

Administrative Council (AC)

The CPVO is supervised by an Administrative Council (AC) comprising representatives of the Member States and the European Commission and their alternates. In 2024, the members of the AC adopted the following:

- AC agreement for cooperation with China (MARA) to organize DUS examination or take-over of DUS reports of several species of Mushrooms (*Flammulina velutipes* (Fr.) Sing, *Hypsizygus marmoreus* (Peck) Bigelow, *Lentinula edodes* (Berk.) Pegler, *Morchella* Dill. ex. Pers.
- Agreement on reviewed of the CPVO Policy on Plant material submitted for DUS testing: clarification that "Material" also covers DNA; clarification on the use of material for R&D purpose.
- In the course of 2024, the following technical protocols were adopted by the AC, based on the UPOV TGs.

|   |  |                     |
|---|--|---------------------|
| common millet                             | <i>Panicum miliaceum</i> L.  | CPVO-TP/248/1       |
| Cauliflower                               | <i>Brassica oleracea</i> L. convar. <i>botrytis</i> (L.) Alef. var. <i>botrytis</i> L.                           | CPVO-TP/045/2-Rev.3 |
| red cabbage, white cabbage, savoy cabbage | <i>Brassica oleracea</i> L. var. <i>capitata</i> L.  | CPVO-TP/048/3-Rev.3 |
| Brussels sprout                           | <i>Brassica oleracea</i> L. var. <i>gemmifera</i> Zenker   | CPVO-TP/054/2-Rev.2 |
| Kohlrabi                                  | <i>Brassica oleracea</i> L. var. <i>gongylodes</i> L. ( <i>Brassica oleracea</i> Kohlrabi Group)                 | CPVO-TP/151/2-Rev.3 |
| Broccoli                                  | <i>Brassica oleracea</i> L. var. <i>italica</i> Plenck   | CPVO-TP/068/1       |
| Lettuce                                   | <i>Lactuca sativa</i> L.   | CPVO-TP/013/6-Rev4  |
| radish, black radish,                     | <i>Raphanus sativus</i> L. var. <i>sativus</i> ; <i>Raphanus sativus</i> L. var. <i>niger</i> (Miller) S. Kerner | CPVO-TP/064/2-Rev.2 |
| Cornsalad                                 | <i>Valerianella locusta</i> L.; <i>Valerianella eriocarpa</i> Desv.  | CPVO-TP/075/2-Rev   |
| Watermelon                                | <i>Citrullus lanatus</i> (Thunb.) Matsum et Nakai  | CPVO-TP/142/2-Rev.3 |

## R&D projects

The Office finances a number of R&D projects; all reports of finalized R&D projects are published on the CPVO web site: <https://cpvo.europa.eu/en/about-us/what-we-do/research-and-development>

## 2. ORNAMENTAL SECTOR

### Statistics

The table hereunder shows the 10 most important ornamental crops over the last 5 years.

| Species                   | 2020       | 2021       | 2022       | 2023       | 2024       | Total 1995-2024 |
|---------------------------|------------|------------|------------|------------|------------|-----------------|
| <i>Rosa</i> L.            | 174        | 168        | 200        | 131        | 152        | <b>5 453</b>    |
| <i>Chrysanthemum</i> L.   | 78         | 83         | 83         | 76         | 88         | <b>4 153</b>    |
| <i>Phalaenopsis</i> Blume | 108        | 130        | 102        | 94         | 103        | <b>1 913</b>    |
| <i>Calibrachoa</i> Cerv.  | 67         | 65         | 33         | 30         | 51         | <b>1 745</b>    |
| <i>Pelargonium</i>        | 63         | 41         | 16         | 20         | 12         | <b>1 702</b>    |
| <i>Lilium</i> L.          | 14         | 36         | 18         | 19         | 10         | <b>1 418</b>    |
| <i>Gerbera</i> L.         | 18         | 29         | 15         | 10         | 13         | <b>1 279</b>    |
| <i>Dianthus</i> L.        | 49         | 40         | 15         | 14         | 11         | <b>1 184</b>    |
| <i>Impatiens</i> L.       | 12         | 9          | 10         | 11         | 13         | <b>1 063</b>    |
| <i>Anthurium</i> Schott   | 22         | 14         | 40         | 6          | 27         | <b>948</b>      |
| <i>Hydrangea</i> L.       | 32         | 38         | 19         | 40         | 18         | <b>683</b>      |
| <b>Total per year</b>     | <b>637</b> | <b>653</b> | <b>551</b> | <b>451</b> | <b>498</b> | <b>21 541</b>   |

During the year 2024, an analysis on the reasons for the decrease of applications in the ornamental sector has been carried out through interviews of breeding companies and stakeholder. This analysis has been presented to the administrative Council of the CPVO. The following points summarize the various topics addressed during the interviews: concentration of the industry; too many varieties on the EU market and breeding activities for less species; increase of production costs; impact of Brexit; use of several forms of IP on the same variety.

### The ornamental expert meeting (OEM)

The CPVO held its annual meeting with EU ornamental experts on 1-2 October 2024 by electronic means. The meeting was attended by experts from seven examinations offices as well as by representatives of the breeder's organisations. The group discussed several DUS technical examination related topics - technical protocols (see list above), such as:

- the threshold as from when national test guidelines shall be drafted (with state of expression and/or example varieties) has been discussed (the threshold agreed upon is when the number of reference varieties accessible to the examination office is approximately around 10)
- the conduct of technical verification when the official variety description was drafted as Linnaean description. It has been reminded that whenever possible, the examination office should privilege an assessment with notes, states of expression and quantitative characteristics assessed with similar varieties.
- the non-availability of reference varieties. A disclaimer "*The variety 'xyz' was identified as similar but could not be obtained for a side-by-side comparison.*" Shall be added to the DUS report when appropriate.
- refusing an application on grounds of the lack of uniformity vs. not being a variety. CPVO noted there is a way to describe lack of uniformity with a few characteristics even though the examiner is not able to identify the plant being true to type.
- *Hydrangea* R&D project: Harnessing molecular data to support DUS testing in ornamentals: a case study on *Hydrangea* to optimize the trials and the selection of reference varieties.

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ANNEX II

FRANCE

GEVES is the Examination Office of France, in charge of DUS and VCUS evaluation of new plant varieties, and in charge of quality testing of seeds.

GEVES website can be consulted here [www.geves.fr](http://www.geves.fr)

Description files can be found on the website for the varieties listed on the French catalogue. <https://www.geves.fr/catalogue-france/>

You can subscribe to our NEWSLETTER available both in French and in English to receive the latest information on GEVES's expert activities in plants and seeds, at national and international levels. Please subscribe here: <https://www.geves.fr/newsletter-en/>

The DUS activity, either in the framework of national listing, or PBR, or in the framework of international cooperation for DUS testing, has slightly decreased in 2024 compared to previous years.

Main activity remains on agricultural species. Detailed figures can be found on the annual report available on our website.

In total in 2024, GEVES carried out more than 3200 DUS cycles, mainly in its premises.

| Crop sector  | Number of DUS cycles in 2024 | Main species tested  |
|--------------|------------------------------|--|
| Agricultural | 2350                         | Maize, oilseed rape, wheat, barley, sunflower, soybean                   |
| Vegetable    | 420                          | Lettuce, tomato, melon, cauliflower, pepper, squash                      |
| Fruit        | 240                          | Peach, vine, apple, sweet cherry, apricot, Japanese plum, pear           |
| Ornamental   | 210                          | Hydrangea, Chrysanthemum, Buddleja, Nerium, Lavandula, Salvia, Echinacea |

The International System of Cooperation for DUS is active and efficient. For more information, the international cooperation service of GEVES can be contacted here: [clarisse.leclair@geves.fr](mailto:clarisse.leclair@geves.fr) and [camille.zitter@geves.fr](mailto:camille.zitter@geves.fr)

In 2024, the international cooperation service of GEVES received more than 1100 applications, mainly from the EU but also from all over the world. 72% of the requests are take-over requests and the DUS reports are then sent according to UPOV document TGP/5.

In addition to that, the French National Office for PBR (INOV) has received 98 applications in 2024, out of which 98% were tested for DUS by GEVES.

INOV is involved in UPOV PRISMA for all genera and species. Contact INOV: [inov@geves.fr](mailto:inov@geves.fr)

Regarding Ornamental DUS testing, the 210 DUS cycles completed in 2024 concern 38 different botanical genera.

Since last year, GEVES has been entrusted by the Community Plant Variety Office of the European Union (CPVO) to work on new species for genera it is already working on and also on a new species: *Senna corymbosa* (Lam.) H. S. Irwin & Barneby.

From 1<sup>st</sup> January 2025, the DUS test for Echinacea will be conducted in 1 cycle.

For all the species taken over by GEVES, information (application deadline, plant material...) is available on the CPVO's website (S2/S3 Publication): [CPVO](http://cpvo.europa.eu)

**National test guidelines developed for Ornamental crops in 2024:** Ceanothus, Cenchrus, Ornamental Banana, Senna and xPyracomeles.

Regarding the use of **molecular markers**, GEVES is using in 2024 in routine molecular markers for the management of variety collection according to UPOV guidance model "Combining Phenotypic and Molecular

Distances in the Management of Variety Collections”, for maize, sorghum, spring barley, durum wheat. Projects are ongoing on Oilseed rape and being finalized for Hydrangea.

GEVES is also planning to use in routine for tomato DUS testing molecular markers for prediction of resistance to TSWV, ToMV: 0 and Fol: 1 in the framework of UPOV model “Characteristic-Specific Molecular Markers”, in accordance with the Test Guidelines in force. For more information on BMT, please contact: GEVES BIOGEVES [rene.mathis@geves.fr](mailto:rene.mathis@geves.fr).

Regarding the use of **disease resistance characteristics**, GEVES uses in routine disease resistance characteristics, processed in bio assays, for DUS results. In 2024, GEVES gave a presentation during the Sixtieth Session of the Technical Committee about its experience concerning the use of disease resistance characteristics in DUS examination, and this presentation is available on the UPOV website [here](#). GEVES provides also services, facilities, protocols, identified standards and strains for such activities to Examination Offices and seed companies, all over the world. For more information, please contact: GEVES SNES [sophie.perrot@geves.fr](mailto:sophie.perrot@geves.fr)

[Annex III follows]

## JAPAN

## 1. Number of applications in 2024

| Year         | Total number | (2024/2023) | Ornamental | (2024/2023) |
|--------------|--------------|-------------|------------|-------------|
| 1978 to 2024 | 37805        | -           | 29816      | -           |
| 2023         | 591          |             | 418        |             |
| 2024         | 599          | (101%)      | 439        | (105%)      |

Top 5 of application for Ornamental in 2024

Chrysanthemum 70, Rosa 65, Dianthus 36, Petunia and Calibrachoa 24 (12, 12), Hydrangea 19

## 2. Number of granted in 2024

| Year         | Number | (2024/2023) | Ornamental | (2024/2023) |
|--------------|--------|-------------|------------|-------------|
| 1978 to 2024 | 30538  | -           | 23970      | -           |
| 2023         | 497    |             | 412        |             |
| 2024         | 703    | (141%)      | 518        | (126%)      |

## 3. National test guidelines harmonized with UPOV TGs in 2024

| Common name of plants (4)           |
|-------------------------------------|
| Beetroot, Bottle Gourd, Pea, Zinnia |

## 4. National test guidelines developed for new type of species in 2024

| Genera or Species (5)  |
|--|
| <i>Anemone coronaria</i> L., <i>Arthropodium candidum</i> Raoul, <i>Cleyera japonica</i> Thunb., <i>Ficus benghalensis</i> L., <i>Lachenalia</i> Jacq. f. ex Murr. |

Web-site: [https://www.maff.go.jp/j/shokusan/hinshu/info/sinsa\\_kijun\\_jp.html](https://www.maff.go.jp/j/shokusan/hinshu/info/sinsa_kijun_jp.html)

## 5. Other

- ✓ Japan continuously provides other UPOV members with examination reports under the Memorandum of Cooperation (MOC). Japan had provided 51 DUS examination reports in total to other countries in 2024. MAFF and Dirección Técnica de Semillas, Instituto Colombiano Agropecuario (ICA) had signed MOC for cooperation in DUS examination in 2024. We have also signed the MOC with the Plant Variety Rights Office for the United Kingdom this February.
- ✓ Since 2016, based on the Memorandum of Understanding (MOU), Center for Seeds and Seedlings, NARO (NCSS) and Naktuinbouw have established Calibration Manuals for DUS technical harmonization. "Calibration manual for Celosia" was finalized in 2025, and it will be published through both of websites. With addition of this, a total of 12 Calibration Manuals will be available for third country.
- ✓ In addition, a three-year extension of the MOU between Naktuinbouw and NCSS, which expired in March 2024, was concluded up to March 2027 in order to contribute to international harmonization in cooperation with Naktuinbouw. In extending the MOU, it was newly agreed to provide technical cooperation on DNA analysis for disease resistance in DUS tests, DNA variety identification techniques for plant variety protection.

## NETHERLANDS (KINGDOM OF THE)

Naktuinbouw Variety Testing developments

- The Unit Variety Testing includes a DUS team of 40 employees, one unit manager, and 4 employees specialized in disease resistance. Also a support team, a trial management team with 2 cultivation managers and a project team. In total there are 70 employees and supplemented with temporary (circa 18) staff in summer. The unit works together with the teams of the unit Identity and Quality (laboratories) especially with Molecular Marker team and team Bioinformatics.
- In 2024 facilities for resistance testing have been expanded and a new drying and storage room has been built for onions.
- The Variety Testing Unit yearly offers a number of courses on Plant Breeders' Rights and/or Listing. In 2025 many courses could be organised again in person.
- Applicants more and more use the online systems of UPOV and CPVO for filing their applications for listing and/or Plant Breeders' Rights. Nowadays it is possible to apply in the Netherlands (Kingdom of) for Plant Breeders' Rights as well as for Listing for all species using UPOV PRISMA.

Number of applications received

In 2024, 2514 applications were received for testing for the first year for National listing, and for National or European Plant Breeders' Rights. Applications of the same variety for Listing as well as PBR, in vegetables and in agricultural crops are split in this table.

| 2024                     | NL listing | NL PBR | EU PBR | TOTAL |
|--------------------------|------------|--------|--------|-------|
| Agriculture              | 247        | 54     | 13     | 320   |
| Vegetable                | 757        | 622    | 72     | 1487  |
| Ornamental (incl. trees) |            | 124    | 625    | 794   |
| TOTAL                    | 1004       | 800    | 710    | 2514  |

DUS projects

## Digitisation

- Naktuinbouw continues to work on the expansion of the Naktuinbouw Academy: a digital training platform.
- Databases: Naktuinbouw develops SNP-databases in French bean, Hemp, Tomato and Lettuce. Some databases are developed nationally, others in international projects (e.g. IMODDUS). The projects are funded by amongst others the Dutch board for plant varieties and CPVO.

## Projects

- Harmorescoll: in this project the reference material for obligatory disease resistance tests is harmonized. We expect that this work will be continues in 2025 and further.
- The EU project INVITE on the improvement on DUS and VCU. Naktuinbouw is one of the partners in this program. 2024 was the last year of this project. Naktuinbouw will continue with follow up project to get usable tools for Analysis with drones in Ryegrass, to use an app for some characteristics in tomato and to continue the work on common databases.
- Naktuinbouw continues to support IP Key projects.
- CPVO funds a project to develop a disease resistance test for ToBRFV in tomato and for Aphis gossypii in cucumber. Another project is to develop SNP marker set for lettuce together with Germany, Spain and France.

#### Other projects

Methodology projects that are funded by the Board for plant varieties in the Netherlands (Kingdom of the) are e.g.

- Marker development for fusarium (FOC1) resistance in brassica,
- Verification research on DNA combined with morphology in tomato and onion,
- Selecting similar varieties with image analysis and AI.

#### International cooperation 2025

- Since 2021, Naktuinbouw has participated in the Collaborative Seed Program in Nigeria. One of the project's goals is to set up a PVP system in the country.
- In 2024 a project with Suriname has been started by the Makandra Program.
- We are participating in Advisory Committee for India – Bangladesh – Netherlands Seed Partnership. These two partnerships are initiative of SeedNL. Under India-Netherlands Seed Partnership, a delegation will visit Naktuinbouw in May. The focus of the visit is PBR and Inspections in the Netherlands. The visit is still being planned so dates are not final yet.
- Together with CPVO a visit to Netherlands (Kingdom of the) for the Bosnia and Herzegovina will be started (funded by TAIEX).

#### PVP Development Program (Toolbox)

- This tool helps countries develop, improve, and implement their Plant Breeders' Rights system. In 2024, different PVP projects were carried out in 11 countries and 12 projects were granted in 2025: Argentina, Armenia, Egypt, Ghana, Guatemala, Kazakhstan, Nigeria, Peru, PVP Toolbox Evaluation 2021-24, UPOV PRISMA support, Taiwan Province of China and Viet Nam.
- More info: PVP Development Program – PVP Toolbox | Naktuinbouw or contact: [PVPToolbox@naktuinbouw.nl](mailto:PVPToolbox@naktuinbouw.nl)

#### Plant Breeders Rights training course.

- In Jan-March 2025, the training course on Plant Breeders Rights has been presented as an e-course with weekly online plenary sessions where the contents were discussed. This edition was attended by 9 students from Nigeria, Surinam and the Netherlands (Kingdom of the).
- In the remainder of 2025 and onwards, the course can be followed as an e-learning with tutoring per e-mail. Participants can register and start at any time throughout the year. The study load is around 80-100 hours, depending on prior knowledge.
- A hybrid version of this course (e-learning + 1 week practical training in the Netherlands (Kingdom of the)) may be organized in spring 2026, provided there is sufficient interest.
- More information: <https://www.naktuinbouw.com/knowledge-education/training-courses/plant-breeders-rights-for-food-security-and-economic-development> or contact [l.pinan.gonzalez@naktuinbouw.nl](mailto:l.pinan.gonzalez@naktuinbouw.nl)

[Annex V follows]

UNITED KINGDOM

The Plant Variety Rights Office for the United Kingdom is part of the Animal and Plant Health Agency (APHA), an executive agency of the Department for Environment, Food and Rural Affairs (Defra) and its remit is to coordinate the delivery of variety listing and Plant Breeders Rights (PBR) in the United Kingdom. Contact details are available on the Gov.UK website: [UK Variety Listing and PBR](#).

In 2024 the United Kingdom received 1123 applications covering PBR and variety listing. The applications were made up of 443 vegetables, 516 agricultural, 107 ornamentals, and 57 fruit. Of these, 663 tests were not conducted in the United Kingdom, but carried out by UPOV members.

The United Kingdom will be implementing a customised version of the UPOV e-PVP administration module and DUS exchange module in 2025. This will further complement the use of UPOV PRISMA as the compulsory application pathway for PBR and variety listing in the United Kingdom.

DUS testing in the United Kingdom is conducted at Niab ([www.Niab.com](http://www.Niab.com)), AFBI ([www.afbini.gov.uk](http://www.afbini.gov.uk)), and SASA ([www.sasa.gov.uk](http://www.sasa.gov.uk)). Niab carry out the testing of wheat (winter and spring), Barley (winter and spring), Oats (winter and spring), Oilseed Rape (winter), Sugar Beet, Field Beans (winter and spring), Fodder Kale, and ornamental plants which include Chrysanthemum, Rose and a range of species of shrubs and herbaceous perennials. AFBI perform DUS testing of perennial ryegrass, Italian ryegrass, hybrid ryegrass and white clover. SASA conduct the DUS testing for potatoes, field pea, swede, turnip rape and vegetable peas.

The United Kingdom authorities are working together to develop a United Kingdom Plant Variety and Seeds (PVS) Strategy spanning PBR, plant variety listing, and setting standards for marketing and certification of seed and other plant propagating material, anticipated to launch in early 2026. This will be the first United Kingdom PVS strategy, and its development is an opportunity to engage with industry and other stakeholders to set out a shared vision, priorities, and actions to achieve these.

England is continuing work to implement the Genetic Technology (Precision Breeding) Act 2023 through the introduction of secondary legislation and consultation with industry. Furthermore, the DUS test centres are working with policy officials to ensure England has the capability to undertake DUS and VCU testing of precision bred plant varieties. The Act removes precision bred plants from regulatory requirements applicable to Genetically Modified Organisms in England.

The United Kingdom and Japan signed a Memorandum of Cooperation on the examination of plant varieties for the purpose of PBR. The MoC covers the exchange of examination reports for the granting of PBR and formalises current working practices between the United Kingdom and Japan, and came into operation on the 14<sup>th</sup> February 2025.

The United Kingdom continues to support the UPOV distance learning courses by providing tutors. Technical and administrative staff at our test centres take advantage of the distance learning opportunities through DL205 and DL305.

Colleagues across the United Kingdom have also benefitted from attending the two recent UPOV technical webinars. Hilary Papworth (Niab) presented in the first webinar on the subject of developing National Test Guidelines in the absence of a UPOV Test Guideline.

Hilary Papworth continues in her role as the Chair of the UPOV Technical Working Party for Ornamental Plants and Forest Trees (TWO). As does Margaret Wallace (Niab) in her role co-ordinating a sub-group of the Technical Committee focussing on issues relating to Test Guidelines and the TG-Template.

To meet the challenges of climate change, the rapid development of new plant varieties for our farmers and growers should be encouraged and facilitated. The United Kingdom is actively driving the implementation of new techniques to DUS testing through several collaborative or internal projects:

- The United Kingdom has been active partners in the European-funded [INVITE](#) ((Niab, SASA and BioSS (Biomathematics and Statistics Scotland)) project, which finished in December 2024. As part of this, innovations have been produced in how genetic markers might be used in DUS. In particular, at the TWM, there will be a presentation on a new method for trial management using genomic prediction, demonstrated on wheat. There will also be a presentation on an enhanced version of COYD for distinctness assessment in

cross-pollinated crops. This embeds information on genetic similarity of varieties into the COYD analysis, giving more precise estimates of variety means. Finally, the method for assessing uniformity in cross-pollinated crops with genetic markers, which was presented at the TWM last year, was presented at the OECD Seed Schemes TWG in January 2025 as an approach for varietal purity.

- The Agri-Food and Biosciences (AFBI) in Northern Ireland are coordinators of the 5-year Horizon 2020 (SFS-29-2018) [InnoVar](#) project. InnoVar aims to augment and improve the efficacy and accuracy of European crop variety testing and decision-making, using an integrated approach incorporating genomics, phenomics and machine learning. Data from our European-wide trial series will form the basis of a new, purpose built, variety recommendation tools. The project focuses on bread and durum wheat initially before applying the InnoVar approach to other crops. The project's consortium includes 21 partners across Europe, including United Kingdom partners ADAS, AHDB and APHA. Key achievements include:

- Development of tools that demonstrate ways to improve the efficiency of plant testing practices utilising phenomics, genomics and machine learning.
- Demonstration of a template for harmonised VCU protocols across Europe and beyond.
- Provide a template for introducing measures of sustainability and resilience into performance testing.
- Provided a roadmap for transferring the InnoVar approach in wheat to other major crops, including perennial ryegrass.
- Developed the concept of High-Performance Low Risk (HPLRTM) categorisation of plant varieties.

- A revised version of DUST is nearly ready for release. This version includes an improved installation process and the new COYU with splines module. The software has been tested by the United Kingdom, the Netherlands (Kingdom of) and Finland. This was mainly successful but revealed that the Excel conversion function does not work outside of the United Kingdom. We are working to resolve this.

- The United Kingdom is starting the introduction of the new COYU with splines method. As part of this, guidance is being developed for dealing with extrapolation.

- Two projects, which have finished in March 2025, have been funded by Defra to explore the use of molecular approaches in DUS work. The first project on barley (*Hordeum vulgare*), has provided proof of concept for the use of molecular markers to predict DUS phenotypes, and to inform selection of similar varieties for the growing trials. A smaller marker set has also been identified and validated for seed stock authentications and varietal identification in barley.

In the second project on raspberry (*Rubus idaeus* L.), phenotypic and genotypic datasets were generated for a collection of over 100 red raspberry varieties to begin exploring the prediction of DUS phenotypes via machine learning approaches. The machine learning models developed showed promise in their ability to predict qualitative DUS characteristics, with further investigation required to validate the predictions on larger datasets, and to explore how the approach would be implemented in practice.

- NIAB has continued their investigation into the use of UAV (Unmanned Aerial Vehicles) within a DUS testing situation

[End of Annex V and of document]