

Technical Working Party for Ornamental Plants and Forest Trees TWO/54/3

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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-22/052 of March 31, 2022. The following reports were received (in alphabetical order):

- Members of the Union: Annexes I to VI: European Union, France, Japan, Netherlands, New Zealand and the United Kingdom

[Annexes follow]

EUROPEAN UNION

Statistics

In 2021, the Community Plant Variety Office of the European Union (CPVO) received 3 480 applications for Community plant variety rights (CPVRs), 653 applicants filed applications for CPVRs. In 2021, the distribution between crop sectors was as follows:

- **Ornamental, 1445 applications (41.5%)**
- Agricultural, 1190 applications (34.2%)
- Vegetable, 578 applications (16.6%)
- Fruit 267 applications (7.7%).

In 2021, the CPVO Office granted 2859 titles for Community protection; 29 583 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 2021, the CPVO provided 547 technical reports to different countries, the five countries from which most requests emanated were Ecuador, Canada, Switzerland, Russian Federation and Serbia.

Presidency

On 21 August 2021, the mandate of the CPVO President Martin Ekvad ended. Francesco Mattina, former vice-President has been appointed as new President of the CPVO.

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 2021, the members of the AC took note of the following:

- Proposal for exploring involvement in initiatives under the EU IP action plan for PVR related activities.
- Update of the CPVO International Cooperation Strategy to align it with new policy objectives of the European Union
- Engaging in a written agreement with third country authorities under which the CPVO could both take-over DUS reports and initiate DUS tests for *Eutrema japonicum*.

The AC also adopted the R&D strategy for 2021-2025: objectives of the previous strategy confirmed (promote BMT in DUS testing and variety identification, shared online databases, improvement and harmonization of CPVO technical protocols). In addition, the CPVO aims at getting involved in EU funded R&D projects like Horizon Europe.

Legal developments and Regulations

- By Regulation (EU) 2021/1873 of the European Parliament and of the Council of 20 October 2021, the term of protection of the Community plant variety rights for varieties of the species *Asparagus officinalis* L. and of the species groups flower bulbs, woody small fruits and woody ornamentals has been extended by five years with retroactive effect. The duration of the Community plant variety rights will, therefore, be extended from 25 to 30 years.
- A study about "the economic contribution of PVR system in the EU" has been launched in 2021, it involves the CPVO, EUIPO, the European Commission and breeder's associations. The study considered the potential for the PVR system to help meet the Commission's Green Deal objectives and the United Nations (UN) Sustainable Development Goals (SDGs). The outcome of the study has been released on 28.04.22 and is available on the CPVO website.

R&D activities

- Projects co-financed by CPVO: in 2021, 4 projects were finalized (Melon database, Durum wheat database (first part “Durdus”), Oilseed rape database (first follow-up), Cannabis database (first part) and Apple (epigenetic markers and phenotyping tools)), 3 projects continued to make good progress (Durum wheat database (follow-up, “Durdus Tools”), Tomato database (first part), HarmoresColl) and two new proposals were evaluated positively for a start in 2022 (Hydrangea (molecular markers), ToBr-Ag (phytopathology tests in vegetables)).
- INVITE project: in 2021, good results were achieved in the development of new molecular and phenotypic tools, as well as for predictive models and field-testing protocols. CPVO continued to provide support for the respect of confidentiality issues regarding the access to historical data and for a good representation of the Examination Offices’ interests and needs for DUS testing.

International affairs

The CPVO participated in several IP Key international outreach activities

- IP Key China
 - Awareness raising seminar in November 2021: videos of the activity available on the [IPKey China website](#);
 - Technical training on DUS in November 2021.
- IPKey Latin America: the licensing course was completed under the IPKey Latin America project in 2021 and will be promoted under the new phase of IPKey Latin America in 2022-2023. Moreover, the project concluded the Study on Ecuador, which will be as well presented under the new phase of the project.
- IPKey South East Asia:
 - Webinar series in June 2021 on PVP and UPOV 91, presentations delivered available on the [IPKey SEA website](#);
 - Training to Plant variety protection and intellectual property officials of Thailand in June 2021;
 - Webinar on Plant Variety Protection and UPOV 1991 (January 2022)
 - Workshop on support to beneficiary countries to accession to UPOV 91 (January 2022), presentations available on the [IPKey SEA website](#).

Other activities in Southeast Asia were carried out under the EAPVP Forum umbrella, such as the annual meeting held in September 2021 where the CPVO participated.

- AfrIPI: regional seminar on the Arusha Protocol. The activity is currently in a follow-up phase, ARIPO will circulate a survey among its Member States to collect information on short term plans with regard to the ratification of the Protocol.
- OAPI: the CPVO Office contributed by electronic means to national seminars for breeders, examiners and seed producers in Libreville (Gabon), Brazzaville (Republic of Congo), Niamey (Niger) and N'Djamena (Chad). These seminars were funded by the European Commission.
- CarIPI: several activities have been carried out under the project in the Caribbean that ultimately led to the implementation of a parallel series of activities under a TAIEX project with the Dominican Republic, implementation started in 2022 with a first mission in March 2022 concerning Quality Audit Systems. The focus of the TAIEX project is on capacity building on DUS matters. Under the CarIPI project the following activities were carried out:
 - Webinar on independence in the conduct of DUS examination and managing of conflict of interest (6 April 2021)

- Webinar on establishing a functional PVR System (23 April 2021)
- Webinar on regional cooperation in PVR (28 September 2021). In the framework of this activity, we circulated as CPVO, UPOV and CarIPI a policy paper on enhancing regional cooperation in the Caribbean, followed by a survey on the single countries plans and ambitions in PVR matter.
- Caribbean week of agriculture (October 2021).

FOCUS ON THE ORNAMENTAL SECTOR

Administrative Council decisions on ornamental Technical Protocols

In December 2021, the following technical protocols were adopted by the AC:

- *Calibrachoa* Cerv. CPVO/TP-207/4
- *Coreopsis* L. CPVO/TP-336/1
- *Hydrangea* L. CPVO/TP-133/3
- *Oncidium* Sw.; *xOncidesa* Hort. (*Oncidium* Sw. X *Gomesa* R. B.); *xlonocidium* Hort. (*Oncidium* Sw. X *Ionopsis* Kunth.); *xZelenkocidium* J.M.H. Shaw. (*Oncidium* Sw. X *xZelenkoa* M.W. Chase & N.H. Williams) CPVO/TP-283/1
- *Ranunculus asiaticus* L.; *Ranunculus cortusifolius* Willd.;
Hybrids between *Ranunculus asiaticus* L. and *Ranunculus cortusifolius* Willd. CPVO/TP-334/1

In April 2022 the revised technical protocol for *Chrysanthemum* was adopted by the AC.

Statistics

For ornamental applications received in 2021, the CPVO requested 1358 technical examinations to be carried out on its behalf and took over 80 technical reports from national authorities, 1164 applications were received from EU applicants (Netherlands, Germany, Denmark, France, Belgium, etc...) and 281 applications from non-EU applicants (United States, Switzerland, United Kingdom, Japan, Brazil, Australia, etc...). The CPVO received applications for 68 'new ornamental species'. In 2021, the 10 most important species represented 41 % of 2021 ornamental applications. The table below shows the number of applications for the 10 most important ornamental species for the last 5 years with a total covering the period 1995-2021:

Species	2017	2018	2019	2020	2021	Total (1995-2021)
<i>Rosa</i> L.	169	242	175	174	168	4970
<i>Chrysanthemum</i> L.	148	140	121	78	83	3906
<i>Calibrachoa</i> Llave & Lex. and <i>Petunia</i> Juss.	104	78	50	78	68	1715
<i>Phalaenopsis</i> Blume	134	112	153	108	130	1614
<i>Lilium</i> L.	36	35	21	14	36	1371
<i>Gerbera</i> L.	30	54	44	18	29	1241
<i>Dianthus</i> L.	60	35	40	48	38	1141
<i>Pelargonium</i> L'Hér. ex Aiton	15	36	39	46	25	1084
<i>Impatiens</i> L.	12	12	16	12	9	1015
<i>Anthurium</i> Schott	25	15	30	22	13	874
Total	733	759	689	598	599	

The ornamental expert meeting

A meeting of ornamental experts was held electronically on 14 and 15 October 2021. The meeting was attended by experts from 8 examinations offices as well as by representatives of CIOFORA. In 2021, the implementation of new or revised UPOV Test Guidelines for *Coreopsis*, *Ranunculus*, *Hydrangea*, *Chrysanthemum*, *Calibrachoa* and *Oncidium* was prepared. They all enter into force in 2022. In addition, the group discussed numerous other items on DUS matters such as:

- The duration of the DUS test for certain crops for which one growing cycle is foreseen but the development of plants requires often more than one vegetation period before the relevant characteristics can be observed
- the proposal to perform only one single observation for species with multi-annual testing
- the modification of the TQ for trees and shrubs: to request information on the rootstock used
- guidance on uniformity thresholds for small deviating color sections in ornamental crops
- the reporting of the absence of similar varieties

R & D projects

New project – Harnessing molecular data to support DUS testing in ornamentals: a case-study on Hydrangea

The CPVO decided to provide 176,596 EUR (80% funding) to the project coordinated by the GEVES (FR); the Bundessortenamt (DE) is partner. The project is scheduled to run from May 2022 until October 2023.

The project aims at:

- 1) Genotyping (a large part of) the living reference collection maintained by the Gaston Allard arboretum Angers and the reference collection maintained by the BSA
- 2) Identifying SNP markers:
 - a. To check the variety identity upon renewal of the living reference collection
 - b. To predict the phenotype of candidate varieties
- 3) To select reference varieties for the growing trial: UPOV-BMT model: “Combining phenotypic and molecular distances in the management of reference collections”

Once finalized, the R&D project is published on the CPVO web site: <https://cpvo.europa.eu/en/about-us/what-we-do/research-and-development>

[Annex II follows]

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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

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 activity in the framework of national listing, PBR, and the activity in the framework of DUS bilateral agreements has slightly decreased in 2021.

Main activity remains on agricultural species, but during the last past 4 years, GEVES has significantly developed its activity on ornamental species.

In total in 2021, GEVES tested more than 1800 new varieties for DUS:

- around 1300 new varieties and parental components in the agricultural sector.
Main species tested are maize, wheat, barley, oilseed rape, sunflower, soybean.
- around 250 new candidate varieties in the vegetable sector.
Main species are tomato, melon, lettuce.
- around 190 new candidate varieties in the ornamental sector.
Main species are Hydrangea, Lavandula, Chrysanthemum, Salvia.
- around 60 new candidate varieties in the fruit sector.
Main species tested are apple, pear, peach, cherry, apricot, Japanese plum, vine.

Additional figures can be found on the annual report available on our website.

The International System of Cooperation for DUS is active and efficient. For more information, the international cooperation service of GEVES can be contacted here: Camille.zitter@geves.fr

In 2021, the international cooperation service of GEVES received more than 1000 applications, mainly from the European Union (EU) but also from all over the world. 70% 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 96 applications in 2021, out of which 95% were tested for DUS by GEVES.

INOV is involved in UPOV PRISMA for all genera and species.

Regarding the use of molecular markers, GEVES is using in 2021 in routine molecular markers for the management of reference collection according to UPOV guidance, for maize, sorghum, spring barley.

Projects are being currently led on Oilseed rape and Tomato.

Concerning Ornamentals, a R&D project, co-funded by the Community Plant Variety Office (CPVO) of the European Union and named *Harnessing molecular data to support DUS testing in ornamentals: a case-study on Hydrangea*, will start in spring 2022. This 18 months project, led by GEVES in collaboration with the Bundessortenamt (German examination office) and the French National Research Institute for Agriculture, Food and the Environment (INRAE), aims to use molecular biology techniques to optimize and secure the management of the reference collection and DUS trials on this species. A poster will be presented at IHC 2022, in Angers.

To end, the workshop dedicated to the use of molecular biology in the framework of the DUS study, initially scheduled for March 2022, has been postponed to June 2023, in person, at GEVES Le Magneraud.

For more information on BMT, please contact: GEVES BIOGEVES rene.mathis@geves.fr.

Regarding the use of disease resistance characteristics, GEVES uses in routine genetic disease resistance characteristics, processed in bio assays, for DUS results. It provides also services, facilities, protocols, identified standards and strains for such activities to Examination Offices and seed companies, all over the world.

Regarding Ornamentals, GEVES contributed to a first ring test on *Puccinia horiana/Chrysanthemum* with Naktuinbouw (Dutch examination office), ILVO (Belgium examination office) and private companies
For more information, please contact: GEVES SNES valerie.grimault@geves.fr.

[Annex III follows]

JAPAN

1. Number of applications in 2021

Year	Number	(2021/2020)	Ornamental	(2021/2020)
1978 to 2021	35932	-	28462	-
2020	713		537	
2021	776	(108.8%)	579	(107.8%)

Top 5 of application for Ornamental in 2021

Chrysanthemum 101, Rosa 83, Petunia, Calibracoa and x Petchoa 53 (30; 16; 7), Hydrangea 37, Dianthus 31

2. Number of granted in 2021

Year	Number	(2021/2020)	Ornamental	(2021/2020)
1978 to 2021	28823	-	22587	-
2020	502		382	
2021	588	(117.1%)	455	(119.1%)

3. National test guidelines harmonized with UPOV TGs in 2022

Genera and Species (5)
Groundnut, Dieffenbachia, Radish, Tomato, Everlasting Daisy

4. National test guidelines developed for new type of species in 2022

Genera and Species (7)
<i>Bauera rubioides</i> Andrews, <i>Berzelia</i> , <i>Boneset</i> , <i>Juniperus conferta</i> Parl., <i>Ligustrum sinense</i> Lour., <i>Pecteilis radiata</i> (Spreng.) Raf., <i>Strobilanthes anisophylla</i> (Wall. ex Hook.) T. Anderson

Web-site: http://www.hinshu2.maff.go.jp/info/sinsakijun/botanical_taxon_e.html

5. Other

- ✓ Regarding vegetative propagation plants, almost 400 plant species and genera were designated whose protected varieties were required the authorization of PBR holders on the propagation including the utilization of farm saved seed, even under the old Act.
Furthermore, to enable PBR holders to exercise their rights effectively and refrain from the unintended outflow of their protected varieties overseas, Japan PVP and Seed Act was amended in December 2020 and took into effect on April 1, 2022. Under the amended PVP and Seed Act, any acts in respect of the propagating material of all protected varieties (including use of farm saved seeds) shall require the authorization of right holders.
It resulted on the gradual increase of the number of applications for vegetable, such as tomato.
- ✓ Japan continuously provides other UPOV members with examination reports under the Memorandum of Cooperation (MOC). We have agreed the MOC with 15 members at April 2022.
For example, MAFF and NCSS carrying out DUS examination for *Eutrema japonicum* (Miq.) Koidz. (syn. *Wasabia japonica* (Miq.) Matsum.) on behalf of CPVO.

- ✓ Since establishment of the East Asia Plant Variety Protection Forum in 2008, Japan continuously support Forum member's activities and will enhance support to establish effective PVP system consistent with the UPOV Convention. These cooperation activities are conducted under the 10-Year Strategic Plan of the Forum which has common direction to join UPOV member. Especially, Japan, Viet Nam and UPOV are working together on the pilot project to develop a single online application Platform "e-PVP Asia" for submitting one application data to multiple PVP Offices. "e- PVP Asia" includes the function to facilitate cooperation in examination among participating countries, that applicant can select country where DUS test would be done, and the report of the DUS test would be transferred to other countries. It is planned to launch "e-PVP Asia" at the end of 2022.
- ✓ Since 2016, based on the Memorandum of Understanding, Center for Seeds and Seedlings, NARO (NCSS) and Naktuinbouw have established Calibration Manuals for DUS technical harmonization. "Calibration manual for tulip" was finalized in 2022, and it will be published through both of websites. With addition of this, a total of 10 Calibration Manuals will be available for third country.

[Annex IV follows]

NETHERLANDS

Naktuinbouw Variety Testing developments

- As from April 2021 the DUS team 4 junior DUS examiners joined the team to replace colleagues who retired or changed jobs. The DUS team now consists of 40 employees, including 2 managers and 4 in disease resistance. The Department of Variety Testing includes also a support team, a trial management team and a project team. In total there are 70 employees.
- The Variety Testing Department yearly offers a number of courses around Plant Breeders' Rights and/or Listing. Last year almost all courses have been provided as online-sessions (Zoom/Teams).
- During the COVID-19 crisis, the daily business of the employees of the Variety Testing department has not been disturbed. They succeeded to do the DUS work at the normal quality level and are also flexible in the contacts with the applicants.
- 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 for Plant Breeders' Rights for all species through UPOV PRISMA as well as for Listing in the Netherlands. In 2021 35,2% of the National applications were filed by electronic means of the CPVO system, mainly due to a reduced application fee (in 2020 34%). Up to now we received a limited number of online applications through UPOV PRISMA.

Number of applications received

In 2021, 2655 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 PBR, in vegetables and in agricultural crops are split in this table.

2021	NL listing	NL PBR	EU PBR	TOTAL
<i>Agriculture</i>	230	95	103	
<i>Vegetable</i>	662	529	74	
<i>Ornamental (incl. trees)</i>		213	749	
TOTAL	892	837	926	2655

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, rose, lettuce, onion, hemp, tomato and perennial ryegrass. 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.

EU projects: Database Melon, Harmorescoll and INVITE + Hemp

- An EU database for melon varieties is developed by cooperation between France, Spain, Portugal, Slovakia and the Netherlands. The development is funded by CPVO. In 2021 the project has been finished and continuation in cooperation is agreed.
- Harmorescoll: in this project the reference material for obligatory disease resistance tests will be harmonized.
- The EU project INVITE on the improvement on DUS and VCU. Naktuinbouw is one of the partners in this program.
- Starting a project on setting up resistance tests to ToBRFV for tomato and pepper and improvement of resistance test melon/*Aphis gossypii*

- International projects
 - Calibration manuals. Naktuinbouw cooperates since 2016 with NCSS Japan on the harmonisation of Dutch Calibration Books and Japanese Testing Manuals.
- Other projects
 - Study on minimum distances in tulip 2021-2023.
 - Studies on DUS and VCU testing in True Potato Seeds
 - Automatic morphological descriptions of ornamental crops through machine learning. <https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksinstituten/plant-research/biometris/show-biometris/MODOMA-Deep-Learning-in-sierteelt.htm>

International cooperation

- In 2021 online activities were carried out with Egypt, APSA, Mexico and Ethiopia.
- In cooperation with CPVO, Naktuinbouw joined the IPKey-project China. Training was organised digitally with direct translation.
- In 2021 a 4-year project is started by the Wageningen university on the Nigerian Seed sector. The Nigerian government and Naktuinbouw are involved on the topics of Plant Breeders rights and variety registration.

PVP Development Program (Toolbox)

- This is a tool to help countries to develop, improve and implement their Plant Breeders' Rights system. The first 5 years period has been finalized successfully. The Dutch Ministry has made another 5 years of funds available (2022-2027) for the implementation of this program.

More info: PVP Development Program - PVP Toolbox | Naktuinbouw or contact: PVPToolbox@naktuinbouw.nl

Plant Breeders Rights for Food security and Economic Development training course.

- In 2021, the course was presented in an online format. In 2022, the course will also be held online from Oct 3 – Dec 2.

More information: <https://www.naktuinbouw.com/bulb/training-course/plant-breeders%E2%80%99-rights-food-security-and-economic-development> or contact: l.pinan.gonzalez@naktuinbouw.nl

[Annex V follows]

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ANNEX V

NEW ZEALAND

There were 26 new applications for ornamental varieties accepted between 1 July 2021 and 1 May 2022 suggesting a slowing in variety protection activity in the New Zealand market. At the end of 2021, there were 115 varieties under examination belonging to 37 genera. In this period, the usual pattern of origin of applications made has reversed with approximately 70% now from domestic breeders and 30% from foreign breeders. Applications from foreign breeders normally are in the majority.

The genera and species make-up of new ornamental applications are primarily from roses, hydrangeas, lavender and Australian and New Zealand natives. Applications numbers for tulip varieties are consistent and continue to represent an important area of activity. There are no plans for national variety testing for tulip, with all grant decisions made using foreign test reports. The first application for a New Zealand bred variety of *Hoya* has been received and national testing will be carried out.

The New Zealand government is making progress with the review of the Plant Variety Rights Act 1987. The Plant Variety Rights Bill was introduced to Parliament in May 2021 and completed its Second Reading Stage in the second quarter of 2022. The objective of the new law coming into force along with the associated Regulations is estimated for later in 2022. In addition, a review of the PVR fees is progressing with the new fee regime in use by late 2022 or early 2023.

[Annex VI follows]

UNITED KINGDOM

Report on the activity of the United Kingdom (UK) Plant Varieties and Seeds Office and the DUS examination centres of NIAB, SASA and AFBI. The Plant Varieties and Seeds Office 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 registration and Plant Breeders Rights (PBR) in the United Kingdom. Contact details are available on the Gov.UK website [UK Variety Listing and PBR](#).

It was our pleasure to host the 51st meeting of the UPOV TWA, in Cambridge.

In 2021 the United Kingdom received some 1400 applications covering Plant Breeders rights and National Listing. The applications were made up of 400 agricultural, 300 fruit, 525 ornamental and 175 vegetables. Around 500 of these applications required DUS testing in the United Kingdom with the remainder having DUS reports purchased from other countries.

As of January 2021, the United Kingdom is now processing all National List and PBR applications through UPOV PRISMA. Since its implementation, the United Kingdom has benefitted from UPOV PRISMA to process applications and has been working constructively with the UPOV PRISMA team to make further improvements. The United Kingdom are grateful to the UPOV PRISMA team for providing training workshops.

To demonstrate experience and competence in performing DUS testing at its three DUS test centres (NIAB, Cambridge; SASA, Edinburgh; and Agri-Food and Biosciences Institute (AFBI), Crossnacreevy), the United Kingdom has implemented a DUS Quality System based on internationally harmonised criteria.

Ornamental DUS testing in the United Kingdom is conducted at NIAB (www.niab.com). NIAB (formerly the National Institute of Agricultural Botany) carry out the testing of Chrysanthemum and a wide range of herbaceous perennials and species of trees and shrubs, this is on behalf of the United Kingdom and under bilateral agreements. All work is carried out at the trial facility in Cambridge.

An industry stakeholder event was organised early March 2022 in conjunction with Defra, APHA, United Kingdom DUS examination centres and the British Society for Plant Breeders (BSPB). This well-attended and well-received webinar provided guidance and information on applying for Variety Listing and Plant Breeders' Rights in the United Kingdom as well an opportunity to engage, collaborate and receive feedback from national and international stakeholders.

The United Kingdom continues to support the UPOV online courses by providing tutors. Technical and administrative staff throughout the United Kingdom take advantage of the distance learning opportunities through DL205 and DL305. Colleagues across the United Kingdom have also benefitted from attending the two UPOV seminars arranged in 2021 and the UPOV Technical Working Parties Preparatory Webinars.

The United Kingdom are actively driving the implementation of new techniques to DUS testing through a number of collaborative or internal projects:

AFBI are coordinators of the 4.5-year Horizon 2020 (SFS-29-2018) InnoVar project (www.h2020innovar.eu). 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.

NIAB, SASA and BioSS (Biomathematics and Statistics Scotland) are active partners in the 5-year H2020 INVITE (Innovations in plant Variety Testing in Europe – www.h2020-invite.eu). INVITE aims to improve both efficiency of variety testing and the information available to stakeholders on variety performance under a range of production conditions and biotic and abiotic stresses. This will be exemplified on ten selected species (apple, fodder grass, sunflower, soybean, wheat, maize, potato, tomato, oilseed rape, and lucerne) representing the main features of propagation, food and feed uses, and having an important breeding activity at EU level. There are 28 partners across Europe involved.

There is collaboration between InnoVar and INVITE. There is also liaison between INVITE and the recently established Australian INVITA project.

There are several projects within the United Kingdom investigating potential improvements to the testing system. For example, NIAB is using the wide range of expertise within the company to explore the use of club root resistance characteristics in oilseed rape DUS testing; UAV (Unmanned Aerial Vehicles) for data collection; molecular markers for reference collection management and trait analysis.

[End of Annex VI and of document]