UPOV
International Union for the Protection of New Varieties of Plants

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Technical Working Party on Testing Methods and Techniques

TWM/3/29

Third Session
Beijing, China, April 28 to May 1, 2025

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REPORT

Prepared by Office of the Union

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OPENING OF THE SESSION

1. The Technical Working Party on Testing Methods and Techniques (TWM) held its third session, in Beijing, China, from April 28 to May 1, 2025. The list of participants is provided in Annex I to this report.

2. The session was opened by Ms. Nuria Urquía Fernández (European Union), Chairperson of the TWM, who welcomed the participants.

3. The TWM was welcomed by Mr. Yan Li, Deputy Director General of Plant Variety Protection Office and Executive Director General of the Development Center of Science and Technology, Ministry of Agriculture and Rural Affairs (MARA), China.

4. The TWM was also welcomed by Mr. Jianren Zhou, Deputy Director General of the Plant Variety Protection Office and the Science and Technology Development Center, National Forestry and Grassland Administration (NFGA), China.

5. The TWM received a presentation on MARA activities from Ms. Jing Li, Deputy Director of New Plant Variety Protection Division, Development Center of Science and Technology, MARA, China. A copy of the presentation is provided in Annex II to this report.

6. The TWM received a presentation on NFGA activities from Mr. Yongqi Zheng, Researcher of the Chinese Academy of Forestry, China. A copy of the presentation is provided in Annex III to this report.

ADOPTION OF THE AGENDA

7. The TWM adopted the agenda as provided in document TWM/3/1 Rev.2

Software and statistical analysis methods for DUS examination

(i) Development of big data platform for DUS examination

8. The TWM received a presentation from Mr. Kun Yang (China) on “Development of big data platform for DUS examination”, a copy of which is reproduced in document TWM/3/19.

9. The TWM noted the software used for management of DUS trial data, including data management, statistical and image analysis. The TWM noted the plans for further developing the platform and invited the expert from China to report developments at its fourth session.

(ii) Grading criteria of Anthurium DUS quantitative characteristics by multiple comparison

10. The TWM received a presentation from Ms. Yunxia Chu (China) on “Grading criteria of Anthurium DUS quantitative characteristics by multiple comparison”, a copy of which is provided in document TWM/3/12.

11. The TWM noted the possibility of reducing the error rate in the analysis of measured quantitative characteristics in Anthurium by the multiple comparisons method.

(iii) COYU development update 2025

12. The TWM received a presentation from Ms. Trudyann Kelly (United Kingdom) on "COYU development update 2025", a copy of which is provided in document TWM/3/5.

13. The TWM received an update on the implementation of the combined over years uniformity criterion with Splines (COYUs). The TWM noted that the analysis had been developed and tested in DUSTNT and R software and that the software would be updated following feedback from test users (Finland, Netherlands (Kingdom of the), and United Kingdom). The TWM noted that the software would be made available to UPOV members and invited the United Kingdom to provide an update on the software, the experience of implementation in United Kingdom, and guidance on how to manage extrapolation within COYU, at its next session.

Phenotyping and image analysis

(i) A new perspective on the DUS test of eggplant fruit color based on lab color parameters

14. The TWM received a presentation from Ms. Yiying Zhang (China) on "A new perspective on the DUS test of eggplant fruit color based on lab color parameters", a copy of which is provided in document TWM/3/13.

15. The TWM noted that the Test Guidelines for Eggplant were being revised and invited Ms. Zhang to present the analysis of fruit skin color to the subgroup of experts, at the next session of the TWV.

(ii) Length data collection device pro

16. The TWM received a presentation from Ms. Shan Lu (China) on "Length data collection device pro", a copy of which is provided in document TWM/3/14.

17. The TWM noted that members and observers interested in the data collection device could contact the expert from China for further information and collaboration.

Developments in molecular techniques and bioinformatics

(a) Latest developments in molecular techniques and bioinformatics

- Data science activities at Naktuinbouw towards genotyping and phenotyping: an update

18. The TWM received a presentation from Ms. Sanchari Sircar (Netherlands (Kingdom of the)) on "Data science activities at Naktuinbouw towards genotyping and phenotyping: an update", a copy of which is provided in document TWM/3/16.

19. The TWM noted the development of software at Naktuinbouw and the invitation for collaboration on data science activities, including image analysis and phenotyping, workflow developments, artificial intelligence and other collaborative efforts.

(b) Cooperation between international organizations

(i) ISTA

20. The TWM received a presentation from Ms. Ana Vicario, International Seed Testing Association (ISTA), on "ISTA update on the use of techniques for variety identification and verification", a copy of which is provided in document TWM/3/25.

21. The TWM noted that the markers selected for detecting perennial types in annual ryegrass were not necessarily associated with morphological characteristics and were based on varieties from different countries. The TWM noted that the markers identified in the project would be published in the ISTA rules.

22. The TWM noted that the neural network used in support of variety identification was a proprietary software.

(ii) OECD

23. 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 which is provided in document TWM/3/26.

(iii) Joint activities

24. The TWM considered possible joint activities with OECD and ISTA and the possible harmonization of terms, definitions and methods in relation to molecular techniques. The TWM agreed to invite the expert from France to lead discussions to organize relevant information on terms and definitions. The TWM noted the expression of interest of the experts from Argentina, China, Germany, Netherlands (Kingdom of the), United Kingdom, CIOPORA and ISF to contribute to the exercise.

25. The TWM noted the report from the representative of OECD that the OECD Seed Schemes had already endorsed the collaboration with UPOV for possible harmonization of definitions and terms.

26. The TWM recalled that the outcomes of the survey of UPOV members on the use of molecular markers per crop was available as a spreadsheet at the webpage of the Technical Committee, at its fifty-eight session (see: https://www.upov.int/meetings/en/doc_details.jsp?meeting_id=67786&doc_id=586962).

27. The TWM discussed the possibility of a joint meeting with participants from the TWM, OECD Seed Schemes and ISTA Variety Committee to discuss cooperation on the use of molecular markers for the purposes of each organization. The TWM agreed that organizing a joint meeting with experts from the three organizations would require specific arrangements and should be further discussed by UPOV, OECD and ISTA.

28. The TWM discussed the establishment of common sets of molecular markers for variety identification and agreed to invite UPOV, OECD and ISTA to further consider the challenges and opportunities of this initiative, such as crop(s), scale of harmonization (e.g. regional, global); and molecular marker-related aspects. The TWM agreed that working with breeders could facilitate selecting marker sets representing those breeding programs.

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

(i) Guidelines for the validation of a new characteristic-specific molecular marker protocol as an alternative method for observation

29. The TWM received a presentation from Ms. Cécile Marchenay (Netherlands (Kingdom of the)) on "Guidelines for the validation of a new characteristic-specific molecular marker protocol as an alternative method for observation", a copy of which is provided in document TWP/9/4.

30. The TWM noted that the proposed procedure related to one possible procedure for the validation of molecular markers and agreed that molecular markers could be validated through their publication in peer reviewed literature.

31. The TWM agreed that information in paragraphs 21 and 28 of document TWP/9/4 should be revised to clarify the validation methods. The TWM agreed that the text box for item 8 on the table should be amended to read as follows:

> "In case the DNA marker test result does not confirm the declaration in the Technical Questionnaire, a field trial or bio-assay should be performed. ~~to assess the correctness of the declaration in the Technical Questionnaire~~."

(ii) Latest developments in characteristic-specific molecular markers at Naktuinbouw: a call for knowledge exchange

32. The TWM received a presentation from Ms. Claire Kamei (Netherlands (Kingdom of the)) on "Latest developments in characteristic-specific molecular markers at Naktuinbouw: a call for knowledge exchange", a copy of which is provided in document TWM/3/7.

33. The TWM noted that Naktuinbouw was initiating a project for the selection of molecular markers for lettuce and that interested experts should contact the expert from the Netherlands (Kingdom of the) for possible partnerships.

34. The TWM agreed that organizations should consider pooling resources in support of common projects. The TWM considered options to make available information about projects developed by UPOV members and observers and agreed they could be reported before each TWM session for inclusion in document TWM/3/2 "Reports on Developments in Plant Variety Protection from Members and Observers".

35. The TWM welcomed the proposal from the Netherlands (Kingdom of the) to lead the updating of the list of molecular markers used per crop, that had been reported to the Technical Committee, at its fifty-eight session (available at: https://www.upov.int/meetings/en/doc_details.jsp?meeting_id=67786&doc_id=586962).

(iii) The use of biomolecular technology in DUS testing - a case study on barley

36. The TWM received a presentation from Ms. Vanessa MacMillan (United Kingdom) on "The use of biomolecular technology in DUS testing - a case study on barley", a copy of which is provided in document TWM/3/20.

37. The TWM noted the report provided in the document and invited the expert from the United Kingdom to report progress at the fourth session of the TWM.

(iv) Artificial Intelligence and molecular markers in soft fruit: a proof of concept

38. The TWM received a presentation from Ms. Margaret Wallace (United Kingdom) on "Artificial Intelligence and molecular markers in soft fruit: a proof of concept", a copy of which is provided in document TWM/3/24.

39. The TWM noted progress in the genetic prediction of morphological characteristics such as the presence of spines in Raspberry. The TWM discussed factors relating to the genetic prediction of morphological characteristics as they related to the results demonstrated in the proof of concept study.

(v) Can better understanding of the genetic architecture of wheat DUS characteristics help streamline the DUS processes?

40. The TWM received a presentation from Ms. Camila Zanella (United Kingdom) on "Can better understanding of the genetic architecture of wheat DUS characteristics help streamline the DUS processes?", a copy of which is provided in document TWM/3/22.

41. The TWM considered the requirements for implementing molecular markers in routine variety examination and agreed that they should at the same time increase efficiency for the examination authority and benefit the applicants.

(vi) Genomic prediction for variety collection management wheat

42. The TWM received a presentation from Mr. Adrian Roberts (United Kingdom), on "Genomic prediction for variety collection management wheat", a copy of which is provided in document TWM/3/6.

43. The TWM noted that adjustments were required for the method to work with notes (ordinal data) instead of actual measurements and invited the expert from the United Kingdom to report progress at the fourth session of the TWM.

(vii) COYD-GP enhanced distinctness criterion for cross-pollinated agricultural crops

44. The TWM received a presentation from Mr. Adrian Roberts (United Kingdom), on "COYD-GP enhanced distinctness criterion for cross-pollinated agricultural crops", a copy of which is provided in document TWM/3/4.

45. The TWM noted that the increased efficiency of the new method COYD-GP for distinctness assessments had been calculated for each characteristic and agreed that further investigation would be required on the overall efficiency gain. The TWM invited the expert from the United Kingdom to report developments at the fourth session of the TWM.

(viii) Community Plant Variety Office (CPVO) R&D activities

46. The TWM received a presentation from Ms. Cecile Collonnier, Community Plant Variety Office (CPVO), on "CPVO R&D activities", a copy of which is provided in document TWM/3/15.

47. The TWM noted the report on recently concluded and ongoing projects co-funded by the CPVO. The TWM noted that the molecular markers selected under the projects were publicly available and noted the offer from China to exchange a selection of KASP markers.

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

(i) Exploiting crop haplotype-tag polymorphisms marker for pedigree identification

48. The TWM received a presentation from Mr. Yikun Zhao, China, on "Exploiting crop haplotype-tag polymorphisms (HTP) marker for pedigree identification", a copy of which is provided in document TWM/3/10.

49. The TWM discussed the usefulness of HTP makers for pedigree identification in maize three-way hybrids and its possible use for soybeans. The TWM discussed the statistical methods to assess confidence of the method and noted the correct identification of 94% of samples in the tests performed. The TWM noted that HTP makers could possibly be used for assessing essentially derived varieties (EDVs). The TWM agreed to invite the expert from China to report developments at its fourth session.

(ii) PAD – an algorithm for progeny-ancestor detection based on genetic profiles

50. The TWM received a presentation from Mr. Emerson Limberger, International Seed Federation (ISF), on "PAD – an algorithm for progeny-ancestor detection based on genetic profiles", a copy of which is provided in document TWM/3/17.

51. The TWM noted that MNP markers would provide better results, but in the absence of MNP markers, genetic tags based on recombination blocks could be used as alternative, although further testing was necessary. The TWM noted that a test version of the algorithm would be made available for interested experts.

(iii) DurdusTools: Current state and use in DUS-testing

52. The TWM received a presentation from Ms. Alexandra Ribarits (Austria), on "DurdusTools: Current state and use in DUS-testing", a copy of which is provided in document TWM/3/21.

53. The TWM noted the use of DurdusTools calculating genetic distances in support of routine DUS examination of the participation authorities since 2024. The TWM noted that the participating authorities covered the operational costs, including database maintenance and molecular data generation.

(iv) Development of DUS phenotyping tools for and with examination offices: experience gained

54. The TWM received a presentation from Mr. Joseph Peller (Netherlands (Kingdom of the)), on "Development of DUS phenotyping tools for and with examination offices: experience gained", a copy of which is provided in document TWM/3/27.

55. The TWM noted the availability of a mobile phone application prototype to assess volume and shape ratios of fruits, for images captured from a top down perspective. The TWM noted that the programming code for the application was open source and available at GitHub. The TWM noted the invitation for collaboration to further develop the application, in particular for stabilizing the mobile phone interface. The application and tutorial are available at: https://play.google.com/store/apps/details?id=com.wur.invite.morph_app&hl=en-US).

56. The TWM agreed on the importance of applications for hand-held devices in support of increased efficiency in DUS examination.

(v) Phenotyping concept for strengthening the plant variety protection chain via combined use of IA&AI

57. The TWM received a presentation from Mr. Zsolt Szani, Hungary on "Phenotyping concept for strengthening the plant variety protection chain via combined use of image analysis and artificial intelligence (IA&AI)", a copy of which is provided in document TWM/3/28.

58. The TWM considered the use of algorithms for image analysis and agreed they should be described and validated. The TWM agreed that the introduction of phenotyping tools in variety examination requires sufficient amount of variety data for training the algorithms and validation of the analysis generated.

(vi) Use of DNA databases at Naktuinbouw to improve DUS work

59. The TWM received a presentation from Ms. Cécile Marchenay (Netherlands (Kingdom of the)) on "Use of DNA databases at Naktuinbouw to improve DUS work", a copy of which is provided in document TWM/3/8.

60. The TWM discussed challenges and opportunities on the use of DNA-based information as the basis to optimize variety collections and the organization of growing trials. The TWM discussed the use of DNA-based information to reduce the number of growing cycles for crops that would normally be examined in two growing trials.

(vii) Shared molecular database

61. The TWM received a presentation from Mr. Rene Mathis (France) on "Shared molecular database", a copy of which is provided in document TWM/3/23.

62. The TWM agreed on the usefulness of shared databases and noted the plans for shared databases in the European Union.

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

- Confidentiality of molecular information

63. The TWM received a presentation 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"), on "Confidentiality of molecular information", a copy of which is provided in document TWP/9/6.

64. The TWM recalled UPOV guidance on confidentiality of molecular information provided in documents TGP/5, Section 1 "Model Administrative Agreement for International Cooperation in the Testing of Varieties" and INF/15 "Guidance for Members of UPOV". The TWM noted that no reports on confidentiality of molecular information had been reported to the TWM and agreed on the importance of safeguarding the confidentiality of parent lines and hybrid formulas. The TWM noted that a similar discussion was being held at OECD.

(f) The use of molecular techniques in the assessment of essential derivation

(i) Exploration of identification techniques based on SNP markers for essentially derived varieties of wheat

65. The TWM received a presentation from Ms. Binshuang Pang (China) on "Exploration of identification techniques based on SNP markers for essentially derived varieties of wheat", a copy of which is provided in document TWM/3/11.

66. The TWM noted the method for establishing a 92% threshold of predominant derivation using at least 20,000 SNPs and commonly known essentially derived varieties (EDV) as the basis for the analysis.

67. The TWM agreed that the variety selection method utilized and its pedigree were important elements for the assessment of essential derivation. The TWM recalled the UPOV guidance in document UPOV/EXN/EDV/3 that a high degree of similarity alone did not automatically mean that a variety had been predominantly derived, such as in the case of convergent breeding.

68. The TWM noted that the method described in the presentation was a recalibration using SNPs of a previously established threshold using SSR markers.

(ii) Essentially derived varieties (EDV) threshold development in soybeans

69. The TWM received a presentation from Mr. Barry Nelson, International Seed Federation (ISF), on "Essentially derived varieties (EDV) threshold development in soybeans", a copy of which is provided in document TWM/3/9.

70. The TWM noted that the preliminary threshold would be evaluated by breeders involved in the study according to their current soybean development programs; if the threshold was agreed upon, it would be shared with relevant seed associations for agreement and potential adoption.

71. The TWM agreed on the importance of breeders' contributions to determining thresholds and avoiding disputes on EDVs. The TWM agreed that implementing a threshold would require looking at variety pedigrees and how to assess remaining criteria for determining essential derivation.

(g) The use of molecular techniques for enforcement

(i) Use of DNA techniques for plant variety right (PBR) enforcement in Peru

72. The TWM received a presentation from Mr. Diego F. Ortega Sanabria (Peru) on "Use of DNA techniques for plant variety right (PBR) enforcement in Peru", a copy of which is provided in document TWM/3/3.

73. The TWM noted the procedures in Peru for field inspections of infringement cases, including the role of the administrative authority to conduct field inspections and the existence of guidelines for DNA-based information. The TWM noted that in Peru the plaintiff should demonstrate the specificity of the markers to be used identifying the protected variety.

74. The TWM noted the challenges reported in relation to enforcement on exported fruits due to the amount of time required for variety identification. The TWM agreed that it was important to strengthen cooperation among authorities in UPOV members on enforcement matters.

(ii) Use of molecular markers as a tool to enforce plant variety right (PBR) in soybean in Uruguay

75. The TWM received a presentation from Ms. Vanessa Sosa and Ms. Pilar Zorilla (Uruguay) and Mr. Diego Risso (Seed Association of the Americas) on "Use of molecular markers as a tool to enforce plant variety right (PBR) in soybean in Uruguay", a copy of which would be provided as an addendum to document TWM/3/18.

76. The TWM noted that in Uruguay the breeders' association and the National Seeds Institute conducted field inspections. The TWM noted that the procedure for variety identification could take up to two days, in some cases. The TWM noted that infringement fines in Uruguay were based on the value of the harvested material and considered an effective measure.

77. The TWM noted that image analysis was also used for variety identification using seeds of protected varieties.

MATTERS FOR INFORMATION

Reports on developments in UPOV

78. The TWM noted a report from the Office of the Union on developments in UPOV.

Reports from members and observers

79. The TWM noted the information on developments in plant variety protection from members and observers provided in document TWM/3/2. The TWM noted that reports submitted to the Office of the Union until May 1, 2025, would be included in the final version of document TWM/3/2.

Other matters for information

80. The TWM noted the information provided in the following documents:

(i) Procedures for DUS examination (document TWP/9/1)
(ii) UPOV Information databases (document TWP/9/2)

(iii) Test Guidelines: support for drafters; additional characteristics; and methods of propagating the variety (document TWP/9/3)
(iv) Proposal for a revision of document TGP/7 “Development of Test Guidelines”, GN 28 “Example Varieties” (document TWP/9/5)

DATE AND PLACE OF THE NEXT SESSION

81. At the invitation of the United Kingdom, the TWM agreed to hold its fourth session in Cambridge, from June 1 to 4, 2026.

FUTURE PROGRAM

82. The TWM agreed that documents for its fourth session should be submitted to the Office of the Union by April 17, 2026. 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.

83. The TWM proposed to discuss the following items at its fourth session:

1. Opening of the session
2. Adoption of the agenda
3. Matters for consideration
   - 3.1 Software and statistical analysis methods for DUS examination
   - 3.2 Phenotyping and image analysis (papers invited)
   - 3.3 Developments in molecular techniques and bioinformatics (papers invited)
     - (a) Cooperation between international organizations (papers invited)
     - (b) Reports of work on molecular techniques in relation to DUS examination (papers invited)
     - (c) Management of databases and exchange of data and material (papers invited)
     - (d) Confidentiality, ownership and access to molecular data
     - (e) The use of molecular techniques in the assessment of essential derivation (papers invited)
     - (f) The use of molecular techniques in variety identification (papers invited)
     - (g) The use of molecular techniques for enforcement (papers invited)
4. 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, guidance and information materials)
5. Date and place of the next session
6. Future program
7. Adoption of the Report on the session (if time permits)
8. Closing of the session

VISIT

84. On the morning of April 29, 2025, the TWM visited Institute of Vegetables and Flowers (IVF), Chinese Academy of Agricultural Sciences in Beijing, observed the molecular marker laboratory and the experimental plots where image analysis was performed using a self-propelled analyzer. The TWM received a presentation on the activities of the IVF by Mr. Feng Cheng, Assistant Director of IVF, a copy of which is provided in Annex IV to this document. The TWM also visited the Information Technology Research Center, Beijing Academy of Agriculture and Forestry Sciences.

85. In the afternoon of April 29, 2025, the TWM visited the Chinese Academy of Forestry in Beijing, including the cultivation of new species of woody plants in laboratories with controlled environments and glasshouses. The TWM received a presentation on the activities of the Chinese Academy of Forestry by Mr. Yongqi Zheng,

Researcher of the Chinese Academy of Forestry, a copy of which is provided in Annex V to this document. Further information is provided in Annex VI to this document.

86. The TWM adopted this report at the end of the session.

[Annex I follows]

ANNEX I

LIST OF PARTICIPANTS

I. MEMBERS

ALBANIA

Luiza SALLAKU (Ms.), Director, Ministry of Agriculture and Rural Development, Tirana
(e-mail: Luiza.Sallaku@eshff.gov.al)

Valdete BUÇA (Ms.), Director, Directorate of Plant Health Policies, Seeds, Seedlings and Fertilizers, Ministry of Agriculture and Rural Development, Tirana
(e-mail: valdete.buca@bujqesia.gov.al)

ARGENTINA

Mariano Alejandro MANGIERI (Mr.), Director, Plant Variety Protection Office, Instituto Nacional de Semillas (INASE), Secretaía de Industria y Comercio Exterior, Ministerio de Economía, Buenos Aires
(e-mail: mmangieri@inase.gob.ar)

Ana Laura VICARIO (Ms.), National Director of Seed Development, Instituto Nacional de Semillas (INASE), Secretaría de Agricultura, Ganadería, Pesca y Alimentación, Ministerio de Economía, Buenos Aires
(e-mail: alvicario@inase.gob.ar)

Alberto BALLESTEROS (Mr.), Examiner officer, Plant Variety Protection Office, Instituto Nacional de Semillas (INASE), Secretaría de Agricultura, Ganadería, Pesca y Alimentación, Buenos Aires
(e-mail: aballesteros@inase.gob.ar)

AUSTRALIA

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

AUSTRIA

Alexandra RIBARITS (Ms.), Senior Expert, Austrian Agency for Health and Food Safety, Wien
(e-mail: alexandra.ribarits@ages.at)

Marlene NIEDERMAYER (Ms.), DUS Testing, Austrian Agency for Health and Food Safety (AGES), Vienna
(e-mail: marlene.niedermayer@ages.at)

CANADA

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

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

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

CHINA

Yan LI (Mr.), Deputy Director of Plant Variety Protection Office, Executive Director General of Development Center of Science and Technology, Ministry of Agriculture and Rural Affairs (MARA), Beijing

Jing LI (Ms.), Deputy Division Director, Development Center of Science and Technology (DCST), Ministry of Agriculture and Rural Affairs (MARA), Beijing

Huijian XU (Ms.), Deputy Director, Development Center of Science and Technology, National Forestry and Grassland Administration of China (NFGA), Beijing

Yongqi ZHENG (Mr.), Director, Laboratory of Molecular Identification of Plant Varieties, Science and Technology Development Center (Office for Protection of New Varieties of Plant), National Forestry and Grassland Administration of China (NFGA), Beijing
(e-mail: zyq8565@126.com)

Jinghua DUAN (Mr.), Director of DUS Division, DUS Division, National Forestry and Grassland Administration, Beijing
(e-mail: 13683366262@163.com)

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 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)

Yinlong ZHOU (Mr.), Deputy Director, Yunnan Flower Technical Training & Extension Center, Kunming
(e-mail: 422344832@qq.com)

Dili WANG (Ms.), Deputy Director of PVP Division, National Forestry and Grassland Administration, Beijing
(e-mail: wangdili@cnpvp.net)

Shenzao FU (Mr.), Technical Director, Institute of Vegetables and Flowers, Beijing Sub-Center of New Plant Variety Tests, Chinese Academy of Agricultural Sciences, Beijing
(e-mail: fushenzao@caas.cn)

Haitao ZHOU (Mr.), Technical Director/Associate Researcher, Jilin Academy of Agricultural Sciences, Gongzhuling
(e-mail: show19830623@aliyun.com)

Dongmei LI (Ms.), Operational Deputy Director/Senior Researcher, Heilongjiang Academy of Agricultural Sciences, Harbin
(e-mail: interli02@126.com)

Jianjun SUN (Mr.), Operational Deputy Director, Hebei Academy of Agricultural Sciences, Yuanyang
(e-mail: 22637217@qq.com)

Yongxiang TONG (Mr.), Operational Deputy Director/Senior Agronomist, Jinzhou Academy of Agricultural Sciences, Jinzhou
(e-mail: 985511758@qq.com)

Fenghua WANG (Ms.), Operational Deputy Director/Senior Researcher, Jilin Academy of Agricultural Sciences, Gongzhuling
(e-mail: Wfh1234@163.com)

Wanmei JIN (Ms.), Professor, Beijing Academy of Agriculture and Forestry Sciences, Beijing
(e-mail: jwm0809@163.com)

Yunxia CHU (Ms.), Senior Researcher, Shanghai Academy of Agricultural Sciences, Ministry of Agriculture and Rural Affairs (MARA), Shanghai
(e-mail: chuyx@189.cn)

Ahong HUO (Ms.), Senior Researcher, Zhangjiakou Academy of Agricultural Sciences, Zhangjiakou
(e-mail: huoahong@163.com)

Binshuang PANG (Ms.), Senior Researcher, Hybrid Wheat Institute, Beijing Academy of Agriculture and Forestry Sciences, Beijing
(e-mail: 1492196201@qq.com)

Yuxia LIU (Ms.), Senior Program Officer, PVP Division, National Forestry and Grassland Administration (NFGA), Beijing
(e-mail: kjzxlyx@163.com)

Hongwei PAN (Mr.), Senior Engineer, Research Institute of Subtropical Forestry, Chinese Academy of Forestry, Hangzhou
(e-mail: cafapanhw@126.com)

Xianghua YUE (Mr.), Senior Engineer, International Centre for Bamboo and Rattan,Sanya Research Base, Sanya
(e-mail: yuexianghua@icbr.ac.cn)

Boxuan WU (Mr.), Senior Program Officer, International Cooperation Department, China National Intellectual Property Administration (CNIPA), Beijing
(e-mail: wuboxuan@cnipa.gov.cn)

Aiming YANG (Ms.), Senior Program Officer, National Forestry and Grassland Administration, Beijing
(e-mail: 691716340@qq.com)

Leijie QIAO (Ms.), Associate Professor, University of Shanxi, Taiyuan
(e-mail: qiaoleijie@yeah.net)

Jun REN (Ms.), Associate Researcher, Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing
(e-mail: renjun@caas.cn)

Xuedan YU (Ms.), Associate Researcher, Research Institute of Forestry, Chinese Academy of Forestry Sciences, Beijing
(e-mail: Yuxd@caf.ac.cn)

Yu CHEN (Mr.), Associate Researcher, Hainan Academy of Forestry (Hainan Academy of Mangrove), Haikou
(e-mail: cfstuchen@126.com)

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

Hua DENG (Ms.), Associate Researcher, Chinese Academy of Forestry, Beijing
(e-mail: denghua@caf.ac.cn)

Chuanhong ZHANG (Ms.), Researcher, Laboratory for Molecular Identification of Plant Varieties, Chinese Academy of Forestry, Beijing
(e-mail: zhangch@caf.ac.cn)

Fengge WANG (Ms.), Researcher, Maize Research Institute, Beijing Academy of Agricultural and Forestry Sciences, Beijing
(e-mail: gege0106@163.com)

Wei GAO (Mr.), Researcher, Jiangxi Academy of Forestry, Nanchang
(e-mail: 284256805@qq.com)

Zeqian LI (Mr.), Engineer, Heze Peony Industry Development Center, Heze
(e-mail: 425771827@qq.com)

Shuoli ZHENG (Mr.), Engineer, Hunan Bontanic Garden, Changsha
(e-mail: 330110588@qq.com)

Hongxing WANG (Mr.), IT Manager, Jiangsu Academy of Agricultural Sciences, Nanjing
(e-mail: whx821x@126.com)

Yao WANG (Ms.), Agronomist, Zhangjiakou Academy of Agricultural Sciences, Zhangjiakou
(e-mail: wangyaolovelife@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)

Jinrong ZHANG (Ms.), Office Manager/Assistant Researcher, Northwest A&F University, Yangling
(e-mail: 743063181@qq.com)

Jian LI (Mr.), Assistant Researcher, Xuzhou Agricultural Science Research Institute, Xuzhou
(e-mail: lijian2022@jaas.ac.cn)

Cuiping CHEN (Ms.), Research Assistant, Qinghai Academy of Agriculture Sciences, Xining
(e-mail: chencuiyang@126.com)

Qun XU (Ms.), Research Assistant, China National Rice Research Institute, Hangzhou
(e-mail: xuqun@caas.cn)

Yiying ZHANG (Ms.), Research Assistant, Shanghai Academy of Agricultural Sciences, Shanghai
(e-mail: zyy425zoey@163.com)

Yikun ZHAO (Mr.), Assistant Researcher, Maize Research Center, Beijing Academy of Agriculture & Forestry Sciences, Beijing
(e-mail: zhaoqiankaisteam@126.com)

Xinyuan CHEN (Ms.), Assistant Engineer, Shanghai Forestry Station, Shanghai
(e-mail: bza@foxmail.com)

Yimeng LI (Ms.), DUS Tester / Assistant Researcher, Xuzhou Agricultural Science Research Institute, JAAS, Xuzhou
(e-mail: 513570540@qq.com)

Cailing TENG (Ms.), Tester, Kunming Sub-Center for Test of New Varieties of Plants, Beijing
(e-mail: tengcailing@yaas.org.cn)

Bihui LU (Ms.), DUS Tester, Jiangsu Academy of Agricultural Sciences, Nanjing
(e-mail: 563921415@qq.com)

Shan LU (Ms.), DUS Tester, Jinzhou Academy of Agricultural Sciences, Jinzhou
(e-mail: lushan1250382@163.com)

Zongzhe YAO (Mr.), Tester, Kunming DUS Test Station, Kunming
(e-mail: 1712726709@qq.com)

CZECH REPUBLIC

Martin TLÁSKAL (Mr.), Biometrician-specialist, Central Institute for Supervising and Testing in Agriculture (UKZUZ), Brno
(e-mail: Martin.Tlaskal@ukzuz.gov.cz)

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

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

EUROPEAN UNION

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

Jean MAISON (Mr.), , Head of PVE Unit, 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, Seed Unit, Finnish Food Authority, Loimaa
(e-mail: kaarina.paavilainen@ruokavirasto.fi)

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

FRANCE

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

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)

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)

GERMANY

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

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

Fruzsina SCHMIDT (Ms.), Mathematical-Statistical evaluation of variety testing, 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)

Zsolt SZANI (Mr.), DUS Expert, Variety Testing Dept. for Horticultural Crops, National Food Chain Safety Office (NÉBIH), Budapest
(e-mail: szanizs@nebih.gov.hu)

ITALY

Chiara DELOGU (Ms.), Senior Researcher, CREA-DC Seed testing Station, Tavazzano
(e-mail: chiara.delogu@crea.gov.it)

JAPAN

Minori HAGIWARA (Ms.), Director for International Affairs on Plant Variety Protection, Plant Variety Protection Office, Intellectual Property Division, Export and International Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), Tokyo
(e-mail: minori_hagiwara110@maff.go.jp)

Manabu OSAKI (Mr.), Chief Examiner, Plant Variety Protection Office, Intellectual Property Division, Export and International Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), Tokyo
(e-mail: manabu_osaki690@maff.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)

Hidemi OSHINO (Ms.), Deputy Adviser, Plant Variety Protection Section, Center for Seeds and Seedlings, National Agriculture and Food Research Organization (NARO), Tsukuba
(e-mail: oshino@affrc.go.jp)

Toshiki YAMAMOTO (Mr.), Deputy Adviser, Plant Variety Protection Section, Center for Seeds and Seedlings (NCSS), National Agriculture and Food Research Organization (NARO), Tsukuba
(e-mail: yamamotot562@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: kobayashi.kenji840@naro.go.jp)

Yukari KANESHIRO (Ms.), Senior Staff, Center for Seeds and Seedlings (NCSS), National Agriculture and Food Research Organization (NARO), Ibaraki
(e-mail: mitsuhashiy419@affrc.go.jp)

Remi MATSUSHITA (Ms.), Staff, Center for Seeds and Seedlings, National Agriculture and Food Research, Kasaoka
(e-mail: matsushita.remi514@naro.go.jp)

Noriko NISHI (Ms.), Staff, Center for Seeds and Seedlings, National Agriculture and Food Research, Tsukuba-shi
(e-mail: nishi.noriko850@naro.go.jp)

LITHUANIA

Austė GEDDES (Ms.), Chief specialist, Plant Variety Division, State Plant Service under the Ministry of Agriculture, Vilnius
(e-mail: auste.geddes@vatzum.lt)

NETHERLANDS (KINGDOM OF THE)

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

Sanchari SIRCAR (Ms.), Researcher, Naktuinbouw, Roelofarendsveen
alvi(e-mail: S.Sircar@naktuinbouw.nl)

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

NEW ZEALAND

Jacqueline BROADHEAD (Ms.), Senior Plant Variety Rights 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)

Cecilia REQUEJO-JACKMAN (Ms.), Senior Plant Variety Rights 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)

Scott GREGAN (Mr.), Senior Plant Variety Rights 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)

PERU

Diego Francoise ORTEGA SANABRIA (Mr.), Technical Secretary, Commission on Inventions and New Technologies, Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (INDECOPI), Lima
(e-mail: dortega@indecopi.gob.pe)

REPUBLIC OF KOREA

Tae Hoon KIM (Mr.), Senior Forest Researcher, Examiner, National Forest Seed Variety Center (NFSV), Chungcheongbuk-do
(e-mail: algae23@korea.kr)

Minjun KIM (Mr.), Forestry Researcher, Nationa Forest Seed & Variety Center, Chungcheongbuk-do
(e-mail: jun10mk@naver.com)

Hongsup KIM (Mr.), Agricultural Researcher, Korea Seed and Variety Service (KSVS), Ganwondo
(e-mail: hskim98@korea.kr)

Dongsun KIM (Mr.), DNA Analysis, Korea Seed & Variety Service (KSVS), Gimcheon City
(e-mail: coinoia@korea.kr)

ROMANIA

Teodor Dan ENESCU (Mr.), Counsellor, State Institute for Variety Testing and Registration (ISTIS), Bucarest
(e-mail: enescu_teodor@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 BELOVA (Ms.), Leading Agronomist 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)

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

SOUTH AFRICA

Donavon SONNENBERG (Mr.), Agricultural Scientist, Department of Agriculture, Land Reform and Rural development, Stellenbosch
(e-mail: DonovanS@Dalrrd.gov.za)

Patricia MOTUPA (Ms.), Scientist Production, Department of Agriculture, Forestry & Fisheries, Pretoria
(e-mail: PatriciaMOT@dalrrd.gov.za)

Diana PHUMZA VAKELE (Ms.), Scientist Production (DUS Examiner), Directorate Genetic Resources, Stellenbosch
(e-mail: phumzav@dalrrd.gov.za)

SPAIN

Isabel RODRÍGUEZ QUILÓN (Ms.), Head, Molecular Laboratory – DTELV, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA-CSIC), Madrid
(e-mail: rodriguez.isabel@inia.csic.es)

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, Laboratory of molecular genetic analysis, Ukrainian Institute for Plant Variety Examination, Kyiv
(e-mail: irs2006@ukr.net)

Nadiia LYNCHAK (Ms.), Senior Researcher, Ukrainian Institute for Plant Variety Examination, Kyiv
(e-mail: lynchaknadin@gmail.com)

Yulia SHYTIKOVA (Ms.), Senior Researcher, Ukrainian institute for plant variety examination, Kyiv
(e-mail: julia_vg@ukr.net)

UNITED KINGDOM

Adrian ROBERTS (Mr.), Lead Statistician for Variety Trials, Biomathematics & Statistics Scotland (BioSS), Edinburgh
(e-mail: a.roberts@bioss.ac.uk)

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

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

Trudyann KELLY (Ms.), Consultant Statistician, Statistics and Data Science Branch (SDSB), Agri-Food & Biosciences Institute (AFBI), Belfast
(e-mail: trudyann.kelly@afbini.gov.uk)

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

Camila ZANELLA (Ms.), Senior Postdoctoral Researcher, NIAB, Cambridge
(e-mail: Camila.Zanella@niab.com)

Vanessa MCMILLAN (Ms.), Senior 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)

URUGUAY

Vanessa SOSA (Ms.), Seed Quality Laboratory Manager, Instituto Nacional de Semillas (INASE), Canelones
(e-)mail: vsosa@inase.uy

Pilar ZORRILLA DE SAN MARTIN MUÑOZ (Ms.), Molecular Laboratory Coordinator, Instituto Nacional de Semillas (INASE), Canelones
(e-mail: pzorrilla@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)

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)

III. ORGANIZATIONS

CROPLIFE INTERNATIONAL

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

Marion LIMES (Ms.), Registration and Protection Specialist field crops, Syngenta, Saint-Sauveur, France
(e-mail: marion.limes@syngenta.com)

Zhenqiang XI (Mr.), China Product Registration Manager, Corteva, Beijing, China
(e-mail: zhenqiang.xi@corteva.com)

EUROSEEDS

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

Branislava POPOV (Ms.), Technical Manager Plant Breeding & Variety Registration, Bruxelles, Belgium
(e-mail: BranislavaPopov@euroseeds.eu)

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

Micaela FILIPPO (Ms.), Vice Secretary-General, International Community of Breeders of Asexually Reproduced Horticultural Plants (CIOPORA), Hamburg, Germany
(e-mail: micaela.filippo@ciopora.org)

INTERNATIONAL SEED FEDERATION (ISF)

Emerson LIMBERGER (Mr.), Germplasm Security Senior Lead, 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, Rijk Zwaan Zaadteelt en Zaadhandel B.V., De Lier, Netherlands (Kingdom of the)
(e-mail: a.schenkeveld@rijkzwaan.nl)

INTERNATIONAL SEED TESTING ASSOCIATION (ISTA)

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

Ana Laura VICARIO (Ms.), National Director of Seed Development, Instituto Nacional de Semillas (INASE), Secretaría de Agricultura, Ganadería, Pesca y Alimentos, Ministerio de Economía, Buenos Aires, Argentina
(e-mail: alvicario@inase.gob.ar)

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)

Csaba GASPAR (Mr.), Head, OECD Codes and Schemes,, 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 (Mr.), Director Ejecutivo, Seed Association of the Americas (SAA), Montevideo, Uruguay
(e-mail: drisso@saaseed.org)

Marymar BUTRUILLE (Ms.), Germplasm IP Scientist Lead, Bayer Crop Science, Ankeny, United States of America (e-mail: marymar.butruille@bayer.com)

IV. OTHER

Dan FANG (Ms.), Senior Consultant Seed Industry, Amcham China, Beijing, China (e-mail: dfdanfang@foxmail.com)

Joseph PELLER (Mr.), Researcher, Wageningen University and Research, Wageningen, Netherlands (Kingdom of the) (e-mail: joseph.peller@wur.nl)

V. OFFICERS

Nuria URQUÍA FERNÁNDEZ (Ms.), chairperson

VI. OFFICE OF UPOV

Yolanda HUERTA (Ms.), Vice Secretary-General

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

Yoshiro NISHIMURA (Mr.), Technical/Regional Officer (Asia)

Jessica MAY (Ms.), Training and Cooperation Assistant

[Annex II follows]

农业农村部科技发展中心
Center for Science and Technology Development, MARA

中国农业植物新品种保护工作简介

Introduction to Agricultural Plants Variety Protection in China

李晶 Li Jing
农业农村部科技发展中心

Development Center of Science and Technology
Ministry of Agricultural and Rural Affairs

4月28日 北京
Beijing 28 April 2025

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Achievements in Agricultural PVP in China

2 **农业植物新品种保护最新进展**
Latest Development in Agricultural PVP

3 **下一步工作**
Future Work Plan

2

2

一、中国农业植物新品种保护成效
Achievements in Agriculture PVP in China

3

3

法规制度不断完善 The PVP legislation has been continuously improved

The release of implementation of the Regulations, Join UPOV, the first application of PVP was accepted

The release of 《Interpretation of the Supreme Court on several issues concerning the trial of disputes over PVP》,《Provisions on Trial of New Plant Varieties Review Committee of the Ministry of Agriculture》

Several Provisions of the Supreme Court on the Specific Application of Law in the Trial of Disputes Concerning Infringement of PVP

The revised Seed Law includes a separate chapter on PVP

1997	1999	2000	2001	2002	2007	2012	2015	2021
《中华人民共和国植物新品种保护条例》颁布	发布条例实施细则 加入UPOV 开始受理植物新品种权申请	《中华人民共和国种子法》颁布实施	发布《最高人民法院关于审理植物新品种纠纷案件若干问题的解释》 发布《农业部植物新品种复审委员会审理规定》	发布《农业植物新品种侵权案件处理规定》	发布《最高人民法院关于审理侵害植物新品种权纠纷案件具体应用法律问题的若干规定》	发布《农业植物品种命名规定》	修订《种子法》将新品种保护单列一章	修改《种子法》，修订《若干问题的解释》和《若干规定》，并颁布规定(二)

The release of 《the Regulations of the People's Republic of China on the Protection of New Varieties of Plants》

The release and implementing of 《the Seed Law of the People's Republic of China》

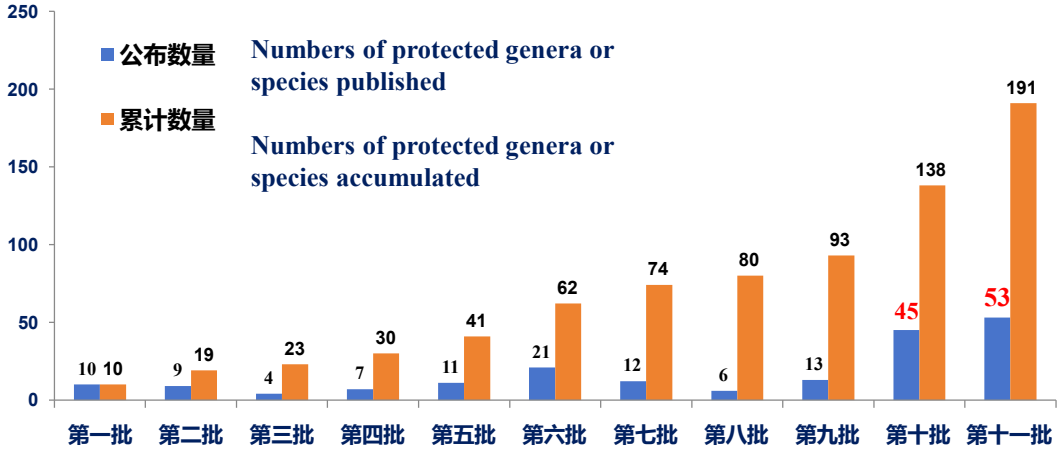
《Provisions on the Infringement case, Cases of New Varieties of Agricultural Plants》

Regulations on the denomination of Agricultural Plant Varieties

Amend the 《Seed Law》, and 《Interpretation of the Supreme Court on several issues concerning the trial of disputes over PVP》 and 《Several Provisions of the Supreme Court on the Specific Application of Law in the Trial of Disputes Concerning Infringement of PVP》, and release the Provisions promulgation II

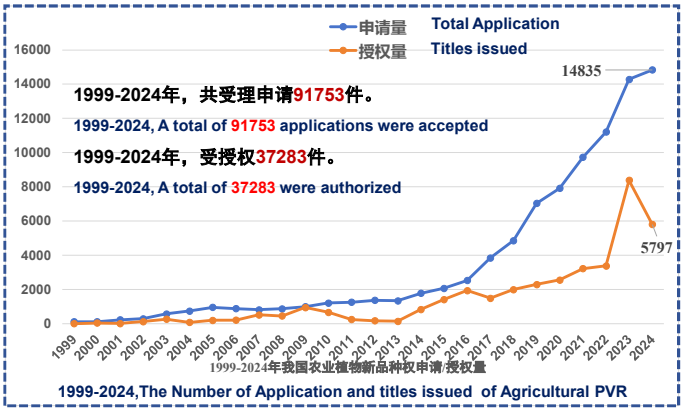
4

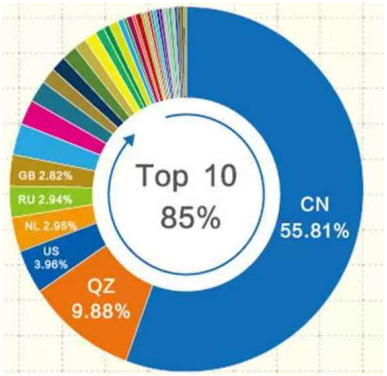
农业植物新品种名录发布情况
The protection list of Agricultural plant variety



5

植物新品种权保护意识不断增强
The Awareness of PVP has been strengthened dramatically





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6

组织架构不断健全
Continuously Improvement of the work system

农业植物品种保护体系 Agricultural PVP system

- 审查机构 Examination authority
  - 农业农村部植物新品种保护办公室（种业管理司） PVP office of MARA(The departmentof seed management)
    - 秘书处（种业管理司品种管理处） Secrearіat(division of variety management,depatment of seed management,MARA)
    - 审查部门（农业农村部科技发展中心、海南自由贸易港农业植物新品种审查协作中心） Examination Division (DCST,MARA,Examination and collaboration center of Hainan Free trade port)
    - 测试机构（农业农村部植物新品种测试中心、分中心、测试站） DUS test Division (DCST,MARA,branch center,test station)
    - 保藏机构（农业农村部植物新品种保护办公室植物新品种保藏中心） Depository institution (Depository institution of plant new variety,office of PVP,MARA)
- 复审机构 Re-Examination division
  - 农业农村部植物新品种复审委员会 Re-examination board new varieties of plants, Ministry of Agriculture and Rural affairs
- 司法、执法机构 Judicial and law enforcement agencies
  - 人民法院 People's court
  - 农业农村行政执法部门 Agricultural and rural administrative law enforcement departments
- 服务机构（代理机构等） Service agencies (agencies, etc.)

7

技术支撑体系不断壮大
The technical support system has been continuously strengthened

1个中心+27个分中心
+6个测试站1
Testing centers+27 branch centers+6 testing stations

258项DUS测试指南+36种作物DNA分子标准
258 DUS test guidelines and 36 DNA molecular standards

构建了品种保护办公自动化、品种权申请、审查管理和测试信息数据服务4个系统，21个子系统。
Four integrated systems with 21 subsystems have been established, covering: plant variety protection management, application, Examination management and Testing data services

8

为粮食安全，乡村振兴做出贡献

Contribute to national food security and rural revitalization

目前，全国推广面积排名前十位的水稻、小麦、玉米、大豆品种中，授权品种占比达94%。

Currently, among the top 10 most widely cultivated varieties of rice, wheat, corn, and soybean in China, the protected varieties account for 94% of them.

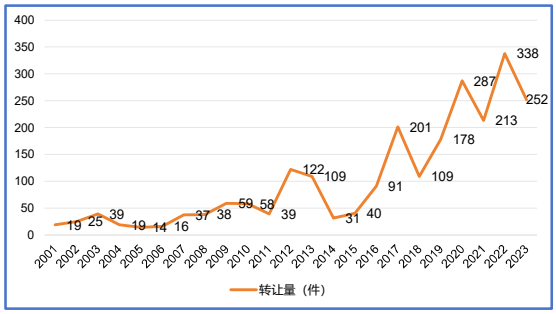
Gastrodiae

Morchella

9

转化和运用取得实效

Effective Utilization of PVR

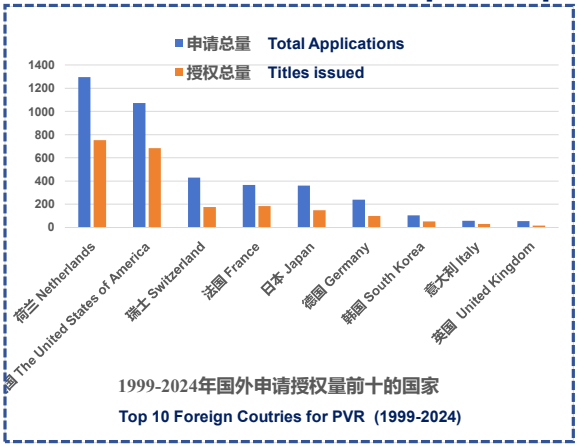


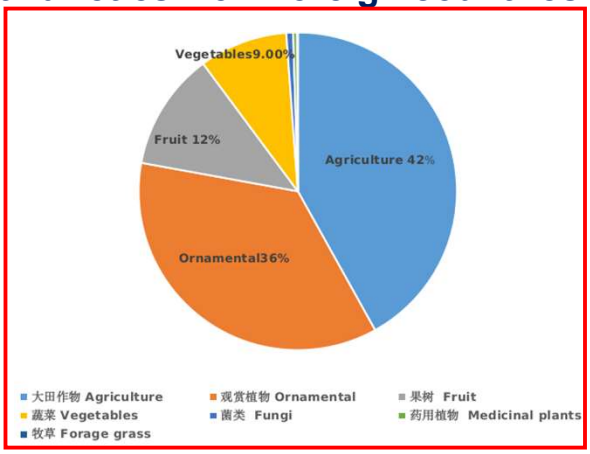
From 2001 to 2023, a total of 2334 agricultural plant variety rights were transferred for effective utilization

10

促进优良品种引进来

Introduction of superior plant varieties from foreign countries





From 1999 to 2024, a total of 4,195 agricultural variety rights from foreign countries'applications were accepted, accounting for 4.6% of the total, with 2,217 titiles issued,representing 5.9% of the total.

11

11

国际合作不断深化

International Cooperation has been continuously strengthened

In 2022, Dr Cui Yehan was elected as the president of the UPOV Council.

Launched the "PRISMA" plantform, promoting "bringing in" and "going global" of varieties.

hosted meetings of the UPOV technical working group.

Dispatch staff to work in the UPOV office.

Hold training courses on PVP for Central Asian and the Lancang-Mekong countries.

visited UPOV, WIPO Director-General and UPOV Secretary-General Daren Tang met with the delegation.

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二、农业植物新品种保护最新进展

Latest Developments in Agricultural PVP

首次全面修订植物新品种保护条例

The Regulations on the Protection of New Varieties of Plant is comprehensively revised for the first time

- **提高保护水平 Strengthen the protection of Plant Variety's Rights**
  - Expand the scope and coverage of protection.
  - Extend the period of protection
  - Specify the implementation of the EDV system
- **严格品种权授予条件 Strictly enforce the conditions for granting PVR**
  - Expand the circumstances under which PVR is not granted and novelty is invalidated.
  - Strengthen the management of denomination for protected varieties
- **完善申请授权流程 Optimize the application and authorization process**
- **其他 Others**

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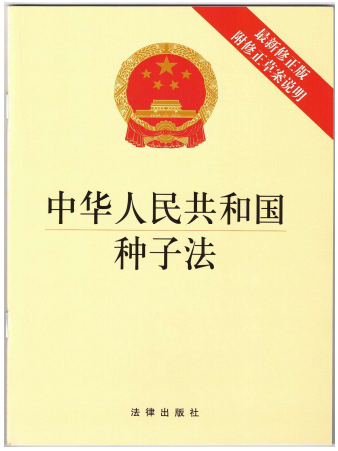
推动EDV制度落地实施

Promote the implementation of EDV



2021年，新种子法首次建立实质性派生品种制度，中国成为国际上实施该制度的第70个成员和第89个国家。

In 2021, the newly revised Seed Law established China's Essentially Derived Variety (EDV) system for the first time, making China the 70th member (and 89th country) globally to implement this regime.

The implementation procedures and measures for the EDV system shall be formulated by the State Council.

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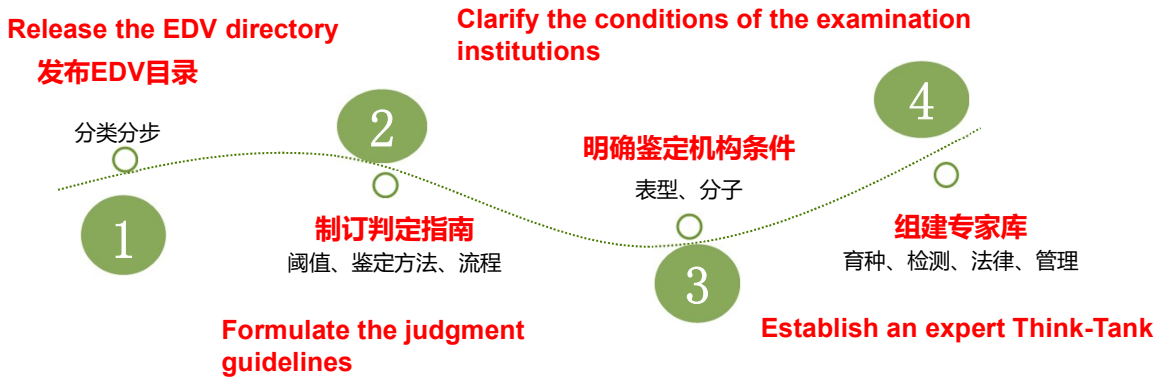
推动EDV制度落地实施

Promote the implementation of EDV



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三、下一步工作 Future Work Plan

- **完善配套规章制度**

  Continue to improve the supporting rules and regulations

- **优化审查测试机制**

  Optimize the review and testing mechanism to enhance the quality and efficiency of services

- **推动品种权保护与运用**

  Promote the protection and application of PVR and expand influence

- **加强国际合作交流**

  Strengthen international cooperation and exchanges

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[Annex III follows]

DUS testing system in forestry/grassland sector

PVP Office
National Forestry and Grassland Administration
Beijing, April 28, 2025

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

Contents

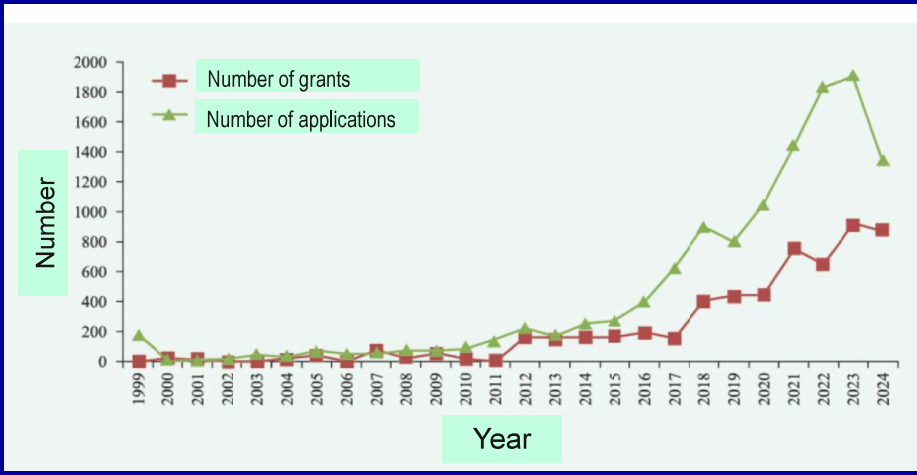
Beijing, China, April 28 to May 1, 2025

1

An overview of DUS examination of PBR applications in forestry sector

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

Number of applications and grants of PBR during 1999-2024



By the end of 2024, the total number of applications reached 12,080, of which 5848 cases were granted PBR.

Beijing, China, April 28 to May 1, 2025

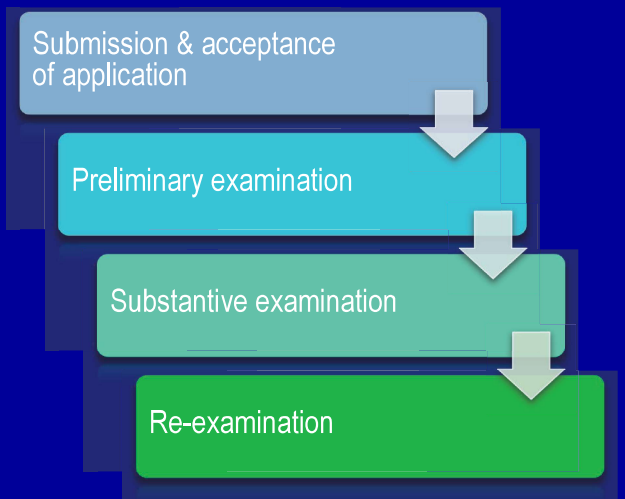
Statisitcs of applications and grants during the last decades

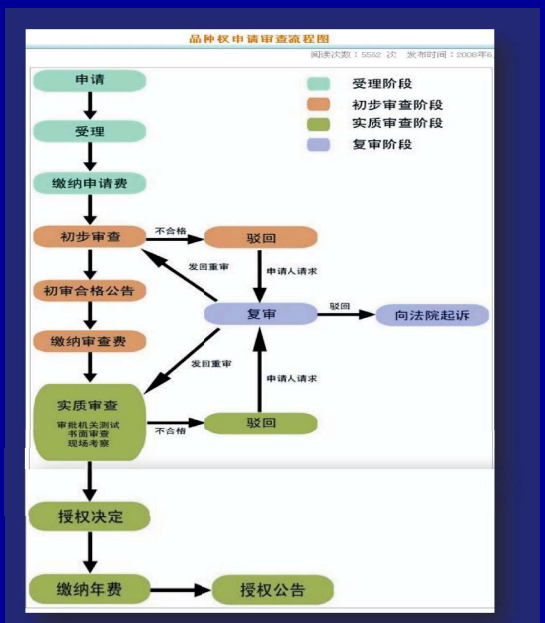
Year	Number of applications			Number of grants		
	Domestic applications	Foreign applications	Sum	Domestic applications	Foreign applications	Sum
2015	208	65	273	164	12	176
2016	328	72	400	178	17	195
2017	516	107	623	153	7	160
2018	720	186	906	359	46	405
2019	656	146	802	351	88	439
2020	897	150	1047	332	109	441
2021	1225	217	1442	637	124	761
2022	1649	179	1828	501	150	651
2023	1671	235	1906	798	117	915
2024	1240	98	1338	734	144	878
合计	10383	1697	12080	4882	966	5848

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

Procedures of PBR application， DUS examination and approval

4 periods to get the grant





Beijing, China, April 28 to May 1, 2025

Procedures of DUS examination

Application accepted, public announcement

Option 1: Growing trial. Commission letter, submission of plants for trial, field observation, test report

Option 2: On-site inspection. Submission of request, arrangement made and applicant notified, expert group examination on site, reporting

Examination report : Report submitted, contents reviewed, and transfered to the Division of Protection

Rules for growing trials of DUS testing and rules for on site inspection by expert group.

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

Growing trial: 8 Test stations and 17 genus/species covered

Test station	Genus/species
Kunming	*Rosa*
	Rododendron
	Viburnum
	Dianthus
	Vaccinium
Shanghai	*Poinsettia*
	Hydrangea
Hangzhou	*Camellia* (Flower)
Heze, Shandong	Paeonia lactiflora

Test station/subcenter	Genus/species
Taiping, Anhui	*Phyllostachys*
	Bambusa
Nanchang	*Gardenia*
	Cinnamomum
Changsha	*Prunus* subg. *Cerasus* sp. (Cherry blossom)
	Hemerocallis
	Begonia
Hainan subcenter	*Bougainvillea*

Beijing, China, April 28 to May 1, 2025

Growing trials for DUS assessment

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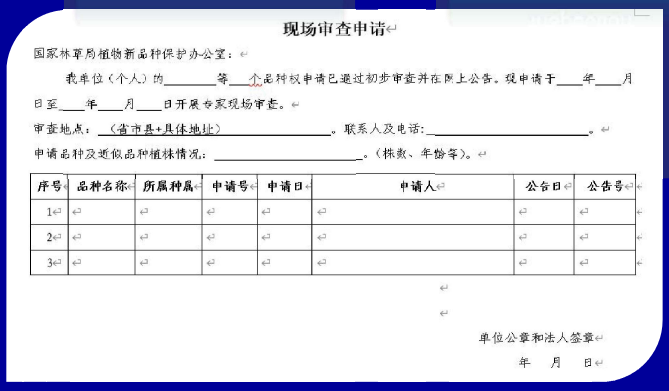
Breeder's test (on site inspection): Procedures

Application for on-site inspection submitted by the applicants

The PVP Office decides an examiner to lead the inspection

The examiner disscuss with applicant to decide dates and venue for the inspection

The examiner invites 2-3 experts for the inspection, and the expert group produces a DUS report



现场审查申请

国家林草局植物新品种保护办公室：

我单位（个人）的_____等___个品种权申请已通过初步审查并在网上公告。现申请于____年____月日至____年____月____日开展专家现场审查。

审查地点：（省市县+具体地址）_____。联系人及电话：_____。

申请品种及近似品种植株情况：_____。（株数、年龄等）。

序号	品种名称	所属种属	申请号	申请日	申请人	公告日	公告号
1							
2							
3							

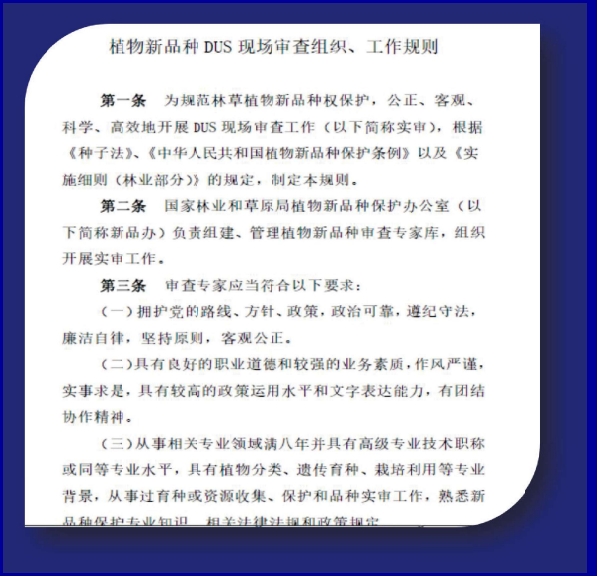
单位公章和法人签章

年 月 日

Beijing, China, April 28 to May 1, 2025

Ruels for on-site inspection

- Seed law, PVP regulations
- Fair, objective, scientific, efficient
- NFGA PVP Office in charge of the inspection
- Restrict requirements for selecting inspection experts
- Complete the DUS report
- Examiner corrdinates the inspection
- Applicant prepares documents and plants as required



植物新品种 DUS 现场审查组织、工作规则

第一条 为规范林草植物新品种权保护，公正、客观、科学、高效地开展 DUS 现场审查工作（以下简称实审），根据《种子法》、《中华人民共和国植物新品种保护条例》以及《实施细则（林业部分）》的规定，制定本规则。

第二条 国家林业和草原局植物新品种保护办公室（以下简称新品办）负责组建、管理植物新品种审查专家库，组织开展实审工作。

第三条 审查专家应当符合以下要求：

（一）拥护党的路线、方针、政策，政治可靠，遵纪守法，廉洁自律，坚持原则，客观公正。

（二）具有良好的职业道德和较强的业务素质，作风严谨，实事求是，具有较高的政策运用水平和文字表达能力，有团结协作精神。

（三）从事相关专业领域满八年并具有高级专业技术职称或同等专业水平，具有植物分类、遗传育种、栽培利用等专业背景，从事过育种或资源收集、保护和品种实审工作，熟悉新品种保护专业知识、相关法律法规和政策规定

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Before onsite inspection

Actions in different periods: Before → During → After → Onsite inspection

- PVP Office appoints examiner and allocates inspection tasks
- Examiner invites experts and sets inspection dates, venue and travel arrangements
- PVP Office informs applicant about the on-site inspection
- Applicant prepares documents and trial sites

国家林业和草原局植物新品种保护办公室

林新保字〔2021〕53号

关于植物新品种现场审查的通知

中南林业科技大学：

你（单位）申请的植物新品种已通过我办的初步审查和公告，根据《中华人民共和国植物新品种保护条例》及实施细则（林业部分）的规定，定于近期进行专家现场审查，请做好相关准备工作。现场审查安排见附件。

现场审查工作我办委托中国林科院亚热带林业研究所负责具体组织，专家的住宿费、交通费、专家费等由我办支付。

联系人：新品办 段经华 010-84238883

亚林所 潘宏伟 1377789018

附件：现场审查安排

国家林草新品办

2021年9月10日

During on-site inspection

Actions in different periods: Before → During → After → Onsite inspection

- Examiner hosts the examination meeting, introduces the experts and participants, highlights the rules for the inspection
- Applicant reports the development of the candidate variety and introduces DUS assessments of the variety using PPT
- Examiner & experts visit the field trial and examine the number of plants and observe the state of expressoin of the charateristics according to the Test Guidelines (TG), ask questions to the applicant , applicant should answers the questions honestly
- Experts discuss the conformity of DUS to the requirements and make DUS report, propose amendaments to the application documents as necessary

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On-site DUS inspection

Actions in different periods: Before → During → After → Onsite inspection

Beijing, China, April 28 to May 1, 2025

After on-site inspection

Actions in different periods

Before → During → After → Onsite inspection

Applicant makes amendments according to the suggestions by examiner & experts

Examiner submit the inspection report and with additional explanations as necessary


植物新品种权申请补正书

Form of amendaments

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

Requirements for DUS trial by the breeder

- On-site inspection is one of the models of DUS tests;
- Trials settings follow the DUS TG for observation, varieties are grown side by side, similar to those conducted by test stations;
- Candidate varieties and similar varieties need to be clearly labled and marked.

Beijing, China, April 28 to May 1, 2025

Check list for applicant to prepare the trial for on-site inspection

Plant material for on-site inspection prepared according to the DUS TG:

- The **number of plants** should not be less than the minimum number set in the TG;
- The **propagation method** used for the trial plants should be clearly and acuurately described (grafted plants should provide information on the rootstock);
- The **age of plants** should not be lower than the minimum age set in the TG;
- Te plants should have **normal growth vigor, no disease and pests, no vius infection**, and the dates are the best time to observe **the expression of the charateristics for distinctness**;
- Applicant should provide plants of the **similar varieties** .

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Cases of on-site inspection: *Syringa*

- Grafted plants, number of plants not less than 6 trees
- Clearly labelled with key information
- Best time to assess the distinctness

Beijing, China, April 28 to May 1, 2025

Cases of on-site inspection: Chest nut

- Grafted plants, number of plants not less than 6 trees
- Clearly labelled with key information
- Best time to assess the distinctness



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Cases of on-site inspection: *Primula vulgaris*

- Sexually reproduced, number of plants not less than 100 plants
- Clearly labelled with key information
- Best time to assess the distinctness


Beijing, China, April 28 to May 1, 2025

Cases of on-site inspection: *Zoysia*

- Seeds or vegetative stem as propagation material, trial design uses single plant plot or dense plants plot (only for turf grass varieties);
- Single plant plot: 15 plants per variety, apcing 1.5 m, plot area 2.25 m^2;
- Dense plants plot: plot area 1m*2m, spacing 5cm*15cm, 2 replicates.

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2

Developments in DUS testing system

Increasing needs for DUS testing

1. **Large number of applications, imposing heavy burden on DUS test.** Increasing public awarness of PVP, rapid increase of applicaton number, leading to new requirements for dealing with applications, DUS examination and granting PBR.
2. **Insufficient number and regional imbalance of DUS testing institutions.** The insufficient number of current testing institutions is not enough to meet the current needs, most of the testing institutions are built in eastern and southern China, but fewer in cntral and western China.
3. **Inadquate capacity of DUS testing.** Existing testing institutions are poorly infrastructured, limiting the number of testable genus/species, the capacity of DUS testing has large gap with the actual needs, urgent upgrading is needed; Current TGs unable to meet the needs.

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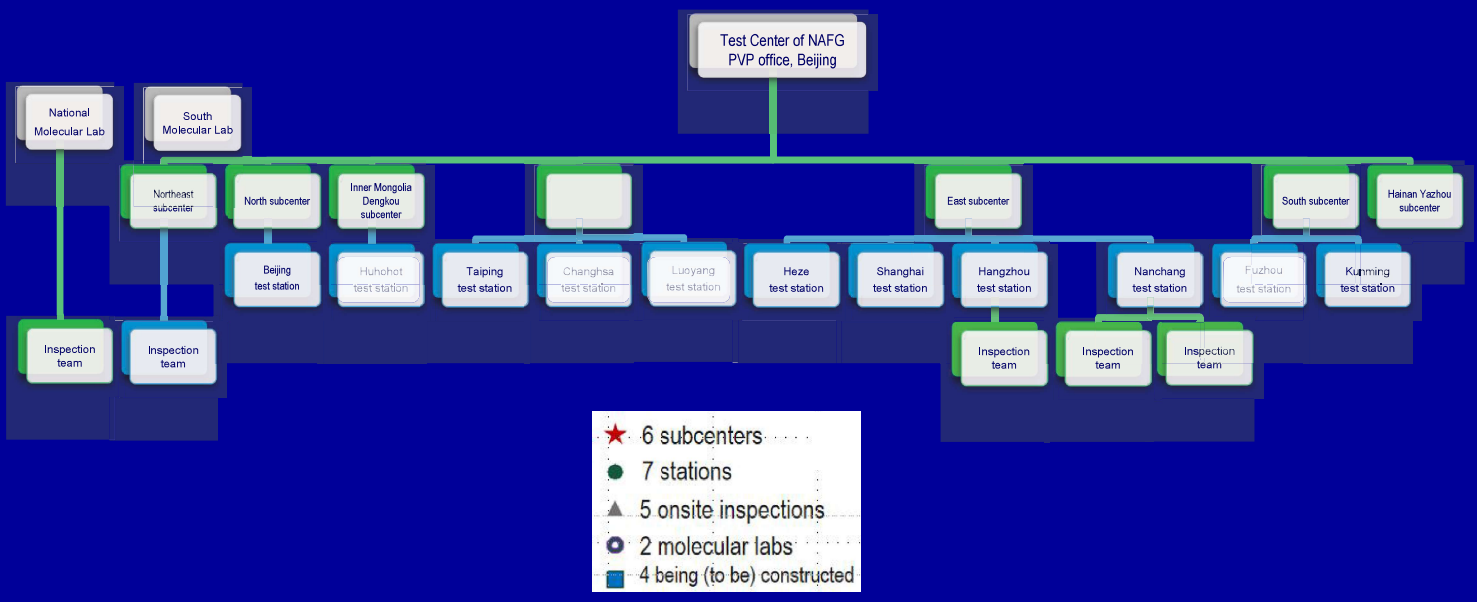
Current status of DUS testing system



Beijing, China, April 28 to May 1, 2025

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List of testing institutions

序号	类型	测试机构名称	依托单位	所在地	测试范围	筹建范围
1	Test station	Kunming	云南省花卉技术培训推广中心	云南省昆明市	蔷薇属月季、杜鹃花属、茉莉属、石竹属、越桔属	悬钩子属
2	Test station	Shanghai	上海市林业总站	上海市静安区	大戟属一品红、绣球属	菊属
3	Test station	Heze, Shandong	菏泽市牡丹产业发展中心	山东省菏泽市	芍药属	
4	Test station	Beijing	北京市农林科学院	北京市海淀区	蔷薇属	
5	Test station	Huangshan, Anhui	国际竹藤中心三亚研究基地	安徽省黄山市	刚竹属、箭竹属	芦竹属
6	Test station	Hangzhou	中国林业科学研究院亚热带林业研究所	浙江省杭州市	山茶属山茶	
7	Test station	Nanchang	江西省林业科学院	江西省南昌市	樟属、栀子属	
8	Onsite inspection	Molecular Lab team	中国林业科学研究院林业研究所	北京市海淀区		
9	Onsite inspection	Jiangxi Fenyi team	中国林业科学研究院亚热带林业实验中心	江西省分宜县		
10	Onsite inspection	Heilongjiang team	黑龙江省林业科学研究所	黑龙江省哈尔滨市		
11	Onsite inspection	Hangzhou team	中国林业科学研究院亚热带林业研究所	浙江省杭州市		
12	Onsite inspection	Jiangxi FRI team	江西省林业科学院	江西省南昌市		

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

List of testing institutions

序号	类型	测试机构名称	依托单位	所在地	测试范围	筹建范围
13	Test center	国家林草植物新品种测试中心	国家林草局科技发展中心（国家林草局植物新品种保护办公	北京市东城区		
14	Subcenter	国家林草植物新品种测试中心华北分中心	中国林业科学研究院华北林业实验中心	北京市门头沟区		
15	Subcenter	国家林草植物新品种测试中心华东分中心	中国林业科学研究院亚热带林业实验中心	江西省分宜县		木兰属、含笑属、紫薇属
16	Subcenter	国家林草植物新品种测试中心华南分中心	中国林业科学研究院热带林业实验中心	广西凭祥市		
17	Subcenter	国家林草植物新品种测试中心磴口分中心	中国林业科学研究院沙漠林业实验中心	内蒙古磴口县		
18	Subcenter	国家林草植物新品种测试中心东北分中心	黑龙江省林业科学研究所	黑龙江省哈尔滨市		
19	Subcenter	国家林草植物新品种崖州测试分中心	海南省林业科学研究院	海南省海口市	叶子花属	
20	Mol. Lab	国家林草植物新品种分子测定实验室	中国林业科学研究院林业研究所	北京市海淀区		
21	Mol. Lab	国家林草植物新品种南方分子测定实验室	南京林业大学	江苏省南京市		
22	TS (to be)	国家林草植物新品种长沙测试站	湖南省植物园	湖南省长沙市	李属樱花、萱草属、秋海棠属	桃花
23	TS (to be)	国家林草植物新品种福州测试站	福建农林大学	福建省福州市		兰属、蝴蝶兰属
24	TS (to be)	国家林草植物新品种洛阳测试站	洛阳市牡丹产业发展中心（国家牡丹园）	河南省洛阳市		芍药属
25	TS (to be)	国家林草植物新品种呼和浩特测试站	内蒙古草业技术创新中心	内蒙古呼和浩特市		苜蓿属、草坪早熟禾、冰草

List of UPOV TG drafted

序号	属（种）名	学名	备注
1	山茶属	Camellia	UPOV发布实施
2	牡丹	Paeonia suffruticosa	UPOV发布实施
3	丁香属	Syringa Linn.	UPOV发布实施
4	核桃属	Juglans	UPOV发布实施
5	木兰属	Magnolia	在编
6	枸杞属	Lycium Linn.	在编
7	银杏属	Ginkgo Linn.	在编

Technical Working Party on Testing Methods and Techniques, Third Session TWM3

13 national TGs as national standards

序号	属（种）名	学名	国家标准
1	梅	Prunus mume	[国标GB/T 24884—2010]
2	山茶属	Camellia	[国标GB/T 26911—2011]
3	牡丹	Paeonia suffruticosa	[国标GB/T 32345—2015]
4	桂花	Osmanthus fragrans	[国标GB/T 24885—2010]
5	核桃属	Juglans	[国标GB/T 26909—2011]
6	柳属	Salix	[国标GB/T 26910—2011]
7	杏	Prunus armeniaca	[国标GB/T 30362—2013]
8	杨属	Populus	[国标GB/T 32344—2015]
9	连翘属	Forsythia Vahl	[国标GB/T 24883—2010]
10	鹅掌楸属	Liriodendron Linn.	[国标GB/T 24887—2010]
11	榛属	Corylus Linn.	[国标GB/T 24886—2010]
12	黄栌属	Cotinus Mill.	[国标GB/T 35813—2018]
13	石榴属	Punica Linn.	[国标GB/T 35566—2017]

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80 national TGs as sectoral standards

林草植物新品种测试指南标准体系

序	新标准名称	标准号/计划	标准状	起草单位
1	植物新品种近似品种筛选指南	LY/T 3396-2024	现行	中国林科院林业研究所
2	植物新品种特异性 一致性 稳定性测试指南 刺槐属	LY/T 1871-2010	现行	山东省林业科学研究院
3	植物新品种特异性 一致性 稳定性测试指南 臭椿属	LY/T 2094-2013	现行	中国林科院林业所
4	植物新品种特异性 一致性 稳定性测试指南 柳木属	LY/T 2284-2014	现行	东北林业大学
5	植物新品种特异性 一致性 稳定性测试指南 榆属	LY/T 2596-2016	现行	山东省林木种苗站
6	植物新品种特异性 一致性 稳定性测试指南 崖柏属	LY/T 2597-2016	现行	北京市农林科学院林业果树研究所
7	植物新品种特异性 一致性 稳定性测试指南 松属	LY/T 2598-2016	现行	北京林业大学
8	植物新品种特异性 一致性 稳定性测试指南 桉属双蒴盖亚属	LY/T 2530-2016	现行	国家林业局桉树研究开发中心
9	植物新品种特异性 一致性 稳定性测试指南 榉属	LY/T 2801-2017	现行	中国科学院植物研究所
10	植物新品种特异性 一致性 稳定性测试指南 白蜡树属	LY/T 2802-2017	现行	中国科学院植物研究所
11	植物新品种特异性 一致性 稳定性测试指南 圆柏属	LY/T 3002-2018	现行	北京市农林科学院林业果树研究所
12	植物新品种特异性 一致性 稳定性测试指南 杉木属	LY/T 3003-2018	现行	福建省林业科学研究院

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30 TGs drafted as pre-studies

序号	属（种）名	学名
1	木通属	Akebia Decne.
2	冬青属	Ilex L.
3	椴树属	Tilia L.
4	榧树属	Torreya Arn.
5	紫藤属	Wisteria Nutt.
6	乌桕属	Sapium Jacq.
7	牡竹属	Dendrocalamus Nees
8	胡枝子属	Lespedeza Michx.
9	山桐子属	Idesia Maxim.
10	石楠属	Photinia Lindl.
11	野牡丹属	Melastoma L.
12	山茱萸属	Cornus L.
13	胡颓子属	Elaeagnus L.
14	花楸属	Sorbus L.
15	悬铃木属	Platanus L.
16	苦竹属	Pleioblastus Nakai
17	六道木属	Abelia R. Br.
18	秤锤树属	Sinojackia Hu
19	鹅耳枥属	Carpinus L.
20	黄连木属	Pistacia L.
21	锦带花属	Weigela Thunb.
22	紫穗槐属	Amorpha L.
23	凌霄属	Campsis Lour.
24	水杉属	Metasequoia Miki ex Hu et W. C. Cheng
25	紫珠属	Callicarpa L.
26	绣线菊属	Spiraea L.
27	冷杉属	Abies Mill.
28	檫木	Sassafras tzumu (Hemsl.) Hemsl.
29	沙冬青属	Ammopiptanthus Cheng f.
30	酸竹属	Acidosasa C. D. Chu et C. S. Chao

Beijing, China, April 28 to May 1, 2025

36 self-funded TGs being drafted

序号	项目名称（简称）	申报单位
1	桔梗属	北京市园林绿化科学研究院
2	夏蜡梅属	浙江农林大学
3	白木香	海南省林业科学研究院（海南省红树林研究院）
4	槟榔	中国热带农业科学院椰子研究所
5	澳洲坚果	中国林业科学研究院林业研究所、广西南亚热带农业科学研究所、贵州省亚热带作物研究所
6	鳄梨	中国林业科学研究院林业研究所、广西南亚热带农业科学研究所、云南省红河热带农业科学研究所
7	铁筷子属	浙江省园林植物与花卉研究所
8	木芙蓉	成都市植物园（成都市公园城市植物科学研究院）
9	孟藜属	广西农业科学院花卉研究所
10	落新妇属	河北科技师范学院
11	木荷属	中国林业科学研究院亚热带林业研究所
12	芦竹属	山东农业大学
13	地黄属	北京市园林绿化科学研究院
14	南酸枣	江西齐云山食品有限公司、中国林业科学研究院林业研究所
15	溲疏属	北京林业大学
16	木香薷	北京市园林绿化科学研究院

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17	薹草属	北京市园林绿化科学研究院
18	牛至	中国科学院植物研究所
19	羊蹄甲属	中国科学院西双版纳热带植物园
20	玉叶金花属	中国科学院西双版纳热带植物园
21	余甘子	中国林业科学研究院热带林业研究所
22	报春花属-小报春	四川农业大学
23	洋常春藤	浙江中医药大学松阳研究院有限公司
24	刺楸属	山东省林草种质资源中心
25	青钱柳属	南京林业大学
26	降香檀	中国医学科学院药用植物研究所海南分所
27	刺五加	中国医学科学院药用植物研究所
28	益智	中国医学科学院药用植物研究所海南分所
29	茶木属	中国医学科学院药用植物研究所
30	海南龙血树	中国医学科学院药用植物研究所海南分所
31	银缕梅	浙江省林业科学研究院
32	安息香属	南京林业大学
33	油橄榄	中国林科院亚热带林业研究所
34	风箱果属	中国林业科学研究院林业研究所
35	南天竹属	云南省花卉技术培训推广中心
36	大岩桐属	成都农业科技职业学院

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Focuses for the next step

1. Testing institutions

Building new test centers/stations in regions with active breeding.

Capacity building of the existing testing institutions, expanding the scope of growing trials.

2. Depositories of DNA samples

Pilot for depository of standard leaf samples for DNA extraction of the candidate varieties, Gradual implementation after experiences obtained.

3. Technical standards system

Improve the system of TGs, speed up the TG drafting, promote slef-funded TG drafting, expand the scope of genus/speceis for TG drafting.

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4. Construction of the database of varities of common knowledge

- Further improve the database of protected varieties;
- Speed up construction of databases of vareties of common knowledge for genus/species with large number of varieties and new applications;
- Construct databases of varieties of common knowledge;
- Improve the efficiency of variety search and selcetion of similar varieties;
- Explore the uses of AI, image analysis in DUS testing.

5. Application of new technologies in DUS testing and variety identification

- Strengthen the R&D of molecular technologies;
- Speed up the development of standars of molecular techniques;
- Construction of molecular databases,with focus on DNA fingerprinting, such as SSR, SNP and MNP markers.

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3

Ideas for discussion

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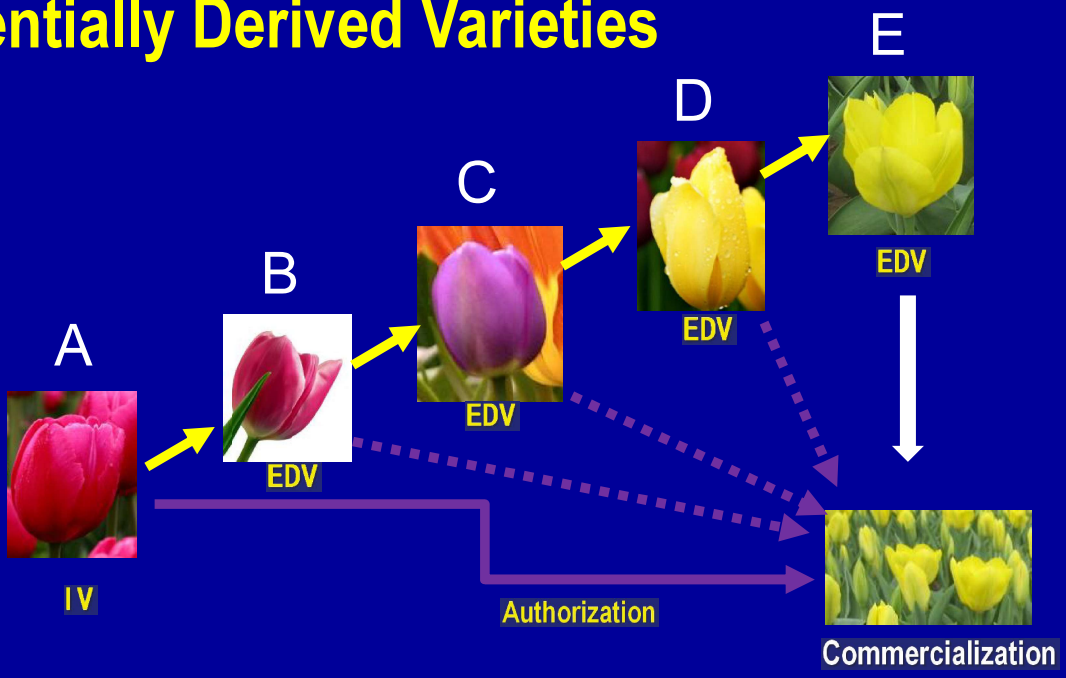
Essentially Derived Varieties



Main approaches to obtaining EDVs

- Natual mutant
- Somaclonal variant
- Variant individual from initial variety
- Repeated backcrossing
- Genetic engineering (Gene editing)

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Imiplications

Better distribution of benefits among breeders

Encourage original breeding

Limit derivative breeding

Induced mutation

Breeding strategy

Hybrid breeding

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Possible changes to the breeding method

- Focus of breeding shift to native species
- Original breeding mainstreamed
- Derivative (reliance) breeding limited

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Models of DUS growing trials

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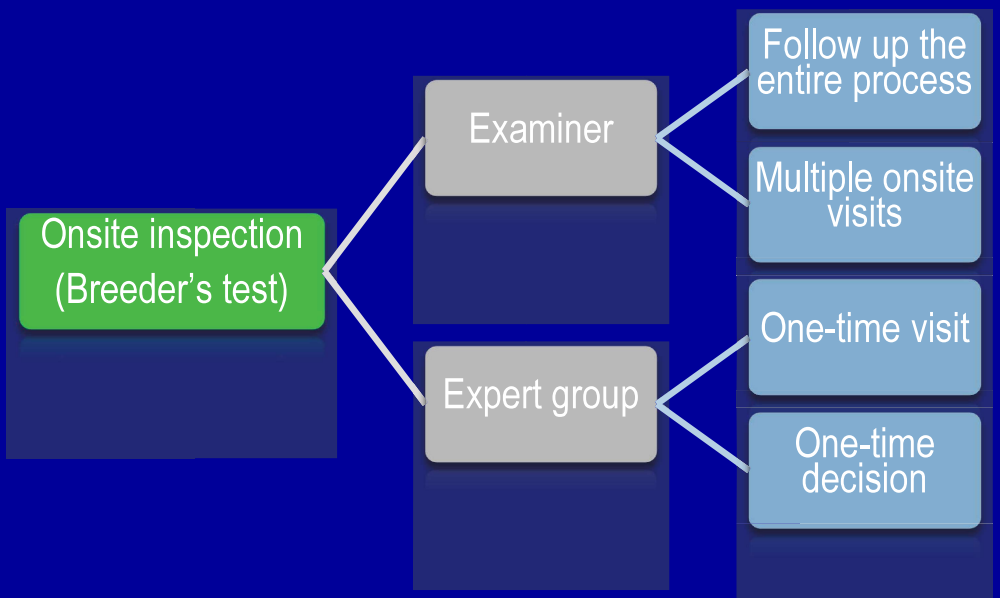
Models of onsite DUS inspection



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Comparisons between examiner and expert group

Action	Expert group（China）	Examiner（Abroad）
Number of onsite visit	1	>1
Number of expert	5->3->2	1
Number of examiner	1+	1+
Difficulties/convenience	Large/no	Small/yes
Economic cost	Large	Small
Time cost	Large	Small
Decision difficlty/subjectivity/accuracy	Large	Small
Reliability of DUS test report	High	High or low
Documents	Simple/incomplete	Complete/Similar to growing trial
Plant materials	Simple	Same as growing trial
Difficulty in DUS determinatoin	Sometimes large	Small
Advantages	Shorter tiime, rapid	Simple, stalble staffing, clear responsibilities
Disadvantages	One time onsite visit, opportunity cost	Restrictive qualification requirements

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Advantage vs disavantages

	Growing trial	Onsite inspection
Time needed	at least 1 growing cycle	One day
Speed	Slow	Fast
Cost	High	Low
Reliability	Large	Small（can be improved）
Convenience	Complex	Simple
Scope of use	Limited	Less limited

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Key elements of onsite inspection

Examiner
- Appointed by the authority

Expert group
- TG drafting
- Taxonomist
- Breeding specilist

Sources of experts
- Experts database
- TG drafting team
- Reserach & education institutions

Theoretial basis
- Testing by breeder

Venue of inspection
- Applicant's site
- Breeder's site

Documents
- Application forms
- Plant materials
- Similar varieties
- Variety collection （database）

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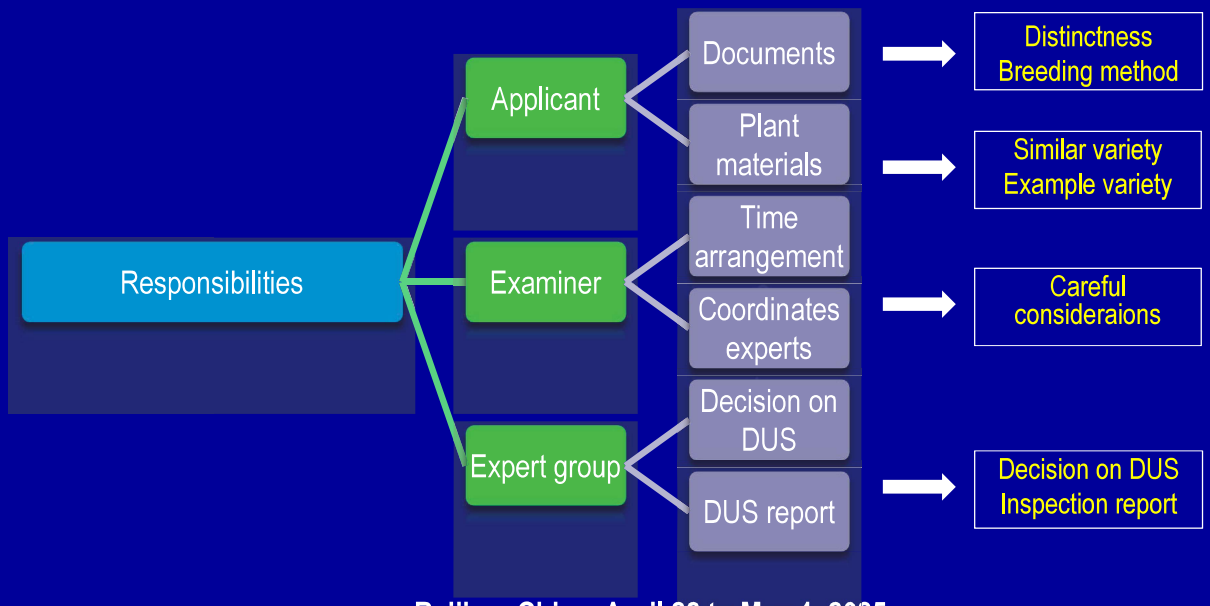
Responsibilities of the parties



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Thank you!

Division of DUS tests administration
010-84238885 csc@cnpvp.net

Lab of Molecular Identification of plant varieties
010-13651011754 zyq8565@126.com

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[Annex IV follows]

1

Introduction of IVF-CAAS

The Institute of Vegetables and Flowers,
Chinese Academy of Agricultural Sciences
Beijing, 2025

2

About IVF-CAAS

- Found in 1958.
- The ONLY national vegetable and flower research institution in China.
- 210 research staff, including 58 professors and 79 assistant professors. Profs, over 30 postdocs and 500 PhD students. 1200+ in total: staff + students + technicians/farm workers.

Mission

- ✓ Make **fundamental discoveries** in the science of vegetables and flowers.
- ✓ Develop **applied technology** and **deliver scientific solutions** to improve quality and yields of vegetables and flowers.
- ✓ Provide **excellent training environment** for young scientists to develop their careers.

Running system

Six administrative offices

10 Research Departments

Hoticulture Industry Chain

Plant Variety	Plant Cutivation	Postharvest	Plant Protection	Quality Control
7 Depts	1 Dept.		1 Dept.	1 Dept.

Plant Variety

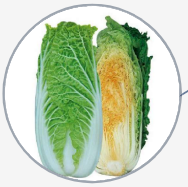
Create fine seeds!

Dept. of Germplasm Resources

The National Mid-term Genebank collects 38,748 vegetable accessions, ranking 1st in China and 4th in the world

Dept. Biotechnology

Functional genomics, Molecular genetics, Molecular quality improvement, Bioinformatics

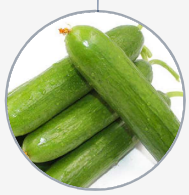


Dept. of Crucifers

Cabbage and broccoli
Chinese cabbage
Spinach

Dept. of Solunums

Tomato
Pepper
Eggplant



Dept. of Cucurbits

Cucumber, Melon
Watermelon, Squash

Dept. of Potato

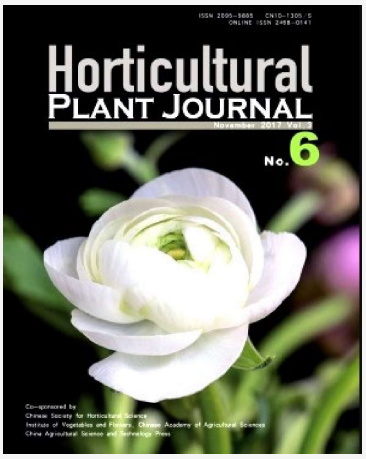
Potato Breeding and Cultivation

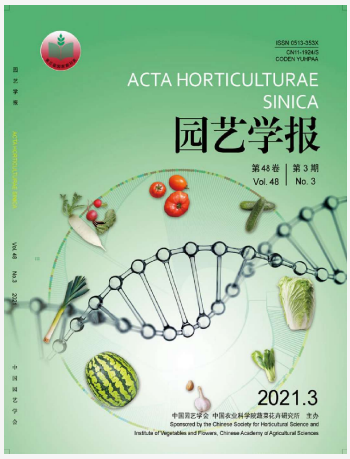
Dept. of Ornamental Horticulture

Rose, Lily
Tree Peony and Peony

Journal Issuing

《**Horticultural Plant Journal**》First Issue in 2015





Technology Transfer

9

10

International Collaboration

IVF has established extensive collaborations with more than 30 countries and has implemented more than 30 international projects, including the European Union Framework Programme, Horizon 2020, and bilateral projects with the United States of America, Netherlands (Kingdom of the), Russian Federation, Peru, and Serbia. It has also established close industrial cooperation with large multinational companies such as Syngenta, Seminis and Bayer.

Joint Laboratories

- **Sino-Dutch Joint Lab on Vegetable Genomics (Beijing, 2001)**
- **Dutch-Sino Joint Lab on Vegetable Genetics & Breeding between IVF-CAAS and WUR (Plant Breeding) (Netherlands (Kingdom of the), 2014)**
- **China-Czech Mycorrhizal and Environmental Biotechnology Research Center (Huai'an, 2014)**
- **IVF-VIR Joint Lab on Vegetable Genetic Resources (Beijing, 2014)**
- **China-Russia Joint Lab of potato genetic breeding (Beijing, 2018)**

11

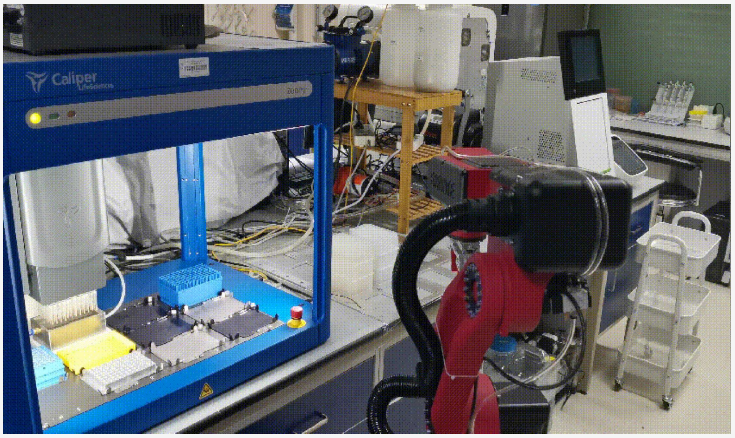
Postgraduates Education

IVF conferred 30 Ph.D. & 60 M.phil degrees, and accepted 5-6 international students per year.

12

Three Digital/Informatization Platforms

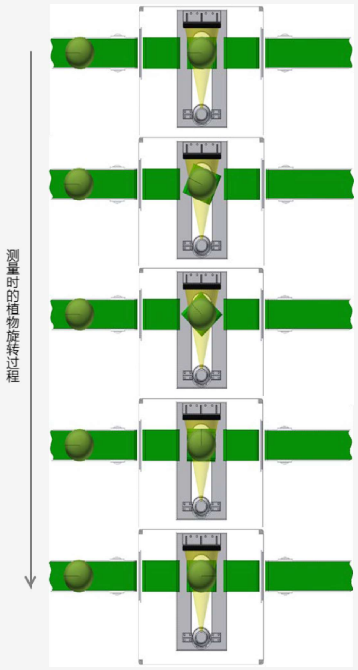
1. High-throughput genotyping platform



Robotic high-throughput detection of molecular markers such as SNPs, Indels. 30,000 samples/day.

2. High-throughput phenotypic platform

phenotyping using RGB-CT 3D imaging and AI



Build in 2019

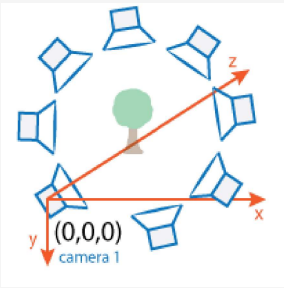
Four modules

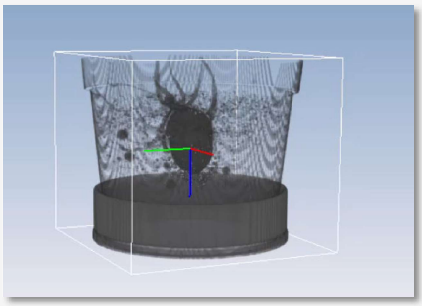
- CT imaging
- RGB-Fluorescence imaging
- Automatic transmission control
- Data management analysis

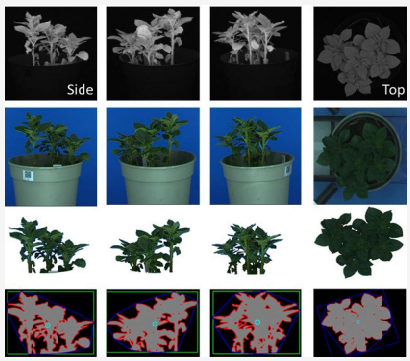
- designed for the phenotypic collaborative study of aboveground and underground organs
- Integrated with the conveying platform
- 360 degree rotational tomography (CT) was performed on the flowerpot
- 3D reconstruction is automatically completed

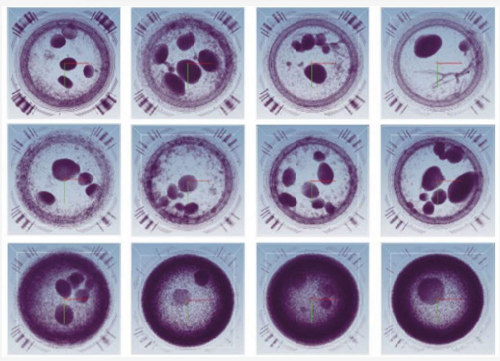
RGB-CT 3D imaging for canopy and tuber

20 traits have been extracted by CT-RGB imaging







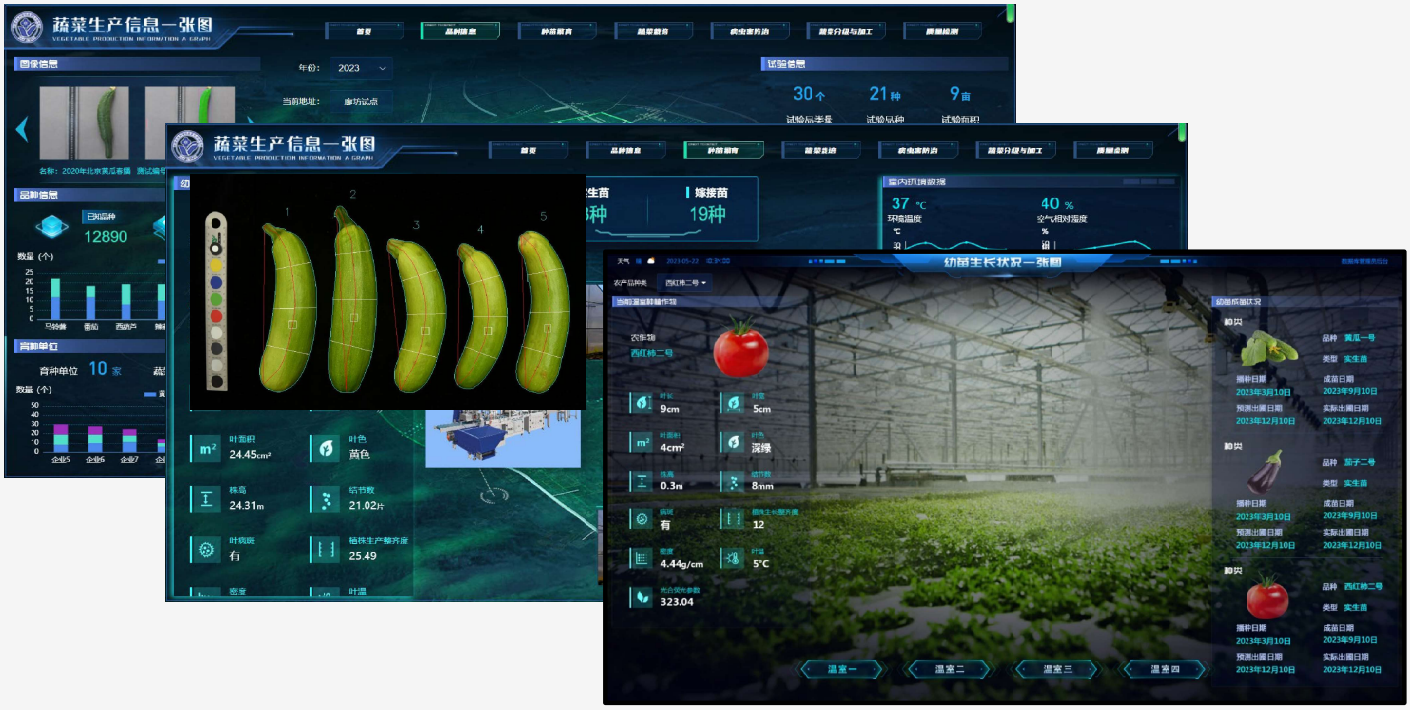


Canopy	Tuber
Angel	Tuber numbers
Angel	Volumes
Width	Voxelcount in pixel
Height	Center of mass
Surface	Euclidean distance
Convex_hull	Radius in pixel
Roundness	Spherical ratio
Center of mass distance	Spherical RatioSphericalRadius in pix
HUE	Mean value
Saturation	Mean attenuation

3. Digital Cultivation (Vegetables) Innovation Sub-Center

Integrate the data resources and models of **vegetable varieties**, **seedling nursery**, **cultivation management**, **pest control**, **post-harvest processing** and **product quality and safety** of vegetable production, and utilize big data analysis, geographic information and other technologies to realize the statistical analysis and visualization of vegetable production data in one system.

Vegetable varieties, Seedling nursery, and Cultivation management



Pest control, Post-harvest processing and Product quality/safety

[Annex V follows]

Molecular fingerprint of plant varieties and their uses as judicial evidences for infringement lawsuit

Yongqi ZHENG
Laboraory for Molecular Identification of Plant Varieties

内容 CONTENTS

1

A brief account of the Laboratory
实验室简介

实验室主要目标
Main objectives of the lab

1. Selection of similar varieties for DUS testing
2. Management of variety collections
3. Distinguish/identification of different varieties
4. Different names for same variety and vise versa
5. Judicial evidences for court decisions
6. Purity/uniformity check

实验室人员 Lab Staffing

首席
Principal Investigator

专家助理
PI Assisstant

专家
Associate Investigator

助理
Resarch Assisstant

研究生
Research Students

远程培训证书
Professional Certificates

1. 实验室员工均获得UPOV网络远程培训合格证书。
2. 2名全国植物新品种测试标准化技术委员会委员
3. 2名国家林草局植物新品种代理资格
4. 2名UPOV植物新品种保护国际证书

1. All staff got UPOV distance learning certificates;
2. 2 members of the national DUS test standardization commeettee;
3. 2 certificates of national PVP agent;
4. 2 UPOV international PVP certificates.

试验室建设历程
Development history of the lab

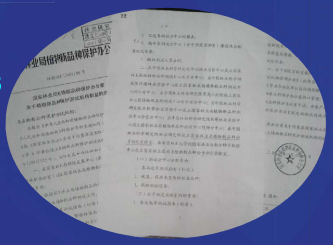
2001 Approved for establishing the Lab

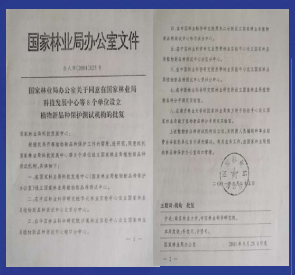
2005 Listed as agent for providing judicial evidences

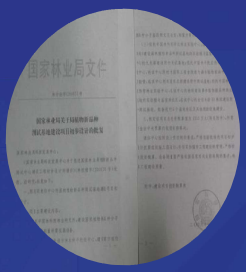
2006 Constructoin plan approved

2009 Review passed

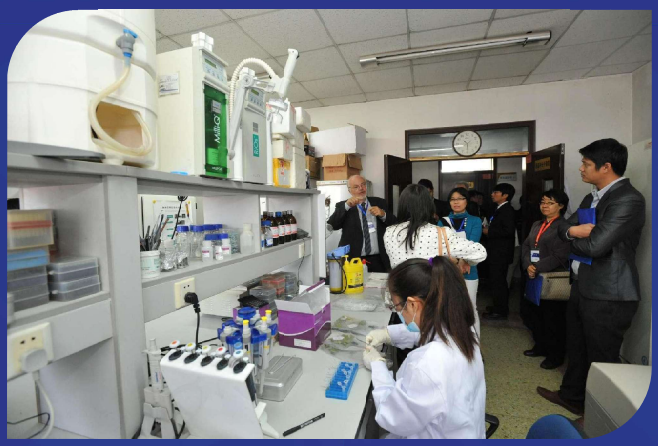
To date Operation







实验室国际合作与学术交流
International cooperation and exchange



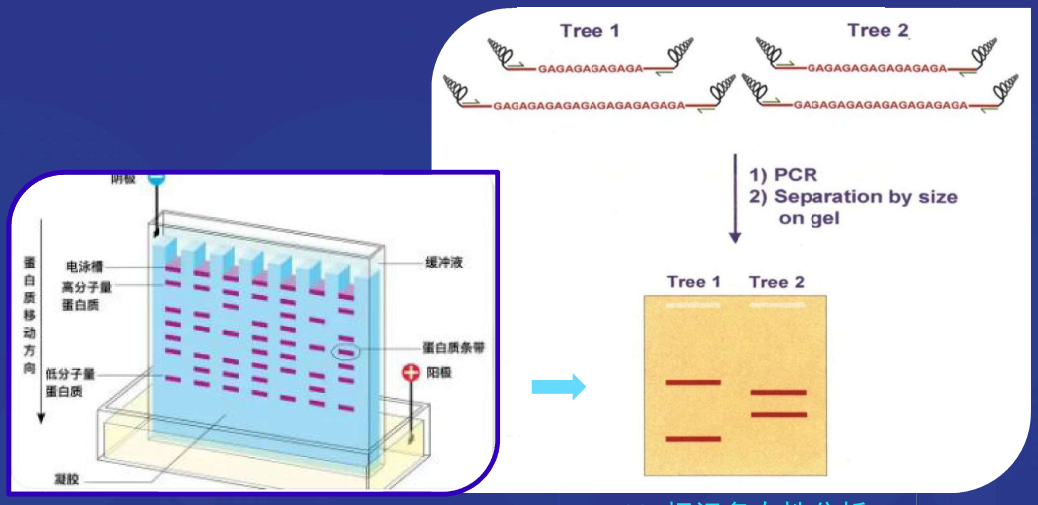
2

分子身份证及其数据库
Molecular IDs and their database

简单重复序列标记
SSR (Simple Sequence Repeats)

1. SSR标记是一种以特异引物PCR为基础的分子标记技术，是一类由几个核苷酸（一般为1-6个）为重复单位组成的长达几十个核苷酸的串联重复序列。每个SSR两侧的序列一般是相对保守的单拷贝序列，据此设计一对特异引物，通过PCR技术将期间的核心微卫星DNA序列扩增出来，利用电泳分析技术就可以得到其长度的多态性，此即 SSR标记的原理。
2. 优点：
   (1) 数量丰富，覆盖整个基因组，揭示的多态性高；
   (2) 具有多等位基因的特性，提供的信息量高；
   (3) 以孟德尔方式遗传，呈共显性；
   (4) 每个位点由设计的引物顺序决定，便于不同的实验室相互交流合作开发引物。

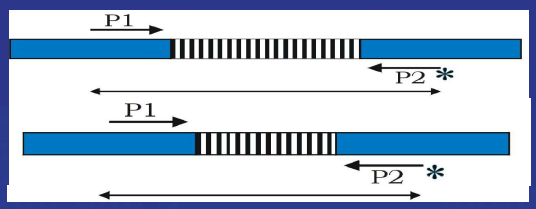
SSR分子标记原理-凝胶电泳
Principles of SSR markers-electrophoresis



SSR标记多态性分析

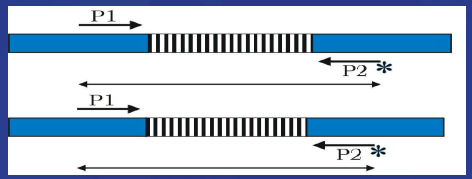
SSR分子标记原理-毛细管电泳
Principles of SSR markers- Capillary electrophoresis

品种1

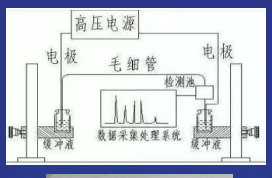


杂合子（Sample1）

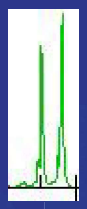
品种2



纯合子（Sample2）



遗传分析仪（CEQ）



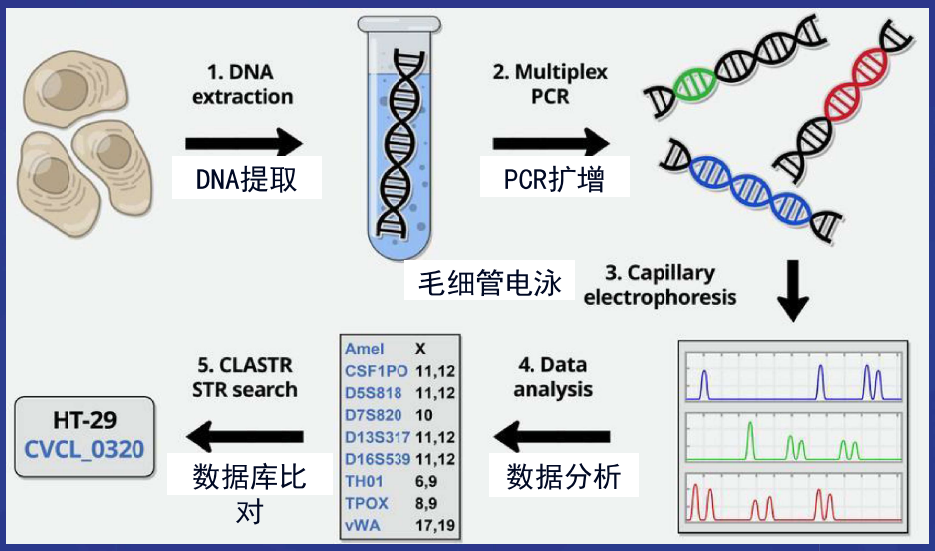
201/204

检测结果

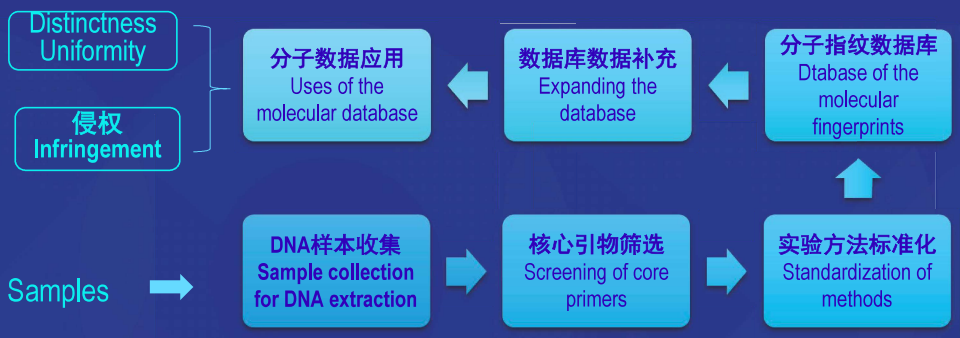
201/201

基因型

SSR分子标记分析流程
Procdures for SSR analysis



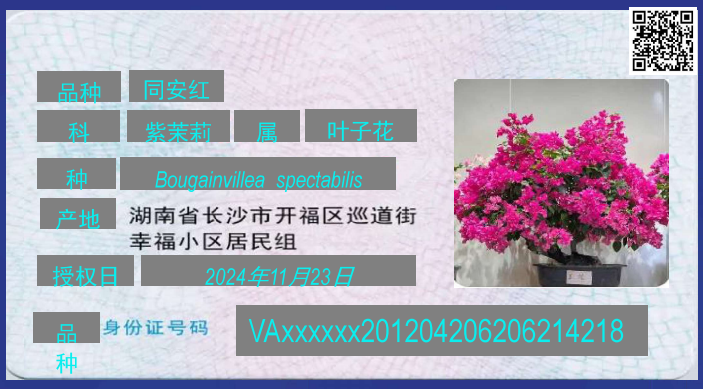
品种分子身份证数据库构建
Molecular IDs and database



基因型数字化、身份ID
Digital genotypes and ID number

品种 Variety	位点1 Locus 1	位点2 locus 2	位点3 Locus 3	...	基因型 Genotype	ID number
VA	201/204	206/206	214/218	...	201204206206214218...	VAxxxxxx201204206206214218...
VB	201/201	206/209	218/218	...	201201206209218218...	VBxxxxxx201201206209218218...

身份证构建及用途
Development of molecular ID and uses



1) Breeder
2)Name: Family/genus/species/variety;
3) Venue where the variety was developed;
4) Date of granting PVR;
4) Molecular ID number

- 身份识别 Identity
- 品种管理 Variety management
- DUS测试 DUS testing
- 司法证据Judicial evidence

分子身份证的用途
Uses of Molecular ID

第1批三角梅品种SSR分析
SSR genotyping of *Bougainvillea* varieties

编号 No.	品种名称 Name	编号 No.	品种名称 Name	编号 No.	品种名称 Name
1	黄金斑叶紫	49	拉斐泰	97	斑叶印度橙粉
2	大斑叶紫红塔	50	热带花束	98	明扬橙
3	橙红	51	软枝枣红	99	哈登
4	软枝浅紫	52	异叶黄	100	雪中红
5	绿叶深紫	53	婴儿玫瑰	101	口红
6	大叶塔紫	54	绿叶枣红	102	金斑紫
7	大叶紫	55	斯嘉丽奥哈拉	103	玛丽海伦
8	胭脂红	56	重苞枣红	104	总统紫
9	金心鸳鸯	57	异叶红	105	蒙娜丽莎
10	重苞怡锦	58	缺刻	106	玫瑰红
...	...	...	...	...	...

共144个三角梅品种，主要采自厦门植物园
A total of 144 varieties sampled for SSR analysis

	BSW10	BSW15	BSW20	BSW25	BSW49	BSW56	BSW57	BSW69	BSW82
1	197/201	235/235	173/176	201/209	243/245	175/175	177186	171/171	159/159
2	199/199	235/235	173/176	201/201	240/243	175/175	186/192	175/175	159/159
3	197/197	*/*	173/173	201/201	240/240	173/173	177192	175/175	159/159
4	197/199	235/239	170/173	201/211	240/246/249	175/175	177/192/195	171/175	159/159
5	199/199	235/235	173/173	207/211	243/243	175/177	186/192	177/181	150/159
6	197/197	235/235	173/176	201/201	240/243	175/175	186/192	175/175	156/159
7	199/199	235/235	170/173	201/211	243/245	167/167	180/195	175/175	159/159
8	197/199	237/237	173/176	201/209	243/245	167/167	177189	171/171	159/159
9	197/197	231/231	170/173	201/209	240/245	167/167	177192	171/175	*/*
10	197/197	235/235	173/173	201/209	240/245	173/173	177192	175/175	159/159
11	197/197	235/235	173/173	201/209	240/245	173/173	177192	175/175	159/159
12	197/201	235/235	173/176	201/209	243/245	175/175	177186	171/171	159/159
13	197/197	235/235	173/173	201/201	240/245	173/173	177192	175/175	159/159
14	197/197	231/235	173/173	201/201	240/245	167/167	177180	171/175	*/*
...	...	...	...	...	...	...	...	...	...

144个三角梅品种基因型数据
Genotypes of 144 varieties

第2批三角梅品种SSR分析
SSR genotyping of *Bougainvillea* varieties

序号 No.	引物 Primers	引物序列 Primer sequence(5'-3')		重复基序 Repeat motifs
1	BOU-SSR6	F: CTACATTGAACCCATCAGTCCAT	R：CGGGTCAGAATCGGGTTAGT	(AT)8
2	BOU-SSR48	F: GCAGCTTAACTCCCCCTTCT	R: ACACCCTTGGGGGAAAAATA	(ATT)5
3	BOU-SSR107	F: GGCTGCGTGGTTCTTTAGAC	R：ACAAAGCCCATGTCCTTCAC	(TTG)5
4	BOU-SSR98	F: AGCTTGTCCTTTGGCTGTGT	R: CCTTTTCCTGTCCCAACAAA	(TTG)5
5	BOU-SSR11	F: TCCAACTGGGAAAAGGCTCA	R: TGAAGGTGTTGATGGTCGGT	(AAC)5
6	BOU-SSR41	F:TCTTCTTGGATTTTCGCGTT	R: AGGAAAGTTGAGCAATGATGG	(ATG)5
7	BOU-SSR53	F: ATCATCCGGATTTTGCCTTA	R: AAAGTGTGAATGCGGTGAAA	(AT)9
8	BOU-SSR89	F: TGATCAACGAAATACGCATAACA	R: CGGATTTCTCCCAAGATGAA	(TTG)5
9	BOU-SSR28	F: ATGCTCGAAAAAGGCTCAAA	R: TTTCCGGGGTTTATCTAGGG	(AAG)5
10	BOU-SSR113	F: CGAATGAATTTGACGGGAAG	R: TTTTGCGGTCCATCTTATCC	(AAG)5
11	BOU-SSR5	F: TTTCCTTGATTGGCTTCAGTCT	R:GCAAGACACGAGGCTGTTCAC	(TA)8
12	BOU-SSR133	F: GCTCTTCTGCTGCTTCCATT	R: ACTCGGAAGATGGGAAGGAT	(CTT)6
13	BOU-SSR10	F: CTCCTCCTAGATCCCGCAAA	R: GAGCTGATTCCCGGTTCGAT	(TGG)5
14	BOU-SSR99	F: TTTGGTGTTTTGGGATTTGG	R：ACCATCAAAGCCTCCTTTTT	(ATG)5
15	BOU-SSR73	F: AGACAAGGAAAGCAAAGCGA	R: TTCAACCAACCCCAAAACAT	(AT)8
16	BOU-SSR47	F: CTCTCTCTGTGCCCCTTTTG	R: GAGGGTTCCCTAAGAGGTGG	(TCA)5
17	BOU-SSR58	F: TCTTGCCATGAAAGCCAAAT	R: GGACAAACCCAAGTGGAAGA	(CTT)6
18	BOU-SSR8	F: ACAACGCTGCTCGCAATT	R: CGGATATTGCGTCGCTGT	(CT)6
19	BOU-SSR80	F: TAATATCACTATCGCCCGCC	R: AAGAGCAAAGCATGAGGCAT	(CT)8
20	BOU-SSR74	F:CCATTGGGACATGGTGAAAT	R: TCATCGAACGACGATAACAA	(TTG)5

20对引物序列信息
20 primer pairs

序号 No.	引物 Primer	等位基因数 Na	有效等位基因数 Ne	Shannnon信息指数 I	观测杂合度 Ho	预期杂合度 He	多态性信息含量 PIC
1	BOU-73	17	6.969	2.238	0.247	0.856	0.843
2	BOU-6	11	6.340	1.999	0.698	0.842	0.823
3	BOU-113	18	5.305	2.115	0.160	0.812	0.796
4	BOU-53	13	5.280	1.950	0.286	0.811	0.79
5	BOU-8	16	4.736	1.950	0.194	0.789	0.765
6	BOU-80	15	4.638	1.859	0.941	0.784	0.759
7	BOU-5	7	4.763	1.651	0.108	0.790	0.757
8	BOU-47	14	4.377	1.833	0.607	0.772	0.747
9	BOU-11	9	4.496	1.686	0.936	0.778	0.744
10	BOU-10	17	4.365	1.828	0.859	0.771	0.741
11	BOU-98	8	4.175	1.593	0.273	0.761	0.724
12	BOU-99	7	3.968	1.577	0.881	0.748	0.710
13	BOU-74	9	3.870	1.518	0.479	0.742	0.697
14	BOU-107	9	3.751	1.572	0.256	0.733	0.693
15	BOU-48	8	3.665	1.510	0.202	0.727	0.684
16	BOU-41	6	3.408	1.411	0.201	0.707	0.662
17	BOU-58	11	3.378	1.401	0.626	0.704	0.651
18	BOU-89	12	3.015	1.439	0.295	0.668	0.622
19	BOU-133	5	2.486	1.081	0.196	0.598	0.526
20	BOU-28	7	1.249	0.458	0.163	0.199	0.189
	均值 Mean	11	4.212	1.633	0.430	0.730	0.696

SSR引物多态性扩增结果
Amplified polymorphism

叶子花属品种分子身份证号
Molecular IDs for *Bougainvillea* varieties

编码 Code	带型 Patterns	编码 Code	带型 Patterns	编码 Code	带型 Patterns
0	?/?	D	235/249	R	241/247
1	231/231	E	236/242	S	242/242
2	231/241	F	236/246	T	243/247
3	233/235	G	236/248	U	245/248
4	234/234	H	237/237	V	246/246
5	234/236	I	237/241	W	247/247
6	234/240	J	237/246	X	248/248
7	234/246	K	237/247	Y	248/250
8	234/248	L	238/238	Z	249/249
9	235/235	M	238/242	a	250/250
A	235/237	N	238/246	b	253/253
B	235/241	O	240/242		
C	235/247	P	240/246		

注：?/?指未获得扩增带型。

SSR带型代码转换
Genotyping codes

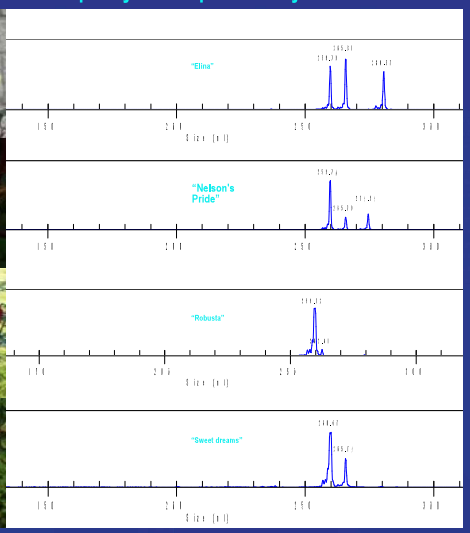
编码 Code	品种名 Cultivar	身份证 Molecular ID	编码 Code	品种名 Cultivar	身份证 Molecular ID
1	黄金斑叶紫	AHMMLIINCS773D97FF23	111	重瓣怡景	H6MJPHID4H517C39DK13
2	大叶塔紫	HPMMM4EO4H713C75BK63	112	银边白	FCM7FIISCL3935778754
3	软枝白	KHM7FIIN9L7935B78744	113	红樱	V89196F35F928J3ACE13
4	暗斑砖红	X86644CV5F858J7AGE63	114	婴儿雀	H7M0PHID4H513C39DK13
5	红心樱花	VE6696FF2FB58J7AGE13	115	珍珠白	HAMHPCHD4H317C69DJ13
6	绿叶樱花	XL6694CV5F858J79CE63	116	小叶紫	4HMLJIHMC1573D47FF13
7	同安红	9LGMPHIJ4H754C99DF23	117	塔粉	H8MLM4FE4H513C35DK63
8	重苞怡红	HBMJPHIV4H743C79DK13	118	暗玫红	Q6NI3H2H5H557C4ADF13
9	大斑叶紫红塔	H8MMM4CO4H743C75DK63	119	蓝月亮	Z8A194FD0F458K3AGE63
10	花叶塔	H8MMM4FO4H743C75BK63	120	蜡染	48A694FD5F658J3ACE63
11	绿叶塔形	H8MMM4FO0H713CA5BK63	121	枣红	41AJP4FD5FA58J3ACE63
12	塔橙	L8MMM4FO4H713F75BK63	122	金边紫	XEMMLIHNC3573D47FF23
13	粉蝶	Z89694FV5F828J7ACE63	123	西瓜	X8A694CU5F458J3ACE63
14	皱叶深红	ZE9694CV5F828J79GH63	124	拉菲娜	X89694FU5F458J39CE63
15	重苞橙	H2MJPGIV4H713C79DK13	125	粉雀	46OG95IH44H338CA9DK13
16	软枝浅紫	HB0DIPINB87733846863	126	巴西丁香紫	5KMLLIFNCS373D47FF23
17	绿叶深紫	9RRN22AGA57ABCD56663	127	金雀	41MH95HE4H338CA9DK13
18	大叶紫	EMC6M88F9S86BDB7F754	128	雪紫	FAM2IIHN9L3935773744
19	胭脂红	CKR6EIINBM7AGD97FE73	129	桧雀	46MH95H44H338CAADK13
20	金心弯弯	V89696FF5FB28J7ACE13	130	泰国柠檬黄	X8A194FD5F628J39GE63
21	重苞怡锦	H2MJPGIV4H713C79BK13	131	花叶橙	X4A194FD5F628J39GE63
...	...	...	...	...	...
107	重瓣橙	H6MJPHID4H517F59DK03	217	火炬	H8IMN4994H513C33DI63
108	塔紫	H8MMN4F84H513C3DK63	218	金边紫	GOB64B1I9R667D42F163
109	潮州红	99EMPHHF4H524C4ADF23	219	柠檬黄	CKL9DIID2H536D42DA23
110	金小双色	T89646F65F928J3ACE13			

219 个叶子花品种的身份证号
Molecular IDs developed for 219 varieties

月季品种分子身份证号
SSR analysis of *Bougainvillea* varieties

Phenotype

Capillary electrophoresis system



DNA fingerprinting data of *Rosa* varieties

No.	Variety Name	primer1 A1	A2	A3	A4	primer2 A1	A2	A3	.....
1	Altesse75	369	373			260			
.....									
29	Elina	369	375	389		260	266	281	
30	Faithful Friend	373	381	389		260	281		
31	Falstaff	358	369	373	389	260	266	271	
32	Ferdy	358	373			260	269		
33	Festival Jewel	373	381	389		260	266		
34	Fiona	373	381	389		260	266		
.....									
80	Nelson's Pride	369	381	389		260	266	275	
81	Norwwich Cathedral					260	266		
82	Nostalgia	373	389			266	281		
83	Old Blush	369	375			260			
84	Open Arms	373	375	381		266			
85	Oranges and lemons	373	389			260	266	271	
.....									
109	Robusta	373	385	389		260			
110	Romantic meillandina	373	381	389		260	266		
111	Rose Ball	373	381	389		260	266	281	
112	Rosita Vendela	369	373	389		260	266		
.....									
134	Sweet dreams	369	373	381	389	260	266		
.....									
152	羽仕妆	375	389			260			

月季品种DNA指纹数据部分数据
SSR analysis of Rose varieties

		P1-Rw55E12				P2-H10D03				P3-CTG623				P4-Rw10M24				P5-Rw59A12			
编号	品种名称	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4
A1	大丰收	205				233	240	251		239				288	297			236	268		
A108	金香槟	205				225	233	251		235	239	244		279	286	299		236	239	268	
A76	天堂	199	205			233	243	249		227	239			269	286			233			
A43	瑞普索迪	186	193			233	240			235	243			278	286			233	251		
A14	朱红女王	186	192	205		233	240			239	244			269	288			233	236		
A314	咖啡时间	183	195	205		225	233	240	242	271				288	299			231	236	239	251
A293	约瑟夫的外衣	192	199	205		225	233			235	239	246		269	288	297		236	239	251	268
A144	彩云	186	192	205		225	233	240		239	244			269	285	299		236	239		
A16	萨曼莎	183	199			225	240	251		235	244			297	299			231	233	235	268
A2	第一红	186	193	205		233	240	251		244	249			288				235	268		
A147	大奖章	183	205			225	233	240		235	239			269	272	286		235	251		
A110	白玛利	183	205			233	235	240		239	244			279	286	299		268			
A78	兰和平	183	195	205		235	242	249		239	246			269	278			239	245	251	268
A45	友禅	186	205			233	240	242		239	244			279	285			235	239	251	268
A315	日本黄包菜	183	192			233	240	242		244	257			269	297			235	268		
A294	西班牙舞娘	195	199	205		233	240			239				279	285	297		233	235	251	
A17	黑美人	192	195	205		225	233	242		239	244	257		286				239	268		
A3	夏洛特	183	205			225	235	240	242	244				285				233	235	268	
A148	游园会	186	205			233	240	242	249	239	244			269	285			233	251	268	
A111	冰山	192	205			235	251			227	239	257		278	286	299		235	239	245	
A85	新星	192	205			233	240			239	244			269	285			239	251	268	
A51	俏佳人	186	205			240	242			239	244			285	297	299		233	239	251	268
A319	卡里加比（篝火）	192	199	205		225	235	249		239	244			286	299			235	239	251	268
A295	盟友	186	205			225	240	242		239				269	285	286		233	235	268	
A23	红魔	201	203	205		233	240	242		239				288	299			235	268		
A4	萨莎90	186	205			225	235	240	242	235	239			279	286			233	236	239	
A112	多头白	186	192	199		233	248			227	244			279	285	297		235	251	268	
A86	美雀	183	192	205		233	235	240		239	246	257		286	299			233	239	251	
A52	安娜	183	203			233	240			239	244	271		286				231	235	239	
A320	樱桃（摩丝哥公爵）	186	205			225	233	242	251	239	244	257		279	285			233	235	268	
A296	法国条纹	186	195			225	240	251		244				286				233	235	239	
A150	第一夫人	199	205			233	242			235	239	244		285	299			233	235	251	268

152 | 2014年96个 | 2015年96个 | 2016年匿名8个

200 rose varieties

牡丹品种DNA样品采集
Sample collection of peony

材料：684个牡丹品种叶片样本：357个收集自国家牡丹基因库，327个收集自牡丹测试站
684 Peony varieties analyzed: 357 from gene bank, 327 from test station.

3

侵权司法鉴定案例
Cases of Judicial evidences for lawsuit

实验室司法鉴定工作发展历程
History of development

2001年
成立国家林业局
植物新品种测试中心
Test center approved

Listed agent for judicial identification

北京市高等法院知识产权司法鉴定机构
2005年

2006年
佳沛猕猴桃品种分子测试

Database of molecular ID Kiwi fruit varieties from Zespri

构建分子身份证数据库
2006–2018年

Molecular ID Kiwi fruit varieties from Zespri

2021年
司法鉴定
Judicial identification

现在
社会化服务
Services to the society

开展分子身份证司法鉴定的植物
Molecular evidences provided for lawsuits

- 山茶 Camellia
- 杜仲 Eucommia ulmoides
- 月季 Rosa
- 牡丹 Paeonia
- 新西兰猕猴桃 New Zealand Zesprit (Kiwi Fruit)
- 枫香 Liquidambar （名品彩叶）
- 杨树 Populus
- 枸杞 Lycium chinensis

分子身份证研制服务机构
Institutios provided with MIDs development

1. 国家林草局植物新品种保护办公室品种数据构建
   PVP Office of NFGA, molecular IDs and databases for varieties of rose, peony and bougainvillea
2. 国家林草局种苗司良种品种身份证构建
   NFGA Department of Seeds & Seedlings, Molecular IDs for certified superior varieties (similar VCU)
   Vegetatively propagated timber and ornemental species
3. 新西兰佳沛公司猕猴桃品种分子身份证研制
   New Zealand Zespri company, MIDs for Kiwi Fruit varieties
4. 上市公司河南名品彩叶公司枫香品种分子身份证研制
   Mingpin Color Plants (A stock market listed Co.), MIDs for varieties of *Liquidambar*
5. 厦门千日红公司三角梅品种分子身份证研制与数据库构建
   Xiamen Qianrihong Co.. MIDs for varieties of *bougainvillea*
6. 佛山植物园山茶属品种分子鉴别及品种身份证构建
   Fusan Botanic Garden (Forestry Rsearch Institute), varieties of *Camellia* (for flowers)

‘黛比’ 分子身份证
MID for *Camellia* 'Debbie'

‘黛比’品种身份证及二维码
'Debbie' variety ID number and QR code

品种名称：黛比（*Camellia* 'Debbie'）
Id：ICR-3749
国家：NewZealand
注册年份：1966
采集地点：佛山植物园
原始产地：中国昆明植物园
植物学分类：被子植物门（Angiospermae） 双子叶植物纲（Dicotyledoneae）原始花被亚纲（Archichlamydeae）侧膜胎座目（ Parietales）山茶亚目（Theineae）山茶科（Theaceae）山茶亚科（Theoideae）山茶族（Trib. Theeae）山茶属（*Camellia*）山茶亚属（Subgen. *Camellia*）红山茶组（Sect. *Camellia*）
分子身份证代码：
AA178178AB189195AC181181AD120132AE296299AF283286AG175175AH2132
17AI280280AJ113115AK155155AL142146AM261267AN167171AP134134AQ174
174AR152155AS154154AT241243AU198198AV182182AW148148AX132135AY13
8138AZ157157Aa161165Ab233233Ac272278Ad164167Ae195195Af120120Ag1421
42Ah137137
DUS 性状身份证代码：
A100B10000C100000D100E00010F010G100H100I010J001K01000L01000M0lN01
0P010Q10000R01S010T0100U0100V0|0000W1000X100Y10
形态特征：
陈丽惠，《山茶花谱台湾情》p.199. 紫红、半重瓣~牡丹型、中~大轮、中~晚花。
高继银、苏玉华、郝爽聪，《国内外茶花名种识别与欣赏》p.289. 花深粉红色，泛紫色调，牡丹型，中到大型花,外轮大花瓣平铺或略呈波浪状，中部大花瓣与小花瓣混生，直立扭曲，偶有少量金黄色雄蕊外露，花朵凋密。叶片浓绿色，小椭圆形，基部心形，叶面粗糙，植株立性，生长旺盛。花期中至晚。

侵权案件背景
Backgroud of the infringement case

棕科公司主张浪升种植合作社所种植、扦插、嫁接的植物繁殖材料侵害其对‘夏梦衍平’‘夏梦小旋’‘夏日七心’‘夏咏国色’等植物新品种享有的权利，提起多案诉讼，要求浪升种植合作社停止侵权、赔偿经济损失共计545.7万元。双方当事人对于被诉植物繁殖材料的特征、特性是否与授权植物新品种相同，以及被诉植株的来源等问题均存在争议。

广州知识产权法院经审理认为，被诉繁殖植株的品种特征、特性是否与授权品种一致的问题，需要通过专业检测技术进行测定。经过向林业类技术专家了解基因指纹图谱检测原理后，法院通过释法促成双方当事人协商选定基因指纹图谱检测方法作为确定被诉植物繁殖材料的特征、特性是否与授权植物新品种相同的方法，并组织当事人当庭取样。

当庭对山茶进行取样
Taking samples at the court

法庭司法鉴定委托
Commission letter for judicail identification

国家林草局新品办公函
Responses to the judicial identification request

国家林业和草原局植物新品种保护办公室

林技新便字〔2021〕24号

关于请完成司法委托任务的函

中国林业科学研究院林业研究所：

接广州知识产权法院告知，该法院已发来司法委托书〔(2021)粤知法技鉴字第11-18号〕，委托设在你所的国家林草植物新品种分子实验室判定"(2020)粤73知民初326-33号中涉及的山茶属(*Camellia* L.)植物新品种的特征、特性是否相同，并判定是否因非遗传变异所致"。

由于这是法院系统第一次委托我局相关单位开展品和鉴定工作，而且国家林草植物新品种分子实验室是我办植物新品种分子技术研究和鉴定的指定单位，具有植物新品种分子鉴定职责，并在分子技术方面具有鉴定能力和经验，请分子实验室与该法院对接，完成好此次委托事项。

国家林业和草原局植物新品种保护办公室

2021年4月16日

中国林科院林业所

林业办字〔2021〕1号

关于广州知识产权法院委托开展
植物新品种分子测试司法鉴定的复函

广州知识产权法院：

贵院"司法鉴定委托书"〔(2021)粤知法技鉴字第11-18号〕收悉。经研究，我单位拟接受贵院委托，安排国家林业和草原局植物新品种分子测定实验室与贵院进一步接洽，开展后续相关工作。

特此复函。

联系人：郑勇奇
联系电话：010-62888565/13651011754
联系地址：北京市海淀区香山路东小府1号林业所508

中国林业科学研究院林业研究所

2021年5月14日

2021年9月接收送检样品
Delivery and recept of samples

授权品种 X05
Protected variety

疑似侵权品种 Y05
Suspected variety

样品拆封
Unpacting

样品核对
Checking

DNA分子检测流程
Procedures for the SSR analysis

样品接收 Recept of samples	样品在送检单位和检测单位工作人员共同见证下开箱、拆封、核对 无误后由检测单位接收
检测样品 Verification of samples	每个品种随机选取三份样品进行检测，不满足三份样品则全部检测， 验证每个品种样品间的一致性。
DNA提取 DNA extraction	植物DNA提取试剂盒（型号：CW0531M 公司：江苏康为世纪生物科技股份有限公司）
引物筛选 Screening primers	根据文献和实验室前期研究基础筛选得到多态性高、扩增效果好、 重复性好的SSR引物
PCR扩增 PCR amplification	ABI 9700 PCR扩增仪
扩增产物检测 Detection of PRC products	毛细管电泳检测PCR扩增产物的大小。
基因型分析 Genotyping	Gene-Marker （版本：Gene-Marker Version 2. 2. 0 产地国家：SoftGenetics LIC, State College, PA, USA）
出具检测报告 Detectio report	

Technical standards: NY2594-2016 植物品种鉴定DNA分子标记法—总则

引物筛选与DNA指纹图谱
Screening of primers and DNA fringerprints

17个 SSR 位点侧翼引物信息表

染色体编号	位点名称	正向引物（5 '-3' ）	反向引物（5 '-3' ）	退火温度（℃）
-	CAM35	GGTTTGGAAAAAGGACACGC	AATCTGCCTCTGGTAGTCCG	58
-	CAM3	CACCGCTTGACTAAAATGG	AAACTATCAACCGTATGGGC	55
-	CAM37	TCACCAGTCACTTTCCCTCC	CCACCAAAAGGCACAATACC	58
-	CAM11	GCTGTAGGCGAACATGAA	CACTTCCACTTCCATATCCA	55
-	CAM38	CATCATCCATCAAACCGTCC	GAAGGCACATTGGTTCTGGG	58
-	CAM39	CTTCTTCTCGATCCACAGCC	CGATCTCCTCCGTAACAAGC	55
-	CAM23	TATTGCCTACGACCATTTCCA	TTTGAGTTCGTTGCCTTCTCT	56
-	CAM40	TCAAAAGAGACCTTGGGCTG	ACCTGGTTCAATCTATGGCG	55
-	CAM13	AGAGGAGAGGAGAGGAGAG	TTTGGAGAGCGACATTGC	54
-	CAM44	AACAATACCCGACTCCTCCC	CCTATGGCGAGACGTTCAAT	55
-	CAM16	ATCGCAGACAACAAGAAGA	GAATTTTCTGGGCCATCTGA	55
-	CAM52	TCCCCATGTAGACTCTTCCG	GGAGGAGATCGTGATGAAG	55
-	CAM24	AGTTCCCCCTCCAGTTTGAC	CCGTTGATCCCTTCGACTTA	54
-	CAM5	TATTGCCTACGACCATTTCCA	GGACCGAGAGGTAACAGTGG	52
-	CAM9	CAGGGTTGCAAGAAGTACCG	ATCAACCGTATGGGCAAAAG	57
-	CAM22	CAACACCACCAACAAGA	AAGACATGTTCGGTTCCGTC	53

"-" 表示染色体位置未知

筛选获得的16对SSR引物
16 perimer pairs selected

检测样品 X05 和 Y05 的 DNA 指纹图谱

序号	位点编号	样品 X05-1	样品 X05-2	样品 X05-3	样品 X05-4	样品 X05-5	样品 X05-6	样品 Y05-1
1	cam35	185	185	185	185	185	185	185
		185	185	185	185	185	185	185
2	cam3	122	113	113	113	113	113	122
		122	122	122	122	122	122	122
3	cam37	132	130	130	130	130	130	132
		134	132	132	132	132	132	134
4	cam11	198	198	198	198	198	198	198
		198	198	198	198	198	198	198
5	cam38	217	215	215	215	215	215	217
		217	215	215	215	215	215	217
6	cam39	191	191	191	191	191	191	191
		206	206	206	206	206	206	206
7	cam23	217	217	217	217	217	217	217
		235	235	235	235	235	235	215
8	cam40	280	280	280	280	280	280	280
		280	280	280	280	280	280	280
9	cam13	131	131	131	131	131	131	131
		131	131	131	131	131	131	151
10	cam44	289	295	295	295	295	295	289
		295	300	300	300	300	300	285
11	cam16	120	120	120	120	120	120	120
		120	120	120	120	120	120	136
12	cam52	258	258	258	258	258	258	258
		261	261	261	261	261	261	241
13	cam24	270	270	270	270	270	270	270
		276	276	276	276	276	276	276
14	cam5	216	216	216	216	216	216	216
		234	234	234	234	234	234	234
15	cam9	139	130	130	130	130	130	139
		139	139	139	139	139	139	139
16	cam22	113	113	113	113	113	113	113
		115	115	115	115	115	115	115

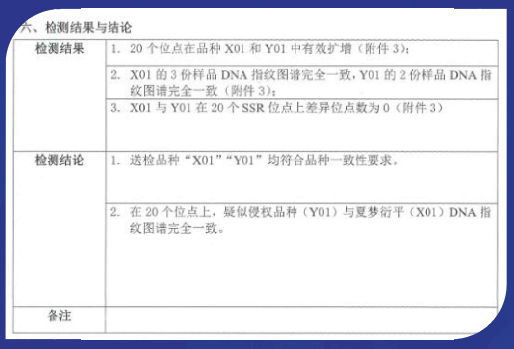
注：数字表示在该位点扩增 DNA 片段大小，单位 bp。

授权品种X05与疑似侵权品种Y05的DNA指纹图谱完全一致
The DNA fingerprints of the 2 varieties are identical

2021年11月出具检测报告
Producing report on DNA analysis

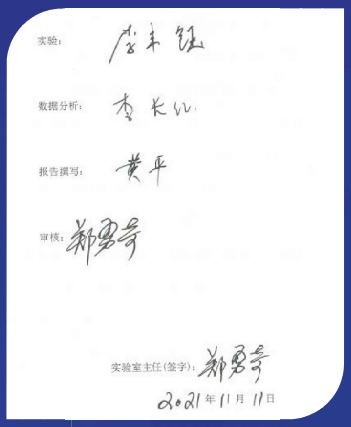
植物品种分子标记
检测报告

国家林业和草原局植物新品种分子测定实验室
2021 年 10 月



六、检测结果与结论

检测结果	1. 20 个位点在品种 X01 和 Y01 中有效扩增（附件 3）； 2. X01 的 3 份样品 DNA 指纹图谱完全一致，Y01 的 2 份样品 DNA 指纹图谱完全一致（附件 3）； 3. X01 与 Y01 在 20 个 SSR 位点上差异位点数为 0（附件 3）
检测结论	1. 送检品种“X01”“Y01”均符合品种一致性要求。 2. 在 20 个位点上，疑似侵权品种（Y01）与夏梦衍平（X01）DNA 指纹图谱完全一致。
备注	



实验：
数据分析：
报告撰写：
审核：
实验室主任(签字)：
2021 年 11 月 11 日

法院宣判
Decision by the court

- 法院根据检测报告认定被诉茶花植株与‘夏梦衍平’‘夏梦小旋’‘夏日七心’‘夏咏国色’等植物新品种的特征、特性一致，并认定浪升种植合作社的被诉行为构成对涉案植物新品种权的侵害。
- 鉴于浪升种植合作社的故意侵权性质，以及同时侵害多项植物新品种权、侵权繁殖材料种植面积广、侵权时间持续长的侵权情节，结合考虑涉案植物新品种的类型、涉案植物新品种权的授权费用高、授权品种的市场售价高等因素，法院在法定幅度内确定较高的赔偿责任，判令浪升种植合作社赔偿共计135万元。
- 系列案件宣判后，浪升种植合作社不服，提起上诉。最高人民法院二审判决：驳回上诉，维持原判。
- **The report produce from the lab was acceppted by the Guangzhou IP court as key evidence for making their judgement for infringement case.**

2022年度十大经典案例之一
One of the top 10 typical cases by the official media

本案属运用基因技术保护植物新品种权利的典型案例。

加大种业知识产权的司法保护，事关农业科技的自立自强，是护航“三农”经济的司法担当。本案通过现代植物基因技术手段提升保护植物新品种权的司法效率，净化种业市场，取得良好的法律效果和社会效果。

案件探索解决侵害植物新品种权纠纷案件中的检测难题，缩短检测时间，有效提升了植物新品种权的司法保护效率，不仅彰显了种业知识产权的司法保护力度，有利于形成对种业侵权行为的强力威慑，更有助于激励种业自主创新，提升种业人的植物新品种权意识，促进乡村振兴。


A03 重点

“拿来”算法重组？立即停止！
私卖别人茶花品种？赔逾百万！

保护知识产权就是保护创新

粤港知识产权保护执法首次实现证据互认

当事人可选择就近法院立案和庭审

上述内容转自“最高人民法院知识产权法庭”公众号, Media source: WeChat Bulletin

近几年承担的案例
Cases of judicial evidences in recent years

1. 2021 年 5 月，广州知识产权法院委托【（2021）粤知法技鉴字第 11-15,17,18 号】，研制建立山茶属品种鉴定 SSR 分子标记方法，完成山茶属品种分子鉴定工作，涉及授权山茶属品种 6 个，提交测试报告 7份。**Guangzhou IP Court, *Camellia***
2. 2024 年3 月，实验室接受广州知识产权法院委托【（2024）粤知法技鉴字第 3,4,5 号】，完成山茶属品种分子鉴定工作，涉及授权山茶属品种 1 个，提交测试报告 3 份。**Guangzhou IP Court, *Camellia*.**
3. 2024 年 3 月，接受某桉树品种权人委托，研制建立桉树属品种鉴定 SSR 分子标记方法，完成桉树品种分子鉴定工作，为品种权人维权提供技术支撑。2024 年8 月，接受江西省景德镇中法委托鉴定山茶属品种。**Jiangxi Jingdezhen IP Court, *Eucalyptus*.**
4. 2025年3月，宁夏杨属侵权案委托。**Ningxia IP Court, *Populus*.**
5. 2025 年 3 月，接受湖南省慈利县人民法院委托鉴定杜仲品种。**Hunan Lizhi county court, *Eucommia ulmoides*.**
6. 2025 年 3 月，实验室接受银川市中级人民法院〔2024)宁 01 知民初 37 号〕、〔(2024)宁 01 知民初 38 号〕对被诉侵权枸杞苗木与原告享有品种权的“杞鑫 1 号”是否属于同一品种进行司法鉴定工作。**Yinchuan City Court, *Lycium barbarum***

[Annex VI follows]

ANNEX VI

TWM3 技术访问日程

The Technical Visit Schedule of TWM3

时　间 Time	参观内容 Visit Content	讲解人 Interpreter
地点：中国农业科学院蔬菜花卉研究所 Location：Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences		
08:30 – 08:45	介绍研究所在信息化和分子方面的研究进展 Introduce the Research Progress of the Institute in the Fields of Informatization and Molecular	程锋 Feng Cheng
08:45 – 09:15	演示大数据平台和智能化表型采集设备 Demonstration of Big Data Platform and Intelligent Phenotype Collection Devices	杨坤 Kun Yang
09:15 – 09:20	草坪合影 Group Photo	
09:20 – 09:30	两个参观路线（二选一）： Two Visiting Routines (Alternative)： 参观全自动分子检测设备 Visiting Fully Automated Molecular Detection Equipment 参观全自动表型采集设备 Visiting Fully Automated Phenotype Collection Equipment	武剑 Jian Wu 线国兰 Guolan Xian
09:30 – 10:00	园艺生活体验 Experience of horticultural life	寇亚平 Yaping Kou
地点：北京市农林科学院信息技术研究中心 Location：Information Technology Research Center, Beijing Academy of Agriculture and Forestry Sciences		
10:30-11:00	展示中心核心成果与重点项目 Display Center's Core Achievements and Key Projects	李英伦 Yinglun Li 温维亮 Weiliang Wen 张　颖 Ying Zhang

时　间 Time	参观内容 Visit Content	讲解人 Interpreter
11:10-11:30	讲解设施关键技术和数据采集应用 Explanation of Key Technologies in Facilities and Data Collection Applications 演示自动化设备运行与技术优势 Demonstration of Automated Equipment Operation and Technical Advantages	温维亮 Weiliang Wen
11:30-12:00	通过视频系统讲解温室整体设计与技术集成 Explain the Overall Design and Technical Integration of the Greenhouse Through the Video System	张颖 Ying Zhang
12:00-13:00	午餐 Lunch	
地点：中国林业科学研究院 Location：Chinese Academy of Forestry		
14:00-14:30	参观科研温室 Visit Scientific Research Greenhouse	黄平 Ping Huang
14:40-15:30	参观全国树木遗传育种重点实验室 Visit the National Key Laboratory of Tree Genetics and Breeding	于雪丹 Xuedan Yu
15:30-16:00	参观国家林草植物新品种分子测定实验室 Visit the National Molecular Testing Laboratory for New Varieties of Forest and Grass Plants	张川红 Chuanhong Zhang
16:00-16:20	茶歇 Tea Break	李长红 Changhong Li
16:20-17:30	品种分子指纹图谱及辅助司法鉴定案例 Molecular Fingerprint of Varieties and Its Application in Forensic Identification Cases	郑勇奇 Yongqi Zheng
17:30-19:30	招待晚宴 Reception Dinner	

[End of Annex VI and of report]