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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL WORKING PARTY ON AUTOMATION AND COMPUTER PROGRAMS

Thirty-Fourth Session
Shanghai, China, June 7 to 10, 2016

REPORT

Document prepared by the Office of the Union

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Opening of the session

1. The Technical Working Party on Automation and Computer Programs (TWC) held its thirty-fourth session in Shanghai, China, from June 7 to 10, 2016. The list of participants is reproduced in Annex I to this report.

2. The session was opened by Mr. Adrian Roberts (United Kingdom), Chairman of the TWC, who welcomed the participants and thanked China for hosting the TWC session. Mr. Yang Xiongnian, Director General of Development Center of Science and Technology, Ministry of Agriculture (MOA) (Director General of DUS Testing Station of New Plant Varieties, MOA), Mr. Cai Youming, President, Shanghai Academy of Agricultural Sciences and Mr. Ma Zhiqiang, Division Chief of Variety Management, Bureau of Seed Management, MOA, welcomed the TWC to China. Copies of the opening speeches are reproduced in Annexes II to IV to this document, respectively.

3. The TWC received a presentation by Mr. Cui Yehan, Professor, Director, Plant Variety Protection Division, Development Center of Science and Technology, MOA, on "Development of Plant Variety Protection System in China", a copy of which is reproduced in Annex V to this report.

Adoption of the agenda

4. The TWC adopted the agenda as presented in document TWC/34/1 Rev.

Short reports on developments in plant variety protection

(a) Reports on developments in plant variety protection from members and observers

5. The TWC noted the information on developments in plant variety protection from members and observers provided in document TWC/34/25 Prov.

(b) Reports on developments within UPOV

6. The TWC received a presentation from the Office of the Union on the latest developments within UPOV, a copy of which is provided in document TWC/34/16.

Molecular Techniques

7. The TWC considered document TWC/34/2 and received an oral report from Mr. Kees van Ettekoven (Netherlands), Chairperson of the BMT.

8. The TWC noted that the BMT, at its fifteenth session, had been invited to develop a list of possible joint initiatives with OECD and ISTA, including the development of a list of terminology (definitions) used by OECD, UPOV and ISTA for consideration at the TC, at its fifty-third session, to be held in 2017.

9. The TWC noted that a Joint OECD/UPOV/ISTA/AOSA Workshop on Biochemical and Molecular Methods would be held in Paris, France, on June 8, 2016.

10. The TWC noted that the TC, at its fifty-second session, had agreed a draft question and answer concerning the information on the situation in UPOV with regard to the use of molecular techniques for a wider audience, including the public in general, as set out in paragraph 23 of this document, and subject to agreement by the CAJ, at its seventy-third session, and the Consultative Committee, at its ninety-second session, the draft would be presented for adoption by the Council, at its fiftieth ordinary session.

11. The TWC welcomed the offer by the Netherlands to report on projects on the use of molecular techniques in DUS examination to the TWC, at its thirty-fifth session (see documents BMT/15/21 “Efficient DUS test in French bean by using molecular data” and BMT/15/22 “Can molecular distance be used as a characteristic?”).

12. The TWC welcomed the offer by China to report its experience on the use of DNA databases of maize, rice and wheat when selecting similar varieties for the examination of distinctness.

13. The TWC agreed to invite presentations from members on the statistical aspects of using molecular markers in DUS examination, including the selection of similar varieties and organization of growing trials. The TWC welcomed the offer by France to make a presentation on current work with databases that include molecular information with computation of molecular distances using the GAIA software.

14. The TWC agreed that software and databases as well as associated statistical methods were important elements of DUS examination and of increasing relevance to plant variety protection. The TWC agreed that the Chairperson of the TWC should report on these particular elements of the work of the TWC to the Technical Committee.

TGP documents

15. The TWC considered the TGP documents below on the basis of document TWC/34/3.

Matters for adoption by the Council in 2016

16. The TWC noted the revisions to documents TGP/0, TGP/7 and TGP/8 to be put forward for adoption by the Council at its fiftieth ordinary session, as set out in document TWC/34/3, paragraphs 6 to 13.

Future revision of TGP documents

17. The TWC noted that the proposals for future revisions of TGP documents to be discussed by the TWPs at their sessions in 2016 would be dealt with under separate documents.

18. The TWC noted the new proposals for revision of TGP documents to be discussed by the TWF at its session in 2016 on duration of DUS tests in the fruit sector and the definition of “recurved” in document TGP/14.

19. The TWC noted that the Technical Committee (TC), at its fifty-second session, held in Geneva, from March 14 to 16, 2016, had requested the TWF to review whether the existing guidance in TGP documents precluded the conclusion of a DUS examination after one growing cycle on document TGP/7.

20. The TWC noted the plans of the TWF to consider whether to propose to revise the definition of “recurved” in document TGP/14.

Program for the development of TGP documents

21. The TWC noted the program for the development of TGP documents, as set out in Annex III to document TWC/34/3.

22. The TWC agreed to request the expert from China to prepare a proposal for reorganizing document TGP/8 to facilitate searches and use by DUS examiners for consideration at the thirty-fifth session of the TWC for consideration.

TGP/7: Development of Test Guidelines

Revision of document TGP/7: Drafter's Kit for Test Guidelines

23. The TWC considered document TWC/34/9 and received a presentation by electronic means from the Office of the Union on the web-based application for drafting of Test Guidelines (web-based TG Template).

24. The TWC noted the issues addressed in response to the comments by Leading and Interested Experts that participated in the testing of the prototype of the web-based TG Template, as set out in document TWC/34/9, paragraphs 21 and 22. The TWC noted that further comments by users of the web-based TG Template could be sent to the Office of the Union.

25. The TWC noted that the TC, at its fifty-second session, had agreed the format of the Table of Characteristics in all Test Guidelines with a structure as set out in document TWC/34/9, paragraph 16.

26. The TWC noted that the TC had agreed that guidance should be developed on the order of the methods of observation for a characteristic in the Table of Characteristics to indicate that the most commonly used method was displayed first.

27. The TWC noted that the development of Version 2 of the web-based TG Template would not start before 2018, subject to availability of resources, after Version 1 had been fully stabilized and tested.

28. The TWC noted that document TGP/7 would be revised to reflect the introduction of the web-based TG Template after Version 1 was fully stabilized and tested.

29. The TWC noted that the system specifications of the web-based TG Template allowed the future development of a web-service application to allow data extraction from the web-based TG Template to other databases, which could offer possibilities to support the development of authorities' own test guidelines. The TWC noted that such a functionality could be developed in the future if data mapping of their own databases was done by the authorities.

TGP/8: Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability

Revision of document TGP/8: Part II: Section 9: the Combined-Over-Years Uniformity Criterion (COYU)

30. The TWC considered document TWC/34/10.

31. The TWC noted that the TC, at its fifty-second session, had agreed to request members of the Union to provide larger data sets to the United Kingdom for developing probability levels for the new method that would match results obtained using the previous probability levels, as set out in document TWC/34/10, paragraph 20.

32. The TWC noted that the Office of the Union had issued UPOV Circular E-16/098 to invite UPOV members' experts to provide to the United Kingdom, by May 27, 2016, data sets including at least 100 candidate varieties, with a possibility that data for those 100 varieties could be derived from several years.

33. The TWC noted the report by an expert of the United Kingdom that a data set on red fescue had been submitted by Slovakia and that Denmark had agreed to submit a data set on spring and winter canola later in 2016.

34. The TWC welcomed the offers from China and France to submit data sets on maize and fescue, respectively. The TWC noted the invitation for submission of other data sets with 100 candidates from as

many crops as possible for developing probability levels for the new method. The TWC agreed to invite the expert from the United Kingdom to report on progress during the thirty-fifth session of the TWC.

Revision of document TGP/8: Part II: New Section: Examining DUS in Bulk Samples

35. The TWC considered document TWC/34/11.

36. The TWC noted that guidance for examining DUS in bulk samples would be developed on the basis of the criteria set out in document TWC/34/11, paragraph 22, and agreed with the proposal by the expert from the Netherlands to use the approach "Control of the characteristic before it is accepted in the relevant guideline".

37. The TWC also agreed that approaches "subplots" and "plant number" would be acceptable on the basis of examples and discussions in the relevant Technical Working Parties, as proposed in the Annex to document TWC/34/11.

38. The TWC noted that DNA markers could be used to assess characteristics on the basis of the existence of a reliable link between the marker and the characteristic and there was no need to develop guidance in this regard under a general guidance for characteristics observed on the basis of bulk samples.

Revision of document TGP/8: Part II: New Section: Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions

39. The TWC considered documents TWC/34/12 and TWC/34/12 Add.

40. The TWC agreed to request the expert from France to continue developing the study on the comparison of methods used for producing variety descriptions to provide further information to explain the results obtained in the practical exercise.

41. The TWC agreed to invite the experts from France, Germany, Italy and Japan to provide a short description of their methods to transform measurements into notes and to provide examples where the methods would not be appropriate using a similar structure to the information submitted by the United Kingdom, as presented in document TWC/34/12 Add.. The TWC agreed that the description of the methods and example situations where they could or should not be used could form the basis for future guidance.

42. The TWC received an oral presentation by an expert from the United Kingdom and noted that the method for peas used a combination of delineating example varieties and crop expert judgement. The TWC noted the explanation that example varieties were not used when the range of values was not continuous, to avoid distortion in the division of the scale of notes into equally spaced states ("notes stretching").

43. The TWC noted that in China some quantitative characteristics without normal distribution were transformed (e.g. log) before dividing the range of expression into equally spaced states for the conversion of observations into notes.

TGP/10: Examining Uniformity

Revision of document TGP/10: New Section: Assessing uniformity by off-types on basis of more than one growing cycle or on the basis of sub-samples

44. The TWC considered documents TWC/34/13 and TWC/34/27.

45. The TWC noted that the TWA had agreed to request a video link with experts from the TWC to discuss the new proposed "Approach 3: Combining the results of two growing cycles" at its forty-fifth session, to be held in 2016.

46. The TWC considered the draft guidance as presented in document TWC/34/13, Annexes I and II, for inclusion in a future revision of document TGP/10, and agreed that cost of trials, consistency of results, time required for decisions and technical aspects of each approach could influence the selection of the most suitable approach for each situation.

47. The TWC agreed that future guidance should provide parameters for decisions on the most suitable approach based on experience of members and agreed to invite examples of different types of crops and the criteria for selecting the approach used for the assessment of off-types. The TWC welcomed the offers from

Germany, the Netherlands and the United Kingdom to provide examples to be presented at its thirty-fifth session.

48. The TWC noted the importance of identifying whether differences in number of off-types between cycles was due to biological reasons or sampling variation and agreed that the relevant part of approach 2 and 3 of the draft guidance should be amended to read as follows, respectively:

> "Care is needed when considering results that are very different in each of the growing cycles, such as when a type of off-type is observed at a high level in one growing cycle and is absent in another growing cycle. A statistical test for consistency should be applied when appropriate."

> "Care is needed when considering results that are very different in each of the growing cycles, such as when a type of off-type is observed at a high level in one growing cycle and is absent in another growing cycle. A statistical test for consistency ~~is possible~~ should be applied when appropriate."

49. The TWC considered document TWC/34/27 "Practical experience of assessing uniformity by off-types on oilseed rape and cauliflower" and received a presentation by an expert from France, a copy of which is reproduced in the Annex to document TWC/34/27.

50. The TWC noted the simulation of decisions using approaches 1 and 3 on different crops and agreed on the usefulness of the worked examples. The TWC noted that cases of diverging results between 2 growing cycles are not common as most varieties would either meet or fail to meet requirements in both cycles.

51. The TWC noted the explanation of the requirement of "independent growing cycle" by an expert from France and the preference for a third growing cycle to increase reliability of observations, as presented in the document TWC/34/27, Annex, page 4.

Information and Databases

(a) UPOV information databases

52. The TWC considered document TWC/34/5.

UPOV code system

53. The TWC noted that the European Union proposal "Proposal to the 'Guide to the UPOV Code System' on the principal botanical name for inter-generic and interspecific hybrids" from Community Plant Variety Office of the European Union (CPVO) presented in document TWC/34/23, was considered under agenda item "Proposal to the 'Guide to the UPOV Code System' on the Principal Botanical Name for Inter-generic and Interspecific Hybrids" (see paragraph 113 of this report).

54. The TWC noted the developments concerning UPOV codes, as set out in document TWC/34/5, paragraph 8.

55. The TWC noted that the Office of the Union would prepare tables of UPOV code additions and amendments, for checking by the relevant authorities, for each of the TWP sessions in 2016.

PLUTO database

56. The TWC noted the summary of contributions to the PLUTO database from 2012 to 2015 and the current situation of members of the Union on data contribution, as presented in Annex II to document TWC/34/5.

57. The TWC noted that the CAJ, at its seventy-second session, had agreed that the Working Group on Variety Denominations (WG-DEN) had considered proposals for the expansion of the content of the PLUTO database to include all recognized varieties, including those that had not been, or were no longer, registered/protected.

58. The TWC noted that the WG-DEN, at its first meeting, had agreed to defer the consideration of the matters concerning the possible expansion of the content of the PLUTO database to include all recognized varieties, including those that had not been, or were no longer, registered/protected until its second, or a subsequent, meeting.

59. The TWC noted the information concerning the training courses “Contributing data to the PLUTO database”, held in Geneva in September and October 2015, as set out in document TWC/34/5, paragraphs 20 to 22.

(b) Variety description databases

60. The TWC considered document TWC/34/6.

61. The TWC noted the developments reported in document TWC/34/6 and, in particular, that:

(a) the TC, at its fifty-second session, had agreed to invite members of the Union to make presentations at the next session of the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT) on how databases containing molecular data might be developed in UPOV; and

(b) the outcome of discussions during the BMT on how databases containing molecular data might be developed in UPOV would be reported to the TC at its fifty-third session.

62. The TWC noted that there were two presentations made on databases containing molecular data at the BMT, at its fifteenth session;

(a) Towards durable DNA databases to support DUS testing (document BMT/15/16)

(b) Advances in the Construction and Application of DNA Fingerprint Databases in Maize (document BMT/15/20)

63. The TWC received a presentation by an expert from the Netherlands on “Naktuinbouw application and information database: Integrated IT-tool to manage applications, requests, trials, reports and variety collections”, a copy of which is reproduced in the Annex to document TWC/34/22.

64. The TWC noted that it was important to take the cost of maintenance into account when creating a database.

(c) Exchange and use of software and equipment

65. The TWC considered document TWC/34/7

Document UPOV/INF/16 “Exchangeable Software”

66. The TWC noted that the Council, at its forty-ninth ordinary session, held in Geneva, on October 29, 2015, had adopted document UPOV/INF/16/5 “Exchangeable Software”.

67. The TWC noted that the TC, at its fifty-second session, had agreed to propose the revision of document UPOV/INF/16/5 to include information on the use of software by members of the Union, and that it would be reported to the CAJ at its seventy-third session and, if agreed by the CAJ, a draft of document UPOV/INF/16/6 “Exchangeable Software” would be presented for adoption by the Council at its fiftieth ordinary session.

Document UPOV/INF/22 “Software and equipment used by members of the Union”

68. The TWC noted that the Council, at its forty-ninth ordinary session, held in Geneva, on October 29, 2015, had adopted document UPOV/INF/22/2 “Software and equipment used by members of the Union.

69. The TWC noted that the TC, at its fifty-second session, had agreed to propose the revision of document UPOV/INF/22/2 to include information on the use of software by members of the Union, and if agreed by the CAJ, a draft of document UPOV/INF/22/3 would be presented for adoption by the Council at its fiftieth ordinary session.

70. The TWC agreed to propose that a note be added to document INF/22 that the information in that document was the responsibility of the contributing authority. The TWC agreed that reference to documents

INF/16 and INF/22 should be made on training materials and presentations to promote the use of that information such as for facilitating the construction of databases.

71. The TWC agreed to suggest that information in INF/22 be presented in an alternative form (e.g. on-line format) rather than an INF document.

(d) Electronic application systems

72. The TWC considered document TWC/34/26 and received a presentation by the Office of the Union via electronic means. The TWC noted the main functionalities developed during the period and the program for development of prototype electronic application form Version 2 (PV2) by October, 2016.

(e) Management of databases

73. The TWC received an oral presentation from an expert of the Netherlands on the development of a search platform technology that would enable searching of multiple, independent databases constructed using different architecture.

74. The TWC noted that the construction of portals could facilitate access to technology and noted that it could allow searches to be conducted across databases constructed using different architecture.

75. The TWC noted the experience of France on the construction and management of a platform for DUS data (GEMMA Platform). The TWC also noted the experience of Germany in sharing a database with France and Spain of morphological characteristic data of maize varieties using unique identifiers and the use of an interface to exchange data.

76. The TWC suggested that guidance on the development and management of databases may be of benefit.

77. The TWC agreed to invite presentations from members on experiences with using databases, and proposals for guidance on the management of databases to be presented to the TWC at its thirty-fifth session.

78. The TWC welcomed the “Database to search for TWC working documents” that was developed by the experts from Germany and distributed to participants to the TWC session as a CD-ROM. The TWC noted that the database was updated every year with TWC documents tagged with indexed keywords. The TWC agreed that the database provided a useful search mechanism for scanned TWC documents.

(f) Bio-informatics

79. The TWC received a presentation by an expert from the Netherlands on “Bioinformatics”, a copy of which is reproduced in the Annex to document TWC/34/24. The TWC agreed that bioinformatics was a field of work closely related to the mandate of the TWC.

(g) Experiences in the development of databases

80. The TWC invited members to present their experiences in the development of databases, including the main elements to be taken into consideration, to be considered during the thirty-fifth session of the TWC.

(h) Search in multiple databases using a portal

81. The TWC received a presentation by an expert from the Netherlands on “Search Plant: A search portal to facilitate tracking and tracing of ornamental varieties”, a copy of which is reproduced in the Annex to document TWC/34/20.

82. The TWC noted that the Search Plant portal (www.searchplant.eu) could search three independent databases with a single search function. The TWC noted the data structure and information technology

requirements for other databases to join the portal and noted the plans for identification of similar varieties in the future by recognition of images.

Statistical methods

(a) Excluding varieties of common knowledge from the second growing cycle when COYD is used

83. The TWC noted the information presented in document TWC/34/8.

84. The TWC received a presentation by an expert from the United Kingdom on "Calculated thresholds for excluding varieties of common knowledge from the second growing cycle when COYD is used", a copy of which is reproduced in the Annex to document TWC/34/8 Add.

85. The TWC noted the request for submission of data sets from different crops for developing the method and welcomed the offer from Denmark, Finland, Germany and Slovakia to provide data sets. The TWC noted that software to calculate thresholds for excluding varieties would be developed to facilitate the application of the method, with a possibility to be integrated into the GAIA software.

(b) Statistical methods for visually observed characteristics

86. The TWC considered document TWC/34/18

87. The TWC noted the report from the expert from France that a study on the development of software to implement the method developed by experts from Denmark and Poland would be reported to the TWC, at its thirty-fifth session.

88. The TWC considered the description of the method presented in the Annex to document TWC/34/18 and agreed that appropriate naming and drafting guidance should be considered once further experience had been acquired and software was available to facilitate its use in DUS examination.

(c) Statistical methods used in the DUSTC software package

89. The TWC received a presentation by an expert from China on "Statistical methods used in the DUSTC software package", including a demonstration of the software package that incorporates statistical analysis procedures, including the methods for calculating COYU and COYD.

Software for DUS examination

(a) A tool to define reference collection

90. The TWC received a presentation by an expert from France on "A tool to define reference collection", a copy of which is reproduced in the Annex to document TWC/34/28, including a demonstration of the prototype software.

91. The TWC noted the series of functions performed by the software automating searches from a theoretical collection of all varieties of common knowledge to the identification of most similar varieties for comparison in growing trials. The TWC noted that development of the software was expected to be completed in 2017.

(b) A single tool for DUS computation process

92. The TWC received a presentation by an expert from France on "A single tool for DUS computation process", a copy of which is reproduced in the Annex to document TWC/34/29. The TWC noted the integration of new functions in the GAIA software and use of the same interface for different processes, such as COYD and COYU, using the same data set.

93. The TWC noted the changes to the data structure in the Excel file used to upload data to GAIA with the introduction of information on replicates and number of plants per replicate. The TWC noted that the improvements made would still allow GAIA to be available free of charge.

94. The TWC agreed to invite France to report on progress in the development of a single tool for DUS computation process at the thirty-fifth session of the TWC.

(c) A ring-test comparing three different software packages for COYD

95. The TWC received a presentation by an expert from China on "A ring-test comparing three different software packages for COYD", a copy of which is reproduced in the Annex to document TWC/34/30. The TWC noted that the same data set was used to compare results generated for the COYD procedure using the statistical packages developed in China (DUSTC), Germany (SAS) and the United Kingdom (DUST). The TWC noted that the three different software packages produced the same result.

Image analysis

(a) Demonstration of Chinese software on image analysis

96. The TWC received a demonstration of the Chinese software on image analysis and noted the series of functions, including the management of a photo database, photo editing, automatic analysis of shape and color, direct comparison between objects and analysis of similarity rate of shape and color.

97. The TWC noted that China planned to improve the conditions to acquire images (e.g. light source and exposure, shape and color scales) allowing accurate direct comparison of images and automatic selection of similar varieties from a photo database. The TWC welcomed the invitation by China for other experts to join the project for improvement of the software.

Minimizing variation between observers

98. The TWC received a presentation by an expert from Finland on "Minimizing variation between observers – practical example from Finland", a copy of which is reproduced in the Annex to document TWC/34/19.

99. The TWC noted the steps taken in Finland for minimizing variation between observers when more than one observer was used for the assessment of MS/VS characteristics in turnip rape, such as Leaf: undulation of margin, Leaf: dentation of margin; and Leaf: number of lobes. The TWC noted that Finland conducted training with the observers prior to beginning of work and calibration exercises in different occasions during the same day of data collection on the field.

Genotype-by-environment interaction, DUS tests and data transformation into notes

100. The TWC received a presentation by experts from Finland and Italy on "Genotype by Environment Interaction (GEI) - DUS test and data transformation into notes", a copy of which is reproduced in the Annex to document TWC/34/17.

101. The TWC agreed that the information presented by the experts from Finland and Italy should be considered along with the guidance currently being developed on transformation of observations into notes and the criteria for choosing among different existing approaches. The TWC agreed to request the experts from Finland and Italy to provide a summary of the presentation to support the development of guidance in document TWC/34/12, to be presented to the TWC at its thirty-fifth session.

Matters concerning variety descriptions

102. The TWC considered document TWC/34/14.

103. The TWC noted the purpose of the variety description developed at the time of the granting of the breeder's right (original variety description), and the status of the original variety description in relation to the

verification of the conformity of plant material to a protected variety for enforcement of the breeder's right, as set out in document TWC/34/14, paragraph 28.

104. The TWC noted the presentations on "Matters concerning variety descriptions" received by the TWPs, at their sessions in 2015, as set out in document TWC/34/14, paragraph 7.

105. The TWC noted the comments by the TWPs, at their sessions in 2015, on matters concerning variety descriptions and the role of plant material used as the basis for the DUS examination, as set out in document TWC/34/14, paragraphs 8 to 26.

Number of growing cycles in DUS examination

106. The TWC considered documents TWC/34/15, TWC/34/15 Add. and TWC/34/21.

107. The TWC noted that the TC, at its fifty-second session, had agreed to invite members of the Union to simulate the impact of using different numbers of growing cycles on DUS decisions using actual data and to report on their results at the TWP sessions in 2016 and at the fifty-third session of the TC.

108. The TWC received a presentation by the expert from Finland on "Number of growing cycles in DUS examination -simulation of impact on DUS decisions", a copy of which is reproduced in document TWC/34/15 Add, and by an expert from the Netherlands on "Minimum number of growing cycles", a copy of which is reproduced in the Annex to document TWC/34/21.

109. The TWC noted that for some members DNA tests were being considered for reducing the number of growing cycles while retaining decisions based on a growing trial.

110. The TWC noted the experience of an expert of Argentina that, in the case of vegetatively propagated and self-pollinated crops, a second growing cycle would not be necessary in cases where distinctness was confirmed with clear differences between varieties (e.g. disease resistance characteristics) in a first growing cycle.

111. The TWC welcomed the offers by France, Germany and the Netherlands to simulate the impact of using different numbers of growing cycles on DUS decisions using actual data to be reported to the TWC at its thirty-fifth session.

112. The TWC noted that, for cross-pollinated varieties, for some UPOV members a third growing cycle was used to examine distinctness, such as in meadow fescue, red clover, timothy, turnip rape and white fescue in Finland.

Proposal to the "Guide to the UPOV Code System" on the Principal Botanical Name for Inter-generic and Interspecific Hybrids

113. The TWC noted the information on a "Proposal to the 'Guide to the UPOV code system' on the principal botanical name for inter-generic and interspecific hybrids" provided in document TWC/34/23.

Date and place of the next session

114. At the invitation of Argentina, the TWC agreed to hold its thirty-fifth session in Buenos Aires, Argentina, from November 13 to 17, 2017, with the preparatory workshop on November 12, 2017.

Chairperson

115. The TWC agreed to propose to the TC that it recommend to the Council to elect Mr. Christophe Chevalier (France), as the next chairperson of the TWC.

Variety denominations

116. The TWC considered document TWC/34/4.

117. The TWC noted the work on the possible development of a UPOV similarity search tool for variety denomination purposes by the Working Group for the Development of a UPOV Denomination Similarity Search Tool (WG-DST), as set out in document TWC/34/4, paragraphs 5 to 13.

118. The TWC noted that a revision of document UPOV/INF/12/4 (document UPOV/INF/12/5), in relation to changes of registered variety denominations had been adopted by the Council, at its forty-ninth ordinary session (see document TWC/34/4, paragraph 14).

119. The TWC noted that the mandate and the composition of the WG-DST had been expanded to prepare recommendations for the CAJ concerning a possible revision of document UPOV/INF/12 (to become the WG-DEN).

120. The TWC noted that the first meeting of the WG-DEN had been held in Geneva, on March 18, 2016.

Experience with new types and species

121. The TWC noted the experience of Argentina with DUS examination of new varieties of the following genera and species: *Lippia integrifolia* (Gris.) Hieron, *Glandularia aristigera* (S. Moore) Tronc., *Macroptilum* spp., *Camelina sativa* L. Crantz, *Chenopodium quinoa* Willd. and *Nierembergia linariaefolia*.

Future program

122. The TWC agreed the following program for the thirty-fifth session of the TWC:

1. Opening of the session
2. Adoption of the agenda
3. Short reports on developments in plant variety protection
   - (a) Reports from members and observers (written reports to be prepared by members and observers)
   - (b) Reports on developments within UPOV (document to be prepared by the Office of the Union)
4. Variety denominations (document to be prepared by the Office of the Union)
5. Matters concerning variety descriptions (document to be prepared by the Office of the Union)
6. TGP documents (document to be prepared by the Office of the Union)
7. Consideration of possible reorganization of TGP/8 (document to be prepared by China and documents invited)
8. Uniformity assessment by off-types
   - (a) Practical experience of uniformity by off-types (documents invited)
   - (b) Factors influencing the choice of approach for off-types over two or more cycles (documents to be prepared by Germany, Netherlands and United Kingdom)
9. Molecular techniques (document to be prepared by the Office of the Union)
   - (a) Selection of similar varieties for maize, rice and wheat using a DNA database (document to be prepared by China)
   - (b) Use of molecular markers in DUS examination (document to be prepared by the Netherlands)
   - (c) Experience in the use of molecular markers in DUS examination (document to be prepared by France)
   - (d) Statistical issues (bio-informatics) related to the use of molecular markers in DUS examination (documents invited)
10. Number of growing cycles in DUS examination (documents to be prepared by France, Germany and Netherlands)

11. Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions:
    (a) Short descriptions (documents to be prepared by France, Germany, Italy and Japan)
    (b) Review results of practical exercise (document to be prepared by France)
    (c) Genotype-by-environment interaction, DUS tests and data transformation into notes (documents to be prepared by Italy and Finland and documents invited)
12. Software, information and databases
    (a) UPOV information databases (document to be prepared by the Office of the Union)
    (b) Variety description databases (document to be prepared by the Office of the Union and documents invited)
    (c) Exchange and use of software and equipment (document to be prepared by the Office of the Union and documents invited)
    (d) Electronic application systems (document to be prepared by the Office of the Union)
    (e) Management of databases
        (i) Experience of members on the application of databases (documents invited)
        (ii) Development of new ideas regarding the management of information (documents invited)
        (iii) Guidance on the management of databases (documents invited)
    (f) A single tool for DUS computation process (document to be prepared by France)
13. Statistical methods
    (a) Excluding varieties of common knowledge from the second growing cycle (document to be prepared by the United Kingdom)
    (b) Statistical methods and software for visually observed characteristics (document to be prepared by France and the United Kingdom)
    (c) The Combined-Over-Years Uniformity Criterion (COYU) (document to be prepared by the United Kingdom)
14. Image analysis (documents invited)
15. Date and place of the next session
16. Future program
17. Report on the session (if time permits)
18. Closing of the session

Technical Visit

123. On the afternoon of June 9, 2016, the TWC visited the Zhuanghang Experimental Station of the Shanghai Academy of Agricultural Sciences (SAAS), in Shanghai. The TWC was welcomed by Ms. Zhou Changyan, Deputy Director, Institute for Agri-food Standards and Testing Technology and Ms. Chu Yunxia, Researcher. The TWC received presentations on SAAS and on DUS testing at the Zhuanghang Experimental Station, copies of which are reproduced in Annexes VI and VII to this report, respectively. The TWC visited the field and greenhouses for DUS trials, and greenhouses for collections of varieties of ornamental plants (alstroemeria, anthurium, guzmania) and vegetables (cowpea, hot pepper, lettuce).

[Annexes follow]

ANNEX I

LIST OF PARTICIPANTS

I. MEMBERS

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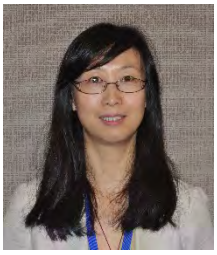

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[Annex II follows]

ANNEX II

OPENING SPEECH BY MR. YANG XIONGNIAN, DIRECTOR, DEVELOPMENT CENTER OF SCIENCE AND TECHNOLOGY, MINISTRY OF AGRICULTURE (DIRECTOR GENERAL, DUS TESTING STATION OF NEW PLANT VARIETIES, MINISTRY OF AGRICULTURE)

Good morning! Mr. Chairman, Mr. Jun Koide, Mr. Leontino Rezende Taveira, ladies and gentlemen,

Welcome to Shanghai to attend the 34th Session of UPOV-Technical Working Party on Automation and Computer Programs. Please allow me to express my sincere welcome to all of you on behalf of Center for Science and Technology Development, and DUS Testing Station of New Plant Varieties of Ministry of Agriculture, and congratulation for the holding of the conference!

DUS testing system has achieved great success since its establishment in 2000 in China. By now it has completed testing of over 11,000 varieties of 75 plant categories, and provided technical support for the authorization of over 6,000 new varieties; it has finished database software development of known varieties, collected more than 13,000 known varieties of 43 plants, 50,000 pieces of relevant description, 32,000 pieces of picture data, and DNA fingerprint data of more than 6,000 varieties; it has provided important technical basis for the authorization and enforcement of variety rights.

Now there are over 100 professional technicians in the testing system. All of them have gone through skill training of DUS, and 70% of them have received technical training of UPOV and its member countries, including Netherlands, the US, France and Germany, etc., forming a qualified and professional DUS testing team.

2016 sees the first year of China's "13th Five Year Plan" as well as an important year for the reform and development of DUS testing system. It is made clear in Seed Law which was implemented since January 1st 2016 that DUS testing is the basic technical basis for variety management, which brings about great changes to our service objects and tasks: for the past 15 years, the test was mainly for varieties applied for protection. According to the revised Seed Law, DUS testing is not only for variety protection, but also for variety certification, registration and market enforcement. The service objects cover variety administrator, cultivator, operator, and law-executor; meanwhile, with the issue of the 10th new variety protection list in April this year, the number of testing varieties will reach 138, and plus the annually examined varieties and non-major agricultural varieties in China, it is predicted that the annual task of DUS testing will increase from 1200 to 7000.

In face of the new changes and challenges, we will work with greater effort on hardware building. We will build and rebuild the DUS test stations in 2016. 5 new stations will be established, and the number of stations will increase from 14 to 22. Through the rebuild, field management will be mechanized, devices will be modernized, data collection will be automated, and analysis and processing will be intellectualized, so as to meet the requirements of DUS testing. At the same time, activities to improve the quality of DUS testing will be launched. Technical Committee of DUS Testing was founded in Jinan last May, and 6 technical working parties were set up according to the system of UPOV. The aim is to improve technical level through the study of the latest technologies of UPOV and its member countries.

Testing system in China cannot go this far in the past 15 years without the support of UPOV and many countries. I know some of you have come to Shanghai last week to communicate with our staff on data sharing and utilization. Thank you very much for your work! I wish the conference a complete success, thanks!

[Annex III follows]

ANNEX III

OPENING SPEECH BY MR. MA ZHIQIANG, DIVISION CHIEF, VARIETY MANAGEMENT, BUREAU OF SEED MANAGEMENT, MINISTRY OF AGRICULTURE

Good morning, ladies and gentlemen,

Let me express my warm welcome to all of you on behalf of the Ministry of Agriculture and the Office for the Protection of New Varieties of Plants!

Since its joining in UPOV in 1997, China has paid great attention to the plant protection of new varieties which has gained quite great achievements. There were 2069 new varieties of plants applied by China in 2015, and we were only after the EU among all UPOV members in terms of annual application; by the end of 2015, 15552 new agricultural plant varieties had been applied in China, among which 6258 had been authorized. We ranked the 4th among UPOV members. The whole society, especially seed companies have stronger awareness of new variety protection, and companies have become the main body applying for variety right. Taking last year as the example, China National Seed Group applied for 64 variety rights, accounting for over 50% of the application of the company for the last 16 years. The newly revised Seed Law which was officially implemented on January 1st this year separates the protection of new varieties of plants in one chapter, which improves the legal hierarchy of new plant variety protection, and clarifies the management property of new variety protection and DUS testing. I believe the protection of new varieties of plants in China will have greater achievements.

The system of new variety protection has a late start in China, but we attach great importance to communicating and cooperating with UPOV members. We are open to the advanced experience that we can digest, improve and create. We have established a relatively complete DUS testing system covering the whole country, trained a professional team of examination and testing, and achieved great success in technical research and application. TWC Session in Shanghai is a perfect platform of communication through which we can work together to make progress. We are happy to provide service for you.

China has a vast territory and abundant resources with rich culture and local customs. Shanghai is the miniature of modernization in China. I hope more and more UPOV meetings can be held in China so that China can have more opportunities to communicate with UPOV members and also, you can have a better understanding of China.

Last but not least, I wish a complete success of the conference, and I wish you a happy week in Shanghai!

[Annex IV follows]

ANNEX IV

WELCOME SPEECH BY MR. CAI YOUMING, PRESIDENT, SHANGHAI ACADEMY OF AGRICULTURAL SCIENCES (SAAS)

Dear guests, ladies and gentlemen,

Welcome to attend the UPOV-Technical Working Party on Automation and Computer Programs (TWC) 34th Session (TWC/34) in Shanghai. Please allow me to express my sincere welcome to all of you on behalf of the organizer Shanghai Station for DUS Testing Center of New Plant Varieties, MOA and Shanghai Academy of Agricultural Sciences (SAAS).

SAAS was founded in 1960 and it has a history of 56 years. SAAS is affiliated with the People's Government of Shanghai, with 10 institutes such as crop breeding and cultivation, horticulture and edible mushrooms, etc. and 1 testing station. It now has 908 employees, with the research fields covering all aspects of agricultural sciences. Since its foundation, SAAS has obtained over 360 scientific awards at ministerial and municipal levels, among which 30 are scientific awards at national level, and 29 are first awards of scientific progress at ministerial and municipal levels.

SAAS pays great importance to agricultural intellectual property such as new plant variety rights. Since the implementation of the system of new plant variety protection, SAAS has applied for 128 new plant variety rights, and 47 have been authorized; 63 have been applied since 2011, involving 13 plant varieties.

Shanghai Station for DUS Testing Center of New Plant Varieties, MOA was set up in September 2000 by SAAS. Shanghai Station is designed to carry out the comprehensive testing of horticultural plants, DUS testing of vegetables, horticultural plants and edible mushrooms as well as relevant technical research. It has undertaken the tests of specificity, consistency and stability of over 500 new plant varieties of 21 categories such as pepper and guzmania.

It is TWC Session organized by China for the first time. We hope the seminar could promote the application and development of automatic operation and computer programs in the field of protection and testing of new plant varieties in China, and improve the quality and efficiency of data processing.

Finally I wish the conference a complete success, and I wish you a happy stay in Shanghai.

[Annex V follows]

ANNEX V

PRESENTATION BY MR. CUI YEHAN ON "DEVELOPMENT OF PLANT VARIETY PROTECTION SYSTEM IN CHINA

Development of Plant Variety Protection System in China

Cui Yehan
Ph. D, Professor, Director
Plant Variety Protection Division, Development Center of Science and Technology
Ministry of Agriculture, P. R. China

Development of Plant Variety Protection System in China

- The PVP system in agriculture has being further improved
- The PVP examination and DUS testing system has being further enhanced
- The improved varieties brought huge benefits along with the application increment
- The law enforcement on PVP has being reinforced constantly
- The international cooperation and exchange has being fruitful

The PVP system in agriculture has being further improved

I. Regulations

- Plant Variety Protection (PVP) System was established in China when Regulations of the People's Republic of China on Protection of New Varieties of Plants (PVP Regulations) was enacted and enter into force in March 20, 1997.

- The PVP Regulations was revised and became effective on March 1, 2013 in order to intensifying anti-counterfeiting and infringement.

Regulations of the People's of China on the Protection of New Varieties of Plants

- Based on the framework of PVP Regulations and its Implementation Rules, Ministry of Agriculture promulgated:

  "Provisions on Examination of the Re-Examination Board for New Varieties of Plants of the Ministry of Agriculture"

  "Provisions of the Ministry of Agriculture on Handing Infringement of New Varieties of Agriculture Plants"

  "Rules on Denomination of Plant Varieties in Agriculture"

  … …

- **Seed Law's amendment was proved by the 12th CPC in 4th Nov. 2015.**
- **Seed Law amendment in relation to PVP as follows:**
  - **Raised PVP legal position**
  - **Clarify DUS test as basic technical reguirements in variety management**
  - **Strengthen the panishment for PVP infringement, the amount of compensation raised significantly**
  - **Clarify the duties of agricultural administrative departments at country level or above**

II. Protection Lists

- **Up to now, the MOA has released ten protection lists of protected agricultural plants involving 138 genera or species, and the SFA has released five lists of protected forestry plants covering 198 genera or species .**
- **Genera or species protected by the MOA includes as the following,**

29 field crops: ***Zea mays* L.; *Oryza sativa* L.; *Triticum aestivum* L.; *Glycime max* (L.) *Merrill*; *Brassica napus* L.; *Arachis hypogaca* L.; *Ipomoea batatas* (L.) *Lam.*; *Setaria italica* (L.) *Beauv.*; *Sorghum bicolor* (L.) *Moench*; *Hordeum* L.; *Boehmeria* L.; *Gossypium* L.; *Linum usitatissimum* L.; *Morus* L.; *Brassica juncea* Czern. et Coss.; *Vigna radiata* (L.) *Wilczek*; *Pisum sativum* L.; *Hevea brasiliensis* (Willd. ex A. de Juss.) Muell. Arg.; *Sesamum indicum* L.; *Manihot esculenta Crantz*; *Saccharum* L.; *Vigna angularis* (Willd.) Ohwi et Ohashi; *Avena sativa* L. & *Avena nuda* L.; *Nicotiana tabacum* L. & *Nicotiana rustica* L.;** *Helianthus annuus* L.; *Fagopyrum* Mill.; *Brassica campestris* L.; *Coix* L.; *Ricinus communis* L.

34 vegetable crops: ***Brassica campestris* L. ssp.; *Solanum tuberosum* L.; *Lycopersicon esculentum* mill.; *Cucumis sativus* L.; *Capsicum* L.; *Brassica oleracea* L. var. *capitata* (L.) Alef. var. *alba DC.*; *Raphanus sativus* L. var. *longipinnatus Bailey* & *Raphanus sativus* L. var. *radiculus* Pers.; *Solanum melongena* L.; *Vicia faba* L.; *Phaseolus vulgaris* L.; *Vigna unguiculata* (L.) Walp.; *Allium fistulosum* L.; *Cucurbita pepo* L.; *Brassica oleracea* L. var. *botrytis* L.; *Apium graveolens* L.; *Daucus carota* L.; *Allium sativum* L.; *Brassica campestris* ssp. *chinensis*; *Momordica charantia* L.; *Lactuca sativa* L.; *Brassica alboglabra* Bailey L.; *Brassica juncea*（L.）Czern. et Coss; *Benincasa hispida* Cogn.;** *Spinacia oleracea* L.; *Cucurbita moschata* Duch.; *Luffa* Mill.; *Brassica oleracea* L . var. *italica* Plenck; *Allium Cepa* L.; *Zingiber officinale* Rosc.; *Zizania latifolia* (Griseb.) Turcz. ex Stapf.; *Asparagus officinalis* L.; (*Dioscorea alata* L.; *Dioscorea polystachya* Turcz.; *Dioscorea japonica* Thunb.); *Helianthus tuberosus* L.; *Abelmoschus esculentus*（L.）Moench

22 fruit crops: ***Malus* Mill.*; Pyrus* L.*; Citrus* L.*; Musa acuminata* Colla*; Actinidia* Lindl.*; Vitis* L.*; Prunus salicina* Lindl. *& P. domestica* L. *& P. cerasifera* Ehrh*; Cucumis melo* L.*; Prunus persica* (L.) Batsch.*; Litchi chinensis* Sonn.*; Eriobotrya japonica* Lindl.*; Prunusavium* L.*; Mangifera indica* L.*; Dimocarpus longan* Lour.*; Fragaria ananassa* Duch.*; Citrullus lanatus* (Thunb.) Matsum et Nakai*;* *Myrica* L.; *Cocos nucifera* L.; *Ananas* Mill.; *Carica papaya* L.; *Artocarpus heterophyllus* Lam.; *Ficus carica* L.

33 ornamental plants: ***Cymbidium goeringii* (Rchb. F)*; Chrysanthemum* L.*; Dianthus* L.*; Gladiolus* L.*; Cymbidium* Sw.*; Lilium* L.*; Strelitzia Ait; Limonium* Mill.*; Gerbera jamesonii* Bolus*; Ranunculus asiaticus* L.*; Hylotelephium tatarinowii* (Maxim.) H. Ohba*; Amaranthus tricolor* L.*; Anthurium* Schott*; Guzmania* Ruiz. *&* Pav.*; Nelumbo nucifera* Gaertn*; Phalaenopsis* Bl.*; Begonia* L.*; Impatiens balsamina* L.*; Impatiens wallerana* Hook. *f; Impatiens hawkeri* Bull.*; Tagetes* L.*; Tulipa* L.*;* *Cyclamen persicum* Mill.; *Salvia splendens* Ker-Gawler; *Viola tricolor* L.; *Petunia hybrida* Vilm.; *Zantedeschia* Spreng.; *Clematis* L.; *Dendrobium* Sw.; *Hemerocallis* L.; *Lavandula* L.; *Primula vulgaris* Huds.; *Narcissus* L.

6 fungus: ***Pleurotus nebrodensis* (Inzenga) Quél;** *Morchella* Dill. ex Pers.; *Lentinula edodes* (Berk.) Pegler; *Auricularia heimuer* F.Wu, B.K. Cui & Y.C.; *Ganoderma* P. Karst.; *Agaricus bisporus* (J.E. Lange) Imbach

5 forage crops: ***Medicago sativa* L.; *Poa pratensis* L.; *Rumex* L.; *Stylosanthes* Sw. ex Willd;** *Zoysia japonica* Steud.

9 other plants: ***Camellia* L. *Section Thea* (L.) *Dyer; Panax ginseng* C. A. Mey.; *Panaxnoto ginseng*（Burk）F.H. Chen.;** *Lycium* L.; *Gastrodia elata* Bl.; *Erigeron breviscapus* (Vant.) Hand.-Mazz.; *Fallopia multiflora* (Thunb.) Harald.; *Isatis indigotica* Fort.; *Stevia rebaudiana* Bertoni.

Species protected by the SFA includes as the following：

Populus tomentosa; Paulownia; Cunninghamia lanceolata; Magnolia; Paeonia suffruticosa; Prunus mume; Rosa; Camellia;

Populus; Salix; Eucalyptus; Castanea mollissima; Juglance; Zizyphus jujuba; Diospyros kaki; Prunus armeniaca;Ginkgo biloba; Vernicia; Taxus; Rhododendron; Prunus persica; Lagerstroemia indica; Prunus triloba; Chimonanthus praecox; Osmanthus fragrans;

Pinus Linn; Picea Dietr; Taxodium Rich; Sabina Mill; Liriodendron Linn; Chaenomeles Lindl; Acacia Willd; Sophora Linn; Robinia Linn; Syringa Linn; Forsythia Vahl; Buxus Linn; Euphorbia Linn; Acer Linn; Hippophae rhamnoides Linn; Ailanthus Desf; Bambusa Retz. corr; Schreber; Indocalamus Nakai; Phyllostachys Sieb. et Zucc; Calamus Linn; Daemonorops Blume;

Cycas Linn; Thuja Linn; Podocarpus L'Her. ex Pers; Betula Linn; Corylus Linn; Castanopsis Spach; Ulmus Linn; Zelkova Spach; Morus Linn; Ficus Linn; Paeonia Linn; Manglietia Blume; Michelia Linn; Parakmeria Hu et Cheng; Cinnamomum Trew; Machilus Nees; Loropetalum R. Br.; Pterocarpus Jacq.; Zanthoxylum Linn.; Clausena Burm. f.; Cotinus Mill.; Euonymus Linn.; Koelreuteria Laxm.; Ampelopsis Michx.; Parthenocissus Pl.; Punica Linn.; Hedera Linn.; Ardisia Sw.; Fraxinus Linn.; Lycium Linn; Catalpa Linn; Lonicera Linn.

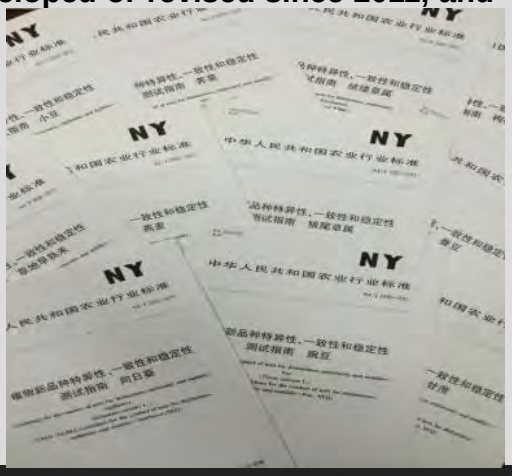
Abelia R. Br.; Abies Mill.; Acanthopanax (Decne. et Planch.) Miq.; Acidosasa C. D. Chu et C. S. Chao; Aesculus L.; Akebia Decne.; Albizia Durazz.; Alnus Mill.; Ammopiptanthus Cheng f.; Amorpha L.; Aucuba Thunb.; Berberis L.; Bombax L.; Bougainvillea Comm. ex Juss.; Broussonetia L'Hér. ex Vent.; Buddleja L.; Callicarpa L.; Calligonum mongolicum Turcz.; Campsis Lour.; Camptotheca acuminata Decne.; Caragana Fabr.; Carpinus L.; Carya Nutt.;Cassia L.; Castanea Mill.; Casuarina L.; Cedrus Trew; Celtis L.; Cephalotaxus Sieb. et Zucc.; Cercis L.; Chimonobambusa Makino; Chionanthus L.; Choerospondias axillaris (Roxb.) B. L. Burtt et A. W. Hill; Clematis L.; Clerodendrum L.; Cornus L.; Cotoneaster Medik.; Crataegus L.; Cryptomeria D. Don; Daphne L.; Davidia Baill.; Dendrocalamus Nees; Elaeagnus L.; Elaeocarpus L.; Ephedra L; Eucommia ulmoides Oliv.; Fargesia Franch.; Gleditsia L.; Haloxylon Bunge;Hamamelis L.; Hibiscus L.; Hippophae L.; Hopea Roxb.; Hydrangea L.; Hypericum L.; Idesia Maxim.; Ilex L.; Illicium L.; Indosasa McClure;Jacaranda Juss.; Jasminum L.;Jatropha curcas L.;

Juniperus L.; Keteleeria Carrière; Lagerstroemia L.; Larix Mill.; Lespedeza Michx.; Ligustrum L.; Lindera Thunb.; Liquidambar L.; Litsea Lam.; Luculia Sweet; Malus Mill. (except fruits); Melastoma L.; Melia L.; Metasequoia Miki ex Hu et W. C. Cheng; Myrica rubra Sieb. et Zucc.; Nitraria L.; Ormosia Jackson; Osmanthus Lour.; Phellodendron amurense Rupr.; Phoebe Nees; Photinia Lindl.; Pistacia L.; Platycarya Sieb. et Zucc.; Platycladus Spach; Pleioblastus Nakai; Potentilla fruticosa L.; Prunus L. (except fruits); Pterocarya Kunth; Pteroceltis Maxim.; Quercus L.; Rubus L.; Sambucus L.; Sapindus L.; Sapium Jacq.; Sassafras tzumu (Hemsl.)Hemsl.; Schima Reinw. ex Blume; Sinojackia Hu; Sorbaria (DC) A. Braun; Sorbus L.; Spathodea P. Beauv.; Spiraea L.; Symplocos Jacq.; Taiwania Hayata; Tamarix L.; Tectona grandis L. f.; Telosma Cov.; Ternstroemia Mutis ex L. f.; Tetradium Lour.; Tilia L.; Toona M. Roemer; Torreya Arn.; Vaccinium L.; Vitex L.; Wisteria Nutt.; Xanthoceras sorbifolium Bunge; Ziziphus Mill.

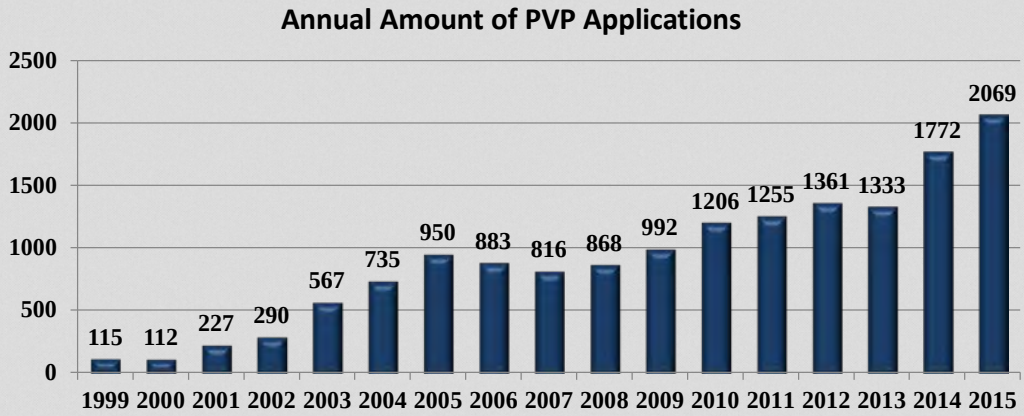
The PVP examination and DUS testing system has being further enhanced

- **The system of PVP examination in the office is preliminarily offering an electronic platform for dealing with PVP application, ranging from application receiving, preliminary examination, DUS testing arrangement to granting and information release.**
- **The MOA has established one headquarters and 22 sub-centers for conducting DUS tests since the year of 2000, carried out DUS testing for more than 2000 new varieties each year.**

- Furthermore, supported by more than 120 experts in different fields, 105 national test guidelines have been developed or revised since 2011, and bring the total TG number up to 186.
- In addition, 16 DNA fingerprint identification standards have been completed, including wheat, canola, cotton, soybean, etc. Those achievements make DUS testing technique standardize possible and prop up PVP examination and granting effectively.

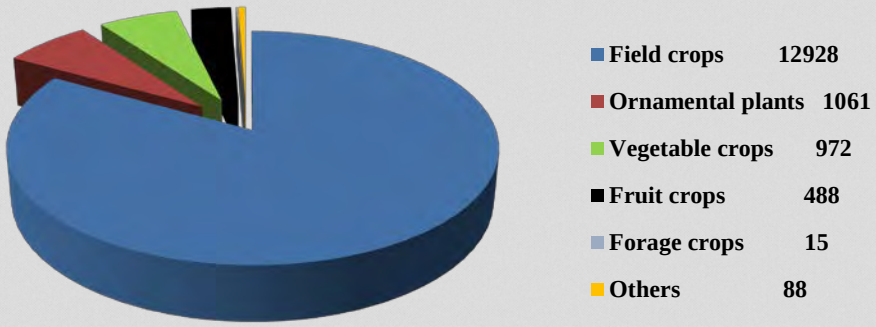


The improved varieties brought huge benefits along with the application increment



- Up to the end of 2015, the total amount of PVP application ran up to 15,552 and the amount of granted reached 6,258.

Distribution of PVR applications by the crop type (MOA)



- Among the granted new varieties, emerged in large number of better ones in maize, rice and wheat, such as “Zhong Dan 909”, “Jing Ke 968”, “Nong Hua 101”, “Y Liang You 1 Hao”, “Xin Liang You 6 Hao”, “Shi Mai 15 Hao” and so on.


Zhong Dan 909


Xin Liang You 6 Hao

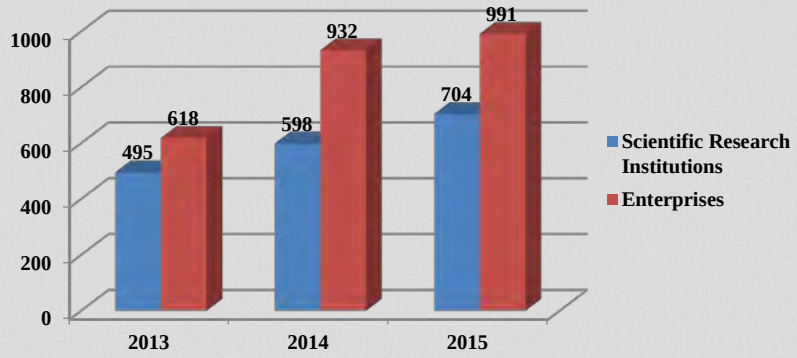

Shi Mai 15 Hao

- **The plantation scale was further enlarged by using these new varieties, it facilitated to make grain yield increment steadily and farmers income increase continuously in China.**

- **Seed companies have been not only drew more attention on breeding investment but also continuing to foster to utilize PVP rights in order to promote themselves' capabilities.**

- **Seed companies integrated with breeding, reproducing, processing, selling are growing.**

- As matter of fact, the amount of application from enterprises is more than that from the scientific research institutions nowadays.



The law enforcement on PVP has being reinforced constantly

Ministry of Public Security

Ministry of Agriculture

State Administration for Industry and Commerce

The special action against plant breeder's rights infringement and the acts of producing and selling fake and inferior seeds/seedlings

- **Meanwhile, Ministry of Agriculture continued to organize special inspection and law enforcement of PVP rights, particularly paid more attention on seed production base supervision in Gansu, Sichuan and Hainan provinces.**

- **In addition, the Intellectual Property Court has been established in Beijing, Shanghai and Guangzhou cities since August 2014.**

- **The movements strengthened the fighting strength of conducting infringement and counterfeiting acts from the first step, kept protecting of plant breeder's rights and interests and promoted to shape a fair and orderly market competition environment.**

The international cooperation and exchange has being fruitful

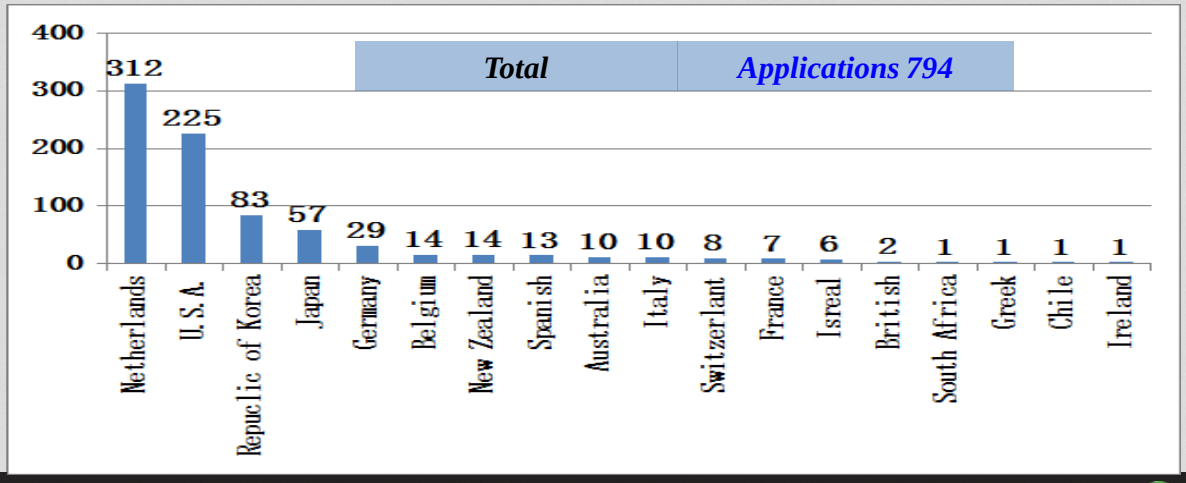
- **As a UPOV member, Chinese government always put cooperation with open up, facilitated communication into a very important place as significant measures for promoting the development of international plant variety protection.**

- **By means of involving in developing related technical guidelines of UPOV as well as holding International PVP training course, participating East-Asia PVP Forum, carrying out international cooperation programs such as Sino-Dutch, Sino-USA, Sino-EU, Sino-Japan-Korea etc., the development space of China in the international PVP field has been expended and the influence of China has been further increased.**


UPOV
UPOV TECHNICAL WORKING PARTY FOR FRUIT CROPS
FORTY-THIRD SESSION
Beijing, July 30 to August 3, 2012
国际植物新品种保护联盟43届果树技术工作组会议


UPOV测试及分子技术会议
Joint workshop on DUS testing and Molecular Techniques
中国北京 Beijing China
2013年9月23-24日，23-24 September, 2013

- **Besides, oversea breeders understand China's PVP system and have confidence on the environment.**

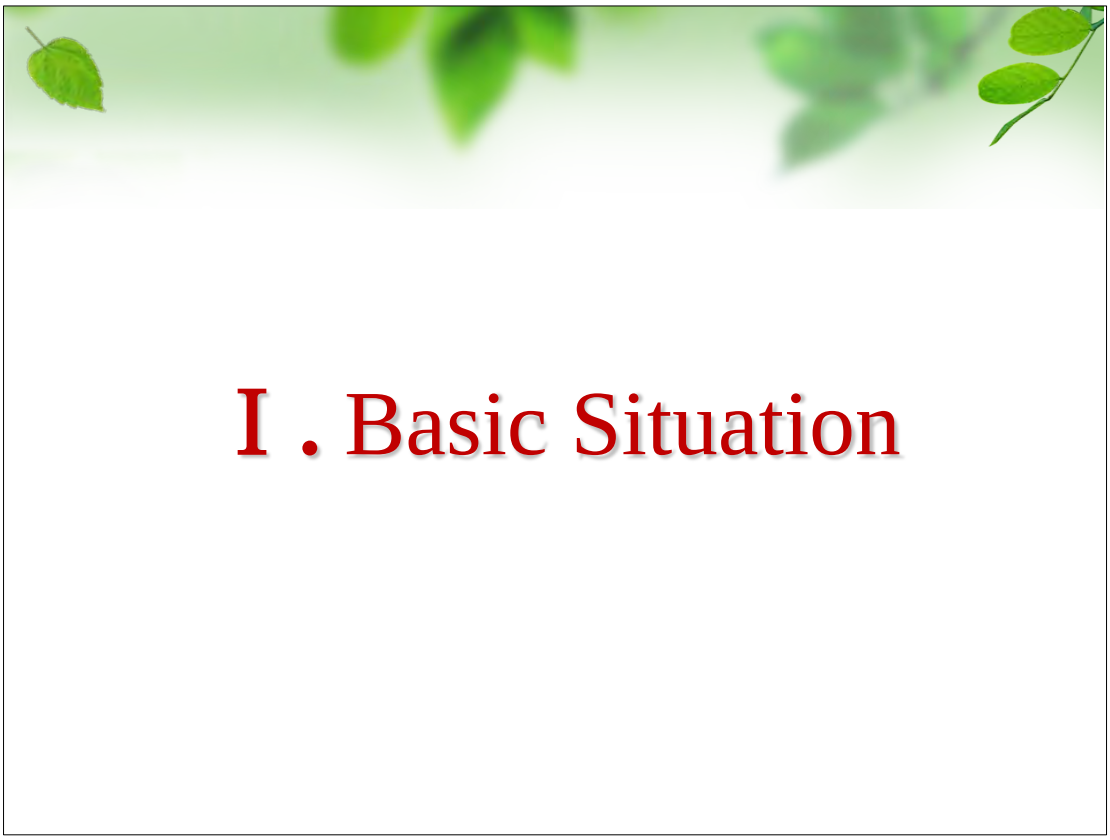


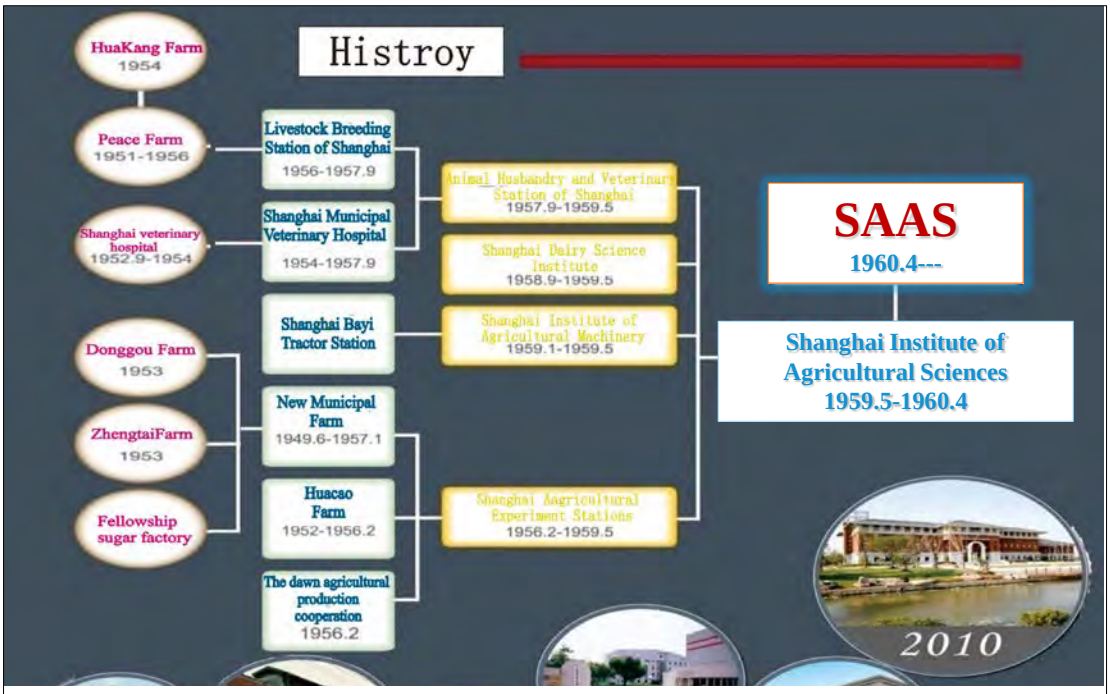
[Annex VI follows]

TWC/34/32

ANNEX VI

PRESENTATION BY MS. YUNXIA CHU ON “INTRODUCTION OF THE SHANGHAI ACADEMY OF AGRICULTURAL SCIENCES”





It locates in the south suburb of Shanghai, is the only research organization of agricultural science and technology sponsored by the Shanghai Municipal Government.

SHANGHAI ACADEMY OF AGRICULTURAL SCIENCES

- Crop Breeding and Cultivation Research Institute
- Forest and Fruit Tree Research Institute
- Protected Horticulture Research Institute
- Edible Fungi Research Institute
- Animal and Veterinary Science Research Institute
- Eco-environmental Protection Research Institute
- Information Research Institute of Science and Technology
- Biotechnology Research Institute
- Institute for Agri-food Standards and Testing Technology
- Agricultural Biological Gene Center
- Service Center
- Zhuanghang Experimental Station
- Shanghai Co-Elite Agricultural Sci-Tech(Group)Co.,Ltd.

13

SHANGHAI ACADEMY OF AGRICULTURAL SCIENCES

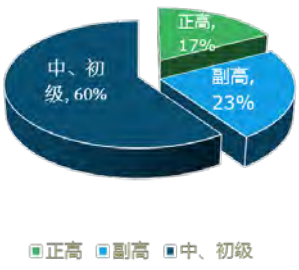
- Administration Office (Propaganda Division)(Policy Research Office)
- Organizational Personnel department (Youth League Committee)
- Discipline Supervision Office
- The Veteran Cadre Management Office (Labour Union)
- Research Management Office
- Planning and Financial Management Office
- Science and Technology Industry Department
- Administrative Management Department

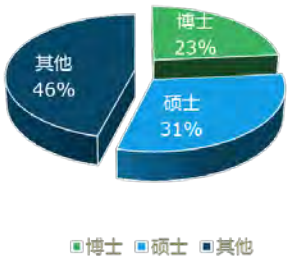
8 divisions

Members

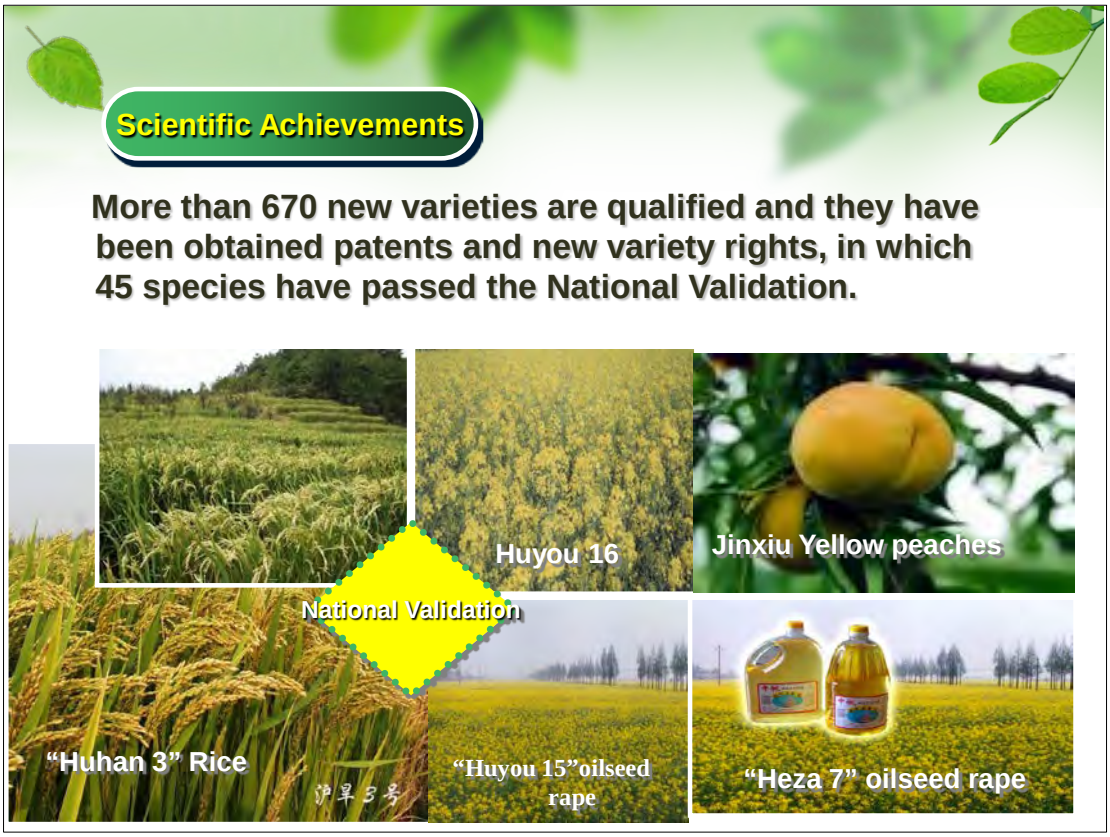
The academy has 823 staff members, with:

- **593** professionals and technicians;
- **237** senior researchers;
- **455** hold the doctorate or master degree;
- **71** enjoyed the government subsidies from the State Counc
- **8** entitled National or local talents
- **1** Post-doctoral Research Station






Scientific Achievements
Since 1960, the Academy has obtained more than 1440 awards of Scientific and Technical Achievements, 360 awards of Ministry and Municipal achievements with:
➢30 items in the National Advanced Award of Science and Technology and Invention;
➢30 items in the first prize of Advanced Award of Science and Technology of Shanghai


Scientific Achievements
More than 670 new varieties are qualified and they have been obtained patents and new variety rights, in which 45 species have passed the National Validation.
National Validation
Huyou 16
Jinxiu Yellow peaches
"Huhan 3" Rice
"Huyou 15"oilseed rape
"Heza 7" oilseed rape

Scientific Achievements

Rice

maize

New Plant Variety Right

Coprinus comatus

Ⅱ .Technology Innovation

1. **Aiming at strengthen food safety and improving the comprehensive productivity ability, further increase the discipline construction of rice, wheat and rape; a number of new varieties are bred with super high yielding and high quality.**

2. Adapt to the urban efficient agriculture development, a number of new varieties of horticultural crops, fruit trees, livestock and poultry.

3. Research and development of advanced technology applicable in resource saving, environment friendly agriculture, actively develop low carbon and circular agriculture

4. Innovation of agri-food safety, detection and control technology; Development of Safety assessment and risk assessment of transgenic agri-food to ensure agri-food safety

5. Key technology of Digital Agricultural to promote Modern Agriculture information

Ⅲ . Technology Service

Basing upon in Shanghai, focusing in Yangtze River Delta Region, and servicing to the whole country

Basing upon in Shanghai, focusing in Yangtze River Delta Region, and servicing to the whole country

Science and technology service for :

- National agricultural Demonstration Zone
- Science and technology demonstration villages and towns
- Advantage agricultural production base

Spring——Recommend New varieties

Summer——The action of safe production technology

Autumn——Agricultural market docking action

Winter——Technical training activities

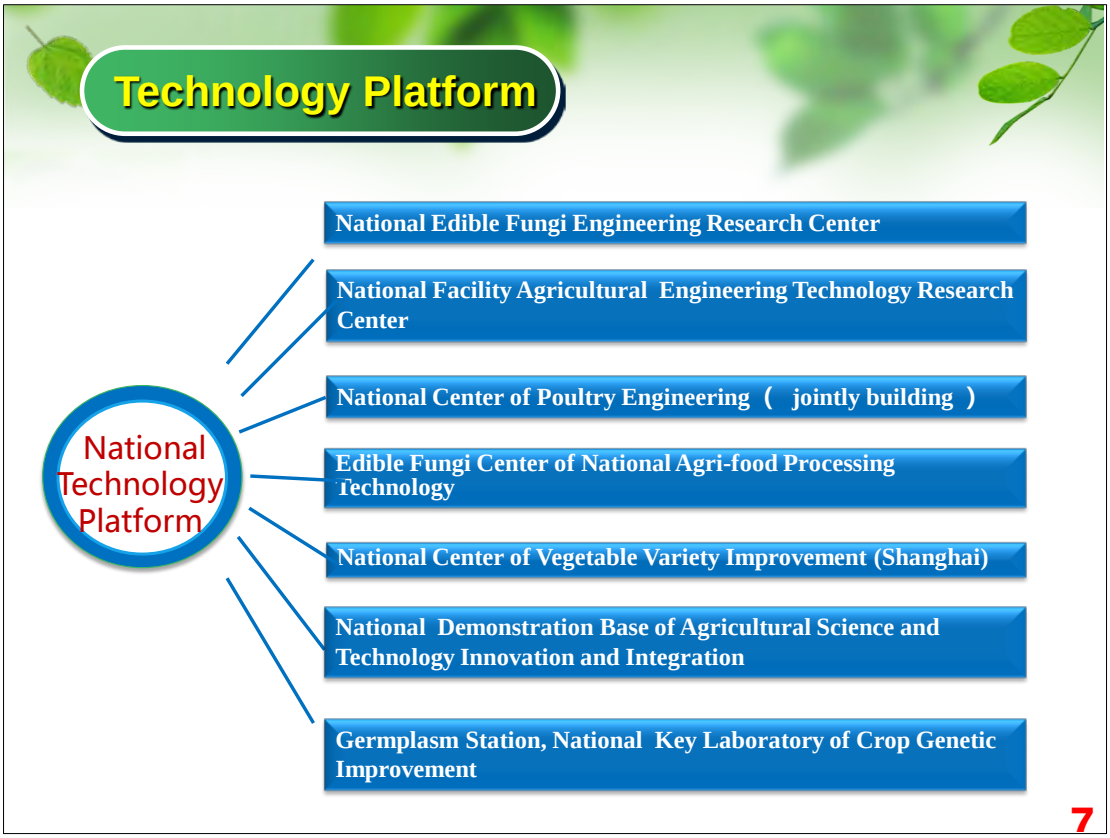
The plan of agricultural science and technology of the four

Project of science and technology to famers



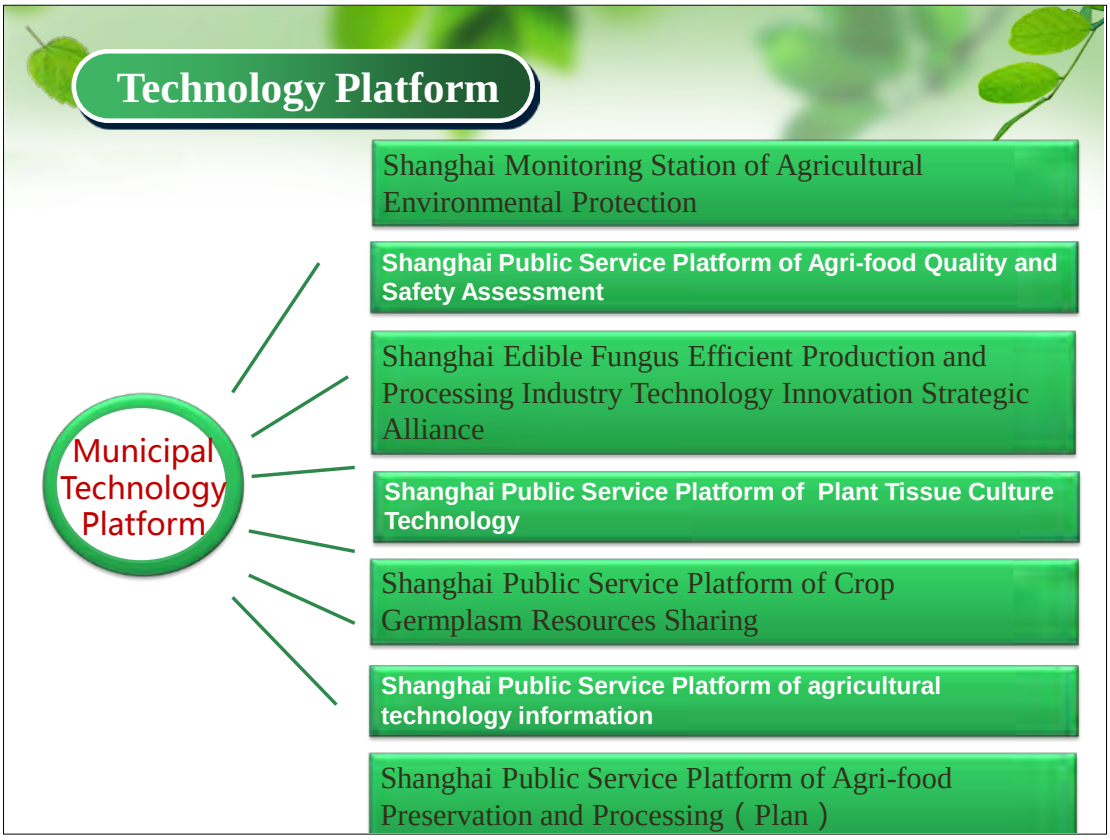

53 experts of rice, pig breeding, vegetables, economic crops (including 35 municipal, 18 of whom were municipal technology household experts)were organized to take part in the project of science and technology to farmers。

IV. Improvement of capacity


Technology Platform
National Technology Platform
National Edible Fungi Engineering Research Center
National Facility Agricultural Engineering Technology Research Center
National Center of Poultry Engineering （ jointly building ）
Edible Fungi Center of National Agri-food Processing Technology
National Center of Vegetable Variety Improvement (Shanghai)
National Demonstration Base of Agricultural Science and Technology Innovation and Integration
Germplasm Station, National Key Laboratory of Crop Genetic Improvement
7


Key Laboratory of Applied Fungi Resource and Application, Ministry of Agriculture
Key Laboratory of Agri-food Safety and Risk Assessment , Ministry of Agriculture （Shanghai）
Surveillance, Inspection and Testing Center for Environmental Safety of GM Crops, Ministry of Agriculture (Shanghai)
Supervision and Testing Center for Edible Fungi Quality, Ministry of Agriculture (Shanghai)
Shanghai Agricultural Environment Research Station, Ministry of Agriculture
Shanghai Station of Crop Genetic Resources and Germplasm, Ministry of Agriculture
Shanghai Station of New Plant Variety Testing Center, Ministry of Agriculture
Entitled Unit of Field Efficacy Test of Registration Pesticide , Ministry of Agriculture
Pesticide Residue Registration Laboratory , Ministry of Agriculture （Shanghai）
Shanghai Station of Edible Fungus , Agricultural Microorganisms Center
Breeding Center for Export Edible Fungi Improved Varieties, Ministry of Agriculture
Double Low Oilseed Rape Stock Seed Base /Hybrid Rice Stock Seed Base, Ministry of Agriculture
Technology Platform of MOA
12


科研平台
Municipal Technology Platform
Shanghai Key Laboratory of Agricultural Genetic Breeding
Shanghai Key Laboratory of Protected Horticulture
Shanghai Digital Agricultural Engineering and Technology Research Center
Shanghai Low-carbon Agricultural Engineering and Technology Research Center
Shanghai Agri-food Safety Engineering Research Center
Shanghai Edible Fungus Engineering Research Center
13


Technology Platform
Municipal Technology Platform
Shanghai Monitoring Station of Agricultural Environmental Protection
Shanghai Public Service Platform of Agri-food Quality and Safety Assessment
Shanghai Edible Fungus Efficient Production and Processing Industry Technology Innovation Strategic Alliance
Shanghai Public Service Platform of Plant Tissue Culture Technology
Shanghai Public Service Platform of Crop Germplasm Resources Sharing
Shanghai Public Service Platform of agricultural technology information
Shanghai Public Service Platform of Agri-food Preservation and Processing（Plan）


Distribution of Bases and Stations
上海市农业科学院各院区布局图
8
食草动物试验站
崇明县
宝山区
嘉定区
上海市
白鹤基地
重固基地
华漕院区
浦东新区
青浦区
闵行区
松江区
奉浦院区
奉贤区
庄行试验站
金山区
果树试验站
headquarters
Shanghai Station
海南省
陵水南繁基地


Base Construction
An Aerial View
of Fengpu Headquarters

Base Construction

Zhuanghang Experimental Station

Base Construction

An Aerial View of Huacao Station

[Annex VII follows]

ANNEX VII

PRESENTATION BY MS. YUNXIA CHU ON "INTRODUCTION SHANGHAI STATION FOR DUS TESTING CENTER OF NEW PLANT VARIETIES, MINISTRY OF AGRICULTURE, CHINA"

INTRODUCTION

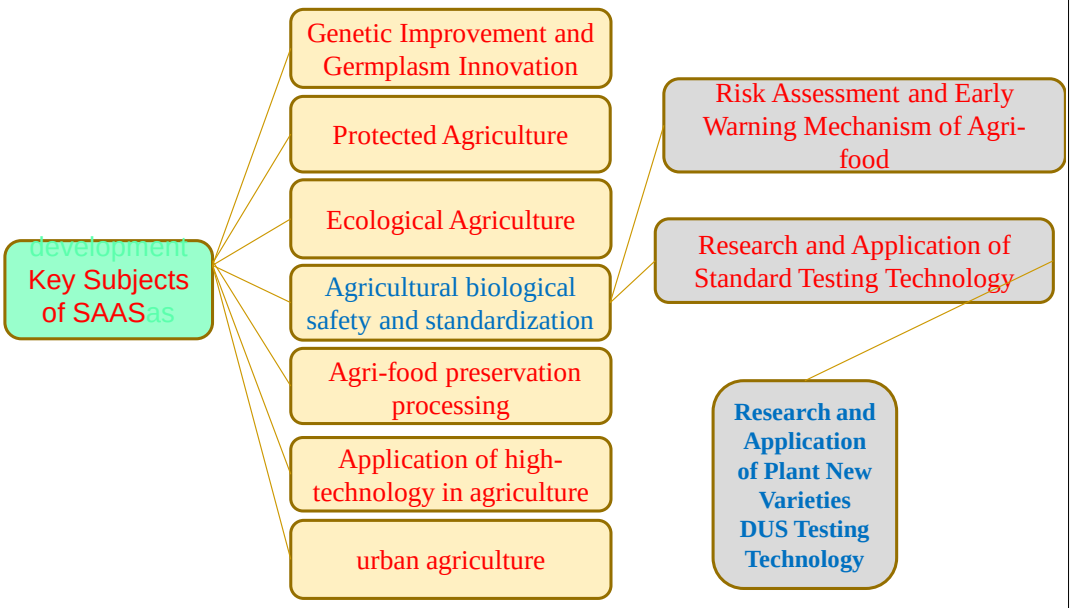
Shanghai Station for DUS Testing Center of New Plant Varieties , MOA. P.R.China

SAAS

June 9, 2016

Contents

Ⅰ、The Position of Subject



Ⅱ、The Construction of Plant New Varieties DUS Testing Technology Platform

1 Testing team

The vice president of SAAS is the director. Shanghai station is affiliated with Institute for Agri-food Standards and Testing Technology. There are 6 full time testers in Shanghai station, including 2 researchers, 1 member holds doctorate degree. Mr. Cheng is a member of National Plant New varieties test standardization technical committee .

No	Name	Job Title	Degree	specialty	full-time or not	Main task	Work on Shanghai Station From
1	Gu Xiaojun	Researcher Director	Ph.D	Agricultural Economy	No	——	2000-
2	Zhao Zhihui	Researcher Vice director	Ph.D	Detect Technique	No	——	2010-
3	Chen Hairong	Researcher Technical director	Master	Horticulture	Yes	Vegetable, Flower, Melon and water melon	2000-
4	Chu Yunxia	Researcher	Ph.D	Horticulture	Yes	Flower	2010-
5	Huang Zhicheng	Assistant Research	Master	Agronomy	Yes	Vegetable, Melon and water melon	2009-
6	Deng Shan	Assistant Research	Master	Agronomy	Yes	Flower	2013-
7	Gu Kefei	Assistant Research	Master	Detect Technique	Yes	Flower testing and administrative management	2010-
8	Li Shouguo	Technician	Junior college	Horticulture	Yes	Field management of all plants	2003-

Ⅱ、The Construction of Plant New Varieties DUS Testing Technology Platform

2 The Basic Construction Completed

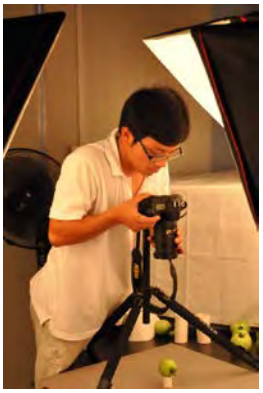
Total field is 7 Acres.
Among them 1024㎡ modern glasshouse
4700㎡ plastic greenhouse

Ⅱ、The Construction of Plant New Varieties DUS Testing Technology Platform

2 The Basic Construction Completed

2000 ㎡ were used as bleachery, storage room, warehouse, operating room and photographic studio .





Ⅱ、The Construction of Plant New Varieties DUS Testing Technology Platform

3 Test guideline drafting

Lead drafting 11 test guidelines: lettuce, spinach, Zizania, shepherd's purse, gerbera, Gladiolus , Strelitzia, cyclamen, Impatiens, dendrobium, Hylotelephium tatarinowii

Among them, **9 test guidelines were issued as industrial standard:** shepherd's purse, Zizania , lettuce , gerbera, Gladiolus, cyclamen, Impatiens, dendrobium, Hylotelephium tatarinowii

Revised 3 test guidelines : tomato, hot pepper, cucumber

Assist drafting 10 test guidelines : strawberry , cauliflower, Black fungus, white mushroom, Lingzhi mushroom, mushrooms, Zantedeschia, Anthurium, Guzmania , Tagetes

Lead drafting 5 DUS testing operate manual: tomato , hot pepper, Anthurium, Guzmania, gerbera .

Ⅱ、The Construction of Plant New Varieties DUS Testing Technology Platform

4 The research on the DUS testing technology

✓ Research on assessment of Distinctness, Uniformity, Stability
✓ The use of new technology such as molecular marker and NIR on the assessment of Distinctness
Comparison of morphological and SRAP Markers in Watermelon DUS
Comparison of morphological and SRAP Markers in lettuce DUS;
✓ The drafting of test manuals , lettuce and gerbera
✓Study on the **variation** of the characteristics in DUS testing
Study on the effects of environment on the characteristics in DUS testing of tomato and hot pepper;
Study on the effects of cultivation on the characteristics in DUS testing of melon
✓ The genetic diversity and the conformity with the test guideline of eggplant example varieties;

Ⅲ、The application of plant new variety DUS testing platform

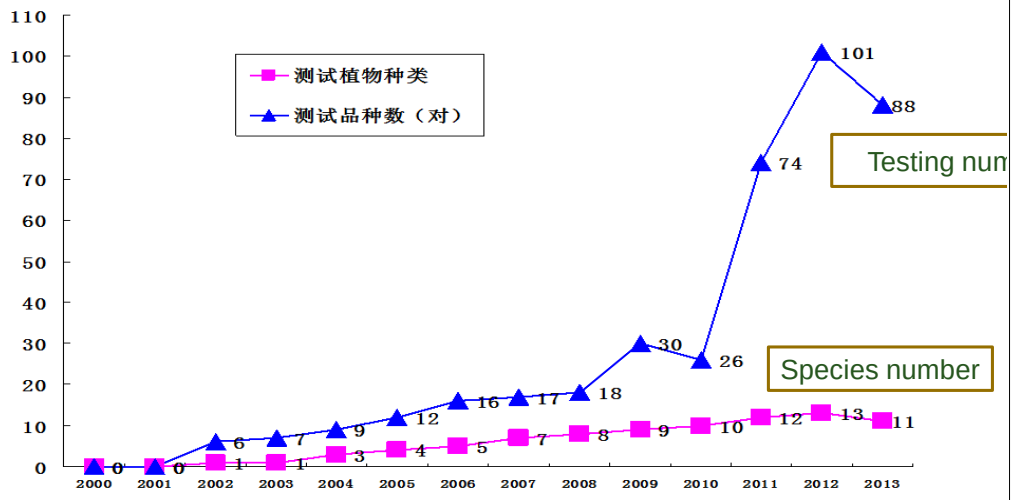
1 The DUS testing work of 18 species, hot pepper and tomato etc.

one of the centers which DUS testing work covered many species

- Vegetables: tomato, eggplant, hot pepper, cucumber, strawberry, pumpkin，cauliflower, cabbage, melon, watermelon, Pleurotus nebrodensis (11 species)
- Flowers: Guzmania, Anthurium，Cymbidium, Lily, Gerbera, Gladiolus (6 genus)
- Crop: maize （1 specie)

Ⅲ、The application of plant new variety DUS testing platform

1 More than 500 DUS test of 18 species or genus



Ⅲ、The application of plant new variety DUS testing platform

2. DUS testing of reference varieties and standard collection of the data

Ⅲ、The application of plant new variety DUS testing platform

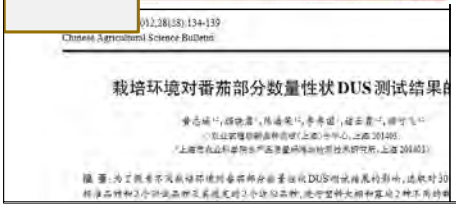
3 Undertake the scientific research projects

- Leading 1 and assistant 3 948 projects of MOA
- Nonprofit agricultural industry research project
- Plant variety protection project , the Ministry of Agriculture
- 3 industry standard projects of MOA
- **3 national standards**
- **1** key research project of Shanghai agricultural commission
- **Leading 1 and assistant 2 key projects of Shanghai science and technology commission**
- **Leading 2 and assistant 1** special project of technical standard from Shanghai science and technology commission
- 1 development fund projects of SAAS

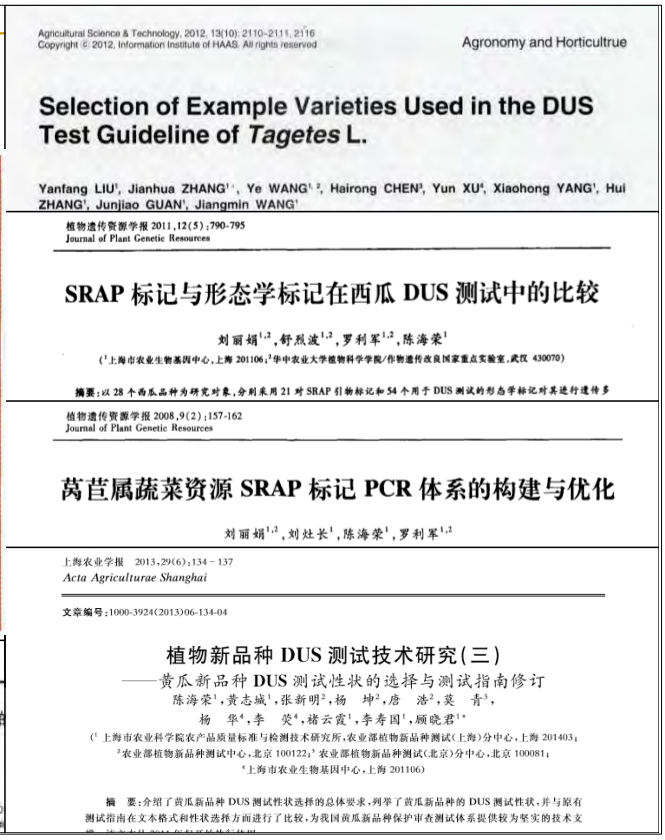
Ⅳ、 Achievement

Third Class of Shanghai Progress of Science and Technology Prize in 2008


上海市科学技术奖
证 书


Chinese Agricultural Science Bulletin

栽培环境对番茄部分数量性状DUS测试结果


Agricultural Science & Technology, 2012, 13(10): 2110-2111, 2116
Copyright © 2012, Information Institute of HAAS. All rights reserved

Agronomy and Horticultrue

Selection of Example Varieties Used in the DUS Test Guideline of *Tagetes* L.

Yanfang LIU[1], Jianhua ZHANG[1,*], Ye WANG[1,2], Hairong CHEN[3], Yun XU[4], Xiaohong YANG[1], Hui ZHANG[1], Junjiao GUAN[1], Jiangmin WANG[1]

植物遗传资源学报 2011,12(5):790-795
Journal of Plant Genetic Resources

SRAP 标记与形态学标记在西瓜 DUS 测试中的比较

植物遗传资源学报 2008,9(2):157-162
Journal of Plant Genetic Resources

莴苣属蔬菜资源 SRAP 标记 PCR 体系的构建与优化

上海农业学报 2013,29(6):134-137
Acta Agriculturae Shanghai

文章编号:1000-3924(2013)06-134-04

植物新品种 DUS 测试技术研究(三)
——黄瓜新品种 DUS 测试性状的选择与测试指南修订

陈海荣[1],黄志斌[1],张新明[2],杨 坤[2],唐 浩[2],莫 青[3],
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摘 要:介绍了黄瓜新品种 DUS 测试性状选择的总体要求,列举了黄瓜新品种的 DUS 测试性状,并与原有测试指南在文本格式和性状选择方面进行了比较,为我国黄瓜新品种保护审查测试体系提供较为坚实的技术支

Contents

Basic Information

The Work of 2015

Ⅰ.Testing task

No	Crop	Applicant varieties	Similar varieties	Total	Reports number
1	tomato	13	11	24	6
2	eggplant	5	4	9	1
3	Hot pepper	20	18	38	9
4	cucumber	3	2	5	3
5	watermelon	4	4	8	1
6	melon	7	7	14	1
7	bitter gourd	1	1	2	0
8	cowpea	2	2	4	1
9	cauliflower	1	1	2	1*
10	cabbage	2	1	3	8*
11	no-heading chinese cabbage	13	10	23	0
12	leaf mustard	2	2	4	0
13	lettuce	1	0	1	0
14	strawberry	3	3	6	1*
15	Anthurium	10	10	20	14*
16	Guzmania	6	3	9	5*
	Total	93	79	172	51

Ⅱ.Progress of scientific research

1 New projects of 2015 (6 projects)

- **Plant variety protection project of the Ministry of Agriculture:**
  "Plant new varieties DUS testing in 2015" ;
  "The drafting of Alstromeria, geranium and Chinese parsley DUS test guidelines" ;
  "DUS testing guidelines of Strelitzia" ;
- **Commissioned project of science and technology development center,MOA:** "The study on the breeder test system"
- **Youth growth plan of Shanghai Agricultral Comission:**
  "Establishment and application of Strawberry reference varieties DNA fingerprint "
- **key projects of Shanghai science and technology commission (assistant):** "Establishment and application on reference varieties of Shanghai main crops DNA fingerprint"

Ⅱ . Progress of scientific research

2 DUS testing related work in 2015

(1) Propagation of example varieties

No	Species/genus	Number	Reproductive pattern
1	tomato	30	Seed
2	eggplant	28	Seed
3	cowpea	22	Seed
subtotal		80	
4	strawberry	40	vegetative
5	gerbera	20	vegetative
6	Anthurium	20	vegetative
subtotal		80	
Total		160	

Ⅱ. Progress of scientific research

2 DUS testing related work in 2015

(2)Drafting of DUS testing operation manual and Photography rules

The DUS testing operation manual of *Anthurium* and *Guzmania* were completed.

(3）DUS testing of varieties applying registration：

20 varieties applying for registration in Shanghai was tested.

（4）Measurement of reference varieties：

Total 200 varieties of 56 hot pepper, 70 cowpea and 74 water spinach were measured, all data were uploaded to the database.

Ⅱ.Progress of scientific research

3. The drafting of Alstromeria, geranium and Chinese parsley DUS test guidelines (Plant variety protection project of the Ministry of Agriculture):

⑴ **Chinese parsley**： **96** germplasm resources were collected from abroad . The characteristic table was formulated. **16** Characteristics were measured and the photos were taken also.

⑵ **geranium**：**34** germplasm resources were collected . **65** Characteristics were measured and the photos were taken also.

⑶ **Alstromeria**： **4** germplasm resources were collected . **42** Characteristics were measured and the photos were taken also.

Ⅱ. Progress of scientific research

4 Research and application of new plant varieties testing technology. (Key project of Shanghai science and technology commission)

- **The DUS testing technology rules of rice , maize, oilseed rape and tomato were established.**
- **The morphological data of 50 candidate varieties and 80 reference varieties was collected.**
- **The DNA detecting schedules of 4 species were completed.**
- **The DNA data of 50 candidate varieties and 80 reference varieties was collected.**
- **DUS testing and assessment techniques of rice , maize, oilseed rape and tomato were built.**

Ⅲ. The drafting of test guideline and operation manuals

- **3 test guidelines were examined as national standard, there are test guidelines of tomato, hot pepper and cucumber.**
- **4 test guidelines were issued as agricultural industry standard, there are test guidelines of *Dendrobium*, *Cyclamen*, *Impatines wallerana* and *Hylotelephium tatarinowii*.**
- **Operation manuals of *Gerbera*, *Anthurium* and *Guzmania* were revised.**
- **The agricultural industry standard, DUS test guideline of strelitzia is developing by Shanghai Station.**
- **10 test guidelines** of Coriander, water spinach, lentils, water shield, shallot, limabean, *Hippeastrum*, *Hosta*, *Freesia*, *Cineraria* **are developing also.**

Ⅳ. Published papers

7

Topic	First Author	Magazine	Vol,Page
Diversity Analysis on Morphological Characteristics of the Example Varieties Based on Maize DUS Testing	Chen Hairong	Journal of Maize Sciences	2015,23(2): 46-51
Expression analysis of dihydroflavonol 4-reductase genes in Petunia hybrida	Chu Yunxia	Genetics and Molecular Research	2015,14(2): 5010-5021
Genetic Diversity Analysis of Japonica Rice Landraces (Oryza sativa L.) from Shanghai Based on DUS Testing	Huang Zhicheng	Journal of Plant Genetic Resources	2015,16(3): 451-459
Establishment of DNA Fingerprint Database of Rice Varieties in Shanghai	Deng Shan	Chinese Agricultural Science BUlletin	2015,31(3): 7-15
Studies on the Effects of Different Ecological Environments on Some Quantitative Characteristics of Zhengdan 958	Huang Zhicheng	Journal of Maize Sciences	2015,23(5): 49-55
Testing Guideline for Distinctness, Uniformity and Stability of Impatiens wallerana	Deng Shan	Chinese Journal of Tropical Crops	2015,36(8): 1410-1414
Classification for Gerbera DUS Testing Quantitative Traits and Diversity Analysis of Mrphological Characteristic	Chu Yunxia	Journal of Plant Genetic Resources	2015,16(4): 920-926

Ⅴ. Cooperation and Communication

1. Ms Chu Yunxia attended the 2nd Meeting of TG harmonization on *Dendrobium* on behalf of China Agricultural Plants New Varieties Protection Office , be held in Busan during Feb 2 to Feb 6.

V. Cooperation and Communication

2. Test guidelines of tomato, hot pepper and cucumber were examined as national standard in Beijing during June 16 to June 19.

V. Cooperation and Communication

3. Mr. Huang Zhicheng attended the UPOV 33rd TWC meeting during June 28 to July 6 .

V. Cooperation and Communication

4.Ph.D Chu Yunxia came to Naktuinbouw to learn the testing of *Zantedeschia* during July 11 to 25.

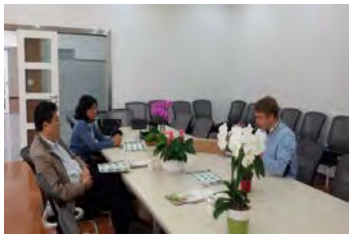
V. Cooperation and Communication

5. Mr. Cheng and Huang came to Nanjing strawberry nursery of national fruit germplasm center to investigate strawberry on Sep 15.

V. Cooperation and Communication

6. Mr. Cheng attended discussion meeting of the tenth agricultural plant variety protection list on Sep22 .


7. Mr. Cheng came to the Kunming Anthurium Company on Oct30.




V. Cooperation and Communication

8. Training course in Danzhou during Nov9 to Nov21.

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