E

TWA/44/23
ORIGINAL: English
DATE: July 20, 2015

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS

Forty-Fourth Session
Obihiro, Japan, July 6 to 10, 2015

REPORT

Document prepared by the Office of the Union

Disclaimer: this document does not represent UPOV policies or guidance

1. The Technical Working Party for Agricultural Crops (TWA) held its forty-fourth session in Obihiro, Japan, from July 6 to 10, 2015. The list of participants is provided in Annex I to this report.

2. The TWA was welcomed by Mr. Katsuhiro Saka, Director, New Business and Intellectual Property Division, Ministry of Agriculture, Forestry and Fisheries (MAFF). A copy of the welcome address is provided in Annex II to this report.

3. The TWA received a presentation on the Plant Variety Protection system in Japan by Mr. Katsumi Yamaguchi, Director, Plant Variety Protection Office, New Business and Intellectual Property Division, MAFF, a copy of which is provided in Annex III to this report.

4. The TWA received a presentation on breeding for agricultural crops in Japan, by Mr. Ikuo Ando, Director, Rice Research Area, National Agricultural and Food Research Organization (NARO), a copy of which is provided in Annex IV to this report.

5. The session was opened by Mr. Tanvir Hossain (Australia), Chairman of the TWA, who welcomed the participants and thanked Japan for hosting the TWA session.

Adoption of the Agenda

6. The TWA adopted the agenda as presented in document TWA/44/1 Rev.

Short Reports on Developments in Plant Variety Protection

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

7. The TWA noted the information on developments in plant variety protection from members and observers, provided in document TWA/44/22 Prov.. The TWA noted that reports submitted to the Office of the Union after June 22, 2015, would be included in the final version of document TWA/44/22.

(b) Reports on developments within UPOV

8. The TWA received a presentation from the Office of the Union on latest developments within UPOV, a copy of which is provided in document TWA/44/21.

9. The TWA agreed to propose that the on-line distance learning course DL-305 be held twice in 2016, once in the Spring and once in the Autumn, to allow maximum participation of DUS experts.

TGP documents

10. The TWA considered documents TWA/44/3 and TWA/44/3 Add.

Matters for adoption by the council in 2015

11. The TWA noted the revisions to documents TGP/0, TGP/5, TGP/9 and TGP/14 to be put forward for adoption by the Council at its forty-ninth ordinary session, as set out in paragraphs 6 to 18 of document TWA/44/3.

Future revision of TGP documents

12. The TWA noted that the proposals for future revisions of TGP documents to be discussed by the TWPs at their sessions in 2015 would be dealt with under separate documents.

13. The TWA noted that the TC had agreed that it would not be necessary to develop further guidance to address issues relating to plant material submitted for examination beyond that already provided in documents TG/1/3, TGP/7 and TGP/9.

14. The TWA noted that the TC had agreed that authorities should provide guidance on the requirements of material submitted for DUS examination to avoid possible effects resulting from the method of propagation (e.g. micropropagation) in the expression of DUS characteristics.

15. The TWA noted that the TC had agreed to add new standard wording in the TG template, Chapter 4.2 “Uniformity”, and amend ASW 8 (c) to provide guidance for Test Guidelines that are developed on the basis of varieties with one type of propagation when varieties may be developed in the future with other types of propagation, for future revision of document TGP/7, as set out in paragraph 24 of document TWA/44/3.

16. The TWA noted that the TC had agreed that the existing guidance in documents TGP/8: Part I: “DUS trial design and data analysis” and TGP/9 “Examining distinctness” was sufficient to address guidance for blind randomized trials.

17. The TWA noted that the TC had agreed to include guidance on “Examining characteristics using image analysis”, for future revision of document TGP/8, as presented in paragraphs 26 and 27 of document TWA/44/3.

Program for the development of TGP documents

18. The TWA noted the program for the development of TGP documents, as set out in the Annex to document TWA/44/3.

TGP/7: Development of Test Guidelines

Revision of document TGP/7: Use of Proprietary Text, Photographs and Illustrations in Test Guidelines

19. The TWA considered document TWA/44/13

20. The TWA agreed with the proposed guidance set out in paragraph 7 of document TWA/44/13 in relation to text, photographs or illustrations that could be subject to third party rights, for inclusion in a future revision of document TGP/7, as follows:

> “In the case of text, photographs, illustrations or other material that is subject to third party rights, it is the responsibility of the author of the document, including Test Guidelines, to obtain the necessary permission of the third party. Material must not be included in documents where such permission is required but has not been obtained.”

21. The TWA agreed that references should be provided in Chapter 9 “Literature” of the Test Guidelines for all text, photographs and illustrations that were subject to third party rights and for which permission had been obtained.

22. The TWA agreed that the third party granting permission should be informed about the extent of use of UPOV documents by its members.

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

23. The TWA considered document TWA/44/12.

24. The TWA agreed with the proposal to revise document TGP/7 to reflect the introduction of the web-based TG Template after Version 1 is finalized.

25. The TWA agreed with the proposal to standardize the format of the Table of Characteristics in all Test Guidelines with a structure as set out in paragraph 15 of document TWA/44/12.

26. The TWA noted that all Leading Experts had prepared the draft Test Guidelines for discussion during the TWPs at their sessions in 2015 using the web-based TG Template.

27. The TWA noted that all Interested Experts had been required to provide their comments on draft Test Guidelines for discussion during the TWPs at their sessions in 2015 using the web-based TG Template.

28. The TWA noted the issues that would be addressed in response to the comments by Leading and Interested Experts that participated in the testing of the 2015 prototype of the web based TG Template, as set out in paragraphs 13 and 14 of document TWA/44/12. The TWA also received a demonstration of the planned resolution of those issues that would be addressed in the 2015 prototype of the web based TG Template, as set out in paragraphs 13 and 14 of document TWA/44/12.

29. The TWA noted the timetable for development of the web-based TG Template, as set out in paragraphs 17 to 19 of document TWA/44/12.

Revision of document TGP/7: Regional Sets of Example Varieties

30. The TWA considered document TWA/44/14.

31. The TWA agreed to include guidance in document TGP/7 that a “region” should be comprised of more than one country in order to justify a regional set of example varieties in Test Guidelines.

32. The TWA noted that current guidance in document TGP/7, GN28, stated that “UPOV Test Guidelines need to cover all the different countries, regions and environments where the DUS examinations are conducted and, as far as possible, they provide universal sets of example varieties in order to maximize harmonization of variety descriptions.” The TWA also noted that GN28 stated that “authorities responsible for DUS testing and breeders need to be able to obtain plant material of example varieties and therefore, in general, example varieties should be widely and readily available for the coverage of the Test Guidelines” and “drafters are encouraged to seek lists of varieties from interested parties in order to identify example varieties with the widest availability.”

33. The TWA agreed with the TWV that, in the case of regional sets of example varieties, a “region” should be defined by the environmental conditions rather than national boundaries.

34. The TWA agreed to include guidance in document TGP/7 that the TWP should determine the basis on which the region would establish an agreed regional set of example varieties (e.g. by an exchange of information, or by a ring-test).

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

Revision of document TGP/8: Part I: DUS Trial Design and Data Analysis, New Section: Minimizing the Variation due to Different Observers

35. The TWA considered document TWA/44/15.

36. The TWA agreed with the draft guidance in the Annex to document TWA/44/15, for inclusion in a future revision of document TGP/8 on minimizing the variation due to different observers.

Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, Section 9: the Combined-Over-Years Uniformity Criterion (COYU)

37. The TWA considered document TWA/44/16.

38. The TWA noted that participants of the exercise to test the software on the new method for the calculation of COYU should:

(i) seek to define probability levels to match decisions using the previous COYU method;
(ii) run the test for rejection probabilities of 1, 2 and 5% levels; and
(iii) assess whether the results are consistent in all crops.

39. The TWA noted that the expert from the United Kingdom had distributed the software module for calculation of COYU and the guidance document to the participants of the exercise.

40. The TWA noted that the experts from Czech Republic, France, Finland, Germany, Kenya, Poland and United Kingdom would participate in the exercise to test the new software on COYU.

41. The TWA noted that a report on the practical exercise and the development of DUST module were presented at the thirty-third session of the TWC by an expert from the United Kingdom.

Revision of document TGP/8: Part II: Selected Techniques used in DUS Examination, New Section: Examining DUS in Bulk Samples

42. The TWA considered document TWA/44/17.

43. The TWA considered further information provided by an expert from the Netherlands on the example of a bulk characteristic in the Netherlands: Content of Glycoraphanin, as reproduced in Annex II to document TWA/44/17 and agreed that it would be necessary to analyze the data obtained from the assessment of the characteristic in order to understand the conclusions provided.

44. The TWA noted that the TC, at its fifty-first session, had agreed to consider further whether the analysis of individual plants to validate characteristics examined on the basis of bulk samples was necessary, and the possible cost implications, and had agreed to invite proposals for alternative approaches for the examination of uniformity.

45. The TWA noted that the TC, at its fifty-first session, had agreed that further information on fulfilling the requirements of a DUS characteristic should be provided in the example of a characteristic examined on the basis of a bulk sample. In that regard, the TWA considered document TWA/44/17, Annex I, provided by an expert from the Netherlands on uniformity requirements in bulk characteristics and concluded as follows:

- before a characteristic observed on the basis of a bulk sample, was included in Test Guidelines it should be considered whether it would be useful and necessary for DUS examination.

- approaches (a) “Control of the characteristic before it is accepted in the relevant guideline”; (d) “Subplots”; and (i) “Plant number” in Annex I should be further developed for the analysis of requirements that a characteristic examined on the basis of bulk samples should fulfill before it is used for DUS testing and producing a variety description.

- approach (h) “DNA analysis” was too general and did not provide useful information for the assessment of uniformity in characteristics observed on the basis of bulk samples. The TWA noted that molecular markers could be used as a method of examining DUS characteristics on the basis of the existence of a reliable link between the marker and the characteristic, in which case the assessment on basis of bulk samples would not be necessary.

46. The TWA noted that the TC, at its fifty-first session, had agreed that the determination of states of expression should be based on existing variation between varieties and considering environmental influence.

47. The TWA noted the offer of France to provide other examples of characteristics based on bulk samples and that the TC had invited other members to provide examples.

Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions

48. The TWA considered document TWA/44/18.

49. The TWA noted that the TWC and the TWA had previously agreed that the guidance on "Different forms that variety descriptions could take and the relevance of scale levels", as reproduced in document TWA/44/18, Annex I, should be used as an introduction to future guidance to be developed on data processing for the assessment of distinctness and for producing variety descriptions.

50. The TWA noted that the TWC had agreed to compare the results of the practical exercise presented by the different participants to identify differences in the results obtained for further understanding of the different methodologies, for consideration at the thirty-third session of the TWC, to be held in Natal, Brazil, from June 30 to July 3, 2015.

51. The TWA noted that the European Union had reported to the Technical Committee that the project on a ring-test on Apple for the management of variety description to be launched in 2015 had been suspended.

TGP/10: Examining Uniformity

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

52. The TWA considered document TWA/44/9.

53. The TWA agreed that the draft guidance for inclusion in a future revision of document TGP/10, as presented in document TWA/44/9 Annex I, should continue to be developed considering the information provided by the TWC on the proposed "Approach 3: combining the results of two growing cycles" and the comparison between the overall risk of the combined samples and the risks for each stage of evaluation separately. The TWA agreed to request a video link with the experts from the TWC to discuss the proposed "Approach 3".

54. The TWA agreed to propose that the first sentence in Annex I be amended to read: "two independent growing cycles could take place in a single location in different years, or in different locations in the same year, according to document TGP/8 Part I, Sections 1.2 and 1.3."

55. The TWA considered the draft guidance provided in document TWA/44/9 Annex I, on the possibility to reject a variety on the basis of a lack of uniformity after a single growing cycle. The TWA agreed that a variety should not be rejected if the uniformity standard was slightly exceeded in the first year. This possibility should only be used if it could be foreseen that the maximum limit would be exceeded also in another growing cycle. In that regard, the TWA agreed to propose that the explanation provided in Annex I, on the possibility to reject a variety on the basis of a lack of uniformity after a single growing cycle, should be amended to read: "Furthermore, on the basis of a clear lack of uniformity, a variety may be rejected after a single growing cycle."

Matters concerning variety descriptions

56. The TWA considered document TWA/44/10 and received a presentation by an expert from the European Union on "Experience with regard to variety descriptions and verifying the maintenance of the variety at the Community Plant Variety Office (CPVO)", which would be made available as an addendum to document TWA/44/10.

57. The TWA noted the experience of the European Union examination offices that, for agricultural crops, a standard sample of the plant material submitted for DUS examination was usually kept by the authority and would be used for verifying the maintenance of the variety against the material provided by the breeder.

58. The TWA agreed to invite Australia, the European Union and Germany to make a presentation on matters concerning variety descriptions at its forty-fifth session, to be held in 2016.

Statistical Methods for Visually Observed Characteristics

59. The TWA considered document TWA/44/20.

60. The TWA noted that the TC, at its fifty-first session, had agreed to remove the document “Statistical methods for visually observed characteristics” from the program for the revision of document TGP/8, and to consider the matter under a separate agenda item.

61. The TWA noted that the TWC had invited an expert from China to make a presentation at the thirty-third session of the TWC on the analysis of visually observed characteristics using the DUST China (DUSTC) software package using the data set of meadow fescue provided by Finland.

Definition of color groups from RHS Colour Charts

62. The TWA considered document TWA/44/19.

63. The TWA considered the possibility to use RHS Colour Chart references as a basis for defining color groups for the purposes of grouping of varieties and organization of the growing trial. The TWA noted that color charts were not routinely used for agricultural crops and agreed that, for the TWA crops, the organs observed and level of variation between the varieties meant that such a level of precision was not useful. The TWA agreed that it would be preferable to use simplified terms to describe color characteristics, such as single colors, color ranges and intensity of a colors in its Test Guidelines (see document TGP/14/2: Section 2: Botanical Terms, Subsection 3: Color: 2. Color).

Molecular techniques

64. The TWA considered document TWA/44/2.

65. The TWA noted the report on developments in the BMT, as set out in paragraphs 7 to 10 of document TWA/44/2, and agreed that it would be important to determine a date for the next session of the BMT in order to maximize participation of all interested experts.

66. The TWA noted that the TC, at its fifty-first session, had agreed to develop a joint document explaining the principal features of the systems of OECD, UPOV and ISTA, subject to the approval of the Council and in coordination with the OECD and ISTA, as set out in paragraph 18 of document TWA/44/2.

67. The TWA noted that the TC, at its fifty-first session, had agreed to develop an inventory on the use of molecular marker techniques, by crop, with a view to developing a joint OECD/UPOV/ISTA document containing that information, in a similar format to UPOV document UPOV/INF/16 “Exchangeable Software”, subject to the approval of the Council and in coordination with the OECD and ISTA, as set out in paragraph 20 of document TWA/44/2.

68. The TWA noted that the TC, at its fifty-first session, had agreed the proposal for the BMT, at its fifteenth session, to develop lists of possible joint initiatives with OECD and ISTA in relation to molecular techniques for consideration by the TC, as set out in paragraph 21 of document TWA/44/2.

69. The TWA noted that the OECD/UPOV/ISTA Joint Workshop on Molecular Techniques had agreed that it would be useful to repeat the joint workshop at relevant meetings of the OECD and ISTA, as set out in paragraph of document TWA/44/2, and, in that regard, that the Technical Working Group Meeting of the OECD Seed Schemes, had agreed that another OECD/UPOV/ISTA Joint Workshop on Molecular Techniques should be organized either back-to-back with the Annual Meeting of the OECD Seed Schemes or in conjunction with the OECD Technical Working Group Meeting.

70. The TWA considered the initial 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, discussed during the TC, at its fifty-first session. The TWA agreed to propose the text to read as follows:

"Is it possible to obtain protection of a variety on the basis of its DNA-profile?

"A variety cannot be protected on the basis of DNA profiles. For a variety to be protected, it needs to be clearly distinguishable from all existing varieties on the basis of characteristics that are physically expressed, e.g. plant height, time of flowering, fruit color, disease resistance etc. ~~[Molecular techniques (DNA profiles) may be used as supporting information].~~

"A more detailed explanation is provided in the FAQ 'Does UPOV allow molecular techniques (DNA profiles) in the examination of Distinctness, Uniformity and Stability ("DUS")?'

"See also:
"What are the requirements for protecting a new plant variety?"

Variety denominations

71. The TWA considered document TWA/44/4.

72. The TWA noted that the TC, at its fifty-first session, and the CAJ, at its seventy-first session, had 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), including the test study, and that the TC had also noted that the result of the test study would be reported to the second meeting of the WG-DST and the most effective search tool would be described and documented, as set out in paragraphs 6 to 13 of document TWA/44/4.

73. The TWA noted that the TC, at its fifty-first session, and the CAJ, at its seventy-first session, had noted the proposed revision of document UPOV/INF/12 in relation to changes of registered variety denominations, as set out in paragraph 18 of document TWA/44/4, and that the CAJ had approved the presentation of that guidance for adoption by the Council at its forty-ninth ordinary session.

74. The TWA noted that the CAJ, at its seventy-first session, had agreed to invite the WG-DST to consider the comments by the CAJ-AG, at its ninth session, on the proposals in document UPOV/INF/12/5 Draft 2 concerning Sections 2.2.2 (b), 2.3.1 (c) and (d), and 2.3.3, in conjunction with the development of an effective UPOV similarity search tool, and any conclusions by the WG-DST to revise document UPOV/INF/12, if appropriate, as set out in paragraph 24 of document TWA/44/4.

75. The TWA noted that the CAJ, at its seventy-first session, had agreed to consider the proposals of the CAJ-AG under Sections 2.2.2 (c), 4(a) and 4(e)(i) at its seventy-second session, as set out in paragraph 25 of document TWA/44/4.

Experiences with new types and species

76. An expert from Argentina reported on new varieties of *Trichloris crinita*, which had been granted plant variety protection and listed in the National List.

77. An expert from the Netherlands reported on applications for new varieties of *Solanum sisymbriifolium* and for an application for a potato variety propagated by true potato seed (TPS).

Matters to be resolved concerning Test Guidelines adopted by the Technical Committee

78. The TWA noted that the TC, at its fifty-first session, held in Geneva from March 23 to 25, 2015, had adopted the Test Guidelines for Adlay (document TG/COIX(proj.5)), subject to the addition of asterisks to Characteristics 1, 13, 14 and 20 being approved by the TWA by correspondence, as set out in Annex II to document TC/51/39 "Report".

79. The TWA noted that the Office had issued circular E-15/094, requesting approval by correspondence for the addition of asterisks to Characteristics 1, 13, 14 and 20 and noted that, as no objections had been received by the deadline of May 1, 2015, the Test Guidelines for Adlay had been adopted and would be published imminently.

Discussion on draft Test Guidelines

*Cotton (*Gossypium *L.)*

80. The subgroup discussed document TG/88/7(proj.1), presented by Mr. Antonio Escolano García (Spain), on behalf of the Leading Expert, Mr. Luis Salaices (Spain), and agreed the following:

General	Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected
2.3	- to simplify wording to read “in the case of hybrids, 2 kg of seed of each component should be submitted, if requested” - to check whether to reduce the quantity of plant material requested for components of hybrids
5.3	to add TQ Chars. 3 and 6 as grouping characteristics
6.5	to add reference to growth stages
Table of Chars.	- to check whether to add more (*) - to order characteristics in chronological order according to growth stages - to present growth stage in Chapter 8.3 and remove (g) - to check availability of example varieties
Char. 1	to replace “cream” with appropriate color (whitish?)
Char. 3	- state 2 to read “medium yellow” - to replace “cream” with appropriate color (whitish?)
Char. 4	- to be continued as QN - to have stats “clearly below”, “same level”, “clearly above” - to check whether to be deleted or modified (to specify which flower to be observed)
Chars. 5, 7, 8, 9	- to add example varieties - to check whether to be deleted
Char. 8	to check whether to read “Fruiting branch: length of internodes”
Char. 9	to check whether to read have states from “very few” to “very many”
Char. 10	to check whether to be deleted or to reduce scale
Char. 11	- to check whether to add example varieties for state 4 “lanceolate” - to check whether state 4 to read “super okra” - to check growth stage
Char. 12	to check whether to be deleted
Char. 13	to read “Leaf: pubescence of lower side”
Char. 15	to read “Stem: pubescence of upper part”
Char. 16	- state 3 to read “light red” - to add state 4 “dark red”
Char. 17	to check whether to add explanation to clarify states of expression (see TGP/14)
Char. 20	- to read “Boll: shape” - to replace “rounded” by “circular”
Char. 23	- to check whether to read “Boll: tip” or “Boll: shape of apex” and include differentiated tip in states of expression - to check wording of states of expression - to check whether to reduce scale to 1 to 3 or 1 to 5
Char. 27	- to check whether to read “Time of opening of bolls” - to add explanation on time of observation (“when 50% of the plants have at least one boll open)
Char. 29	to check whether “fuzz” is an appropriate botanical term
Char. 31	to check whether to add more states of expression
Char. 35	spelling “strength”
Chars. 34 - 38	- to add explanation on how the characteristics are observed - to check whether characteristics fulfill criteria of DUS characteristic
Char. 40	- to check whether 9 notes are necessary - to add example varieties
New chars.	to check whether to add the following new characteristics: “Plant: growth type” with states “determinate”, “intermediate”, “indeterminate” “Number of seeds per boll” with “low”, “medium”, “high”
Ad. 20	to be displayed in grid
Ad. 23	to be improved (see comment on Char. 23)
TQ 6	to be completed

**Elytrigia* (Elytrigia elongata *(Host) Nevski*)

81. The subgroup discussed document TG/ELYTR(proj.5), presented by Mr. Alberto Ballesteros (Argentina), and agreed the following:

General	- Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected - to add scheme explaining time of observation/growing cycles and revise characteristics (particularly QN characteristics) and explanations accordingly
Cover page	to change coverage of Test Guidelines to *Elytrigia pontica* (UPOV code ELTRG_PON)
2.3	- to delete “for seed-propagated varieties” - to select appropriate ASW version (without “In the case of seed”)
4.2.3	to delete “of seed-propagated varieties”
5.3	to include the grouping characteristics in the TQ
Table of Chars.	- to check whether to add (*) to more characteristics - to follow botanical order of presentation of characteristics
Char. 1	- to be indicated as QN - to be indicated as VG
Char. 2	to read “rhizomes” (plural)
Char. 3	- to read “Leaf: color” - to be indicated as PQ - to remove hyphen in “grey-green” - to have notes 1 to 5
Char. 4	- to add (a) - to be indicated as MS - to remove capital letter in state “Very short” - to add explanation on time of observation (see general comment on schema to be added)
Char. 5	- to add (a) - to add explanation on time of observation (see general comment on schema to be added)
Char. 6	- to add (*) - to add (+) and explanation - to read “Leaf sheath” - to have notes 1 and 9
Char. 7	- to check whether state “high” to read “long” - to be indicated as MS
Char. 9	- to be indicated as QN - to add state “medium” - to have notes 1 to 3
Char. 10	- to read “Time of emergence of inflorescence” - to add (*)
Char. 11	to remove hyphen in “brown-yellow”
8.1 (a)	to be revised according the schema to explain time of observation/growing cycles (see general comment
8.1 (b)	- to read “full” - to read “Observations on flowers (spike) should be made at full flowering”
8.1(c)	to read “Observations on leaves should be made before flowering on the middle third of the plant”
Ad. 1	- to be revised according the schema to explain time of observation/growing cycles (see general comment) - to check whether to read “Plant growth habit should be observed between 45 and 90 days after planting”
Ad. 2	- to clarify time of observation (see general comment) - to improve diagram and remove pictures - to delete “removal of plants” - to check whether to read “Rhizomes are white below soil and erect and green above soil”
Ads. 3, 4 and 5	to clarify time of observation (see general comment)
Ads. 4 and 5	to check whether to have a complete sentence “Observations should be made…”

Ad. 8	to check whether to be replaced by the addition of explanation (b) covering several characteristics
Ad. 10	to correct spelling
TQ 6	to be completed

*Field Bean (*Vicia faba *L. var. minor)*

82. The subgroup discussed document TG/8/7(proj.1), presented by Ms. Cheryl Turnbull (United Kingdom), and agreed the following:

General	- Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected - to add growth stage key
Common names	- to check whether to include English common name “Faba Bean” - to check whether to include Spanish common name “Habín”
3.1.2	to be deleted
4.2.3	- to read “In the case of visual observation, for the assessment of uniformity, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 160 plants, 6 off-types are allowed.” - to delete second paragraph - to add numbering to last paragraph
Table of Chars.	to add example varieties
Char. 2	to check whether QN
Chars. 3, 4	- to be indicated as VG/MS - to have three states from small to large only
Char. 5	to be deleted
Char. 6	to be indicated as MG/MS
Char. 8	to have order of states “yellow”, “brown”, “black”
Chars. 9, 10, 11	check whether to be combined
Char. 11	- to check whether to have notes 1, 3, 5 - to check whether state one to read “absent or very weak”
New Char.	to check whether to add a new char. after Char. 12 to read “Flower: length in relation to standard”
Char. 13	- to check whether to read “Sepal: length” - to replace “large” with “long”
Char. 15	to add (+) and illustration
Chars. 16, 17, 18	to check wording “wing” and provide improved illustration for the wing
Char. 18	to add (+) and illustration
Char. 24	to read “Only varieties with: wing: melanin spot: present: Stem: anthocyanin coloration”
Char. 28	to have notes 1 to 9
Chars. 29, 30	to move text in brackets to Chapter 8.2
Char. 30	to add (+) and to move “(from suture to suture)” to explanation in Ad. 30
Char. 31	to add (+) and illustration
Char. 32	to delete MS
Char. 33	to have notes 1, 3, 5
Chars. 34 - 37	to delete “dry”
Char. 36	to remove state “mixed” to have notes 1 and 9
New char.	to check whether to add new char “Pod: attitude”
Ad. 16	to precise point of observation
Ad. 25	to be improved
Ad. 36	to be replaced with explanation of current adopted version
TQ 5	to add Char. 36 (grouping char.)
TQ 6	to be completed

*Oats (*Avena sativa *L. &* Avena nuda *L.)*

83. The subgroup discussed document TG/20/8(proj.1), presented by Mr. Antonio Escolano García (Spain). The TWA agreed the following:

General	- document reference for next draft to be corrected TG/20/11(proj.2) - Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected - to add growth stage key
1.	to read "… Avena nuda L. and Avena sativa L."
2.2	to read "… seed and panicles, if requested."
2.3	- to read "… 3 kg Panicles: 120" - to move sentence "The panicles should be well developed and should contain a sufficient number of viable seeds to establish a satisfactory row of plants for observation." to the bottom of Chapter 2.3
4.2.3	to delete "or parts of plants" in first sentence
4.2.4	to replace "ear-row" by "panicle row"
Table of Chars.	to add example varieties
Char. 2	to check whether to extend growth stage until panicle emergence
Char. 3	to read "Leaf blade: hairiness of margins" and add explanation "to be observed at leaf below flag leaf"
Char. 5	to move text in brackets to explanation in Chapter 8.2
Char. 6	to add explanation that very few hairs can be considered as "present"
Char. 7	- to check whether to reduce scale - to add explanation that the strongest expression should be recorded
Char. 9	to be moved before Char. 8
Chars. 9, 10	to read "Glume" (singular)
Char. 10	to check whether to have notes 1, 3, 5
Char. 11	- to delete "intensity" - to add explanation or illustration - to check whether to have notes 1 to 5
Char. 13	to check whether to have notes 1 to 5
Char. 16	to replace MG by VG
Char. 17	- spelling "color" - to check whether can also be observed at growth stage 00 (on submitted seed); if so, to become Char. 1
Char. 18	to check whether to reduce scale to 3 or 5 notes
Char. 20	to check whether to reduce scale to 3 or 5 notes
Char. 21	to add explanation (see TG Wheat)
New chars.	to check whether to include the following characteristics: "Flag leaf: glaucosity of sheath" (notes 1-9, growth stage 60-66, VG/B, QN) panicle: orientation of branches (states 1 "divergent", 2 "semi divergent", 3 "one sided", - states to be checked for appropriate botanical terminology; growth stage 70-75, VG/B, QN)
TQ 4	to select Standard Wording for breeding scheme as appropriate
TQ 5	- to complete list with even states of expression - to check whether to add Chars. 2, 5, 12 as grouping Chars.
TQ 6	to be completed

*Quinoa (*Chenopodium quinoa *Willd.)*

84. The subgroup discussed document TG/CHENO(proj.2), presented by Mr. Erik Lawaetz (Denmark), and agreed the following:

General	Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected

Cover page	to check whether to delete English common name “Pigweed”
4.1.4	number of parts to be taken from each plant to be indicated as 1
4.2.2	to check whether population standard should be reduced (FR= 1%)
Table of Chars.	- General: to check approach to color characteristics and possibility to separate anthocyanin from color - to add example varieties - to check whether to add more (*)
Char. 1	- to check whether to have states “light green”, “medium green”, “dark green”, “red”, “purple” - to delete “main” if Char. 7 is deleted
Char. 2	to be deleted
Char. 4	- to be moved after Char. 6 - to delete MG
Chars. 4, 5	to delete “A”
Char. 5	- to be indicated as PQ - to add state “intermediate”
Char. 6	- to read “Leaf: dentation on margin” - to add explanation that to be observed in the middle part of the plant
Char. 7	to check whether to be deleted
Char. 8	to be moved after Char. 13
Char. 10	to delete “A”
Char. 11	to replace “long” with “tall” to read “Plant: height at beginning of flowering”
Char. 12	- to read “Stem: color” - to delete “A”
Char. 13	- to read “Stem: color of stripes” - to check whether to add state “yellow” (to check whether “yellow” or “orange” is correct) - to change order of states from pink to red
Char. 14	- to read “Inflorescence: shape of clusters” - to check botanical terms for the states of expression/clusters
Char. 15	to check correlation with Char. 17
Char. 17	- to check whether QN - to check for the appropriate botanical terms
Char. 19	to delete “at maturity” and add (+) and explanation on time of observation
Char. 20	- to delete “A” - to delete MG
Char. 21	- state 3 to read “light brown” - to add new state “yellow” - to follow order of colors according to TGP/14 (red, grey, black)
8.1 (a)	to check proprietary rights
8.1	- to add new explanation for characteristics 4, 6, 8 that to be observed in the middle part of the plant - to check whether to add explanation of panicle (where does the panicle start in the plant?)
Ad. 3	to be deleted
Ad. 5	to add explanation that to be observed on lower leaves
Ad. 9	to correct spelling of inflorescence
Ad. 15	to add explanation that the number of branches with inflorescences should be observed
TQ. 4.2	to select appropriate standard wording on method of propagation
TQ 6	to add example

*Soya Bean (*Glycine max *(L.) Merrill)*

85. The subgroup discussed document TG/80/7(proj.1), presented by Mr. Alberto Ballesteros (Argentina), and agreed the following:

General	Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected
2.3	to check whether quantity of plant material needs to be revised
3.1.1	to use Standard Wording

3.4.1	to check whether to reduce number of plants to 100 plants
4.2.2	- to be reviewed - to keep compatibility with number of plants (if changed to 100 plants in Chapter 3.4.1 population standard should be 1% and 3 off-types allowed?)
Table of Chars.	- to remove capital letters for example variety denominations (except codes) - add growth stage key from current adopted version - to order characteristics by botanical order - disease resistance protocols to be presented in appropriate table (see TGP/12) - to check to which chars. to add (*) (add (*) to all grouping chars.) - to check availability of non-GM varieties for example varieties
Char. 1	- to be indicated as PQ - to replace “bronze” by “orange brown” - to check whether to read “Hypocotyl: intensity of anthocyanin coloration” with states from “absent or light” to “dark”
Char. 2	- to be indicated as PQ - to remove hyphens - to delete state “semi-determinate to determinate”
Char. 3	to be indicated as QN to remove hyphens
Char. 4	- to read “Main stem: color of hairs” - to add (+) and explanation on location of part to be observed (middle third) - to use appropriate color name for “tawny” (dark red, brown red?)
Chars. 4, 5	to check whether to be combined as a PQ characteristic
Char. 7	to have notes 1 to 5
Char. 8	to add (+) and explanation (grid)
Char. 9	to check whether to be indicated as VS/MS and add (+) and explanation on how measurements are taken
Char. 10	- to add (+) and explanation (grid) - to be indicated as PQ
Char. 11	- to have notes 1 to 5 - to add (+) and explanation on how to be observed
Char. 12	to be indicated as VG
Char. 13	- to check whether “Pod: tanning” or to use appropriate color names - to check whether to add states “grey”, “brown”, “black” (see current adopted version of TG) - to check whether to be deleted (see comment on Char. 14)
Char. 14	to check whether to read as Char. 12 in currently adopted version
Char. 15	to add (+) and explanation
Char. 16	- to be indicated as PQ - to add (+) and illustration (grid)
Char. 17	- to add (+) and explanation (ground color / over color) state 7 to read “black” - to add relevant states from Char. 18
Char. 18	to be deleted
New Char.	to check whether to add new Characteristic “Seed: glaucosity” after Char. 17 with states from “weak” to “strong” and notes 1 to 3
Char. 20	- to delete state 2 “mixture” - to check whether to read “Seed: peroxidase reaction” - to add (+) and explanation from current adopted version
Char. 21	- state 4 to read “medium brown” - to delete state 8 “light or intermediate brown and imperfect black” - to add (+) and explanation - to check whether to add states “imperfect yellow”, “light black”, “mixed”
Char. 22	to check whether to be indicated as PQ and a third states can be added
Char. 23	- to move text in brackets to explanation - to check whether to add other varieties to for remaining states of expression or to redistribute varieties across the range of the characteristic
Char. 25	- to be deleted - to check with the author of the “American Scale” to open the scale for including other varieties with earlier maturity groups and whether to move to Chapter TQ 7.3

Char. 26-37	- to read “Resistance to…” - to add (+) and explanation on the testing protocol - to delete all disease resistance characteristics
8.1 (a)	to check allocation of (a) throughout table of characteristics
8.2	General comment: to be revised according to changes in Table of Characteristics
Ad. 1	to check whether to delete all illustrations of color
Ad. 2	to check whether to delete first two sentences or full explanation
Ad. 5	to check whether to be replaced by drawings
4.2	to select options from standard wording
TQ 5	to add Characteristics 2, 12, 21, 25
TQ 6	to be completed

**Wheat* (Triticum aestivum *L. emend. Fiori et Paol.*) *(Revision)*

86. The subgroup discussed document TG/3/12(proj.4), presented by Ms. Beate Rücker (Germany), on behalf of the Leading Expert, Ms. Virginie Bertoux (France), and agreed the following:

General	Leading Expert to confirm that all IP rights on photos, illustrations and text have been respected
2.2	to read “… in the form of seed and ears (if requested).”
2.3	to delete “(if requested)” after “Ears”
4.2.7	to replace “declared” by “considered” (twice)
4.2.8	to read “For the assessment of uniformity of single hybrids, a population standard of 10% and an acceptance probability of at least 95% should be applied. In case of characteristics indicated by B, the sample size for the assessment of uniformity maybe reduced to 200 plants. In case of a sample size of 200 plants, 27 off-types are allowed. In case of a sample size of 100 ear rows, plants or parts of plants, 15 off-types are allowed.”
5.3 (a)	to be deleted
Table of Chars.	to provide new set of example varieties (to reduce number of example varieties)
Char. 6	to have states (1) absent or weak, (2) medium, (3) strong
Char. 19	growth stage to be indicated as 80-92
Char. 22	state 5 to read “horizontal”
Char. 23	to read “Lower glume: length of beak”
Char. 24	to read “Lower glume: shape of beak”
Char. 26	- growth stage to be indicated as 69 - 92 - to be moved after Char. 11 - to be indicated as VG/B
8.1 (a)	to read “Characteristics of lower glume should be observed on spikelets in the midthird of ear”
Ad. 1	to read “Seed color should be observed on dry seeds or by using NaOH solution (seeds soaked for 10 minutes at 60°C or 60 minutes at room temperature in a 5M NaOH solution).”
Ad. 2	- first sentence to read “Not possible to be observed on purple or bluish seeds.” - to delete line for “Scale of recording” - last sentence to read “Any alternative method may be used if it gives the same results.”
Ad. 3	last sentence to read “Any alternative method may be used if it gives the same results.”
Ad. 5	- explanation for state 1 to read “all or almost all flag leaves are rectilinear” - explanation for state 9 to read “almost all or all flag leaves are recurved” - no pictures to be included
Ad. 6	to add “The” at beginning of sentence”
Ad. 7	to read “Time of ear emergences is reached when the …”
Ad. 13	text to read “Pith in cross section should be observed half way between base of ear and uppermost node. All stems of the plant should be checked and the highest score per plant recorded.”
Ad. 27	to check formatting of third paragraph (three hyphens)
TQ 4.2	“Other” to be moved to (c) and delete (d)

Annex, introduction	- to replace “UPOV member States” by “UPOV members” - second sentence of second paragraph to read “Any alternative method may be used if it gives the same results”. - to delete last sentence
Annex	- to read “5. Recognition of Glutenin Allels” - to reintroduce scheme specifying genotypes from previously adopted version - to check whether to replace current example varieties with the following ones:

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
Glutenin composition: allele expression at locus Glu-A1	**Gluténine: expression de l'allèle occupant le locus Glu-A1**	**Glutenin-Zusammensetzung: Allel-Ausprägung im Locus Glu-A1**			
(+)					
band 1	bande 1	Bande 1		Meister ~~Kadett~~	1
band 2*	bande 2*	Bande 2*		Sonett, Spontan ~~Courtot~~	2
no band	pas de bande	keine Bande		JB Asano ~~Talent~~	3
Glutenin composition: allele expression at locus Glu-B1	**Composition de la gluténine: expression de l'allèle occupant le locus Glu-B1**	**Glutenin-Zusammensetzung: Allel-Ausprägung im Locus Glu-B1**			
(+)					
bands 6 + 8	bandes 6 + 8	Banden 6 + 8		Meister ~~Norman~~	1
bands 7 + 8	bandes 7 + 8	Banden 7 + 8		KWS Loft ~~Courtot~~	2
bands 7 + 9	bandes 7 + 9	Banden 7 + 9		Tobak ~~Kadett~~	3
band 7 (or 7 + 9 in the presence of bands 5 + 10 of char. Glu-D1)	bande 7 (ou 7 + 9 en présence des bandes 5 + 10 du car. Glu-D1)	Bande 7 (oder 7 + 9 in Gegenwart der Banden 5 + 10 des Merkm. Glu-D1)		JB Asano ~~Okapi~~	4
bands 13 + 16	bandes 13 + 16	Banden 13+ 16		Fanion, Ronsard ~~Carala~~	5
bands 14 + 15	bandes 14 + 15	Banden 14 + 15		Atomic ~~Troll~~	6
bands 17 + 18	bandes 17 + 18	Banden 17 + 18		Tabasco ~~Moulin~~	7
band 20	bande 20	Bande 20		Ilias ~~Figaro~~	8
bands 6.1 + 22	bandes 6.1 + 22	Banden 6.1 + 22		Zollernspelz, Schwabenkorn	9
Glutenin composition: allele expression at locus Glu-D1	**Composition de la gluténine: expression de l'allèle occupant le locus Glu-D1**	**Glutenin-Zusammensetzung: Allel-Ausprägung im Locus Glu-D1**			
(+)					
bands 2 + 12	bandes 2 + 12	Banden 2 + 12		Tobak ~~Courtot~~	1
bands 3 + 12	bandes 3 + 12	Banden 3 + 12		Matrix ~~Norman~~	2
bands 4 + 12	bandes 4 + 12	Banden 4 + 12		- ~~Talent~~	3
bands 5 + 10	bandes 5 + 10	Banden 5 + 10		JB Asano ~~Kadett~~	4

Information and databases

(a) UPOV information databases

87. The TWA considered document TWA/44/5.

GENIE database

88. The TWA noted the information on allocation of crop type(s) for UPOV codes used in the PLUTO database as of June 26, 2014.

89. The TWA noted that information on crop type(s) had been introduced in the GENIE database and that the GENIE database had been modified to show the crop type(s) for each UPOV Code.

90. The TWA noted that a standard report for TWP allocations for UPOV codes had been introduced on the GENIE webpage.

91. The TWA noted that allocation of crop type(s) for further UPOV codes would occur when UPOV codes were used in the PLUTO database for the first time.

92. The TWA noted the request to check the UPOV codes used in the PLUTO database for the first time, since June 26, 2014, as provided in Annex III, part C to document TWA/44/5 (available on the TWA/44 website) and to submit comments to the Office of the Union by August 15, 2015.

UPOV code system

93. The TWA noted the request to check the amendments to UPOV codes, as provided in Annex III, part A, to document TWA/44/5.

94. The TWA noted the request to check the new UPOV codes or new information added for existing UPOV codes, as provided in Annex III, part B, to document TWA/44/5.

95. The TWA noted the request to submit comments on Annex III, parts A "UPOV codes amendments to be checked" and B "New UPOV codes or new information", to the Office of the Union by August 15, 2015.

PLUTO Database

96. The TWA noted the summary of contributions to the PLUTO database from 2012 to 2014 and the current situation of members of the Union on data contribution, as presented in Annex II to document TWA/44/5.

97. The TWA noted that an additional column in the PLUTO search screen, showing the date on which the information was provided, had been introduced.

98. The TWA noted that both the "Denomination" and "Breeder's Ref" fields had been made searchable, independently or in combination, by denomination search tools on the "Denomination Search" page of the PLUTO database.

99. The TWA noted the information concerning the training course "Contributing data to the PLUTO database", held in Geneva in December 2014 and the plans to organize three further courses, in English, French and Spanish, from September 7 to 9, 2015, from November 23 to 25, 2015, and from October 5 to 7, 2015, respectively.

(b) Variety description databases

100. The TWA considered document TWA/44/6.

101. The TWA noted that the TWC had invited an expert from China to present the analysis of variance for the interaction "variety x location" (environment) of the QN characteristics considered in the study using the statistical module of the new software "DUSTC" developed by China, at its thirty-third session.

102. The TWA noted that the TC had agreed to include a discussion item on facilitating the development of databases at its fifty-second session.

(c) Exchange and use of software and equipment

103. The TWA considered document TWA/44/7.

104. The TWA noted that the Council, at its forty-eighth ordinary session, had adopted the revision of document UPOV/INF/16 "Exchangeable Software" (document UPOV/INF/16/4 on the basis of document UPOV/INF/16/4 Draft 1).

105. The TWA noted that discussions on the inclusion of the SISNAVA software in document UPOV/INF/16 would be continued in the TWC, subject to the conclusion on discussions on the variation of variety descriptions over years in different locations.

106. The TWA noted that the TC, at its fifty-first session, and the CAJ, at its seventy-first session, had agreed the proposed revision of document UPOV/INF/16/4 concerning the inclusion of information on the use of software by members of the Union in conjunction with the comments of the TC, as set out in Annex I

to document TWA/44/7 and that a draft of document UPOV/INF/16/5 “Exchangeable Software” would be presented for adoption by the Council at its forty-ninth ordinary session.

107. The TWA noted that the Council, at its forty-eighth ordinary session, had adopted document UPOV/INF/22 “Software and equipment used by members of the Union” (document UPOV/INF/22/1).

108. The TWA noted that the TC, at its fifty-first session, and the CAJ, at its seventy-first session, had agreed the proposed revision of document UPOV/INF/22/1 concerning software and equipment used by members of the Union in conjunction with the comments of the TC, as set out in Annex II to document TWA/44/7, and that a draft of document UPOV/INF/22 would be presented for adoption by the Council at its forty-ninth ordinary session.

(d) Electronic application systems

109. The TWA noted the information provided in document TWA/44/8 and received a report on latest developments by the Office of the Union on the development of a prototype electronic application form, via video link, a copy of which would be provided as an addendum to document TWA/44/8.

Recommendations on draft Test Guidelines

(a) Test Guidelines to be put forward for adoption by the Technical Committee

110. The TWA agreed that no draft Test Guidelines would be submitted to the TC for adoption at its fifty-second session, to be held in Geneva in March 2016.

(b) Test Guidelines to be discussed at the forty-fifth session

111. The TWA agreed to discuss the following draft Test Guidelines at its forty-fifth session:

Barley (*Hordeum vulgare* L. *sensu lato*)
Castor Bean (*Ricinus comunis* L.)
Cotton (*Gossypium* L.)
Elytrigia (*Elytrigia elongata* (Host) Nevski), (*Agropyron elongatum* (Host) P. Beauv.)
Field Bean (*Vicia faba* L. var. minor)
Oats (*Avena sativa* L. & *Avena nuda* L.)
Quinoa (*Chenopodium quinoa* Willd.)
Red Clover (*Trifolium pratense* L.)
*Scorpion Weed (*Phacelia tanacetifolia* Benth.)
Soya Bean (*Glycine max* (L.) Merrill)
*Wheat (*Triticum aestivum* L. emend. Fiori et Paol.) (Revision)

112. The leading experts, interested experts and timetables for the development of the Test Guidelines are set out in Annex VI.

(c) Possible Test Guidelines to be discussed in 2017

113. The TWA expressed its interest to consider drafts of the following Test Guidelines in 2017:

Finger millet (*Eleusine coracana* (L.) Gaertn.)
Ginseng (*Panax ginseng* C.A. Mey.) (Revision) (document TG/224/1)

* possible final draft Test Guidelines

114. The TWA noted that the Office of the Union had been contacted by the International Rice Research Institute (IRRI) with a view to the possibility of initiating a revision of the Test Guidelines for Rice (document TG/16/8). The TWA agreed that the information submitted by IRRI to the Office of the Union should be circulated for consideration by the TWA.

(d) Participation in discussions of Test Guidelines from other TWPs

115. The TWA agreed to propose that the following experts be added as interested experts to the following draft Test Guidelines being discussed by the Technical Working Party for Vegetables (TWV), subject to the deadlines agreed in document TWV/49/32 "Report", Annex IV:

Subject	Interested experts (countries/organizations) †
Brown Mustard (*Brassica juncea* (L.) Czern.)	DE, ES, GB, QZ
Turnip (*Brassica rapa* L. var. *rapa* (L.) Thell.)	DE, FI, GB, JP, NZ, QZ

Guidance for drafters of Test Guidelines

116. The TWA considered document TWA/44/11.

117. The TWA agreed with the plan to update the TG drafters' webpage to provide the following information as set out in paragraph 11 of document TWA/44/11:

Web-based TG Template
Additional characteristics
Summary information on quantity of plant material required on adopted Test Guidelines
Test Guidelines under development (reference to document TC/[xx]/2)
Shapes extract from document TGP/14

Date and place of the next session

118. At the invitation of Mexico, the TWA agreed to hold its forty-fifth session in Queretaro, Mexico, from July 11 to 15, 2016, with the preparatory workshop on July 10, 2016.

Future program

119. The TWA proposed to discuss the following items at its next session:

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
   (b) Reports on developments within UPOV (oral report by the Office of the Union)
4. Molecular Techniques (document to be prepared by the Office of the Union)
5. TGP documents
6. Variety denominations (document to be prepared by the Office of the Union)
7. 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) Exchangeable software (documents to be prepared by the Office of the Union)

† for name of experts, see list of participants

(d) Electronic application systems (document to be prepared by the Office of the Union)

8. Uniformity assessment
9. Experiences on matters concerning variety descriptions (documents to be prepared by Australia, European Union and Germany and documents invited)
10. Experiences with new types and species
11. Impact of endophytes on DUS characteristics in grasses (document to be prepared by the European Union and documents invited)
12. Matters to be resolved concerning Test Guidelines adopted by the Technical Committee (if appropriate)
13. Discussion on draft Test Guidelines (Subgroups)
14. Recommendations on draft Test Guidelines
15. Guidance for drafters of Test Guidelines
16. Date and place of the next session
17. Future program
18. Report on the session (if time permits)
19. Closing of the session

Visit

120. On the afternoon of July 8, 2015, the TWA visited the Hokkaido Agricultural Research Center (HARC) of the National Agriculture and Food Research Organization (NARO) in Memuro, Kasai-gun, Hokkaido. The TWA was welcomed by Mr. Masayuki Hirafuji, Director, HARC, NARO, who gave a presentation on NARO and HARC in Memuro. A copy of the presentation is provided in Annex V to this report. The TWA also received the following presentations, copies of which are provided in Annex V to this report:

Activities of NARO HARC wheat breeding group	Mr. Koichi Hatta, Group Leader Wheat Breeding Group, HARC, NARO
Sugar beet in Japan: breeding a disease resistant variety “Hokkaido 101”	Mr. Yosuke Kuroda, Senior Researcher, HARC, NARO
Breeding of new potato varieties in Japan	Mr. Kenji Asano, Researcher, HARC, NARO
Seed potato production system in Japan, starting from Foundation Seed	Mr. Tukasa Kawakami, International Affairs Coordinator, NCSS
Bean breeding at Tokachi Agricultural Station	Mr. Hisanori Shimada, Senior Research Manager of Bean Breeding Group, Tokachi Agricultural Experiment Station

121. The TWA also visited field trials for sugar beet, potato, winter wheat, adzuki bean and common bean at the Tokachi Agricultural Experiment Station.

122. The TWA adopted this report at the end of the session.

[Annexes follow]

ANNEX I

LIST OF PARTICIPANTS

I. MEMBERS

ARGENTINA

Alberto BALLESTEROS, Examiner for Cereal, Cotton, Rice and Forage Crops/Examinador técnico, Registro de Variedades, Secretaría de Agricultura, Ganadería y Pesca, Ministerio de Agricultura, Ganadería y Pesca, Venezuela 162, 3 piso, of. 347, 1063 Buenos Aires
(tel.: +54 11 3220 5424 fax: +54 11 4349 2444 e-mail: aballesteros@inase.gov.ar

AUSTRALIA

Tanvir Hossain, Senior Examiner, Plant Breeder's Rights Office, IP Australia, P.O. Box 200, Woden ACT 2606, Australia
(tel.: +61 2 6283 7984 fax: +61 2 6283 7999 e-mail: tanvir.hossain@ipaustralia.gov.au)

CANADA

Elizabeth PRENTICE-HUDSON (Ms.), Examiner, Plant Breeders' Rights Office, Canadian Food Inspection Agency (CFIA), 59 Camelot Drive, Ottawa, Ontario K1A 0Y9
(tel.: +1 613 773 7139 fax: +1 613 773 7115
e-mail: elizabeth.prentice-hudson@inspection.gc.ca)

CZECH REPUBLIC

Radmila SAFARIKOVA (Mrs.), Head of Division, Central Institute for Supervising and Testing in Agriculture (UKZUZ), National Plant Variety Office, Hroznová 2, 656 06 Brno
(tel.: +420 543 548 221 fax: +420 543 212 440 e-mail: radmilla.safarikova@ukzuz.cz)

DENMARK

Erik LAWAETZ, DUS Coordinator, TystofteFonden, Teglvaerksvej 10, Tystofte, 4230 Skaelskoer
(tel.: +45 5080 84 53 fax: +45 5080 8456 e-mail: eal@tystofte.dk)

EUROPEAN UNION

Dirk THEOBALD, Head of the Technical Unit, Community Plant Variety Office, (CPVO), 3, boulevard Maréchal Foch, CS 10121, 49101, Angers Cedex 02
(tel.: +33 2 4125 6442 fax : +33 2 4125 6410 email: theobald@cpvo.europa.eu)

Anne WEITZ (Ms.), Technical Expert Agricultural Species, Community Plant Variety Office, (CPVO), 3, boulevard Maréchal Foch, CS 10121, 49101, Angers Cedex 02
(tel.: +33 2 4125 6437 fax : +33 2 4125 6410 email: weitz@cpvo.europa.eu)

FINLAND

Kaarina PAAVILAINEN (Ms.), Senior Officer, Seed Certification, Finnish Food Safety Authority (EVIRA), P.O. Box 111, 32200 Loimaa
(tel.: +358 40 833 2480 e-mail: kaarina.paavilainen@evira.fi)

GERMANY

Beate RÜCKER (Ms.), Head of Division, National Listing, Variety Protection, Genetic Resources, Bundessortenamt (Federal Plant Variety Office), Osterfelddamm 80, 30627, Hannover
(tel.: +49 511 9566 5639 fax: +49 511 9566 5639
email: beate.ruecker@bundessortenamt.de)

ITALY

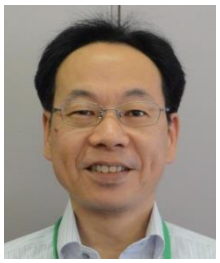
Giovanni CORSI, Researcher, Center for Seed Experimentation and Certification (CRA-SCS), via di Corticella, 133 Bologna
(tel.: +39 051 63 16 894 fax: +39 051 63 16 898 e-mail: giovanni.corsi@entecra.it)

JAPAN

Katsuhiro SAKA, Director, New Business and Intellectual Property Division, Ministry of Agriculture, Forestry and Fisheries (MAFF), 1-2-1 Kasumigaseki, Chiyoda-ku, 100-8950 Tokyo
(tel.: +81 3 6738 6464 fax: +81 3 3502 6572 e-mail: katsuhiro_saka@nm.maff.go.jp)

Katsumi YAMAGUCHI, Director, Plant Variety Protection Office, New Business and Intellectual Property Division, Food Industry Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), 1-2-1 Kasumigaseki, Chiyoda-ku, 100-8950 Tokyo
(tel.: +81 3 6738 6446 fax: +81 3 3502 6572 e-mail: katsumi_yamaguchi@nm.maff.go.jp)

Kenji NUMAGUCHI, Senior Examiner, Plant Variety Protection Office, New Business and Intellectual Property Division, Food Industry Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), 1-2-1 Kasumigaseki, Chiyoda-ku, 100-8950 Tokyo
(tel.: +81 3 6738 6464 fax: +81 3 3502 6572 e-mail: kenji_numaguchi@nm.maff.go.jp)



Hideaki BAN, Examiner, Ministry of Agriculture, Forestry and Fisheries (MAFF), 1-2-1 Kasumigaseki, Chiyoda-ku, TOKYO 100-8950
(tel.: +81 3 6738 6469 fax: +81 3 3502 6572 e-mail: hideaki_ban@nm.maff.go.jp)

Yoshiyuki OHNO, Assistant Examiner, Plant Variety Protection Office, New Business and intellectual Property Division, Ministry of Agriculture, Forestry and Fisheries, 1-2-1 Kasumigaseki, Chiyoda-ku, 100-8950 Tokyo
(tel.: +81 3 6738 6464 fax: +81 3 3502 6572 e-mail: yoshiyuki_ohno@nm.maff.go.jp)

Yoshiaki TAKAMATSU, Assistant Examiner, Office of Plant Variety Examination, New Business and Intellectual Property Division, Food Industry Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF), 1-2-1 Kasumigaseki, Chiyoda ku, 100-8950 Tokyo
(tel.: +81 3 6738 6464 fax: +81 3 3502 6572 e-mail: yoshiaki_takamatsu@nm.maff.go.jp)

Kei MIYANARI (Ms.), Officer, Management Section, Plant Variety Protection Office, New Business and Intellectual Property Division, Food Industry Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries, 1-2-1, Kasumigaseki, Chiyoda-ku, 100-8950 Tokyo
(tel.: +81 3 6738 6464 fax: +81 3 3502 6572 e-mail: kei_miyanari@nm.maff.go.jp)

Sanji TAKEMORI, President, National Center for Seeds and Seedlings (NCSS), Fujimoto 2-2, Tsukuba-shi, Ibaraki-ken
(tel.: +81 29 838 6581 fax: +81 29 839 1183 e-mail: takemori@ncss.go.jp)

Tsukasa KAWAKAMI, International Affairs Coordinator, Planning and Management Division, Administration Department, National Center for Seeds and Seedlings (NCSS), Fujimoto 2-2 Tsukuba-shi, 305-0852 Ibaraki-Ken
(tel.: +81 29 838 6587 fax: +81 29 839 1183 e-mail: kawaka3@affrc.go.jp)

Takashi HAMADA, Senior Staff, National Center for Seeds and Seedlings (NCSS), 91, Heisei-cho, Kasaoka-shi, Okayama-ken
(tel.: +81 865 69 6644 fax: +81 865 66 0264 e-mail: wyverns3@affrc.go.jp)

Kohei IMAMURA, Senior Staff, National Center for Seeds and Seedlings (NCSS), 2-2 Fujimoto, Tsukuba-shi, Ibaraki-ken
(tel.: +81 29 838 6584 fax: +81 29 838 6595 e-mail: kohei@ncss.go.jp)

Hana MAKINO (Ms.), Senior Staff, National Center for Seeds and Seedlings (NCSS), 2-2 Fujimoto, Tsukuba-shi, Ibaraki-ken
(tel.: +81 29 838 6584 fax: +81 29 838 6595 e-mail: hmakino@affrc.go.jp)

Kentaro SEKIZAWA, Senior Staff, National Center for Seeds and Seedlings (NCSS), 91, Heisei-cho, Okayama-ken, Kasaoka-shi
(tel.: +81 865 69 6644 fax: +81 865 66 0264 e-mail: sekizawa@ncss.go.jp)

Junji TAKEUCHI, Senior Staff, 1089, Nishinosato, Kitahiroshima-shi, Hokkaido
(tel.: +81 11 375 3611 fax: +81 11 375 3644 e-mail: junzi88@affrc.go.jp)

Moyuri KINEBUCHI (Ms.), National Center for Seeds and Seedlings (NCSS), 91, Heisei-cho, Kasaoka-shi, Okayama-ken
(tel.: +81 865 69 6644 fax: +81 865 66 0264 e-mail:kinebuchi@ncss.go.jp)

Ikuo ANDO, Director, Rice Research Area, National Agriculture and Food Research Organization (NARO), 2-1-18 Kannondai, Tsukuba, Ibaraki 305-8518
(tel.: +81 29 838 8678 e-mail: andow@affrc.go.jp)

Kyoko SHIMIZU (Ms.), Coordinator, Japan International Cooperation Agency (JICA), 3-6 Kouyadai, Tsukuba city, Ibaraki 305-0074
(tel.: +81 29 838 1744 fax: +81 29 838 1776 e-mail: shimizu-kyoko@cdn.jica.go.jp)

Masayuki UCHIDA, 1217 Toyono, Iizuna-machi, Kamiminochi-gun, Nagano 389-1212
(tel.: +81 26 217 7194 e-mail: gogaku@movie.ocn.ne.jp)

NETHERLANDS

Henk BONTHUIS, Manager DUS Agricultural Crops, Naktuinbouw, Binnenhaven 1, NL-6709 PD Wageningen
(tel.: +31 6467 131 02 email: h.bonthuis@naktuinbouw.nl)

Lysbeth HOF (Mrs.), DUS Examiner, Agricultural Crops, Naktuinbouw, Binnenhaven 1, 6709 PD Wageningen
(tel.: +31 6 29 55 06 26 fax: +31 3 17 41 17 21 e-mail: l.hof@naktuinbouw.nl)

NEW ZEALAND

Christopher HARDY, Examiner, Plant Variety Rights, Plant Variety Rights Office of New Zealand, MBIE Southern Business Centre, 55 Wordsworth Street, 8023 Christchurch
(tel.: +64 3 962 6239 e-mail: christopher.hardy@pvr.govt.nz)

REPUBLIC OF KOREA

Kwanghong LEE, Researcher, Korea Seed and Variety Service (KSVS), 456 Yepyeong-Ro, Sangnam-Myeon, Miryang-Si, Gyeongsangnam-do 627-912
(tel.: +82 55 352 9552 fax: +82 55 353 2590 e-mail: grin@korea.kr)

Byung Cheon YU, Researcher, Korea Seed & Variety Service (KSVS), 456 Yepyeong-ro, Sangnam-myeon, Miryang-si, Gyeongsangnam-do 627-912
(tel.: +82 55 352 9552 fax: +82 55 353 2590 e-mail: ybc1209@korea.kr)

SLOVAKIA

Ľubomír BASTA, Crop Specialist, Variety Testing Department, Central Controling and Testing Institute in Agriculture (UKSUP), Partizánska 14, 053 61 Spisské Vlachy
(tel.: +421 53 45 99 389 e-mail: lubomir.basta@uksup.sk)

SPAIN

Antonio ESCOLANO GARCÍA, Director, Centro de Ensayos de Madrid, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria, Ministerio de Economía y Competitividad, Ctra. Coruña km. 7,5, 28040 Madrid
(tel.: +34 913 476 954 e-mail: escolano@inia.es)

UNITED KINGDOM

Cheryl TURNBULL (Ms.), Technical Manager (DUS), Centre for Plant Varieties and Seeds, National Institute of Agricultural Botany (NIAB), Huntingdon Road, Cambridge CB3 0LE
(tel.: +44 1223 342291 e-mail: cheryl.turnbull@niab.com)

VIET NAM

Thai Ha NGUYEN, DUS Tester, Tuliem Station, Plant Variety Protection Office (PVPO), Department of Crop Production (DCP), Ministry of Rural Development (MARD), 519 Kim Ma, Ngoc Khanh Street, Ba Dinh District, Hanoi
(tel.: +84 984 953 662 e-mail: thaiha_dm@yahoo.com)

Thi Hang CAM (Ms.), Officer, Department of Crop Production, Plant Variety Protection Office
(e-mail: pvpvietnam@mard.gov.vn)

II. OBSERVERS

BURKINA FASO

Emmanuel KOMBEMA, Officer, Department of Agriculture, Water Resources, Assainissement and Food Security, Ministry of Agriculture, Water Resources, Assainissement and Food Security
(e-mail: kombeem@yahoo.fr)

CAMBODIA

IV PHIRUN, Deputy Director, Department of Industrial Crops, General Directorate of Agriculture (GDA), Ministry of Agriculture, Forestry and Fisheries (MAFF), No. 54B-49S, St. 395-656, Sangkat Toek Laok III, Khan Tuol Kork, Phnom Penh
(tel.: +855 11 828 461 fax: +855 23 883 427 e-mail: ivphipm@gmail.com)

Sovorn CHAN, Technical Staff, Department of Horticulture and Subsidiary Crops, General Directorate of Agriculture (GDA)
(tel.: +855 77 849 870 e-mail: chansovorn@gmail.com)

ETHIOPIA

Mezgebu Ayele CHEWAKA, Seed Quality Control Expert, Input Quality Control and Utilization Process, Oromia Agricultural Bureau
(tel.: +251 912 078024, +251 11 369 0081, +251 11 371 7474 fax: +251 11 371 7488
e-mail: mezgebuach@gmail.com)

INDONESIA

Isma Naberisa TARIGAN (Ms.), PVP Services, Center for Plant Variety Protection and Agricultural Permits, Ministry of Agriculture
(e-mail: isma.tarigan@gmail.com)

Nina Agusti WIDANINGSIH (Ms.), PVP Examiner, Centre for Plant Variety Protection and Agricultural Permits, Ministry of Agriculture, Republic of Indonesia, Jl. Harsono RM No. 3, Ragunan, Jakarta Selatan 12550
(tel.: +62 21 788 40405 fax: +62 21 788 40389 e-mail: n.a.widaningsih@gmail.com, nina_agusti@yahoo.com)

LAO PEOPLE'S DEMOCRATIC REPUBLIC

Vandy PHETPASEUT, Deputy Director of Agromy Management Division, Department of Agriculture, Ministry of Agriculture and Forestry, Vientiane
(tel.: +856 21 412350 e-mail: vandy_doa@hotmail.com)

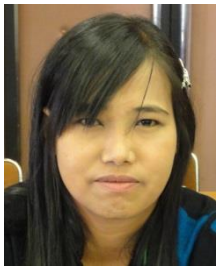
Ketsadong SILYTHONE, Technical Staff, Department of Agriculture and Forestry
(e-mail: tui_ketsadong@hotmail.com)

MALAYSIA

Azidah ASBHY BUYONG (Ms.), Assistant Director, Plant Variety Registration, Department of Agriculture, Crop Quality Control Division, Aras 7 No. 30, Persiaran Perdana, Wisma Tani, Putrajaya Presint 4, 62624 Putrajaya
(tel.: +60 3 8870 3576 fax: +60 3 8888 7639 e-mail: azidah@doa.gov.my, azidah.ashby@gmail.com)

Noor Hasnita YUZANI BINTI YUSOFF (Mrs.), Assistant Director, Seed Certification Section, Department of Agriculture, Crop Quality Control Division, Ministry of Agriculture
(tel.: +603 88703569 fax: +603 88887639 e-mail: noorhasnita@doa.gov.my, hasnitayusoff82@gmail.com)

MYANMAR



Khin Nyein CHAN (Mrs.), Assistant Research Officer, Maize and Other Cereal Crops Section, Department of Agricultural Research (DAR), Yezin, Nay Pyi Taw
(tel.: +95 67 416534 fax: +95 67 416535 e-mail: pyaephyozaw2002@gmail.com)

Phyo Oo WAI, Assistant Staff Officer, Ministry of Agriculture and Irrigation, Department of Agriculture, Nay Pyi Taw
(e-mail: nandasoe76@gmail.com, waiphyo2412@gmail.com)

SRI LANKA

Chandana Perera MODARAGE, Agricultural Instructor, Department of Agriculture/Seed Certification Service
(tel.: +94 8123 88 421, +94 718 457 862 e-mail: agrimcpera@gmail.com)

Ravindra Abeykoon SIRIWARDENA ABEYKOON MUDIYANSELAGE, Assistant Director, Department of Agriculture, Seed Certification Service
(tel.: +94 8123 88 421, +94 714 4954 442 e-mail: raviabey2003@yahoo.com, raviabey2009@gmail.com)

THAILAND

Bordintorn SORNSUPAB, Agricultural Scientist, Plant Varieties Protection Office, Department of Agriculture, 50 Phaholyothin Rd., Bangkok
(tel.: +66 2549 5628 e-mail: bordintorn.bk@gmail.com)

III. ORGANIZATIONS

CROPLIFE INTERNATIONAL

Marcel BRUINS, Consultant, CropLife International, 326 Avenue Louise, Box 35, 1050 Brussels, Belgium
(tel. : +32 2 542 0410 fax : +32 2 542 0419 e-mail : mbruins1964@gmail.com)

EUROPEAN SEED ASSOCIATION (ESA)

Bert SCHOLTE, Technical Director, 23 rue Luxembourg, 1000 Brussels, Belgium
(tel. : +32 2 743 2860 fax: +32 2 743 2869 e-mail: bertscholte@euroseeds.eu)

INTERNATIONAL SEED FEDERATION (ISF)

Bert SCHOLTE, Technical Director, 23 rue Luxembourg, 1000 Brussels, Belgium
(tel. : +32 2 743 2860 fax: +32 2 743 2869 e-mail: bertscholte@euroseeds.eu)

IV. OFFICER

Mr. Tanvir Hossain, Chair

V. OFFICE OF UPOV

Ben RIVOIRE, Technical/Regional Officer (Africa, Arab Countries), International Union for the Protection of New Varieties of Plants (UPOV), Chemin des Colombettes 34, 1211 Geneva 20, Switzerland
(tel.: +41 22 338 8426 fax: +41 22 733 0336 e-mail: ben.rivoire@upov.int)

(via video link)

Leontino TAVEIRA, Technical/Regional Officer (Latin America/ Carribean), International Union for the Protection of New Varieties of Plants (UPOV), Chemin des Colombettes 34, 1211 Geneva 20, Switzerland
(tel.: +41 22 338 8426 fax: +41 22 733 0336 e-mail: leontino.taveira@upov.int)

Hend MADHOUR (Ms.), Data Modeler, International Union for the Protection of New Varieties of Plants (UPOV), Chemin des Colombettes 34, 1211 Geneva 20, Switzerland
(tel.: +41 22 338 8352 fax: +41 22 733 0336 e-mail: hend.madhour@upov.int)

(via video link)

Romy OERTEL (Ms.), Secretary II, International Union for the Protection of New Varieties of Plants (UPOV), Chemin des Colombettes 34, 1211 Geneva 20, Switzerland
(tel.: +41 22 338 7293 fax: +41 22 733 0336 e-mail: romy.oertel@upov.int)

[Annex II follows]

ANNEX II

Welcome address by Mr. Katsuhiro Saka, Director, New Business and Intellectual Property Division, Ministry of Agriculture, Forestry and Fisheries (MAFF)

It is my great honor to make a few remarks on behalf of Japanese government, upon the opening of the 44th Session of the Technical Working Party for Agricultural crops (TWA).

First of all, I would like to extend a warm welcome to all the participants to this session. It is a great pleasure for us to welcome PVP experts from 27 organizations and countries, here to the City of Obihiro. And I would like to express my sincere gratitude to UPOV Secretariat for their support in the preparation process for this Session.

I understand that UPOV membership has now increased to 72 states and organizations, and the number of titles in force exceeded 100,000 for the first time in the year 2013. The work of the Technical Working Parties has also made a significant progress, and UPOV now has 313 internationally-harmonized Test Guidelines.

In addition, we have also observed a rapid progress in cooperation among UPOV member states as well as in support programs to possible members of the Union. Currently, examination cooperation among member states is in place for more than 2,000 plant groups, and such efforts are further growing.

Also, here in Asian region, various cooperative activities and technical assistance programs including those under the East-Asia PVP Forum are conducted, with the active participation of UPOV member and non-member states, with a view to reinforce PVP system in the region as a whole.

Eight experts from East Asia PVP Forum members are participating in this session.

I would also like to introduce that 10 trainees of “seed quality control system” training course, organized Japanese aid agency, JICA, are also participating in this Session in order to learn how the UPOV PVP system is developed.

Facing rapid growth of global population and diversification of the market demands, we believe it would be of a greater emergence to promote the breeding of elite varieties with specific characteristics regarding yield potential, resistance to biotic and abiotic stresses and marketability, and to enhance PVP system as a prerequisite for that.

In this regard, I recognize that the work of PVP experts here for the development of internationally-harmonized examination is truly important as the basis for tackling all those global issues. My Government would be willing to continue its support to those important efforts of UPOV Technical Working Parties.

Taking this opportunity, I would like to touch upon our latest efforts on PVP. Japan joined the Union in 1982 as its 16th member state, and acceded to 1991 Act in 1998. During three decades since the accession to UPOV, the total number of applications to Japanese PVP system is more than 30,000 and total number of registrations is more than 24,000.

At the same time, we have developed our examination system to realize shortening the examination period through reinforcement of capacity for examination and enhancement of efficiency.

In order to promote the international harmonization of the examination and to provide the basis for cooperation with other members of the Union, our PVP Office is conducting the review and revision of our national test guidelines in accordance with UPOV Guidance. Last year, we had prepared and revised 27 TGs in total.

Before concluding my remarks, I would like to introduce some of the events during the session.

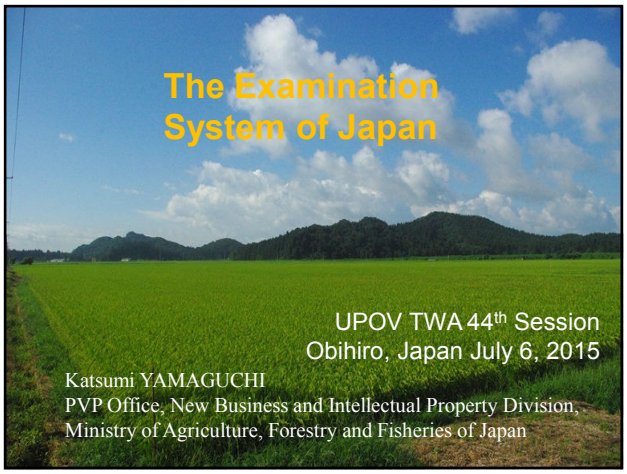
All the participants are cordially invited to a reception hosted by my Ministry tomorrow evening. And in Wednesday afternoon, we will organize a technical visit to both national and local Agricultural research facilities, which are NARO Hokkaido Agricultural Research Center and Hokkaido Research Organization Tokachi Agricultural Experiment Station, to present you recent progress in breeding agricultural crops in Japan.

The city of Obihiro is located in the center of Tokachi region, where its agriculture has substantial role in our food supply. Tokachi Farmers produce 26% of our domestic wheat production, 35% of potato, 47% of sugar beet, as well as 15% of milk.

Apart from technical discussion, I think it would be a very good opportunity for you to experience Japanese food culture in one of our most important agricultural producing areas.

Lastly, I hope that this TWA Session will be in great success for further promoting the international harmonization in PVP examination.

[Annex III follows]



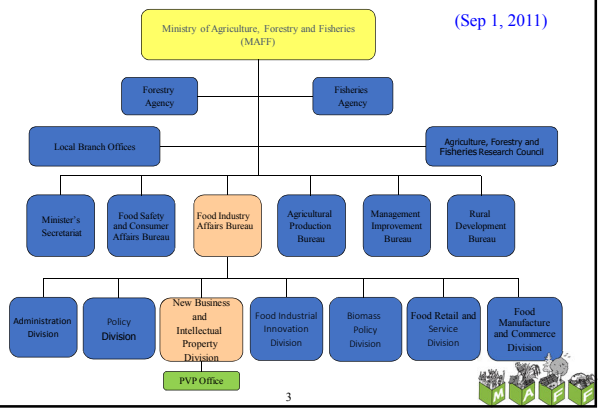
History of PVP System in Japan

	Japan	UPOV
1947	Agricultural Seeds and Seedlings Law	
1972		1961/1972 Act
1978	PVP and Seed Act	1978 Act
1982	Join the UPOV 1978 Act	
1991		1991 Act
1998	Amendment of the Act	
	Join the UPOV 1991 Act	
2003	Amendment of the Act	
2005	Amendment of the Act	
2007	Amendment of the Act	

2

Organizational Chart of MAFF

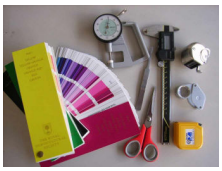
(Sep 1, 2011)



3

Organization for PVP

MAFF
PVP Office
- ✓Filing and granting
- ✓Development of Technical Protocols
- ✓Examinations



National Center for Seeds and Seedlings (NCSS) : Incorporated Administrative Agency

HQs, 10 stations, 1 sub-station
- ✓DUS Test
- ✓Production of Foundation seeds
- ✓Seed Inspection
- ✓PVP G-men

4

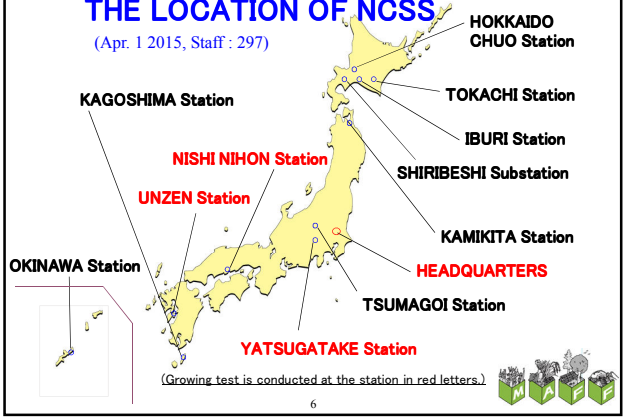
Structure of the PVP Office

Director
- Deputy Director (1) — section chief(2)
- Chief Examiner(1)
- Senior Examiner(7)
- Examiner(16)
- Assistant Examiner(7)
  - Management of Examination
  - Development of TGs
  - Filing, Formality Examination, Registration, Publication
  - Examination Group
    - ●Ornamental Trees, Variety Denominations
    - ●Perennial Ornamental Plants
    - ●Ornamental Plants exclude Perennial plants, Chrysanthemum, Orchid
    - ●Agriculture Crops, Fodder Crops, Industrial Crops, Mulberry , Mushroom, Trees, Sea weed
    - ●Vegetable, Fruit trees, Bulb plants
    - ●UPOV, CPVO, International Affairs

5

THE LOCATION OF NCSS

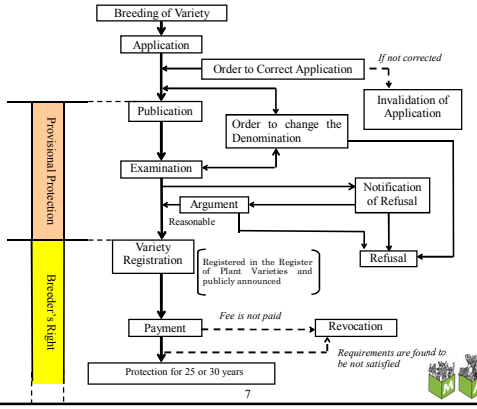
(Apr. 1 2015, Staff : 297)



(Growing test is conducted at the station in red letters.)

6

Procedures for PVP system



7

Duration of PBR and Application Fee

- 25 years from the date of variety Protection
- 30 years for Woody Plants

- Application Fee 47,200 JPY (384USD (1USD ≒ 123JPY))

8

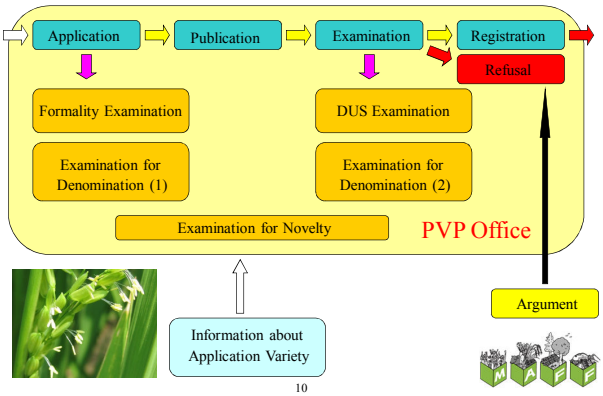
Annual Registration Fee

Year from Protection	Annual Fee
1st – 3rd year	6,000 JPY (49USD) / year
4th – 6th year	9,000 JPY (73USD) / year
7th - 9th year	18,000 JPY(146USD) / year
10th - 30th year	36,000 JPY(293USD) / year

(1USD ≒ 123JPY)

9

Examination Procedures



10

Examination

- Procedure
  - ✓Formality examination
  - ✓Planning for DUS Test – decision of the test method
    - Growing Test
    - Breeder Testing (On-site Inspection)
    - Documentary Examination (including International Cooperation)
  - ✓Examination on Denomination before publication & registration
  - ✓Examination on Novelty

11

the DUS test method (1)

Growing Test

- ✓Conducted by the NCSS.
  Mainly ornamental plants (Chrysanthemum, Carnation, Rose, Petunia, Calibrachoa etc.) and vegetables
- ✓Some of food crops and fruit crops are conducted by local government experimental stations according to the request of NCSS.

12

the DUS test method (2)

Breeder testing (On-site Inspection)

(In the event that the all following conditions are satisfied)

It is proven that

- ✓ the applicant or agent can conduct a reliable trial according to the instruction from PVP office,
- ✓ the characteristics on the TG can be confirmed and compared with those of the comparative varieties if on-site inspection would be conducted at an appropriate time,
- ✓ the applicant can submit reliable data if there were characteristics which could not assessed when on-site inspection was conducted.

13

the DUS test method (3)

Documentary Examination (including International Cooperation)

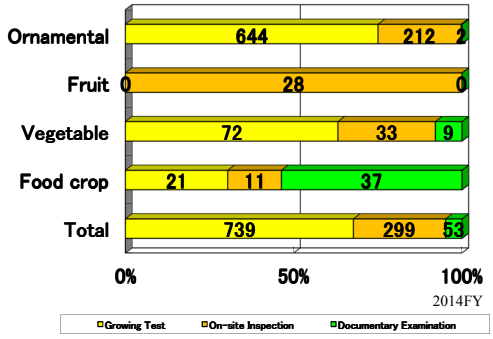
(In the event that the all following conditions are satisfied)

- ✓ A characteristics assessment based on the TG for each variety was conducted for two or more years by a public research institution or an institution approved by the Director of the Division.
- ✓ For characteristics requiring measurement based on the TG, data on actual measurements have been submitted that prove the characteristics scores for the candidate and comparative varieties on the application form are appropriate.
- ✓ For characteristics requiring observation based on the TG, data including photographs and specimens have been submitted that prove the characteristics scores for the candidate and comparative varieties on the application form are appropriate.

14

Ratio of DUS Test Methods by Crops

This ratio changes according to the tendency of applications in every year.

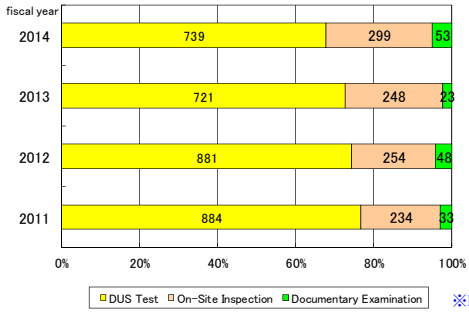


※Plan base

15

Ratio of DUS Test Methods by Year

This ratio changes according to the tendency of applications every year.

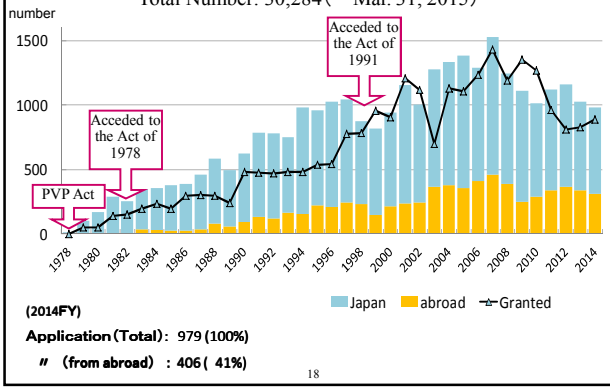


※Plan base

16

Trend of Applications

Total Number: 30,284(～Mar. 31, 2015)



(2014FY)

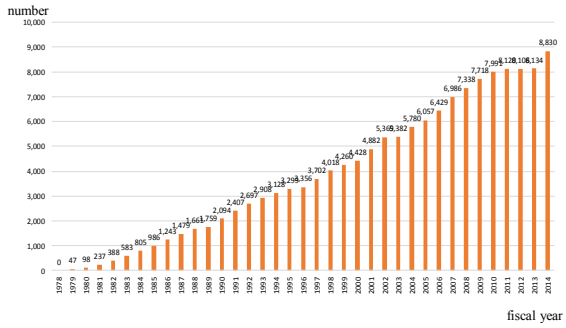
Application (Total): 979 (100%)

〃 (from abroad) : 406 (41%)

18

Variety protected at the end of each fiscal year

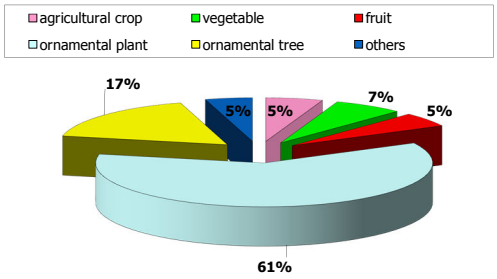
Total number of right granted: 24,275（～Mar. 31, 2015）



19

Right Granted by Crop

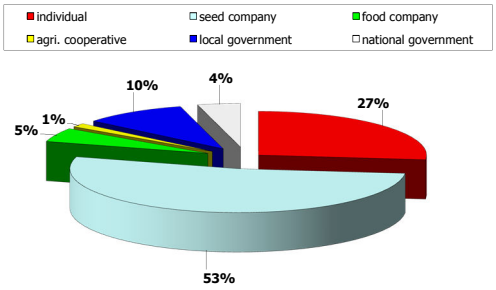
Total Number: 24,275（～Mar. 31, 2015）



20

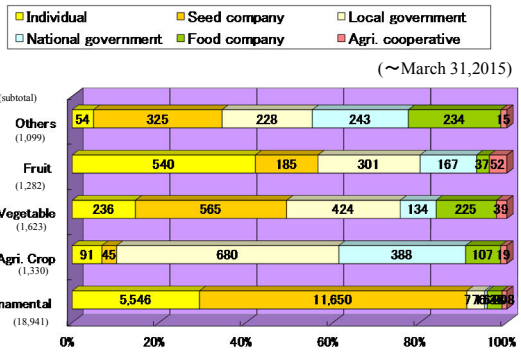
Right Granted by Title Holder

Total Number: 24,275（～Mar. 31, 2015）



21

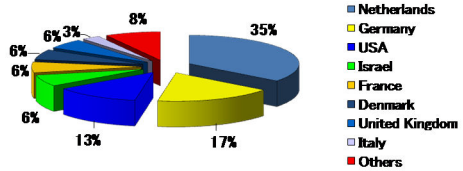
Right Granted by Crop and Title holder



22

Registered varieties bred abroad

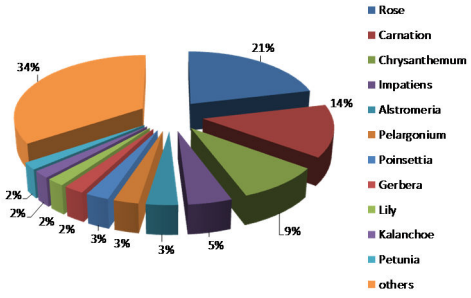
Total Number: 7,447（1978～Mar. 31, 2015）



2012FY		2013FY		2014FY	
1 Netherlands	105	1 Netherlands	109	1 Netherlands	131
2 USA	42	2 USA	57	2 Germany	58
3 Germany	25	3 Germany	53	3 USA	41
Total	275	Total	345	Total	325

23

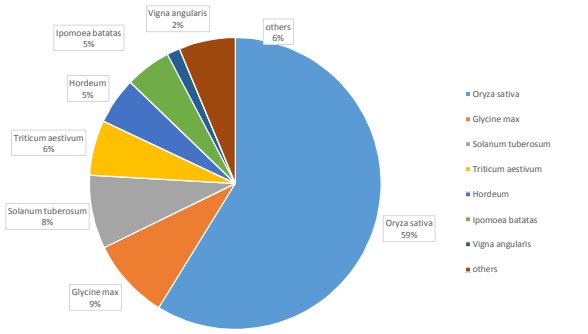
Ornamental Applications Bred abroad



Total Number; 9,607 (until Mar. 2015)

24

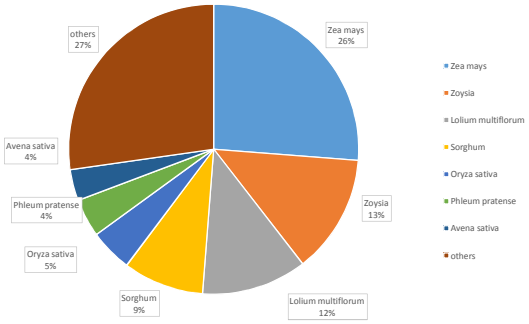
Food Crop Applications



Total Number; 1,519 (until Mar. 2015)

25

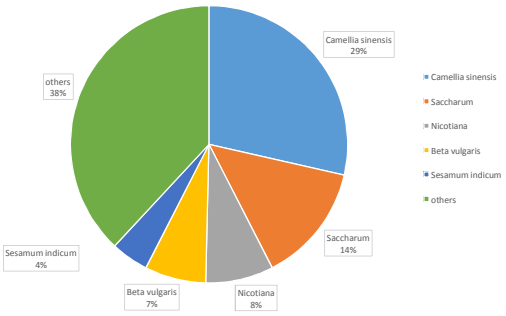
Fodder Crop Applications



Total Number; 400 (until Mar. 2015)

26

Industrial Crop Applications



Total Number; 252 (until Mar. 2015)

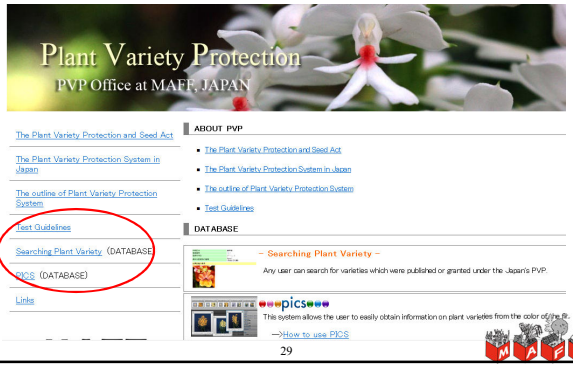
27

Introduction to web-site

Japanese PVP Office web-site

Top page in English

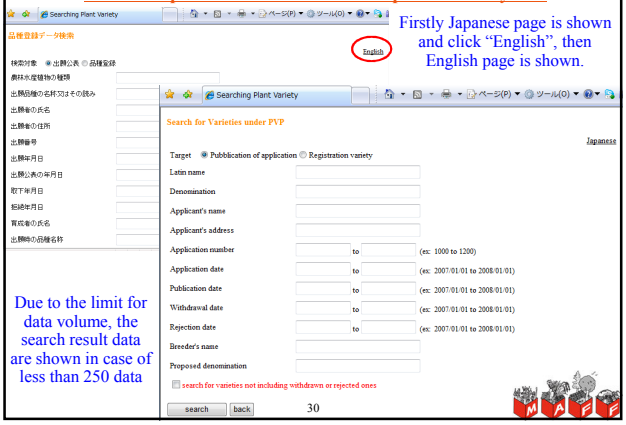
http://www.hinsyu.maff.go.jp/en/en_top.html



29

Japanese PVP Office web-site

search for plant varieties under the Japanese PVP system



Firstly Japanese page is shown and click "English", then English page is shown.

Due to the limit for data volume, the search result data are shown in case of less than 250 data

30

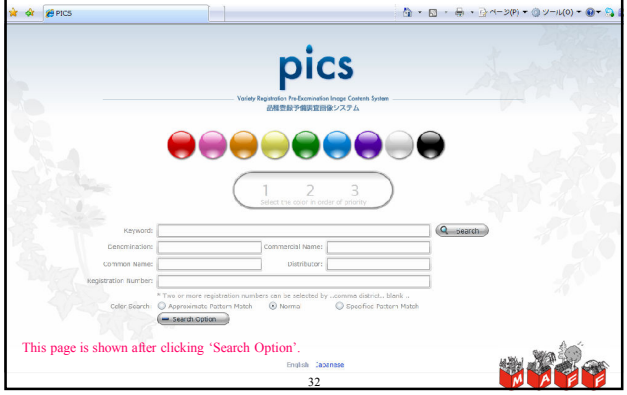
Japanese PVP Office web-site
Test guidelines

There are about 600 National TGs. Many TGs have English pages.

31

Japanese PVP Office web-site
search engine for plant varieties by flower colors

The data of PICS has been increasing.



This page is shown after clicking 'Search Option'.

32

[Annex IV follows]

National Agriculture and Food Research Organization

NARO

Rice breeding in Japan

National Institute of Crop Science

Ikuo Ando

Paddy field is the most stable food production system in Japan from old days.

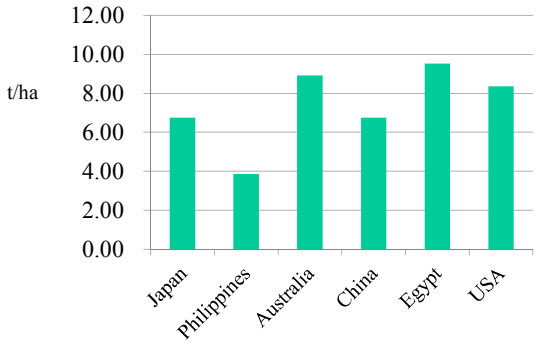
Rice production in Japan

Cultivated area and yield in Japan in 2013

- Total Land Area 37,780,000 ha
- Cultivated Area 4,537,000 ha

- Rice cultivated Area
  - Paddy field: 1,597,000 ha
  - Upland field: 1,720 ha
- Average Yield(brown rice base)
  - Paddy rice: 5.30t/ha (Avr.)
  - Upland rice: 2.49t/ha

Rice yield in the world in 2012



(FAO STAT)

Production cost

- Average rice production cost in Japan is about 9300 $ / ha.
- It is about 7 times of the cost in USA.

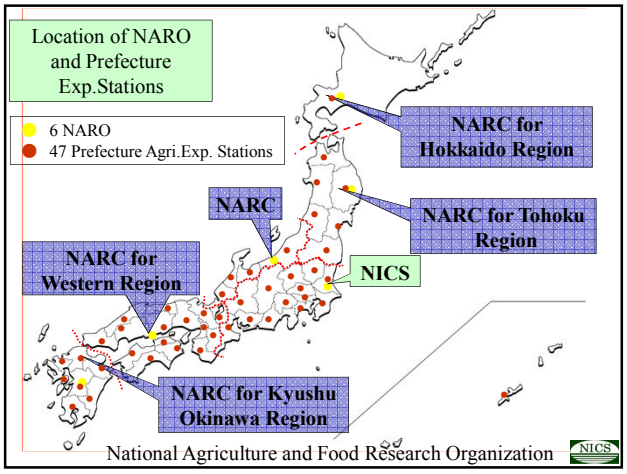
USDA 2012, 1US$ = 120 円

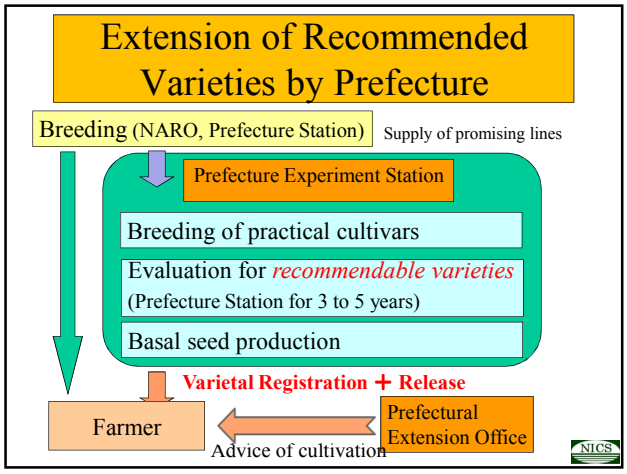
Major problems in the paddy field farming in Japan

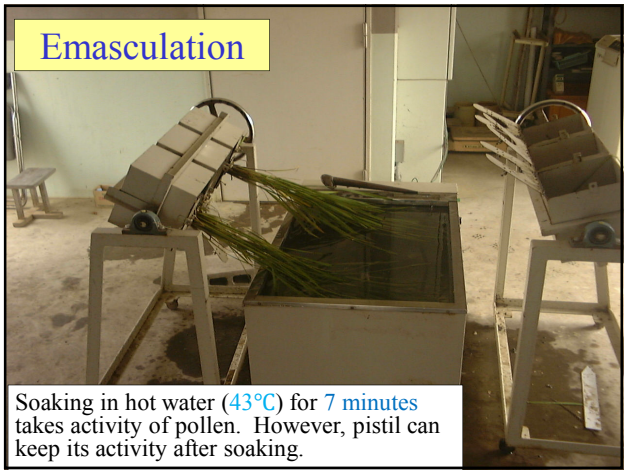
- Low food self-sufficiency ratio (40% by calorie base)
- Overproduction of rice
- Decreasing and aging of the farming community
- Gap between the production cost of rice in Japan and abroad
- Damage by a global climate change

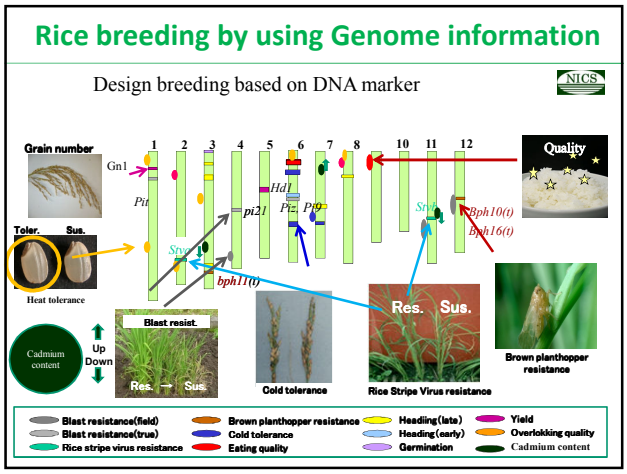
Strategies of rice breeding

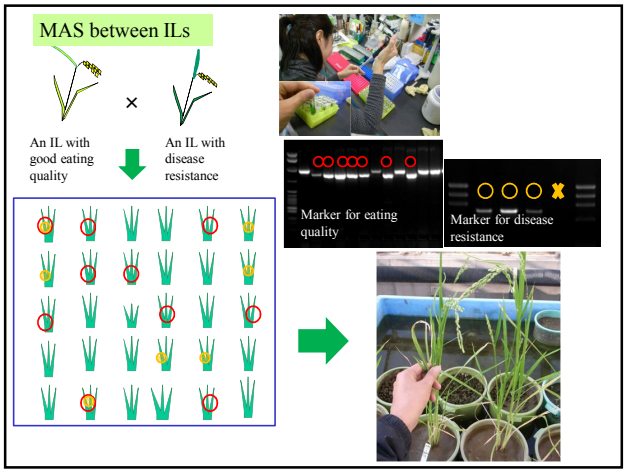
- Expanding the rice demand:
  - ☆Rice with better eating quality for higher commercial value.
  - ☆Rice for health.
  - ☆Rice as materials; bread, noodle etc.
  - ☆Rice as a forage crop (grain and whole crop silage, WCS)
- Reducing the labor time and production cost:
  - ☆Rice with high yield, direct seeding adaptability, multiple resistance to pests and diseases.
  - ☆Late planting or seeding for double cropping with wheat or barley
- Avoiding to the high temperature damage by the global warming:
  - ☆High temperature adaptable cultivars











To expand rice demand

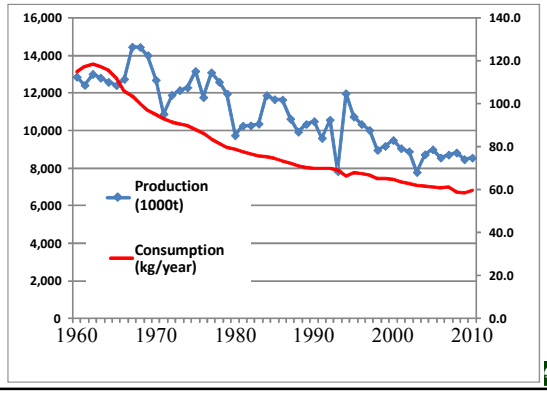
☆Rice with better eating quality for higher commercial value.

☆Rice for health.

☆Rice as materials; bread, noodle etc.

☆Rice as a forage crop (grain and whole crop silage, WCS)

Production and consumption



"Koshihikari", the most common rice cultivar

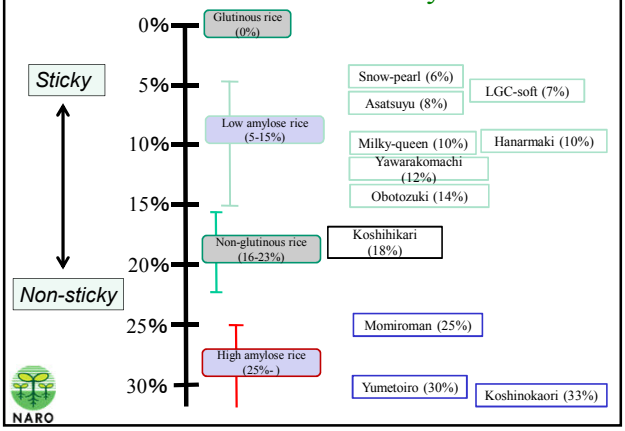
Rice cultivars in Japan, 2013

Order	Variety	Combination	Area rate(%)
1	Koshihikari	Norin22 / Norin 1	37.6
2	Hitomebore	Koshihikari / Hatsuboshi	9.6
3	Hinohikari	Kobanebare / Koshihikari	9.5
4	Akitakomachi	Koshihikari / Ouu292	7.5
5	Nanatsuboshi	Hitomebore / Kukei90242A // Kuiku 150	3.0
6	Kinuhikari	Shu2800 // Hokuriku100 / Nagoyutaka	2.9
7	Haenuki	Shounai29 / Akitakomachi	2.7
8	Mashigura	Oou 341 / Yamagata 40	1.9
9	Asahinoyume	Aichinokaori//Tukinohikari /Aichi 65	1.5
10	Kirara 397	Shimahikari / Kitaake	1.5

NICS

Expanding the variation of rice grains

Rice Cultivars with Various Amylose Contest



NARO

Cultivar "Oborozuki" with the new low amylose gene *WX1-1*, brought large progress in eating quality of rice in cool area

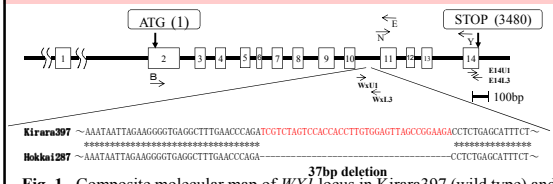


Fig. 1. Composite molecular map of *WX1* locus in Kirara397 (wild type) and Hokkai287(mutant).

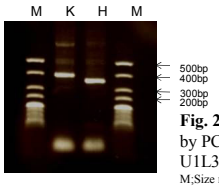


Fig. 2. DNA fragments by PCR with Wx-U1L3 primer.
M;Size marker, HyperLadder V, K;Kirara397, H;Hokkai287

High amylose content cultivars

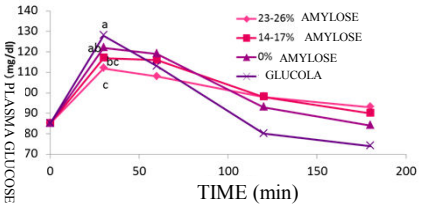
NARO

「Koshinokaori」

- AC: 33%
- short grain
- suitable for rice flour noodle

Rice noodle

High-AC rice cultivars are expected as lower-Glycemic Index (GI) rice with rich resistant starch.



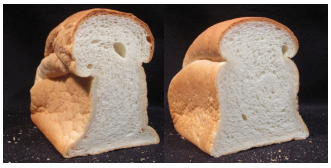
Mary S Goddard et al. Am J Clin Nutr 1984

High yielding cultivar suitable for bread "Takanari"

NARO

High yielding variety selected from the combination of indica-japonica cross. This yield of brown rice reaches to 8t to10t/ha.

Its eating quality of boiled rice is poor, however, its rice bread is better than "Koshihikari".

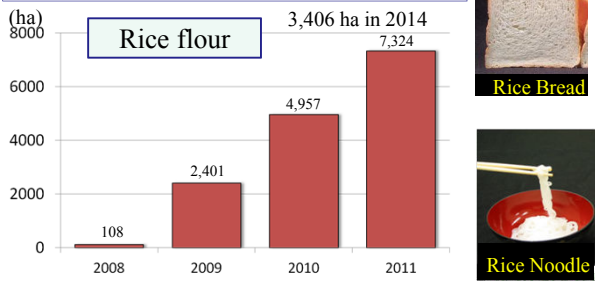


Koshihikari Takanari

NICS

Demands of rice for flour

MAFF aims to produce 100 thousand ton rice flour (about 20 thousand ha) .



Rice Bread

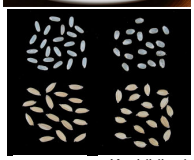
Rice Noodle

Expansion of cultivation of rice for flour use

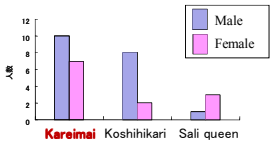
Cultivars for food service industry

Rice cultivar for Curry "Kareimai"

NARO


Kareimai Koshihikari

◆Stickiness of surface of "Kareimai" is low, however, its interior is soft like "Koshihikari".



◆Its aptitude with curry is evaluated more highly than "Kishihikai" and "Sali-queen".

"Kareimai"was developed under joint research with curry company

Cultivars with functionality

Colored rice cultivars "Asamurasaki" and "Benigoromo"

NARO


Asamurasaki Akitakomaochi


Benigoromo Akihikari

Colored rice has pigment in its aleurone layer.
Purple black rice: Anthocyan Red rice: Tannin, proanthocyanidin

NICS

Cultivars with functionality

The rice bran of these varieties has higher level of antioxidant activities than some of the colored vegetables.

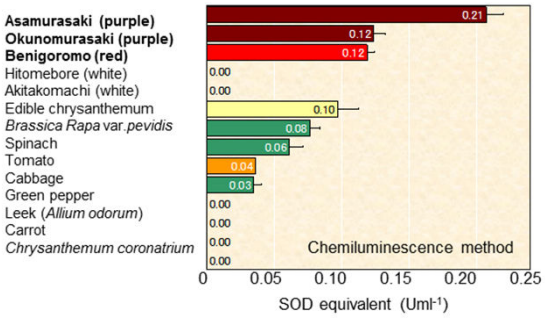
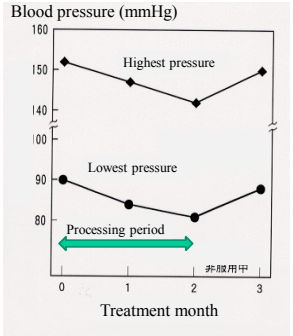


Fig.1. Radical scavenging activity of rice bran and vegetables (Kimura *et al*. 2002)

Pre-germinated Brown Rice

- Gamm-aminobutylic acid(GABA) accumulate in embryo of soaked brown rice.
- GABA has good influence to control blood pressure.

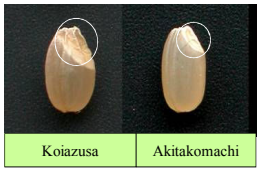


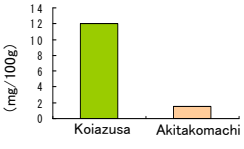
Okada *et al*. (2000) Nippon Shokuhin Kagaku Kaishi 47,8

NICS

Cultivars with functionality

Giant embryo rice with rich GABA


Koiazusa Akitakomachi



GABA content in brown rice

Developed various products using giant embryo cultivars

【GABA】
γ-amino butyric acid (Gaba) is effective in stabilizing Blood Pressure

NICS

Rice cultivars with low levels of easy-to-digest protein (Low-glutelin, lacking a globulin)

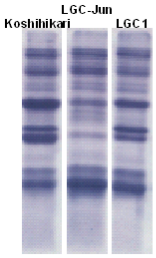


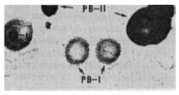
Table. Nutritional quality of LGC1, LGC-Katsu, LGC-Jun, and Koshihikari

Cultivar name	Glutelin (% of total protein)	26-kDa globulin (% of total protein)	Prolamine (% of total protein)	Protein content (% of dry matter)	Easy-to-digest protein[a] (% of total protein)
LGC1	22.1	14.1	44.9	7.5	55.1
LGC-Katsu	13.4	0.0	62.2	7.6	37.8
LGC-Jun	16.5	0.0	59.4	7.7	40.6
Koshihikari	47.5	9.4	25.4	7.5	74.6

37-39-kDa glutelin
26-kDa globulin
22-23-kDa glutelin
Proteins easy-to- digest

a: Excluding the 13- and 16-kDa proteins.

16-kDa prolamine
13-kDa prolamine
Proteins difficult-to- digest

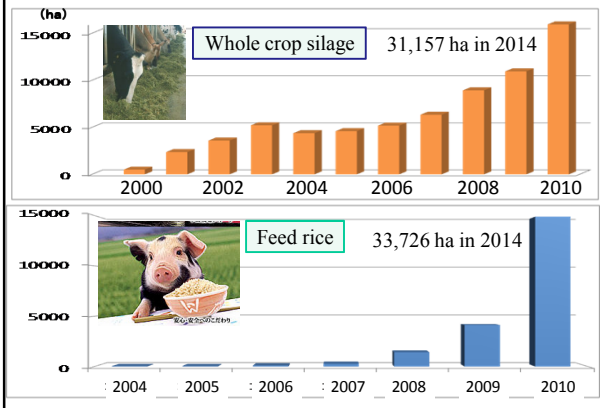


Iida S, Amano E, Nishio T (1993) A rice (*Oryza sativa* L.) mutant having a low content of glutelin and a high content of prolamine. *Theor Appl Genet* 87: 374–378
Iida S, Miyahara K, Nishio T (1998) Rice mutant lines lacking a globulin. *Breeding Science* 48: 45–49

'Sake' with lower the amino acid level and the light taste brewed using the low glutelin rice cultivars.

'Sake' brewed using the low glutelin rice cultivar "Mizuhonoka".

Expansion of feed rice in Japan



Recycling between Paddy field and Livestock —Feed and Whole Crop Silage Rice—

Feed

Barnyard manure

Production of Feed rice in fallow paddy field

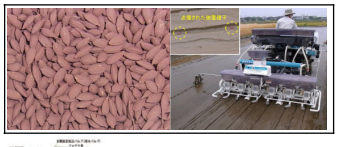
Stabilization of domestic feed production

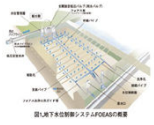
To reduce the labor time and production cost:

☆Rice with high yield, direct seeding adaptability,
☆multiple resistance to pests and diseases.
☆Late planting or seeding for double cropping with wheat or barley

Direct seeding as a low cost rice production techniques

Direct seeding machines

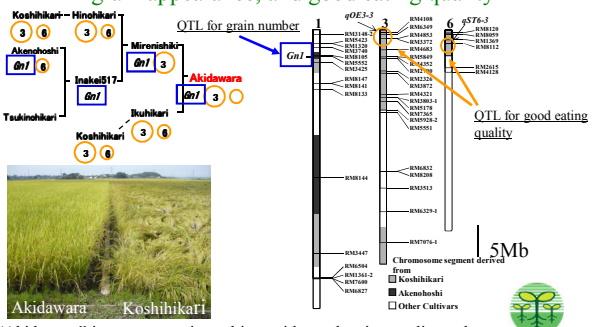




FOEAS Farm-Oriented Enhancing Aquatic-System

New cultivars adaptable for direct seeding

Temperate *japonica* rice variety with high-yielding, good grain appearance, and good eating quality



"Akidawara" is a *japonica* rice cultivar with good eating quality and high-yielding ability. Compared with "Koshihikari", the grain appearance and eating quality of "Akidawara" are almost the same, grain yield is 13% higher and lodging resistance is superior.

NARO
NICS

Upland field for test of leaf blast resistance

Rice varieties selected by using DNA marker (1)

【Near isogenic lines with resistance to disease and insect】

KOSHIHIKARI + Blast resistance (6 years)

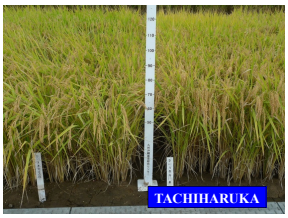
HINOHIKARI + BPH resistance (6 years)

Under cultivation of these varieties, farmer can omit application of insecticide or fungicide.

NICS

Accumulation of various disease /pest resistance by using genome information

Blast resistance + Rice stripe virus resistance (8 years)

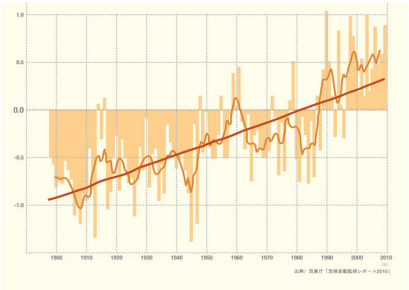


Resistance to Brown planthopper + Blast + Rice stripe virus (6 years)

Under cultivation of these Cultivars, farmer can omit application of both insecticide and fungicide.

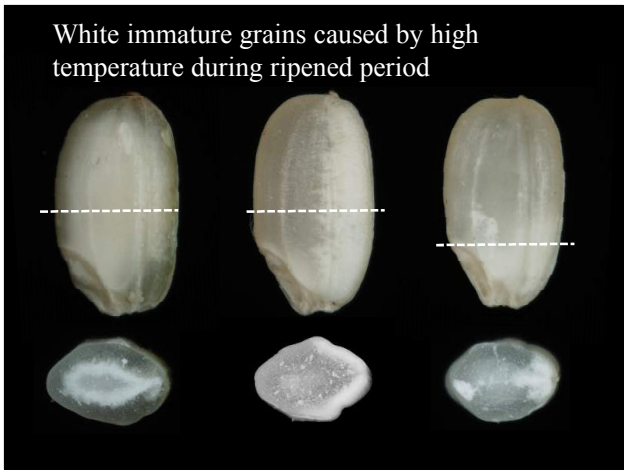
Global warming in Japan

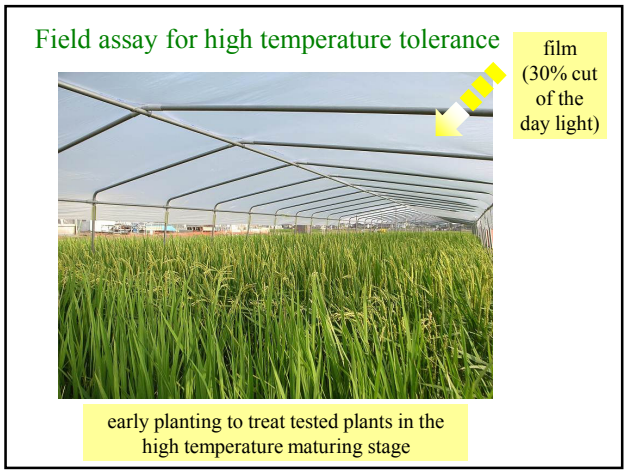
Average Temperature in Japan from 1898 to 2010

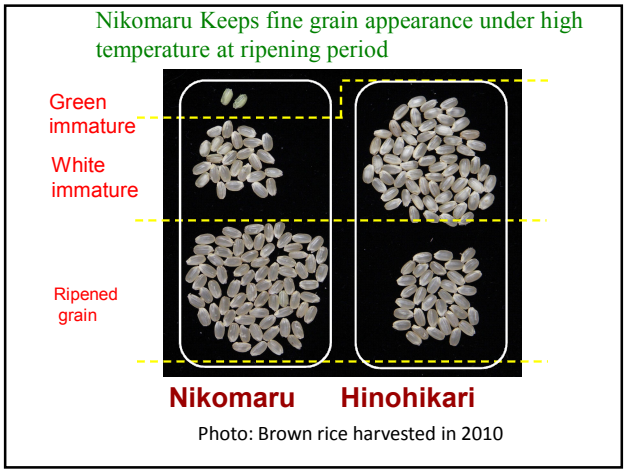


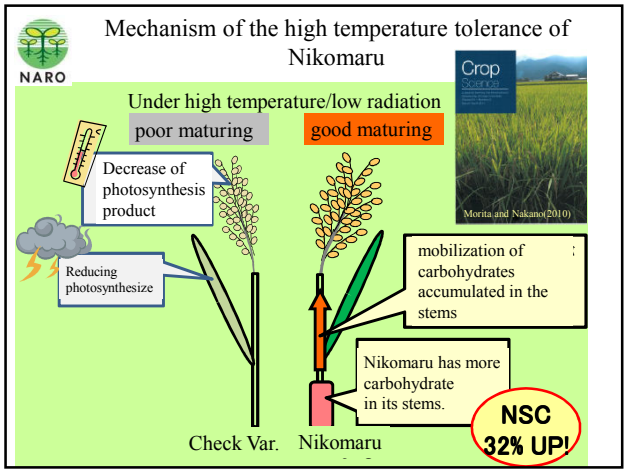
To avoid the high temperature damage by the global warming :

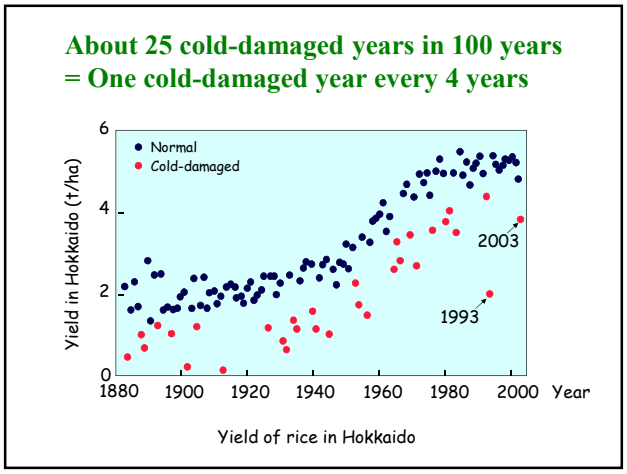
☆High temperature stress tolerance cultivars


White immature grains caused by high temperature during ripened period


Field assay for high temperature tolerance
film (30% cut of the day light)
early planting to treat tested plants in the high temperature maturing stage


Nikomaru Keeps fine grain appearance under high temperature at ripening period
Green immature
White immature
Ripened grain
Nikomaru
Hinohikari
Photo: Brown rice harvested in 2010

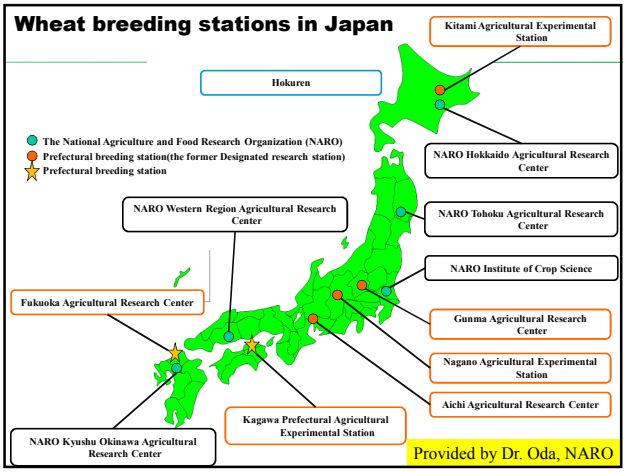

NARO
Mechanism of the high temperature tolerance of Nikomaru
Crop Science
Morita and Nakano(2010)
Under high temperature/low radiation
poor maturing
good maturing
Decrease of photosynthesis product
Reducing photosynthesize
mobilization of carbohydrates accumulated in the stems
Nikomaru has more carbohydrate in its stems.
NSC 32% UP!
Check Var.
Nikomaru


About 25 cold-damaged years in 100 years
= One cold-damaged year every 4 years
Normal
Cold-damaged
Yield in Hokkaido (t/ha)
2003
1993
Year
Yield of rice in Hokkaido


Cool weather damage of rice field in northern Japan

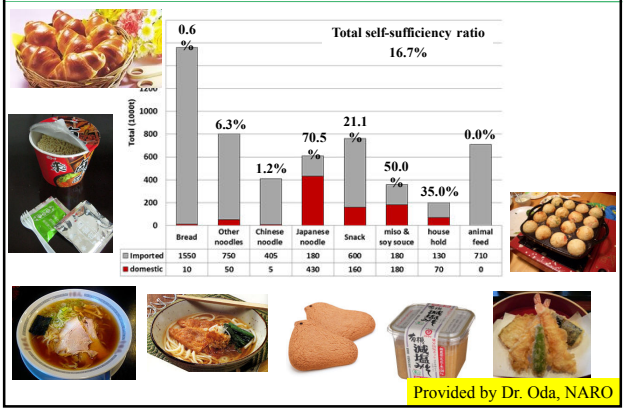
Test field for cool tolerance

Wheat breeding stations in Japan



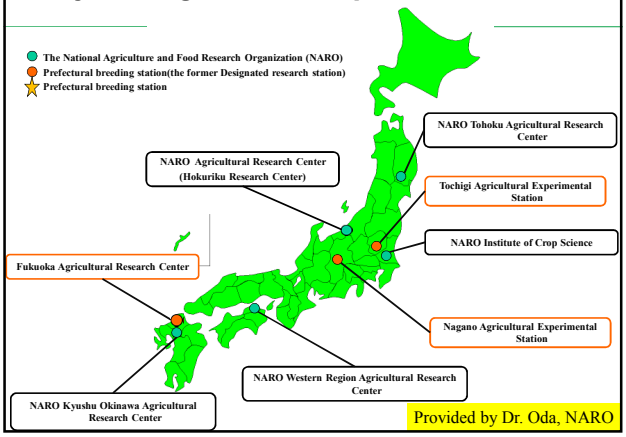
Provided by Dr. Oda, NARO

Strategy to increase domestic wheat production



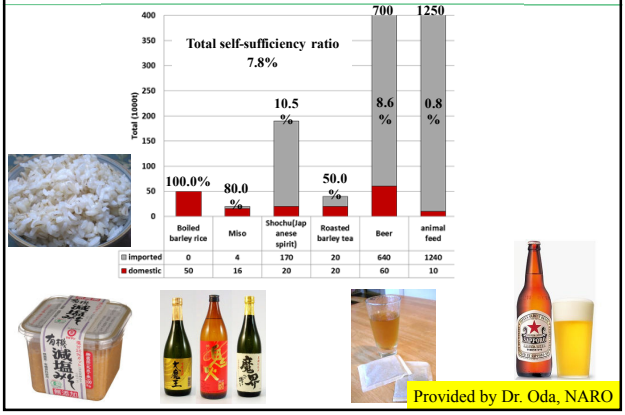
Provided by Dr. Oda, NARO

Barley breeding stations in Japan



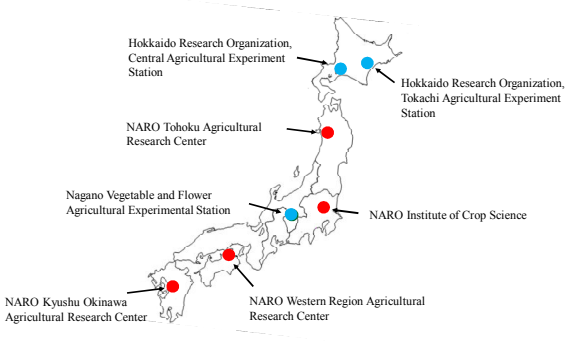
Provided by Dr. Oda, NARO

Strategy to increase domestic barley production



Provided by Dr. Oda, NARO

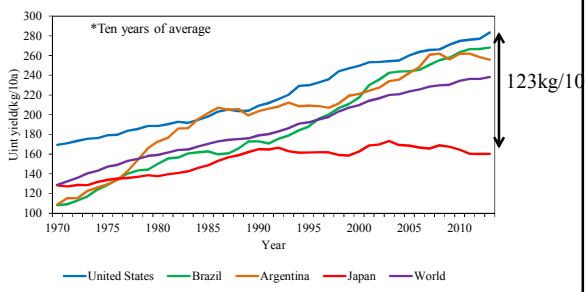
Japanese soybean breeding centers



Japanese major soybean breeding centers are consisted of 4 Naro's breeding centers and 3 prefectural breeding centers.

Provided by Dr. Hajika, NARO

"Low yield" is one of the biggest problem of Japanese soybean production



Unit yield of domestic soybean production has not improved over past 20years. ⟶ Why?

Provided by Dr. Hajika, NARO

Causes of low yield

Abiotic factor

- Heavy and continual rain
- Typhoon
- Water injury
- Drought stress
- Cold summer

Others

- Pod dehiscence
- Green stem
- Weed damage

Biotic facter

- Soybean mosaic virus (SMV)
- Soybean dwarf (SDV)
- Peanut stunt virus (PSV)
- Phytophthora root rot
- Root necrosis
- Soybean cyst nematode (SCN)
- Bean bug
- Common cutworm

Main objective of breeding program in red letters

Cooperation in breeding and cultivation technologies in blue letters

Provided by Dr. Hajika, NARO

Thank you for your kind attention !

[Annex V follows]

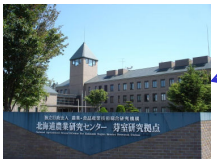
NARO/HARC Memuro

Masayuki Hirafuji

Director in NARO National Agriculture and Food Research Organization
Hokkaido Agricultural Research Center
Prof. in University of Tsukuba

Institutes of NARO in Japan

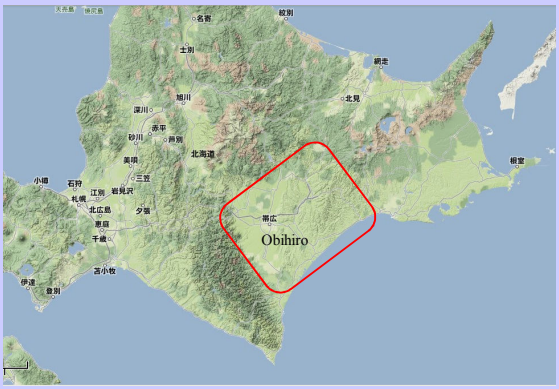
HARC
Hokkaido Agricultural Research Center



Memuro Campus of HARC
40 researchers

NARO: 1700 researchers (total: 3000)

The Most Advanced Large-scale Agricultural Area in Japan



30 years ago, the first drone was developed.

The first drone for field phenotyping

Monitoring of Spreading Infection of Disease by Image Data (RGB+IR)

National Agricultural Research Organization
Hokkaido Agricultural Research Center

Activities of NARO HARC wheat breeding group

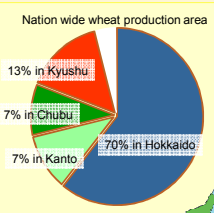
Documentation by Koichi HATTA,
Project Sub-Leader

NARO (National Agriculture and Food Research Organization) is Japan's largest organization that comprehensively conducts research and development related to food, agriculture, and rural areas. 1

Wheat Breeding programs in Japan

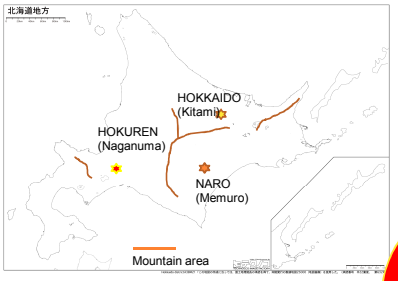
- Prefectural program
- National program
- Private program
- University program
- Prefecture own program

Nation wide wheat production area

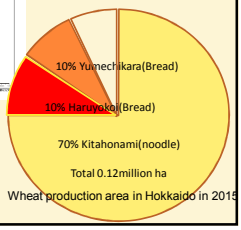


Spring wheat sown at autumn in paddy field.
It is difficult to produce high protein content wheat because of low nitrogen supply from soil.

Breeding programs in Hokkaido



- Prefectural program (HOKKAIDO)
  Winter wheat for noodle and bread
  Spring wheat for Bread
  Barley for Beer
- National program (NARO)
  Winter wheat for bread
- Private program (HOKUREN)
  Spring wheat for bread

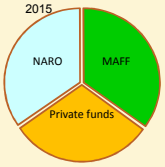


Wheat production area in Hokkaido in 2015

- HOKKAIDO
  Prefectural funds, farmer's funds, national funds
- NARO
  National funds, farmer's funds
- HOKUREN
  Farmer's funds, national funds

The profile of our wheat breeding group

Research funds
approx. 20million yen/ year
without personal expenses of permanent researcher



Group member

Researcher
- Group leader (Resistance breeding)
- Senior research fellow (Crop science)
- Researcher (genetics)
- Senior research fellow (Food chemistry)
- Graduate student

Technician
- Machinery operators 2
- Lab work technicians 5
- Field worker 0-4 as needed

Research Subject

① To breed new bread wheat variety to Hokkaido area.
② To develop a technique for yield and protein content prediction in wheat production.
③ To develop a new application of new wheat variety.
④ To evaluate genetic resources.

Circumstance in developing of autumn sowing variety in japan

Change in dietary habits	Characteristics of wheat
Increasing in bread-centered diet	Wheat originated in dry regions
Especially low self-sufficiency rate in wheat for use in bread. Consumer prefer to domestic product.	Wheat for use in bread cannot be cultivated in Japan where the climate is rainy and humid. (Diseases and ear sprouting phenomenon)

Need for development of high-quality domestic wheat for use in bread, Hokkaido Agricultural Research Center began research about 20 years ago.

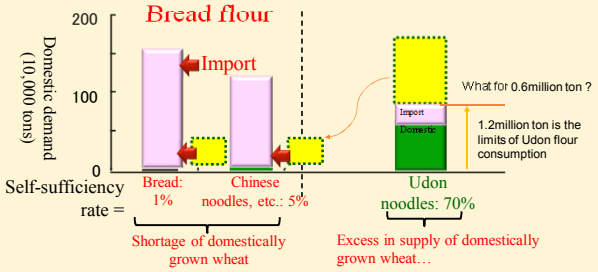
In addition to the traditional spring sowing wheat, which has a short growth period, is low-yielding, high in protein content, and high-priced (for use in bread), attention has been drawn to autumn sowing wheat, which has a long growth period, is high-yielding, low in protein content, and low-priced (for use in udon noodles).

5

Self-sufficiency Rates in Wheat by Use in Japan

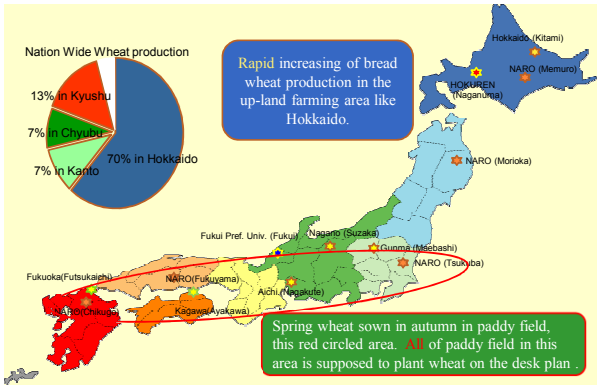
From food security viewpoint, former Democratic party administration planed for

Increasing domestic wheat production over the next decade.
880,000 tons in 2010 → 1,800,000 tons in 2020

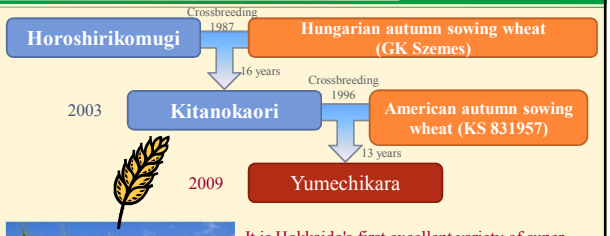


3

How to increase domestic wheat production



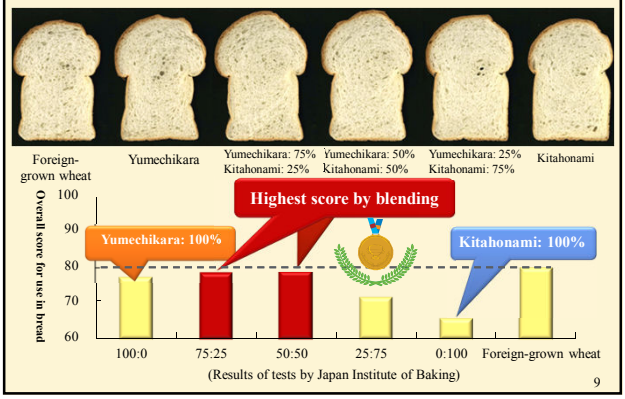
Development of Autumn Sowing Variety for Use in Bread. Actual activity in HARC



It is Hokkaido's first excellent variety of super-strong wheat with superior suitability in blending with domestic wheat "for use in udon noodles." It has strong resistance to wheat yellow mosaic disease, which has spread in Hokkaido. Place expectations on its diffusion in the future!

6

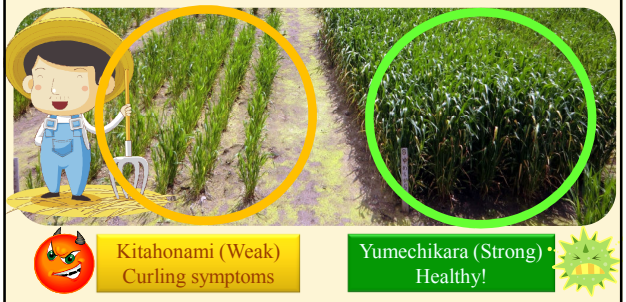
Puffy bread can be produced by blending "Yumechikara" and "medium-strength wheat!"



9

There are also benefits to producers!

Field where the wheat yellow mosaic disease virus has broken out

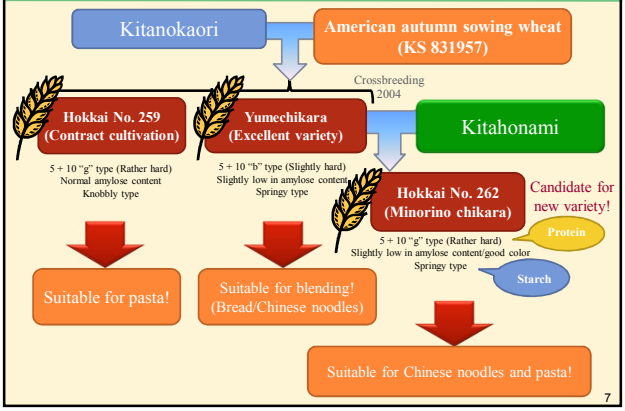


Kitahonami (Weak) Curling symptoms

Yumechikara (Strong) Healthy!

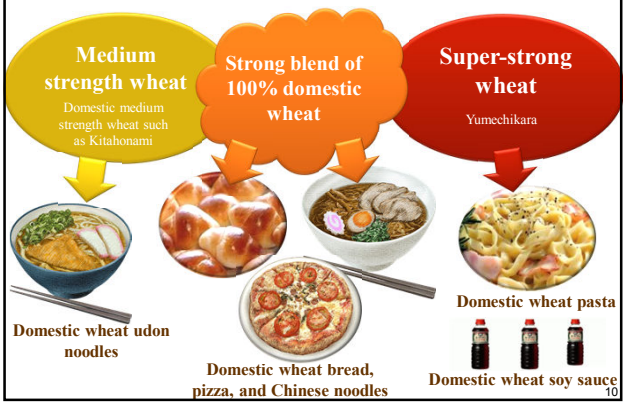
11

The Group of Three Super-strong Wheat Varieties



7

Applications taking advantage of the characteristics of super-strong wheat "Yumechikara"



10

National Agriculture and Food Research Organization
農業・食品産業技術総合研究機構

Sugar beet in Japan

Breeding a disease resistant variety "Hokkai 101"

Kuroda Y , Taguchi K, Takahashi H, Okazaki
(Hokkaido Agricultural Research Center, NARO)

2015 Jul 8, Memuro

Sugar crops

Sugar cane (*Saccharum officinarum*)

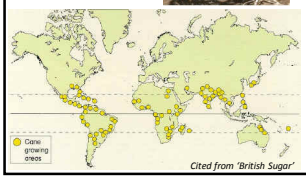
80% of sugar production (136 Mt)

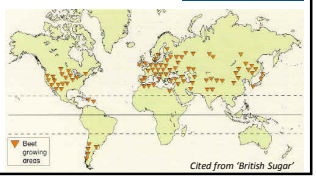
Sugar yield 99kg/t
Stem yield 78 t/ha

Sugar beet (*Beta vulgaris*)

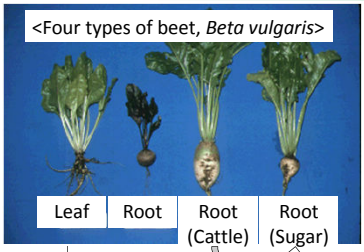
20% of sugar production (33 Mt)

Sugar yield 172kg/t
Root yield 56 t/ha





History of sugar beet



(recently domesticated crops)

400~600 B.C.~ (Mediterranean)

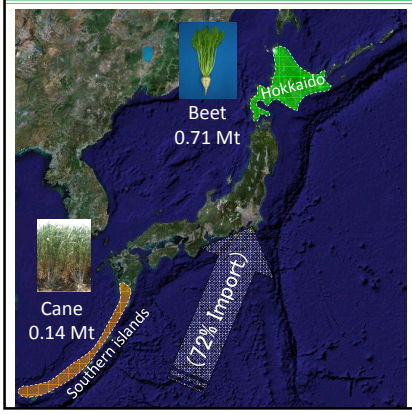
Wild relatives *B. maritima*

Present (Sugar 17%)

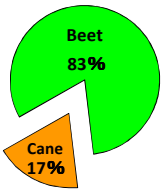
230 years

1786 A.C. Achard (GER) selected sweet type of fodder (Sugar 3%)

Sugar production in Japan

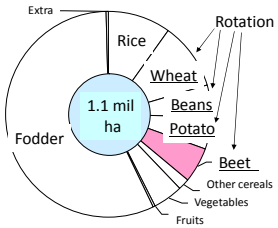


William S. Clark（1826-1886）



Sugar production in JPN
(28% self sufficiency)

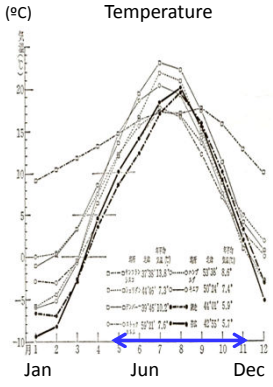
Role of sugar beet in Hokkaido

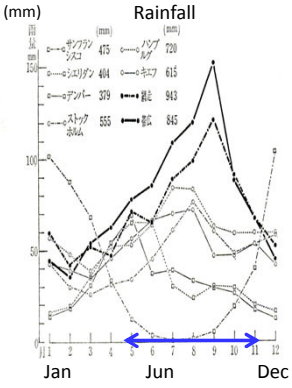


Sugar beet is one of the main rotation crop

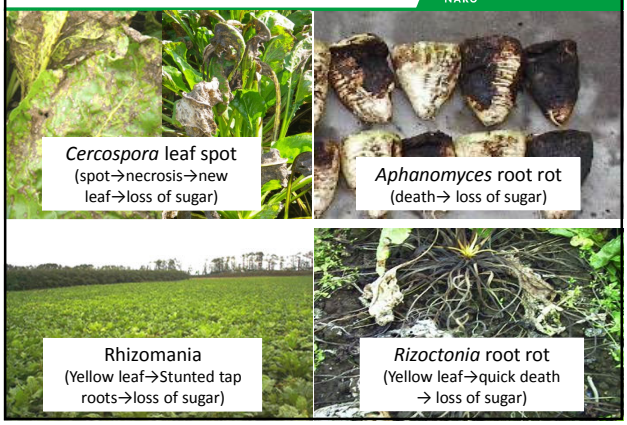
There are 8 sugar refining factories

Temperature and Rainfall

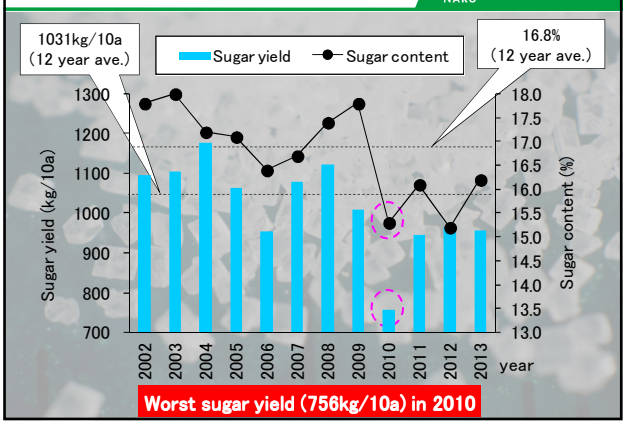




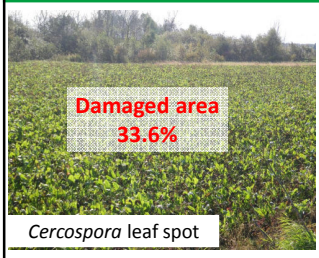
Four major diseases



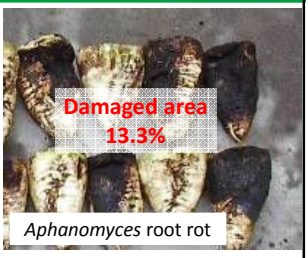
Sugar beet production in Hokkaido



Spread of diseases in 2010



There are good fungicides. However, the fungicides could not spray with good timing because of a long rain in 2010.



There is no good fungicide to control this disease. It costs a lot to improve drainage of soil.

Need for multiple disease resistance

Disease resistance since 2006

Variety	Disease resistance Cer	Ap	Rz	Ri
Morino	MS	M	S	W
Scone	W	MS	–	W
Nozomi	W	–	–	W
Kitasayaka	MS	MS	S	W
Stout	S	M	–	M
Etopirika	W	M	–	W
Amaibuki	W	M	–	MW
Ascend	W	M	–	MW
Fruden R	MS	MW	S	W
Rhizomacs	MS	M	S	MS
Animart	W	M	–	MW
Crona	W	M	–	W
Kachimaru	W	MS	–	MW
Rycka	MS	M	S	MW
Remieru	W	M	–	MW
Yukimaru	MW	M	S	W
Papirika	MW	M	S	MW
Rivolta	S	MS	S	S
Amahomare	M	M	–	W

Strong *Cercospora* resist.
2 varieties (7.8% of area)

Strong *Aphanomyces* resist.
no variety

Strong Rhizomania resist.
8 varieties (34.7% of area)

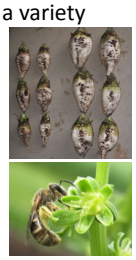
Strong *Rhizoctonia* resist.
1 variety (1.5% of area)

Can not cope with disease spread like in 2010

Sugar beet breeding in Japan

- 5 researchers (breeders)
- 3 way crossing to be a variety

♀A (CMS) X ♂B (O-type)
♀(AxB) (F_1 CMS) X ♂C (Pollen)
(AxB)xC



- Biennial (two years for seed)
- Development of a new varieties in cooperation with world sugar beet companies

World seed companies

syngenta
Syngenta.com
Sweden
(World ranking no.3)

KWS
Germany
(World ranking no.6)

SESVANDERHAVE
Netherlands

Discovery of "NK-310"

- Strong resistances to three diseases (*Cercospora, Aphanomyces, Rhizoctonia*)

NK-310 (resistance)

NK-184 (susceptible)

Development of "Hokkai 101"

NK-280mm-CMS
(Cer, Ap, Ri)

NK-333mm-O
(Ap)

Pollen parent (*Syngenta)
(Rz)

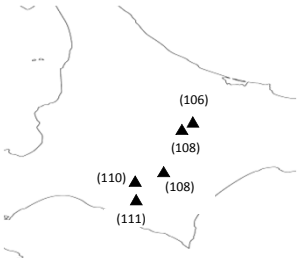
(2003)

(2006)

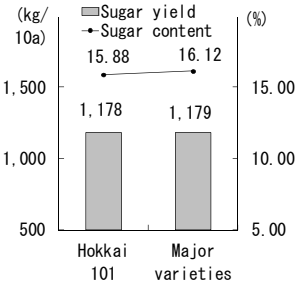
"Hokkai 101"

Practical trait ? (Sugar yield, bolting)
Multiple disease resistances ?
⇒ Official tests over 3 years

Sugar yield (precision field)

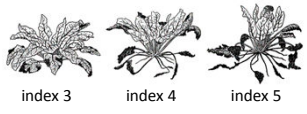


Sugar yield of Hokkai 101
(%Compare to the standard var.)



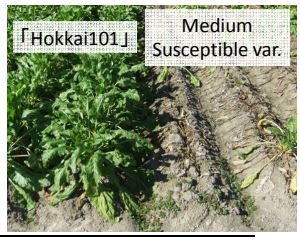
Sugar yield of Hokkai 101 is equally as good as major varieties

Cercospora leaf spot resistance



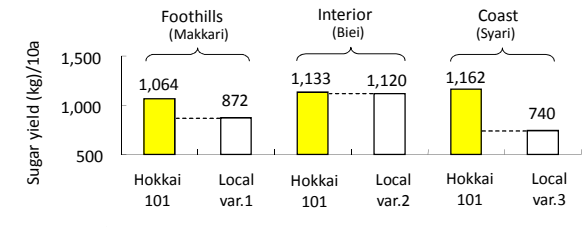
Strain or Variety	2009		2010		2011		Rank (ave.)
	Index	Rank	Index	Rank	Index	Rank	
Hokkai 101	2.4	S	1.6	S	1.5	S	S
Stout	2.4	S	1.6	S	1.1	S	S
Monohikari	3.0	M	2.5	M	4.1	MW	M
Monohomare	3.8	W	3.3	MW	—	—	MW
Starhill	3.9	W	4.5	W	4.8	W	W

Aphanomyces root rot resistance



Strain or Variety	2009		2010		2011		Rank (ave.)
	Index	Rank	Index	Rank	Index	Rank	
Hokkai 101	0.8	S	1.7	S	0.6	S	S
Hokkai 90	0.6	S	1.4	S	0.5	S	S
Kitasayaka	1.2	MS	2.8	MS	0.9	MS	MS
Monohomare	2.4	M	3.4	M	1.5	M	M
Kabutomaru	3.6	MW	4.5	MW	2.5	MW	MW

Sugar yield (farmers' field)



Cercospora index (0:no~5:severe)	1.0	<	1.7	2.0	<	3.0	1.3	<	3.6
Root rot (%)	2.1	<	13.7	0.0	<	5.9	1.0	<	39.2
Bolting (%)	2.7	<	0.0	0.0	<	0.0	20.3	<	0.0

In 2010, sugar yield of Hokkai 101 was superior to local varieties due to disease resistances.

Summary

- Sugar beet in Japan: a important rotation crop
- Diseases due to humid and high temperature in summer
- Discovery of a multi disease resistant strain
- Development of a multi disease resistant variety


“Hokkai 101” is growing on farm !

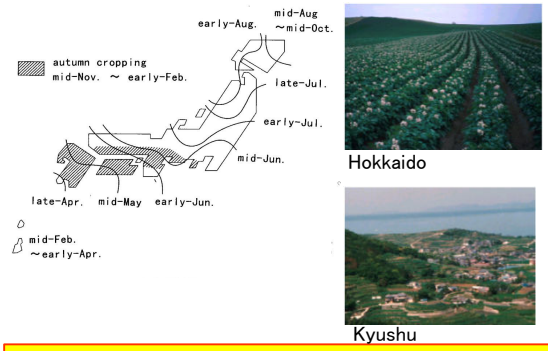
National Agriculture and Food Research Organization
農業・食品産業技術総合研究機構

Breeding of new potato cultivars in Japan

NARO Hokkaido Agricultural Research Center
Upland Farming Resource Research Division

Kenji Asano

Potato production in Japan



Potatoes are cultivated at any time all year around in different regions across Japan

Cropping types of potato in Japan

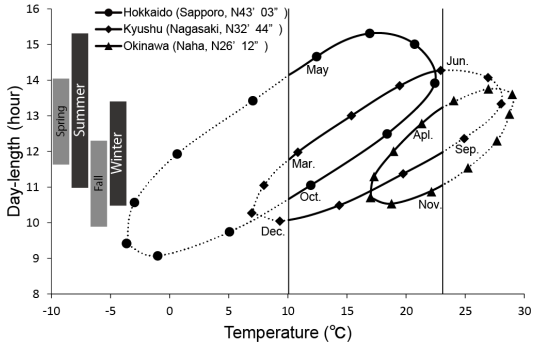

Spring cropping in Nagasaki


Summer cropping in Hokkaido


Fall cropping in Nagasaki

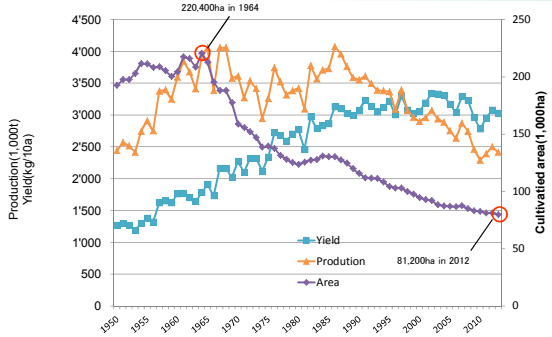

Winter cropping in Kagoshima

Cropping type and meteorological conditions



Growing conditions are drastically different among cropping type.

Potato production in Japan



In spite of decreasing in cultivated area, gross production has remained almost same level, due to an increase in yield.

Potatoes has various usage

Objectives of potato breeding in Japan

Fresh market
- Appearance and flesh color
- Good texture for use

Starch production
- High starch content
- Starch qualities

- Tuber size and shape
- Less discoloration after peeling and cooking
- Low PGA content
- Blackspot bruising tolerance

- High yield
- Proper maturity
- Pest and disease resistance
- Suitability to machine cultivation
- Drought/moisture resistance

- Proper dry matter content
- Uniformity of dry matter distribution
- Low reducing sugar content (for fried food)
- Flesh quality and starch granule size

Food processing

Different characteristics are required for each purpose.

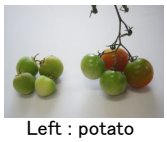
Breeding flow chart in NARO.

No. of years	Breeding stage	No. of plants and replicates	No. of lines	Disease resistance and adaptability test
1 year	Crossing		200,000	
2 years	Primary individual selection of seedling	1,1	20,000	Potato cyst nematode Late blight Potato virus Y Potato virus X Common scab
3 years	Secondary individual clonal selection	1,1	17,000	
4 years	Line selection	8,1	1,500	
5 years	Preliminary performance yield test	36,1	200	
6 years	Performance yield test	42,3	40	
7 years	Performance yield test	42,3	40	Local adaptability test Test of specific character
8-10 years	Performance yield test	42,3	40	Performance test for recommendable cultivars Test of specific character
11 years	New cultivar		1/1	

New cultivars are released almost every 5years

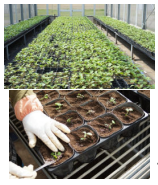
Crosses～Seedlings stages


Artificial pollination


Left : potato
Right : tomato


Seeds
0.5g/1,000seeds


seedlings




Tubers harvested from seedlings

Field evaluation


Secondary individual clonal selection

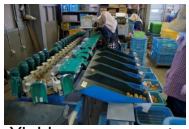

Internal defects


Selected line


Line selection (8plants/lines)


Performance yield test
(42plants/plot 3 Rep.)

Yield and qualities evaluation


Yield measurement

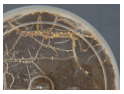

Starch content measuremt


Boiling


Selection based on yield, appearance, occurrence of internal defect etc.


Frying

Disease resistance breeding


Potato cyst nematode


Potato virus Y

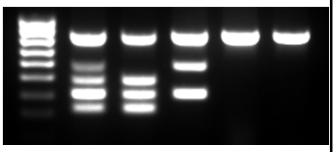
Markers are available


Late blight


Common scab

No available markers

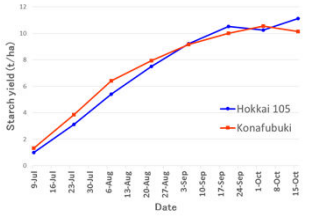

Selection at infested field


Selection by DNA marker

New starch cultivar “Hokkai 105”

農研機構

Site	cultivar name	date of vine drying	Total yield (t/ha)	specific gravity	Starch yield (t/ha)
Memuro	Hokkai 105	8-Oct	58.9	1.1069	11.0
	Konafubuki	26-Sep	45.2	1.1153	9.2
Kitami	Hokkai 105	20-Oct	64.3	1.1143	13.0
	Konafubuki	6-Oct	50.9	1.1204	11.0



・High starch yield

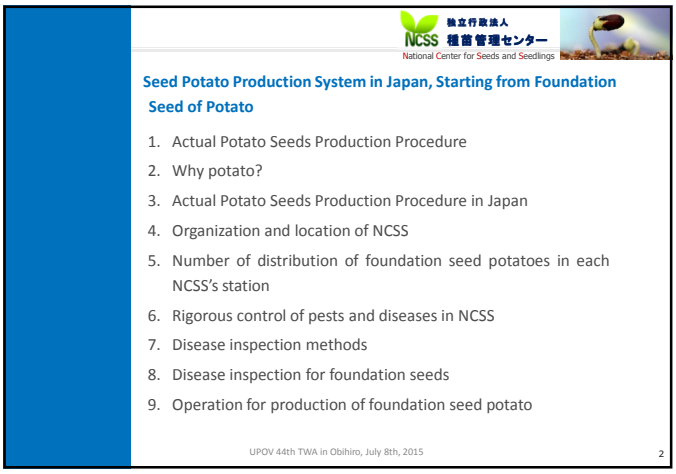
・Resistant to PCN and PVY

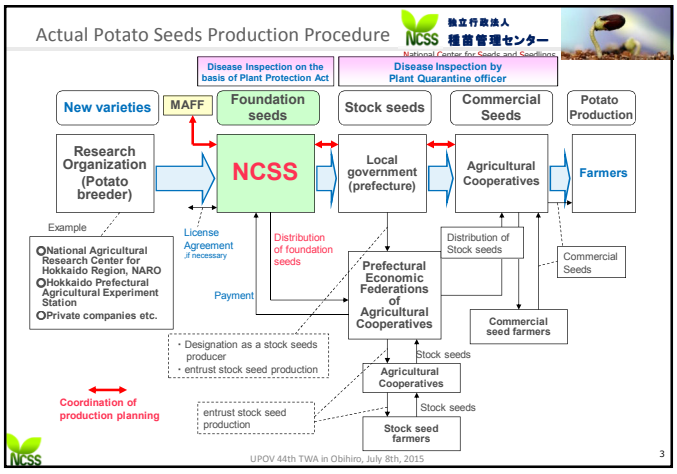
・Late maturity

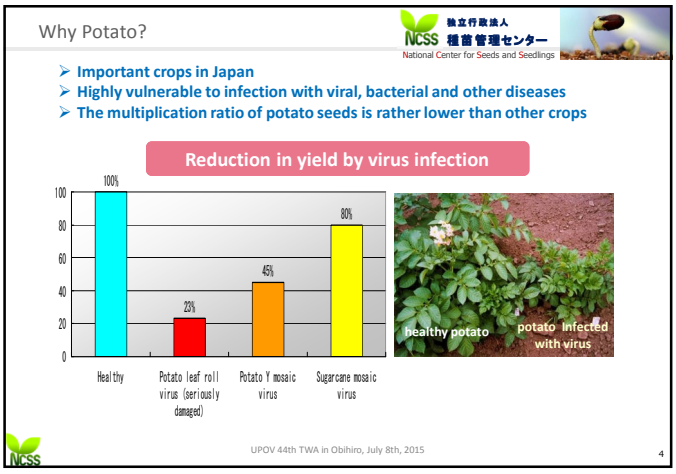
Thank you

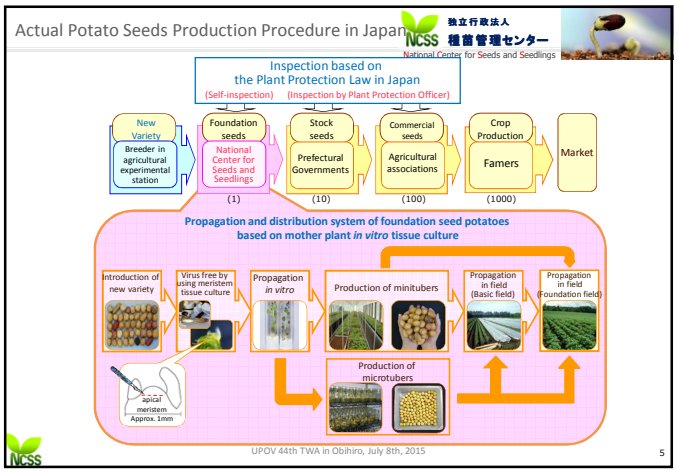
農研機構

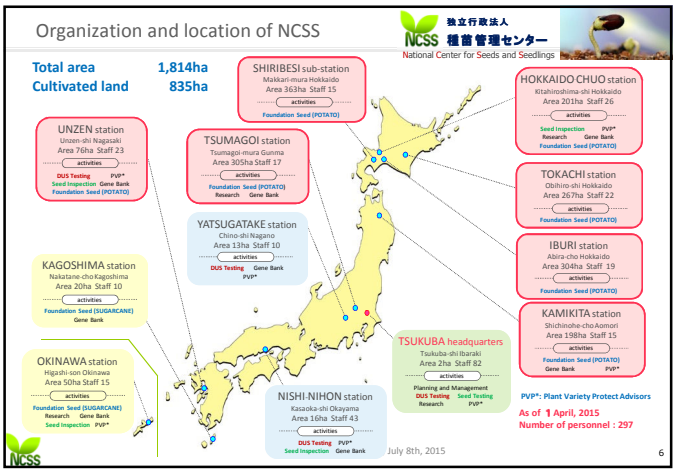

Seed Potato Production System in Japan, Starting from Foundation Seed of Potato
Tsukasa KAWAKAMI
International Affairs Coordinator
Planning and Management Division, Administration Department
National Center for Seeds and Seedlings (NCSS),
Incorporated Administrative Agency


Seed Potato Production System in Japan, Starting from Foundation Seed of Potato
1. Actual Potato Seeds Production Procedure
2. Why potato?
3. Actual Potato Seeds Production Procedure in Japan
4. Organization and location of NCSS
5. Number of distribution of foundation seed potatoes in each NCSS's station
6. Rigorous control of pests and diseases in NCSS
7. Disease inspection methods
8. Disease inspection for foundation seeds
9. Operation for production of foundation seed potato
UPOV 44th TWA in Obihiro, July 8th, 2015
2

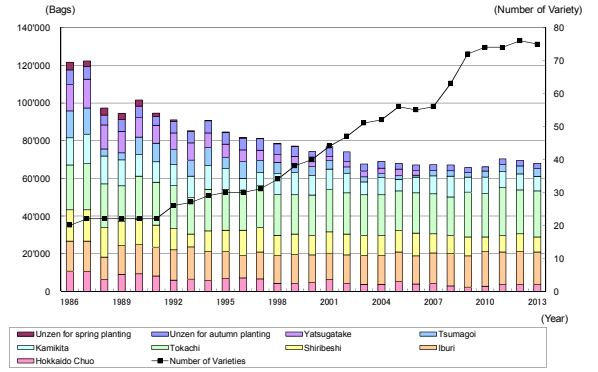

Actual Potato Seeds Production Procedure
Disease Inspection on the basis of Plant Protection Act
Disease Inspection by Plant Quarantine officer
New varieties
MAFF
Foundation seeds
Stock seeds
Commercial Seeds
Potato Production
Research Organization (Potato breeder)
NCSS
Local government (prefecture)
Agricultural Cooperatives
Farmers
Example
National Agricultural Research Center for Hokkaido Region, NARO
Hokkaido Prefectural Agricultural Experiment Station
Private companies etc.
License Agreement if necessary
Distribution of foundation seeds
Payment
Distribution of Stock seeds
Commercial Seeds
Prefectural Economic Federations of Agricultural Cooperatives
Commercial seed farmers
・Designation as a stock seeds producer
・entrust stock seed production
Stock seeds
Agricultural Cooperatives
Coordination of production planning
entrust stock seed production
Stock seeds
Stock seed farmers
UPOV 44th TWA in Obihiro, July 8th, 2015
3


Why Potato?
Important crops in Japan
Highly vulnerable to infection with viral, bacterial and other diseases
The multiplication ratio of potato seeds is rather lower than other crops
Reduction in yield by virus infection
100%
23%
45%
80%
Healthy
Potato leaf roll virus (seriously damaged)
Potato Y mosaic virus
Sugarcane mosaic virus
healthy potato
potato infected with virus
UPOV 44th TWA in Obihiro, July 8th, 2015
4

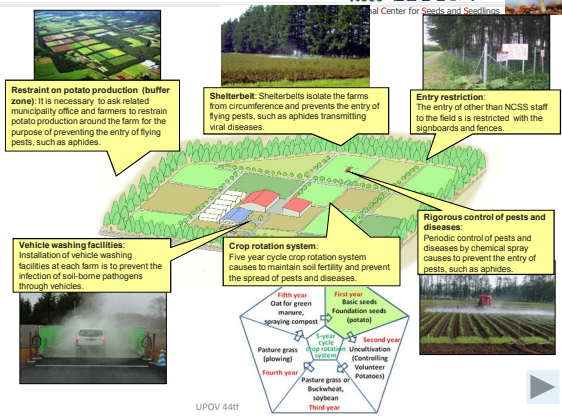

Actual Potato Seeds Production Procedure in Japan
Inspection based on the Plant Protection Law in Japan
(Self-inspection) (Inspection by Plant Protection Officer)
New Variety
Breeder in agricultural experimental station
Foundation seeds
National Center for Seeds and Seedlings
Stock seeds
Prefectural Governments
Commercial seeds
Agricultural associations
Crop Production
Famers
Market
(1)
(10)
(100)
(1000)
Propagation and distribution system of foundation seed potatoes based on mother plant in vitro tissue culture
Introduction of new variety
Virus free by using meristem tissue culture
Propagation in vitro
Production of minitubers
Propagation in field (Basic field)
Propagation in field (Foundation field)
apical meristem Approx. 1mm
Production of microtubers
UPOV 44th TWA in Obihiro, July 8th, 2015
5


Organization and location of NCSS
Total area 1,814ha
Cultivated land 835ha
SHIRIBESI sub-station
Makkari-mura Hokkaido
Area 363ha Staff 15
UNZEN station
Unzen-shi Nagasaki
Area 76ha Staff 23
TSUMAGOI station
Tsumagoi-mura Gunma
Area 305ha Staff 17
HOKKAIDO CHUO station
Kitahiroshima-shi Hokkaido
Area 201ha Staff 26
TOKACHI station
Obihiro-shi Hokkaido
Area 267ha Staff 22
YATSUGATAKE station
Chino-shi Nagano
Area 13ha Staff 10
IBURI station
Abira-cho Hokkaido
Area 304ha Staff 19
KAGOSHIMA station
Nakatane-cho Kagoshima
Area 20ha Staff 10
KAMIKITA station
Shichinohe-cho Aomori
Area 198ha Staff 15
TSUKUBA headquarters
Tsukuba-shi Ibaraki
Area 2ha Staff 82
OKINAWA station
Higashi-son Okinawa
Area 50ha Staff 15
NISHI-NIHON station
Kasaoka-shi Okayama
Area 16ha Staff 43
PVP*: Plant Variety Protect Advisors
As of 1 April, 2015
Number of personnel : 297
July 8th, 2015
6

Number of distribution of foundation seed potatoes in each NCSS's station



Rigorous control of pests and diseases in NCSS



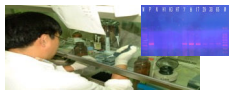
Disease inspection methods

1. Viruses disease inspection

Inoculation test

Electron microscope test

Antiserum test（ELISA）



Genetic screening test（PCR）

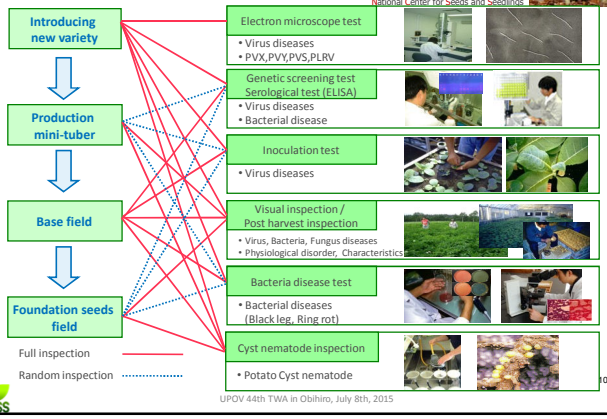
2. Bacteria disease inspection

Blackleg disease test

Ring rot disease test

3. Cyst nematode examination

Disease inspection for foundation seeds



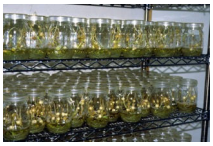
In vitro multiplication from New Varieties

- Apical meristem culture

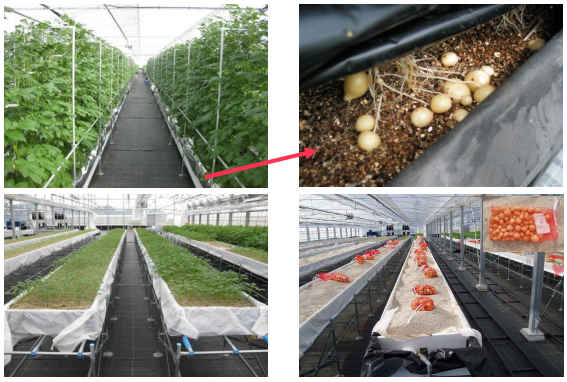
- In vitro plantlet

- Multiplication by stem cutting

- Micro Tuber



Production of Minituber



Production in base field

- Using mini tuber
- Cultivation covered with a tunnel of insect proof net


Production in foundation field

- Using seed potatoes harvested in base fields
- Early planting to avoid heavy aphid times



- Tuber-unit planting
- Planting hedge trees
  → to prevent the entry of pests
- Extermination of pests by using pesticides

Visual inspection by rouging

Potato harvesting

Thank you for your attention.

I hope you can enjoy staying in Japan.

Bean Breeding at Tokachi Agri. Exp. Station

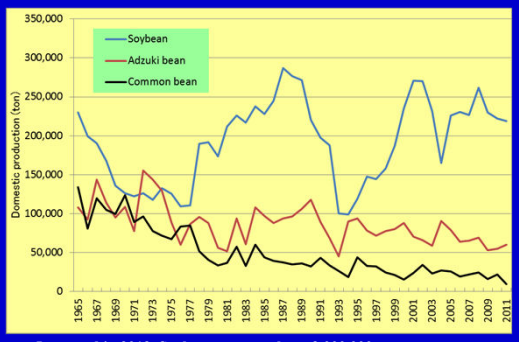
Soybean

Adzuki Bean

Common Bean

H. Shimada, Senior Research Manager of Bean Breeding Group

Domestic production of beans in Japan



Imported in 2013: Soybean about 3,000,000 ton
Adzuki bean about 25,000 ton
Common bean about 12,000 ton

Crop rotation in upland farming in Tokachi

Uses of Soybean produced in Japan

Tofu

Nimame

Boiled and tasted soybean with other vegetables

Nattou

Fermented boiled soybean

Miso

Fermented soybean paste

Uses of Adzuki bean produced in Japan

Sekihan
Steamed sticky rice with adzuki bean

Dorayaki cake

Daifuku rice cake

Manju
Wrapped adzuki bean paste in steamed rice flour cake

Dango dumplings

Monaka

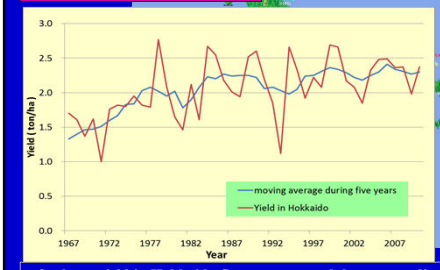
Objectives of Soybean Breeding

- Maturity Early at Eastern Area, Middle at Western Area
- Cool- weather tolerance
- Resistance to browning or cracking of seeds by low temperature
- Resistance to cyst nematode races
- Tolerance to wet damage
  - important for soybean cultivated in paddy fields
- Adaptability to combine harvesting
  - non or less pod-shattering, lodging resistance, high pod-setting
- Processing Quality

Maturity – Early at Eastern Area, Middle at Western Area

Frostless season in Tokachi
Beginning of June – Beginning of Oct. about 120 – 130 days
Average temperature from June to Sep. about 17 degree centigrade

Cool-weather tolerance



Soybean yield in Hokkaido fluctuates up and down according to high or low temperature in summer.

Resistance to browning or cracking of seeds by low temperature after flowering stage

Seed Coat Browning

Yukihomare (R)

Toyomusume (S)

Seed Cracking

Glass-house for tests for cool-weather tolerance and resistance to seed browning and cracking : the temperature inside is controlled below 18 degree centigrade in daytime during the treatment

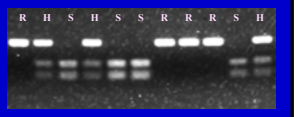
Resistance to soybean cyst nematode races

Race 3 is spread most dominantly in Hokkaido, followed by Race 1.
We are breeding resistant varieties to Race 3 and Race 1.

Damage by cyst nematode race 3

Yukihomare (R) Kariyutaka (S)

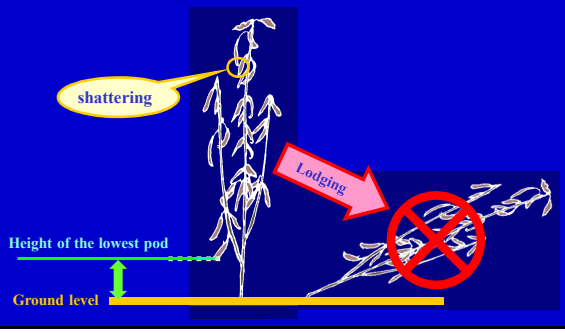
DNA marker assist selection



R : resistant type
H : hetero type
S : susceptible type

Adaptability to combine harvesting

- Non or Less pod-shattering
- Lodging resistance
- High position of pod-setting



Processing Quality for Tofu

Measurement of Tofu hardness by a texture analyzer

- Tofu hardness
  → Yield of Tofu from soybean
- Viscosity of soymilk
  → Uniformity of curdling

Objectives of Adzuki bean Breeding

- Maturity Early at Eastern Area, Middle at Western Area
- Resistance to soil-born diseases
- Cool- weather tolerance
- Adaptability to machinery farming
  - lodging resistance, high pod-setting, long hypocotyl
- Processing Quality

Resistance to soil-born diseases

Brown stem rot

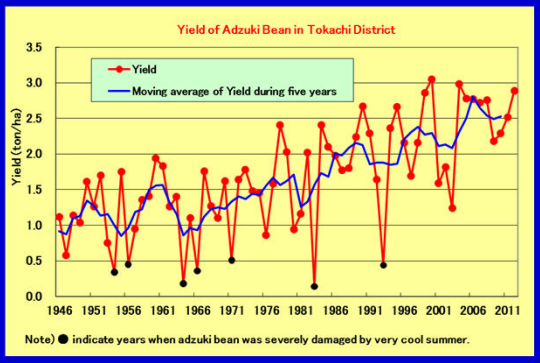
Resistant Susceptible

Brown stem rot resistance is selected by DNA markers.

Phytophthora stem rot

Field test for resistance to Phytophthora stem rot in paddy fields

Cool-weather tolerance



Adzuki bean yield in Tokachi Dist. severely fluctuates up and down according to high and low temperature in summer.

Cool-weather tolerance

Pod-setting fails by pollen sterilization under low temperature.

Stigma of normal flower— more than 100 normal pollen grains

Stigma of damaged flower with no fertile pollen grain

Normal temperture

Low temperature treatment during former part of flowering period

Adaptability to machinery farming

1. Lodging resistance
2. High pod-setting
   → Less harvest loss by combine harvesting
3. Long hypocotyl
   → Ridging at early stage can bury weeds.

Normal Long hypocotyl

[Annex VI follows]

ANNEX VI

DRAFT TEST GUIDELINES TO BE DISCUSSED AT TWA/45
(* indicates possible final draft Test Guidelines)

Guideline date for Subgroup draft to be circulated by Leading Expert: **April 1, 2016**
Guideline date for comments to Leading Expert by Subgroup: **April 29, 2016**

New draft to be submitted to the Office of the Union
before May 27, 2016

Species	Basic Document	Leading expert(s)	Interested experts (countries/organizations) [1]
Barley (*Hordeum vulgare* L. *sensu lato*)	TG/19/10	Ms. Beate Ruecker (DE)	AU, AR, CA, CZ, DK, ES, FI, GB, JP, IT, NL, NZ, KR, QZ, SK, CLI, ESA, ISF
Castor Bean (*Ricinus comunis* L.)	TG/RICIN(proj.1)	Mr. Adriaan de Villiers (ZA)	AR, BG, BR, FR, IT, QZ, UA, ESA, ISF, Office
Cotton (*Gossypium* L.)	TG/88/7(proj.1)	Mr. Luis Salaices (ES)	AR, AU, BR, CN, CO, ES, JP, KE, QZ, TZ, VN, ZA, CLI, ESA, ISF, Office
Elytrigia (*Elytrigia elongata* (Host) Nevski), (*Agropyron elongatum* (Host) P. Beauv.)	TG/ELYTR(proj.5)	Mr. Alberto Ballesteros (AR)	HU, PL, QZ, ESA, ISF, Office
Field Bean (*Vicia faba* L. var. *minor*)	TG/8/7(proj.1)	Ms. Cheryl Turnbull (GB)	AR, AU, CA, CO, CZ, DE, DK, ES, FR, GB, IT, NL, QZ, ZA, CLI, ESA, Office
Oats (*Avena sativa* L. & *Avena nuda* L.)	TG/20/8(proj.1)	Mr. Antonio Escolano (ES)	AR, AU, BR, CA, CN, CO, CZ, DE, DK, ES, FI, FR, GB, IT, JP, KR, NL, QZ, SK, UY, ZA, ESA, ISF, Office
Quinoa (*Chenopodium quinoa* Willd.)	TG/CHENO(proj.2)	Mr. Erik Lawaetz (DK)	AR, BR, CA, CL, CO, ES, FR, KR, NL, QZ, ZA, ESA, ISF, Office
Red Clover (*Trifolium pratense* L.)	TG/5/7	Ms. Robyn Hierse (ZA)	AR, AU, BR, CZ, DE, DK, ES, FI, FR, GB, IT, JP, NZ, QZ, SK, UY, ZA, CLI, ESA, ISF, Office
*Scorpion Weed (*Phacelia tanacetifolia* Benth.)	TG/PHACE(proj.3)	Ms. Bogna Kowalczyk (PL)	AT, CZ, DE, FR, QZ, RO, ESA, ISF, Office
Soya Bean (*Glycine max* (L.) Merrill)	TG/80/7(proj.1)	Mr. Alberto Ballesteros (AR)	AR, AU, BR, CA, CN, CO, ES, FR, IT, JP, KR, NL, PY, QZ, SK, UY, VN, CLI, ESA, ISF, Office
*Wheat (*Triticum aestivum L. emend. Fiori et Paol.*) (Revision)	TG/3/12(proj.3)	Ms. Virginie Bertoux (FR)	AR, AT, AU, BG, BR, CA, CL, CN, CZ, DE, DK, ES, FI, GB, HR, HU, IT, JP, KE, KR, NL, NZ, PL, QZ, RO, SK, UA, ZA, CLI, ESA, ISF, Office

[End of Annex VI and of report]

[1] for name of experts, see list of participants

* possible final draft Test Guidelines