OECD SEED SCHEMES
AN INTERNATIONAL SEED VARIETAL CERTIFICATION SYSTEM

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Summary

- Operation of the seed schemes
- TOR for AHWG
- Survey
- Rules
- Guidelines
- Joint Workshop
- What next?

General overview of the OECD Seed Schemes

The OECD Seed Schemes seek to facilitate International trade in Seed through harmonised standards and varietal certification procedures

The OECD Seed Schemes Rules are updated / agreed by consensus at the Annual meeting.

Varietal certification procedures include generation control, varietal identity and varietal purity standards and isolation requirements

Operation of the Schemes

- Certification is Based entirely on
  - Crop inspection
  - Control plots
- Schemes specify varietal purity characters for some 77 species

Operation of the Schemes

- Characters are field based
- However, schemes recognise that it is not always possible to be definitive with varietal identity in a field situation
- Can be more problematic with varietal purity
- Request from some Member Countries to use non field based characters
- OECD Annual meeting 2011 set up *ad hoc working group* to look at the problem and make recommendations
- OECD ***does not / will not*** develop any BMT methods

AHWG Terms of reference

- Carry out a survey of methods available to NDAs which will enhance ability to determine varietal identity/ purity / hybridisation
- Evaluate usefulness of these techniques and their validation
- Recommend relevant validated tests
- Recommend how seed schemes should use the techniques
- Recommend rules changes to facilitate the use of these tests

Survey

- 1st Survey carried out in 2012
- Membership was asked to list and provide information on any biochemical or molecular test used
- From membership of 58, 26 replies were received;
- 6 replies were to note that no such tests were allowed

Survey

- The list was updated in 2015
- Has been carried out Annually by the OECD Secretariat
- Following concerns raised, the 2018 survey was revised – only asked for BMT tests carried out in Seed Certification
  - a) for National certification
  - b) for OECD certification

Survey results (2018)

- 43 Member countries (61) contributed to the survey
- 11 Member countries had nothing to report

- Survey information falls into 3 categories:
  - International recognition
  - National / other validation
  - No validation

Survey results (2018)

- Internationally recognised tests:
- 20 countries declared using BMTs with "international recognition"
  - Argentina, Austria, Brazil, Canada, Chile, Croatia, Czech Republic, Denmark, France, Germany, Hungary, Italy, Netherlands, Poland, Serbia, Slovak Republic, Spain, Switzerland, the United Kingdom and Uruguay
  - 23 different species

Survey Results - Internationally Validated

Avena sativa (oats)	Lolium (ryegrass)
Brassica napus (rapeseed)	Lolium multiflorum
B. Juncea (mustard)	Linum usitatissimum (flax)
B. nigra (black mustard)	Oryza sativa (Rice)
B. oleracea L. var capitata; (Cabbage Group)	Pisum sativum (pea)
B. oleracea L. gongylodes Group (Kohlrabi).	Solanum lycopersicum (tomato)
B. oleracea L. var. gemmifera Zenker (Brussels sprout)	Solanum tuberosum (potato)
B. oleracea L. (broccoli/calabrese)	Triticosecale
B. oleracea L. convar. botrytis (L.) Alef. var. botrytis (Cauliflower)	Triticum aestivum (wheat)
Glycine max (soyabean)	Triticum durum (durum wheat)
Helianthus annuus (sunflower)	Zea mays (maize)
Hordeum vulgare (barley)	

Information for A. sativa

Name of BMT	Country	What is this BMT used for?			Was this technique used as part of Seed Certification in the last two years?			Validated	If "YES" by whom	Reference
		Purity	Identity	Hybridisation	National Certification (Y/N)	OECD certification (Y/N)	In the last 2 years, how many times did the NDA use this method for the purpose of certification			
A-PAGE (Acid-Polyacrylamide Gel Electrophoresis)	Argentina	X	X		N	N	0	Yes	ISTA	ISTA Rule 8.8.6
	Czech Republic	X	X				2			
	Germany	X	X							
	Italy	X	X		Y	Y	0			
	Serbia	X			N	N	0			
	Slovakia	X	X							
	Spain	X	X							
	United Kingdom	X	X		Y	N	0			
IEF PAGE (Ultra Thin Layer – IsoElectroFocusing - Polyacrylamide Gel Electrophoresis)	Germany	X	X					Yes	CPVO	Additional characteristic in national Guideline BSA March 2006 corresponding to other cereals as Hordeum vulgare CPVO CPVO-TP/019/4 01/10/2015
SDS-PAGE (Sodium Dodecyl Sulfate - Polyacrylamide Gel Electrophoresis)	Germany	X	X					Yes	CPVO	Additional characteristic in national Guideline BSA March 2006 corresponding to other cereals as Hordeum vulgare CPVO CPVO-TP/019/4 01/10/2015

Information for T. aestivum -1

Name of BMT	Country	What is this BMT used for?			Was this technique used as part of Seed Certification in the last two years?			Validated	If "YES" by whom	Reference
		Purity	Identity	Hybridisation	National Certification (Y/N)	OECD certification (Y/N)	No of times used in the last 2 years			
SDS-PAGE (Sodium Dodecyl Sulfate - Polyacrylamide Gel Electrophoresis)	Austria	X	X		N	N	0	Yes	UPOV	Part III - Description of the Method to be Used - Glutenin composition: allele expression at loci Glu-A1 (27), Glu-B1 (28) and Glu-D1 (29) - SDS PAGE Method for Analysis of HMW Glutenins from T. aestivum of the UPOV TG3/11 Guidelines for the conduct of tests for distinctness, homogeneity and stability
	Czech Republic	X	X				50			
	Denmark		X							
	Germany		X							
	Italy	X	X		Y	Y	0			
	Poland	X	X							
	Slovakia	X	X							
	Spain	X	X							
	United Kingdom	X	X		Y	N	14			
A-PAGE (Acid-Polyacrylamide Gel Electrophoresis)	Argentina	X	X		N	N	0	Yes	ISTA/UPOV	ISTA Rule 8.8.8 UPOV tg/19/10 guidelines for the conduct of tests for distinctness, uniformity and stability /

Information for T. aestivum -2

Name of BMT	Country	What is this BMT used for?			Was this technique used as part of Seed Certification in the last two years?			Validated	If "YES" by whom	Reference
		Purity	Identity	Hybridisation	National Certification (Y/N)	OECD certification (Y/N)	No of times used in the last 2 years			
Method for Determination of Phenol Reaction	Italy	X	X		Y	Y	0	Yes	UPOV	Ad 24 " Grain: coloration with phenol - Method for Determination of Phenol Reaction" UPOV TG : Seed coloration with phenol of UPOV TG/3/12l for Distinctness, Uniformity and Stability tests Triticum aestivum L. (wheat)
	United Kingdom	X	X		Y	N	10			
SRR based method	Italy	X	X		Y	Y	0	Yes	ISTA	ISTA Rule 8.10.2 Triticum (wheat) Microsatellite Markers
	Canada		X		Y	N	46			
GMO detection	Brazil		X		Y	N	0	Yes	ISO / EURL	Internal methods validated with reference to EURL validation studies and to the standards ISO 24276, ISO 21569, ISO 21570 and ISO 21571

Survey results - II

- National validated tests:
  - 21 different species
  - 16 different NDAs:
    - Austria, Brazil, Belgium, Canada, France, India, Italy, Moldova, Poland, Russian Federation, Slovenia, Spain, Turkey, Ukraine, the USA and Zambia.

Survey Results – National / other Validated

Avena sativa (oats)	Rice
Beta vulgaris (sugar beet)	Phaseolus vulgaris
Brassica napus (rapeseed)	Solanum lycopersicum (tomato)
Endivia	Solanum tuberosum (potato)
Glycine max (soyabean)	Sorghum
Helianthus annuus (sunflower)	Triticosecale
Hordeum vulgare (barley)	Triticum aestivum (wheat)
Lactuca sativa (lettuce)	Truiticum durum (Durum wheat)
Linum usitatissimum (flax)	Triticum spelta (spelt wheat)
Lolium (ryegrass)	Zea mays (maize)
Lupinus (lupins)	

Survey results - III

- Non validated tests:
  - 23 different species
  - 9 different NDAs
    - France, India, Italy, Japan, Netherlands, Poland, Serbia, United Kingdom and the USA.

Survey Results – Non Validated tests

Allium cepa	Lactuca sativa
Avena sativa (oats)	Linum usitatissinum
Brassica spp	Lolium (ryegrass)
Brassica napus (rapeseed)	Lupinus luteus
Capsicum annuum	Panicum spp
Citrillus lanatus	Pisum sativum (pea)
Cucumis melo	Phaseolus vulgaris
Cucurbita maxima	Solanum melongena
Cucurbita pepo	Solanum tuberosum
Glycine max (soyabean)	Triticale
Helianthus annuus	Vicia faba (faba bean)
Hybrid cereals	

Seed Scheme Rules

- The Seed Scheme Rules were imprecise about the use of BMT:

- Nearest Rule was the Rule 7.4.5 “Other controls as appropriate”:

“*The National Designated Authority is entitled to make any other tests appropriate to the variety concerned and to obtain any information required for the certification of each seed lot.*”

- However, the AM decided that this Rule was not intended to cover BMT, and instructed the AHWG to advise on appropriate Rules changes.

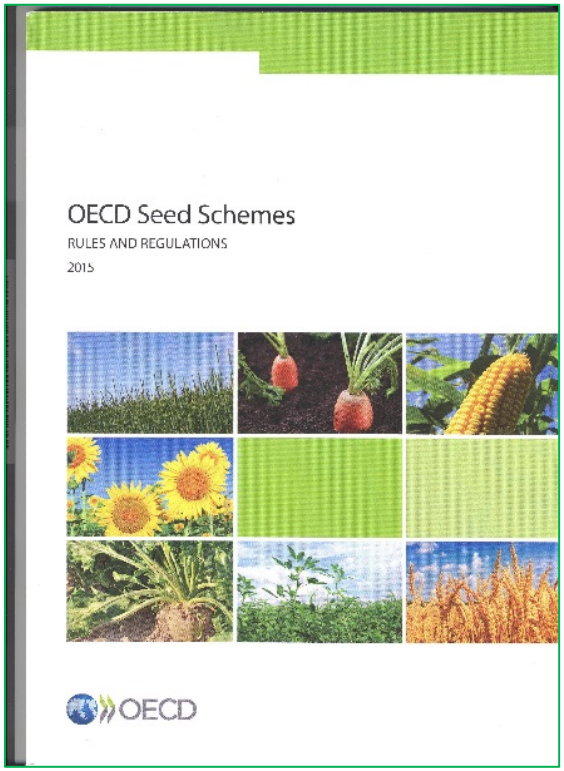
Seed Scheme Rules

- Rules changes were agreed at the 2019 AM. 7.4.5 will read:

"Where field inspection and control plot testing have been fully implemented and still left some doubt as to the varietal identity of a seed lot, the National Designated Authority is entitled to make any other supplementary tests as recorded in the Annex to Part III of the Guidelines for control plot tests and field inspection of seed crops, as being appropriate to the variety concerned and to obtain any supplementary information in support of the certification decision for the seed lot concerned including internationally recognised biochemical and molecular techniques performed by a laboratory as referred to in Rule 7.4.2.1."

Seed Scheme Rules

- For the avoidance of doubt, this will also be added to Common Rule 8 on Post Control tests of the Seed as Rule 8.6



Seed Scheme Rules

- And:
- 7.4.5.1

  The National Designated Authority may authorise non-official laboratories to carry out the analysis. If the National Designated Authority decides to use this procedure, it must define its scope (activities, species, categories and persons concerned). The National Designated Authority shall satisfy itself of verifications and other requirements, and take all measures which guarantee equivalent operations by an authorised laboratory or by an official laboratory.

Guidelines - Use of Internationally Recognised Laboratory Tests

2019 – The Annual Meeting has agreed to a Revision of the "Guidelines for Control Plot Tests and Field Inspection of Field Crops"

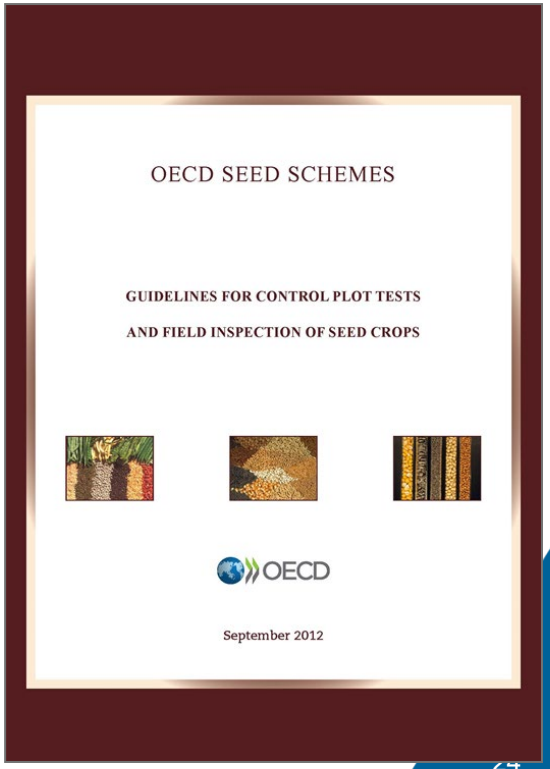
Now includes the conditions under which non- field based tests can be carried out:

- Complementary process to Field Inspection/control plot process only
- Must in no way replace field Inspection/control plot

  Can only be used where these traditional techniques have been implemented fully but still leave some doubt as to the identity of a variety.
- That these techniques are not be compulsory, but under some circumstances could be used by those National Designated Authorities that wish to do so

Guidelines

- Methods used must be internationally recognised and documented methods.
  - This is to ensure that any techniques used by an NDA have been shown to be accurate and repeatable.
- Apply to any category of seed
- Methods to be used for Identity only
- Annual Meeting to approve specific tests for specific species



Guidelines

- Where an National Designated Authority, other than the certifying NDA, is planning to reject a seed lot based on results obtained through the use of these methods, this should be undertaken in agreement with the certifying NDA.
- Where a technique is used that is not documented in the variety description, an authenticated standard sample of the variety must be available for comparison and must be treated and examined in the same way as the sample under test.
- Where a variety description includes an internationally recognised test, it can be used as part of the OECD process, regardless of the above.

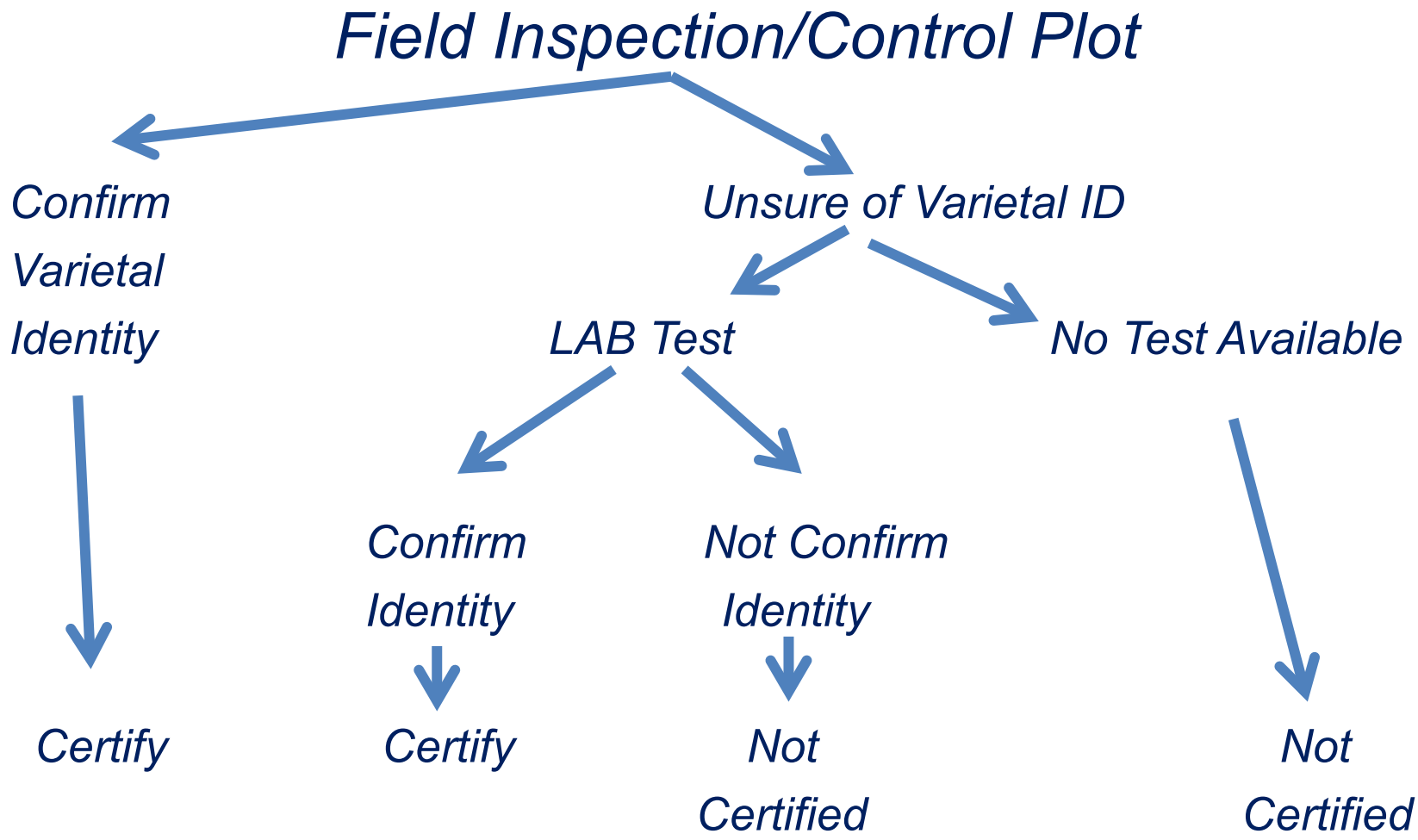
Guidelines

- The guidelines contain an Annex that has the approved list of techniques
- Will be a “living document” that can be updated as the NDAs determine through the Annual meeting,
  - The precise method for this has yet to be determined

Example from the Annex

SPECIES	NAME OF TEST	DOCUMENTED BY	REFERENCE
Avena sativa (Oats)	A-PAGE (Acid-Polyacrylamide Gel Electrophoresis)	ISTA	**ISTA Rule 8.8.6**
Brassica napus (Rapeseed)	Isozymes in starch gels	CPVO	**Annex II.2 " Description of the SGE Method (Starch Gel Electrophoreses) for the Analysis of Isoenzymes from Brassica napus " of CPVO-TP/036/2 Final " protocol for Distinctness, Uniformity and Stability tests"**
	GMO detection and identification	ISTA	**Internal methods validated with reference to EURL validation studies and to the standards ISO 21569 and ISO 21571**
Glycine max (soyabean)	Seed: coloration due to peroxidase activity in seed coat	UPOV	**Ad. 16: "Seed: coloration due to peroxidase activity in seed coat" to the UPOV TG/80/6 guidelines for the conduct of tests for Distinctness, Uniformity and Stability**
	GMO Detection, Identification and Quantification	**ISTA/ EURL**	**Internal methods validated with reference to EURL validation studies and to the standards ISO 21569, ISO 21570 and ISO 21571**

Use of Internationally Validated Laboratory Tests for Varietal Identity



Other initiatives

Co-operation with other International Organisations:

- OECD held a joint OECD/UPOV/ISTA/AOSA WORKSHOP on biochemical and molecular methods in Paris on 8 June 2016
- Designed to bring OECD up to speed with developments the other organisations

Workshop Conclusions

- To develop a joint document explaining the principal features (e.g. DUS, variety identification, variety purity, etc.) of the systems of OECD, UPOV, AOSA and ISTA and, for mutual understanding, to repeat the joint workshop at relevant meeting of ISTA.

- To carry out a joint inventory by UPOV, OECD, AOSA and ISTA of the use of molecular marker techniques, by crop, with a view to developing a document containing that information. The OECD could contribute to the document by sharing the ongoing list of molecular techniques used by NDAs and collected / updated annually by the OECD Secretariat.

- To develop a list of terms and their definitions as used by OECD, UPOV, AOSA and ISTA and to make an attempt to harmonise these.

- To consider organising another similar workshop in three years' time.

- To consider if using the term “internationally validated” is still appropriate and if it should be replaced by another term such as “internationally harmonised” methods.

Further tasks

- The AM has instructed the AHWG to recommend changes to its ToR and to continue with future work;
  - Will include how future internationally recognised laboratory tests can be “approved” by the AM
  - The following has been suggested (based on UPOV):

The Annual Meeting of the Seed Schemes has agreed that any techniques that are used must be shown to have:

- reproducibility of data production between laboratories and detection platforms (different types of equipment);

- repeatability over time;

- discrimination power;

- accessibility of methodology

Further tasks

- Conditions for varietal Purity
- If each test is suitable for varietal identity or purity or both
- ……

Thank you

www.oecd.org/tad/seed

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http://www.oecd.org/tad/code/seeds.htm