Working Group on
Biochemical and Molecular Techniques and DNA Profiling in Particular (BMT)

Preparatory Workshop for the Tenth Session

and

Technical Workshop on the Use of Molecular Techniques in Plant Variety Protection

Seoul, November 20, 2006

Agenda item 1.

INTRODUCTION TO UPOV

PROGRAM (Morning)

Preparatory Workshop for the Tenth Session of the BMT (starting at 9.00)

1. Introduction to UPOV
2. Introduction to the UPOV Technical Working Parties (TWPs) and the BMT
3. Overview of the General Introduction and TGP documents
4. The UPOV Website
5. Agenda of the BMT session
6. Situation in UPOV concerning the possible use of molecular techniques in plant variety protection

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WHAT IS UPOV?

The International **C**onvention for the Protection of New Varieties of Plants

established

The International **U**nion for the Protection of New Varieties of Plants

Union internationale pour la **p**rotection des **o**btentions **v**égétales

UPOV

PROGRAM (Afternoon)

Technical Workshop on the Use of Molecular Techniques in Plant Variety Protection (starting at 13.30)

7. Experiences and outlooks on the use of molecular techniques in plant variety protection by UPOV members
8. Feedback from participants
9. Closing of the Workshops (at 17.00)

UPOV Mission Statement:

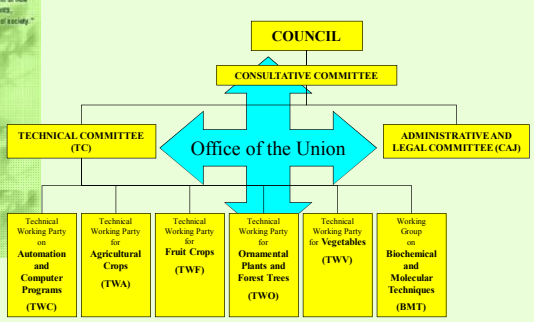
"To provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society"

THE UNION

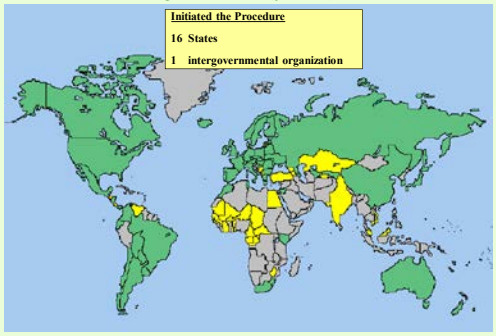
- Members of the Union
  - States or Intergovernmental Organizations
- Permanent Organs of the Union
  - The Council - consisting of the representatives of the members of the Union
  - The Office of the Union - carries out all the duties and tasks entrusted to it by the Council

UPOV Membership/Territories covered

UPOV Structure



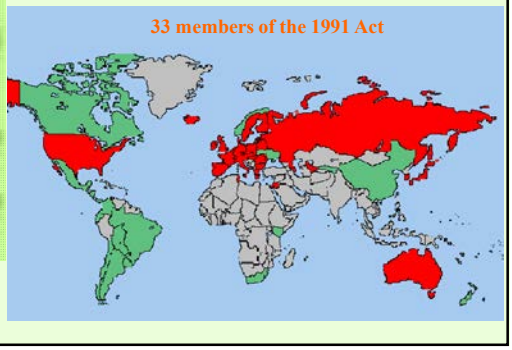
Members of UPOV (green) and initiating States and organizations (yellow)



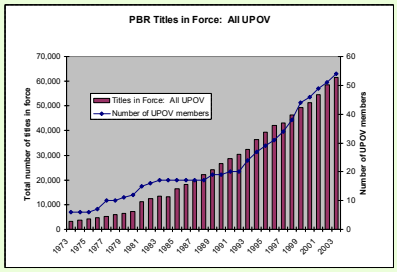
PLANT VARIETY PROTECTION SITUATION

- 62 members of the Union
- 16 States have initiated the procedure for becoming members of the Union
- 1 intergovernmental organization has initiated the procedure for becoming members of the Union:
  - OAPI (16 countries)
- 48 States have contacted the Office of the Union for assistance in the development of legislation on plant variety protection

UPOV Membership/Territories covered



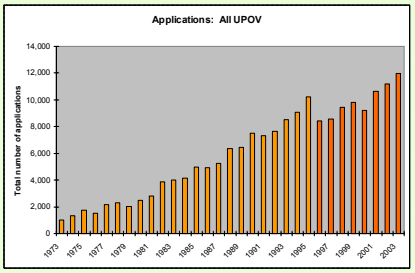
Development of Plant Variety Protection

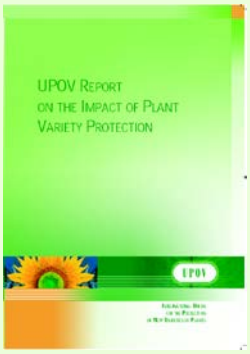


TWP Venues

	TWA	TWC	TWF	TWO	TWV	BMT
1994	Spain	Israel	New Zealand	Australia	UK	France
1995	Germany	Poland	UK	Netherlands	Netherlands	Netherlands
1996	Greece	Germany	Israel	Israel	Czech Rep.	
1997	Uruguay	Hungary	Netherlands	Denmark	Spain	United Kingdom
1998	France	Belgium	Australia	New Zealand	Poland	USA
1999	Canada	Finland	Slovakia	Czech Rep.	Germany	
2000	Sweden	Ukraine	Hungary	Hungary	France	France
2001	Mexico	Czech Rep.	Spain	Japan	Italy	Germany
2002	Brazil	Mexico	Argentina	Ecuador	Japan	
2003	Japan	Denmark	Canada	Canada	Netherlands	Japan
2004	Poland	Japan China (workshop)	Germany	Germany	Rep. of Korea	
2005	New Zealand	Canada	Japan	Rep. of Korea	Slovakia	USA
2006	China	Kenya	Brazil	Brazil	Mexico	Rep. of Korea

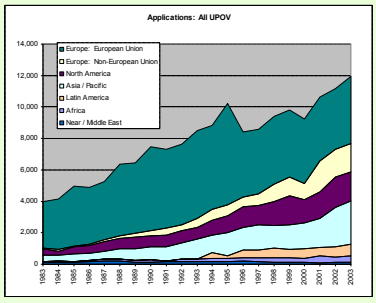
Development of Plant Variety Protection





Executive summary available at: www.upov.int "News & Events"

Development of Plant Variety Protection



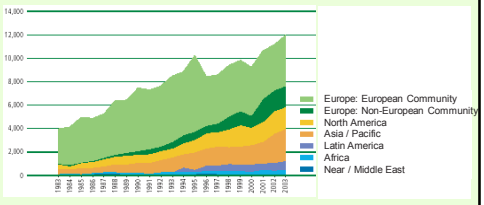
Expansion of UPOV

Figure 1. Members of UPOV (shown in green): **1990**

Figure 2. Members of UPOV (shown in dark green) and initiating States and organizations (shown in light green): September **2005**

Expansion of UPOV

Figure 5. Applications: All UPOV and CPVO: by region

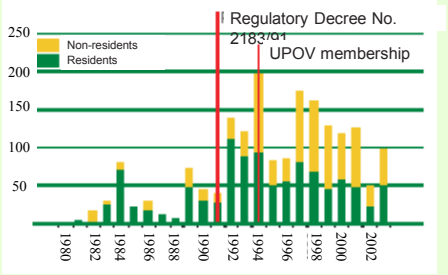


Extending coverage to plant genera and species:

1975: 500 plant genera and species (approx.)
1985: 900
1995: 1,300
2005: 2,300

Argentina

Figure 13. Argentina: Number of Titles Granted



Newer UPOV Members

Figure 11. **Latin America Countries** acceding to UPOV between 1994 and 2000

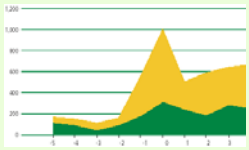


Figure 12. **Countries in transition to a market economy** acceding to UPOV between 1993 and 2000

China

Figure 27. China: Royalties Collected in Henan Province **(Maize)**

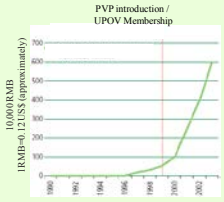
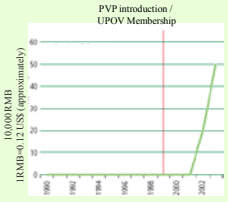


Figure 28. China: Royalties Collected in Henan Province **(Wheat)**



SECTION III.

Reports on Studies Conducted in Individual Countries:

Argentina
China
Kenya
Poland
Republic of Korea

China

Figure 29. China: Number of Breeders in Henan Province **(Maize)**

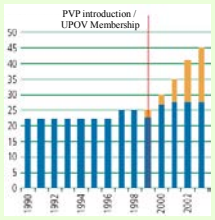
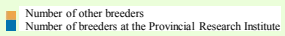


Figure 30. China: Number of Breeders in Henan Province **(Wheat)**



Republic of Korea

Figure 48. Republic of Korea: Number of Applications

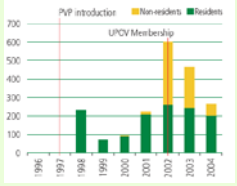


Figure 49. Republic of Korea: Number of Applications by Categories of Crop

Republic of Korea

Figure 52. Republic of Korea: Number of Rose Breeders

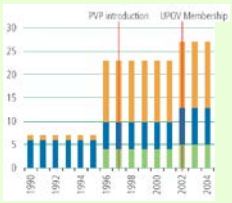
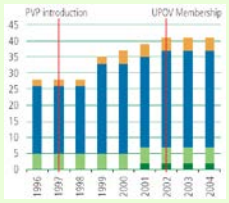


Figure 53. Republic of Korea: Number of Rice Breeders



Republic of Korea

Box 27

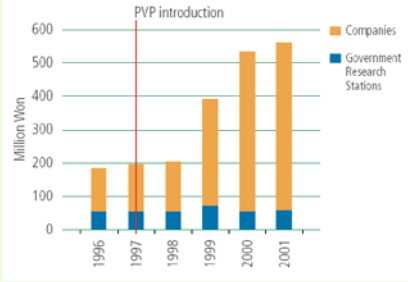
Root yield and red ginseng proportion of new, protected ginseng varieties

Varieties	Root yield (ton/ha)	Red ginseng percentage (%)
Chunpoong	6.89	38.00
Yunpoong	7.35	20.60
Geumpoong	6.15	35.40
Gopoong	5.73	24.70
Sunpoong	5.70	23.90
Average of conventional varieties	5.46	15.00

High-quality variety "Chunpoong"

Republic of Korea

Figure 55. Republic of Korea: Breeding Investment-Chinese Cabbage



Republic of Korea

Box 29

Korean rose variety "Red Angel", granted protection in 2003, was bred using the protected variety "Little Marble", developed in the Netherlands

Little Marble (Red variety)
Developed in the Netherlands

Red Angel (Dark red variety)
Developed at the Kyunggi Provincial Rural Development Administration
Crossing of: Princess×Little Marble

UPOV in the Asia / Pacific Region

Asia/Pacific Region

Members of the Union

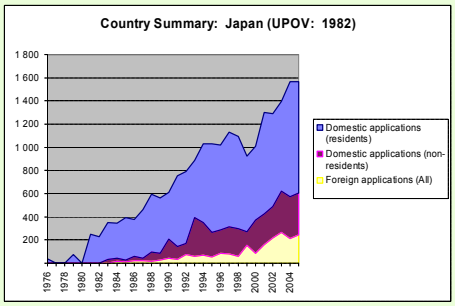
Australia (1991 Act)
China
Japan (1991 Act)
New Zealand
Republic of Korea (1991 Act)
Singapore (1991 Act)

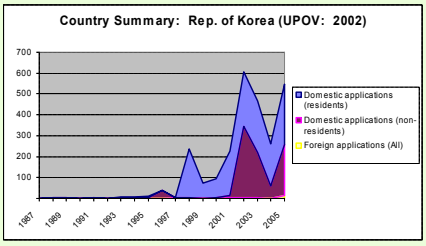
Initiated the Procedure

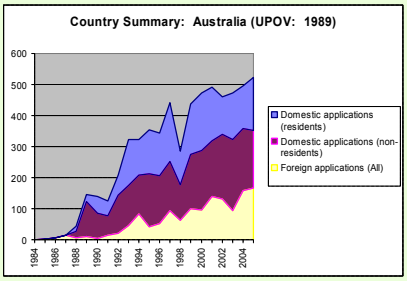
India
Malaysia
Viet Nam

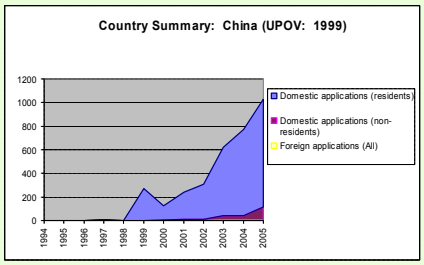
Contacted the Office

Bangladesh
Cambodia
Fiji
Indonesia
Lao People's Democratic Republic
Mongolia
Myanmar
Nepal
Pakistan
Philippines
Sri Lanka
Thailand
Tonga









BENEFITS OF UPOV MEMBERSHIP

- Internationally accepted *sui generis* system
- Increased access to new, improved varieties for the benefit of breeders, farmers, growers and consumers (benefit of society)
- Protection for Breeders in other UPOV members' territories
- Assistance in establishment of institutional framework
- Co-operation in examination
- Technical guidance and assistance
- Awareness / Influence of future developments

Agenda item 2

Introduction to the UPOV Technical Working Parties (TWPs) and BMT

THE CONDITIONS FOR GRANTING A BREEDER'S RIGHT

Other conditions

- VARIETY DENOMINATION
- FORMALITIES
- PAYMENT OF FEES

NO OTHER CONDITIONS!

THE DUS EXAMINATION

- The meaning of "DUS"
- Nature of the DUS Examination
- Characteristics
- UPOV Guidance for Examination
- Organization of the Examination

DISTINCTNESS

Must be clearly distinguishable from any other variety whose existence is a matter of common knowledge

>>> *CHARACTERISTICS* <<<

which

- *may* have direct *commercial relevance*
  e.g. Flower color (ornamental); Fruit color
- *but commercial relevance* NOT required - often no commercial value
  e.g. Leaf shape

THE CONDITIONS FOR GRANTING A BREEDER'S RIGHT

Criteria to be satisfied

- NOVELTY
- DISTINCTNESS
- UNIFORMITY
- STABILITY

} **"DUS"**

DISTINCTNESS

Apple: Fruit color

DISTINCTNESS

Apple: Fruit color

DISTINCTNESS

(Must be clearly distinguishable from any other variety whose existence is a matter of common knowledge)

General Introduction (Chapter 5.3.3)

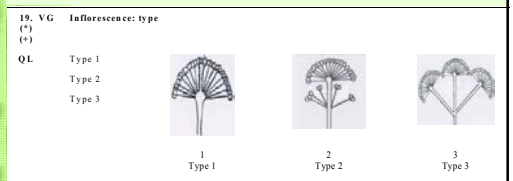
A variety may be considered to be **clearly distinguishable** if the **difference in characteristics** is:

(a) **consistent**, and

(b) **clear**.

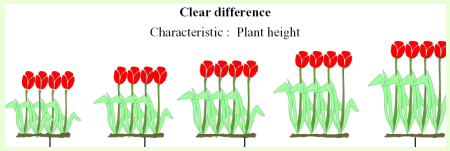
DISTINCTNESS

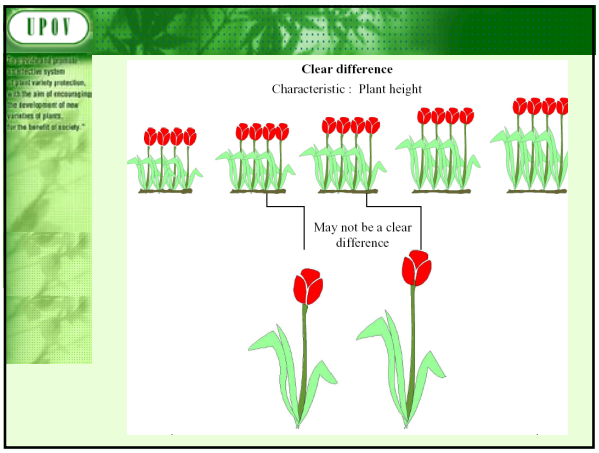
Apple: Flower bud color

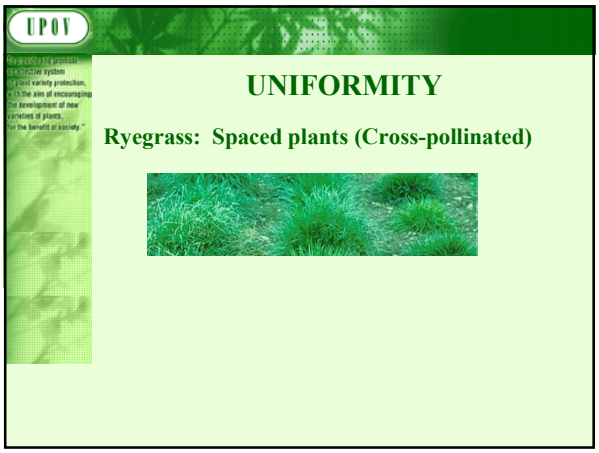


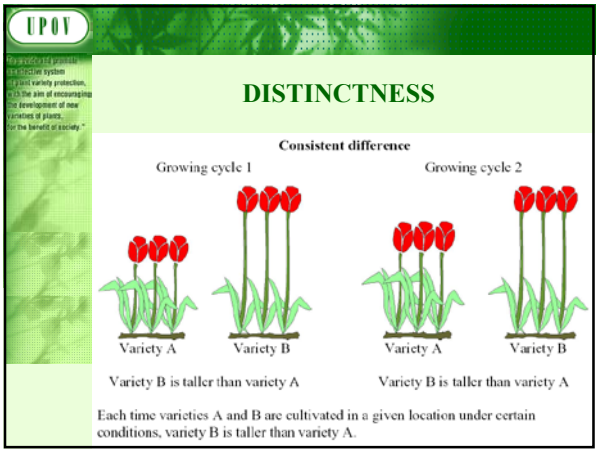
DISTINCTNESS

Maize: Stem base color

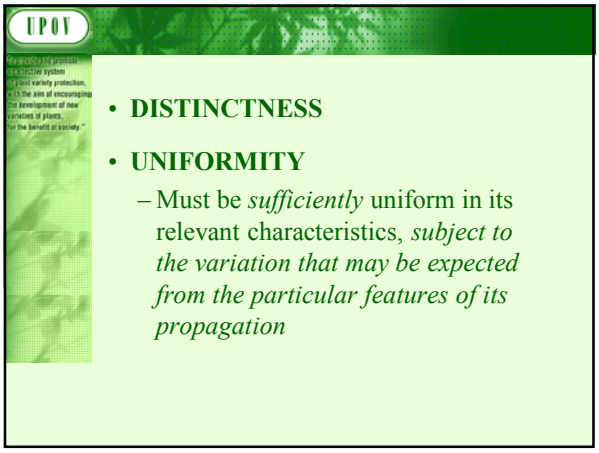


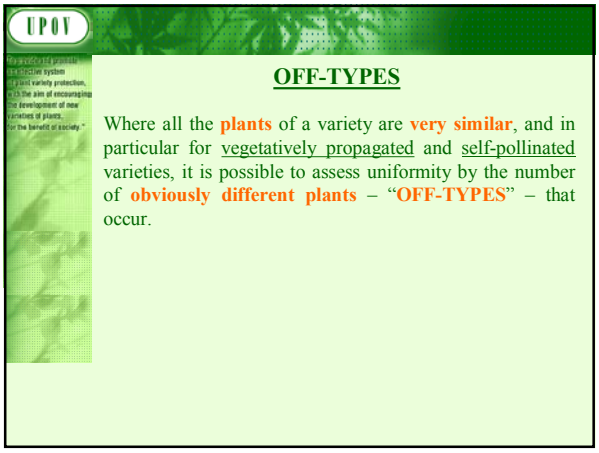

UPOV
Clear difference
Characteristic : Plant height
May not be a clear difference


UPOV
UNIFORMITY
Ryegrass: Spaced plants (Cross-pollinated)

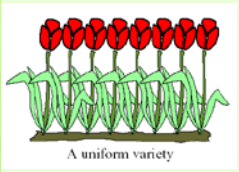

UPOV
DISTINCTNESS
Consistent difference
Growing cycle 1
Growing cycle 2
Variety A
Variety B
Variety A
Variety B
Variety B is taller than variety A
Variety B is taller than variety A
Each time varieties A and B are cultivated in a given location under certain conditions, variety B is taller than variety A.


UPOV
UNIFORMITY
Wheat: (Self-pollinated)

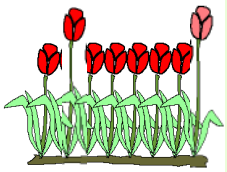

UPOV
• DISTINCTNESS
• UNIFORMITY
– Must be *sufficiently* uniform in its relevant characteristics, *subject to the variation that may be expected from the particular features of its propagation*


UPOV
OFF-TYPES
Where all the plants of a variety are very similar, and in particular for vegetatively propagated and self-pollinated varieties, it is possible to assess uniformity by the number of obviously different plants – "OFF-TYPES" – that occur.

OFF-TYPES



A uniform variety



UNIFORMITY

Ryegrass: Spaced plants (Cross-pollinated)

OFF-TYPES

How many off-types should we accept?

The individual Test Guidelines fix for each crop:

- **the population standard** (percentage of off-types to be accepted if all individuals of the variety could be examined)
- **the acceptance probability** (probability of correctly accepting that a variety is uniform)

Relative Tolerance Limits

Cross-pollinated varieties, including mainly cross-pollinated and synthetic varieties, generally exhibit wider variations within the variety than vegetatively propagated or self-pollinated varieties and inbred lines of hybrid varieties, and it is more difficult to determine off-types.

Therefore, **relative tolerance limits**, for the range of variation, are set by comparison with comparable varieties, or types, already known.

The candidate variety should not be significantly less uniform than the comparable varieties.

Off-types

According to the size of the sample examined, statistical tables give the maximum number of off-types tolerated in that given samples

e.g.: population standard = 1% and acceptance probability = 95%

Sample size	*Number of off-types allowed*
1-5	*0*
6-35	*1*
36-82	*2*
83-137	*3*
138-198	*4*
199-262	*5*

- **DISTINCTNESS**
- **UNIFORMITY**
- **STABILITY**
  - Relevant characteristics must remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle

Nature of the DUS Examination

The "DUS Test" (field trial)

Selection of Characteristics

Criteria	Fruit: color	Ear: glaucosity	Yield	Straw strength
(a) results from a given genotype or combination of genotypes	Yes	Yes	Yes	Yes
(b) sufficiently consistent and repeatable in a particular environment	Yes	Yes	(No)	(No)
(c) exhibits sufficient variation between varieties to be able to establish distinctness	Yes	Yes	???	???
(d) is capable of precise definition and recognition	Yes	Yes	(No)	???
(e) allows uniformity requirements to be fulfilled	Yes	Yes	???	???
(f) allows stability requirements to be fulfilled	Yes	Yes	???	???
Commercial value	Yes	No	Yes	Yes
ACCEPATABILITY	Yes	Yes	No	No

Selection of Characteristics

The basic requirements that a characteristic should fulfill before it is used for DUS testing or producing a variety description are that its expression (TG/1/3: Section 4.2.1) :

(a) **results from a given genotype** or combination of genotypes;

(b) is sufficiently **consistent and repeatable** in a **particular environment**;

(c) exhibits sufficient **variation between varieties** to be able to establish distinctness;

(d) is capable of **precise definition and recognition**;

(e) allows **uniformity requirements** to be fulfilled;

(f) allows **stability requirements** to be fulfilled, meaning that it produces consistent and repeatable results after repeated propagation or, where appropriate, at the end of each cycle of propagation.

Special Characteristics: Disease Resistance

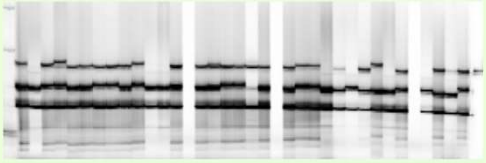
Criteria	Disease Resistance
(a) results from a given genotype or combination of genotypes	*Knowledge of nature of genetic control of resistance is important
(b) sufficiently consistent and repeatable in a particular environment	*Standardize conditions (greenhouse / laboratory) & methodology *Standardize inoculum *Ring-test
(c) exhibits sufficient variation between varieties to be able to establish distinctness	*Susceptible / Resistant OR varying degrees of resistance?
(d) is capable of precise definition and recognition	*Define and recognize races and straims
(e) allows uniformity requirements to be fulfilled	see above
(f) allows stability requirements to be fulfilled	see above
	Difficult and expensive

Selection of Characteristics

- **Yield ???**
- **Straw strength ???**

Etc.

Molecular Techniques?



Agenda 3:

Overview of the General Introduction and TGP Documents

UPOV provides guidance by:

- The "General Introduction" (TG/1/3)
  - General technical principles
  - Organization of DUS Testing
  - Associated "TGP" Documents (e.g. statistical methods)

GUIDANCE FOR EXAMINATION

TG/1/3 General Introduction

"Associated" TGP Documents

Ref.	Title
TG/00	List of TGP Documents and Latest Issue Dates
TGP/1	General Introduction With Explanations
TGP/2	List of Test Guidelines Adopted by UPOV
TGP/3	Varieties of Common Knowledge
*TGP/4	Constitution and Management of Variety Collections
TGP/5	Experience and Cooperation in DUS testing
TGP/6	Arrangements for DUS testing
TGP/7	Development of Test Guidelines
TGP/8	Trial Design and Techniques Used in the Examination of DUS
*TGP/9	Examining Distinctness
*TGP/10	Examining Uniformity
TGP/11	Examining Stability
TGP/12	Special Characteristics
TGP/13	Guidance for New Types and Species
TGP/14	Glossary of Technical, Botanical and Statistical Terms Used in UPOV Documents
TGP/15	New Types of Characteristics

*Priority

Guidance for Examination

facilitates:

BEST PRACTICE (based on experience)

=> good decisions

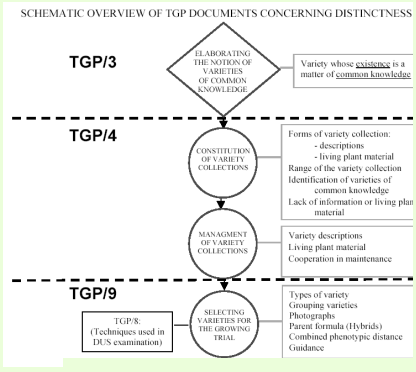
=> good definition of the object of protection (strong protection)

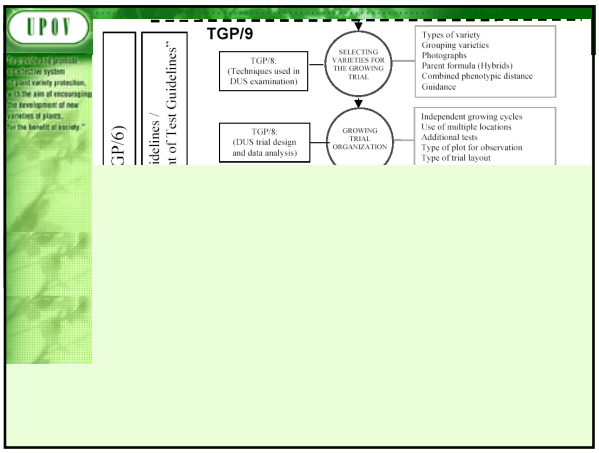
=> efficiency in method of examination (learn from the best)

HARMONIZATION

=> efficiency

- mutual acceptance of DUS reports (minimize cost of examination for individual authorities)
- mutual recognition of variety descriptions (all parties speak the same "language")
- simple and cheap system for applicants (minimize cost for breeders)





Test Guidelines

- **228 Test Guidelines** adopted
- Further **63 discussed** in 2006
  (25 revisions / 38 new Test Guidelines)

UPOV provides guidance by:

- The "General Introduction" (TG/1/3)
  - General technical principles
  - Organization of DUS Testing
  - Associated "TGP" Documents (e.g. statistical methods)

AND

- **"Test Guidelines"**
  - **Species/Crop-specific recommendations developed by crop experts**
  - **TGP/7 "Development of Test Guidelines" adopted**

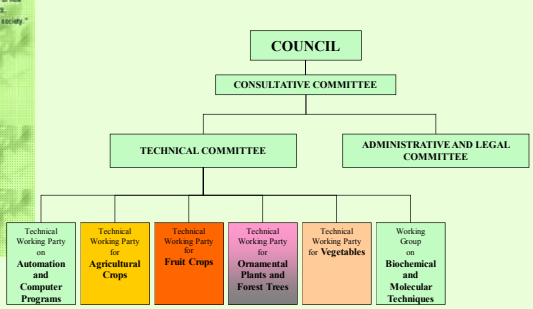
UPOV Test Guidelines ("Test Guidelines")
are developed for
individual species / variety groupings

- Basis for internationally harmonized examination of DUS testing through guidance on the features of DUS Testing e.g.
  - growing cycles of testing (usually one or two)
  - number of plants (6 to 600)
  - material to be tested
  - **characteristics to be examined** (around 30 - 100)
  - **example varieties**
  - uniformity standards

  and facilitating harmonized variety descriptions on the basis of selected characteristics

- Drafted by Members' Experts (Technical Working Parties)

UPOV Structure



ORGANIZATION OF THE DUS EXAMINATION

(Article 12 of the 1991 Act of the UPOV Convention)

...cause the growing of the variety or the carrying out of other necessary tests, ……

[i.e. the authority may arrange for other parties to conduct the growing trials or other tests

e.g. by an

Independent Institute

Individual Breeder / Applicant

Organization on behalf of a group of breeders / applicants]

"In the course of the examination, **the authority** ……

[i.e. the examination is conducted by the authority]

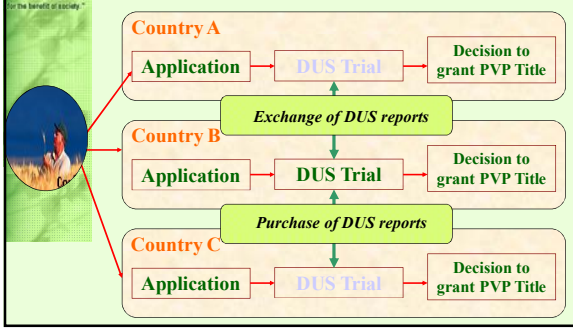
…may grow the variety or carry out other necessary tests, ….

[i.e. the authority may conduct growing trials, or other tests, itself - "Official Testing"]

.. or **take into account** the results of growing tests or other **trials which have already been carried out**."

[i.e. the authority may take into account the results from previous tests or trials conducted by, for example, other National Authorities (purchasing of DUS reports)]

Cooperation in DUS Trial

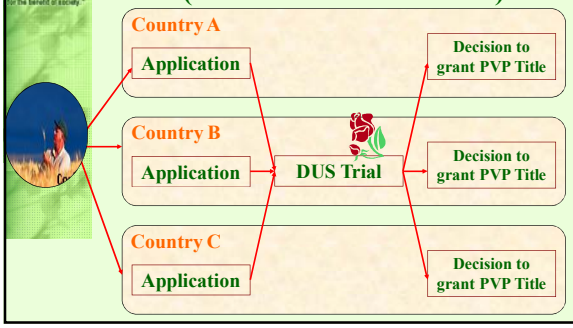


Cooperation between Authorities

Cooperation between Authorities can involve:

- **purchase of DUS Test Reports** from other Authorities
- **bilateral arrangements** to remove the need for duplication of DUS Tests
- **centralized DUS testing** at regional or global level

Cooperation in Examination (centralized examination)



Cooperation with Breeders

DUS Testing in Cooperation with Breeders

- is always under the **control of the Authority**
- can involve the applicant in all aspects of conducting the DUS Test but will always result in a **decision being taken by the Authority**

Cooperation between Authorities

Cooperation between Authorities is important for:

- minimizing the time for DUS examination
- minimizing the cost of DUS examination
- optimizing examination of Distinctness in growing trials

Agenda item 4:

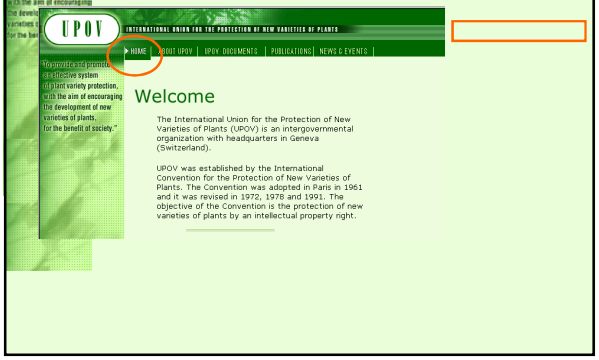
UPOV Website
http://www.upov.int

(e-mail: upov.mail@upov.int)

Cooperation with Breeders

Cooperation with Breeders

- maximizes the use of all available information
- minimizes the time for DUS examination
- can provide access to breeders' specialist resources

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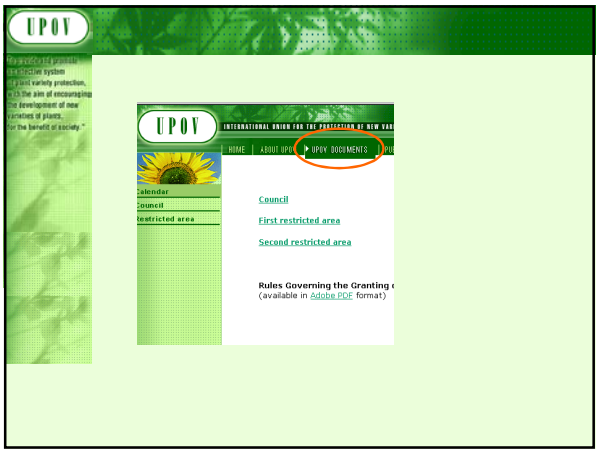
Mission Statement
Introduction
UPOV Convention
Membership
UPOV Bodies
Legal Resources
Key Issues
MISSION STATEMENT
To provide and promote an effective system
with the aim of encouraging the development
the benefit of society.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Calendar
Council
Restricted area
Council
First restricted area
Second restricted area
Rules Governing the Granting
(available in Adobe PDF format)


UPOV
INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
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MISSION STATEMENT
To provide and promote an effective system of plant variety protection,
with the aim of encouraging the development of new varieties of plants, for
the benefit of society.


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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
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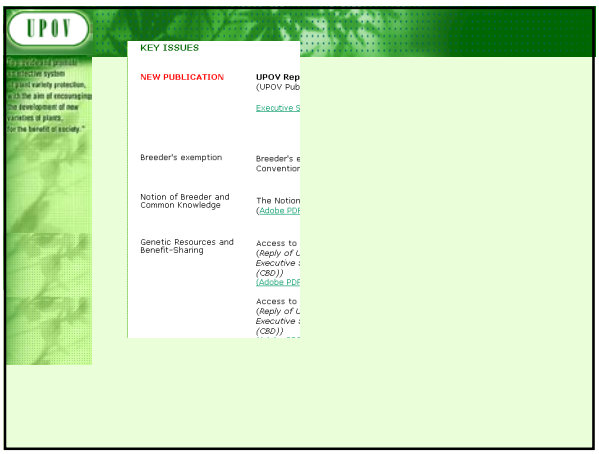
Laws & Treaties
List of Taxa Protected
Plant Variety
General Introduction to DUS
TGP Documents
Test Guidelines
Practical Technical
LIST OF UPOV PUBLICATIONS*
The following UPOV publications are available on request:
Abbreviations:
A = Arabic, C = Chinese, D = Dutch, E = English, F = French, FEG = French/English/German,
G = German, I = Italian, J = Japanese, P = Portuguese, R = Russian, S = Spanish
221
(A)
(C)
(D)
(E)
(F)
International Convention for the Protectio
Plants,
text of 1991 only


UPOV
KEY ISSUES
NEW PUBLICATION
UPOV Rep
(UPOV Pub
Executive S
Breeder's exemption
Breeder's e
Convention
Notion of Breeder and
Common Knowledge
The Notion
(Adobe PDF
Genetic Resources and
Benefit-Sharing
Access to
(Reply of U
Executive
(CBD))
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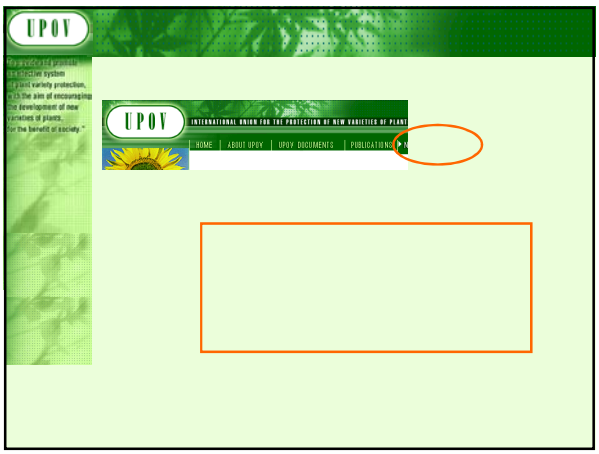
Executive
(CBD))


UPOV
INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANT
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Agenda item 5:

Agenda of the BMT Session

Agenda item 6

Situation in UPOV concerning the possible use of molecular techniques in plant variety protection

BMT Agenda

Seoul, November 21 to 23, 2006

1. Opening of the session
2. Adoption of the agenda
3. Reports on **developments in UPOV** concerning biochemical and molecular techniques
4. Reports on the work of the **Crop Subgroups**
5. Short presentations on **new developments in biochemical and molecular techniques** by DUS experts, biochemical and molecular specialists, and plant breeders (**oral reports by PARTICIPANTS**)
6. Report of **work on molecular techniques on a crop-by-crop** basis **(PAPERS INVITED)**
   (a) vegetatively propagated crops
   (b) self-pollinated crops
   (c) cross-pollinated crops

PREVIEW

Situation in UPOV concerning the possible use of molecular techniques in:

PART I: DUS Examination

PART II: BMT Guidelines

PART III: variety identification in relation to:

– enforcement of plant breeders' rights;

– technical verification; and

– consideration of essential derivation

BMT Agenda (cont.)

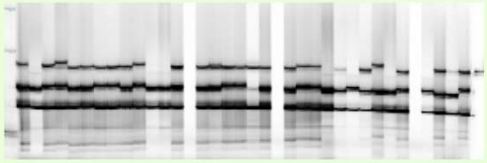
7. **Guidelines for DNA-Profiling**: Molecular Marker Selection and Database Construction "BMT Guidelines" (document BMT Guidelines (proj.6))
8. **Practical exercise in the development of an exchangeable database of molecular data of plant varieties**
9. **Statistical methods** for data produced by biochemical and molecular techniques (papers invited)
10. The use of molecular techniques in examining **essential derivation** (papers invited)
11. The use of molecular techniques in **variety identification (PAPERS INVITED)**
12. Recommendations on the establishment of new crop specific subgroups
13. Date and place of next session
14. Future program
15. Report of the session (if time permits)
16. Closing of the session

Part I

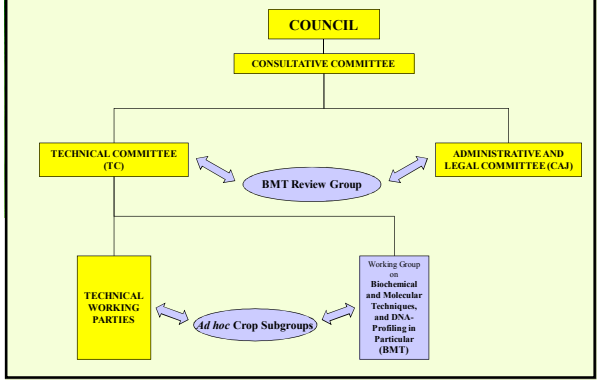
Situation in UPOV concerning the possible use of molecular techniques in the **DUS Examination**

UPOV

Molecular Techniques?



UPOV



UPOV

Legal and other considerations

- **Conformity with the UPOV Convention**
- **Potential impact on the strength of protection**

Technical considerations

- **Reliability and robustness of techniques**
- **Accessibility of the technology**
- **Harmonization of methodologies**
- **Cost of examination**
- **Implications for breeders (e.g. cost and time involved for new uniformity requirements)**

UPOV

Harmonized approach

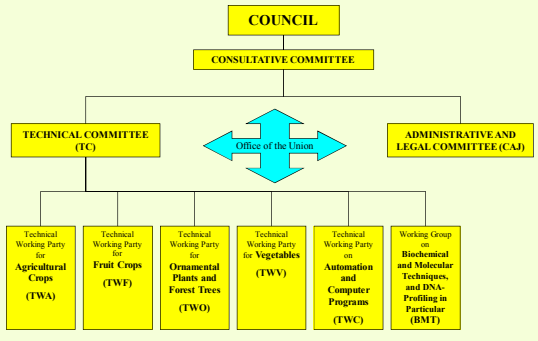
Harmonization

⇒ facilitates cooperation in DUS testing

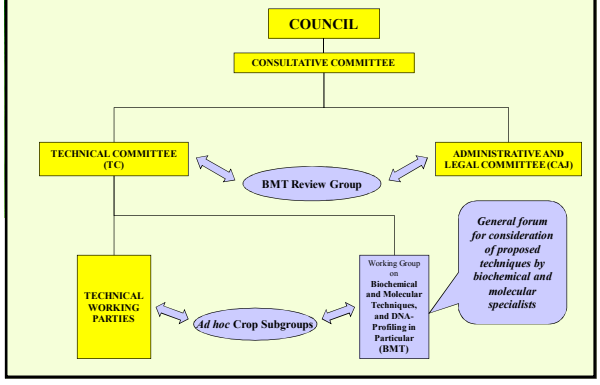
e.g. purchase of DUS reports

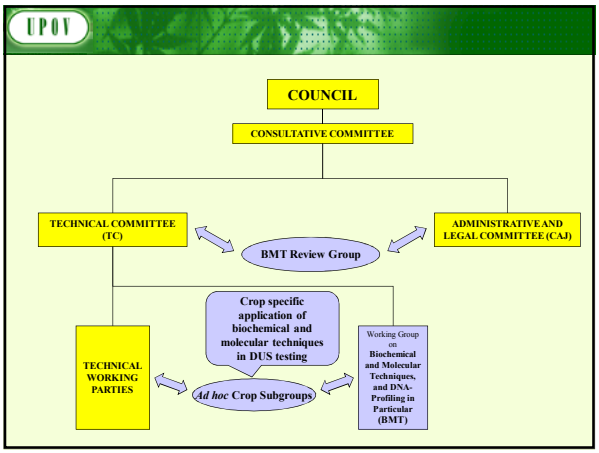
⇒ internationally recognized variety descriptions (effective protection)

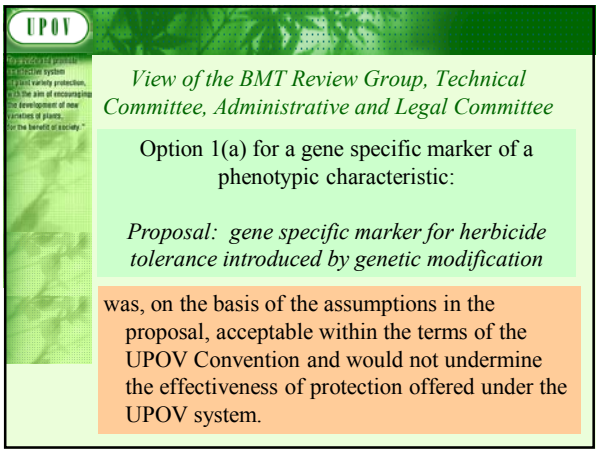
UPOV

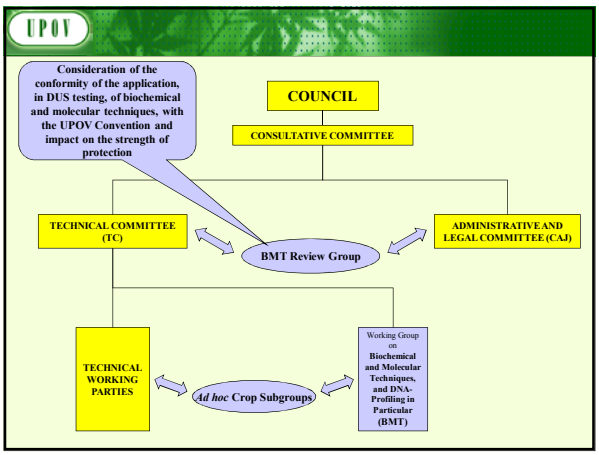


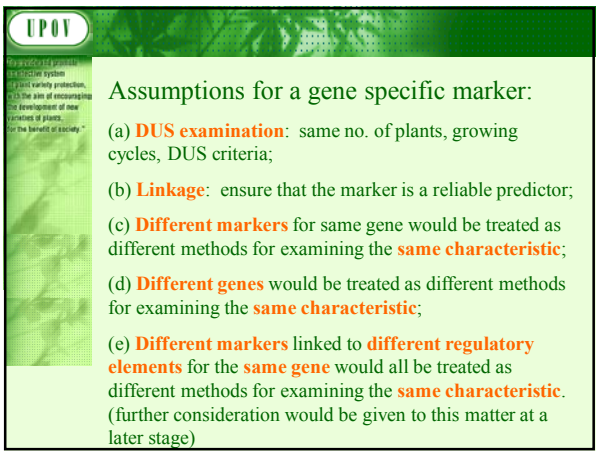
UPOV

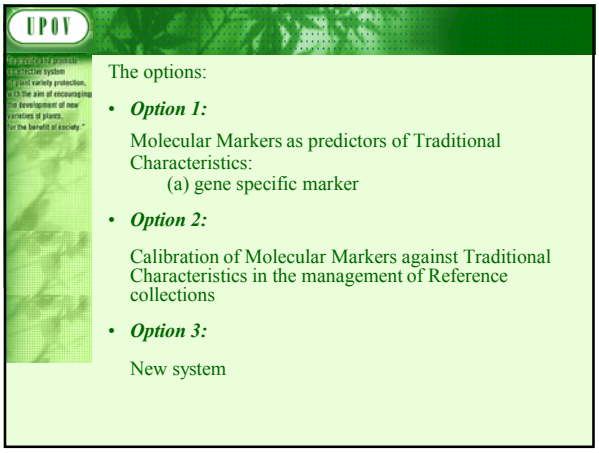


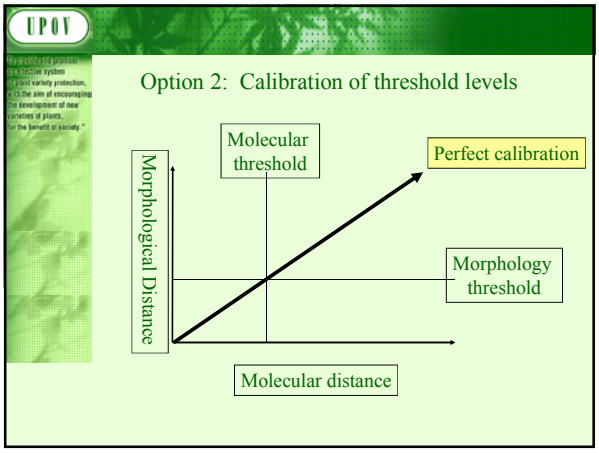

UPOV
COUNCIL
CONSULTATIVE COMMITTEE
TECHNICAL COMMITTEE (TC)
BMT Review Group
ADMINISTRATIVE AND LEGAL COMMITTEE (CAJ)
Crop specific application of biochemical and molecular techniques in DUS testing
TECHNICAL WORKING PARTIES
Ad hoc Crop Subgroups
Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT)


UPOV
View of the BMT Review Group, Technical Committee, Administrative and Legal Committee
Option 1(a) for a gene specific marker of a phenotypic characteristic:
Proposal: gene specific marker for herbicide tolerance introduced by genetic modification
was, on the basis of the assumptions in the proposal, acceptable within the terms of the UPOV Convention and would not undermine the effectiveness of protection offered under the UPOV system.


UPOV
Consideration of the conformity of the application, in DUS testing, of biochemical and molecular techniques, with the UPOV Convention and impact on the strength of protection
COUNCIL
CONSULTATIVE COMMITTEE
TECHNICAL COMMITTEE (TC)
BMT Review Group
ADMINISTRATIVE AND LEGAL COMMITTEE (CAJ)
TECHNICAL WORKING PARTIES
Ad hoc Crop Subgroups
Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT)


UPOV
Assumptions for a gene specific marker:
(a) DUS examination: same no. of plants, growing cycles, DUS criteria;
(b) Linkage: ensure that the marker is a reliable predictor;
(c) Different markers for same gene would be treated as different methods for examining the same characteristic;
(d) Different genes would be treated as different methods for examining the same characteristic;
(e) Different markers linked to different regulatory elements for the same gene would all be treated as different methods for examining the same characteristic. (further consideration would be given to this matter at a later stage)


UPOV
The options:
• Option 1:
Molecular Markers as predictors of Traditional Characteristics:
(a) gene specific marker
• Option 2:
Calibration of Molecular Markers against Traditional Characteristics in the management of Reference collections
• Option 3:
New system


UPOV
Option 2: Calibration of threshold levels
Molecular threshold
Perfect calibration
Morphological Distance
Morphology threshold
Molecular distance

View of the BMT Review Group, Technical Committee, Administrative and Legal Committee

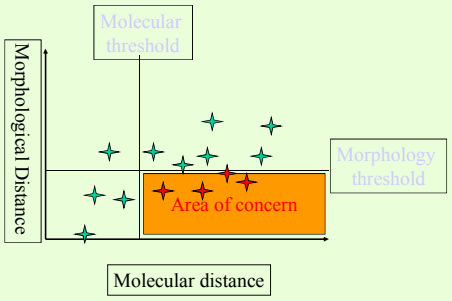
Option 2: Calibration of threshold levels for molecular characteristics against the minimum distance in traditional characteristics

Proposal: Option 2 for Maize, Oilseed Rape and Rose

where used for the management of reference collections was, on the basis of the assumptions in the proposals, acceptable within the terms of the UPOV Convention and would not undermine the effectiveness of protection offered under the UPOV system

- whilst recognizing the need to improve the relationship between morphological and molecular distances.

Option 2: Calibration of threshold levels



Assumptions for calibration of threshold levels :

(a) **Uniformity and Stability**:

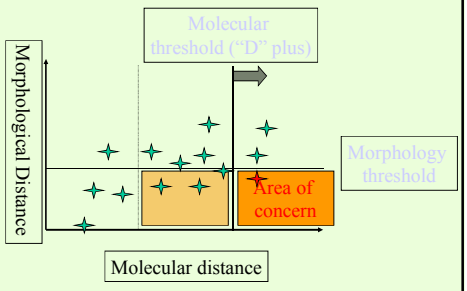
(i) [molecular] **differences** calculated between varieties **take into account the variation within varieties**;

(ii) suitable **uniformity standards** could be developed for molecular markers **without requiring varieties**, in general, **to be more uniform**

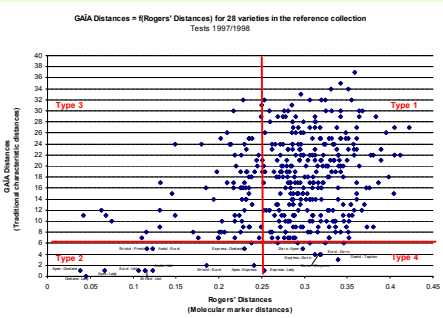
(b) would only be used for the establishment of a **"Distinctness plus"** threshold in the **management of reference collections**;

(c) would meet all the **normal requirements for any characteristic** to be used in the DUS examination and, in particular, would be checked to ensure they are **sufficiently consistent and repeatable**.

Option 2: Management of Reference Collections ("Distinctness plus")



Option 2: Oilseed Rape



View of the BMT Review Group, Technical Committee, Administrative and Legal Committee

Option 3: New system

Proposal: Option 3 for Rose and Wheat

no consensus on the acceptability of the Option 3 proposals within the terms of the UPOV Convention and no consensus on whether they would undermine the effectiveness of protection offered under the UPOV system.

- concerns were raised that, in these proposals, using this approach, it might be possible to use a limitless number of markers to find differences between varieties. The concern was also raised that differences would be found at the genetic level which were not reflected in morphological characteristics

Harmonized approach

Harmonization

⇒ facilitates cooperation in DUS testing

e.g. purchase of DUS reports

⇒ internationally recognized variety descriptions (effective protection)

Part III

variety identification in relation to:

- enforcement of plant breeders' rights
- technical verification
- consideration of essential derivation

Part II

BMT GUIDELINES

VARIETY IDENTIFICATION

CAJ and TC agreed to invite the BMT Review Group to examine the possible use of molecular tools for variety identification in relation to the enforcement of plant breeders' rights, technical verification and the consideration of essential derivation.

Guidelines for DNA-profiling:
molecular marker selection and database construction
("BMT GUIDELINES")

- guidance for
  - developing **harmonized methodologies** with the aim of generating high quality molecular data **for a range of applications**
  - the **construction of databases** containing molecular profiles of varieties, possibly produced in different laboratories using different technologies.

VARIETY IDENTIFICATION

The Consultative Committee noted that:

"The BMT is a group open to DUS experts, biochemical and molecular specialists and plant breeders, whose role is to:
– […]

"(viii) Provide a **forum for discussion on the use of biochemical and molecular techniques in the consideration of essential derivation and variety identification**."

BREEDERS' RIGHTS

Essentially Derived Varieties (EDV's)

Article 14(5):

(a) The provisions of paragraphs (1) to (4) shall also apply in relation to

(i) **varieties which are essentially derived** from the protected variety, where the protected variety is not itself an essentially derived variety,

VARIETIES COVERED

- the protected variety
- varieties which are not clearly distinguishable from the protected variety
- varieties whose production requires the repeated use of the protected variety *(e.g. as a parent for a hybrid variety)*
- **varieties which are essentially derived from the protected variety (1991 Act)**

Essentially Derived Varieties (EDV's)

...a **variety shall be deemed to be essentially derived** from another variety ("the initial variety") **when**

(i) it is **predominantly derived from the initial variety**, or from a variety that is itself predominantly derived from the initial variety, while retaining the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety,

(ii) **it is clearly distinguishable** from the initial variety and

(iii) **except for the differences which result from the act of derivation, it conforms to the initial variety in the expression of the essential characteristics** that result from the genotype or combination of genotypes of the initial variety.

ESSENTIAL DERIVATION

PURPOSE:

To ensure sustainable plant breeding development by:

- providing effective protection for the classical breeder and
- encouraging cooperation between classical breeders and developers of new technologies such as genetic modification

Essentially Derived Varieties (EDV's)

May be obtained for example by:

- selection of a natural or induced mutant
- selection of a somaclonal variant
- selection of a variant individual from plants of the initial variety
- back-crossing
- transformation by genetic engineering

An essentially derived variety may be protectable, but authorization of the breeder of the initial variety would be required for commercial exploitation

Essentially Derived Varieties

Patented genetic element

Protected plant variety

>===<

New Variety (?)
Essentially Derived Variety (?)

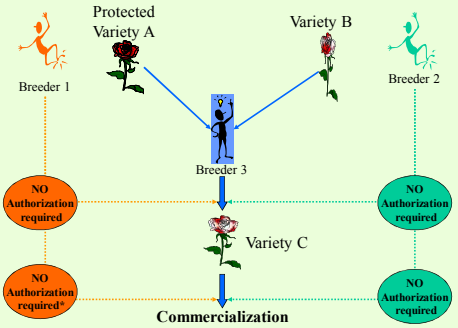
Essentially Derived Varieties (EDV's)

Article 14(5):

(a) The provisions of paragraphs (1) to (4) shall also apply in relation to

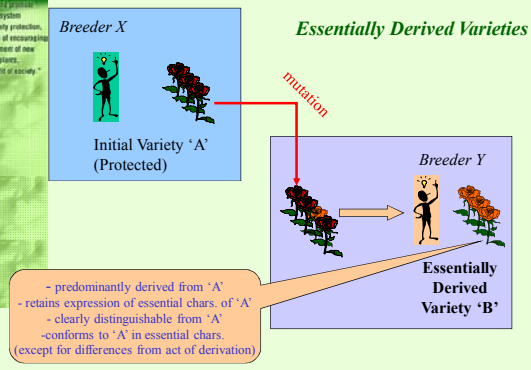
(i) **varieties which are essentially derived** from the protected variety, where the protected variety is not itself an essentially derived variety,

THE BREEDER'S EXEMPTION: *Example*



*except for: **essentially derived varieties (1991 Act);**
varieties which require repeated use of a protected variety (variety A); and varieties not clearly distinguishable from a protected variety (variety A).

Essentially Derived Varieties



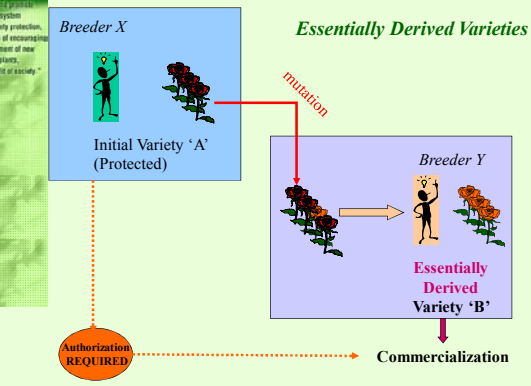
Essentially Derived Varieties (EDV's)

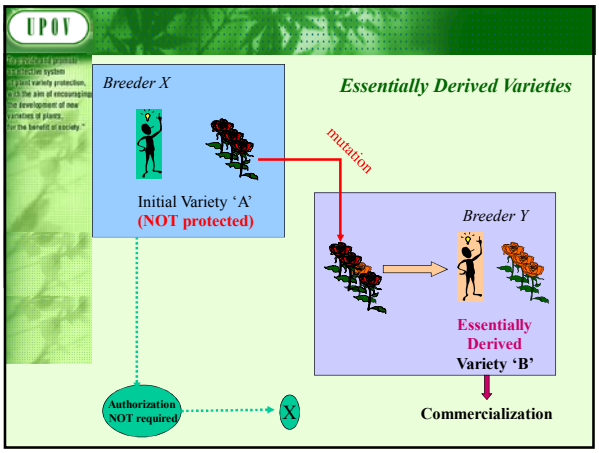
Can EDVs be protected ? YES

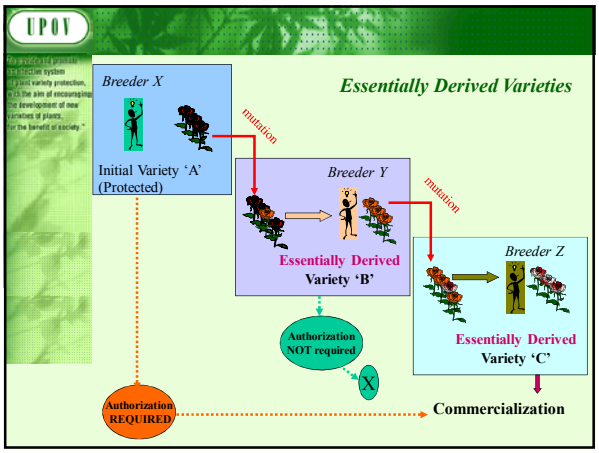
Can EDVs be commercially exploited? AUTHORIZATION NEEDED

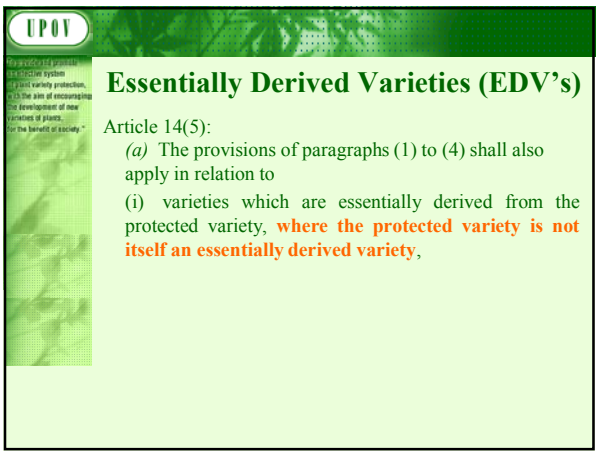
It requires the authorization of the PBR holder of the initial variety

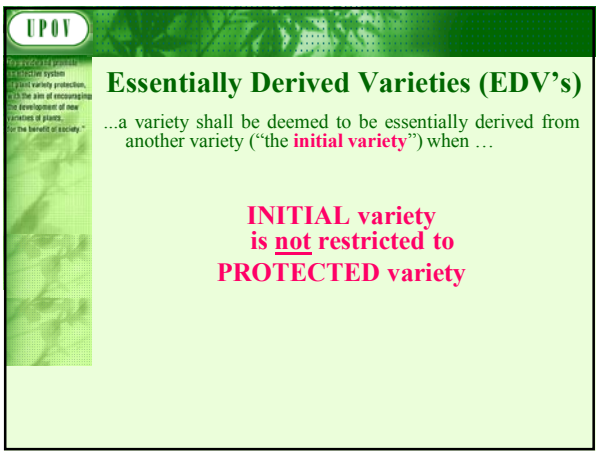
Essentially Derived Varieties

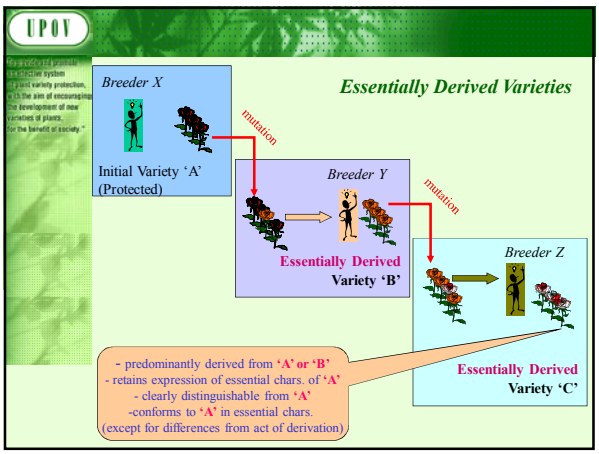


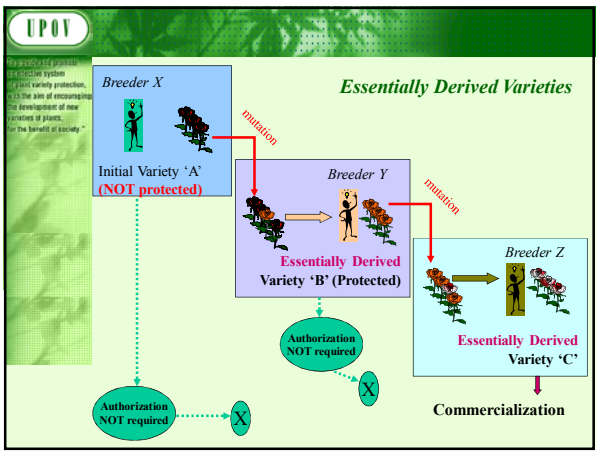

UPOV
Essentially Derived Varieties
Breeder X
Initial Variety 'A'
(NOT protected)
mutation
Breeder Y
Essentially Derived Variety 'B'
Authorization NOT required
X
Commercialization

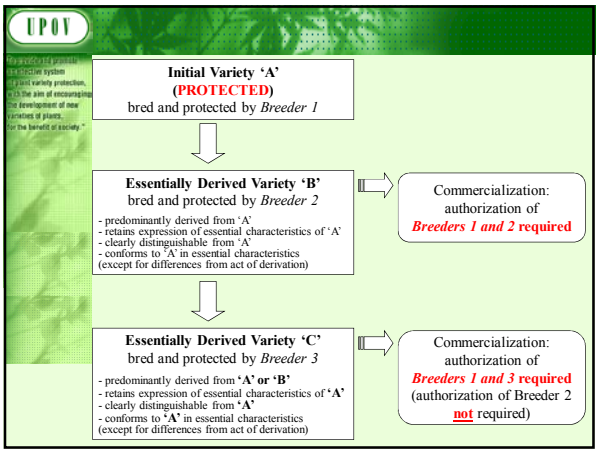

UPOV
Essentially Derived Varieties
Breeder X
Initial Variety 'A'
(Protected)
mutation
Breeder Y
Essentially Derived Variety 'B'
mutation
Breeder Z
Essentially Derived Variety 'C'
Authorization NOT required
X
Authorization REQUIRED
Commercialization

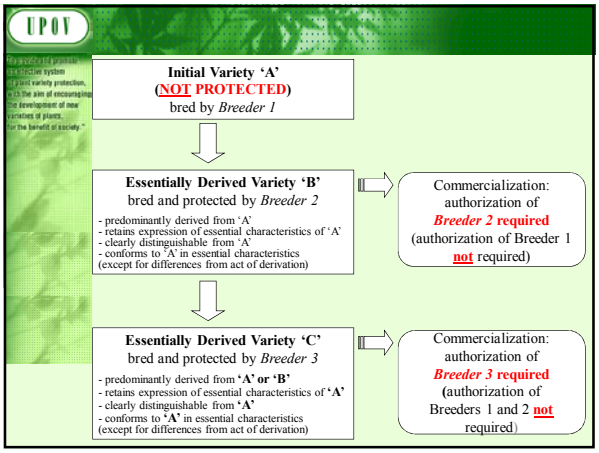

UPOV
Essentially Derived Varieties (EDV's)
Article 14(5):
(a) The provisions of paragraphs (1) to (4) shall also apply in relation to
(i) varieties which are essentially derived from the protected variety, where the protected variety is not itself an essentially derived variety,


UPOV
Essentially Derived Varieties (EDV's)
...a variety shall be deemed to be essentially derived from another variety ("the initial variety") when …
INITIAL variety
is not restricted to
PROTECTED variety


UPOV
Essentially Derived Varieties
Breeder X
Initial Variety 'A'
(Protected)
mutation
Breeder Y
Essentially Derived Variety 'B'
mutation
Breeder Z
Essentially Derived Variety 'C'
- predominantly derived from 'A' or 'B'
- retains expression of essential chars. of 'A'
- clearly distinguishable from 'A'
-conforms to 'A' in essential chars.
(except for differences from act of derivation)


UPOV
Essentially Derived Varieties
Breeder X
Initial Variety 'A'
(NOT protected)
mutation
Breeder Y
Essentially Derived Variety 'B' (Protected)
mutation
Breeder Z
Essentially Derived Variety 'C'
Authorization NOT required
X
Authorization NOT required
X
Commercialization


UPOV
Initial Variety 'A'
(PROTECTED)
bred and protected by Breeder 1
Essentially Derived Variety 'B'
bred and protected by Breeder 2
- predominantly derived from 'A'
- retains expression of essential characteristics of 'A'
- clearly distinguishable from 'A'
- conforms to 'A' in essential characteristics
(except for differences from act of derivation)
Commercialization:
authorization of
Breeders 1 and 2 required
Essentially Derived Variety 'C'
bred and protected by Breeder 3
- predominantly derived from 'A' or 'B'
- retains expression of essential characteristics of 'A'
- clearly distinguishable from 'A'
- conforms to 'A' in essential characteristics
(except for differences from act of derivation)
Commercialization:
authorization of
Breeders 1 and 3 required
(authorization of Breeder 2
not required)


UPOV
Initial Variety 'A'
(NOT PROTECTED)
bred by Breeder 1
Essentially Derived Variety 'B'
bred and protected by Breeder 2
- predominantly derived from 'A'
- retains expression of essential characteristics of 'A'
- clearly distinguishable from 'A'
- conforms to 'A' in essential characteristics
(except for differences from act of derivation)
Commercialization:
authorization of
Breeder 2 required
(authorization of Breeder 1
not required)
Essentially Derived Variety 'C'
bred and protected by Breeder 3
- predominantly derived from 'A' or 'B'
- retains expression of essential characteristics of 'A'
- clearly distinguishable from 'A'
- conforms to 'A' in essential characteristics
(except for differences from act of derivation)
Commercialization:
authorization of
Breeder 3 required
(authorization of
Breeders 1 and 2 not
required)


UPOV
THANK YOU