New plant breeding methods trapped between different systems of protection

Perspectives of UPOV

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1. What is protected by UPOV?
2. How the breeding method may affect the plant breeder’s right (EDV)
3. The latest situation in UPOV
What Is a Plant Variety?

The term "species" is a familiar unit of botanical classification within the plant kingdom. However, it is clear that within a species there can be a wide range of different types of plant. Farmers and growers need plants with particular characteristics and that are adapted to their environment and their cultivation practices.

A plant variety represents a more precisely defined group of plants, selected from within a species, with a common set of characteristics.
What is a Plant Variety?

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A plant variety represents a more precisely defined group of plants, selected from within a species, with a common set of characteristics.
Can I use plant variety protection to protect the following:
- a trait (e.g. disease resistance, flower color)
- a chemical or other substance (e.g. oil, DNA)
- a plant breeding technology (e.g. tissue culture)?

No. The definition that a variety means a “plant grouping” clarifies that a trait, a chemical or other substance and a plant breeding technology do not correspond to the definition of a variety.
The UPOV Convention makes no restriction with regard to the methods or techniques by which a new variety is “bred”.

UPOV
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Essentially Derived Varieties

PURPOSE:

to ensure **sustainable** plant breeding development by:

– providing effective protection for the breeder

and

– encouraging cooperation between breeders and developers of new technologies such as genetic modification
Scope of the Breeder’s Right (1991 Act)

Article 14

Scope of the Breeder’s Right

(1) [Acts in respect of the propagating material]
(2) [Acts in respect of the harvested material]
(3) [Acts in respect of certain products]
(4) [Possible additional acts]
(5) [Essentially derived and certain other varieties]
VARIETIES COVERED (1991 Act)

In addition to the protected variety itself, VARIETIES:

• not clearly distinguishable from the protected variety

• whose production requires the repeated use of the protected variety e.g. hybrids produced using a protected variety (1978 Act also)

• which are essentially derived from the protected variety
Breeder’s exemption

Article 15

Exceptions to the Breeder’s Right

(1) [Compulsory exceptions] The breeder’s right shall not extend to
(i) acts done privately and for non-commercial purposes,
(ii) acts done for experimental purposes and
(iii) acts done for the purpose of breeding other varieties, and, except where the provisions of Article 14(5) apply, acts referred to in Article 14(1) to (4) in respect of such other varieties.

[...]

UPOV

Article 14
Scope of the Breeder’s Right
(1) [Acts in respect of the propagating material]
(2) [Acts in respect of the harvested material]
(3) [Acts in respect of certain products]
(4) [Possible additional acts]
(5) [Essentially derived and certain other varieties]
* Except for:
(i) varieties which are essentially derived from the protected variety, where the protected variety is not itself an essentially derived variety,
(ii) varieties which are not clearly distinguishable in accordance with Article 7 from the protected variety and
(iii) varieties whose production requires the repeated use of the protected variety.
Essentially Derived Varieties

Article 14
Scope of the Breeder’s Right

(5)[Essentially derived and certain other varieties]
(a) [...]
(b) For the purposes of subparagraph (a)(i), 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.
Essentially Derived Varieties

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
Plant breeding methods (continued)

- Mutation
- Somaclonal variant
- Variant individual
- Backcrossing
- Genetic engineering
- Gene editing
Can EDVs be protected in their own right?
- same criteria for protection

YES

Can EDVs be commercially exploited?

Requires the authorization of the PBR holder of the INITIAL VARIETY and the PBR holder of the EDV

AUTHORIZATION NEEDED
Essentially Derived Varieties

Breeder 1

Initial Variety ‘A’ (Protected)

Authorization to commercialize variety B REQUIRED

Predominantly derived

Essentially Derived Variety ‘B’

- predominantly derived from ‘A’
- retains expression of essential chars. of ‘A’
- clearly distinguishable from ‘A’
- conforms to ‘A’ in essential chars.
  (except for differences from act of derivation)

Breeder 2

Commercialization
Essentially Derived Varieties

Article 14
Scope of the Breeder’s Right

(5)[Essentially derived and certain other varieties]

(a) […]

(b) For the purposes of subparagraph (a)(i), a variety shall be deemed to be essentially derived from another variety (“the initial variety”) when

does NOT say another PROTECTED variety
Essentially Derived Varieties

Breeder 1

Initial Variety ‘A’
(Not protected)

- predominantly derived from ‘A’
- retains expression of essential chars. of ‘A’
- clearly distinguishable from ‘A’
- conforms to ‘A’ in essential chars.
  (except for differences from act of derivation)

Essentially Derived Variety ‘B’

Breeder 2

Authorization to commercialize variety B
NOT required

Commercialization
Scope of the Breeder’s Right (1991 Act)

Article 14

Scope of the Breeder’s Right

(5)[Essentially derived and certain other varieties]

(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,

Article 14*
Scope of the Breeder’s Right

(1)[Acts in respect of the propagating material]
(2)[Acts in respect of the harvested material]
(3)[Acts in respect of certain products]
(4)[Possible additional acts]
Essentially Derived Varieties

Breeder 1

Initial Variety ‘A’ (Protected)

Predominantly derived

Breeder 2

Essentially Derived Variety ‘B’ (Protected)

Breeder 3

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)
Essentially Derived Varieties

Breeder 1
Initial Variety ‘A’ (Protected)

Predominantly derived

Breeder 2
Essentially Derived Variety ‘B’ (Protected)

Authorization to commercialize variety C NOT required

Breeder 3
Essentially Derived Variety ‘C’

Authorization to commercialize variety C REQUIRED

Commercialization
Essentially Derived Varieties

Breeder 1
Initial Variety ‘A’
(NOT protected)

Predominantly derived

Breeder 2
Essentially Derived Variety ‘B’ (Protected)

Authorization to commercialize variety C
(NOT required)

Breeder 3
Essentially Derived Variety ‘C’

Commercialization
Essentially Derived Varieties

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)
Essentially Derived Varieties

**Initial Variety ‘A’**
(NOT 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 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)
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EXPLANATORY NOTES ON ESSENTIALLY DERIVED VARIETIES
UNDER THE 1991 ACT OF THE UPOV CONVENTION

Document adopted by the Council
at its thirty-fourth extraordinary session
on April 6, 2017
Seminar on the Impact of Policy on Essentially Derived Varieties (EDVs) on Breeding Strategy
Unless EDV
Mono-parental EDV example in Apple

A subset of naturally occurring mutations of ‘Kidd’s D-8 apple (marketed as ‘Gala’)

[Diagram of apple varieties and relationships]
New Plant Variety Development requires a lot of time and cost.

- The grape variety "Shine Muscat" developed by the National Agriculture and Food Research Organization (NARO) took **33 years** from the selection of the parent line "Akitsu 21" to its registration, and **18 years** from the start of crossbreeding tests of "Akitsu 21".

- In the last 18 years alone, **13 researchers** have been involved in the development of the variety.

Long Progress in the development of “Shine Muscat" variety at NARO

- 1973: "Akitsu No. 23" was selected by crossing "Steuben" and "Muscat of Alexandria" with the goal of breeding a variety that is good tasting and can be grown with low labor.
- 1973: Development of a successor variety to "Akitsu 21" begins.
- 1988: Based on the results of cultivation characteristics tests throughout Japan, it was not selected as a variety, but used as a breeding mother with excellent traits.
- 1999: Nationwide testing of cultivation characteristics of "Akitsu No. 23" begins.
- 2003: "Akitsu No. 23" was selected as a candidate for a new variety.
- 2006: From 115 plants obtained from crossing with "Shiranami", "Akitsu No. 23" (later called "Shine Muscat") was selected.
- 2007: Seedling sales begin.
- 2008: "Shine Muscat" is registered as a variety under the Plant Variety Protection and Seed Act.

"Shine Muscat" is a good-tasting and low-labor grape variety developed in Japan.
UPOV EDV Seminar - Summary

- Evidence that the current UPOV guidance does not reflect the practice amongst breeders in the understanding of essentially derived varieties (EDV).

- *Evolution of breeding techniques has created new opportunities/incentives for predominately deriving varieties from initial varieties, more rapidly and at a lower cost.*

- Clear indication from presentations and discussions that the understanding and implementation of the EDV concept influences breeding strategy – therefore, it is *important that UPOV guidance is tuned to maximize benefits to society in terms of maximizing progress in breeding.*
What is the Food Systems Summit?

In 2021, UN Secretary-General António Guterres will convene a Food Systems Summit as part of the Decade of Action to achieve the Sustainable Development Goals (SDGs) by 2030. The Summit will launch bold new actions to deliver progress on all 17 SDGs, each of which relies to some degree on healthier, more sustainable and equitable food systems.

The Summit will awaken the world to the fact that we all must work together to transform the way the world produces, consumes and thinks about food...
Historically, greater food production meant greater land use; but there has been a “decoupling” since about 1960.

This “decoupling” was initially driven by greater use of inputs, but production growth increasingly comes from efficiency gains.

Growth of global agricultural output, by source:
- Using additional land
- Using additional inputs (water, fertilizer, etc.)
- Efficiency gains

Plant breeding methods

Pedigree method

vegetative propagation

F1 hybrid

F1

P1 × P2

F2

Phenotypic screening

Plants space-planted in rows for individual plant selection

F4

Families grown in progeny rows for selection.

F6

Preliminary yield trials. Select single plants.

F7

Further yield trials

F8 – F12

Multi-location testing, licensing, seed increase and cultivar release
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<th>Plant breeding methods (continued)</th>
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Seminar on the Impact of Policy on Essentially Derived Varieties (EDVs) on Breeding Strategy

Working Group on Essentially Derived Varieties (WG-EDV) to draft a revision of the Explanatory Notes on Essentially Derived Varieties for consideration by the Administrative and Legal Committee (CAJ).

October 2019