

Experiences of Members of the Union in Measures to
Improve the Efficiency and Effectiveness of DUS Testing

**Assessment of Uniformity
Harmonization between Species**

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Uniformity – Requirements of the UPOV Convention

Article 6(1)(c) of the 1961/1972 and 1978 Acts of the UPOV Convention:

- a variety is deemed uniform if it is “**sufficiently homogeneous**, having regard to the particular features of its **sexual reproduction or vegetative propagation.**”

Article 8 of the 1991 Act:

- a variety is uniform if, “subject to the variation that may be expected from the particular features of **its propagation**, it is **sufficiently uniform** in its **relevant characteristics**”.

What should be taken into account

- **Relevant characteristics**
- **Feature of propagation**
- **Type of expression of characteristics (QN, QL, PQ)**

Relevant characteristics

- **Relevant characteristics** of a variety include at least all characteristics used for the examination of DUS or included in the variety description established at the date of grant of protection of that variety.
- Therefore, any obvious characteristic may be considered relevant, irrespective of whether it appears in the Test Guidelines or not". Hence, it is a matter for the authority to decide, which other characteristics it may include in its consideration of distinctness, which must also be considered for uniformity and stability
- (Exceptions – dry matter content, content of drugs, weight thousand seed Usually observed in bulk sample)

Feature of propagation

Different level of uniformity according to particular feature of propagation:

- Truly self-pollinated varieties (low level of genetic variation, variation results predominantly from environment)
- Mainly self-pollinated varieties
- Inbred lines
- Vegetatively propagated varieties
- Cross-pollinated varieties (high genetic variation, variation results from genetic and environment)
- Mainly cross-pollinated varieties
- Synthetic varieties
- Hybrids (single-cross, three-way crosses, double crosses)

Some modification within group are acceptable (e.g.- segregation for three-way hybrid, for synthetic varieties, for male sterile varieties maintained by near-isogenic maintainer lines ...)

Type of expression of characteristics

Type of expression of characteristics (QN, QL, PQ) -
the variation in the expression of the relevant
characteristics within variety - the basis for assessment
of uniformity

Common approaches for the assessment of uniformity

| | Type of expression | | |
|--------------------------------------|---------------------------------|-----------|---|
| Method of propagation of the variety | QL | PQ | QN |
| Vegetatively propagated | Off-types | Off-types | Off-types (Visual observation) Standard deviations (measurement) |
| Self-pollinated | Off-types | Off-types | Off-types (Visual observation) Standard deviations (measurement) |
| Cross-pollinated | Off-types | Off-types | Standard deviations |
| Single hybrid (inbred parent lines) | Off-types | Off-types | Off-types (Visual observation) Standard deviations (measurement) |
| Other hybrid | according to the type of hybrid | | |

Off-types approach

What we need to know?

- a sample size, e.g. 100 plants;
- a fixed population standard, e.g. 1%;
- an acceptance probability, e.g. at least 95%

| | Population standard | | | | | | |
|-----------------------------|---------------------|----|----|----|----|------|------|
| Acceptance Probability 95 % | 10% | 5% | 3% | 2% | 1% | 0.5% | 0.1% |
| Allowed number of off-types | 15 | 9 | 6 | 5 | 3 | 2 | 1 |

Standard deviation approach

Overall level of variation observed across all individual plants is considered and compare with comparable varieties

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

Is there any chance to harmonize uniformity assessment between species ?

Type of expression of
relevant characteristics

Feature of propagation

Sample size for
uniformity
assessment

Genetic background

How to deal
with
subsample



Acceptance
probability and
population standard
of similar species

How to define
subsamples - years,
locations, ...

Information sources

UPOV web pages:

<http://www.upov.int/tgp/en/list.jsp>

- Documents

- UPOV Convention
- TG/1/3
- TGP/10 Examining Uniformity
- Test Guidelines

Thank you for your attention

