

## **ESA Position Paper on The possible use of molecular markers for DUS testing**

**ESA\_03.0022.6**

### **Introduction**

More and more results of the research on the use of biochemical and molecular techniques become available and make an evaluation in view of practical application necessary.

UPOV continues to consider certain important issues regarding the utilisation of these new techniques in the examination of Distinctness, Uniformity and Stability in relation to the following:

- conformity with the UPOV Convention, and
- potential impact on the strength of protection especially in view of the possibility to undermine the effectiveness of this protection.

Models with the following features were discussed:

- molecular characteristics as a predictor of traditional characteristics, i.e. use of molecular characteristics which are directly linked to traditional characteristics as gene specific markers.
- Calibration of threshold levels for molecular characteristics against the minimum distance in traditional characteristics.

The conclusions of UPOV as regards these models are as follows:

- The model for a gene specific marker of a phenotypic characteristic was acceptable within the terms of the UPOV Convention and would not undermine the effectiveness of protection.
- The model for a calibration of threshold levels for molecular markers against the minimum distance in traditional characteristics for Oilseed Rape, Maize and Rose, where used for the management of reference collections, was acceptable within the terms of the UPOV Convention and would not undermine the effectiveness of protection.
- The model for using a set of molecular markers in the same way as existing non-molecular characteristics for roses and to expand and organise reference collections and to screen candidates prior to field testing for wheat did not reach consensus on the acceptability within the terms of the UPOV

Convention and on whether they would undermine the effectiveness of protection.

## **Position**

ESA considers the actual system of DUS testing based on phenotypic assessment the most appropriate way to deal with differences between varieties occurring in nature.

It considers the use of molecular markers in DUS-testing not acceptable based on the following reasons:

- DNA marker profiles are not predictable for most phenotypic characteristics due to lack of genetic linkage information or to the relatively complex genetic control of many phenotypic traits.
- the use of molecular markers in setting distinctness, if based only on one band of difference in a molecular pattern could lead to a decrease of minimum distances in DUS and by this would jeopardise the value of Plant Breeders Rights.
- DUS testing based on DNA markers cannot be restricted to distinctness but necessarily would have to be used for uniformity and stability as well. This could have important consequences.

Therefore ESA proposes other solutions instead of the use of markers in DUS-testing to limit the costs of DUS testing.

ESA considers closer cooperation of all Plant Variety Offices together with cooperation with breeders a more realistic, less cost bearing and less negative impact creating approach. In this respect ESA supports the setting up of an UPOV database on phenotypic characteristics, which could be used for pre-screening with the relevant reference collections.

As a consequence, ESA considers that UPOV should focus on the approach of molecular markers as predictors of traditional characteristics only if directly linked to these characteristics. This link between the marker and the trait should be able to be predictive of the state of the trait. The marker must be able to reveal the allelic variability that can be observed with phenotypic characteristics.

This might be useful for the examination of phenotypical characteristics that cannot be consistently observed in the field or require additional special arrangements (e.g. disease resistance).

This position does not imply that ESA rejects the use of molecular markers in general.

ESA does not object to the use of markers for grouping, i.e. field

organisation of the reference collection.

Furthermore ESA considers that they could be used in other areas than DUS testing for instance as a tool in the assessment of essential derivation as well as for variety identification.