



## **Position Statement on the Use of Molecular Markers in Testing for Distinctness, Uniformity and Stability (DUS)**

The American Seed Trade Association (ASTA) supports changes that increase the efficiency, speed, or information content or reduce transaction costs of the current DUS procedures while maintaining or improving current levels of protection afforded by Plant Variety Protection (PVP). ASTA currently believes that morphological characteristics should continue to provide the foundation for DUS determination. There are a number of reasons for this belief, including familiarity and experience with morphological traits. Nonetheless, not all morphological traits are equally useful or reliable. Therefore, the list of required traits should be regularly reviewed on a crop by crop basis in order to remove traits that are no longer reliably useful as a basis for PVP examination.

The use of molecular markers in plant breeding and plant variety identification has increased considerably in many crop species. ASTA strongly endorses the use of DNA-based markers for variety identification purposes, such as for enforcement of intellectual property rights or determination of genetic conformity for resolution of essentially derived variety (EDV) disputes. Progress continues to be made in technologies, cost, species that can be profiled, and informativeness of molecular markers. United States testing authorities should begin considering and addressing issues that could arise if molecular marker data would, in the future, be incorporated into the DUS system. In this regard, U.S. testing authorities should participate in and keep fully abreast of the work that is done and reported under the auspices of the Biochemical and Molecular Techniques (BMT) Working Group of the International Union for the Protection of New Varieties of Plants (UPOV).

ASTA considers that platform-independent DNA-based markers, i.e., Single Nucleotide Polymorphisms (SNPs), could be useful in the DUS testing and examination process as follows:

- When DNA-based markers are fully predictive of the expression of phenotypic DUS characteristics;<sup>1</sup> and
- When used for the calibration of DNA-based markers with respect to the expression of phenotypic characteristics in the management of reference collections<sup>2</sup> and in the proper planning of DUS trials. The use of phenotypic descriptors together with DNA-based data can be acceptable for these purposes provided that no phenotypically

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<sup>1</sup> See Option 1a as outlined in UPOV documents TC/38/14-CAJ/45/5 and TC/38/14 Add.-CAJ/45/5 Add.

<sup>2</sup> See Option 2 as outlined in UPOV documents TC/38/14-CAJ/45/5 and TC/38/14 Add.-CAJ/45/5 Add.

similar varieties, which are essential for comparison, are omitted.

ASTA recommends establishing a plan for implementing the use of DNA-based markers in the field of DUS testing and examination based upon the following principles and applications:

- A combination of marker profiles and an informative set of morphological characters could improve efficiency and reliability of the DUS system while maintaining the current minimum distance between varieties and therefore not jeopardize Breeders' Rights under UPOV;
- A marker database could be used to identify the most similar variety or varieties so that only morphological data need be examined for those varieties to assess distinctness; and
- A publicly available set of markers is established and protocols to generate marker data and to calculate distance measures based on marker data are agreed upon.

Crop-specific studies will be required to address issues such as:

- Public availability of informative markers;
- Establishment of crop-specific sets of markers;
- Availability of technological expertise and resources to breeders;
- The need to profile existing protected inbred lines and varieties with crop-specific marker sets; and
- Cost.

Until these studies are conducted, ASTA believes that morphological traits should remain the foundation for determining DUS.

ASTA considers that with the present state of the art, DNA-based markers alone should not be accepted for establishing DUS.

*Approved by the Board of Directors on June 25, 2009, replacing the 2006 position.*