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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

**ADMINISTRATIVE AND LEGAL COMMITTEE**

**Forty-Third Session**  
**Geneva, April 5, 2001**

ADDENDUM TO DOCUMENT CAJ/43/3

TERMS OF REFERENCE OF AD HOC SUBGROUP OF TECHNICAL AND LEGAL  
EXPERTS ON BIOCHEMICAL AND MOLECULAR TECHNIQUES

*Document prepared by the Office of the Union*

I. Background

1. At its thirty-sixth session, the Technical Committee agreed to a proposal from the Working Group on Biochemical and Molecular Techniques and DNA Profiling in Particular (BMT) to establish *ad hoc* crop subgroups, formed jointly by crop experts and biomolecular technicians, for further studies on the possible use of molecular techniques in DUS testing. Subgroups were established for Maize, Oilseed Rape, Rose, Tomato and Wheat and meetings have been held during February/March 2001. Each subgroup was invited to consider the potential for use of molecular techniques on the basis of a work program developed by the Technical Committee and an "issues paper" prepared by the Office of the Union in consultation with the Chairman of the BMT and the Chairmen of the Subgroups. On this basis, the subgroups have considered various possible models for the way in which molecular techniques might be introduced for DUS testing and where there is most need for such techniques. These two aspects are considered below.

## II. Need for Molecular Characteristics

2. There was a broad consensus amongst participants of the sub groups that the greatest need for the development of molecular characteristics is in the “management of reference collections.” The term “management of reference collections” encompasses the need to establish distinctness from any other variety whose existence is a matter of common knowledge and the need to organize, in an effective way, the growing trial of candidate varieties and other reference varieties which have previously not been established to be distinct from the candidate varieties. The potential advantage of molecular characteristics is that information obtained from different DUS examiners will be directly comparable and could be used by other parties for considering distinctness against candidate varieties. This would allow the screening of a larger collection of varieties than currently included in physical reference collections, and by the use of these characteristics for establishing distinctness prior to the growing trial (“pre-screening”) could significantly reduce both the number of reference varieties which need to be included in the growing trial and the number of traditional characteristics which need to be examined for distinctness.

3. It was noted that the process of pre-screening could require a greater difference between varieties than the minimum distance for distinctness used in a growing trial, since it was only the first step in determining distinctness. It was considered that this greater difference (“minimum distance plus”) would allow the introduction of a suitable safety margin for molecular characteristics if they were used in this way. Experience gained over time may then allow this safety margin to be reduced.

## III. Models for the Possible Introduction of Molecular Techniques in DUS Testing

4. In considering the possible use of molecular techniques, or any characteristic, it is necessary to consider how they might be used to examine Distinctness, Uniformity and Stability.

### *Distinctness, including use in “Pre-screening”*

5. The discussions in the subgroups reviewed technical developments in relation to three different general approaches, which might be considered for the introduction of these techniques. Each of these was developed with regard to the existing level of difference required for distinctness of plant varieties, or “minimum distance”:

#### OPTION 1: Molecular Characteristics as Predictors of Traditional Characteristics

(a) It was generally agreed that molecular characteristics which directly and consistently predict distinctness for traditional characteristics (e.g. gene specific markers for herbicide tolerance or disease resistance) presented no major concerns regarding possible erosion of the “minimum distance.” It was noted that, at present, there are only a limited number of molecular characteristics with such linkage. It was also noted that the reliability of the linkage would need to be kept under constant review.

(b) An alternative is to identify a set of molecular characteristics which can be used reliably to estimate a traditional characteristic; for example, quantitative trait loci, although

this is not the only possible example. Having estimated the traditional characteristic in this way, the information could then be used as a basis for clearly distinguishing varieties.

#### OPTION 2: Calibration of Molecular Characteristics against Traditional Characteristics

6. It was considered that concerns regarding the possible erosion of minimum distance might be addressed by calibrating the minimum distance required for distinctness using molecular characteristics against the minimum distance established by traditional characteristics, to ensure that there would be no significant change as a result of the introduction of the former. It was also considered necessary to conduct an analysis, prior to any decision on its introduction, to review any change in the nature of decisions which may result and consider the impact on the effectiveness of plant variety protection.

#### OPTION 3: Development of a New System followed by Impact Analysis

7. The final approach considered by the subgroups was the development, from scratch, of a system for determining distinctness in a technically robust way (and also in accordance with the UPOV Convention). Having developed such a model system, this would be analyzed (e.g. by a review of possible differences in decisions compared to the existing system) for its impact on the effectiveness of plant variety protection. Consideration would then need to be given as to whether such changes, if any, were acceptable when considered alongside any other possible benefits or disadvantages.

#### *Uniformity and Stability*

8. The current subgroups consider self-pollinated or vegetatively propagated species for which, broadly speaking, the current uniformity requirements are based on uniformity in an absolute sense, rather than cross-pollinated species, for which uniformity is assessed in relative terms.

9. The work in the subgroups demonstrated that when existing protected varieties (i.e. uniform for traditional characteristics) are examined there is often, at least to some extent, some lack of uniformity for molecular characteristics. When considering the possible introduction of molecular characteristics it would be necessary to consider if there should be a requirement for such characteristics to be uniform in absolute terms, as for traditional characteristics, or if relative uniformity would be acceptable. It was noted that requiring higher standards of uniformity could, in some cases, have a negative impact on variety performance.

10. At present there is insufficient information to establish whether it would be simple and practical for breeders to establish uniformity and maintain this (i.e. stability) for molecular characteristics. The general consensus at the meetings was that, in principle, a lack of absolute uniformity should not necessarily prevent the use of these characteristics if satisfactory guidelines are developed. However, it was noted that lack of absolute uniformity would diminish the power of discrimination for the characteristics.