



TGP/9.5 Draft 1

ORIGINAL: English

DATE: July 11, 2002

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

Associated Document
to the
General Introduction to the Examination
of Distinctness, Uniformity and Stability and the
Development of Harmonized Descriptions of New Varieties of Plants (document TG/1/3)

DOCUMENT TGP/9
“EXAMINING DISTINCTNESS”

**Section TGP/9.5: Use of Parental Formula for Examining
Distinctness in Hybrids**

Document prepared by experts from France

to be considered by the

*Technical Working Party for Agricultural Crops (TWA), at its thirty-first session to be held in
Rio de Janeiro, Brazil, from September 23 to 27, 2002*

*Technical Working Party for Ornamental Plants and Forest Trees (TWO), at its thirty-fifth
session to be held in Quito, from November 18 to 22, 2002*

SECTION 9.5 USE OF THE PARENTAL FORMULA FOR EXAMINING DISTINCTNESS IN HYBRIDS

In the Test Guidelines for certain species (maize, sunflower, oilseed rape) an optional method is described to assess Distinctness of an hybrid variety with a pre-screening approach based on the parental components; of the hybrid and its formula.

The method includes four main steps, which are:

- (i) Description of parental lines according to the Test Guidelines of the given species.
- (ii) Check of the originality of these parental lines in comparison with the reference collection, based on the characteristics in Chapter VII in order to screen the closest inbred lines.
- (iii) Check of the originality of the hybrid formula in comparison with those of the hybrids of common knowledge, taking into account the closest inbred lines.
- (iv) Assessment of the distinctness at the hybrid level of varieties with similar formula.

The basic principle of the method is that two inbred lines A and B used in two different crosses $A \times C$ and $B \times C$ will give two different hybrids according to the UPOV rules as soon as the difference between A and B is enough important and clearly qualified.

The aim of the paper is to describe how to use this method.

Before that, it's important to underline the main reasons to develop such a method and under which conditions it can be used.

The main interest lies on the fact that:

Breeders working on hybrid programs are focusing their attention on the inbred lines to get a good general and specific combining ability.

An inbred line with a good genetic value is generally used in many different hybrid varieties. It means that the DUS test done on an inbred line can be used for these different hybrid varieties.

For different species, the knowledge of the genetic control of some characteristics gives the possibility to check the trueness of the formula declared by the applicant. So a clear link can be established between the hybrid variety and the parental lines.

DUS test on inbred lines which are generally highly homozygous and, then uniform, is easier compared to, DUS test on a three ways cross or double cross hybrid which have to be assessed plant by plant.

The management of the reference collection is facilitated and a few hybrids have to be sown each year.

Such approaches have been developed on different species in France using software with which the closest lines can be detected using combinations of characteristics with consideration of their variability within the species; their susceptibility to environmental effect and their reliability.

Using such a method to study DUS of a hybrid variety, other conditions have to be fulfilled

Check of the trueness of the formula: the aim is to check if the candidate hybrid variety has really been produced by crossing the parental lines declared and submitted by the applicant.

Different characteristics can be used to do this check as soon as the genetic pattern of each parent can be identified in the hybrid.

Generally characteristics based on polymorphism of enzymes or of some storage proteins can be used.

If no characteristic is available or pertinent enough, the only possibility is to cross the parental lines using the plant material delivered by the applicant and to compare the hybrid variety seedlots (the sample delivered by the applicant and the sample harvested after the cross),

Check of uniformity and stability of each parental lines.

These two criteria represent an important condition to get stability of the hybrid; the other one is the use of the same formula at each cycle of the hybrid seed production.

To assess uniformity and stability of the parental lines, the UPOV recommendations on this type of variety have to be followed.

A check of the uniformity on the hybrid seedlot has also to be done even if there is no need to assess distinctness at the hybrid level.

Description of the hybrid

In case of the assessment of Distinctness only based on the parental lines, a description of the candidate hybrid has to be established.

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