E

TWA/28/17
ORIGINAL: French
DATE: June 1, 1999

UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS

Twenty-Eighth Session
Ottawa, June 22 to 25, 1999

USE OF ELECTROPHORESIS OR OTHER SUPPORTING EVIDENCE IN DUS TESTING

Document prepared by experts from France

USE OF ELECTROPHORESIS OR OTHER SUPPORTING EVIDENCE IN DUS TESTING

(F. BLOUET – J. GUIARD)
France

CONVENTIONAL BASIS

Article 1 vi) considers the variety on the basis of phenotypical characteristics for defining a plant grouping by comparison within the whole considered species.
For this reason, only one characteristic, without any consideration of minimum distance, is enough to identify a plant grouping entity corresponding to a variety.

Article 7 is defining the obligation of distinctness to be fulfilled by a candidate variety to a plant breeders' rights title.
Complementary to article 1 vi, the notion has to be qualified in view to insure a "clear distinctness" without prejudging the nature of the characteristics to be taken into account.
Whatever the characteristics used, the clear distinctness must be demonstrated at the phenotypical level.

Technical basis

UPOV technical guidelines are proposing a set of morphological and physiological characteristics which constitutes the background to establish a description of the candidate varieties. On this basis it is possible to pronounce on distinctness for a majority of cases.

Positive pronouncement can be based on ***a difference for one of the UPOV characteristics, considered as enough*** to establish a clear distinctness in the meaning of article 7. More often, such a distinctness is based on ***small differences observed on a group of UPOV characteristics***. In few cases, experts are convinced that the candidate is clearly a distinct variety without evidence as previously described (*see annex I*).

In such cases, it is necessary to consider if there are ***other tools for the identification of the variety***. The characteristics revealed through such tools should be taken complementary to UPOV characteristics as ground for describing the variety. They should never be considered solely as a sufficient basis for distinctness just because they are not establishing as such a clear distinctness for the efficiency of plant breeders' rights.

Besides the case where the aim would be to support evidence based on experts' conviction or on characteristics which not fulfilled UPOV requirements, two others approaches can be considered:

- The possibility to use biochemical and/or biomolecular characteristics as markers of morphological and physiological ones. More and more, scientific papers present results dealing with the use of molecular markers to tag genes of interest and their application in plant breeding programs.

When such a link would have been established, laboratory tools could be used instead of field observations for the concerned characteristics. At this stage, no change would appear in the descriptions of varieties as no characteristic would have been added but only the method would have to be considered and harmonized by UPOV.

- The development of a system based on distances in which different kinds of characteristics (morphological, physiological, biochemical and/or biomolecular) could be used in combination.
  To be efficient and to fulfill the UPOV basis of the variety definition these distances have to be defined and calibrated according to the variability described in each species concerned.
  In that case, clear distinctness is no more a question of minimum difference for each characteristic, but minimum distance between varieties.
  This last approach has already been discussed in the BMT group and some methodological work is undertaken in some countries first to study the essential derivation, but also to propose new approaches concerning management of reference collection and distinctness.

These topics are essential if we want to escape from a lower efficiency of plant breeder's rights in relation with the introduction of new technologies to establish clear difference between varieties.

[Annex 1 follows]

Example of a flax variety A for which a positive decision on distinctness was taken on the basis of :

- **small differences with a variety B for 3 UPOV characteristics ,**
- **significant differences observed in the VCU trials ,**
- **clear difference for one isoenzyme (ACP)**

1 st step : application of the usual DUS procedure

- A flax variety A, observed in 1992 and 1993 in France (La Minière) and Belgium (Merelbeke) was found to be close to variety B in the DUS trials.
- For each of the 15 UPOV characteristics, the minimum distance was never achieved twice out of the 4 sets of data (F 1992, F 1993, B 1992, B 1993) (see table 1)
- Small differences were found in comparing the descriptions for 3 characteristics :

  - sepal : dotting
  - boll : size
  - seed : weight per 1000 seeds

  The examiners underlined that these characteristics are very fluctuating (especially the dotting of sepals) and thus, would not allow them to recognize A and B easily. On the other hand, these 3 characteristics are quantitative and thus, indicate that A and B are not genetically similar.

- In 1993, it was not possible to identify safely variety A and variety B when sown in a special trial with a side by side lay-out, and when observing the whole phenotype of the two varieties at different stages.

2 nd step : taking into account VCU characteristics

- The breeder mentioned a clear difference in the agronomic behaviour of variety A versus B. Effectively, significant differences were observed in 1992 and 1993, in the French and Belgium VCU networks for yield and lodging. The French and Belgium experts agreed on the fact that the two varieties were two different products of selection, clearly distinct for yield and resistance to lodging.

3 nd step : asking the breeder to provide a reliable tool for identifying his variety.

- A final positive decision was taken after asking the breeder to provide a praticable characteristic which could allow a clear identification of his variety (A).

The breeder declared that the two varieties A and variety B were easily identificable by electrophoresis of ACP. This was checked and confirmed.

The evidence of distinctness was then supported by electrophoresis.

[End of Annex 1, Annex 2 follows]

TABLE 1

Differences observed between variety A and variety B in DUS trials in France and Belgium (1992 and 1993)

	F-1992	F-1993	B-1992	B-1993	remark
N° UPOV TG/57/6					
1 - Plant : natural height	- 2,6 cm	- 1,8 cm	+ 9,4 cm	- 1,3 cm	Minimum distance (5 cm) never achieved and inconsistency of differences.
2 - Stem : length	+ 1,0 cm	+ 2,2 cm	+ 4,9 cm	+ 0,5 cm	Minimum distance (5 cm) never achieved but consistency of small differences.
3 - Flower : size of corolla	0	0	0	0	No difference
4 - Sepal : dotting	+ 2	+1	+4	+2	Characteristic highly influenced by environment. Minimum distance of 4 achieved once and consistency of small differences.
5 - Petal: color of crown	0	0	0	0	No difference
6 - Petal : color of corolla	0	0	0	0	No difference
7 - Petal : longitudinal folding	0	0	0	0	No difference
8 - Stamen : color of distal part	0	0	0	0	No difference
9 - Anther : color	0	0	0	0	No difference
10 - Style : color	0	0	0	0	No difference
11 - Boll : size	+ 2	+1	+1	+1	Minimum difference (2) achieved once and consistency of small differences.
12 - Boll : ciliation of false septa	0	0	0	0	No difference
13 - Seed : weight per 1000 seeds	+ 0,2 g	+ 0,4 g	+ 0,6 g	+ 0,4 g	Minimum distance (0,5 g) achieved once and consistency of small differences.
14 - Seed : color	0	0	0	0	No difference
15 - Time of beginning of flowering	- 1 day	+ 1 day	+ 2 days	+ 1 day	Minimum distance (3 days) never achieved and inconsistency of differences.

[End of Annex II and document]