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COMBINATIONS OF LINES

Document prepared by the Office of the Union

Background

1. At the forty-second session of the Technical Committee (TC), held in Geneva, from April 3 to 5, 2006, the Delegation of Colombia proposed to consider the examination of a single application for a plant breeder's right for a variety formed by a combination of different lines. The Delegation reported the case of an application for a coffee variety formed by a combination of more than 40 different lines. In response to that request for clarification of how to address a single application for a plant breeder's right for a combination of different lines, the TC agreed that a document should be prepared for consideration at the forty-third session of the TC.

2. The Office of the Union (Office) considered the background to the matter raised at the forty-second session of the TC and observed that the initial request related to several species, and because of the range of breeding methods and methods of propagation which existed in plant breeding, it was concluded that it might be more appropriate for a particular case to be considered. Therefore, it proposed to the TC (see document TC/43/11) that the matter be considered in relation to a specific crop at the relevant Technical Working Party (TWP) and, in particular, in relation to the relevant Test Guidelines.

3. At its forty-third session, held in Geneva, from March 26 to 28, 2007, the TC agreed that examples of specific cases concerning a single application for a plant breeder's right for a combination of different lines should be raised with the relevant TWP, where appropriate in relation to the relevant Test Guidelines. Given the importance of the matter, which related to the definition of variety in the 1991 Act of the UPOV Convention, the TC agreed that it should be clarified that the TWPs should investigate the specific cases from a technical perspective in order to facilitate consideration of the principles by the TC and the CAJ.

Matters to be considered

4. A plant grouping can be considered to be a variety if it satisfies the definition of a variety set out in Article 1(vi) of the 1991 Act of the UPOV Convention, but this does not necessarily mean that a variety will fulfil the conditions required for grant of a breeder's right under the UPOV Convention, e.g. the DUS criteria. The issue raised by the TC was with regard to whether a plant grouping of a combination of lines could be protected by a single title of protection. Thus, the focus of this document is to consider the DUS criteria in relation to a type of plant grouping and not whether the plant grouping would fulfil the definition of a variety. In clarifying the purpose of this document, it is recognized that there are issues concerning varieties which fulfill the definition of a variety, but which might not be eligible for protection. However, it is not necessary to explore those issues in order to consider whether a plant grouping of a combination of lines could be protected by a single title of protection, which is the focus of this document.

5. With regard to whether a plant grouping of a combination of lines could be protected by a single title of protection, the main consideration is whether the condition of uniformity would be fulfilled. In that respect, document TG/1/3 "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (General Introduction) states the following:

> "6.1 Requirements of the UPOV Convention
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> According to Article 6(1)(c) of the 1961/1972 and 1978 Acts of the UPOV Convention, a variety is deemed uniform if it is "sufficiently homogeneous, having regard to the particular features of its sexual reproduction or vegetative propagation." Article 8 of the 1991 Act deems that a variety is uniform if, "subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics," thereby making it clear that characteristics are the basis for examination of uniformity.
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> "6.2 Relevant Characteristics
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> At least for the purposes of the 1991 Act of the UPOV Convention it is necessary to clarify the meaning of relevant characteristics. Relevant characteristics of a variety include at least all characteristics used for the examination of DUS or included in the variety description established at the date of grant of protection of that variety. Therefore, any obvious characteristic may be considered relevant, irrespective of whether it appears in the Test Guidelines or not. [underlining added for emphasis]
> […]

"6.4.1 Self-Pollinated and Vegetatively Propagated Varieties

"6.4.1.1 Determination of Off-Types by Visual Assessment

A plant is to be considered an off-type if it can be clearly distinguished from the variety in the expression of any characteristic of the whole or part of the plant that is used in the testing of distinctness, taking into consideration the particular features of its propagation. This definition makes it clear that, in the assessment of uniformity, the standard for distinctness between off-types and a candidate variety is the same as for distinctness between a candidate variety and other varieties (see Chapter 5, section 5.5.2)."

6. In accordance with the request of the TC, the Office issued a circular to the TC and TWPs (circular E 473, April 12, 2007), inviting examples of specific cases concerning a single application for a plant breeder's right for a combination of different lines. Whilst it had been agreed that the specific cases should be discussed by the relevant TWP, it was proposed, with the agreement of the Chairpersons of the TC and TWP(s), that all the cases should be circulated to all the TWPs and the conclusions of the relevant TWPs be reported to other TWPs for information. The following section presents the cases provided in response to that circular.

Examples of Specific Cases

Testing of Seed-propagated Varieties of Ornamental Species (Technical Committee and Technical Working Party for Ornamental Plants and Forest Trees (TWO))

7. At its thirty-fifth session, held in Geneva, from March 22 to 24, 1999 (see document TC/35/12 "Report", paragraphs 36 to 42), the TC discussed the way to handle applications of hybrid varieties from non-uniform parental lines, and the *Pelargonium* seed-propagated variety, as described in document TC/35/7.

8. The TC "agreed to evaluate if it was possible for the breeder to go further in the breeding process to get more homogeneity, and if the range of variability could be predictable, but it had to be cautious in this sense in order to avoid blocking research in this field of plant breeding by accepting materials that were too heterogeneous or by being very strict in the assessment of homogeneity. The [TC] proposed to make a more careful analysis and asked the TWO to analyze whether [it] was possible to accept this kind of material." (see document TC/35/12, paragraph 42).

9. At the thirty-second session of the TWO, held in Pruhonice, Czech Republic, from September 13 to 18, 1999, (see document TWO/32/9 "Report", paragraph 16) "Some experts confirmed that there were problems, as many specialists from the seed industry had asked Offices a great many questions concerning UPOV's attitude in certain special cases. The specialists had submitted their problems and were awaiting advice and possible solutions. For example, some flower mixtures contained about ten types of plant with different colorations. To ask for protection for all of them was too expensive. One possible solution might be to protect only two or three types with the most predominant coloration. In conclusion the [TWO] decided to continue discussing the issue together with its discussion of document TC/35/15 Prov. [revised working document for the preparation of a new General Introduction]".

Varietal Associations: Oilseed Rape (France)

10. The situation in France with regard to varietal associations was reported as follows:

> "In France, the only experience […] is with varietal associations in Oilseed rape [Rape seed (*Brassica napus* var. *napus* / *Brassica napus* L. *oleifera*)]. For the DUS test, each component of an association is tested separately; so we don't consider the association as a variety. For national listing according to the European Union rules, each component must be registered as a variety and there is a special list besides the national and common catalogues where the associations are listed for certification purposes. For plant breeder's rights, each component can be applied for and protected as far as all the requirements are fulfilled. The association can't receive a plant breeder's right because more than one variety is concerned."

Wheat: midge resistance (Canada)

11. The following explanation was received by Plant Breeders' Rights Office of Canada (PBRO) from a wheat breeder who wanted to apply for a plant breeder's right for a combination of lines with different levels of resistance to an insect:

> "The orange wheat blossom midge is a small fly which is causing significant problems/damage in the wheat crop in Western Canada and adjacent northern USA states as well as the UK.
>
> Currently resistance has been developed based on the gene *Sm* 1 to combat this. There is some biological control of the wheat midge by a parasitiod wasp. Resistance based on a single gene is often short lived due to the combinations of mutations of virulence that occur in the insect population and the high selection pressure for the mutation when exposed to a monoculture of resistance host. In order to maintain the long term commercial and environmental value of *Sm* 1, it is proposed that all midge resistant cultivars include an interspersed refuge (90 % resistant-10 % susceptible ratio) to discourage the resistance of virulence mutations in the wheat midge population.
>
> The *Sm* 1 gene is highly effective, simply inherited, easy to select for in breeding programs and appears to have no negative agronomic impacts.
>
> The purpose of the wheat midge refuge is to provide a sufficient number of homozygous susceptible midges such that mutations to virulence to *Sm* 1 would tend to be lost because of high probability that midges carrying a mutation to virulence will mate with homozygous susceptible midges rather than each other.
>
> Other salient biological features of this refuge system would be:
>
> 1. That wheat midges mate at the emergence site, so in resistant crop assortative mating would occur.
> 2. That larvae are not able to move from spike to spike, so they cannot move to susceptible plants far away (Unlike in corn, with the BT corm borer resistance).
> 3. That individual midge females produce progeny of only one sex, enforcing outcrossing.
> 4. That wheat midges survive almost exclusively on spring wheat in western Canada as flowering time of spring wheat most closely matches the time of emergence of the adult midge and
> 5. That *Sm* 1 provides a highly effective resistance response; 3rd instar larvae are rarely observed on resistant wheat.

It is believed that it would be too time consuming and expensive to produce iso-lines of the resistant cultivar at this point for use as a refuge, thus using a susceptible variety with similar agronomics would be preferred.

Using insecticides to control the problem increases costs, has a narrow application window and kills the parasitiod wasp and may have environmental impacts.

Using only the resistant line to combat this based on a single gene has been shown in the past for example, with hessian fly resistance, that the resistance breaks down in less than 10 years."

12. The PBRO rejected the application for the combination of lines and the breeder filed separate applications for the individual lines themselves.

Rice: rice blast resistance (Republic of Korea)

13. The following cases in rice were reported by the Plant Variety Protection Division, National Seed Management Office (NSMO) of the Republic of Korea:

Application 1: Saechucheong
(Saechucheong BIL-1, Saechucheong BIL-2, Saechucheong BIL-3)

Saechucheong was a multiline mixture of three near isogenic lines (NILs), composed of equal proportions in seed weight of the three NILs.

The characteristics of each line were as follows;

Saechucheong BIL-1: resistance to rice blast races KJ301, KI313 and KI409
Saechucheong BIL-2: resistance to rice blast races KJ101, KI315a and KI409
Saechucheong BIL-3: resistance to rice blast races KJ201, KI409, KI1113 and KI307

Application 2: Ansung
(Ansung BIL-1, Ansung BIL-2, Ansung BIL-3)

Ansung was a multiline mixture of three near isogenic lines (NILs), composed of equal proportions in seed weight of the three NILs.

The characteristics of each line were as follows;

Ansung BIL-1: susceptible to rice blast races KJ105, KI1113, KI307
with resistance to the other 7 out of 10 races.
Ansung BIL-2: susceptible to rice blast races KJ105, KI315a
with resistance to the other 8 out of 10 races.
Ansung BIL-3: susceptible to rice blast races KJ101 and KI315a
with resistance to the other 8 out of 10 races.

14. The NSMO rejected the applications above due to lack of uniformity and each of the NILs were filed separately for plant breeders' rights, although some NILs were rejected for lack of distinctness with other NILs.

15. At their sessions in 2007, the Technical Working Party for Agricultural Crops (TWA), the Technical Working Party for Fruit Crops (TWF), the Technical Working Party for Ornamental Plants and Forest Trees (TWO) and the Technical Working Party for Vegetables

(TWV) considered the cases presented in this document from a technical perspective. In particular, the TWA, TWF, TWO and TWV considered the cases raised in this document in conjunction with their discussions and proposals on document TGP/10/1 Draft 7, Section 1.2 and Section 2.4 “Segregating Characteristics”.

[End of document]