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

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# TECHNICAL WORKING PARTY FOR ORNAMENTAL PLANTS AND FOREST TREES

## Forty-first Session
## Wageningen, Netherlands, June 9 to 13, 2008

COMBINATIONS OF LINES OR VARIETIES

*Document prepared by the Office of the Union*

1. At its forty-third session, held in Geneva, from March 26 to 28, 2007, the Technical Committee (TC) considered document TC/43/11 "Applications Covering a Number of Lines". 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 Technical Working Party (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 Administrative and Legal Committee (CAJ).

Examples of specific cases considered by the Technical Working Parties

2. In accordance with the request of the TC, the Office of the Union (Office) issued a circular to the TC and Technical Working Parties (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 agreed by the Chairpersons of the TC and TWPs, that all the cases should be circulated to all the TWPs and the conclusions of the relevant TWPs reported to other TWPs for information.

3. The examples of specific cases considered by the TWPs at their sessions in 2007 are presented in the annex to this document. As an introduction to its consideration of those cases, the TWPs were provided with the following explanation:

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 fulfill 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 is with regard to whether a plant grouping of a combination of lines could be protected by a single title of protection. Thus, it is necessary to consider the DUS criteria in relation to a type of plant grouping and not whether the plant grouping would fulfill the definition of a variety. In clarifying that matter, 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.

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
>
> 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.
>
> "6.2 Relevant Characteristics
>
> 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)."

Conclusions of the Technical Working Parties

*Technical Working Party for Agricultural Crops*

6. At its thirty-sixth session, held in Budapest, Hungary, from May 28 to June 1, 2007, the Technical Working Party for Agricultural Crops (TWA) considered document TWA/36/8. It received an explanation from an expert from Canada on the background to the case reported by the Plant Breeders' Rights Office of Canada (PBRO), concerning a wheat breeder who wanted to apply for a plant breeder's right for a combination of lines with different levels of resistance to orange wheat blossom midge. That expert clarified that the lines were clearly distinguishable on the basis of characteristics in the relevant Test Guidelines. The TWA further received an explanation from an expert from the Republic of Korea on the two cases of rice, both concerning multiline mixtures of three near isogenic lines. The near isogenic lines had been developed using an existing variety as a recurrent parent, from which they differed only with respect to disease resistance.

7. The expert from Australia reported that a question had been raised in Australia concerning a collection of near isogenic lines with different disease resistances and explained that the breeder had been informed that it would be necessary to make separate applications for the different isolines. He clarified that disease resistance would be considered to be a relevant characteristic for the purposes of uniformity. He also explained that the recurrent parent would be considered as the most similar variety of common knowledge for the purposes of the examination of distinctness of the isolines.

8. An expert from the Netherlands reported on the case in the 1980s of a collection of five wheat components, with different sources of resistance to yellow rust, which had been marketed in the European Community as "Tumult". He explained that it had been necessary for the five components to be protected individually. The expert wondered whether, in relation to the example of the varietal association of oilseed rape in document TWA/36/8 (reproduced in the annex to this document), that association might be considered to be a form of synthetic variety if oilseed rape was considered to be a cross-pollinated crop. An expert from France explained that, unlike the case of synthetic varieties, in the case of a varietal association it was not the harvested seed which was commercialized.

9. An expert from the Community Plant Variety Office of the European Community (CPVO) wondered how an application for a combination of near isogenic lines could be rejected for uniformity on the basis of a characteristic which was not included in the UPOV Test Guidelines. The Technical Director noted that this would be possible according the wording agreed by the TWA for document TGP/10/1 Draft 7, paragraph 1.2, i.e. "[…] it is a matter for the authority to decide, in addition to those characteristics included in the UPOV Test Guidelines or national guidelines, which other characteristics it may include in its consideration of distinctness, which must (also) be considered for uniformity and stability."

10. An expert from France observed that authorities had possibly already protected multilines without having been aware of doing so, because the characteristics for discriminating the lines were not characteristics examined for DUS. He expressed concern at the use of the term "combination of lines" because of the possibility of confusion with "combination of genotypes" used in relation to the definition of variety in Article 1(vi) of the 1991 Act of the UPOV Convention. He considered that it was important to be clear on what was meant by "combination of lines" and also considered that it was important to consider the situation in relation to the definition of a variety and any consequences for the quality of

protection for breeders. With regard to the case of multilines, he observed that it might be possible for breeders to obtain sufficient protection by protecting only one of the lines.

11. An expert from Japan reported that an application had been received in Japan for a collection of near isogenic lines of rice with different resistances to rice-blast. In that case, the breeder had been required to protect the individual lines separately and had marketed the multiline under a brand name.

12. The TWA agreed that the wording agreed for document TGP/10/1 Draft 7, Section 1.2 (Introduction), provided sufficient guidance on how authorities could address applications covering a "combination of lines" as explained in document TWA/36/8. The consideration of the TWA with regard to near-isogenic maintainer lines was incorporated in its proposals concerning document TGP/10/1 Draft 7, Section 2.4 "Segregating characteristics".

*Technical Working Party for Vegetables*

13. At its forty-first session, held in Nairobi, Kenya, from June 11 to 15, 2007, the Technical Working Party for Vegetables (TWV) considered document TWV/41/8.

14. The TWV considered that, in cases where an authority was aware of a lack of uniformity in candidate varieties for characteristics which were not included in the UPOV Test Guidelines or the authority's own guidelines, the authority should take such characteristics into account in its examination of distinctness, uniformity and stability. The TWV also considered that it was important to clarify that the decision on the uniformity of a variety for the purposes of plant breeders' rights was independent of any decision on whether a combination of lines could be marketed.

15. The considerations of the TWV were incorporated in its proposals concerning document TGP/10/1 Draft 7, Section 1.2 (Introduction) and Section 2.4 "Segregating characteristics".

*Technical Working Party for Ornamental Plants and Forest Trees*

16. At its fortieth session, held in Kunming, China, from July 2 to 6, 2007, the Technical Working Party for Ornamental Plants and Forest Trees (TWO) considered document TWO/40/8 in conjunction with its discussions on document TGP/10/1 Draft 7.

17. The considerations of the TWO were incorporated in its proposals concerning document TGP/10/1 Draft 7, Section 1.2 (Introduction) and Section 2.4 "Segregating characteristics".

*Technical Working Party for Fruit Crops*

18. At its thirty-eighth session, held in Jeju, Republic of Korea, from July 9 to 13, 2007, the Technical Working Party for Fruit Crops (TWF) considered document TWF/38/8 in conjunction with its discussions on document TGP/10/1 Draft 7.

19. The considerations of the TWF were incorporated in its proposals concerning document TGP/10/1 Draft 7, Section 1.2 (Introduction) and Section 2.4 "Segregating characteristics".

*Technical Working Party on Automation and Computer Programs*

20. At its twenty-fifth session, held in Sibiu, Romania, from September 3 to 6, 2007, the Technical Working Party on Automation and Computer Programs (TWC) noted the information provided in document TWC/25/7.

Conclusions of the Technical Committee

21. At its forty-fourth session, held in Geneva from April 7 to 9, 2008, the TC considered the matter, as set out in document TC/44/11, in conjunction with document TGP/10/1 Draft 9.

22. With regard to consideration of applications covering a combination of lines, the Delegation of Colombia sought clarification of how a mixture of lines was covered in document TGP/10.

23. The Technical Director explained that a combination of near isogenic lines was addressed in document TGP/10/1 Draft 9, Section 2.4 “Segregating characteristics”, which also needed to be considered in relation to the final sentence of Section 1.2 of that document which noted that it “is a matter for the authority to decide, in addition to those characteristics included in the UPOV Test Guidelines or national guidelines, which other characteristics it may include in its consideration of distinctness, which must also be considered for uniformity and stability.”. He referred to the examples reported by Japan (paragraph 11 of document TC/44/11 and of this document) and the Republic of Korea (paragraphs 7 and 8 of the Annex to document TC/44/11 and to this document) for examples of how that approach had been applied. With regard to combinations of unrelated lines, the general principles of assessing uniformity according to off-types or standard deviations, as appropriate, would apply.

24. The Chairman suggested that it might be helpful to consider further examples of combinations of lines which had not been covered by the examples in document TC/44/11, provided that specific examples were provided.

25. The Delegation of France noted that the term combination of lines might not cover all possibilities and suggested to ensure that future documents should cover the possibility of a combination of varieties.

26. In conclusion, with regard to applications covering a combination of lines, as considered in document TC/44/11, the TC noted the discussions in the TWPs and noted that the conclusions of the TWPs were reflected in the proposals concerning document TGP/10/1 Draft 9, Section 1.2 (Introduction) and Section 2.4 “Segregating characteristics”. It agreed that further specific examples might be put forward by for consideration by the TWPs at their sessions in 2008, and subsequently by the TC at its forty-fifth session. However, it agreed that the title of any future agenda item and document should be “Combination of lines or varieties”.

[Annex follows]

ANNEX

EXAMPLES OF SPECIFIC CASES

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

1. 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.

2. 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).

3. 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)*

4. 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. var. *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)*

5. 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 parasitoid 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 corn 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 parasitoid wasp and may have environmental impacts.

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

6. 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)*

7. 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.

8. 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.

[End of Annex and of document]