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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
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TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS

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REVISION OF DOCUMENT TGP/12:
DISEASE NOMENCLATURE AND DISEASE RESISTANCE CHARACTERISTICS

Document prepared by the Office of the Union

1. The purpose of this document is a report on developments concerning the revision of document TGP/12 "Guidance on Certain Physiological Characteristics" to include guidance on explanations for disease resistance characteristics and the nomenclature of pathogens in Test Guidelines.

2. The structure of the document is as follows:

3. The following abbreviations are used in this document:

CAJ:	Administrative and Legal Committee
TC:	Technical Committee
TC-EDC:	Enlarged Editorial Committee
TWA:	Technical Working Party for Agricultural Crops
TWC:	Technical Working Party on Automation and Computer Programs
TWF:	Technical Working Party for Fruit Crops
TWO:	Technical Working Party for Ornamental Plants and Forest Trees
TWV:	Technical Working Party for Vegetables
TWPs:	Technical Working Parties

INTRODUCTION

4. At its forty-fifth session, held in Geneva from March 30 to April 1, 2009, the Technical Committee (TC) considered a proposal made by Mr. Kees van Ettekoven (Netherlands) at the forty-second session of the Technical Working Party for Vegetables (TWV), held in Cracow, Poland, from June 23 to 27, 2008, concerning the nomenclature of disease resistance. The TC agreed to invite the TWV to propose whether to include a section on the nomenclature of disease resistance in document TGP/14 "Glossary of Technical, Botanical and Statistical Terms Used in UPOV Documents" or in a future revision of document TGP/12 "Guidance on Certain Physiological Characteristics".

5. At its forty-third session, held in Beijing, China, from April 20 to 24, 2009, the TWV considered documents TWV/43/13 "Nomenclature of Pathogens" and TWV/43/16 "Principles on the Use of Disease Resistance Characteristics in UPOV Test Guidelines" and concluded that the proposal should be presented to the TC and other Technical Working Parties (TWPs) for consideration for a possible future revision of document TGP/12/1 (document TGP/12/2). It also agreed that the states of expression for quantitative characteristics with three notes might be reviewed, if appropriate.

6. At its forty-sixth session, held in Geneva from March 22 to 24, 2010, the TC agreed that the TWV should develop a proposal for a revision of document TGP/12/1 in order to provide guidance on the nomenclature and use of disease resistance characteristics, as set out in paragraphs 4 and 5 above.

EXPLANATIONS FOR DISEASE RESISTANCE CHARACTERISTICS IN TEST GUIDELINES

Comments of the Technical Working Parties

7. At their sessions in 2010, the Technical Working Parties were invited to consider proposals developed by experts from the Netherlands concerning guidance on explanations for disease resistance characteristics and the nomenclature of pathogens. Those proposals are reproduced in annexes I and II to this document, respectively.

8. The Technical Working Party for Agricultural Crops (TWA), at its thirty-ninth session, held in Osijek, Croatia, from May 24 to 28, 2010, considered document TWA/39/21 and noted that the document would need to be developed further with regard to states of expression for quantitative disease resistance characteristics (see document TWA/39/27Rev. "Report", paragraph 67).

9. The Technical Working Party for Vegetables (TWV), at its forty-fourth session, held in Veliko Tarnovo, Bulgaria, from July 5 to 9, 2010, considered document TWV/44/21 "Disease nomenclature and disease characteristics" (see document TWV/44/34 "Report", paragraphs 56 to 58). With regard to the proposed standard disease resistance protocols in Section 2.4 (Annex II to this document), the TWV agreed that the information items that were not asterisked in the protocol should not be elaborated in detail in the Test Guidelines and should be replaced by a reference to the contact details for UPOV members that would be able to provide such information on request. In making that proposal, the TWV emphasized that it was of primary importance to achieve standardized results, rather than using standardized detailed conditions, and also noted that the information in the Test Guidelines would not become outdated so quickly as would be the case if detailed methodologies were provided.

10. The TWF at its forty-first session, held in Cuernavaca, Morelos State, Mexico, from September 27 to October 1, 2010, considered document TWF/41/21 (see document TWF/41/30 Rev. "Report", paragraphs 52 and 53) and noted that breeding developments, for example with regard to Plum Pox Virus in Apricot and Apple Scab in Apple, could mean that disease resistance characteristics would become of increasing relevance for Test Guidelines for some fruit crops in the future. It was also noted that the Test Guidelines for Japanese Pear (document TG/149/2) contained a characteristic for resistance to black spot (*Alternaria kikuchiana* Tanaka).

11. The TWF noted the importance of disease resistance as a breeding aim and its importance for variety registration purposes, but clarified that such factors did not directly affect the suitability of disease resistance as a DUS characteristic. With regard to examining disease resistance as a DUS characteristic, the TWF noted that it was important to recall that authorities could arrange for tests to be conducted by specialized laboratories and could also use cooperation with other UPOV members in order to address situations where the DUS testing center did not have suitable facilities for conducting the test, or was prevented from conducting such tests because of phytosanitary restrictions. It agreed that it would be useful to prepare a document setting out such issues and invited Mr. Sergio Semon (European Union) to prepare such a document. In order to advance consideration of the issue, the TWF agreed that a first draft of that document should be circulated to the TWF by correspondence by June 30, 2011, with 4 weeks for comments and that a document should be provided to the Office of the Union 6 weeks before the forty-second session of the TWF.

Comments of the Enlarged Editorial Committee (EDC)

12. At its meeting on January 6, 2011, the TC-EDC proposed that the explanations for disease resistance characteristics in the Test Guidelines should refer to published methods rather than reproducing the methods in the Test Guidelines.

EXPLANATIONS FOR NOMENCLATURE OF PATHOGENS IN TEST GUIDELINES:

13. The TWV agreed with the proposals concerning "2.5 The nomenclature of pathogens", as set out in document TWV/44/21 (Annex I to this document).

14. The Technical Committee (TC), at its forty seventh session held in Geneva, from April 4 to 6, 2011, agreed that document TC47/23 "Revision of Document" TGP/12 "Disease nomenclature and disease resistance characteristics" (Annex I) should be developed further with regard to states of expression for quantitative disease resistance characteristics (see document TC/47/26 "Report on Conclusions", paragraph 76).

15. With regard to the proposed standard disease resistance protocols in Section 2.4 of Annex II to document TC/47/23, the TC agreed that:

- the information items that were not asterisked in the protocol should not be elaborated in detail in the Test Guidelines and should be replaced by a reference to the contact details for UPOV members that would be able to provide such information on request. The TC agreed that the asterisk symbol should be replaced in order to avoid confusion.

- the explanations for disease resistance characteristics in the Test Guidelines should refer to published methods rather than reproducing the methods in the Test Guidelines.

- it was important to recall that authorities could arrange for tests to be conducted by specialized laboratories and could also use cooperation with other UPOV members in order to address situations where the DUS testing center did not have suitable facilities for conducting the test, or was prevented from conducting such tests because of phytosanitary restrictions. It agreed that it would be useful for document TGP/12 to address such issues and agreed that Mr. Sergio Semon (European Union) should coordinate with Mr. Kees van Ettekoven (Netherlands) the preparation of document TGP/12 for the TWP sessions in 2011.

(see document TC/47/26 "Report on Conclusions", paragraph 77).

16. Annex to this document contains further development concerning explanations for disease resistance characteristics in Test Guidelines and the nomenclature of pathogens.

[Annex follows]

ANNEX

EXPLANATIONS FOR DISEASE RESISTANCE CHARACTERISTICS IN TEST GUIDELINES AND NOMENCLATURE OF PATHOGENS:

Proposal developed by experts from the Netherlands

It is proposed that Section I, 2. "Disease Resistance", of document TGP/12/1, be amended by replacing "2.4 Explanations for disease resistance characteristics in Test Guidelines" and "2.5°The nomenclature of pathogens" with the following text:

2.4 Explanations for disease resistance characteristics in Test Guidelines

2.4.1 Where disease resistance characteristics are included in Test Guidelines, the following information should be provided in Chapter 8 "Explanations on the Table of Characteristics" in the form of a standard disease resistance test protocol as set out below. This standard resistance protocol is guidance and not a strict prescription. It is not only advised to use the subjects mentioned, it also is advised to use the same order of the subjects. In order to increase the legibility and use of the protocols it is also advised to restrict the number of extra topics. Compulsory elements are printed in bold, the other elements may be used depending on the resistance test protocol.

STANDARD RESISTANCE PROTOCOL

1. Pathogen
2. Quarantine status
3. Host species
4. Source of inoculum
5. Isolate
6. Establishment isolate identity
7. Establishment pathogenicity

8. Multiplication inoculum
- 8.1 Multiplication medium
- 8.2 Multiplication variety
- 8.3 Plant stage at inoculation
- 8.4 Inoculation medium
- 8.5 Inoculation method
- 8.6 Harvest of inoculum
- 8.7 Check of harvested inoculum
- 8.8 Shelflife/viability inoculum

9. Format of the test
- **9.1 Number of plants per genotype**
- **9.2 Number of replicates**
- **9.3 Control varieties**
- 9.4 Test design
- 9.5 Test facility
- 9.6 Temperature
- 9.7 Light
- 9.8 Season
- 9.9 Special measures

10. Inoculation
10.1 Preparation inoculum
10.2 Quantification inoculum
10.3 Plant stage at inoculation
10.4 Inoculation method
10.5 First observation
10.6 Second observation
10.7 End of test

11. Observations
11.1 Method
11.2 Observation scale
11.3 Validation of test
11.4 Off-types

12. Interpretation of data in terms of UPOV characteristic states

13. Critical control points:

2.4.2 It is advised not to include all non compulsory elements in each guideline but rather to provide references to UPOV members that have experience with the relevant disease resistance protocol.

2.4.3. For further guidance, the explanations for the disease resistance characteristics provided as examples in this section can be found in the relevant Test Guidelines.

2.5 The nomenclature of pathogens

2.5.1 Introduction

2.5.1.1 As in the plant kingdom, also in the field of pathogens the denomination of the subject is important in order to correctly identify the various diseases. The names of pathogens sometimes have to change as a consequence of improved insight in the pathogen and its relation with other pathogens. Continuous attention to the proper use of names is therefore important.

2.5.1.2 In the seed trade, because of limited space on seed labels, the scientific binomial for the pathogens is normally replaced by a code. In the disease resistance coding working group of the International Seed Federation (ISF) a system of codes was introduced to ensure uniformity in the use of these codes[a]. The codes are derived from the names of the pathogens and can also be found on the ISF website: *www.worldseed.org* on the subject of pathogen coding. It is advised to introduce the disease codes in the Test Guidelines. The old name will keep the appropriate code, e.g. *Oidium neolycopersici* (ex *Oidium lycopersicum*) On (ex Ol).

2.5.1.3 It is also advised to use the same separators as used by the ISF, for example :(colon) to separate the species code from the strain/race/pathotype code. The colon is followed by a space e.g. in Bl: 1-25.

2.5.1.4 As with the names and codes of the diseases, also the correct naming of the races and strains needs to be standardized to avoid confusion. It is advised to implement the race nomenclature developed by ISF in the Test Guidelines.

2.5.2 Names of the relevant pathogen naming organizations on which the names for pathogens are based:

American Phytopathological Society (APS)
International Committee for Taxonomy of Viruses (ICTV)
International Society of Plant Pathology (ISPP)
CAB International Bioscience

2.5.3 Explanation about the use of old and new names

In principle, the Test Guidelines should follow the latest valid taxonomic views. This principle has two disadvantages: the Test Guidelines are not revised annually and in practice the users of the pathogen names may be familiar with the old name and not yet with the new name. ISF is very active in the standardization of pathogen naming. The disease resistance coding working group from ISF introduced the following system[a]: a new denomination is given in brackets and inverted commas behind the old name with the prefix 'new' for a period of 5 years. After 5 years, the names are reversed: the new name is given first with behind it in brackets the old name with the prefix 'ex' for a further period of 5 years. After the second period of five years, only the new name is given. It is advised to follow the same principles in the UPOV Test Guidelines in order to avoid confusion.

2.5.4 Necessity to change Test Guidelines

2.5.4.1 As Test Guidelines are only revised with long intervals, the solution using the new and the old code (between brackets) for 5 years is suitable for Test Guidelines as well, thus avoiding the need of frequent partial revisions of guidelines for the change of pathogen names. It is advised to use this principle in the Test Guidelines. Examples of such solutions that are in use in practice at the moment:

Melon:
Podosphaera xanthii (ex *Sphaerotheca fuliginea*) Px (ex Sf)

Cucumber:
Golovinomyces cichoracearum (ex *Erysiphe cichoracearum*) Gc (ex Ec)
Podosphaera xanthii (ex *Sphaerotheca fuliginea*) Px (ex Sf)

Tomato:
Fulvia fulva (ex *Cladosporium fulvum*) Ff (ex Cf)
Oidium neolycopersici (*ex Oidium lycopersicum*) On (ex Ol)

2.5.4.2 It is not necessary to revise Test Guidelines in order to reflect changes in pathogen names from year to year, because the old pathogen name will be mentioned for 10 more years in international trade.

[Endnote continued from previous page]

[a] Further information on the approach can be found at:
http://www.worldseed.org/isf/pathogen_coding.html.
(This note is for background information when considering this draft and will not appear in the final, published document.)

[End of Annex and of document]