



TC-EDC/Jan11/12  
ORIGINAL: English  
DATE: December 19, 2010

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

**ENLARGED EDITORIAL COMMITTEE**

**Geneva, January 6, 2011**

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

*Document prepared by the Office of the Union  
(containing proposals prepared by experts from the Netherlands)*

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:

INTRODUCTION.....2

TABLE OF CONTENTS OF DOCUMENT TGP/12/1.....3

COMMENTS OF THE TECHNICAL WORKING PARTIES.....4

*Explanations for disease resistance characteristics in Test Guidelines.....4*

*Explanations for nomenclature of pathogens in Test Guidelines:.....5*

ANNEX I Explanations for disease resistance characteristics in Test Guidelines: *Proposal developed by experts from the Netherlands*

ANNEX II Explanations for nomenclature of pathogens in Test Guidelines: *Proposal developed by experts from the Netherlands*

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 Ettehoven (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 1 and 2 above. The following copy of the table of contents of document TGP/12/1<sup>\*</sup> is provided for information:

---

\* A copy of document TGP/12/1 is provided on the TC-EDC webpage under “Background Documents” (for information only)

## TABLE OF CONTENTS OF DOCUMENT TGP/12/1

<i>TABLE OF CONTENTS</i>	<i>PAGE</i>
<b>SECTION I. DEVELOPMENT OF CHARACTERISTICS BASED ON A RESPONSE TO AN EXTERNAL FACTOR.....</b>	<b>3</b>
1. INTRODUCTION.....	3
1.1 Requirements for characteristics based on a response to an external factor.....	3
1.2 Terms Describing the Response of Plants to Pests, Pathogens and Abiotic Stresses.....	6
1.2.1 Preamble.....	6
1.2.2 Definitions.....	6
1.2.2.1 Biotic factors (pest or pathogen).....	6
1.2.2.2 Abiotic factors (e.g. chemical, temperature).....	6
2. DISEASE RESISTANCE.....	7
2.1 Introduction.....	7
2.2 Criteria for use of disease resistance characteristics.....	7
2.2.1 Results from a given genotype or combination of genotypes (see Table 1 (a)).....	7
2.2.2 Is sufficiently consistent and repeatable in a particular environment (see Table 1 (b)).....	7
2.2.3 Exhibits sufficient variation between varieties to be able to establish distinctness (see Table 1 (c)).....	7
2.2.4 Is capable of precise definition and recognition (see Table 1 (d)).....	7
2.2.5 Allows uniformity requirements to be fulfilled (see Table 1 (e)).....	8
2.2.6 Additional points for consideration.....	8
(i) the availability of reliable inoculum and host differential set.....	8
(ii) quarantine regulations.....	8
(iii) technical requirements.....	8
2.3 Developing characteristics for disease resistance.....	8
2.3.1 Qualitative characteristics.....	8
2.3.2 Quantitative characteristics.....	9
2.4 Explanations for disease resistance characteristics in Test Guidelines.....	10
3. INSECT RESISTANCE.....	11
3.1 Developing characteristics for insect resistance.....	11
3.2 Example of Corn borer ( <i>Ostrinia nubilalis</i> (Hübner)) resistance in maize varieties.....	11
3.3 Example of resistance to <i>Therioaphis maculate</i> in Lucerne (UPOV Test Guidelines: TG/6/5).....	11
3.4 Example of resistance to colonization by <i>Aphis gossypii</i> in Melon (UPOV Test Guidelines: TG/104/5).....	11
3.5 Explanations for insect resistance characteristics in Test Guidelines.....	12
4. CHEMICAL RESPONSE.....	13
4.1 Introduction.....	13
4.2 Herbicides.....	13
4.2.1 Herbicide Tolerant Varieties.....	13
4.2.2 Case Study on the Use of Herbicide Tolerance in Cotton as a Characteristic in the DUS Examination.....	13
4.3 Plant Growth Regulators.....	14
4.4 Explanations for chemical response characteristics in Test Guidelines.....	14
<b>SECTION II. CHEMICAL CONSTITUENTS: PROTEIN ELECTROPHORESIS.....</b>	<b>15</b>

## 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.

Explanations for disease resistance characteristics in Test Guidelines

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.

52. 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).

53. 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.

Explanations for nomenclature of pathogens in Test Guidelines:

10. The TWV agreed with the proposals concerning “2.5 The nomenclature of pathogens”, as set out in document TWV/44/21 (Annex II to this document).

[Annexes follow]

## ANNEX I

## EXPLANATIONS FOR DISEASE RESISTANCE CHARACTERISTICS IN TEST GUIDELINES:

*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" 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 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.

#### STANDARD RESISTANCE PROTOCOL

\*compulsory

- \* 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:

[Annex II follows]

## ANNEX II

## EXPLANATIONS FOR NOMENCLATURE OF PATHOGENS IN TEST GUIDELINES:

*Proposal developed by experts from the Netherlands*

It is proposed to add the following text after Section I, 2.4 “Explanations for disease resistance characteristics in 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<sup>a</sup>. 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<sup>1</sup>: a new denomination is given in brackets and inverted commas behind the old name with the prefix 'now' 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.

[End of Annex II and of document]

---

<sup>1</sup> Further information on the approach can be found at:

[http://www.worldseed.org/isf/pathogen\\_coding.html](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.)