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## USE OF DISEASE AND INSECT RESISTANCE CHARACTERISTICS IN DUS EXAMINATION

*Document prepared by an expert from the European Union**Disclaimer: this document does not represent UPOV policies or guidance*

## BACKGROUND

1. The Technical Working Party for Vegetables (TWV), at its forty-ninth session, held in Angers, France, from June 15 to 19, 2015, agreed to discuss the item "Use of disease resistance characteristics in DUS examination" at its next session (see document TWV/49/32 Rev., paragraph 141).
2. The Technical Committee (TC), at its fifty-second session, held in Geneva, Switzerland, from March 14 to 16 2016, agreed to discuss the item "Use of disease and insect resistance characteristics in DUS examination" at its next session (see document TC/52/29 Rev., paragraph 208).

## USE OF DISEASE AND INSECT RESISTANCE CHARACTERISTICS – COMMUNITY PLANT VARIETY OFFICE OF THE EUROPEAN UNION (CPVO) APPROACH AND PROPOSAL

The situation in CPVO technical protocols

3. In general the CPVO follows UPOV as regards the introduction of new disease and insect resistance characteristics into CPVO technical protocols. This means in practice that where there is an asterisked disease and insect resistance characteristics in a UPOV Test Guidelines, the relevant characteristic is also marked with an asterisk in the corresponding CPVO technical protocol. For non-asterisk disease and insect resistance characteristics in the UPOV Test Guidelines, the CPVO vegetable expert group (VEM) explored whether to make it obligatory on EU level, or whether to maintain such characteristic as a non-mandatory characteristic in the technical protocol. The basis for deciding whether to add an asterisk in the CPVO technical protocol was whether a disease and insect resistance characteristics was of paramount importance within the European Union (EU) but not at the worldwide level.

4. Today 12 CPVO vegetable technical protocols contain disease and insect resistance characteristics. There were a total of 127 disease resistance characteristics in these 12 technical protocols (ranging from a maximum of 25 in tomato, to just 1 in cabbage), with 33 being asterisked disease resistances. It should be noted that in the 12 corresponding UPOV Test Guidelines, only 24 of these disease and insect resistance characteristics are asterisked.

The usefulness of disease resistance characteristics for examination authorities

5. The fact that some disease and insect resistance characteristics are marked with an asterisk contributes to the international harmonization of variety descriptions.

6. There is also an associated advantage for examination authorities in having a higher number of disease and insect resistance characteristics (DRCs) within the UPOV Test Guidelines. Since disease and insect resistance characteristics are usually marked as qualitative (QL) within a Test Guidelines, with the states of expression “absent” and “present”, such characteristics can be very discriminatory in the maintenance of the variety collection, the organization of the DUS trial and the subsequent selection of the most similar comparison varieties. Consequently, in those vegetable Test Guidelines where asterisked DRCs are to be found, these are also included as grouping characteristics in the corresponding Test Guidelines. As a consequence, the examination office can reduce substantially the number of comparison varieties which need to be taken into account. This will lead to a smaller and less expensive field trial.

#### The current situation in the EU as regards asterisked disease resistance characteristics

7. Since a few years ago, some breeders from certain regions of the EU have campaigned vigorously that the principle of asterisked disease resistances is prejudicial to their interests. Their argument is based on the reasoning that several of the obligatory disease and insect resistance characteristics are of no importance for the crop in some regions of the EU, since there is no pest or pathogen infestation there. The CPVO protocols are therefore proving to be an obstructive legislative tool for such breeders, because it does not allow them to put up for registration new varieties which are not bred for resistance/susceptibility. As a result of intensive discussions within EU and CPVO bodies, and the uncertainties as regards possible landmark legal cases on the issue, it was decided by the CPVO's Administrative Council in 2013 to place a “moratorium” on asterisked disease and insect resistance characteristics in CPVO vegetable protocols.

#### The phasing-in approach for asterisked disease resistance characteristics in the CPVO

8. In the meantime, the CPVO together with its entrusted examination offices in vegetables and the European Seed Association (ESA) have been analyzing the matter in depth in order to resolve the situation via technical means. As a first action it was agreed to undertake a review of all 33 asterisked disease and insect resistance characteristics to be found in CPVO vegetable technical protocols in order to explore the necessity to maintain an asterisk for all of those. The main proposal emanating from this consultation process was to establish a running-in phase in the adoption of asterisked disease and insect resistance characteristics within CPVO vegetable protocols.

9. Taking into account that several years are required to start a breeding program in any particular disease or insect resistance, it has been reasoned that a period of time is required from the moment the proposal to add an asterisk is agreed upon, to the moment it is formally implemented in the corresponding CPVO protocol. Such a phasing-in period was considered to be an elegant consensual solution which did not prejudice current asterisked disease and insect resistance characteristics, whilst allowing the possibility to have new asterisked disease and insect resistance characteristics in the future. It would allow breeders to develop their breeding activity in that area over a reasonable period of time, as well as to allow all the concerned examination authorities in the EU in that species to set up the testing facilities (or bilateral agreements) for the disease and insect resistance characteristics in question.

10. The standard phasing-in time period for asterisked DRCs agreed upon by the CPVO's vegetable expert meeting in October 2014 is five years. Notwithstanding, the length of time required could be decided on a case by case basis according to the complexity of the disease resistance and the amount of time required by examination offices and breeding programs to adjust them to the future obligatory situation. At the time of creating/revising a CPVO vegetable protocol, there would be an asterisk with a footnote for those disease and insect resistance characteristics which have been identified as needing to be compulsory in the future and are not so at present, whilst at the same time outlining the running-in period of time. This running-in phase would not apply to existing asterisked disease and insect resistance characteristics. Once the revised technical protocol is adopted, examination offices and ESA would be formally notified so that the stakeholders could start adjusting to the future situation. During the running in phase, examination offices would be free to observe the signaled out characteristics on a voluntary basis for candidate vegetable varieties. Once the running-in phase had elapsed, the asterisk would become definitive, thus rendering the observation of that disease resistance characteristic obligatory. This would happen automatically at the end of the running-in phase.

#### Latest developments

11. The concept of a phasing-in period for asterisked disease and insect resistance characteristics within CPVO vegetable technical protocols was adopted by the CPVO's Administrative Council in October 2015. This meant that any subsequent revision to a CPVO vegetable protocol would take into account this principle when deciding whether to add an asterisk to a new or existing disease and insect resistance characteristic.

At the CPVO's annual meeting of vegetable experts in December 2015, this principle was first put into practice in the partial revision of the CPVO technical protocols for lettuce and spinach. The experts present agreed on the following proposed text for these two species:

*Lettuce (TP/13/05 Rev.)*

"In the case of disease resistance characteristics, only those resistances marked with an asterisk (\*) in the CPVO column are compulsory.

For varieties testing resistance "present" (9) to *Bremia lactucae* Isolate BI: 16 (characteristic 37.1), it is compulsory to test Isolates BI: 20, 21, 26 and 27 (characteristics 37.3, 37.4, 37.9, 37.10, hence with marked [\*]). For varieties testing resistance "present" (9) to *Bremia lactucae* Isolate BI: 29 (characteristic 37.11), it is compulsory also to test Isolates BI: 30 and BI: 31 (characteristics 37.12 and 37.13, hence with marked [\*]).

In accordance to the approval by the CPVO Administrative Council on 01/10/2015 of the procedure "The use of disease resistance characteristics in CPVO vegetable Technical Protocols" (DOC-AC-2015-2-18), a phasing-in period is established for the new asterisked diseases resistance characteristics set out in the present protocol TP-13/5 Rev. The phasing-in period for TP-13/5 Rev. has been established for three years, and will cease to apply on 01/01/2019, at which time the characteristics in question will become obligatory.

The characteristics in question are the following:

- [\*] 37.10: Resistance to downy mildew (*Bremia lactucae*) Isolate BI:27
- (\*) 37.11: Resistance to downy mildew (*Bremia lactucae*) Isolate BI:29
- [\*] 37.12: Resistance to downy mildew (*Bremia lactucae*) Isolate BI:30
- [\*] 37.13: Resistance to downy mildew (*Bremia lactucae*) Isolate BI:31"

*Spinach (TP/55/5 Rev.)*

"In the case of disease resistance characteristics, only those resistances marked with an asterisk (\*) in the CPVO column are compulsory.

In accordance to the approval by the CPVO Administrative Council on 01/10/2015 of the procedure "The use of disease resistance characteristics in CPVO vegetable Technical Protocols" (DOC-AC-2015-2-18), a phasing-in period is established for the new asterisked diseases resistance characteristics set out in the present protocol TP-55/5 Rev. The phasing-in period for TP-55/5 Rev. has been established for three years, and will cease to apply on 01/01/2019, at which time the characteristics in question will become obligatory.

The characteristics in question are the following:

- (\*) 19.9: Resistance to *Peronospora farinosa* f. sp. *spinaciae* race Pfs:10
- (\*) 19.11: Resistance to *Peronospora farinosa* f. sp. *spinaciae* race Pfs:12
- (\*) 19.12: Resistance to *Peronospora farinosa* f. sp. *spinaciae* race Pfs:13"

12. The above proposals from the vegetable expert group (VEM) for the partial revision of the CPVO lettuce and spinach protocols were subsequently approved by the CPVO's Administrative Council in April 2016. This means that for the following three years both breeders and examination offices within the EU will have to the possibility to develop their facilities to the new situation. In 2019, when the phasing-in period elapses and the disease resistance characteristics in question become obligatory, then all candidate lettuce and spinach varieties will have to be tested for these characteristics. This also means that the candidate varieties will have to be uniform for these disease resistances, irrespective of whether they are resistant or susceptible.

Conclusions and possibilities for UPOV Test Guidelines

13. The phasing-in period has been welcomed by breeders and examination offices in the EU as a user-friendly way to adjust over a period of time to the growing importance of certain disease and insect resistance characteristics. If the initial experience with the phasing-in period for lettuce and spinach in the coming three years is favorable, it is likely that the principle will be adopted to more disease and insect resistance characteristics in CPVO vegetable protocols. This will assist in having a more focused DUS trial with fewer comparison varieties.

14. The next logical step would be to consider a phasing-in approach for asterisked disease and insect resistance characteristics for UPOV Test Guidelines.

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