

**EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION**  
**ORGANISATION EUROPEENNE ET MEDITERRANEENNE POUR LA PROTECTION DES PLANTES**

The EPPO Standard PM 7/98 *Specific requirements for laboratories preparing accreditation for a plant pest diagnostic activity* describes how validation should be conducted. It also includes definitions of performance criteria.

[illegible]

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|                                                                                                     | on detection and identification of tomato mottle mosaic virus (ToMMV) using molecular tests<br>- Report on the results of the test performance study on detection and identification of tomato mottle mosaic virus (ToMMV) using molecular tests.<br>Report on the results of the test performance study on detection and identification of tomato mottle mosaic virus (ToMMV) using molecular tests<br>- Report on the results of the test performance study on detection and identification of tomato mottle mosaic virus (ToMMV) using molecular tests.<br>Report on the results of the test performance study on detection and identification of tomato mottle mosaic virus (ToMMV) using molecular tests |
| <b>Validation process according to EPPO Standard PM7/98?</b>                                        | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Is the lab accredited for this test?</b>                                                         | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Was the validated data generated in the framework of a project?</b>                              | Euphresco                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>If yes, please specify</b>                                                                       | Euphresco project 2022-A-394 (Validation of molecular diagnostic methods for the detection and identification of tomato mottle mosaic virus (ToMMV-detect))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description of the test</b>                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Organism(s)</b>                                                                                  | Tomato mottle mosaic virus / Tobamovirus maculatusellati (TOMMV0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Detection / identification</b>                                                                   | detection and identification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Method(s)</b>                                                                                    | Molecular real time RT PCR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Method: Molecular real time RT PCR</b>                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Reference of the test description</b>                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>As or adapted from an EPPO diagnostic protocol</b>                                               | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>New test being considered for inclusion in the next version of the EPPO diagnostic protocol?</b> | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>As or adapted from an IPPC diagnostic protocol</b>                                               | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Reference of the test</b>                                                                        | DAFF DEECA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Is the test modified compared to the reference test</b>                                          | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Kit</b>                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Is a kit used</b>                                                                                | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Manufacturer name</b>                                                                            | ThermoFisher Scientific                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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| <b>Specify the kit used</b>                                                                                                          | AgPath-ID™ One-Step RT-PCR                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Kit used following the manufacturer's instructions?                                                                                  | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b><i>Other information</i></b>                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Reaction type</b>                                                                                                                 | Simplex                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Performance Criteria :</b>                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Organism 1.:</b>                                                                                                                  | <b>Tobamovirus maculatussellati(TOMMV0)</b>                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b><u>Analytical sensitivity</u></b>                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>What is smallest amount of target that can be detected reliably?</b>                                                              | at least to $2.5 \times 10^5$ dilution of isolate ToMMV NIB V 373 (level of agreement between experiments: 100%).                                                                                                                                                                                                                                                                                                                                    |
| <b><u>Diagnostic sensitivity</u></b>                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Proportion of infected/infested samples tested positive compared to results from the standard test, see appendix 2 of PM 7/98</b> | 79.2%                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Standard test(s)</b>                                                                                                              | Calculation was done on the basis of health status of the samples. Isolates used: ToMMV NIB V 373 dilutions $2.5 \times 10^1$ to $2.5 \times 10^8$ of isolate ToMMV NIB V 414 dilutions 2x and $2 \times 10^1$ .                                                                                                                                                                                                                                     |
| <b><u>Analytical specificity - inclusivity</u></b>                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Number of strains/populations of target organisms tested</b>                                                                      | two ToMMV isolates (NIB V 373 and NIB V 414).                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Specificity value</b>                                                                                                             | 100% evaluated on two isolates of ToMMV (one from seed and one from leaf material).                                                                                                                                                                                                                                                                                                                                                                  |
| <b><u>Analytical specificity - exclusivity</u></b>                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Number of non-target organisms tested</b>                                                                                         | 3 healthy tomato samples (two seeds, one leaves), 11 isolates of 9 other tobamovirus species (CGMMV isolate NIB V 403, ObPV isolate NIB V 364, ORSV isolate NIB V 365, PaMMV isolate NIB V 366, PMMoV isolate NIB V 408, TMGMV isolate NIB V 404, TMV isolates: NIB V 405 and 413, ToBRFV isolate NIB V 331, ToMV isolate NIB V 410, ToMV isolates NIB V 406).                                                                                       |
| <b>Specificity value</b>                                                                                                             | from 86% (12 laboratories with inconclusive result for PaMMV, one laboratory with inconclusive result also for PMMoV, while one laboratory with inconclusive result in addition to PaMMV for one ToMV isolate) to 100% (1 laboratory) evaluated on 3 healthy tomato samples (two seeds, one leaves) and 11 isolates of 9 other tobamovirus species (1 isolate of CGMMV, ObPV, ORSV, PaMMV, PMMoV, TMGMV and ToBRFV, and 2 isolates of ToMV and TMV). |
| <b><u>Diagnostic Specificity</u></b>                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Proportion of uninfected/uninfested samples (true negatives) testing negative compared to results from a standard test</b>        | 92.3%                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Specify the test(s)</b>                                                                                                           | /                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <b>Reproducibility</b>                                                                                            |                                                                                                                                                                                                                                                                                                                                   |
| <b>Provide the calculated % of agreement for a given level of the pest (see PM 7/98)</b>                          | 97%                                                                                                                                                                                                                                                                                                                               |
| <b>Repeatability</b>                                                                                              |                                                                                                                                                                                                                                                                                                                                   |
| <b>Provide the calculated % of agreement for a given level of the pest (see PM 7/98)</b>                          | /                                                                                                                                                                                                                                                                                                                                 |
| <b>Test performance study</b>                                                                                     |                                                                                                                                                                                                                                                                                                                                   |
| <b>Test performance study?</b>                                                                                    | yes                                                                                                                                                                                                                                                                                                                               |
| <b>Brief details of the test performance study and its output. It available, link to published article/report</b> | Preparation for test performance study organized in the framework of the Euphresco project 2022-A-394.                                                                                                                                                                                                                            |
| <b>Other information</b>                                                                                          |                                                                                                                                                                                                                                                                                                                                   |
| <b>Any other information considered useful</b>                                                                    | Test performance study organized in the framework of the Euphresco project 2022-A-394 involving 13 laboratories from 12 countries. Full validation report is available: <a href="https://drop.euphresco.net/data/af730655-4022-4e87-a952-b94cfda3a971/">https://drop.euphresco.net/data/af730655-4022-4e87-a952-b94cfda3a971/</a> |

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