EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION
ORGANISATION EUROPEENNE ET MEDITERRANEENNE POUR LA PROTECTION DES PLANTES
Summary sheet of validation data for a diagnostic test

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.

Laboratory contact details	EUPHRESCO-GRAFDEPI Via Carlo Giuseppe Bertero, 22, 00156 ROMA, Italy
Short description of the test	Detection and identification of Flavescence dorée phytoplasma by direct and nested PCR followed by RFLP
Date, reference of the validation report	2014-07-31 - Project EUPHRESCO GRAFDEPI Final Report - 1)http://www.euphresco.net/media/project_reports/grafdepi_final_report.pdf 2)The Euphresco Grafdepi Group, 2015. European interlaboratory comparison of detection methods for “flavescence dorée” phytoplasma: preliminary results. Phytopathogenic Mollicutes doi: 10.5958/2249-4677.2015.00015.8 Vol. 5 (1-Supplement), January 2015, S35-S37
Validation process according to EPPO Standard PM7/98?	yes
Is the lab accredited for this test?	no
Was the validated data generated in the framework of a project?	Euphresco
If yes, please specify	GRAFDEPI
Description of the test	
Organism(s)	Grapevine flavescence dorée phytoplasma (PHYP64)
Detection / identification	detection
Matrix(ces) tested	Other The samples had been provided by different partners of Project GRAFDEPI and belonged to different plant host species. The homogenising and preparation were performed by ANSES-LSV (France). The samples consisted in DNA extracts. The batches’ selection was based on methodology proposed in PM7/98 for the evaluation of the performance criteria of analytical methods. Positive samples were from different parts of Europe in order to have a wide diversity of strains for testing the inclusivity of methods. Phytoplasmas in the same group and/or infecting grapevines were also chosen to test different degrees of specificity/exclusivity of methods. 13 samples were negative for the Flavescence dorée phytoplasma. 4 of them were healthy Vitis sp.. The other ones were other phytoplasmas of 16SrV group and

	phytoplasmas from other groups, mixed with DNA extract of healthy grapevine to reach the volume necessary for the ring-test. 11 samples were positive for the Flavescence dorée 1 / 4 phytoplasma. They were DNA extracts of Vitis sp. tested positive by PCR for Flavescence dorée phytoplasmas pure or mixed with different quantities of healthy grapevine or mixed with DNA extracts positive for the 16SrXII group phytoplasmas. When it was possible, supernumerary fractions were produced for each sample to validate their status and for testing the homogeneity of the division during the preparation of tubes for the participants. Then, these supernumerary fractions were randomly chosen in the series of tubes. DNA extracts were amplified in real-time triplex PCR (Pelletier et al., 2009). See Appendix
Plant species tested	Vitis sp.
Method(s)	Molecular PCR-RFLP
Method: Molecular PCR-RFLP	
Reference of the test description	
As or adapted from an EPPO diagnostic protocol	no
As or adapted from an IPPC diagnostic protocol	no
Reference of the test	- Martini, M.; Murari, E.; M ori, N.; Bertaccini, A.; 1999. Plant Disease 83, 925-930. - Deng, S.; Hiruki, C.; 1991. Journal of Microbiological Methods 14, 53 – 61) - Schneider B., Seemüller E., Smart C. D., Kirkpatrick B. C., 1995. In: Razin S. and Tully J. G. (ed.). Molecular and Diagnostic Procedures in Mycoplasmology 2: 369–380. New York: Academic Press. -Gibb, K. S.; Padovan, A. C.; Mogen, B. D.; 1995. Phytopathology 85, 169-174. - Padovan, A. C.; Gibb, K. S.; Bertaccini, A.; Vibio, M.; Bonfiglioli, R. G.; Magarey, P. A.; Sears, B. B.; 1995. Australian Journal of Grape and Wine Research 1, 25-31.
Other information	
Reaction type	Nested
Other details on the test	Detection and identification of Flavescence dorée phytoplasmas by a direct universal PCR with primers P1/P7, followed by a nested universal PCR with primers 16R758f (M1)/M23SR1804r (B6) and RFLP analysis of nested amplicons after digestion with TaqI restriction enzyme
Are the performance characteristics included in the EPPO diagnostic protocol?	**no**
Performance Criteria :	
Organism 1.:	**Grapevine flavescence dorée phytoplasma(PHYP64)**

Analytical sensitivity	
What is the smallest amount of target that can be detected reliably?	The analytical sensitivity was calculated in five laboratories analyzing three samples at five dilution levels (1/10; 1/100; 1/300; 1/900; 1/2700) in five repetitions. Samples (DNA extracts) came from IPEP (Serbia), ACW (Switzerland) and ANSES (France). The homogenising and preparation were performed by ANSES-LSV (France) Two values are provided: The last dilution level with 100% positive results: less than 1/10 (for all samples) The last dilution level with, at least, one positive result for each sample: 1/2700 (for all samples)
Diagnostic sensitivity	
Proportion of infected/infested samples tested positive compared to results from the standard test, see appendix 2 of PM 7/98	Six laboratories were involved in performing this method within the ringtest. The results of one Partner have been removed because the RFLP analysis was not possible. A total of 120 results has been analysed. Determined in 11 samples positive for Flavescence dorée phytoplasma. They were DNA extracts of Vitis sp. tested positive by PCR for FD pure or mixed with different quantities of healthy grapevine or mixed with DNA extracts positive for the 16SrXII group phytoplasmas. Within the ringtest 7 diagnostic methods were compared. Diagnostic sensitivity: 88.89% False negative: (8/120) 6.7%
Standard test(s)	Other protocols included in the ringtest: - Simoultaneous detection of FD and BN phytoplasmas by multiplex nested-PCR (Dairè et al., 1997; Angelini et al., 2001; Clair et al., 2003) - Detection of Flavescence dorée phytoplasma by universal direct PCR and nested 16SrV-group specific PCR - Simplex real time PCR for the detection of FD and BN phytoplasmas with an internal control for grapevine (Angelini et al., 2007) - Simplex real time PCR for the detection of FD and BN phytoplasmas with an internal control - (Hren et al., 2007) - Triplex real-time PCR for simultaneous FD and BN phytoplasmas detection with an internal control for grapevine. (Pelletier et al., 2009) - Triplex real time PCR for simultaneous FD and BN phytoplasmas detection with an internal control - (under patent IPADLAB)
Diagnostic Specificity	
Proportion of uninfected/uninfested samples (true negatives) testing negative compared to results from a standard test	Six laboratories were involved in performing this method within the ringtest. The results of one Partner have been removed because the RFLP analysis was not possible. A total of 120 results has been analysed. 13 non target samples: 4 healthy grapevines and 9 were other phytoplasmas of 16SrV group and phytoplasmas from other groups. Diagnostic specificity: 93.18%
Specify the test(s)	Other protocols included in the ringtest: - Simoultaneous detection of FD and BN phytoplasmas by multiplex nested-PCR (Dairè et

	al., 1997; Angelini et al., 2001; Clair et al., 2003) - Detection of Flavescence dorée phytoplasma by universal direct PCR and nested 16SrV-group specific PCR - Simplex real time PCR for the detection of FD and BN phytoplasmas with an internal control for grapevine (Angelini et al., 2007) - Simplex real time PCR for the detection of FD and BN phytoplasmas with an internal control - (Hren et al., 2007) - Triplex real-time PCR for simultaneous FD and BN phytoplasmas detection with an internal control for grapevine. (Pelletier et al., 2009) - Triplex real time PCR for simultaneous FD and BN phytoplasmas detection with an internal control - (under patent IPADLAB)
Reproducibility	
Provide the calculated % of agreement for a given level of the pest (see PM 7/98)	The reproducibility was calculated in five laboratories analyzing three samples at five dilution levels (1/10; 1/100; 1/300; 1/900; 1/2700) in five repetitions. Samples (DNA extracts) came from IPEP (Serbia), ACW (Switzerland) and ANSES (France). The homogenising and preparation were performed by ANSES-LSV (France). Reproducibility: 67.73%
Repeatability	
Provide the calculated % of agreement for a given level of the pest (see PM 7/98)	The repeatability was calulated in five laboratories analyzing three samples at five dilution levels (1/10; 1/100; 1/300; 1/900; 1/2700) in five repetitions. Samples (DNA extracts) came from IPEP (Serbia), ACW (Switzerland) and ANSES (France). The homogenising and preparation were performed by ANSES-LSV (France) Repeatability: 77.60%
Test performance study	
Test performance study?	yes
Brief details of the test performance study and its output.It available, link to published article/report	EUPHRESCO Project GRAFDEPI (CRA-PAV, Italy; AGES, Austria; CRA-W, Belgium, PPRS, Turkey; INIAV, Portugal; ACW, Switzerland; ILVO, Belgium; DIPSA, Bologna Italy; DISAA, Milan Italy; IPEP, Serbia; NIB, Slovenia; IRTA, Spain; ANSES, France; Cra-VIT, Italy)
Other information	
Any other information considered useful	The ringtest was carried out by 15 laboratories and it is not possible to state if any of them is accredited for this test.
The following complementary files are available online:	• EUPHRESCO-GRAFDEPI Samples for determination of performance criteria

Creation date: 2015-02-10 00:00:00 - Last update: 2021-05-17 17:39:06