1. Content of the 'Topic Description' document

1.1. Topic area

The topic fits within the Euphresco primary topic area 'Diagnostics, field detection and surveillance'.

1.2. Topic title

Use of barcoding, from theory to practice.

1.3. Description of the problem the research should solve

DNA barcoding is increasingly used as a diagnostic tool in phytosanitary laboratories. DNA barcoding protocols for selected EU-regulated arthropods, bacteria, fungi, nematodes and phytoplasmas were developed within EU project 'Quarantine organisms Barcoding of Life (QBOL)'. A test performance study (TPS) was set up in 2011 to validate the use of the developed protocols as a diagnostic tool and to identify possible difficulties in the use of the protocols and Q-bank. TPS data showed that the developed tests were very robust and produced highly reproducible results.
Suggestions for additional work were considered in the framework of the Euphresco project 'DNA Barcoding - Optimizing and validating DNA barcoding protocols for plant pests'. An international test performance study was organised to generate data on diagnostic sensitivity and robustness. Overall diagnostic sensitivity obtained when using the identifications provided by TPS participants was 87%. Analysis of the TPS data showed that neither the amplification/sequencing of loci, nor the creation of consensus sequences, negatively influenced the diagnostic sensitivity. The interpretation of analysis results had the biggest influence on the diagnostic sensitivity, and the majority of incorrect identified samples were the result of conservative identification (i.e. identification on a higher taxonomical level) showing that some participants did not feel confident in assigning a lower taxon level to the sample. Re-analysis of the consensus sequence data provided by TPS participants showed that an overall diagnostic sensitivity of 99% could be obtained.

The need for training experts of the competent organisations was highlighted in the recommendation given at the end of the Euphresco project and by the EPPO Panel on Diagnostics and Quality Assurance.

1.4. Description of the expected results

Two workshops (one per year) will be organised in the framework of the project that will allow participants to be informed of the most recent advancements on the method and to receive training on a number of tools for data analysis: sequencing analysis softwares that allow assembly of raw sequence data (e.g. Geneious), online databases (Q-bank, NCBI, BOLD). Raw sequence data will cover examples from arthropods, bacteria, fungi, invasive plants, nematodes, phytoplasmas, viruses and viroids, depending on the needs and wishes of the workshops' participants.
A proficiency test will be organised at the conclusion of the workshops to determine the performance of individual laboratories.

1.5. Beneficiaries of this research product

The project will benefit to any phytosanitary laboratory that wishes to include (or increase the use of) DNA barcoding as a routine diagnostic tool for the identification of plant pests and pathogens.

1.6. Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
1. European and Mediterranean Plant Protection Organization, International Françoise Petter fp@eppo.int	Project coordination, organisation of trainings and workshops Contact person: Françoise Petter fp@eppo.int Contact person: Madeleine Mc Mullen mm@eppo.int Contact person: Baldissera Giovani bg@eppo.int
2. Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH, Austria Sylvia Blümel sylvia.bluemel@ages.at	-Participation in the workshop -Participation in the proficiency tests Contact person: Sabine Grausgruber sabine.grausgruber-groeger@ages.at
3. Instituut voor Landbouw- en Visserijonderzoek, Belgium Martine Maes Martine.maes@ilvo.vlanderen.be	-Reliability of bacterial identification -Participation to the workshops Contact person: Martine Maes martine.maes@ilvo.vlaanderen.be
4. Canadian Food Inspection Agency, Canada Cheryl Dollard cheryl.dollard@inspection.gc.ca	-Training material -Involvement in workshops Contact person: Cheryl Dollard Cheryl.dollard@inspection.gc.ca Contact person: Philip Macdonald Philip.macdonald@inspection.gc.ca
5. Aarhus University, Denmark Mogens Nicolaisen mn@agro.au.dk	-Reliability of identification of phytoplasmas (including mixed infections) using barcoding. Participation in workshops. Contact person: Mogens Nicolaisen mn@agro.au.dk
6. Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail, France Géraldine Anthoine geraldine.anthoine@anses.fr	-Nematology: participation in the workshops and in the TPS Contact person: Sylvie Gamel sylvie.gamel@anses.fr Contact person: Anne-Marie Chappé anne-marie.chappe@anses.fr
7. Bundesministerium für Ernährung und Landwirtschaft, Germany Bettina Beerbaum Bettina.Beerbaum@bmel.bund.de	-Providing DNA of diverse populations/ pathotypes of potato cyst nematodes (*Globodera rostochiensis*, *G. pallida*), diverse species and populations of *Bursaphelenchus* spp. (incl*. B. xylophilus*), and DNA of German populations of *Anoplophora glabripennis* -Participation in the workshops and the

	proficiency tests organized for bacteria, fungi (including Oomycetes), nematodes and insects Contact person: Stephan König Stephan.koenig@julius-kuehn.de
8. Science and Advice for Scottish Agriculture, Great Britain David Kenyon david.kenyon@sasa.gsi.gov.uk	-Interested in barcoding a range of material and willing to supply DNA. Contact person: Alex Reid alex.reid@sasa.gsi.gov.uk
9. Zemkopības ministrija Republikas, Latvia Kristine Kjago Kristine.kjago@vaad.gov.lv	-Participation in the workshops. -Participation in TPS. Contact person: Gunita Bokuma gunita.bokuma@vaad.gov.lv
10. Nederlandse Voesdel-en-Warenautoriteit, The Netherlands Martijn Schenk M.Schenk1@nvwa.nl	- Co-organization of annual interactive training course covering all or a selection of organism groups depending on the composition of the trainee groups. - Setting-up the training course (theoretical and practical sessions). - Give lectures and guide practical (computer) sessions - we have access to hardware and software and can take this to EPPO HQ - In case of overwhelming interest for the training course, we might consider hosting additional sessions at the NPPO-NL - Organization of data-analysis PT (i.e. EPPO standard DNA barcoding appendices 7 and 8) using trace files as starting material for the analysis. Contact person: Bart van de Vossenberg b.t.l.h.van.de.vossenberg@minlnv.nl
11. Instituto Nacional de Investigação Agrária e Veterinária, I.P., Portugal Leonor Cruz leonor.cruz@iniav.pt	- Participation in the workshop - Contributing with sequences from current activity Contact person: Eugenia de Andrade eugenia.andrade@iniav.pt
12. Department of Agriculture, Animal and Plant Health Inspection Service, United States of America Laurene Levy Laurene.Levy@aphis.usda.gov	-Participation in validation tests, trainings, workshops and proficiency test for bacteria, fungi, phytoplasmas, viruses and viroids. Contact person: Stefano Costanzo Stefano.Costanzo@aphis.usda.gov
13. University of Guelf, Canada Robert Hanner rhanner@uoguelph.ca	-Contribution to be detailed Contact person: Robert Hanner rhanner@uoguelph.ca
14. University of Belgrade, Republic of	-Contribution to be detailed

Serbia Branka Krstic homemadeent@gmail.com	 Contact person: Branka Krstic homemadeent@gmail.com Contact person: Aleksandra Bulajic bulajic_aleksandra@yahoo.com
15. State Service of phytosanitary Inspection, Tajikistan Gulnoz Hisamutdinova ghisamutdinova@gmail.com	-Interested in following the project. Active participation conditioned to the obtention of funds. Contact person: Gulnoz Hisamutdinova ghisamutdinova@gmail.com
16. BEJO, The Netherlands Ilona Kars I.Kars@bejo.nl	-Contribution to be detailed Ilona Kars I.Kars@bejo.nl
17. HM Clause, France Hubert Lybeert hubert.lybeert@hmclause.com	-Contribution to be detailed Hubert Lybeert hubert.lybeert@hmclause.com

1.7. Research project partnership outside Euphresco

The workshops and trainings will be open to researchers outside the Euphresco network. The research organisations have not been identified, but the events will be advertised through EPPO and Euphresco. There is a limit in the number of participants (16 persons) that could attend the trainings. The activities could be opened preferentially but not exclusively to the non-EU researchers involved in the previous test performance studies (e.g. Canada, China, Israel, Peru, USA). Australia and New Zealand could be interested in participating in the workshop.

☒ The funding consortium of the topic mentioned in section 1.2 requires to advertise the topic outside the Euphresco network.

1.8. Any other relevant information on content

None

2. Euphresco management aspects of the project

2.1. Indication of the topic budget

Funding organisation [a]	Mechanism [b]	Total Budget [c]
1. EPPO (Int.)	NC	€ 10 000
2. AGES (AT)	NC	€ 14 000
3. ILVO (BE)	NC	€ 5 000
4. CFIA (CA)	NC	€ 10 000
5. AU (DK)	NC	€ 4 000
6. ANSES (FR)	NC	€ 6 000
7. BMEL (DE)	NC	€ 10 000
8. SASA (GB)	NC	€ 11 000
9. VAAD (LV)	NC	€ 12 000
10. NVWA (NL)	NC	€ 30 000
11. INIAV (PT)	NC	€ 58 597
12. APHIS (US)	NC	€ 4 806
13. UG (CA)	NC	€ 30 000
14. FA (RS)	NC	€ 2 000
15. SSPI (TJ)	NC	€
16. BEKO (NL)	NC	€
17. HMCLAUSE (FR)	NC	€
total		€

2.2. Expected duration of the project (only for non-competitive topics)

24 months.

2.3. Any other relevant information on topic organisation and management

One workshop/training will be organised each year, each followed by a proficiency test.

[a] First member is project coordinator. A minimum of two partners are necessary for each proposal. Add lines as needed.
[b] Please indicate the preferred mechanism (e.g. real pot RP; virtual pot VP; non-competitive NC), or several mechanisms if there is flexibility.
[c] Optional, as this amount can still change in the next phase. In-kind contribution should also be indicated in this column.