1 Content of the 'Topic Description' document

1.1 Topic area

Diagnostics, field detection, surveillance.

1.2 Topic title

Assessment of a generic method for the detection of Begomoviruses.

1.3 Description of the problem the research should solve

The Genus *Begomovirus* (Family Geminiviridae) is the largest genus of plant viruses (288 species). They infect a wide range of economic important dicotyledonous plants and specially tomatoes. In Europe and especially in the Mediterranean basin several Begomoviruses have been detected mainly on tomato and others crops of economic importance. Among the genus *Begomovirus*, the most harmful member is probably the *Tomato yellow leaf curl virus* (TYLCV). This virus is widespread worldwide and associated with the damaging tomato yellow leaf curl disease. It seems to have spread from infected plants and with the dissemination of its insect vector: *Bemisia tabaci*. Although there is some genetic variability, all strains found in Europe belong to two species: *Tomato yellow leaf curl Sardinia virus* (TYLCSV) or *Tomato yellow leaf curl virus* (TYLCV). If the oldest reports date back to the 1980's, it still continues to infect sporadically with a variable intensity different regions of Europe (see EPPO Global Database).
Recently, several reports were published in Europe and in the Mediterranean basin about infection of new emerging Begomoviruses inducing severe damage or presenting a threat for main crops i.e *Tomato leaf curl New Delhi virus* ToLCNDV in Spain, Italy, and Tunisia. Moreover, due to the new emerging Begomoviruses worldwide and the large distribution of their vector in all tomato producing area (open field and greenhouse), at least two other Begomoviruses, absent in Europe, should be considered as a potential threat for the tomato production: *Tomato mottle virus* (ToMoV) and *Tomato leaf curl virus* (ToLCV). Their distribution being closely related to the distribution of their vector *Bemisia tabaci*, their introduction and dissemination should be monitored to avoid spread.

Early diagnosis of Begomoviruses was based on symptomatology, but the variability of biotic of abiotic factors susceptible to induce similar symptoms doesn't facilitate a correct identification. ELISA test might also be used but with little success due to low antigenicity of the viral coat protein (CP). However, the high level of homology between the CPs of different Begomoviruses allows the design of generic primers for detection of the above-mentioned strains and in some extends to some others regulated and non-regulated Begomoviruses. Reliable and common protocols based on PCR appear necessary.
Due to the risk, many of these Begomoviruses have already been regulated or added to the EPPO pest lists. Despite this, there is no test available for the detection of a wide range of Begomovirus allowing an easy identification. A standard for TYLCV and ToMoV (EPPO PM7/50) already exists, but it wasn't evaluated for other Begomoviruses. This project proposes to work on this aspect and it will be divided in three work packages:

- Selection of a restricted list of targets and non-targets viruses, and selection of PCR tests to be evaluated against the selected viruses
- Collection and propagation of the plant material to be tested
- Organization and participation to an interlaboratory test performance study

1.4 Description of the expected results

The main expected result of this project is to get reliable validation data in order to propose a common test for the detection of the main regulated or threatening Begomoviruses and their

associated strains. This could contribute to the improvement of diagnostic protocols (e.g. EPPO diagnostic standard 7/50 (1) on TYLCV and Tomato mottle begomoviruses).

1.5 Beneficiaries of this research product

The results of the project will benefit to National and Regional Plant Protection Organisations, policy makers and private companies.

1.6 Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
1. Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail, France Géraldine Anthione: Geraldine.anthoine@anses.fr	-Selection of targets and non-targets, selection of PCR based methods to be evaluated. -Collection and propagation (if possible and necessary) of the plant material to be tested. -Set up and organization of the test performance study. Contact person: Pascal Gentit pascal.gentit@anses.fr Contact person: Anne Saison anne.saison@anses.fr
2. Ministry of Agriculture and Forestry, Environment and Water Management, Austria Sylvia Blümel: sylvia.bluemel@ages.at	-Participation in the test performance study. -Participation in selecting PCR based methods to be evaluated. Contact Person : Sabine Grausgruber-Groger sabine.grausgruber-groeger@ages.at
3. Benaki Phytopathological Institute, Greece Ms Irene Vloutoglou: i.vloutoglou@bpi.gr	-Contribution in providing plant material infected by local targets and non-targets to be tested. -Participation in the test performance study. Contact person: Nikon Vassilakos n.vassilakos@bpi.gr Contact person: Christina Varveri c.varveri@bpi.gr
4. Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Italy Mr Luca Riccioni luca.riccioni@crea.gov.it	-Contribution in providing plant material infected by local targets and non-targets to be tested. -Participation in the test performance study. Contact person : Laura Tomassoli laura.tomassoli@crea.gov.it
5. Netherlands Food and Consumer Product Safety Authority (NVWA), The Netherlands Martijn Schenk M.Schenk1@nvwa.nl	-Contribution to be detailed Contact person : Marleen Botermans m.botermans@nvwa.nl
6. Ministry of Agriculture Forestry and Food, Slovenia Ms Erika Oresek:	-Participation in the evaluation of PCR based methods. -Participation in the test performance study. Contact person: Nataša Mehle

Funding organisation	Research activity and researchers involved
Erika.oresek@gov.si	natasa.mehle@nib.si Contact person: Maja Ravnikar maja.ravnikar@nib.si
7. Science and Advice for Scottish Agriculture, United Kingdom Mr David Kenyon: David.Kenyon@sasa.gsi.gov.uk	-Taking part in test performance study /proficiency tests. -Collection of potato microplants infected with different Begomoviruses. Contact person: Colin Jeffries colin.jeffries@sasa.gsi.gov.uk
8. Agdia EMEA, France Mr Marcos Amato marcos.amato@agdia-emea.com	-Participation in the TPS Contact person: Marcos Amato marcos.amato@agdia-emea.com
9. Bejo Zaden B.V., The Netherlands Mr Theo van der Horst t.vanderhorst@bejo.nl	- Participation in the TPS Contact person: Dryas de Ronde D.deRonde@bejo.nl
10. International Potato Center, Peru Jan Kreuze j.kreuze@cgiar.org	-Participation in the inter-laboratory tests/proficiency tests. Contact person: Jan Kreuze j.kreuze@cgiar.org Contact person: Giovanna Muller g.muller@cgiar.org

1.7 Research project partnership outside Euphresco

Euphresco funding ensures a certain level of transnational collaboration among Euphresco member countries. It is possible, if the funding consortium is interested, to contact funding organisations or research groups outside the geographical area covered by Euphresco members. The Euphresco coordinator could advertise the research topic in order to have an enlarged collaboration. If funders are interested in this possibility, please check the case below:

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

Information to sharpen the profile of sought partners could be useful (but not mandatory): country/region (if there are preferences), skills/expertise required, etc.

1.8 Any other relevant information on content

Due to particular way of propagation of most of the relevant Begomoviruses, the work package including the collection and the propagation of infected material is critical for the success of the inter-laboratory comparison test. In this respect, the importance of providing enough plant material or DNA extracts by all partners for the project is stressed.

2 Euphresco management aspects of the project

2.1 Indication of the topic budget

Funding organisation [a]	Mechanism [b]	Total Budget [c]
1. ANSES (FR)	NC	€ 32 000
2. AGES (AT)	NC	€ 6 750
3. BPI (GR)	NC	€ 8 487
4. CREA (IT)	NC	€ 5 000
5. NVWA (NL)	NC	€ 5 000
6. MKGP (SI)	NC	€ 5 000
7. SASA (GB)	NC	€ 2 200
8. AGDIA (FR)	NC	€ 3 000
9. BEJO (NL)	NC	€
10. CIP (PE)	NC	€ 5 000
total		€

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

18 months.

2.3 Any other relevant information on topic organisation and management

None.

[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.