

1. Content of the 'Topic Description' document

1.1. Topic area

Pest/vector biology, epidemiology, taxonomy

1.2. Links to the Euphresco Strategic Research Agenda

The topic addresses the following objective(s) of the 2017-2022 Euphresco Strategic Research Agenda

- Objective 2017-R-1.2: to support taxonomic research for the unambiguous identification of pests
- Objective 2017-I-1.2: to improve access to collections of phytosanitary importance
- Objective 2017-I-2.1: to support data exchange, data use, and re-use for the benefit of plant health research activities
- Objective 2017-I-2.2: to contribute to databases for plant pests identification and diagnostics
- Objective 2017-C-2.1: to address plant health challenges through whole-chain, multi-actor approaches
- Objective 2017-C-3.1: to favour knowledge exchange and support common initiatives with relevant players

1.3. Topic title

Development of seed identification guide and database for invasive plants and weedy species

1.4. Description of the problem the research should solve

Plant species are one of the most diverse taxonomy groups with about 369,000 flowering species according to the Royal Botanical Garden of Kew. Seeds of invasive plants and weeds are the main agent for long-distance spreading and introduction into new areas. This long distance spread of weeds is facilitated by human activities to reach far beyond the natural dispersal range, especially under current globalization of high speed and volume trades. The agricultural production bases and natural habitats are in great risks with potential arrival of invasive alien species through human trade activities. The prevention of weed seeds spreading is the most effective and economic measure for invasive plants or weeds control.

Tools for the detection of weed seeds that contaminate agricultural commodities, such as seeds and grains, are needed to support quarantine inspection and commodity quality controls. However, there are limited taxonomic and diagnostic guides for the detection and identification of weed seeds. Also, there is a lack of collaboration in data exchange and data sharing that prevent the use of digital databases on a large scale for phytosanitary diagnosis. Sharing of knowledge for the development of identification features of pest seeds will contribute to building capacity for diagnostic tests related to quarantine species detection for safe trade among trade partners.

1.5. Description of the expected results

The collaborative approach of the project is to develop a list of plant species that are important for international trade and relevant globally through an analysis of regulated plant species from multiple regions, countries, or project participating countries. It is expected that the project will develop seed identification resources related to 100 invasive plants or weedy species, e.g., 20 will be of importance for Europe, 20 for North America, 20 from South America, 20 from Asia, and 20 for the Pacific. The developed resources are expected to be open access and expandable for further development in data construction.

1.6. Beneficiaries of this research product

Developed data, resources, and tools will be openly accessible for use by testing professionals in phytosanitary certification or inspection, seed analysts, farmers, inspectors, scientists, and the testing and processing industries for agricultural produces.

1.7. Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
<p>1. Canadian Food Inspection Agency, Canada</p> <p>Cheryl Dollard cheryl.dollard@inspection.gc.ca</p>	<p>-Project coordination; -Data protocol training and development; -Data development for 20 species on weed seed identification;</p> <p>Contact person: Ruoqing Wang E.mail address: Ruoqing.wang@inspection.gc.ca</p>
<p>2. The Irish food and Agriculture Development Authority –Teagasc, Ireland</p> <p>Susanne Barth susanne.barth@teagasc.ie</p>	<p>-Data development for 15 grass weed species on weed seed identification; -Image distribution via Teagasc farmer education channels; -Invasive species in unregulated wildflower seed mixes in the EU – development of guidelines;</p> <p>Contact Person: Susanne Barth E.mail address: susanne.barth@teagasc.ie</p>
<p>3. Council for agronomic research and economic analysis, Italy</p> <p>Pio Federico Roversi piofederico.roversi@crea.gov.it</p>	<p>-Identification tools of <i>Orobanche</i> seeds collected in infested fields, using the resources present in the laboratory -Production of pictures, identification, and fact sheets - Characterization by molecular tests;</p> <p>Contact Person: Elena Perri E.mail address: elena.perri@crea.gov</p> <p>Contact Person: Daniela Villa: E.mail address: daniela.villa@crea.gov.it</p> <p>Contact Person: Giovanni Corsi: E.mail address: giovanni.corsi@crea.gov.it</p>
<p>4. University College Dublin, Ireland</p> <p>Noeleen Smyth noeleen.smyth@ucd.ie</p>	<p>-EU & National regulated Invasive plant species general identification guide for Ireland; -Identification images and development of fact sheets for regulated invasive alien plant species in Ireland;</p> <p>Contact person: Noeleen Smyth E.mail address: noeleen.smyth@ucd.ie</p> <p>Contact person: Colette O Flynn E.mail address: coflynn@biodiversityireland.ie</p>



<p>5. Netherlands Food and Consumer Product Safety Authority, the Netherlands</p> <p>Martijn Schenk M.Schenk1@nvwa.nl</p>	<p>-Data development for species relevant for Europe and/or from Asia; -Focus on feed and seed commodities;</p> <p>Contact person: Johan van Valkenburg E.mail address: j.l.c.h.vanvalkenburg@nvwa.nl</p> <p>Contact person: Merlijn van den Berg E.mail address: to be provided</p>
<p>6. Agresearch, New Zealand</p> <p>Chris Buddenhagen Chris.Buddenhagen@agresearch.co.nz</p>	<p>-Weeds seeds of New Zealand books and images, several hundred species; -To reference in the database the 400-plus species on the quarantine weeds list;</p> <p>Contact person: Chris Buddenhagen E.mail address: Chris.Buddenhagen@agresearch.co.nz</p> <p>Contact person: John Hampton E.mail address: John.Hampton@lincoln.ac.nz;</p> <p>Contact person: David Teulon E.mail address: david.teulon@plantandfood.co.nz;</p> <p>Contact person: Trevor James E.mail address: trevor.james@agresearch.co.nz</p>
<p>7. Te Tira Whakamātaki, New Zealand</p> <p>Melanie Mark-Shadbolt mel@ttw.nz</p>	<p>-Exploration of selected community frameworks for weed identification, to inform interpretations of best practice; -Review of protocols for relevant international agreements (e.g. CBC, UNDRIP, UNDRR Sendai Framework etc.);</p> <p>Contact person: Simon Lambert E.mail address: Simon@ttw.nz</p>
<p>8. All Russia Plant Quarantine Department, Russia</p> <p>Yury Shneyder yury.shneyder@mail.ru</p>	<p>-Data development for weed seeds associated with grain wheat; -Production of pictures, identification and fact sheets;</p> <p>Contact person: Kulakova Yuliana E.mail address: thymus73@mail.ru</p> <p>Contact person: Ebel Tatyana E.mail address: t-ebel@sibmail.com</p>

1.8. Research project partnership outside Euphresco

The project is open to participants from Euphresco member countries and interested countries outside of the member countries, such as trade partners of the member countries. The project would also like to involve non-profit international organizations, such as International Seed Morphology Association.

☒ The funding consortium of the topic mentioned in section 1.2 requires that the topic is advertised outside the Euphresco network

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

1.9. Any other relevant information on content

The related digital platform has been developed and developer tools and guides can be found here: <https://www.idseed.org/authors.html>. The project participants will receive training from the project coordinator and the existing protocols and data methods are open for further development and improvement from participants. The product of this project can be published on a digital platform with open-access data, resources, and tools, such as <https://www.idseed.org/>

2. Euphresco management aspects of the project

2.1 Indication of the topic budget

Funding organisation	Mechanism	Total Budget
1. CFIA (CA)	NC, in kind	€
2. Teagasc (IE)	NC, in kind	€
3. UCD (IE)	NC, in kind	€
4. CREA (IT)	NC, in kind	€
5. NVWA (NL)	NC	€
6. Agresearch (NZ)	NC	€
7. TTW (NZ)	NC	€
8. VNIIKR (RU)	NC	€

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

24 months.

2.3 Identification of project coordinator

Has the research project coordinator been identified?

- Yes
 No

2.4 Any other relevant information on topic organisation and management

The project will be managed through a number of work packages. A potential structure of the project could be as described below.

WP1 Project Management

The project management deals with the overall management of the work packages (progress of the work, timely submission of reports, organization of meetings). A responsible person will be appointed to each work package for coordination and planning.

WP2 Project member training and data protocol review

The project coordinator will provide training to participating members for the existing data collection on seed identification features. After the training, the members can review data protocols and templates, and conduct revision and improvement when it is necessary.

WP3 Develop a prioritized species list

Project members will prioritize about 100 invasive/weed species based on the quarantine needs of their own country or trade partners (i.e., import or export), or potential common risk.

WP4 Development of reference datasets for pest seed identification

Project members create diagnostic reference data, which included information in text or images on taxon nomenclature, species distribution, and seed (plant dispersal unit) morphological features for diagnostic purposes. The developed datasets will be published online for knowledge exchange, as well as training of end-users.