

**EMPHASIS with  
and for society:  
the value of Participation**

The EMPHASIS approach moves from one-way “knowledge transfer” of results and ideas to mechanisms that facilitate “knowledge exchange” in networks. Relevant inputs and evaluation by end-users have been an integral part of project workflow. EMPHASIS is a participatory research project, involving end-users in setting research objectives, gathering and processing data and interpreting results. Involvement of SMEs, engagement with stakeholders, and implementation of specific activities dedicated to R&D, to on-farm experiments, to practical solutions demonstration and validation and to regulation aspects enhance successful translation of project results into marketable products.



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**EMPHASIS**

Effective Management  
of Pests  
and Harmful  
Alien Species:  
Integrated Solutions

*A four-year project  
funded by the European  
Commission under the  
Horizon 2020 programme  
with the aim to manage  
pathogens and pests in  
agricultural crops and  
forests, while paying  
special attention to  
invasive alien species  
that reach the EU  
from other continents  
as a consequence of  
globalisation.*

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## PREDICTION

Pest management challenges and opportunities have been evaluated according to stakeholder-focused criteria and through pathway analysis.

**Risk prioritisation of market opportunities** – A method was created to allow technology developers to evaluate market opportunities based on national pest risk register analysis to compare existing and future pest risks. Species were identified which were both high-risk and had the greatest potential for the mitigation of risk. This allows industry and authorities to re-evaluate target species and to identify new market opportunities for technologists.

## PREVENTION

Monitoring tools and practical solutions for surveillance have been developed and provided to end-users.

**From Research to Business** – The EMPHASIS project has allowed the Genie systems to evolve and become more suitable for deployment within agricultural production. The Genie II, Genie III and Genie HT instruments support molecular diagnostics based on isothermal amplification of DNA with the LAMP method being the most commonly used. The key objective was to make the method accessible by and cost-effective to growers and agronomists for on-site rapid detection of plant disease and pests.

**A network of sentinel plots against invasive alien species** – Sentinel plots of plants are a simple and inexpensive method for early detection of new or emerging pathogens, easy to use for a grower or agronomist for immediate, practical observations, while further tests on samples at research organisations can provide more detailed information. They can be used to derive more detailed information about pathogen outbreaks. In EMPHASIS, sentinels were used to capture data on outbreaks of wheat stem rust in Europe; predict infection risk and spray timings for downy mildew on basil, and monitor the *Alternaria* early blight complex on potato. All three organisms have recently emerged as potential threats to crops in Europe.

## THE AIM OF EMPHASIS PROJECT

The overall goal of Emphasis Project was to ensure a European food security system and the protection of biodiversity and ecosystem services by developing integrated mechanisms of response measures comprising practical solutions to help predict, prevent and protect agriculture and forestry systems from native and alien pest threats and promoting best practices by involving stakeholders at large.



# HOW?

## PROTECTION

Practical solutions for managing native and alien pests in agriculture, horticulture and forestry have been developed; their technical and economic feasibility has been demonstrated and their market uptake has been enhanced.

**Guidelines for sustainable IPM control of specific weeds** – Combination of biological (including plant biodiversity), mechanical and physical, and chemical measures have been developed and tested to effectively manage the invasive weed species, *Ambrosia artemisiifolia* and *Heracleum* spp and the tree *Ailanthus altissima*.

**Guidelines for IPM strategies for vegetables crops** – A practical guide for growers for soil-borne pathogens, air-borne pathogens and *Bemisia tabaci* containment in vegetable crops has been developed. The proposed IPM approach combines prevention, monitoring, biological control, cultural practices, host plant resistance targeted to each pathosystem.

**Guidelines for seedling insect containment in oilseed rape** – Alternative seedling insect control methods to neonicotinoids as seed treatment insecticides were proposed. Growing practices for all involved stakeholders were analysed based on facts and results, developing preventative and safe strategies for honey bees and oil seed rape growers.

**Eradication of alien species in forestry: *Heterobasidion irregulare* as case study** – *Heterobasidion irregulare*, a major fungal pathogen of pines in North America, was accidentally introduced into Italy during World War II. Practical solutions for the surveillance and monitoring of *H. irregulare* have been settled, including the development, validation and optimization of a fast and specific detection method based on Loop-mediated isothermal AMplification (LAMP) assay. Two solutions for the local eradication of the pathogen were tested in the field and showed to be feasible and effective.

**Tools for management of ash dieback, a new invasive tree disease** – *Hymenoscyphus fraxineus* a fungus from Eastern Asia is currently causing large-scale dieback and death of ash trees (*Fraxinus* spp.) in forests as well as urban green all over Europe. Field experiments and DNA-based testing methods have been used to screen a large collection of *Fraxinus* species and cultivars for susceptibility. The results provide forest owners and managers of ash trees with tools to assess risks in existing plantations and to minimize future risks by substituting susceptible species by more resistant ones.

**On-farm experiments** – The effectiveness of the practical solutions developed by EMPHASIS was assessed, validated and transferred through co-innovative research and demonstrations (large-scale field trials, workshops for inspection services for the uptake of diagnostic tools). SMEs have been involved to translate results from the project into marketable products.

## PROMOTION

A mutual learning process with end-users has been developed, and the solutions identified within the project have been promoted through training and dissemination.

**Engagement and inclusion as key values** – The dissemination and communication activities, using traditional and innovative communication tools, have engaged different stakeholders (e.g. journalists, media and social users, students, policy makers) through a virtual collaborative platform on the website, webinars, summer schools, workshops, training courses, surveys, white papers, or new outreach formats, such as stage shows in theatre. All these activities have generated articles on the public press, views on Twitter, Facebook, building a growing community focused on plant health and invasive alien species topics.

To promote uptake of innovative solutions a contest-like activity (Call for early adopters) was launched for those who want to pioneer solutions developed by the project offered by 3 SMEs: Agrobio, Agrinewtech and Optisense. A total of 67 end-users applied. Seven beneficiaries from Italy, Romania, Slovenia, Bulgaria, Greece and Belgium were selected.

**HabiThreats Toolkit** – A science-based, technological toolkit was developed to present and disseminate EMPHASIS projects' outcomes and promote integrated solutions for end-users, professional organisations and potential stakeholders. Its objective is to contribute to tackling the general lack of information on native and alien pests, to effectively communicate project's objectives and results, to provide users with an overall understanding of IPM, enable them to apply knowledge, making direct use of project's outcomes in a comprehensive, tailored and interactive way.