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Innovating for the future of farming and rural communities

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Managing pests and harmful alien species effectively through integrated solutions

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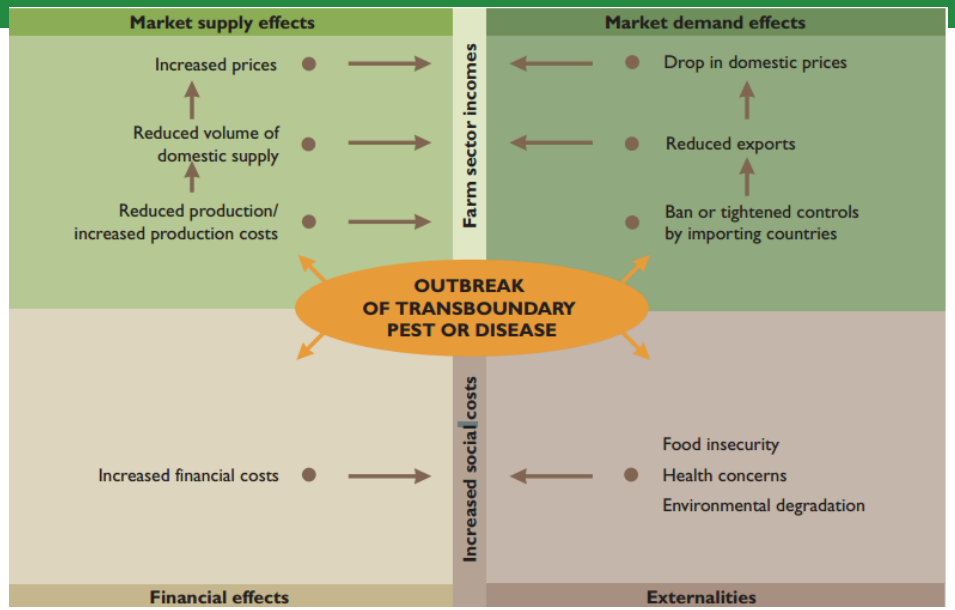
EMPHASIS

Effective Management of Pests and Harmful Alien Species – Integrated solutions

THE TOPIC

Economic impacts of transboundary pests and diseases (FAO, 2011)



MAIN OBJECTIVES

To ensure a **European Food Security System** and the protection of biodiversity and of ecosystem services while developing integrated mechanisms of response measures (practical solutions) to **predict**, to **prevent** and to **protect** agriculture and forestry systems from native and alien pests threats.

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ACTIVITIES

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PREDICT

pest management challenges and opportunities will be evaluated according to stakeholder-focused criteria and through pathway analysis.

PREVENT

practical solutions for surveillance in different pathways to enhance preparedness will be provided to end-users, and monitoring tools following outbreaks and eradication will be developed.

PROTECT

practical solutions for managing native and alien pests in agriculture, horticulture and forestry will be developed, their technical and economic feasibility will be demonstrated and their market uptake will be enhanced.

PROMOTE

a **mutual learning process with end-users** will be developed, and the solutions identified by the project will be promoted through training and dissemination.

RESULTS ALREADY ACHIEVED

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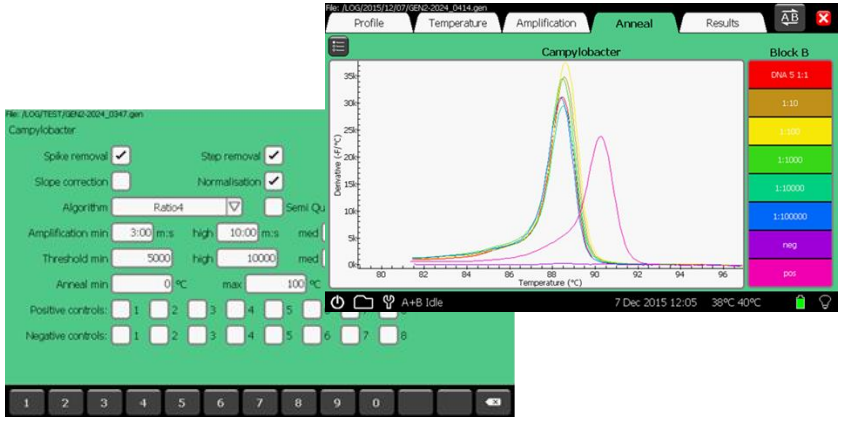
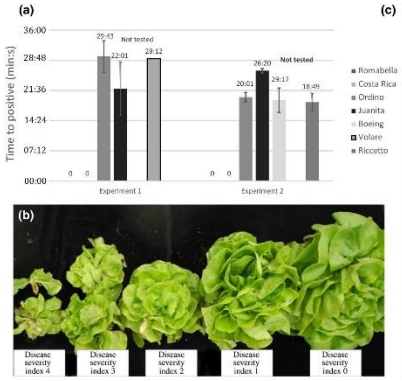
- **Analytical Framework** on Pest Management Challenges and Opportunities
- **Learning Platform** and **Decision-taking analysis**

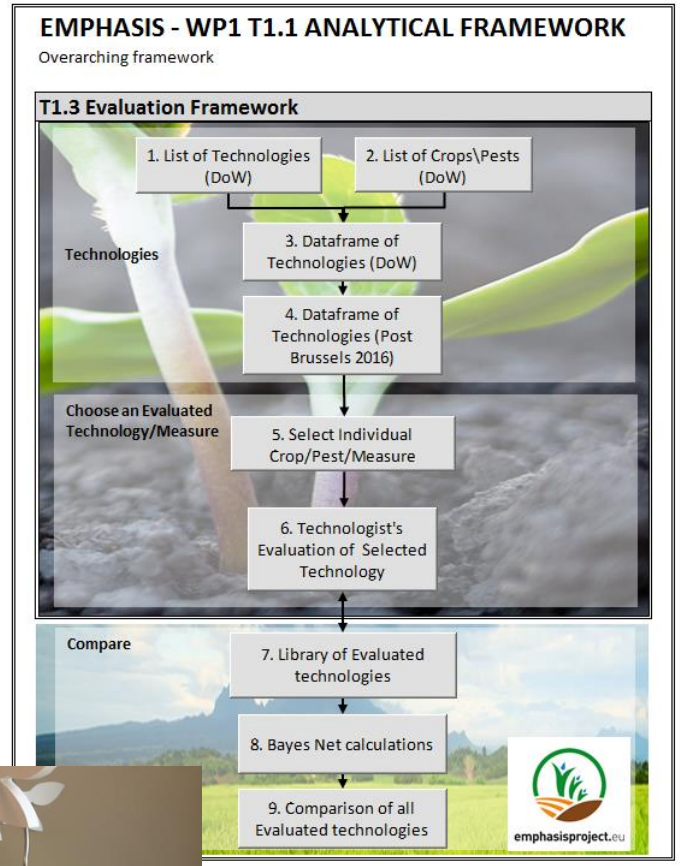
- Automated result calling **algorithms** developed for LAMP assays implemented on the Genie platform





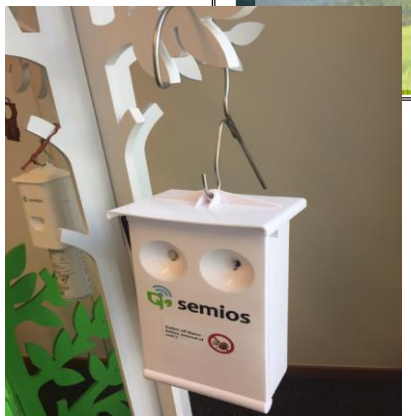
(c)

Lettuce cultivar	Experiment	Disease severity index	LAMP result after crude extraction
Romabella	1	0	-
	2	0	-
Costa Rica	1	0	-
	2	0	-
Ordino	1	2	+
	2	1.2	+
Juanita	1	4	+
	2	4	+
Boeing	1	Not tested	Not tested
	2	2.8	+
Volare	1	4	+
	2	Not tested	Not tested
Riccetto	1	Not tested	Not tested
	2	3.6	+



- Suite of **validated LAMP kits** available to provide species level detection and identification

- **Pheromone puffer** for semiochemical use in insect pest management



RESULTS IN PROGRESS

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- Pathway risk analysis
- «Early detector» network of sentinel plot locations
- Protocol for genomic identification of mixed pathogens from spore traps
- Effective BCAs for the management of target pests
- Introducing resistance to stem rust into EU wheat material
- Screening of microbial BCAs candidate for *Leptosphaeria maculans* and *Mycosphaerella graminicola* control on debris

- Guidelines for sustainable IPM strategies for vegetable crops and weeds
- Ash tree varieties resistant to *Chalara fraxinea*
- Forecasting scheme to predict stem rust pandemic
- Guidelines for seedling insects containment on oilseed rape and for crop debris management in a wheat/oilseed rape rotation
- User-friendly operational device for native *Heterobasidion* spp. containment in conifers
- Procedures to locally eradicate the alien *Heterobasidion irregulare* on conifers

What EMPHASIS will change

- Effective practical solutions for the prevention and management of pests and IAS.
- Scientific support to EU policies.
- Significant economic gains/avoided losses for the European agriculture and forestry.
- Increased product quality and lower environmental impact.
- Impact on agricultural and forestry production and risk management practices.

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EMPHASIS CONTRIBUTION TO EPPO STANDARDS:

Revisions: **PM7/98** Specific requirements for laboratories preparing accreditation for plant pest diagnostics **PP1/103** *Phytophtora capsici*; **PP1/122** *Phytophthora nicotianae var. parasitica* on citrus; **PP1/073** *Psylliodes chrysocephala*; **PP1/218** *Phyllotreta* spp. on rape; **PP1/259** *Delia radicum* on oilseed rape; **PP1/264** Mating disruption pheromones*;* **PM9/9** *Heracleum mantegazzianum, H. sosnowskyi* and *H. persicum*

New Standards: **PM7** and **PM9** for: *Heterobasidion irregulare; Peronospora belbahrii; Ailanthus altissima.*

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HOW DOES EMPHASIS CONTRIBUTE TO THE STRATEGY?

Priority Area 2: Healthier plants and animals

- use of functional biodiversity for pest and disease control;
- increase resilience for plant production;
- tackling societal dimension of plant health (food safety and quality), societal engagement;
- tools to prevent and control pests and diseases (biosecurity); early detection systems;
- cost-effective surveillance and control approaches/measures;
- innovative approaches to pest and disease management;
- provide producers with alternative approaches to the use of pesticides (enabling to reduce their use) and facilitate their uptake;
- support the implementation of the Sustainable Use of Pesticides Directive, including IPM;
- opening the way to a more comprehensive one health concept (plant-animal-humans).

WHAT IS MISSING IN THE FIELD

Biology, epidemiology and management of pathogens

- New diseases of Vegetable and Ornamental Crops
- Epidemiology of plant pathogens
- Effect of climate change on pathogens and mycotoxin production
- Disease Management

Molecular diagnostics and Plant-Pathogen Interactions

plant and food biosecurity and Food safety

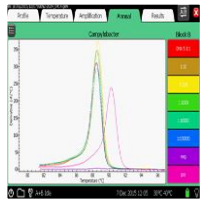
- Biosecurity
- Human Pathogens on Plants
- Postharvest diseases
- Mycotoxins

WHAT IS MISSING IN THE FIELD

A Global Surveillance System to reduce the global burden of crop diseases by informing, preparing and enabling response plans for a food-secure future

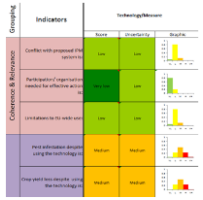
The GSS building blocks:

1. Diagnostic network (regional hubs for diseases identification, coordinating with national research systems and NPPOs)
2. Risk assessment network (regional hubs setting priorities and focusing attention on risk assessemet models and information)
3. Data management network (collecting, filtering, analysing, storing and disseminating data of both pathogens and their host)
4. Communication network (effective, timely, responsible and secure communication of disease outbreak knowledge)
5. Management network (governance, fundraising, policies and guidelines).



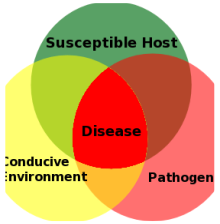
Diagnostic network

Risk assessment network



Data management network

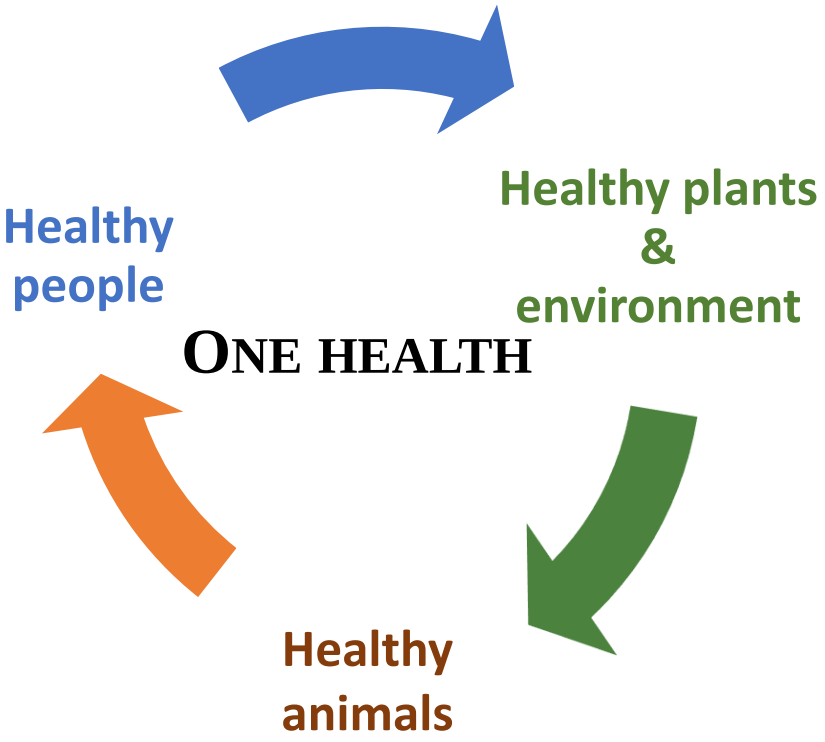
Communication network



Management network

WHAT IS MISSING IN THE FIELD

"ONE HEALTH" collaborative efforts of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals, plants and our environment.

Impacts:

- enhancement of breakthroughs in biomedical research
- epidemiological studies
- public health policy decision-making
- biosecurity concerns
- prevention, preparedness and forensic capabilities across all kingdoms barriers.