

EXPECTED OUTCOMES

A decision-making tool for use by law enforcement officers to allow discrimination between deliberate and accidental outbreaks

Risk assessment tools for plant pathogens and HPOP

A database of EU and international expertise in relation to contingency plans, capabilities for tracking pathogen outbreaks, models of management systems for bioterrorism threats, and strategies in risk communication

PROJECT COORDINATOR

Agroinnova: Center of Competence for Innovation in the Agro-environmental Field
University of Turin, Italy
via Leonardo da Vinci, 44
10095 Grugliasco (TO) Italy

CONTACT PERSONS:
Maria Lodovica Gullino
malodovica.gullino@unito.it
Paola Colla
paola.colla@unito.it
www.agroinnova.unito.it

National Institute of Agricultural Botany (NIAB)

Huntingdon Road,
CB30LE, Cambridge,
United Kingdom

CONTACT PERSON:
Jane Thomas
jane.thomas@niab.com
www.niab.com

The Food and Environment
Research Agency (FERA)
Sand Hutton, YO41 1LZ,
York, United Kingdom

CONTACT PERSON:
Christine Henry
christine.henry@fera.gsi.gov.uk
www.fera.defra.gov.uk

Rheinische Friedrich-Wilhelms-
Universität Bonn (UNIBONN)
Regina Pacis Weg, 3
53113, Bonn, Germany

CONTACT PERSON:
Heinz-Wilhelm Dehne
hw-dehne@uni-bonn.de
www.uni-bonn.de

Institut National de la
Recherche Agronomique
(INRA)
Rue De L'Université, 147
75338, Paris Cedex 07, France

CONTACT PERSON:
Frédéric Suffert
fsuffert@gnignon.inra.fr
www.inra.fr

Regional Environmental Center
for Central and Eastern
Europe (REC)

Ady Endre ut 9-11, Szentendre,
2000, Hungary

CONTACT PERSON:
Marta Szigeti Bonifert
mbonifert@rec.org
www.rec.org

Imperial College London
Exhibition Road, South
Kensington Campus, SW7 2AZ,
London, United Kingdom

CONTACT PERSONS:
John Mumford
j.mumford@imperial.ac.uk
Brooke Alasya
b.alasya@imperial.ac.uk
www.imperial.ac.uk

Middle East Technical
University (METU)
Inonu Bulvari Campus,
06531, Ankara, Turkey

CONTACT PERSON:
Hami Alpas
imah@metu.edu.tr
www.metu.edu.tr

SPIN-TO Srl
via Pietro Micca, 22
10122, Turin, Italy

CONTACT PERSON:
Alessandro Bertin
bertin@spin-to.it
www.spin-to.it

United Nations Interregional
Crime and Justice Research
Institute (UNICRI)
viale Maestri del Lavoro, 10
10127, Turin, Italy

CONTACT PERSON:
Jayant Sangwan
sangwan@unicri.it
www.unicri.it

The Agricultural Research
Organisation of Israel - The
Volcani Centre (ARO)

Derech Hamcibim, 68
50250, Bet Dagan, Israel

CONTACT PERSON:
Abraham Gamliel
agamliel@volcani.agri.gov.il
www.agri.gov.il

National Institute for Microbial
Forensics & Food and
Agricultural Biosecurity
(NIMFFAB)

Oklahoma State University (OSU)
Whitehurst, 203
74078, Stillwater,
United States of America

CONTACT PERSON:
Jacqueline Fletcher
jacqueline.fletcher@okstate.edu
www.ento.okstate.edu/nimffab

Kansas State University
Fairchild Hall, 2
66506-1103, Manhattan (KS),
United States of America

CONTACT PERSON:
James Stack
jstack@ksu.edu
www.k-state.edu

AGRINNOVA

NIAB

fera

universität bonn

INRA

REGIONAL ENVIRONMENTAL CENTER



plantfoodsec.eu



plantfoodsec.eu

PLANT AND FOOD BIOSECURITY NETWORK OF EXCELLENCE

A five-year project to create a virtual research network in order to improve the quality and impact of plant and food biosecurity training and research in Europe.

Imperial College
London

METU

spin-to

unicri

NIMFFAB

KSTATE

PLANT AND FOOD BIOSECURITY NETWORK OF EXCELLENCE

A FIVE-YEAR PROJECT TO CREATE A VIRTUAL RESEARCH NETWORK IN ORDER TO IMPROVE THE QUALITY AND IMPACT OF PLANT AND FOOD BIOSECURITY TRAINING AND RESEARCH IN EUROPE

Plant and Food Biosecurity (PLANTFOODSEC) is a Network of Excellence funded under the FP7 Security Programme for the period 2011 to 2016. It focuses on biological threats that have the capacity to affect and damage agriculture, infect plants, and ultimately affect food and feed at any stage in the supply chain. The goal of the project is to create a virtual research network in order to improve the quality and impact of training and research in relation to crop and food biosecurity in Europe, thus enhancing preparedness to prevent, respond to and recover from the possible use of plant pathogens or pests against crops in the European agro-food system. The project provides timely scientific inputs to enable a response to the threat posed to European agriculture, farming and the agro-food industry by agro-terrorism, to assist in developing preventive and suppressive crisis management, and to implement specific European policies. The project also aims to improve the level of training available for network partners and to promote the sharing of project results between all partners, thus creating a network with the practical skills to achieve the overall project goal. The end users of the project outcomes are expected to be national and European authorities responsible for plant health and security.

THE RESULTS

Halfway through the project implementation period, PLANTFOODSEC has:

- | identified regulatory threats;
 - | prioritised target crops (including food, feed and timber crops);
 - | prioritised target pathogens using a new tool for assessment based on risk scenarios;
 - | characterised the early development of a plant disease epidemic;
 - | set up a tool for the prioritisation of target human pathogens on plants (HPOP) and mycotoxins;
- and
- | designed a virtual diagnostic network.



IDENTIFICATION OF REGULATORY THREATS

This deliverable strictly concerns "legislation threats", defined as areas that are not covered by legislation, or that are unclear or contradictory. Such threats may result in countries not responding to a crisis due to a perceived or actual lack of powers, the possibility of a legal challenge, or other concerns. Reluctance to act may also be due to misunderstandings or differing legal interpretations, for example when an EU law is translated into a member state's language in their own legislation.



PRIORITISATION OF TARGET CROPS

A comprehensive list of target plants and crop products relevant for Europe was established, including 451 crops categorised into 11 groups (field crops, vineyards, orchards, vegetable crops, nursery and ornamental horticulture, medicinal and aromatic plants, forest production, beverage crops, straw, tree sap, seeds). In addition, criteria for prioritisation were identified. These refer to the crop's economic and sociological importance, consumption and environmental impact. A first classification of the most important crops from an economic point of view was established on the basis of the value of production. This "top 20" list makes possible the selection of the most important crops, after which other criteria will be identified exclusively for these crops. These criteria will modulate the final classification and help define the strategic shortlist of target plants.



PRIORITISATION OF TARGET PATHOGENS

A comprehensive list of 522 pests has been drawn up, updating the list of candidate organisms established in the EU project CropBioterror, including harmful organisms such as insects, fungi, bacteria, viruses and nematodes likely to reduce crop biosecurity. The list is the result of an analysis of 17 existing pest lists. Six criteria were defined to briefly characterise the pests and to make links with crops and forest trees from the lists presented. The criteria include taxonomy, pest presence in Europe, host presence in Europe, host type and host specificity.



PLANT DISEASE EPIDEMIOLOGY APPLIED TO CROP BIOSECURITY: CHARACTERISATION OF THE EARLY DEVELOPMENT OF A PLANT DISEASE EPIDEMIC

To mimic the early dynamics of an epidemic following a deliberate introduction, the course of the two most damaging European wheat diseases – Septoria tritici blotch, caused by *Mycosphaerella graminicola*; and leaf rust, caused by *Puccinia triticina* – was investigated. The study will provide direction on how to sample "hidden" sources of disease and how to evaluate their contribution to disease initiation, which parallels tracking the initiation of a disease caused by a malevolent act. The hypothesis was that the fungus over-summer on wheat volunteers, which would form a "green bridge" between the two successive crops. In a team effort based on farmers' knowledge of the local environment, it was possible to find several volunteers infected with rust. Genetic analyses confirmed that the volunteers and the successive crops harbour similar pathogen populations. The expectation is that the contribution of the infected volunteers to the initiation of disease in a given wheat crop can now be quantified, taking into account the spatial arrangement of the volunteers' spots in the crop's neighbourhood.



SETTING UP OF A TOOL FOR THE PRIORITISATION OF TARGET HUMAN PATHOGENS ON PLANTS AND MYCOTOXINS

Recent incidents of human pathogens on plants (HPOP) within EU countries were analysed in order to provide guidance on the prioritisation of the risks involved in any future HPOP incidents. Fresh produce and microorganisms requiring further investigation were also identified. The analysis was based on a few specific criteria: only known diseases were covered; no new or emerging pathogens were considered; incidents involving fresh produce were investigated, but not incidents involving food or animal feed; critical groups of the population were not considered independently; and literature available in open access areas was reviewed. A set of preventative measures was designed in order to reduce the risk of transmitting infectious diseases, quarantined pests, invasive alien species and living modified organisms within the food chain as well as within natural and managed ecosystems.



RISK ASSESSMENT TOOL

The PLANTFOODSEC project has developed a tool to enable rapid assessments of agro-terrorism scenarios. The tool, a set of utility functions, combines expert-elicited views concerning the perpetrator (motivation, capacity), agent (pathogen), pathway (method of introduction) and receptor agro-ecosystem (ecology, climate, vulnerability) in order to provide a comparative measure of risk. The tool allows the inclusion of uncertainty in ratings of likelihood and impact for each of 15 key risk factors.



DESIGN OF A VIRTUAL DIAGNOSTIC NETWORK

A framework for a virtual web-based diagnostic network, with the temporary acronym EUPFSIS (EU Plant and Food Security Information System), was presented to the consortium at the third project meeting in March 2012. The design allows for information to be gathered together, searched and reported, and also allows for information flow between experts and field workers. The primary components are: catalogues (experts, laboratories, facilities, plant diseases, pathogens, disease events); people-to-people links (field worker to expert, expert to expert); identification assistance (on-line submission of images/videos, inter-expert submissions); and monitoring. Users of the system can be divided into a number of groups. Expert users include pathologists, entomologists and other users with experience and high levels of expertise in one or more diseases, food product contamination or plant health problems. The system is intended to make broad expert knowledge available to assist in diagnosis. One important role of the proposed system is to alert all users to the availability of training courses, workshops, meetings and other important learning facilities throughout the EU and, where relevant, worldwide. Regional authorities represent another category of user, who should be able to see details of disease location, disease type and date of outbreak within their region.