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EDITORIAL



Maria Lodovica Gullino
Director of Agroinnova,
University of Torino – Project Coordinator

Biosecurity involves taking a strategic and integrated approach towards analysing and managing risks to human, animal and plant life and health, as well as associated risks to the environment. Plant biosecurity aims at protecting all plant resources and the food supply from the natural or intentional introduction, establishment and spread of plant pests, pathogens and noxious weeds. Interest in biosecurity has risen considerably over the last 15 years in parallel with increasing trade of food and plant and animal products, the

intensification of international travel, and new outbreaks of transboundary diseases.

Although most outbreaks of plant disease have natural causes or are the result of inadvertent introductions of pathogens through human activities, the risk of a deliberate introduction of high-consequence plant pathogens cannot be excluded.

Whatever the cause of a plant disease outbreak, a comprehensive biosecurity system is essential to protecting domestic agriculture and food supplies. Whereas numerous representatives of the United States Administration and Congress have publicly expressed great concern regarding the threat of biological warfare – especially manifested bioterrorism – in Europe, crop and food biosecurity is not yet fully considered as a real threat. Current EU capabilities to detect and respond to agro-terrorism and

bio-criminal acts are modest at best, spread amongst many organisations, normally handled by regional or national bodies, and are poorly coordinated. At the same time, legal regimes concerned with biosecurity, trade, biodiversity and food safety are connected neither at international nor European levels.

As biosecurity risks transcend national and regional boundaries, we must monitor, assess and manage these risks in a coordinated way across the EU. Strong plant biosecurity programmes should integrate elements of deterrence, prevention, detection, response and recovery by including the following: early detection and diagnostic systems; epidemiological models for predicting pathogen spread; reasonable but effective strategies and policies for crop biosecurity; distributed physical and administrative infrastructures; a national response coordination plan; and strategies for forensic

investigation and attribution in cases of intentional or criminal activity.

In the period 2011–2016, PLANTFOODSEC performed the first step needed to set up a virtual Centre of Competence on Biosecurity, the aim of which is to become the backbone for the EU Plant and Food Biosecurity Scientific Community. It will do so by acting as a network of research centres, universities and other stakeholders to enhance preparedness and response capabilities to prevent, respond and recover from both intentional and unintentional biosecurity threats to EU agriculture, farming and the agro-food industry. The PLANTFOODSEC Consortium is currently working to make the virtual European Centre of Competence on Plant and Food Biosecurity a sustainable reality by building the capability to ensure the broad implementation of the project results.

EVENTS

Brussels, February 29, 2016



3rd Meeting of the Community of Users on Disaster Risk and Crisis Management

Originally scheduled for November 24, 2015 but cancelled due to a terrorism alert in Brussels, this meeting, organised by DG Migration and Home Affairs, has been rescheduled for February 29, 2016. The many different risks affecting security in the fields of CBRNE (Chemical, Biological, Radiological, Nuclear and high-yield Explosives) involve various operational actors and communities covering research and policy. The aim of the Community of Users in Disaster Risk and Crisis Management is to pave the way towards ensuring proper transfer and implementation of research outputs to “users”, which include industry, SMEs, first responders, civil protection units and decision makers.

Brussels, November 24–27, 2016



Horizon 2020 Societal Challenge 2 Work Programme for 2016–2017

Infoweek on the H2020 Work Programme for Societal Challenge was held in Brussels on November 24–27, 2016 in Brussels. Specifically, the work programme focuses on food security, sustainable agriculture and forestry, maritime and maritime inland water research, and bio-economy. Infoweek kicked off with a workshop on thematic networks and the multi-actor approach. Find out more at: <http://ec.europa.eu/programmes/horizon2020/en/news/interactive-innovation-motion-multi-actor-projects-and-thematic-networks-under-horizon-2020>

Angers (France), Nov. 30–Dec. 2, 2016



TESTA – Eppo Conference on Diagnostics for Plant Pests

The Eppo Secretariat organised a Conference on Diagnostics that was held in Angers, France from November 30–December 2, 2015. The first half of the event was dedicated to the EU FP7 TESTA project “Seed Health: Development of Seed Treatment Methods, Evidence for Seed Transmission and Assessment of Seed Health”. Find out more at: http://archives.eppo.int/MEETINGS/2015_conferences/testa.htm

EUROPEAN / GLOBAL NEWS REVIEW



Horizon 2020 Secure Societies: Protecting freedom and security of Europe and its citizens

Horizon 2020 is the EU Framework Programme for Research and Innovation. With nearly EUR 80 billion of funding available over seven years (2014 to 2020), Horizon 2020 is organised in three main pillars (Excellent Science, Industrial Leadership, and Societal Challenges) and two specific objectives (“Spreading excellence and widening participation”, “Science with and for society”).

Funding opportunities under Horizon 2020 are set out in multiannual work programmes that the European Commission has prepared through a strategic programming process that integrates EU policy objectives. The third pillar (i.e. Societal Challenges) supports research and innovation in climate, environment, energy, transport and other fields relevant to society. It supports the development of breakthrough solutions coming from multi-disciplinary collaborations involved also in fields such as social sciences and humanities. Within the third pillar, Societal Challenge 7 (i.e. “Secure societies: Protecting freedom and security of Europe and its citizens”) aims to enhance social resilience against natural and manmade disasters, to fight crime and terrorism, to improve border security, and to provide enhanced cyber-security.

On October 13, 2015, the European Commission published its Work Programme 2016–2017, organised in three main focus areas: Critical infrastructure protection, Digital security, and Security. The latter focuses on three areas, or sub-calls: Disaster resilience, Fighting against crime and terrorism, and Border security and external security.

The aims of these sub-calls are: to reduce the loss of human life, environmental, economic and material damage from natural and manmade disasters, including from extreme weather events, crime and terrorism threats; to mitigate or altogether avoid potential consequences of incidents; to enhance systems, equipment, tools, processes and methods for rapid identification to improve border security, while respecting human rights and privacy. Furthermore, solutions will be developed to support the EU's external security policies in civilian tasks, ranging from civil protection and humanitarian relief to border management, peace-keeping and post-crisis stabilisation, including conflict prevention, peace-building and mediation. Proposals are invited against 28 topics, which are published on the Participant Portal under “Funding opportunities” at: <http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/index.html>.

Total funding available for 2014–2020 Secure Societies challenge amounts to EUR 1.695 billion, of which an estimated EUR 382 million have been allocated for the period covered by the Work Programme for 2016–2017.



WP8 IN FOCUS 1/2

Overcoming the fragmentation of research in plant and food biosecurity



Paola Colla

Agroinnova, University of Torino
Project Manager

A Consortium of European researchers, led by the Centre of Competence AGROINNOVA of the University of Torino, has been exploring the topic of crop biosecurity since 2004, taking into account the risks that the deliberate introduction of plant pathogens poses to European agriculture and forestry. This work has been carried out through several EU and NATO-funded research projects, such as the following:

- FP6 CROPBIOERROR – “*Crop and food biosecurity, and provisions of the means to anticipate and tackle crop bioterrorism*” (2004–2007);
- NATO Security through Science – “*Tools for Crop Biosecurity*” (2005–2006);
- NATO Science for Peace and Security (2008);
- Europaid – “*Tackling BIOSECURITY between Europe and Asia: Innovative detection, containment and control tools of Invasive Alien Species potentially affecting food production and trade*” (2007–2010).

The EU Network of Excellence PLANTFOODSEC (2011–2016) has renewed and reinforced the established partnership by enlarging it to include new countries, institutions and topics. The overall aims are to enhance preparedness and response capabilities to prevent, to respond to and recover from any biological incident or deliberate criminal activity that threatens the European agri-food system.

Following the recommendations of the European Commission’s European Security Research

Advisory Board (ESRAB), the objectives of the original project proposal refer to the following areas in the interest of improving EU bio-preparedness in the agri-food sector:

- risk assessment, modelling and impact (analytical capacities);
- training;
- detection, identification and authentication (surveillance capacities, detection systems);
- situation awareness and assessment (biosecurity and bio-safety guidelines, professional code of conduct versus dual-use risks);
- information management; and
- intervention and neutralisation.

The Joint Programme of Activities, including eight work packages (WPs), has been designed to combine and functionally integrate in a durable way a substantial amount of partners’ activities in the field, including:

- actions to identify and update the biology, epidemiology and impacts of high priority pathogens, as well as through the optimisation of detection and diagnostic tools (WP1, WP2, WP3, WP4);
- actions to develop effective responder strategies by defining specific protocols on emergent pest and disease management (WP5); and
- a comprehensive strategy to enhance knowledge of target groups and to inform relevant stakeholders (WP6, WP7).

WP8 (Management and Monitoring) includes actions aimed to enhance networking, to overcome the fragmentation of partners’ research,

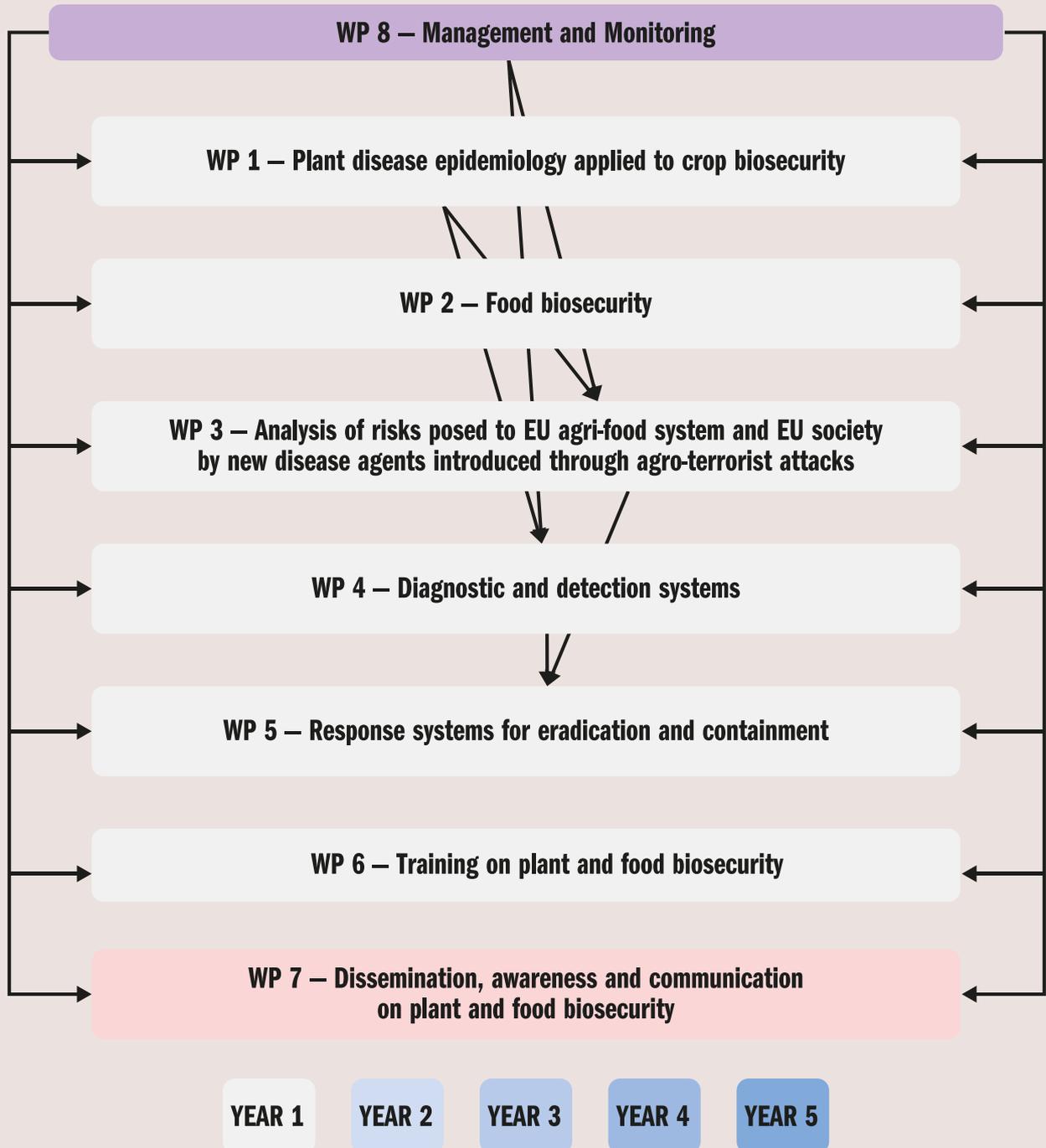
and to facilitate and coordinate cooperation within and among the WPs.

In addition to administrative tasks (organisations of project meetings, reporting etc.), specific activities are devoted to network durability, which involves setting up a specific team to search for funding sources. While funding opportunities related to food biosecurity and intentional threats to plant biosecurity are still being investigated, the ability to carry out prolonged network research on unintentional threats to plant biosecurity is ensured to date through two initiatives approved within Horizon 2020 Societal Challenge 2, namely:

- “Effective Management of Pests and Harmful Alien Species – Integrated Solutions (EMPHASIS)” (2015–2019), www.emphasisproject.eu. This project has been approved within topic SFS3-2014, “Practical Solutions for Native and Alien Pests Affecting Plants” – scope (A) “Native and Alien Pests in agriculture and forestry”; and
- “EU-China Lever for IPM Demonstration (EUCLID)” (2015-2019), www.euclidipm.org. This project has been approved within topic SFS3-2014 – scope (B) “EU-China cooperation on IPM in agriculture”.

WP8 IN FOCUS 2/2

Work package interdependencies (Pert diagram)



PROJECT MEETINGS



Final meeting

The tenth and final PLANTFOODSEC project meeting will take place on January 18–19, 2016 in Brussels. The meeting venue is the Permanent Representation of the Piedmont Region in Belgium. The meeting is restricted to partners, and the agenda is split between PLANTFOODSEC Steering Committee meeting and a Security Panel meeting.



PLANTFOODSEC final workshop

A considerable amount of research promoted by the European Union – but which has also involved non-EU countries such as the United States, Israel and Turkey – has made possible the development of a comprehensive set of tools for end users in the agri-food chain. These tools will be presented in Brussels during the final project workshop, to be held at the Permanent

Representation of Piedmont Region on January 19, 2016. The workshop will touch upon vulnerabilities, threats and gaps in crop biosecurity. The practical tools developed by PLANTFOODSEC will be demonstrated in the context of a plant disease outbreak scenario, covering protection, response and recovery from a biological incident or deliberate criminal activity

threatening the EU agri-food system. To learn more about the event and registration details, go to: https://www.plantfoodsec.eu/latestnews_ews_article.php?id=439&t=L&s

WORK PACKAGE NEWSFEED 1/2

**WP1****Plant disease epidemiology applied to crop biosecurity**

One of the goals of WP1 was to assess the build-up, persistence and release of primary inoculum and the early stages of epidemics of selected pathogens in order to differentiate between the consequences of natural and deliberate field contamination.

The INRA group used two important wheat pathogens as case studies: *Puccinia triticina* (the cause of leaf rust) and *Zymoseptoria tritici* (the cause of septoria leaf blotch). By combining experimental and modelling approaches, we increased our knowledge on the build-up, persistence and release of primary inoculum of the two pathogens. Initially developed in the context of biosecurity and agroterrorism threat analysis, our research also produced knowledge of practical interest to growers, who have to control the two diseases every year.

In order to study the primary inoculum in leaf rust epidemics, field volunteers collected fungal isolates that were pathotyped for virulence by using a set of wheat varieties with different resistance factors. Based on previous knowledge of fungal populations, the genetic diversity was far greater than expected.

**WP2****Food biosecurity**

Microbial contamination of fresh produce, storage grains, and other plant-based foods is a major cause of foodborne human illness in the EU, as it is globally. Although most such incidents are unintentional, law enforcement personnel require tools to identify and investigate potential cases of nefarious contamination. Using previous serious cases of known food-borne illness in the EU and elsewhere, PLANTFOODSEC scientists have developed a decision-making tool for use by investigators to assess the likelihood that an outbreak of foodborne illness has been caused naturally, accidentally or intentionally. A special training exercise involving fictitious scenarios will guide trainees in how to use the tool to evaluate foodborne illnesses. Also, partners at ARO, UNIBONN and OSU have completed a review of current standards of mycotoxin analysis in food, with an emphasis on minimum essay requirements for applications in a biosecurity context. All WP2 partner groups are compiling results from completed WP2 activities in a final project document reviewing food safety research and conclusions within the PLANTFOODSEC framework, which will contribute to a strengthened network of plant pathologists and food safety experts that can serve as a resource for the EU in future research and response efforts.

**WP3****Analysis of risks posed by the intentional introduction of new pests and disease agents**

WP3 partners have demonstrated the PLANTFOODSEC risk assessment tool in almost 100 scenarios covering a wide range of potential motivations, biological agents, pathways and receptor systems. Undertaken by experts from INRA and the Imperial College London, they work with a motivation-agent-pathway-receptor paradigm to describe problems. The scenarios are determined through a systematic review of risks of varying significance and which are representative of potential threats that Europe faces. PLANTFOODSEC builds on previous reviews in the CROPBIOERROR project to provide risk assessments that are consistent with conventional plant health assessment protocols. A further step in risk analysis is to review the effect of plausible management actions directed at those factors which determine risk. In addition, in support of appropriate response management, WP3 (Imperial) and WP2 (OSU) are cooperating to develop a tool to undertake the forensic evaluation of pathogen outbreaks found in the field.

**WP4****Diagnostic and detection systems**

The last stages of the Diagnostic Network structure are being completed, including adding crop cultivar names so that disease outbreaks can be tracked according to specific cultivars. This is especially important when a “breakdown” of resistance to a new or emerging pathotype occurs. User countries will need to add their own cultivars of interest, but the structure to enable this is built into the Diagnostic Network. Examples of disease records will be uploaded to the system for demonstration at the final workshop in January 2016. A further WP4 deliverable — that is, a handbook for surveillance, detection and diagnostic methods — is now being finalised. An inter-laboratory test for validating a molecular technique to characterise pathotypes of *Leptosphaeria maculans* is also underway. The Diagnostic Network will provide a ready-made platform for diagnostic labs throughout the EU to track, monitor, and interrogate the features of disease outbreaks. If appropriate permission is granted, the network will allow inter-country access to summary information on outbreaks — either as they happen or provided on a basis of future collaborative investigation into the causes of disease outbreaks. The final workshop will focus on demonstrating these facilities and on promoting system uptake in the interest of its continued development following the end of the project.

WORK PACKAGE NEWSFEED 2/2

**WP5****Response systems for eradication and containment**

The main focus of WP5 is to provide a system approach strategy for the containment and eradication of introduced pests by incorporating all practices that have a potential impact on the introduced pest, along with a decision-making tool for assessing the application of each component. The system approach includes a flowchart of activities and responsibilities, a protocol of specific activities, and a decision tool for choosing the best approach and strategy. The experimental model for testing and validating this approach is the pathosystem *Fusarium proliferatum*. *Allium cepa* was selected for this purpose, since it offers excellent case studies of the epidemic chain and can have an impact on food. This pathosystem also assists in developing technologies for the forensic study of outbreaks – and specifically for assessing the source occurrence of a disease that *F. proliferatum* caused in commercial onion fields in southern Israel. This system approach addresses all aspects of mitigating *F. proliferatum* in onions. It targets all stages of seed production, set production and commercial onion growing. Special attention is given to ensure maximum impact on the targeted pathogen and minimum negative impacts on food safety.

**WP6****Training on plant and food biosecurity**

Training during the last period has concentrated on developing skills in the area of plant disease identification, assessment and management. It is important to raise awareness of biosecurity among agronomists and trials operators, as they are likely to be first reporters and responders in the case of an outbreak of disease in crops. It is also important to train new entrants to the profession in disease identification and management. Courses were held at the National Institute of Agricultural Botany, Cambridge (NIAB) in the UK as follows: a one-day training course for trials managers in disease identification and assessment in oilseed rape; a lecture on diseases of forage crops presented as part of a forage crop agronomy workshop; and a lecture on practical disease management given to Cambridge PhD students as part of a training for new entrants to the profession. Another important aim of the training WP is to strengthen the Diagnostic Network through exchanges of personnel between project partners. To this end, Giovanna Gilardi from the University of Turin visited NIAB in November to exchange experiences on the detection, diagnosis and control of plant diseases in crops.

**WP7****Dissemination, awareness and communication on plant and food biosecurity**

In the remaining months of the project, a final leaflet, final poster and final newsletter (issue no. 10) will be produced under this WP. All outputs will be presented in January in Brussels at the final conference and final workshop, which will target key EU representatives. The final meeting will showcase all of the deliverables that have been produced over the course of the five-year project. Furthermore, all WP7 activities will be briefly evaluated in terms of the impact of the communication and dissemination component on the target groups. The developed communication strategy will be reviewed, and the establishment of the 'Real Network' will be discussed. In general, the aim of the WP7 activities on plant and food biosecurity dissemination, awareness and communication in the final months will be to prove their importance as part of a comprehensive strategy within the project, with the added purpose of enhancing the knowledge of target groups and informing relevant stakeholders.

**WP8****Management and monitoring**

The PLANTFOODSEC goal is to develop and implement a virtual centre of competence to prevent, respond to and recover from intentional and unintentional biosecurity threats to EU agriculture, farming and the agri-food industry. In order to ensure the sustainability of project results after the project ends, possible institutional mechanisms to make the Virtual Centre of Competence into a sustainable reality are being investigated. Considerable effort is also being devoted to organising the final project meeting in Brussels on January 18–19, 2016 and to preparing the final project report. In addition, a book based on PLANTFOODSEC project outcomes is currently being prepared in collaboration with Springer. The provisional title is "Practical Tools for Plant and Food Biosecurity – Results from a European Network of Excellence", and its publication is expected by the end of 2016.

THE PROJECT // Five years, EU funding of EUR 6 million, 13 partners, eight work packages and three continents: these are the numbers that sum up the project “Plant and Food Biosecurity, Network of Excellence” (PLANTFOODSEC), launched in February 2011. The aim is to build a virtual centre of competence in order to increase the quality and impact of plant and food biosecurity training and research in Europe, thus enhancing preparedness and response capabilities to prevent, respond to and recover from biological incidents or deliberate criminal activity threatening the European agri-food system.



PROJECT COORDINATOR

Agroinnova,
Center of Competence for Innovation
in the Agro-environmental Field,
University of Turin

Largo Paolo Braccini, 2, 10095
Grugliasco (TO) Italy

CONTACT PERSONS:

Maria Lodovica Gullino
marialodovica.gullino@unito.it

Paola Colla
paola.colla@unito.it

www.agroinnova.unito.it