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# PLANTFOODSEC NEWS

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# EDITORIAL



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The recent attacks in Brussels and Paris have made it clear that terrorism remains a threat to all EU countries. In the future, terrorists may resort to non-conventional means such as introducing biological materials that have the capacity to infect thousands of people, destroy agriculture, infect animals and poison food. Although the risk of a bioterrorist attack is low, the consequences could be devastating. An accidental outbreak of *E. coli* O104 in May 2011 claimed 49 lives and infected

4,180 people in France and Germany, as well as causing economic losses in the horticultural produce industry of GBP 54 million in the UK, EUR 200 million a week in Spain, EUR 80 million a week in the Netherlands, EUR 30 million a week in Germany and France, EUR 4 million a week in Belgium and EUR 3 million a week in Portugal. The intentional or unintentional release of a biological agent need not target humans to disrupt our societies and harm our economies. Perhaps not equally damaging, but nevertheless able to cause severe economic disruption, would be deliberate releases of a plant pest/pathogen into agriculture or the environment. Such releases could result in the destruction of crops that are food sources, but could also interfere with open trade across the EU and with non-EU trade partners. In a 2006 article in the *Journal of Agricultural Science*, E.C.

Oerke reported that losses of crops such as wheat and potatoes can reach 70 percent where no crop protection control is applied. Attacks on iconic environments can cost countries both economic and social distress. As a response to the growing bioterrorism threat, in 2007 the EU published the Green Paper on Biopreparedness. The European concept of biopreparedness covers a broad range of activities relating to the protection of public health and wealth against all potential risks, whether they arise from a terrorist attack, other intentional release, accident, or naturally occurring disease affecting humans, animals or the food chain. The Green Paper on Biopreparedness led to the formulation of the EU action plan on strengthening chemical, biological, radiological and nuclear security (the EU CBRN Action Plan), after which PLANTFOODSEC received funding.

It is essential for the Network of Excellence PLANTFOODSEC to be maintained in a state of readiness to deal with outbreaks in crops in Europe. Training and routine exercises are the key to maintaining the preparedness of the network.

## UPCOMING EVENTS

Ankara (Turkey), summer 2015



### PLANTFOODSEC summer school 2015

The 2015 PLANTFOODSEC summer school will be hosted by METU and will be on the theme "Subtyping Methods of Human Pathogens on Plants (HPOP)". Participants at the summer school will have an opportunity to find out about the latest advances in subtyping methods via lectures, hands-on sessions and field trips.

York (UK), February 2015



### LAMP and microarrays for plant pathogen detection

The 2015 winter school will be held at the Food and Environment Research Agency (FERA). The aim is to give trainees deeper knowledge and expertise on diagnostics and new methods for detecting plant pathogens. Practical sessions will be complemented by lectures and discussions to provide background information on these and other relevant topics. The programme and application form will be made available on the project website [www.plantfoodsec.eu](http://www.plantfoodsec.eu).

Budapest (Hungary), April 22-24, 2015



### Ninth PLANTFOODSEC meeting

The ninth PLANTFOODSEC meeting will comprise a meeting of the Fusarium working group and a workshop for end users on a web-based diagnostic network and a tool for risk analysis. The event will also provide an opportunity for meetings of the WP technical committees and the project Steering Committee, which will focus on security activities related to the Network of Excellence. As the project is now in its final year, the focus will be on project sustainability and the involvement of end users.

## EUROPEAN/GLOBAL NEWS REVIEW



## First meeting of the Community of Users on Disaster Risk Management and Crisis Management

Managing the many different threats to security involves a variety of communities, including actors in the fields of research, policy and operations (including industry/SMEs, first responders, civil protection units). While these communities have to address common aspects related to the overall risk management cycle – from prevention to preparedness, detection, response and recovery – they all have specific needs and are involved in a variety of practices related to their particular field of operations. In this respect, the appropriate transfer (and implementation) of research outputs must be designed taking into consideration these specificities. While policies and research programming (that is, the identification of research topics and the defining of programmes) are designed following a concerted approach at EU level in order to avoid possible duplications and ensure the greatest possible complementarity, in practice policy coordination in operational terms and synergies among funded research projects often lag behind what could potentially be achieved. This is partly due to the absence of a “community of users”, which would take on the role of establishing links among different actors in sectors dealing with disaster risk management and crisis management.

The creation of a community of users is therefore proposed in order to improve the coordination of information exchanges of a general nature through a visible platform, with the ultimate aim of preventing fragmentation. The development of

this community of users will be coordinated by the European Commission. Two demonstration projects – End-User Driven Demo for Chemical, Biological, Radiological, Nuclear and Explosives (EDEN for CBRN-E); and Driving Innovation in Crisis Management for European Resilience (DRIVER) – will support its creation and development and play the role of catalyst for gathering information and suggesting synergies. The goal is for the community of users to provide an “umbrella” at EU level, offering an overview (based on publicly available information) of science and policy developments in the relevant sectors.

The first meeting of the Community of Users on Disaster Risk Management and Crisis Management was held in Brussels, Belgium, on November 24 and 25, 2015.

For more information, please visit <http://www.driver-project.eu/content/1st-meeting-cou-disaster-risk-management-and-crisis-management>

WP6 IN FOCUS

Expanding the Network of Excellence through knowledge transfer

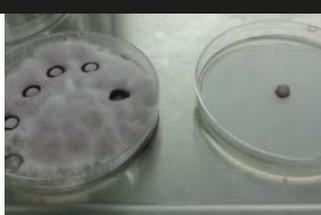


The training plan carried out by WP6 plays a key role in strengthening and extending the PLANTFOODSEC Network of Excellence by:

- › increasing awareness of issues such as biosecurity and dual-use research within the scientific, policy and inspection areas, and by targeting agronomists and food producers who may be in the front line in the event of an outbreak;



- › training new entrants to the profession, as well as established staff, on new tools, particularly with a view to their use in biosecurity (e.g. diagnostics, epidemiology and risk assessment);



- › strengthening the network by means of exchanges of staff and students between partners to increase mutual understanding of working practices in other countries; and providing training on contingency planning for the control of outbreaks of plant pests and diseases and human pathogens on plants.



Since the start of the project, WP6 has carried out 20 training courses on preventing, preparing for, containing and responding to bioterrorism and/or naturally occurring disease outbreaks; 21 training events on diagnostics at laboratory and field level; 34 courses on plant pathogen forensics; two courses on the contained use of pathogens; and four academic courses on the consequences of dual-use bioresearch and on the ethics of bioresearch. In order to strengthen the network, WP6 has also completed eight exchanges of students and staff between laboratories in the network. Two summer schools have been organised on the principles of plant disease identification and plant and food biosecurity, and another is planned for the summer of 2015, to be held on mycotoxin detection at the Food and Environment Research Agency (FERA) in York, UK. A recent example of the exchanges carried out during the project was the visit of Filiz Yeni from METU in Turkey to the National Institute for Microbial Forensics and Food and Agricultural Biosecurity (NIMFFAB)

at Oklahoma State University in the USA from May 6 to September 6, 2013. While in the USA Filiz worked with Professor Dr. Jacqueline Fletcher (director of NIMFFAB) and Assistant Professor Li Maria Ma (OSU), learning how to develop a multiple-locus variable number tandem repeat analysis (MLVA) procedure for strain discrimination. She worked with non-O157 STEC serogroups, including O26, O111, O103, O121, O45 and O145, and also tried to develop an MLVA method for strain discrimination for *Salmonella enterica* subsp. *enterica*. She also worked with Ian Montcrief to learn the inter-simple sequence repeat (ISSR) technique for strain discrimination for *Fusarium proliferatum*, which causes salmon-coloured blotches on yellow, red and white onions, using DNA samples collected from Germany, North America and Israel in the framework of the PLANTFOODSEC project. This type of training provides the network with the expertise to trace pathogens during outbreaks in order to determine the origin of the disease.

Completed courses

Topic	Number of training courses completed
Regular transnational, multi-sector training courses on preventing, preparing for, containing and responding to bioterrorism and/or naturally occurring disease outbreaks	20
Training on diagnostics at laboratory and field level	21
Training on plant pathogen forensics	34
Training on legislation and contained-use licensing	2

## PROJECT TRAININGS AND MEETINGS

### Training at METU



The most recent project training event, on the topic of human pathogens on plants (HPOP), was held on September 24 and 25, 2014, at the Middle East Technical University (METU) in Turkey. The event attracted 27 participants, including government employees

and graduate students, and comprised lectures and presentations complemented with a practical, hands-on session. The successful event brought together experts on HPOP and food safety from the USA and Turkey.

### Consortium meeting in Turkey



The eighth PLANTFOODSEC consortium meeting was organised and hosted by the Middle East Technical University (METU) on September 25 to 27, 2014, in Antalya, Turkey. Participants included project partners, members of the Security Panel, and the external project reviewer appointed by the European Commission. The three-day event also provided an

opportunity for meetings of the technical committees of the work packages and for meetings of the project Steering Committee and Security Panel.

### TESTA workshop on seed health



High-quality seed produces high-quality, high-yielding crops that ensure European and global food security. Seed is traded globally and can spread diseases and pests. Controls are in place to reduce these risks but must be supported by methodologies for risk assessment, sampling, the detection of pests and pathogens, and disinfection. The EU FP7 TESTA project (Seed Health: Development of Seed Treatment Methods, Evidence for Seed Transmission and Assessment of Seed Health) aims to develop innovative methods to control diseases and pests, including

faster, more accurate assessment of transmission; economical and practical sampling to detect low levels in large seed lots; new and efficient detection; non-destructive testing; and improved disinfection. On the occasion of the third TESTA annual meeting, held in Turin, Italy, on January 12-13, 2015, the University of Turin's centre of competence Agroinnova organised a workshop open to Italian stakeholders on January 14, 2015, dealing with the diagnostics of seedborne pathogens, seed disinfection methods, and the main emerging seed-transmitted diseases in the vegetable sector.

The workshop brought together more than 50 participants, including farmers, agronomists and representatives from the seed industry and local phytosanitary services. For more information, please visit the TESTA project website: <https://secure.fera.defra.gov.uk/testa/showNews.cfm>

## WORK PACKAGE NEWSFEED 1/2



### WP1

#### Plant disease epidemiology applied to crop biosecurity

Fungal isolates collected in the field were pathotyped for virulence using a set of differential wheat varieties with varying resistance factors. The genetic diversity was far higher than expected from previous knowledge of the fungal populations. The statistical models routinely run to compare the genetic structures of fungal populations over time, and thus detect the possible emergence of new strains, could not therefore be used. A new method of statistical analysis is being developed, which takes into account the relative small size and high diversity of the sample.

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 to differentiate between the consequences of natural and deliberate field contamination. Experimental work was carried out on leaf rust (*Puccinia triticina*) and septoria leaf blotch (*Zymoseptoria tritici*), two common wheat pathogens in Europe.

Concerning the study of primary inoculum in septoria leaf blotch epidemics, we are delighted to announce the defence by David Morais (in April 2015) of his PhD on this topic.



### WP2

#### Food biosecurity

Following an outbreak of microbially caused foodborne human illness, investigators must assess whether it was caused intentionally in order to determine the need for a criminal investigation. Scientists from OSU are creating a decision-making tool to help investigators. Trainees will be guided to use the tool to decide if a case of foodborne illness should be regarded as natural or intentional. The "Directory of EU Laboratories Involved in Foodborne Illness Investigation", prepared by METU and posted on the PLANTFOODSEC website, evaluates resources for the forensic investigation of foodborne illness outbreaks in the EU. Response systems in selected EU member states, the USA and Turkey were compared, and gaps and needs identified. An inventory of EU laboratories responsible for investigating foodborne illness outbreaks was compiled, and the *Escherichia coli* O104:H4 outbreak in Germany was reviewed to identify needs and gaps in the response system. Scientists from OSU have developed an enhanced strain discrimination assay multiple-locus variable number tandem repeat analysis (MLVA) for non-O157 Shiga toxin-producing strains of *E. coli*, which are increasingly implicated in outbreaks in the US and EU. Finally, UNIBONN partners have addressed the detection, identification and analysis of mycotoxins produced by plant pathogenic fungi, which can be harmful to humans and livestock.



### WP3

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

WP3 has been considering pest/crop/scenario combinations for evaluation using its risk assessment tool. To date, 98 crop/pest/scenario combinations have been evaluated and 20 combinations presenting the most significant risk have been identified. Patterns have been identified associated with different scenario types: Biowarfare (BW); Bioterrorism (BT); and Biocrime (BC). Constraints to risk in BW scenarios were frequently associated with the existence of motivation but these scenarios were less constrained by access to quarantine pathogens and mass rearing techniques because of state powers and budgets. The BT scenarios tended to be high risk only where the biological properties of the pathogen made it easier to import, culture and release. The BC scenarios were smaller in scale and thus easier to perpetrate, but were constrained by feasibility and motivation factors. The limited persistence of agents in the environment was an important constraint in all scenario types. For some agent-receptor combinations there was large variation in risk with scenario type, but for other combinations risk was consistent across scenario types. This means that not just the agent and receptor but all four areas of the biosecurity paradigm (Motivation and Capacity, Pathway, Agent and Receptor) must be considered when compiling a risk register. In the coming months, risk management measures that can be applied to each scenario will be identified by INRA/ANSES experts. Risk reduction measures will be quantified, allowing the re-evaluation of residual risk and the reordering of crop/pest scenarios when risk mitigation is included.



### WP4

#### Diagnostic and detection systems

Greater functionality is being added to the diagnostic network structure. It is now possible to capture diagnostic records and ancillary data such as location and variety. The system can be used by diagnostic laboratories to upload records, while preserving client confidentiality. Registered organisations have access to summary data for particular organisms throughout Europe, as well as community pages on emerging issues, protocol updates, workshops and trainings. The diagnostic record capture element is not duplicated by other organisations and provides an innovative output for both advisory and statutory laboratories. Contacts with many plant diagnostic organisations throughout Europe have now been made, and many have expressed interest in the system and a willingness to participate. These contacts will be followed up with the aim of launching the network in Brussels in 2016. There are also plans for a demonstration workshop at the next project meeting in Budapest. In addition, WP4 has extended the principles of the *Fusarium proliferatum* study to another pathogen of EU relevance. Although the study is not as extensive as the onion-related work, molecular profiling techniques have been applied to explore variations in a key oilseed rape pathogen, *Leptosphaeria maculans*, the causal agent of stem canker, and the recent emergence of a new variant that confers virulence to the Rlm7 resistance gene. The final phase will be an inter-laboratory exercise to demonstrate the comparability of outcomes with different operators.

## WORK PACKAGE NEWSFEED 2/2



### WP5

#### Response systems for eradication and containment

WP5 is identifying measures to prevent the spread of deliberately introduced pathogens in the EU. WP5 first reviewed and compared the regulations applicable in EU member states and other participating countries with regard to accidental or deliberate introductions of non-indigenous harmful organisms. This review was accompanied by a white paper highlighting possible means of cooperation between countries and agencies in order to mitigate threat situations. The current 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 pathosystem *Fusarium proliferatum* - *Allium cepa* was selected as it offers excellent case studies of the epidemic chain and can have a significant impact on food safety and human health. A systematic approach is applied to address 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. Forensic technologies are also being developed specifically for assessing the source occurrence of a disease caused by *F. proliferatum* in commercial onion fields in southern Israel.



### WP6

#### Training on plant and food biosecurity

To complement the mycotoxin summer school, a one-day course will be held at the Food and Environment Research Agency (FERA) in York, UK, in June/July 2015. The course will be targeted at agronomists/producers and will focus on the identification and prevention of problems in winter wheat and maize crops, especially the *Fusarium* wheat blight. Details can be obtained from the organisers Phil Jennings (FERA) (philip.jennings@fera.gsi.gov.uk) and Jane Thomas (NIAB). In addition, an extra winter school is planned at FERA on loop-mediated isothermal amplification (LAMP) and microarrays for plant pathogen detection. The aim is to give trainees deeper knowledge and expertise on diagnostics and new methods for detecting plant pathogens. The practical sessions will be combined with lectures and discussions, which will provide background information for the practical sessions and other relevant topics. The programme and application form are available on the project website [www.plantfoodsec.eu](http://www.plantfoodsec.eu) or from Christine Henry (FERA) (christine.henry@fera.gsi.gov.uk).



### WP7

#### Dissemination, awareness and communication on plant and food biosecurity

The team has developed a database of European food security networks and contacts, which will serve as a platform for developing a stakeholder network for the project. All WP7 activities are aimed at raising awareness of the threat of biological weapons to agriculture, forestry, livestock and poultry, and of the preventive role of bioscientists. The communication strategy will be designed and implemented in line with national and EU rules and will ensure public awareness of biosecurity issues; provide information to policy makers to enable the continual updating of non-proliferation agreements on bioweapons; give a consistent message to the media and the public; use a database of experts to ensure that reliable information is available to the media and the public; ensure that sensitive information is not released inadvertently; and validate information presented on the website. All deliverables, including issues of the newsletter, are available in the publications section of the project website. The next goal for WP7 will be targeted information sharing with end users and stakeholders. The upcoming PLANTFOODSEC meeting in Hungary, hosted by the Regional Environmental Center (REC), will be open to external experts and will strategically involve end users as the project enters its final year of implementation.



### WP8

#### Management and monitoring

Networking activities have taken place both within and outside Europe, and at the same time links have been established with other projects and organisations that deal with agriculture, food and biosecurity. One PLANTFOODSEC representative joined the first meeting to set up a community of users in the area of disaster risk and crisis management, held on November 24–25, 2014, in Brussels and organised by the EC's Directorate-General for Home Affairs. Eight project meetings have been held since the start of PLANTFOODSEC. The ninth project meeting will be hosted by the Regional Environmental Center (REC) in Szentendre, Hungary, on April 22–24, 2015. Two important items on the agenda will be the PLANTFOODSEC diagnostic network, which will be open to end users (diagnostic laboratories, phytosanitary services), and the second internal evaluation workshop. It has already been agreed that the 10th and final project meeting will be held in Brussels in January 2016. Further details and exact dates will be announced nearer the time.

**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.



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