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plantfoodsec.eu

PLANTFOODSEC NEWS

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European Commission
Enterprise and Industry

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EDITORIAL

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Enhancing channels of communication within the PLANTFOODSEC network was one of the main goals right from the early stages of project development. The project website www.plantfoodsec.eu has evolved into an important platform for disseminating information about current activities; past, ongoing and future events; and all produced deliverables. According to the visitor statistics, the website has been well received by an international audience from a total of 14 countries worldwide.
The PLANTFOODSEC identity is conveyed through a number of channels: advertising, print collateral, website, HTML emails and even PowerPoint templates. Many news items describing project progress have been published in the eight issues of the newsletter (for details see "WP7 in focus" on page 5).

Much new energy was injected into the project by the success of the roundtable involving high-level participants from the EU in February 2013, which actively promoted the status and purpose of the research activities.
The success of PLANTFOODSEC depends on the commitment of every project participant. The work of the researchers in the framework of the other work packages has broadened the boundaries of communication, giving us new inputs about their achievements and expanding the overall newsfeed. Accelerated research results and increased levels of activity have meant more opportunities to keep in touch. The dissemination, awareness and communication team is therefore keen to maintain constant progress on the level of both internal and external communication.
In addition, the project offers a wealth of opportunities for productive discussions at individual level, given the fact that work package leaders and researchers participate in a variety of external stakeholder events where they are able to present the project's major outputs. The PLANTFOODSEC voice is therefore represented at several valuable international events.
The final project deliverables will emphasise outcomes and the impact of all the good work going on across the PLANTFOODSEC consortium. Final activities in this respect will strive to ensure that the voice is even more confident, while directly fulfilling the goal of PLANTFOODSEC – the creation of an enduring Network of Excellence that communicates its success to a clearly defined audience.

EVENTS

Brussels (Belgium), January 19, 2016

PLANTFOODSEC final conference and stakeholder workshop

The PLANTFOODSEC project has now launched its closing phase. Following nine consortium meetings in various partner countries, three workshops and numerous dissemination events, the final conference will provide an opportunity to present project outcomes and outputs. The choice of Brussels as the venue for the concluding event was a strategic move, as the main goal is to present to high-level EU stakeholders what has been achieved during five years of project implementation. Further details will be provided nearer to the date of the event.

Ankara (Turkey), June 22–26, 2015

METU summer school

This year's summer school, "Food Protection and Safety Issues in a Changing World", was organised by the Middle East Technical University (METU) in Ankara, Turkey. The five-day course offered a comprehensive series of lectures on all aspects of food protection, safety and climate change, drawing on the experience of experts from universities and government institutions in both Turkey and the USA.

Sand Hutton, York (UK), July 6–11, 2015

FERA summer school

The summer school organised by Fera Science Ltd. focused on *Fusarium* and mycotoxins. Two days were devoted to technical sessions, while lectures and discussions also took place in order to provide background information for the practical sessions. The course was held at the National Agrifood Innovation Campus in Sand Hutton, York.

EUROPEAN / GLOBAL NEWS REVIEW

Towards a long-term strategy for European agricultural research and innovation by 2020 and beyond

Demand for agricultural production worldwide will increase in the next few decades owing to global population growth, changes in consumption patterns, as well as rising demand for new non-food uses (bio-energy, bio-products). The European Commission organised a workshop at Expo Milano 2015 on June 19, 2015, to launch the discussion on the future of European agricultural research and innovation up to 2020 and beyond.

A background paper (http://ec.europa.eu/agriculture/expo-milano-2015/cap-events/long-term-vision/background_en.pdf) was prepared to kick off a process of reflections and exchanges on long-term agricultural research needs. European Union agricultural research and innovation should support transition pathways towards resilient and sustainable farming systems that combine the goals of ensuring productivity while taking into account all the dimensions of sustainability (environmental, economic and social).

The paper identifies five core priority areas to support pathways towards resilient and sustainable farming systems and rural economies:
a) resource-efficient production systems in a changing climate;
b) ecological approaches at farm and landscape level; c) healthy plants and animals; d) new openings for rural growth; and e) developing human and social capital in rural areas.

For each priority area, stakeholders were requested to express their views on, among other things, core research questions and the role of infrastructure and other research capacities. The background paper was opened for contributions through an online survey, and PLANTFOODSEC participated by providing the following contributions relevant to the "healthy plants and animals" core priority area:

1. Referring to research activities to be considered, although most plant disease outbreaks have natural causes or result from the inadvertent introduction of pathogens due to human activities, the risk of agro-terrorism — that is, the "*deliberate introduction of plant pathogens or pests with the goal of generating fear, causing economic losses, and/or undermining EU environmental, social and economic stability*" — cannot be excluded.

2. Related core-research questions should take into account deterrence, prevention, detection, response and recovery, including effective strategies and policies, distributed physical and administrative infrastructure, and strategies for forensic investigation and attribution in cases of intentional or criminal activity.

For more information, see: http://ec.europa.eu/agriculture/expo-milano-2015/cap-events/long-term-vision_en.htm

EUROPEAN / GLOBAL NEWS REVIEW

D. Morais
INRA

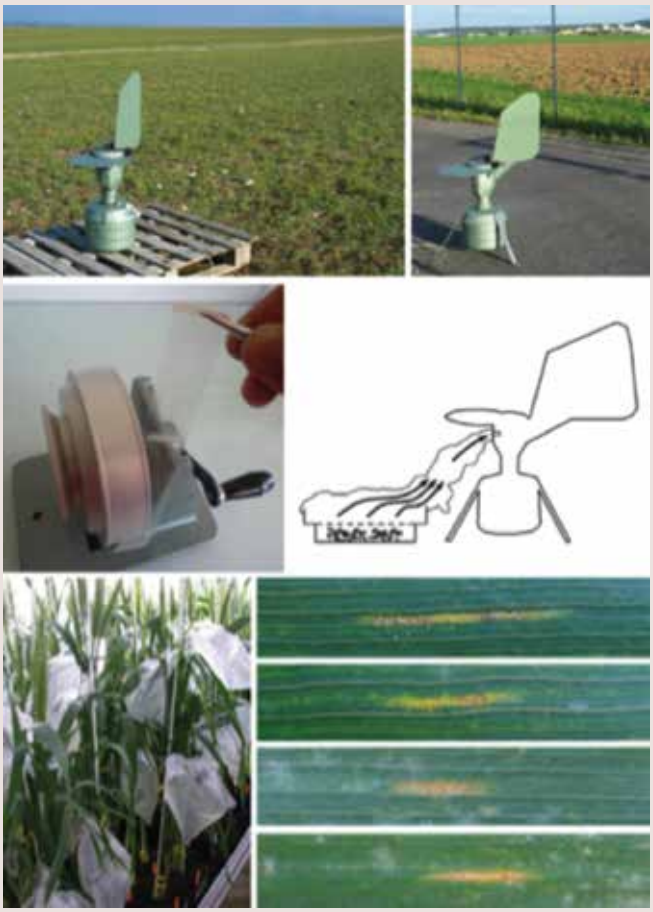
Comparative pathogenicity of sexual and asexual spores of *Zymoseptoria tritici* (septoria tritici blotch) on wheat

Zymoseptoria tritici ascospores and pycnidiospores are regarded as the main forms of primary and secondary inoculum respectively in *septoria tritici* blotch epidemics. The pathogenicity of the two types of spores of the same genotypic origin was compared through a two-stage inoculation procedure in controlled conditions. Adult wheat leaves were inoculated with ascospores collected from field sources, yielding 119 lesions. Pycnidiospores collected from 12 lesions resulting from these ascospore infections were then used for inoculation. Lesion development was assessed for five weeks and latent period, lesion size and pycnidium density were estimated for different isolates. The latent period was calculated as the maximum time likely to have elapsed between inoculation and either the appearance of the majority of the sporulating lesions (leaf scale) or the appearance of the first *pycnidia* (lesion scale). The latent period was significantly longer (around 60 degree-days, i.e. three to four days) after infection with ascospores than with pycnidiospores. No difference was established in terms of lesion size and pycnidium density.

A comparison with other ascomycete fungi suggests that the difference in latent period might be related to the volume of spores and their ability to cause infection. Fungal growth before the appearance of lesions may be slower after inoculation with an ascospore than with a pycnidiospore. The mean latent period at the very beginning of epidemics, when first lesions are mainly caused by ascospores, may be longer than in spring, when secondary infections are caused by pycnidiospores. Disease models would be improved if these differences were considered.

D. Morais, V. Laval, I. Sache and F. Suffert

***Figure**: Experiment design used to compare the pathogenicity of ascospores and pycnidiospores of* Zymoseptoria tritici. *(a) Burkard spore trap placed in wheat monoculture plot (D+) with wheat debris (Grignon). (b) Burkard spore trap placed out of field 300 m apart (Grignon). (c) Melinex tape wound around the periphery of the rotating drum of the Burkard spore trap. (d) Collection of ascospores from wheat debris. Boxes of debris were covered with a plastic bag connected to the Burkard spore trap aperture in order to maximise the amount of collected ascospores. (e) Inoculated leaves enclosed in a bag to promote infection. (f–i)* Septoria tritici *blotch lesions after inoculation with ascospore suspensions.*



WP7 FOCUS

The PLANTFOODSEC group in Budapest, during the last project meeting

One of the originally defined expectations of PLANTFOODSEC was to make results available to a wide public of end users. Other specific goals related to Work Package 7 (WP7) on dissemination, awareness and communication were to improve awareness of biosecurity issues among stakeholders and the general public, taking into account the importance of information sharing as well as the balance between confidentiality and public access, encryption and database management (dual use issues). 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 bio-scientists.

Activities under WP7 began as early as the kick-off meeting, during which a press release was issued to mark the launch of a very ambitious roadmap for promoting the project and its activities, events, deliverables and mid-term results.

In terms of deliverables, the numbers to date indicate considerable progress. The consortium has produced or organised the following: 199 items (web and print) published in the general press; seven press releases; four external dissemination events and exhibitions on biosecurity and research; eight newsletters; two leaflets; one roundtable with high-level participants from the EU; one promotional slot on Italian television; one video for EC DG Enterprise and Industry; three workshops; and two posters. By the end of the project in January 2016, the numbers will have risen significantly.

The database of European food security networks and contacts that was developed within WP7 has served as a platform for the development of a project network. During the two workshops organised for end users and stakeholders, this database was greatly appreciated as a tool for identifying relevant end users. The database was part of the overall communication strategy, which was designed and implemented in line with national and EU rules. The goals of the strategy are to ensure public awareness of biosecurity issues; provide information to policy makers to enable the continual updating of non-proliferation agreements on bioweapons; convey a consistent message to the media and the public; draw on 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.

In the past few years, social media have become an increasingly vital communication tool. Although the original PLANTFOOSEC communication strategy, which was developed in 2010, did not foresee the setting up of social media accounts, it is now catching up with the trend. Meanwhile, PLANTFOODSEC is being mentioned in the Twitter accounts of a number of other current projects as well as in major EU, institutional and personal Twitter accounts (e.g. @EU_H2020, @AgriNewTech, @spinto_it, @GullinoL, @FoodSecurityUK, @FeraScience, @unito, @LIFE_Programme, @EUEnvironment, @EU_Commission, @agroinnova, @EmphasisProject). This is an indication that the PLANTFOODSEC team is eager to catch up with the latest social networking trends in order to ensure the success of its promotional activities.

The success of PLANTFOODSEC's internal and external communication activities throughout project implementation is clearly indicated by the emergence of a new project that integrates PLANTFOODSEC partners within an even bigger consortium covering 10 countries and 22 partners. The HORIZON 2020 participatory research project EMPHASIS offers integrated solutions for the effective management of pests and harmful alien species while also addressing native and alien pest threats. There is no better indication of success than a follow-up cooperation project to which PLANTFOODSEC communication efforts have certainly contributed.

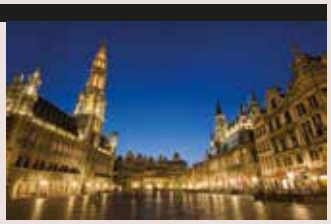
PROJECT TRAININGS AND MEETINGS

LAMP and microarrays for plant pathogen detection

The five-day course organised by the Food and Environment Agency (FERA) in Sand Hutton, York, between February 9 and 13, 2015, included extensive practical sessions covering nucleic acid extraction, loop-mediated isothermal amplification (LAMP) for the detection of plant pests and pathogens, and the use of array tube microarrays for the parallel detection of multiple targets. LAMP is a simple, rapid, specific and cost-effective nucleic acid amplification method developed by Eiken Chemical Co. Ltd. It is characterised by the use of four or six different primers that are specifically designed to recognise six distinct regions on the target gene. Because of its high specificity, the presence of an amplified product can indicate the presence of a target gene. Tube microarrays are able to detect tens of thousands of targets in a single test with greater sensitivity than traditional tools such as ELISA. Multiple probes are attached to a solid surface for the parallel detection of multiple targets. By analysing which probes have hybridised, it is possible to identify which targets are present in the sample. Lectures and discussion sessions provided background information for the practical sessions. Lecture topics included different DNA/RNA extraction methods in relation to experimental set-up; detection and diagnostics; the setting up of LAMP reactions; LAMP results and troubleshooting; sequencing/barcoding/next generation sequencing; clean-up PCRs for arrays; hybridisation; scan arrays and the analysis of array results; and validation and quality.

Ninth PLANTFOODSEC meeting

Hosted by the Regional Environmental Center for Central and Eastern Europe (REC) in Szentendre, Hungary, on April 22 to 24, 2015, the event included a meeting of the Fusarium working group and a workshop for end users on a web-based diagnostic network and tool for risk analysis. There were also meetings of the work package technical committees and project Steering Committee and Security Panel, which focused on security activities related to the Network of Excellence. As the project is now in its final year, the focus was on project sustainability and end-user involvement.



Invasive alien species: Czech contribution to challenges in European research and policies

On June 3, 2015, the Czech Liaison Office for R&D (CZELO), together with the Permanent Representation of the Czech Republic to the EU in Brussels, organised a half-day conference in Brussels on invasive alien species (IAS) and diseases. The aim was to discuss related challenges in Europe and the impact of IAS and diseases on the development of EU policies in the field of agriculture and environment. The conference presented policy views on IAS and diseases and agricultural research, as well as the views of stakeholders (researchers from the Czech Republic and other European countries). The PLANTFOODSEC lead partner participated at the event and presented the project's main objectives, results and impacts.
The presentations are available on the website of the Czech Liaison Office for Research, Development and Innovation.

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 to differentiate between the consequences of natural and deliberate field contamination. A large set of experimental work and conceptual approaches were performed on leaf rust (*Puccinia triticina*) and septoria leaf blotch (*Zymoseptoria tritici*), two common pathogens of wheat in Europe.

For the study of primary inoculum in leaf rust epidemics, fungal isolates collected on wheat volunteers in the field were pathotyped for virulence using a set of differential wheat varieties that differed by their resistance factor. The genetic diversity was far greater than expected from previous knowledge of the fungal populations. Accordingly a new method of statistical analysis is being developed that takes into account the relatively small size and high diversity of the sample.

David Morais successfully defended his PhD "Components of the early stages of septoria tritici blotch epidemics (*Zymoseptoria tritici*): Quantity, efficiency and origin of primary inoculum" in April 2015.

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. PLANTFOODSEC scientists are creating a decision-making tool for use by investigators to assess the likelihood that an outbreak of foodborne illness was caused naturally/accidentally or intentionally. This decision helps investigators to determine the most appropriate outbreak response. The tool will be supplemented with a training exercise in which trainees will be guided to apply the tool to evaluate a fictitious scenario of a foodborne illness. Partners at ARO, UNIBONN and OSU examined current standards for mycotoxin analysis in food with an emphasis on minimum assay requirements for applications in a biosecurity context. A position paper on this topic is under review. All WP2 partner groups are reviewing lessons learned in completed WP2 activities, tasks and deliverables, which will serve as a basis for the final project review paper on food safety and security in the EU.

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

WP3 partners have been engaged in exciting research in key areas including legal framework and definitions for agroterrorism; scenarios to cover the range of motivation, biological agents, pathways and receptor systems; expert elicitation of probabilities and impacts; and demonstrations for risk modelling. The legal framework demonstrates key distinctions between agroterrorism and agricultural quarantine in trade. The development of a risk assessment tool has been an important centrepiece for many of these activities and has provoked enthusiastic and productive interactions on the scenarios to use and the nature of risks and risk scoring to achieve comparable ratings between scenarios. The system was demonstrated to other WPs at the February 2013 meeting in Paris and a "live" elicitation was performed with a pathogen expert for *Fusarium* in onions to show how the tool provides a rapid risk assessment of a scenario and how that result can be compared against other scenarios. Further development is planned in an intramural meeting in Versailles to improve the tool and scenarios for wider testing.

WP4
Diagnostic and detection systems

Further functionality is being added to the Diagnostic Network structure, particularly in the area of diagnostic record capture. Agronomists will be able to use mobile phones to record pictures of disease outbreaks. While these will initially be categorised as unconfirmed records, the system could be used to monitor disease outbreaks nationally and internationally, depending on how permissions are set. The potential use of the network was discussed at the April workshop in Budapest. Outbreaks of Barley Yellow Dwarf Virus (BYDV) in Sweden usually occur about three weeks later than those in Germany, thus if the pattern and timing of outbreaks in Germany were available on a map-based visual, it would greatly assist the planning and timing of BYDV control in Sweden, where serious losses due to the virus have recently been recorded. The diagnostic record capture element is not duplicated by other organisations and is an innovative output of PLANTFOODSEC for both advisory and statutory laboratories as well as agronomists and advisors. It will be demonstrated at the final workshop in Brussels in January 2016. A further WP4 deliverable is also being developed. A handbook on surveillance, detection and diagnostic methods, based on the *Fusarium proliferatum* study, will outline the steps to be taken to identify a disease outbreak source, providing a model that can be applied to other organisms.

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

A summer school on *Fusarium* and mycotoxins was organised in July by Fera Science Ltd. at the National Agrifood Innovation Campus a few miles from York, UK. The course included one day on *Fusarium* ear blight in winter wheat, with an inoculated trial showing symptoms caused by the different pathogens, cultivar evaluation and pathogen diagnostics. A second day was devoted to regulations for mycotoxins, sampling and rapid test methods – especially those linked to *Fusarium*. Practical sessions on mycotoxin detection were combined with lectures and discussion sessions that provided useful background information. Further information about the course can be obtained from Christine Henry (Christine.Henry@fera.co.uk).

WP7
Dissemination, awareness and communication on plant and food biosecurity

The database of relevant European food security networks and contacts developed within WP7 has served as a platform for developing a network for the project. During the workshop for end users on a web-based diagnostic network and tool for risk analysis, hosted by the REC, these contacts were crucial when considering potential stakeholders. The previously developed communication strategy is being followed to strategically address end users and expand the network, with the aim of reaching the main project target – the establishment of the Network of Excellence. In the remaining months of the project a final leaflet, final poster and two more newsletters will be produced under this WP. All outputs will be presented at the final conference, planned for January 2016 in Brussels, where key EU representatives will be targeted.

WP8
Management and monitoring

The PLANTFOODSEC goal is to develop and implement a virtual centre of competence to prevent, respond to and recover from both intentional and unintentional biosecurity threats to EU agriculture, farming and the agro-food industry. In order to ensure its sustainability after the project end, a benchmarking process involving discussions with many stakeholders is currently taking place, and possible institutional mechanisms to make the virtual centre of competence into a concrete centre are being investigated.
Networking links have been established with, among others, EUPHRESCO (www.euphresco.net), a network of national funding organisations to support research and enhance international collaboration in the phytosanitary area.
The results of the second external review held during autumn 2014 were analysed during the second internal workshop held during the ninth project meeting at the REC in April 2015. The tenth and final project meeting will take place in Brussels on January 18-19, 2016. Further details will be announced near to the date.

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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