
COST Action CA16107
EuroXanth: integrating science on *Xanthomonadaceae* for integrated plant disease management in Europe

Minutes of the Workshop
“Towards *Pathogen Profiles* for the BSPP journal *Molecular Plant Pathology*”

Brussels, COST Association, Avenue Louise 149, Belgium, 25-26 February 2020

Minutes of the workshop written by R. Koebnik and reviewed by all participants.

Attending: Jens Boch (DE, WG3 Leader), Nicolas Chen (FR, Guest), Bart Cottyn (BE, WG1), Marie-Agnès Jacques (FR, WG1, Internal and Financial Monitoring Reporter), Monika Kałużna (PL, WG1, STSM Coordinator), Ralf Koebnik (FR, WG2, Action Chair), Joël F. Pothier (CH, WG2 Leader), Emilio Stefani (IT, WG4 Leader), Fernando Tavares (PT, WG3), Jean Martin van der Wolf (NL, WG2), and Joana Vicente (GB, WG1, Science Communication Manager).

On February 25 and 26 in Brussels (Belgium), this special task force workshop brought together ten members of all four Working Groups plus one guest scientist from Angers (France). The goal of this workshop was to advance with providing pending Deliverables in the form of *Pathogen Profiles* in the BSPP Open Access journal MOLECULAR PLANT PATHOLOGY. The focus was on Deliverables 5, 6, 9, and 12, but also Deliverables 10 and 11 were covered. Other topics of general interest, such as the DokuWiki project and the upcoming budget period, have been discussed as well.

Deliverables

5. Protocols for detection of *Xanthomonadaceae* listed as quarantine organisms in Europe (EPPO A1 and A2 lists of pests recommended for regulation as quarantine pests) (WG1 / Month 24)
6. List of molecular markers useful to study the genetic diversity and population structure of plant-associated *Xanthomonadaceae* (WG1 / Month 24)
9. Protocols for resistance and pathogenicity screening of the most important crop species and bacterial strains covered by the EuroXanth COST Action (WG2 & WG3 / Month 30)
10. Repertoire of important candidate bacterial factors in the microbe-eukaryote interaction at different steps of the infection/dissemination cycle (WG2 / Month 36)
11. Inventory of plant resistance genes, allelic variants and quantitative trait loci (QTL) in crop species that are effective against infection by members of the *Xanthomonadaceae* family (WG3 / Month 36)
12. Recommendation of disease control measures based on a better understanding of the microbe-eukaryote interaction and the effects of bio-control approaches on pathogen populations (WG4 / Month 42)

The workshop started with a round-table introduction of all participants. Then, RK gave an overview about EPPO-listed quarantine pathogens and available *Pathogen Profiles*, that have been published in the BSPP journal MOLECULAR PLANT PATHOLOGY. He also reminded of the general structure of such *Pathogen Profiles*, including their more or less standardised Abstract and the more open content of the manuscript, which should cover aspects of the Deliverables 5, 6, 9 and 12. Over the whole workshop, phases of general discussions changed with phases of group work on drafting *Pathogen Profiles*.

Later, RK presented the outcome of the WG2-WG3 Meeting in Lednice, 2019, where details of the DokuWiki Project and Effector Database had been discussed. The workshop was a good opportunity to exchange on this topic and to take decisions for the next steps.

JV used this workshop to take short interviews. They were posted online as short videos, thus featuring our EuroXanth COST Action, which has now a dedicated [channel](#).

ES triggered a discussion about the future of the EuroXanth COST Action and if there could be a follow-up activity in the form of another COST Action. Some tentative topics were discussed.

The evening of the first day was a great opportunity to join for dinner and to discuss various points in a less-formal and more relaxed atmosphere. Of course, Belgian beer was a must...

Pathogen Profiles

Four *Pathogen Profiles* have been identified that should be drafted by the EuroXanth consortium and it was agreed on their authorships and deadlines. As requested by the Editor-in-Chief at MOLECULAR PLANT PATHOLOGY, Ralph Dean, this set of four *Pathogen Profiles* will be accompanied by an Editorial Letter, which will be drafted by the Chair, Vice Chair and four WG Leaders.

Pathogens	Disease	Authors (corresponding author underlined)	Deadline
Bean pathogens (<i>X. citri</i> pv. <i>fuscans</i> , <i>X. phaseoli</i> pv. <i>phaseoli</i>)	Common bean blight	Mylène Ruh (FR), Joana Costa (PT), David Studholme (GB), Marie-Agnès Jacques (FR), Nicolas Chen (FR)	May 2020
Nut pathogens (<i>X. arboricola</i> pvs. <i>corylina</i> and <i>juglandis</i>)	Bacterial blight of hazelnut and walnut; Walnut oozing canker	Monika Kałużna (PL), Marion Fischer-Le Saux (FR), Aleksa Obradovic (RS), Joël Pothier (CH), Fernando Tavares (PT), <u>Emilio Stefani</u> (IT)	October 2020
Strawberry pathogens (<i>X. fragariae</i> , commenting <i>X. arboricola</i> pv. <i>fragariae</i>)	Angular leaf spot of strawberries	Bart Cottyn (BE), Joanna Puławska (PL), Jan van der Wolf (NL), Joana Vicente (GB), Andrew Aspin (GB), <u>Joël Pothier</u> (CH)	October 2020
Pathogens of ornamental plants (<i>X. axonopodis</i> pv. <i>poinsetticola</i> , <i>X. phaseoli</i> pvs. <i>dieffenbachiae</i> and <i>syngonii</i>)	Bacterial leaf spot or blight of <i>Anthurium</i> , <i>Dieffenbachia</i> , <i>Philodendron</i> , <i>Poinsettia</i> and <i>Syngonium</i>	Olivier Pruvost (FR), Isabelle Robène (FR), Jan van der Wolf (NL), <u>Bart Cottyn</u> (BE)	September 2020
Editorial		Vittoria Catara (IT), Joana Costa (PT), Joël Pothier (CH), Jens Boch (DE), Emilio Stefani (IT), Ralf Koebnik (FR)	October 2020

In this list, the bacterial blight pathogen of onion, *X. euvesicatoria* pv. *allii*, which is listed as an A1 quarantine pathogen, is missing. However, for this pathogen, a recent EPPO Standard diagnostic protocol is available, which already includes most of the Deliverables (Bulletin OEPP/EPPO Bulletin, 2016, 46(3): 429-443): <https://onlinelibrary.wiley.com/doi/10.1111/epp.12329>.

Once the manuscripts are drafted, they will be sent to a member of the Core Group who will revise the manuscript before submission. It will be the duty of that colleague to carefully check and improve (if necessary) the manuscript and to make sure that the Deliverables are properly addressed. This internal revision will justify co-authorship of the revising colleague.

It was suggested to use a common structure for all the abstracts, which need to be exchanged between the writing teams in due time. It was also suggested to use a common map in order to illustrate the worldwide distribution of the pathogens.

Some resources of interest to draft the manuscripts can be found at CABI and EPPO:

<https://www.cabi.org/isc/>

<https://gd.eppo.int/search?k=xanthomonas>

Addendum after the workshop: Two more *Pathogen Profiles* will be prepared and coordinated by the GTIPP team at the IRD Montpellier, France, on cassava pathogens (*X. phaseoli* pv. *manihotis*, *X. cassavae*) and (ii) rice pathogens (*X. oryzae* pvs. *oryzae* and *oryzicola*). The corresponding publication fees will be paid from other resources.

For all these *Pathogen Profiles* the journal's Editor-in-Chief recommended a blockbuster edition and in consequence indicated that he prefers receiving submissions at the same time. Therefore, MAJ and colleagues decided to postpone to mid-end of September the *Pathogen Profile* on common bacterial blight agents.

Effector Database

The French Laboratory of Plant-Microbe Interactions (LIPM) in Castanet-Tolosan has agreed to host the Type III Effector Database, making use of the platform that they have developed for effectors from *Ralstonia* (<https://iant.toulouse.inra.fr/T3E>).

As discussed during the WG2-WG3 Meeting in Lednice, Matthieu Arlat has provided a list of 38 genomes that could serve as a backbone for the database. This selection is based on a phylogenetic tree that was constructed from 93 single-copy proteins that are conserved in all the *Xanthomonadaceae*. Since then it was discussed among LIPM and RK to reduce this number to a more representative set of strains. RK presented 12 strains that he considers as a good representative set of xanthomonads harboring a Type III Secretion System. These are type or model strains and/or strains with high-quality genome sequences:

1. *X. arboricola* 15-088
2. *X. campestris* ATCC 33913^T or 8004
3. *X. citri* 306
4. *X. cucurbitae* ATCC 23378
5. *X. euvesicatoria* 85-10
6. *X. fragariae* Fap21
7. *X. hortorum* VT106
8. *X. oryzae* PXO99^A
9. *X. phaseoli* CFBP 6164
10. *X. vasicola* NCPPB 1060
11. *X. translucens* DSM 18974^T
12. *X. vesicatoria* LMG 911^T

This choice of strains is open to discussion and will then be shared with LIPM.

The following schedule was proposed:

Task	Responsible	Deadline
Consensus about representative genomes	Ralf Koebnik	March 17
List of T3Es (Xops), Send to LIPM Toulouse	Eran Bosis, Joël Pothier, Ralf Koebnik	March 31
Implementation of Effector Database	Matthieu Arlat, Alice Boulanger, Laurent Noël	July 31
Release of Effector Database	LIPM (Sébastien Carrère)	August 31

DokuWiki Project

The DokuWiki Project, which had a great drive and popularity at the time of the Annual Conference in Lednice, was unfortunately a bit on hold due to unexpected issues with the way how references should be managed and entries harmonised. The DokuWiki Project core team doesn't want to leave these tasks to the contributors so that they can focus on the content. However, due to the number of contributions already received, these tasks are now quite time consuming. JP explained the details and elaborated alternatives. Concerning the references, the alternatives are to: 1) use a central reference database with a dedicated plugin called RefNotes, 2) use DokuWiki footnotes, 3) replace numbered references by author names, or 4) keep the actual format of the entries and harmonize them. The different alternatives will be discussed in more details by the DokuWiki Project core team in the coming weeks in order to select the most efficient approach to continue smoothly with this collaborative project.

Similarly, it had been proposed during the WG2-WG3 Meeting in Lednice to approach breeders and seed companies to figure out which kind of information they would consider the most valuable for their programmes. Unfortunately, this duty of WG3 was not pursued. JB suggested this time to abandon this idea and rather proceed with the initial plan of drafting the resistance gene profiles.

For both parts of the DokuWiki, i.e. effectors and resistance genes, the following schedule was decided:

- Management of references / Formating: March 15
- Send out for EuroXanth-internal review: April 15
- Feedback from EuroXanth-internal review: May 31
- Send out for external expert review: June 30
- Feedback from external expert review: August 31

The goal is to harmonise and complete all the DokuWiki entries as soon as possible. When necessary, missing profiles (e.g. *R* genes for *Arabidopsis* or for strawberry) should be added.

DokuWiki project: <http://internet.myds.me/dokuwiki/doku.php>

EuroXanth COST Action – what's next?

ES reminded of the idea to have a follow-up activity for the EuroXanth COST Action. One idea that is currently receiving attention is a COST Action on bacteriophages, which would include basic science, genomics, ecology, theoretical biology/modeling, but also application in human health and agriculture (livestock and plant diseases). Regulatory aspects and acceptance problems should be addressed as well.

Another idea would be to include or focus on endophytes. RK is not too enthusiastic about proposals that are too broad, e.g. all kind of management practices for all kind of plants and diseases. It might be a good idea to either focus on a group of organisms (such as in the past for xanthomonads or bacterial pathogens with a pathogen-centric view or for stone fruit diseases with a host-centric view) or on a group of entities (e.g. effectors from all plant pathogens or endophytes or small molecules [e.g. peptides, aptamers, RNA, nanoparticles] against different diseases).

RK informed that Núria S. Coll and Marc Valls started to build a new COST Action with the scope on “Fighting emerging pathogens in a climate change scenario”.



Special task force workshop participants at the headquarter of the COST Association in Brussels.

From left to right: J. Boch, J. Vicente, F. Tavares, M. Kaluzna, J. van der Wolf, M.-A. Jacques, R. Koebnik, E. Stefani, B. Cottyn, J. F. Pothier and N. Chen