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

Minutes of the WG2/WG3 Meeting

Lednice, Czech Republic, 11 September 2019

Minutes of the WG1 Meeting written by J. Boch and R. Koebnik, and reviewed by all participants

Attending: Matthieu ARLAT (FR), Jens BOCH (DE, WG3 Leader), Eran BOSIS (IL, WG2 Vice Leader), Alice BOULANGER (FR), Vittoria CATARA (IT, Action Vice Chair), Jaime CUBERO DABRIO (ES), José GADEA (ES), Ralf KOEBNIK (FR, Action Chair), Roland KÖLLIKER (CH, WG3 Vice Leader), Joël F. POTHIER (CH, WG2 Leader), David STUDHOLME (GB), Jean Martin VAN DER WOLF (NL), and Joana VICENTE (UK)

On 11 September at 2:00 p.m. in Lednice (Czech Republic), a special task force meeting between participants of WG2 "Pathogen Biology" and WG3 "Genetic Resistance – Host Defence" of the COST Action CA16107 was organised at the Mendel University, Faculty of Horticulture, directly after the 3rd Annual Conference of the EuroXanth COST Action. The meeting addressed three major points, all of which are directly linked to several of the Action's goals and deliverables, such as protocols for resistance and pathogenicity screening, a database of type III effectors and a Wiki-like document about bacterial virulence factors and plant disease resistance genes.

Deliverable 9 - Protocols for resistance and pathogenicity screening

It was discussed that pathogen profiles, which are short reviews on a specific species, should be published. The focus should be on quarantine xanthomonads (*Xanthomonas* and *Xylella*) for which such a profile does not exist yet or where it is outdated. The following species fall into this definition: *Xanthomonas arboricola* (pvs. *corylina*, *pruni*), *Xanthomonas axonopodis* (pv. *poinsettiicola*), *Xanthomonas citri* (pvs. *aurantifolii*, *citri*), *Xanthomonas euvesicatoria* (pvs. *allii*, *euvesicatoria*, *perforans*), *Xanthomonas fragariae*, *Xanthomonas cynarae* (pv. *gardneri*), *Xanthomonas oryzae* (pvs. *oryzae*, *oryzicola*), *Xanthomonas phaseoli* (pvs. *dieffenbachiae*, *phaseoli*), *Xanthomonas translucens* (pv. *translucens*), *Xanthomonas vesicatoria* and *Xylella fastidiosa*. The editor of the Open Access journal MOLECULAR PLANT PATHOLOGY (impact factor 4.379) had been contacted before by MC Member Marie-Agnès Jacques and has indicated that the journal would be interested in publishing this. He suggested that the format should include one umbrella article with a topic, e.g., "Worldwide Threats of Xanthomonads", and the series of pathogen profiles. This suggestion was discussed and the idea was welcomed. It was discussed that such pathogen profiles usually appear once a month, but maybe it is possible to publish several of them simultaneously. Candidate responsible authors have been identified and discussed during the MC Meeting the day before (see Minutes).
[EPPO A1 list pathogens are highlighted in yellow; EPPO A2 list pathogens are highlighted in blue.]

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Deliverable 10 - Inventory of bacterial virulence factors

The inventory was assembled just prior to the Annual COST Conference by the attendants of the conference in the form of a series of DokuWiki entries. Each entry addressed a specific type III effector from *Xanthomonas*, because these are generally key virulence factors.

First, it was discussed how to proceed with the assembly of the DokuWiki entries. It was generally agreed that first, these entries need to be reviewed internally to ensure that they are of high quality. Several options how this can be achieved were discussed. Finally, it was suggested that the first round of review should be internally, i.e., by a different person from the list of authors who initially wrote the DokuWiki files. This should be easily feasible because the DokuWiki format is made for handling corrections and amendments (versioning). Possibly, the reviewers will be assigned by random choice. In a live survey held during the Annual COST Conference on panel of 63 participants, around 90% of the attendants indicated that they would further help to assemble the DokuWiki profiles, which suggests that such a review process is feasible. We aim to launch this reviewing process before December (Responsible: WG2 Leader Jöel Pothier).

In a second step, the DokuWiki entries should be reviewed by experts in the field. For this, either the Chair and/or the Working Group Leaders will send out emails to colleagues who are experts for a given effector, based on recent publications. It should be easy for them to spot mistakes or omissions in the description. Furthermore, this will greatly enhance the visibility of the DokuWiki entries and these experts might get interested to use the DokuWiki tool in the future and contribute to its further development.

In general, the format for references within the DokuWiki files should be transferred to a footnote format, which is typically used in DokuWiki profiles and which provides an automatic update of the reference list during changes and additions to the profile. Not all effectors are found in the RefSeq database. Therefore, general accession numbers should be provided.

In addition, it was discussed, how the effector-DokuWiki can be functionally extended. The group in Toulouse (LIPM; represented by Matthieu Arlat and Alice Boulanger) has developed an online prediction tool for *Ralstonia solanacearum* type III effectors and it was suggested that this might be extended to *Xanthomonas* effectors. The scientists from Toulouse will explore the option on the bioinformatic side (Responsible: MC Member Alice Boulanger, Deadline: October 31, 2019). Twelve representative *Xanthomonas* genome sequences of high quality would be required to build up the system. Based on his work that was presented in his oral contribution to the 3rd Annual EuroXanth Conference, Matthieu Arlat will suggest a list of representative genome sequences (Deadline: December 31, 2019). In essence, the tool will provide users with the opportunity to scan a novel genomic sequence for the presence of type III effectors. It was strongly suggested to separate the list of predicted effectors into "validated" and "candidate" categories, following the example of *R. solanacearum*.

Deliverable 11 - Inventory of plant resistance genes

The list of sources of resistance is currently relatively variable and includes well described dominant resistances, as well as QTLs, candidate genes, and molecular markers. To make this list highly useful, it was discussed to approach possible end users, e.g., breeders, European seed associations, etc. A short questionnaire will be developed, which will be sent to selected users to understand which information should be prioritized in the list of resistances (Responsible: WG3 Leader Jens Boch, Deadline: November 30, 2019).

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The list already contains many important crop plants. It was suggested to add some ornamentals (e.g., *Dieffenbachia*, *Pelargonium*, *Zinnia*), because they are infected by xanthomonads (e.g., *Xanthomonas hortorum*). It was recognized that an entry for *Arabidopsis* is still missing. This is important, because *Arabidopsis* functions as a model plant for dicotyledons, including concepts for resistance. It was suggested to approach an expert in the field for this entry.

At present, it is still unclear how the DokuWiki database will be hosted after completion of this COST Action. Universities typically have security concerns about databases with foreign access. Web hosting companies and other institutes have annual costs which would not be covered after the end of the EuroXanth COST Action. This problem needs to be solved in an upcoming WG2/WG3 Meeting or during the MC Meeting in the fourth budget period.

This intense afternoon meeting was characterized by lively discussions in an inspiring atmosphere and a strong cohesive effect among all the 13 participants could be clearly perceived. This result can certainly be attributed to several previous encounters fostered by COST CA16107, which contributed highly to the “small family/network feeling” and can thus be considered as a very positive and valuable output of this COST CA16107 special task force meeting.

The day ended with an after-party at the Mendel University to which the Czech students from the Faculty of Horticulture had us invited. All participants would like to thank all the Czech organisers for their great hospitality and commitment to the EuroXanth COST Action.

Special task force in the garden of the Faculty of Horticulture, Lednice. From left to right: A. Boulanger, J. Gadea, J. Cubero, J. M. van der Wolf, J. F. Pothier, J. Boch, R. Koebnik, R. Kölliker, E. Bosis, V. Catara, D. Studholme, M. Arlat and J. Vicente.

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