



Networks

Q-bacco-net: An initiative to ensure availability of high quality reference material of plant quarantine bacteria in support of research and European plant protection

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Reliable diagnosis and detection of quarantine bacteria are crucial for European agriculture. The establishment of efficient diagnostic and detection methods is reliant on expertise and well characterised reference material which is representative of the considered taxa and includes related strains as well as non-relatives which share diagnostic features (so called “look-alike” strains). To improve access to these resources, three public collections, BCCM/LMG, NCPPB and CIRM-CFBP have associated as the Q-bacco-net initiative, stimulated by ILVO and supported by EPPO. This network aims to underpin research and diagnosis of quarantine bacteria by proposing a panel of relevant reference strains for each quarantine pathogen.

International trade and travel has increased tremendously in recent years with plants and plant products being moved into and from the European Union. As a consequence, the rate of introduction and establishment of new, economically or environmentally damaging plant organisms and invasive species has increased steadily. Climate change may also increase the probability of establishment of organisms in areas other than their area of origin. Such organisms include plant-pathogenic bacteria.

Twenty-seven taxa of bacteria are currently identified as posing an unacceptable risk to agricultural and horticultural crops, forest and the wider environment and have consequently been included in the Annexes of the Directive 2000/29/EC as pests of the European Union (these lists of organisms are also called quarantine pest lists). The lists of pests recommended for regulation and of pests representing a putative risk to the European and Mediterranean region are available through the EPPO (European Plant Protection Organisation) website respectively as A1/A2 Lists of Pests and the Alert List (<http://www.eppo.int/QUARANTINE/quarantine.htm>).

In the absence of any curative methods for bacterial plant diseases, the only options for control remain avoidance, prevention and prophylaxis. As a consequence, detection of quarantine bacteria is of utmost importance in the adoption of relevant measures to prevent their dissemination in support of European plant protection. Detection and identification of quarantine bacteria must be reliable since the consequences of mis-detection (false negative or false positive findings) can be dramatic, from both economical and agricultural points of view. In order to design reliable detection/diagnostic methods, it is necessary to have access to reliable, well-characterised reference material. Ideally, this material should offer an overview of the considered taxa with respect to diversity and diagnostic characteristics. Control strains should be representative of the known diversity within the taxa. Negative control strains should include closely related strains as well as non-relatives, which share diagnostic features (so called “look-alike” strains), and

which can be isolated simultaneously with target quarantine bacteria.

Three well-established public collections of plant pathogenic bacteria (BCCM/LMG, CIRM-CFBP and NCPPB), operating under ISO 9001:2008 certification, have been associated within Q-bacco-net, a new initiative stimulated by the Institute for Agricultural and Fisheries Research (ILVO) and supported by the Dutch Q-Bank project and the European Plant Protection Organisation (EPPO). These collections have agreed common panels of reference strains (Q-bacco-ref) for each bacterial taxon listed by EPPO as A1 or A2 pests or on the Alert List. The reference strains were selected using the following criteria:

- they represent the complete known diversity of considered taxa and also include closely related and look-alike strains;
- they are well characterised phenotypically and genetically;
- they cover the range of geographical and biological origins;
- they include, where relevant, species or subspecies type strains, pathovar reference strains and whole genome sequenced strains.

Common quality standards are applied to their characterisation, authentication, maintenance, storage and distribution. The reference panels are intended for display through the EPPO website. More information about these strains is available on the websites of the respective collections and also through StrainInfo (<http://www.straininfo.net/>).

The three collections decided to share their biological resources to ensure the strains of the panels are available in at least 2 of the 3 collections, to ensure their continued accessibility and availability to the community of diagnosticians and scientists, including the national plant protection organisations. These public collections are well placed to propose these reference strains through their existing strategic collaboration with research specialists in plant-pathogenic bacteria, through their core mission of preserving biological resources and associated data, and of organising access to these resources in full compliance with (inter)national legislation (Janssens *et al.*, 2010).



Networks

It is expected that the reference panels will evolve with time, to stay in line with known diversity and taxonomic descriptions of target organisms and their look-alikes, and to take into account new additions to the target lists. Arrays of genetic markers for each target organism are also expected to increase. With Q-bacco-net, the three public collections aim to underpin the activities of diagnostic and research labs by improving access to well-characterised reference strains, and to facilitate new developments of reliable and effective detection/diagnostic methods as well as assisting in their validation and ensuring that they are used proficiently.

Reference

Janssens, D., D. R. Arahall, *et al.* (2010). «The role of public biological resource centers in providing a basic infrastructure for microbial research.» *Res Microbiol*161(6): 422-429.