



March 2016

VirusCollect: Fulfilling the need for a common reference collection of plant viruses and viroids

Plant diseases, including many plant viruses, are a continuous threat to the cost-effective and safe production of food and cause significant losses in yield and quality of many important crops. It is therefore essential to minimise the impact of plant diseases through an effective and coordinated system of legislation, plant passports and testing laboratories. In such system, reliable and cost-effective diagnosis methods for plant viruses are essential. These only can be developed, validated and implemented when suitable reference materials are available. Historically, reference materials were supplied from collections maintained by European universities and research institutions. However the maintenance of such collections had come under severe pressure due to a decrease in the number of scientists (virologists in particular) and allocated budgets. For plant viruses and viroids, type isolates (if still available) were dispersed between different public and/or private collections (Roehorst *et al.*, 2013).



The Euphresco project VirusCollect aimed to establish a common reference collection of viruses and viroids by linking collections of individual institutions via Q-bank.

To establish international collaboration on virus collections between National Plant Protection Organisations and allied institutions, basic requirements had to be fulfilled. Standard operating procedures (SOP's) were developed and implemented in participating laboratories to guarantee the quality of isolates and data, i.e. on characterization and inclusion, maintenance, release and production of reference materials.

The Q-bank Viruses and Viroids database <http://www.q-bank.eu/Virus/> provides information on the nature of viruses and viroids.

To ensure better accessibility to the public, the design and contents of the database were improved. Over 1000 virus species were included and relevant information for each species is now provided.

EU-regulated/ recommended for regulation species were marked as such and linked to the EPPO Global Database whenever possible.



The inclusion of additional data and corresponding nucleotide sequences will allow provisional identification of 'unknown' virus isolates using the 'search' and 'BLAST' functions of Q-bank. To further extend the usability of the database specific search options were included and information on the availability of over 500 specific virus isolates in Q-bank can be easily obtained. These options are of interest for both scientists (plant virologists, breeders) and policy makers.

Within the VirusCollect project, more than 60 virus isolates were characterised and corresponding data included in Q-bank. These include isolates of phytosanitary and/or economically important virus species already present in collections, as well as 'new' and 'emerging' species. Biological and serological properties were determined and sequence data generated. Characterised isolates were adequately stored to maintain their viability and guarantee their availability for future reference and use. VirusCollect enabled a first step in the collaboration and standardisation of virus collections, resulting in common views on quality standards as a prerequisite for the establishment of an international network. These fundamental standards laid the basis for improving the quality of individual collections as well as the layout of Q-bank as a platform to share data and information. The achievements towards a common reference collection were appreciated and resulted in a follow-up Euphresco VirusCollect II project, in which eight countries expressed their interest to join the network and collaborate on this initiative.

To conclude:

- The project VirusCollect improved the quality of both the infrastructure and 'contents' of virus collections at participating laboratories by development and implementation of SOP's and characterization and inclusion of relevant isolates.
- Q-bank Viruses and Viroids database plays a key role in sharing data, information and isolates, and as such is an indispensable tool for linking virus collections.
- The best way to improve the 'contents' of collections is to focus on the 'spin-off' of other projects by securing data and isolates.
- The interpretation of the GMO legislation, the Convention on Biodiversity, in particular the Nagoya protocol, need attention at an international level due to the foreseen impact on the sustainability of existing collections, in particular on the availability and exchange of relevant reference materials.

Project ID: Reference collection for regulated viruses and viroids (VIRUSCOLLECT).

References:

Roehorst JW, Boonham N, Winter S, Menzel W, Van der Vlugt RAA (2013) The plant viruses and viroids database and collections of Q-bank. EPPO Bulletin 43, 238–243.