

GRAPEVINE VIRUS COLLECTION AT NYON: A CONTRIBUTION TO A PUTATIVE NETWORK OF A WORLDWIDE GRAPEVINE VIRUS REFERENCE COLLECTION

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Summary

The grapevine virus collection Agroscope Changins-Wädenswil ACW at Nyon and a proposal for an International Network of Grapevine Virus Reference Collections are presented.

INTRODUCTION

First steps towards a grapevine virus collection in an experimental vineyard of the Federal Agricultural Research Station of Changins, now Agroscope Changins-Wädenswil Research Station, at Nyon have been initiated some 50 years ago by R. Bovey, founding member and former secretary of the International Council for the Study of Virus and Virus-like Diseases of the Grapevine (ICVG). At that time, grapevine viruses were not well known and could not easily be transmitted from grapevine to herbaceous test plants. Transmission of grapevine fanleaf virus by a nematode vector was only demonstrated in 1958 by Hewitt *et al.* and its mechanical transmission to an herbaceous host by Cadman *et al.* in 1960. It was therefore judicious to conserve the viruses to be investigated on grapevine plants. This allowed studying not only the virus but also the pathology of the associated disease. Several dozens of grapevine viruses have since been discovered and characterized. As experimental transmission to herbaceous host plants still fails for many of them, maintaining these viruses on vines, either on the original plants or on grafted indicator vines, remains therefore as relevant as in the past. Any new accession should possibly be made available to the international scientific community. The extra costs for the maintenance in a collection are low compared to those invested in the study of a newly discovered virus. A second good reason to carry on a grapevine virus collection is its use as a reference set for diagnostic purposes. Both biological and laboratory assays require internal standards. Finally, although harmful viruses may be, they merit at least partial conservation as unique elements of our diverse biological system.

THE GRAPEVINE VIRUS COLLECTION AT NYON

The present grapevine virus collection at Nyon was entirely renewed since 2000 and comprises today more than 2200 staked goblet vines. The origins go back to several older collections in the same experimental

vineyard. Most vines are grafted on 3309 or SO4 rootstocks, few others are own rooted. Each clone comprises three identical vines or occasionally multiples of three. The actual collection comprises therefore more than 600 clones of distinct accessions. They come from many countries and a majority is affected by grapevine leafroll but the collection includes also vines with rugose wood, fanleaf, fleck and other virus diseases. Vines infected by viruses transmitted by *Longidorus* spp. are maintained in concrete containers. The collection is situated in the vicinity of the Research Station in an experimental field free of *Xiphinema* spp. as well as potential known aerial virus vectors. Natural transmission of grapevine leafroll has indeed not been recorded since over 30 years. Spacing between vines is 0.9 m and between rows 1.8 m. Clones of three goblet vines with variable growth or symptoms are therefore easily visually distinguished, controlled or photographed (Fig. 1).



Fig. 1. Grapevine virus collection Agroscope Changins-Wädenswil ACW at Nyon in autumn.

Every vine is identified by a unique number (plant number) engraved on a metallic label on the corresponding stake. Each tenth stake in the row is coloured in order to find one's position easily. Over the years, older accessions are rejuvenated or grafted on indicators, rootstocks or graft infected with multiple viruses. Each time, daughter plants get a new plant number in order to distinguish clearly any vine once conserved in the collection, used for research and controls or sent to other institutes. The identification of a newly planted or assembled vine must also include the parent plant numbers, cultivar, origin, clone and health status. The procedure rapidly generates considerable amounts of data but allows tracing the origin of any

component of a vine, the growing cane, rootstock and eventually one or several additional grafts. Compiling all the plant identifications and temporary localizations requests an efficient database. We presently use Microsoft Access to handle the data (Fig. 2).

Fig. 2. Part of a Microsoft Access datasheet from the grapevine virus collection at Nyon.

A WORLDWIDE GRAPEVINE VIRUS COLLECTION

Grapevine virus collections are maintained in a number of research institutes around the world, e.g. Golino (1992). Efforts have also been made in Europe to constitute centralized collections. Massive intercontinental exchange of vine germ plasm is however not desirable. Therefore, the existence of geographically dispersed collections is likely to persist. Their funding is however not easy and rapid changes of research activities may well endanger their long term survival. Thus, any kind of common international interest or agreement would support and strengthen local efforts in this field, since international recognition generally helps to convince local financing authorities. Although particular plant material can normally be obtained from a colleague upon a request, we know little about all the material that is available around the globe. An exchange of information and minimal standardisation would therefore be useful and assure that valuable material does not get lost, especially material that has been used in published work. Access to international grapevine virus references will also be of interest for diagnostic and phytosanitary purposes. Consequently, we propose to examine the possibility of creating an international network of grapevine virus collections.

PROPOSAL

(1) As a first step, we invite members of ICVG to communicate to the secretary, before the end of the year 2009, their interest in sharing information about their grapevine virus collections and any useful suggestion and recommendation.

(2) In the first half of 2010, participants provide more information about their collections, i.e. localization, organisation, use, size, owner, person in charge, some pictures as well as any other relevant information.

(3) Participants provide precise data about important accessions in their collections and the type of material that could be made available: leaf samples, wood, canes, virus extracts, cDNA., antibodies, etc. This might include the expression of the willingness to conserve material for third part institutes that do not have the necessary facilities or sanitary containment. Collections of insect-proof houses or *in vitro* collections might be necessary in some grapevine-growing regions.

It is possible that some institutes may just indicate a link to their already existing database. Other may prefer to have information also compiled in an extra database of ICVG. The outcome is still entirely open.

A special file could be opened in the ICVG homepage <http://www.icvg.ch>, and progress reported periodically.

LITERATURE

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