

Current status of major grapevine viruses in La Côte vineyards of Switzerland

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Summary

A survey of grapevine viruses was performed in the vineyard of La Côte (Switzerland). Samples of randomly chosen vineyards were collected and tested for the presence of different viruses. Results indicated the presence of the following viruses in single or mixed infection: Grapevine rupestris stem pitting-associated virus, Grapevine leafroll-associated virus GLRaV-1, -2, -3, -4, Grapevine virus B, Grapevine fleck virus, Arabis mosaic virus and Grapevine fanleaf virus. GRSPaV, GFLV and GLRaV-2 were the most widely distributed viruses in the region. Grapevine infection degeneration appeared to be widespread as over 50% of locations presented GFLV infection. Grapevine leafroll disease was also frequent as 3/4 of the locations were infected by GLRaV-1 or GLRaV-3. The high virus incidence in La Côte vineyard emphasizes the need for planting virus free materials from certification programs.

Introduction

Viral diseases are reported to cause several detrimental effects on grape and wine production. However, the sanitary status of the Swiss viticulture industry is largely unknown. Therefore, we have undertaken a survey of viruses in the La Côte region of Vaud vineyards. The vineyard of the La Côte region covers a surface of ca. 2000 ha and is located on the edge of Lake Geneva between Lausanne and Geneva. The aim of the present work was to evaluate in commercial vineyards the occurrence of viruses and their incidence rates. Information about virus incidence will help to evaluate the economic impact of viral diseases and to define an efficient control strategy to mitigate their negative impact.

Materials and Methods

Sixty commercial vineyards were selected on a random basis in the La Côte region. Vineyards are at least ten years old. Within a given vineyard, a plot (500m²) was defined and 30 individual grapevines were sampled at random. Samples were collected in January 2012 and consisted of dormant canes. Three dormant canes per grapevine were collected and bulked for virus testing. The following viruses were assessed by DAS-ELISA: Grapevine leafroll-associated virus (GLRaV) 1, -2, -3, -4, Grapevine fanleaf virus (GFLV), Arabis mosaic virus (ArMV) and Grapevine fleck virus (GFKV). The following viruses were assessed by RT-PCR on pooled samples: grapevine virus A (GVA), grapevine virus B (GVB), grapevine rupestris stem pitting-associated virus (GRSPaV) and GLRaV-7.

Results and Discussion

The viruses GRSPaV, GFKV and GLRaV-2 were predominant in the La Côte vineyard (Table 1). All tested locations were infected by GRSPaV. GFKV infections were detected in nearly all tested locations and its incidence was high (Fig. 1). GLRaV-2 is the third most frequent virus and showed a high incidence (Fig. 1). After GLRaV-2, GLRaV-3 was the most common virus associated to leafroll in the region. GLRaV-3 infection was detected in 2/3 of the tested locations and in higher percentage than GLRaV-1. GLRaV-4 was only occasionally detected.

Virus	Tested locations	Virus infected locations (%)
GLRaV-1	60	37
GLRaV-2	60	72
GLRaV-3	60	67
GLRaV-4	60	20
GLRaV-7	47	0
GFLV	60	57
ArMV	60	13
GFKV	29	97
GVA	47	0
GVB	47	36
GRSPaV	47	100

Table 1. Viral infection frequency in commercial vineyards in the La Côte region.

Grapevine leafroll disease appeared to be widespread in La Côte vineyard as 3/4 of the locations were infected by GLRaV-1 or GLRaV-3. The spread of leafroll disease in La Côte is similar to what has been reported for Valais area, another Swiss wine region (Besse and Gugerli 2009). However, contrary to the latter region, La Côte vineyard is characterized by a high percentage of GLRaV-2 infection, a result inherent to the prevailing cultivar Chasselas.

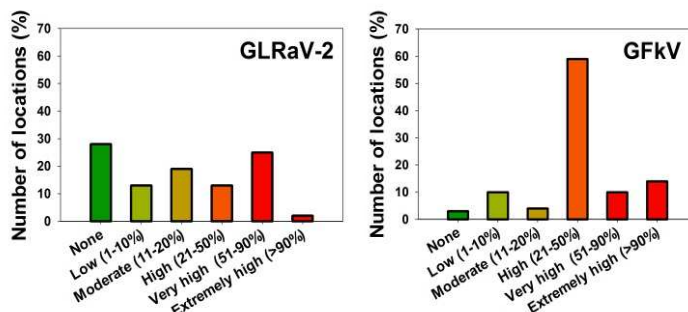


Figure 1. Incidence of GLRaV-2 and GFKV. Number of locations according to the virus incidence category.

GFLV infection was present in 57 % of the tested locations and the virus had a high incidence in 14% of locations. After GLRaV-2 and GFKV, GFLV was the virus with the highest incidence. The other nepovirus tested, ArMV, was detected at a lower level and always on locations already infected by GFLV.

Here the reported high rate of GFLV, GFKV and GLRaV infection found in the La Côte vineyard might have detrimental effects on grape and wine production. Considering those results, there is little doubt that it is important to use virus free plant from certificated material and that grapevine certification program is of paramount importance for a sustainable wine production.

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