Research Note virus transmission by grape phylloxera (*Daktulosphaira vitifoliae* Fitch)

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Summary: Grape phylloxera (*Daktulosphaira vitifoliae* FITCH) infests immature roots of both *Vitis vinifera* L. and phylloxera resistant rootstocks. A capability to transmit viticultural viruses would make grape phylloxera a phytosanitary threat even under conditions where direct damage by the insect is not likely. We tested the hypothesis that phylloxera could transmit grapevine fanleaf virus (GFLV) by planting infected and non-infected vines in common 10 liter pots and infecting roots of the infected vine with grape phylloxera. In this test infection of a previously non-infected plant in the absence of nematode population suggests that grape phylloxera is a vector of GFLV. .

Key words: virus transmission, phylloxera, grapevine fanleaf virus.

Introduction

More than 40 virus or virus-like diseases affect grapevine health and productivity worldwide (*Golino* et al., 1991). In the European literature, records of the grapevine fanleaf virus disease (GFLV) date back to 200 years (*Horváth*, 1972). Grapevine leaves with typical GFLV symptoms were found in herbaria established before the introduction of American rootstock hybrids to Europe. GFLV is a nepovirus. Shoot and leaf characteristics are symptomatic of the disease but symptoms can vary by cultivar and environmental circumstances. The virus can be eliminated by a 4 to 6 week heat treatment at 37–38°C. GFLV is transmitted by the dagger nematodes, *Xiphinema index [Thornet & Allen]* and *Xiphinema italiae [Meyl]* (Raski et al., 1983).

The most dangerous pest in viticulture is grape phylloxera (*Daktulosphaira vitifoliae* Fitch). *Horváth* (1972) set up the hypothesis that it can transmit GFLV. Walker et al. (1989) showed that rootstock O39–16 and O43–43 are both resistant to the feeding of *X. index*, but presence of GFLV was identified. The authors hypothesize that the repeated probing by these dagger nematodes is capable of transmitting GFLV. It is therefore possible that probing by grape phylloxera on resistant or susceptible roots may similarly transmit the virus.

The purpose of our study was to determine whether grape phylloxera activity could transmit GFLV.

Material and method

The research was conducted in the Department of Horticulture, Veszprém University of Agricultural Sciences Keszthely, Hungary. Thirty one year old *Vitis vinifera cv. Chardonnay* plants infected with GFLV were obtained from the Institute for Viticulture and Enology *Mard*, Kecskemét and 15 virus-free *Vitis vinifera cv. Chardonnay* and 15 virus free *V. berlandieri* x *V. riparia* Teleki 5C plants were obtained from Zalaegerszeg (Hungary-Kaszás nurseries). Phylloxera eggs were collected from leafgalls from vines not infected with GFLV from two Hungarian vine districts (Dunaalmás and Öregbaglas)

The grapevines were planted in spring 2002 in a heat-sterilized (at 100°C, for 5 hours) 1:2 mixture of peat and sand. One virus infected and one virus-free plant was placed in each 10 liter plastic pot. In August 2002, 200 phylloxera eggs were placed on the root of each virus-infected vine. The plants were placed in a greenhouse and each pot was watered with 0.7dl water / 10 days in winter and 4–5dl per week in summer.

Each virus-free vine was tested for the presence of the virus three times with ELISA (*Clark & Adams*, 1977) in May of 2003 by the Plant and Soil Sanitary Service, Kecskemét. The soil was examined for *Xiphinema*. The method of testing for *Xiphinema* was according to Seinhorst (1962).

Results and Discussion

Of the 15 initially uninfected Teleki 5C vines, one plant became infected with GFLV. *Figure 1* shows the characteristic leaf symptoms of the infected vine. Of the initially uninfected *Chardonnay* vines, none tested positive for GFLV. No *Xiphinema* were found in the soils.

This result shows that phylloxera is capable of transmitting GFLV and suggests the need to test for the transmission of other grapevine diseases. Because Teleki 5C is a resistant vine, the transmission is likely to have occurred through probing of the roots.

Figure 1. Leaf deformation caused by grapevine fanleaf virus on Chardonnay leaves (Photo: *L. Tóth Hajnalka*)

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