GRAPEVINE CV. PLOVDINA AS INDICATOR OF FLAVESCENCE DORÉE

[1]**S.Kuzmanović**(*), [2]R. Osler, [3]M. Tosić, [2]M. Martini, [1]M. Starović, [1]S. Stojanović and [1]G. Aleksić
[1] Institute for Plant Protection and Environment, Belgrade, Serbia, Tel: +381(11)2660079, Fax: +381(11)2669860, E-mail: kuzmanovic@beotel.yu
[2]Dipartimento di Biologia applicata alla Difesa delle Piante, Università degli Studi di Udine, Via delle Sceinze 208, 33100 Udine, Italy
[3] Faculty of Agriculture, University of Belgrade, Serbia

Introduction

Grapevine yellows (GY) are devastating phytoplasma diseases occuring in many viticultural regions of Serbia. During the last years these diseases have become epidemic in several vineyards and areas of Serbia.

The most frequent pathogens causing GY in Serbia are Flavescence dorée (FD) and Bois noir (BN) phytoplasmas (Duduk et al., 2003, 2004; Kuzmanovic et al., 2004).

The generic disease identification of GY is based on observation of symptoms and electron microscopy analysis, while the precise aetiology is possible mostly by molecular methods such as Polymerase chain reaction (PCR) (Duduk et al., 2003, 2004; Kuzmanovic et al., 2002, 2003, 2004) but also by specific vector transmission.

A noticeable difference in GY symptoms expression has been observed among the most common grapevine cultivars grown in Serbia. One of the most sensitive cultivar to GY appeared to be cv. Plovdina, an old local variety.

The aim of the present work was to know the precise susceptibility of cv. Plovdina to FD in order to suggest this genotype as a suitable indicator.

Materials and Methods

Ten plants of cv. Plovdina showing severe symptoms and that were proved by PCR to be FD infected, were selected in a vineyard in Nis region. Five healthy plants of the same variety showing no symptoms of GY, were collected from a vineyard in Sabac region as control plants. After transplanting, the control plants were grown under greenhouse insect proof conditions.

Both groups, GY diseased and healthy grapevines were top-grafted with scions originated from healthy mother plants of grapevine cv. Plovdina using the “green grafting” method. Grafting was performed in July 2004. Two to four scions were grafted on each of the 10 diseased grapevines. In the case of the 5 control plants only one scion per plant was grafted under greenhouse conditions.

Growth and GY symptoms were observed on scions grafted on diseased and control grapevines respectively. The GY symtpoms on the test scions of Plovdina were observed 20, 30 and 45 days after grafting.

Results and Discussion

Fifteen out of the 32 (46,8%) graftings of healthy Plovdina scions on the 10 diseased plants of the same cv. were successful. Seventeen (53,2%) of them failed (Table 1). All graftings on control plants performed in greenhouse were succesful.

The first GY symptoms consisting of yellowing of the Plovdina leaves, have been observed 20 days after grafting (Table 1). Thirty days after grafting, the symptoms were very tipical of FD consiting of yellowing and reddening followed by downward rolling of the laminae (Table 1). Fortyfive days after grafting the leaves turned completely to red. All the taken top-grafted scions showed GY symptoms with the exception of plant n. 8 in which 2 out of 3 taken graftings were symtpomatic (Table 1). No symptoms appeared on leaves developed on scions grafted on control plants.

The obtained results proved that grapevine cv. Plovdina is very sensitive to FD. The symtpoms developed very quickly, three to four weeks after the green grafting. Therefore, cv. Plovdina could be suggested as a suitable indicator for FD detection. Green grafting showed to be a practical and reliable grafting method.

Several researchers (Constable et al., 2003; Osler et al., 2003; Curkovic Perica et al., 2003) have shown that there is a big difference among grapevine cvs. and rootstocks regarding the reaction to GY infection. Therefore, we can consider the results we obtained as a considerable contribution to the study concerning the sensitivity of cv. Plovdina to GY. No less interesting is the demonstration of cv. Plovdina as a suitable indicator for FD. Future investigations will be conducted on the sensitivity of cv. Plovdina as test plant to BN.

Table 1. GY symptoms appearance on scions of healthy cv. Plovdina grafted on FD infected vines of the same variety.

Plovdina FD infected plant	Grafting taking	Symptoms appearance *		
		20 days	30 days	45 days
1	0/2			
2	2/3	+	+	+
3	3/4	+	+	+
4	0/2			
5	2/4	+	+	+
6	2/3	+	+	+
7	0/3			
8	3/4	2/3 +	2/3 +	2/3 +
		1/3 -	1/3 -	1/3 -
9	1/3	+	+	+
10	2/4	+	+	+
Total	15/32			

*Symptoms appearance on the test scions respectively 20 days (leaves yellowing); 30 days (yellowing, reddening of leaves, as well as downward rolling of laminae); and 45 days (leaves reddening and downward rolling of laminae) after grafting.

References

Constable, F.E., Gibb, K.S., Randles, J.W. & Symons, R.H., 2003. Biology and epidemiology of Australian grapevine phytoplasmas. Extended Abstracts of 14th Meeting of ICVG, 12-17 September 2003, Locorotondo (Bari), Italy. pp. 58 - 59.

Curkovic Perica, M., Seruga, M., Kozina, B., Krajacic, M. & Skoric, D., 2003. Grapevine yellows – spread of the disease in Croatia. Extended Abstracts of 14th Meeting of ICVG, 12-17 September 2003, Locorotondo (Bari), Italy. p. 95.

Duduk, B., Ivanović, M., Dukić, N., Botti, S. & Bertaccini, A., 2003. First report of an elm yellows, subgroup 16Sr V-C phytoplasma infecting grapevine in Serbia. Plant Dis. 87, 599.

Duduk, B., Botti, S., Ivanović, M., Krstić, B., Dukić, N. & Bertaccini, A., 2004. Identification of phytoplasmas associated with grapevine yellows in Serbia. J. Phytopathology 152, 575–579.

Kuzmanovic, S., Starovic, M., Tosic, M., Stojanovic, S. & Tomic, T., 2002. Detection of phytoplasma disease on grapevine in Serbia by electron microscopy. Plant Protection, Belgrade,Vol. 53 (2-3), N^{o} 240-241, 75-86 (in Serbian, Engl. abstr.).

Kuzmanovic, S., Starovic, M., Tosic, M., Stojanovic, S. & Tomic, T., 2003. Phytoplasmas on grapevine in Serbia. Extended Abstract of 14th Meeting of ICVG, 12-17 September 2003, Locorotondo (Bari), Italy. pp. 93-94.

Kuzmanovic, S., Martini, M., Ferrini, F., Ermacora, P., Starovic, M., Tosic, M. & Osler, R., 2004. Stolbur and Flavescence dorée phytoplasmas present in Grapevine in Serbia. V Congress of Plant Protection, 22-26 November 2004, Zlatibor, Serbia. pp. 138-139.

Osler, R., Carraro, L., Ermacora, P., Ferrini, F., Loi, N., Loschi, A., Martini, M., Mutton, P.B. & Refatti, E., 2003. Roguing: a controversal practice to eradicate grape yellows caused by phytoplasmas. Extended Abstracts of 14th Meeting of ICVG, 12-17 September 2003, Locorotondo (Bari), Italy. p. 68.