PHOMOPSIS VITICOLA MANAGEMENT IN TÂRNAVE VINEYARDS

PHOMOPSIS VITICOLA ÎN PODGORIA TÂRNAVE

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Abstract. *Phomopsis viticola, in poorly managed vineyards can produce a lot of damage due to its year to year infection pattern. In combination with a high spore reserve from the previous year, this causes reduced grape yields. This study aims to assess the Phomopsisviticola attack in Târnave vineyards during May-July 2020. The data (frequency and intensity of the attack) was collected from Crăciunelu de Jos, and the attack degree (AD) was calculated before and after the treatments for Saugvinonblanc, Riesling italian, Fetească regală and Traminer roz grapevine varieties. The AD before the treatment with contact and systemic products was between 27.80% and 4.10%, after the treatments of the first period (May-June 2020) the AD was reduced at values between 3.40% and 0.83% and after the treatments of the second period (June-July 2020) the AD had the values between 9.00% and 12.40%. In conclusion, the fungicide treatments administrated are efficient in managing Phomopsis viticola in vineyards from Transylvania.*
Key words: *Vitis vinifera, Phomopsis viticola,* fungicide treatment, attack degree

Rezumat. *Phomopsis viticola, în plantațiile de viță de vie slab administrate, poate produce daune mari datorită ciclului de infecție de la an la an. În combinație cu o rezervă mare de spori din anul precedent, aceasta cauzează pagube importante in plantațiile de viță de vie. Acest studiu prezintă evoluția atacului de Phomopsis viticola în podgoria Târnave în perioada mai-iulie 2020. Datele (frecvența şi intensitatea atacului) au fost colectate din podgoria Crăciunelu de Jos şi gradul de atac (GA) a fost calculat înainte şi după tratamente la soiurile Saugvinon blanc, Riesling italian, Fetească regală şi Traminer roz. GA înainte de tratamente fitosanitarecuproduse de contact şi sistemice a fost între 27.80% şi 4.10%, după tratamentele din prima perioadă (mai-iunie 2020) GA-ul a fost redus la valori între 3.40% şi 0.83%, iar după tratamentele din a doua perioadă (iunie-iulie) valorile, GA-ului au fost cuprins intre 9.00% şi 12.40%. În concluzie, tratamentele fungice administrate sunt eficiente în combaterea Phomopsis viticola în podgoriile din Transilvania.*
Cuvinte cheie: *Vitis vinifera , Phomopsis viticola,* tratament fungic, grad de atac

INTRODUCTION

Grapevines (*V. vinifera* and *Vitis spp*.) are one of the most economically important and extensively grown woody perennial fruit crops in the world

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(Gramaje *et al.*, 2007). *V. vinifera*, and many other species belonging the *Vitis* genus together with their interspecific hybrids are important especially for rootstock development, wine production, table grapes and other secondary products.With 173685 ha grape harvested in 2018 (FAOSTAT), România ranks the 5th in Europe. One of the important vineyards of Romania is Târnave vineyards having as primary production the high quality white wines, high quality aromatic white wine, sparkling wine and table grapes (Oprea, 2001).

Grapevines are attacked by many species of fungi, the most damaging being: *Plasmopara viticola* (Gessler *et al.,* 2011) which causes downy mildew, *Uncinula necator* (Doster and Schnathorst, 1985) which causes powdery mildew, Esca which is an amalgamation of fungi species (Fischer and Peighami-Ashnaei 2019) that cause physiological decline and *Phomopsis viticola* which causes excoriose and also Phomosis dieback (Ùrbez-Torres *et al.,* 2013).

Excoriose is present everywhere grapevines are grown and the most damage is done when the precipitation levels are high in the early season. The disease can cause bud death, poor shoot growth and stunted leaves and later in the season when the shoots are heavier breaking from the base can occur. The spreading pattern of excoriose is fairly slow, but in time it builds up, leading to declined vigor and yield of the vines (Pearson and Goheen, 1988; Phillips 1997). The term excoriose was introduced by Ravaz and Verge (1925) (Ravaz and Verge 1925; Phillips 1997). According to them the following symptoms are typical: early in the season the fungus invades the young shoots causing elongated black lesions on the internodes (Phillips 1997; Gramaje *et al.*, 2007; Ùrbez-Torres *et al.,* 2013). Affected branches become swollen at the base and the blackened cortex may rupture. Such branches are very brittle and readily collapse under their own weight, while others may dieback. After harvest, the black areas on the canes turn grey or white and are spotted with black fruit-bodies immersed in the host tissues. All these symptoms are seen now as typical, also including bud death and a possibility of shoot dieback (Pearson and Goheen, 1988).

In România, excoriose was found in vineyards in Valea Călugarească at the beginning of the growing season, Odobeşti, Coreteşti – Vrancea, Pietroasele and Drăgăşani (Oprea and Podosu, 2008). In Europe first reports about excoriosis come from France in 1925 (Ravaz and Verge, 1925). Later the disease has spread in all parts of the world where grapes are grown (Galet, 1977).

MATERIAL AND METHOD

The experimental plots were located in Crăciunelu de Jos belonging to SCDVV Blaj. The plots (0,5 ha) were cultivated with the following varieties: Sauvignon blanc (SB), Riesling Italian (RI), Fetească regală (FR) and Traminer roz (TR) trained in demi-high Guyot system, each plot had 5 repetitions in a diagonal pattern, the number of vines in each repetitions was between 25 and 40. The evaluations were done three times, first in 12.05.2020, second in 04.06.2020 and third in 13.07.2020. The attack degree (AD) was calculated using the following formula: (frequency x intensity)/100;

this was done for all repetitions. The mean and standard errors were calculated. Treatments were applied with varied products and they are listed in table 1.

Table 1

Treatments applied for grapevine fungal diseases in Crăciunelu de Jos vineyard for the period May-July 2020

Nr. Crt	Date	Commercial name	Active substance
1	14.05.2020	Fantic M 0.25% + Thiovit Jet 80 WG 0.3%	Benalaxyl-M 4%+ Mancozeb 65% Wetable sulfur 80%
2	22.05.2020	Polyram DF 0.25% + Topas 100 ec 0.025%	Metiram 70% Penconazol 100 g/l
3	28.05.2020	Equation PRO 0.04% + Topas 100 ec 0.025%	Cimoxanil 30% + Fomaxadon 22,5% Penconazol 100 g/l
4	11.06.2020	Universalis 593,5 SC 0.2%	Azoxistrobin 93,5 g/l + Folpet 500 g/l
5	19.06.2020	Mikal Flasch 75 WG 0.3% + Flint Max 75 WG 0.016%	Trifloxistrobin 25% + Tebuconazol 50% Aluminum fosetil 50%+Folpet 25%
6	29.06.2020	MikalFlasch 75 WG 0.3%	Aluminum fosetil %+ Folpet 25%
7	9.07.2020	Valis M 0.2%	Mancozeb 60%+ Valifenalat 6%
8	19.07.2020	Triumf 0.25%	Copper hydroxide 40%

Agro technological operations were applied as standard and in the studied period the elimination of basal and excess shoots and harrowing were done.

The experimental data were analyzed with the program Statview 5.0 performing one-way analysis of variance (ANOVA), followed by a Fisher protected least significant difference (PSLD) test. P values lower than 0.05 were considered significant while p values between 0.05 and 0.1 were considered as tendencies.

RESULTS AND DISCUSSIONS

Excoriosis symptoms have been found on all observed vines in the Crăciunelu de Jos vineyard. In figure 1, evolution of the disease, can be clearly observed for all the varieties during the studied period.

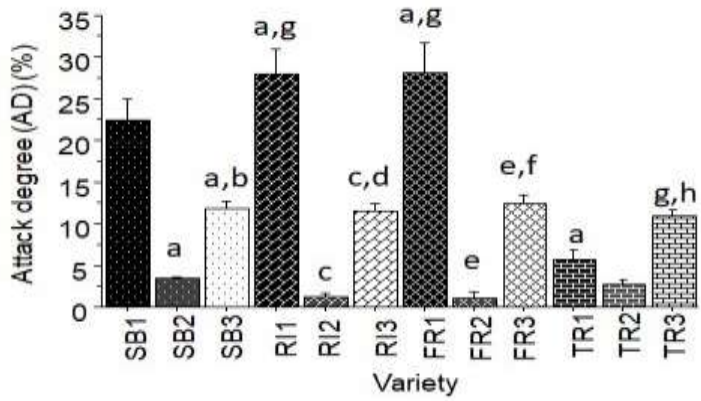

Fig. 1 Evolution of excoriosis in Crăciunelu de Jos vineyard as determined in the period May-July 2020 (where, SB 1 - Sauvignon blanc observed at 12.05.2020, SB 2 - Sauvignon blanc at 04.06.2020, SB 3 - Sauvignon blanc at 13.07.2020, RI 1 - Riesling italian at 12.05.2020, RI 2 - Riesling Italian at 04.06.2020, RI 3 - Riesling Italian at 13.07.2020, FR 1 - Feteascăregală at 12.05.2020, FR 2 - Feteascăregală at 04.06.2020, FR 3 - Feteascăregală at 13.07.2020, TR 1 - Traminerroz at 12.05.2020, TR 2 - Traminerroz at 04.06.2020, TR 3 - Traminerroz at 13.07.2020 and a-statistically different when compared with SB1, b- statistically different when compared with SB2, c- statistically different when compared with RI1, d- statistically different when compared with RI2, e- statistically different when compared with FR1, f- statistically different when compared with FR2, g- statistically different when compared with TR1, h- statistically different when compared with TR2).

At the beginning of the treatments AD was quite high for Sauvignon blanc (22.50%), Riesling italian (27.86%) and Feteascăregală (28.06%), the only exception was Traminer roz (5.70%). After the treatments of the first period for all the varieties observed AD decreased significantly for Sauvignon blanc (AD=3.40% for SB2 vs AD=22.50% for SB1), for Riesling italian (AD=1.24% for RI2 vs AD=27.86% for RI1) and for Feteasca regală (AD=1.10% for FR2 vs AD=28.06% for FR1). The second group of treatments with fungicides helped to control excoriosis at values of AD significantly lower that the initial observed for all the varieties mentioned above (AD= 11.80% for SB3 vs AD=27.86% for SB1; AD=11.40% for RI3 vs AD=27.86% for RI1; AD=12.40% for FR3 vs AD=28.06% for FR1). The treatments done in the first period were more efficient compared with the ones done in the second interval (AD=3.40% for SB2 vs AD=11.80% for SB3; AD=1.24% for RI2 vs AD=11.40% for RI3; AD=1.65% for FR2 vs AD=12.40% for FR3). This may be explained by the fact that in the first treatments the foliage was just emerging, and in treatments after the second evaluation the foliage was grown and vigorous, therefore a complete coverage with solution was impossible. Evolution of excoriosis for Traminer roz was different: at the first evaluation the AD was very low (AD=5.70%), second evaluation compared to the first was

not statistically different with an AD= 2.76%, but third compared to the second was statistically different with an AD= 11.00%.

Overall all three varieties followed the same pattern, high AD at the start of the season, then a significant drop and a slow rise again until they remained at a level which do not seem to affect the vines, Traminer roz was the exception at the first evaluation, the second and third following the pattern described above. These data show a different sensitivity of the grapevine varieties to the attack of *Phomopsis viticola*, but the same type of response to the fungicide treatments. Some varieties can have a higher susceptibility to the fungal attack, primarily due to their genetics (Fetească regală, Sauvignion blanc and Riesling italian).

Oprea and Podosu (2008) indicated that excoriosis was found also on the varieties: Fetească albă (20%), Chasselas d'ore (38%), Cabernet Sauvignon (26), Riesling italian (15.6%), Cardinal (50%), Clairete (21.6%), Merlot (7.8%), Pinot Noir (11.2%), in the following vineyards: Odobeşti, Coreteşti – Vrancea, Valea Călugărească, Pietroasele Drăgăşani. The grapevine affected by excoriose was growing on the areas presenting a clay compact acid soil, watered in excess and industrially polluted (Oprea and Podosu, 2008). In the Blaj vineyards in 2010 *Phomopsis viticola* had a higher intensity and this allowed the authors to establish correlations between disease intensity and weather conditions (Comşa *et al*. 2012). Excoriose produced by *Phomopsis viticola* was present at the beginning of the vegetation period in the observed vineyards, in Valea Călugărească (Oprea and Podosu, 2008). Oprea and Podosu observed that before the budding period, the tendrils of vine showed dark colored spots, isolated or associated, about 0.5 - 2 cm x 0.3 – 1.0 cm, usually placed at the base of shoot. The budding period was 12 - 14 days delayed, and the buds located at the tendril of vine base were dead. A detailed observation on the damaged shoots of vines revealed that the first 3 - 4 basal buds were dead, and only the buds located upper on the shoot being viable. (Oprea and Podosu, 2008). In our case, as the observations were done later (May-July), we observed cane and leaf spots (fig. 2).

Fig. 2 Cane and leaf spots caused by *Phomopsis viticola* on grapevine

CONCLUSIONS

Fungicide treatments are efficient in managing *Phomopsis viticola* in Târnave vineyards.

Some varieties are more tolerant to *Phomopsis viticola* that the others – Traminer roz versus Sauvignon blanc, Riesling italian and Fetească regală.

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