

## THE EFFICIENCY OF CERTAIN PESTICIDE COMPLEXES ON THE HEALTH OF CERTAIN VARIETIES OF VINES CULTIVATED BY S.C.VIE VIN VÂNJU MARE COMPANY DURING 2016-2017

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### ABSTRACT

The long experience in the field of vines' phytoprotection is highlighted by the multitude of studies that wanted to elucidate certain aspects related to the biological efficiency of the various plant protection products according to the farming area and the cultivated variety.

In this context, this study wanted to monitor the effect of some treatment regimes on the main phytoparasites of some varieties of vines (*Fetească neagră*, *Cabernet sauvignon*, *Tămâioasă românească*) cultivated by S.C. Vie Vin Vânju Mare company in the period 2016-2017.

### INTRODUCTION

The vine, one of the most widespread cultures in the temperate climate, is exposed to many factors with adverse effects on production and plants, because of the interference of these factors with the basic physiological processes. The causes of such adverse effects can be identified as abiotic factors (climate regime, air pollution) or biotic factors, among which the specific harmful organisms have a determining role (Monette, 1988; Martelli, 1993).

A difficult problem of contemporary viticulture is the sensitivity of varieties existing in culture to the attack of dangerous agents. Bădărău et al., 2007, state that the use of pesticides in vineyards with noble European varieties will also remain an important technological link in the near future in the integrated control of harmful organisms and will contribute to obtaining high and good crops only in the case of strict compliance with the recommended dosages and application techniques.

Dejeu et al., 1997; Fregoni, 2005, state that an integrated phytosanitary management of the vinicultural ecosystem must be based on an ecological concept, based on appropriate measures of natural control of harmful species.

Tomoiagă Liliana et al., 2006, present an integrated control program against vine pests and diseases adapted to the modern control strategy integrated in viticulture. For a successful control, they recommend to apply the control strategy at farm level depending on the microclimate and the biological reserve of harmful organisms.

### MATERIAL AND WORKING METHOD

The research was carried out at S.C. Vie Vin Vânju Mare S.R.L. company, during 2016-2017, on three varieties: *Cabernet Sauvignon* cultivated on an area of 12 ha, *Fetească neagră* covering an area of 7 ha and the *Tămâioasă românească* variety covering an area of 7.3 ha.

In order to establish the health of the three varieties at the phytosanitary control, there were taken into account the main pathogens of the vine: *Plasmopara viticola*, *Uncinula necator* and *Botryotinia fuckeliana*.

For the control of pathogens, two treatment regimes were tested, namely:

Regime I where there were predominantly used organic synthesis products (Table 1).

**Table no.1.**

**Products used in the conventional system**

Product used	Active substance (%)	Dose/ha	Dangerous agent
Shavit F72WDG	Folpet 70% + Triadimenol 2%	2 kg	Blight and Mildew
Armetil M	Mancozeb 8% + Metalaxyl 64%	2.5 kg	Blight
Alleato 80 WG	Aluminium fosetil 800 g/kg	2 kg	Blight
Funguran OH 50 WP	77% copper hydroxide equivalent to 50% metallic copper	2 kg	Blight
Falcon 460EC	Spiroxamine 250 g/l + tebuconazole 167g/l + triadimenol 43 g/l	0.3 l	Mildew
Folicur Solo 250EW	Tebuconazole 250 g/l	0.4 l	Mildew
Cosavet 80 DF		3 kg	Mildew
Bumper 250 EC	Sulphur 80%	0.2 l	Mildew
Kumulus 80 DF	Propiconazole 250 g/l	0.3 kg	Mildew
Teldor 500 SC	Sulphur 80%	1 l	Botrytis bunch rot
	Fenhexamid 500 g/l		

Regime II where there were used inorganic products to combat blight and mildew (Table 2).

Under the first treatment regime, the products for the control of blight and mildew were applied in different combinations and under the second regime for the control of the same diseases there were applied mixed copper and sulphur products.

**Table no.2.**

**Products used in the unconventional system**

Product used	Active substance (%)	Dose/ha	Dangerous agent
Funguran OH 50 WP	77% copper hydroxide equivalent to 50% metallic copper	2 kg	Blight
Cosavet 80 DF	Sulphur 80%	3 kg	Mildew
Teldor 500 SC	Fenhexamid 500 g/l	1 l	Botrytis bunch rot

Conventional treatments were applied under production conditions with the OSELLA 1000 pump, driven by the universal U-650 DTC tractor, the volume of solution per unit of area being of 1000 l/ha, and the unconventional treatments were made with the manual rear pump of the Vermorel type.

In the year 2016, as a result of the evolution of climatic conditions in order to control the pests, 7 treatments were applied on 9 May, 23 May, 13 June, 28 June, 7 July, 20 July, 8 August.

In order to control the pests, in 2017, the number of treatments was reduced to 6, being applied on 16 May, 29 May, 13 June, 22 June, 7 July, and 21 July.

The estimation of the attack caused by pathogens, *Plasmopara viticola*, *Uncinula necator*, *Botryotinia fuckeliana*, was performed at the level of the supraterranean organs (leaves and bunches) according to the methodologies used in the Forecast and Warning Stations.

For each pathogenic agent, for each variety, in each treatment variant, there was established the frequency (F%), the intensity (I%) and there was calculated the degree of attack (GA%), the data collected being processed according to usual formulas.

### RESULTS AND DISCUSSIONS

In the climatic conditions of 2016, following the 7 conventional product treatments as shown in Table 3, the degree of attack of the *Plasmopara viticola* fungus recorded slightly different values depending on the variety and the attacked organ. The highest values of the degree of attack both on leaves and bunches were recorded in the *Tămâioasă românească* variety being of 3.43% and 2.92% respectively, the *Cabernet Sauvignon* variety being at the opposite pole, where the degree of attack values were below 2% irrespective of the organ analyzed.

**Table no.3.**

#### The biological efficiency of conventional products in combating blight, mildew and Botrytis bunch rot in 2016

Variety	Pathogenic agent				
	Plasmopara viticola		Uncinula necator		Botryotinia fuckeliana
	GA %		GA%		GA%
	Leaves	Bunches	Leaves	Bunches	Bunches
<i>Fetească neagră</i>	2.20	2.32	12.40	10.20	2.12
<i>Cabernet Sauvignon</i>	1.78	1.60	2.12	1.20	0.60
<i>Tămâioasă românească</i>	3.43	2.92	14.89	13.46	2.20

As regards the *Uncinula necator* fungus, in the same year after the application of the conventional products, it is observed that the *Tămâioasă românească* variety recorded values of the degree of attack of 14.89% on the leaves, respectively 13.46% on the bunches, while for the *Cabernet Sauvignon* variety the values of the degree of attack are of 12.40% on the leaves and 1.20% on the bunches. As in the case of blight, the *Cabernet Sauvignon* variety had the best response to the *Uncinula necator* fungus attack both on the leaves and bunches.

The attack of the *Botryotinia fuckeliana* pathogen was present on the bunches of the studied varieties with a value ranging from 0.60% for the *Cabernet Sauvignon* variety to 2.20% for the *Tămâioasă românească* variety.

From the analysis of the data in Table 4 there can be noticed that following the application of treatments with unconventional products under the same environmental conditions the values of the degrees of attack for the three monitored pathogens were higher irrespective of the variety and the analyzed organ.

**Table no.4.**

#### The biological efficiency of unconventional products in combating blight, mildew and Botrytis bunch rot in 2016

Variety	Pathogenic agent				
	Plasmopara viticola		Uncinula necator		Botryotinia fuckeliana
	GA %		GA%		GA%
	Leaves	Bunches	Leaves	Bunches	Bunches
<i>Fetească neagră</i>	3.82	2.93	15.42	12.52	3.02
<i>Cabernet Sauvignon</i>	2.24	2.01	3.58	1.97	1.04
<i>Tămâioasă românească</i>	3.97	3.42	15.60	14.85	3.13

As regards the leaf attack of the *Plasmopara viticola* fungus, it recorded a value of 3.97% for the *Tămâioasă românească* variety, the variety with the highest value of the bunch attack of 3.42%.

The *Uncinula necator* fungus scored with leaf attack levels ranging from 3.58% for the *Cabernet Sauvignon* variety to 15.60% for the *Tămâioasă românească* variety, while the bunch attack recorded values ranging from 1.97% for the *Cabernet Sauvignon* variety to 14.85% for the *Tămâioasă românească* variety.

In the case of *Botryotinia fuckeliana* fungus attack, the attack rates on bunches were higher than in the case of conventional treatments, with the maximum value reaching 3.13% for the *Tămâioasă românească* variety.

From the analysis of the data shown in Tables 5 and 6, it is noticed that in the climatic conditions of year 2017 when there were applied 6 treatments in the Vânju Mare vineyard both in the conventional and unconventional system, the values of the degrees of attack for the monitored phytopathogens were lower irrespective of the variety analyzed compared to year 2016.

For the *Plasmopara viticola* pathogen, the maximum leaf attack rate was of 2.58% in the conventional system (Table 5) for the *Tămâioasă Românească* variety and of 3.96% in the unconventional system (Table 6) for the same variety. The bunch attack recorded values that varied between 1.18% for the *Cabernet Sauvignon* variety in the conventional system and 3.12% for the *Tămâioasă românească* variety in the unconventional system.

For *Uncinula necator* the values of the degree of attack on both leaves and bunches have been clearly differentiated according to the cultivated variety and less depending on the type of treatment within the same variety.

**Table no.5.**

**The biological efficiency of conventional products in combating blight, mildew and Botrytis bunch rot in 2017**

Variety	Pathogenic agent				
	Plasmopara viticola		Uncinula necator		Botryotinia fuckeliana
	GA%		GA%		GA%
	Leaves	Bunches	Leaves	Bunches	Bunches
<i>Fetească neagră</i>	2.04	1.84	11.15	10.02	1.26
<i>Cabernet Sauvignon</i>	1.36	1.18	2.04	1.12	0.40
<i>Tămâioasă românească</i>	2.58	2.39	13.54	11.78	1.78

The attack of the *Botryotinia fuckeliana* fungus recorded low values irrespective of the type of vegetation treatments, due to the evolution of climatic conditions in 2017 which was a dry and unfavourable year for the fungus attack. The maximum value of the degree of attack was of 2.68% in the unconventional system for the *Tămâioasă românească* variety.

**Table no.6.**

**The biological efficiency of unconventional products in combating blight, mildew and Botrytis bunch rot in 2017**

Variety	Plasmopara viticola		Uncinula necator		Botryotinia fuckeliana
	GA%		GA%		GA%
	Leaves	Bunches	Leaves	Bunches	Bunches
<i>Fetească neagră</i>	2.86	2.74	12.53	11.09	2.17
<i>Cabernet Sauvignon</i>	2.14	1.94	3.88	2.11	1.02
<i>Tămâioasă românească</i>	3.96	3.12	14.36	12.24	2.68

## CONCLUSIONS

The data obtained illustrate the influence of climatic conditions in the research years on the evolution of the pathogens attack *Plasmopara viticola*, *Uncinula necator*, *Botryotinia fuckeliana*, the behaviour of the varieties analyzed at their attack depending on the type of treatment applied on vegetation.

As regards the degree of attack (GA%) of the three monitored pathogens, it can be stated that among the studied varieties, the *Tămâioasă românească*, irrespective of the type of treatment, is the most sensitive variety, and *Cabernet Sauvignon* is the most resistant variety in both types of plant protection practice.

As regards the attack of the three phytoparasites (*Plasmopara viticola*, *Uncinula necator*, *Botryotinia fuckeliana*) in the climatic conditions of the years 2016-2017, in the Vânu Mare area, it was found that regardless of the type of treatment, the pathogen *Uncinula necator* recorded the highest values of the degree of attack being the problem pathogen.

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