

# EVALUATING THE EFFECTIVENESS OF CERTAIN PLANT PROTECTION PRODUCTS USED TO PROTECTING THE VINES IN THE ECOSYSTEM VINEYARD COPOU IAȘI-2011

## EVALUAREA EFICACITĂȚII UNOR PRODUSE FITOSANITARE UTILIZATE ÎN PROTECȚIA VIȚEI DE VIE ÎN ECOSISTEMUL VITICOL COPOU IAȘI-2011

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**Abstract.** *The type of action of certain chemical products for combating pests and diseases requires a thorough knowledge of the negative consequences that can arise after using them in the vineyards. Lately, the focus has increased upon the use of some bio-preparation with non-toxic effects on the environment and on the grape production. The 2011 wine year for the ecosystem vineyard Copou-Iasi is considered to be, in terms of climate conditions, convenient for the culture of the vine. In this way, the treatment schemes have been planned following the forecast and warning bulletins that had been issued. The treatments have been performed at different times of the vegetation, depending on the evolution of the climate conditions, on the biology of the pathogens and on the development of the phenological stages of the analyzed assortment.*

**Key words:** pests and diseases, chemical products, vineyard.

**Rezumat.** *Modul de acțiune al unor produse chimice de combatere a bolilor și dăunătorilor necesită o cunoaștere temeinică a consecințelor negative ce pot să apară în urma utilizării lor asupra plantațiilor viticole. În ultimul timp se pune accent tot mai mult pe folosirea unor biopreparate cu efecte non-toxice asupra mediului și producției de struguri. Anul viticol 2011 pentru ecosistemul viticol Copou-Iași este considerat, din punct de vedere al condițiilor climatice, favorabil culturii viței de vie. În acest sens schemele de tratament au fost întocmite după buletinele de prognoză și avertizare emise. Tratamentele s-au efectuat în diferite momente ale vegetației în funcție de evoluția condițiilor climatice, biologia agenților patogeni și desfășurarea fazelor fenologice ale soiului analizat.*

**Cuvinte cheie:** boli și dăunători, produse chimice, viță de vie

### INTRODUCTION

Nowadays it is inconceivable to obtain high yields per unit of area without taking into account the following factors: phytopathogenic agents and weeds whose counter is a part of every cultures technology (Șandru, 1996).

In this sense it is required a good knowledge of the ecological factors that are being in favor or unfavour of the pathogen of the pest kept under observation.

The rich assortment of fungicides offered every year by different companies is making more and more difficult to evaluate in a correct mode their

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effectiveness against the vine's pathogens. The action of these fungicides requires a thorough knowledge of how to integrate the ecosystem; this complex, host-plant pathogen, can cause undesirable effects if the fungicides are not correctly used (Turcanu, 1997).

This paper presents the results obtaining from testing the effectiveness of some fungicides against manna and gray mold on the vines from the "Viticulture and Winemaking/Vinification Research and Development Station" experimental polygon, in the year 2011, and the recommendations of the usage in the production of the most efficient fungicides.

## MATERIAL AND METHOD

The experiment has been organized in the polygon affiliated to the plant protection laboratory of Viticulture and Winemaking/Vinification Research and Development Station, and was performed on the Aligoté variety which was grafted on Kober 5 BB. The distance between the rows is 2.2 meters, and between hubs in row is 1.2 meters. The experimental polygon was established on a surface of one hectare, with a S-V exposition and a 2-3% slope.

The culture system practiced in the wine area Copou-lasi is a semi-protected one, and the gaps between the rows are alternately maintained grassing / field work. For the optimal performance timing of the treatments, climatic elements were carefully monitored, both from its own weather station and from the sensor AGROEXPERT, having into consideration: maximum and minimum air temperature, soil temperature, the recorded rainfall, heatstroke and hygroscopicity, taking into account the weather warnings as too. Based on this data and taking into account the biological reserve of the main pathogens and pests there have been established specific treatment regimens. The works in green and the ones for the maintenance of the soil, at a time and in between the gaps on throughout the growing season had come in addition to the plant treatment; there had been executed five treatments for the two pathogens, *Plasmopara viticola* and *Botrytis cinerea* (Tomoiagă, 2006); the phenophase and the frequency of the treatment applications are presented in table 1.

The experimental variants were represented by four products against the manna of the vine and a product used against gray mold of grapes. Against manna was used Amisulbrom SC 200, in combination with two products against manna in a different concentration; each variant is reported to a standard product, Moltovin, 3 l/ha and an witness untreated for this pathogen. Treatment for gray rot of grapes was used as standard product, the Switch, 0.6 l / ha, and the report was made to an untreated witness. In the "late flowering" phenophase it has been made the first treatment with the tested products (BBCH 71), for the two pathogens and the following treatments were made every 12-14 days until the entry of the grapes in ripe (BBCH 81).

Table 1

**The phenological and calendaristic time of the treatment application**

The treatment / phenophase	Date
T1/ BBCH 71 end of the flowering	21.06.2011
T2 /BBCH 73 formation of the grains	04.07.2011
T3 / BBCH 75 the grain growth	20.07.2011
T4 / BBCH 77 the compact of the bunches	05.08.2011
T5 / BBCH 81 entry into first fruits	19.08.2011

With in the experimental polygon, the observations were made upon the frequency, intensity and degree of the attack, the methodology applied in the forecasting and warning stations (Ilişescu, 2003). The highlight of the pathogens of vines and their numerical density assessment were performed by field surveys, sampling, by sampling strings, leaves and bunches. The laboratory determinations were made under binocular magnifying glass and by making microscopic preparations and the field observations were conducted in correlation with covering the phenological spectrum in conjunction with the development of the climatic factors (Iacob et al., 2000).

## RESULTS AND DISCUSSION

In the wine center Copou-Iasi, the year 2011 was considered to be favorable for the vine culture, the propagation of the pathogens *Plasmopara viticola* and *Botrytis cinerea* being limited by special weather conditions (table 2).

Table 2

Meteorological data recorded during the vegetation period of the 2011

Month	Average monthly (t°C)		Maximum (t°C)	Low (t°C)	Rainfall (l/m <sup>2</sup> )		Hygrosopicity (%)		Insolation (hours)	
	Normal	2011			Normal	2011	Normal	2011	Normal	2011
IV	10,1	9,8	23,3	1,0	40,3	73,0	62	60	171,3	191,3
V	16,1	16,2	29,4	2,2	52,5	54,7	62	60	220,9	252,0
VI	19,4	19,8	32,5	11,3	75,1	136,3	63	63	264,6	227,7
VII	21,3	21,4	33,5	10,8	69,2	72,4	62	66	294,4	279,9
VIII	20,6	20,9	30,6	10,6	57,6	33,0	63	56	272,2	299,7
IX	16,3	17,8	30,4	7,3	40,8	21,4	66	59	215,4	221,8

During the testing the average temperature in the growing season ranged between 20.9 and 21.4 °C, June being the only month when has been exceeded the recorded rainfall, 136,3-21,4 l/m<sup>2</sup> compared with normal 75,1 l/m<sup>2</sup>. By the end of July there were recorded 72.4 l/m<sup>2</sup>, the normal value of the month precipitation being 69.2 l/m<sup>2</sup> and the average temperature was 21.4<sup>0</sup> C. In August, temperatures were quite high, and the total rainfall was 33 l/m<sup>2</sup>, thereby limiting the emergence of fungi. In the figures 1 and 2 there are presented general aspects of the emergence and spread of pathogens *Plasmopara viticola* and *Botrytis cinerea* in favorable climatic conditions (Ilişescu, 1999).



Fig. 1 - The manna vine (attack on leaves)



Fig. 2 - The gray rot (attack on clusters)

The quantities of commercial product applied per unit of area were different: product Amisulbrom 200 SC was applied firstly at a dose of 0.375 kg /

ha and then combined with the products Mancozeb (in two doses 1.6 kg and 2.0 kg / ha) and Folpet a dose of 0.940 kg/ha. The product for grey rot, MCW 3858 (cyprodinil and tebuconazole) was tested in a single dose of 1.6 l/ha. The observations were made throughout the whole testing period, before starting the treatment and after their application, and on the appreciation of the attack, made at the grapes compaction (BBCH 77), we found that it was insignificant, the values recorded being very low.

The determinations made at the entry of the grapes in ripe (BBCH 81) were made by counting the organs of the vine (leaves and clusters), which showed signs of attack, for the determination of the frequency, intensity and degree of attack; the notes were made using a scale from 1-6, (Rafaila, 1980), tables 3 and 4. Treatments were made with a spraying device Matabi SUPERGREEN 16, using the normal volume of fluid per hectare. The results obtained in the experimental group on the effectiveness of the products tested according to the degree of attack recorded, compared with the untreated witness and the standard products are shown in figure 3. When calculating the effectiveness of the products the following formula was used:

$$E\% = \frac{\text{Gam} - \text{Gav}}{\text{Gam}} \times 100, \text{ where:}$$

Gam- the degree of version control procedures;

Gav- the degree of attack variant;

Table 3

The traits recorded on variants treated against manna

The product	Variante code	Dose l/kg/ha	Rep.	BBCH 80-85 (entry into firstfruits) / date: 06.09.2011.					
				F%		I%		Ga%	
				Grap.	Leav.	Grap.	Leav.	Grap.	Leav.
Amisulbrom 200 SC	V1	0,375l/ha	1	0	9,29	0	3,66	0	0,34
			2	0	7,74	0	3,63	0	0,28
			3	0	7,4	0	4,16	0	0,3
			4	0	5,63	0	8,87	0	0,49
			Med	0	7,51	0	5,08	0	0,38
Amisulbrom 200 SC+ Mancozeb 750	V2	0,3 l/ha+1,6 kg/ha	1	0	4,66	0	4,27	0	0,19
			2	0	7,93	0	4,4	0	0,34
			3	0	5,66	0	4,16	0	0,23
			4	0	3,84	0	2,75	0	0,1
			Med	0	5,52	0	3,89	0	0,21
Amisulbrom 200 SC + Mancozeb 750	V3	0,3 l/ha+2,0 kg/ha	1	0	4,76	0	4,9	0	0,23
			2	0	3,84	0	3	0	0,11
			3	0	5,81	0	3	0	0,17
			4	0	2,77	0	6,5	0	0,18
			Med	0	4,29	0	4,35	0	0,18
Amisulbrom 200 SC+Folpet	V4	0,3 l/ha+0,94 kg/ha	1	0	5,4	0	3	0	0,16
			2	0	5,47	0	3,63	0	0,19
			3	0	0	0	0	0	0
			4	0	2,38	0	3	0	0,1
			Med	0	3,31	0	2,4	0	0,07
Moltovin Standard	V5	3.0 l/ha	1	0	2	0	3	0	0,06
			2	0	0	0	0	0	0
			3	0	0	0	0	0	0
			4	0	3,5	0	3,1	0	0,1
			Med	0	1,37	0	1,52	0	0,02
Martor (net.)	V6		Med	0	22,36	0	18,47	0	4,12

Table 4

## The traits recorded on variants treated to control gray rot

The product	Variante code	Dose l/ha	The inflorescences attacked		The grapes attacked	
			GA%	E%	GA%	E%
MCW 3858, (cyprodinil+tebuconazol)	V7	1,6	-	-	0,36	93,18
Switch (standard)	V8	0,6	-	-	0,16	97,00
witness (untreated)	V9	-	-	-	5,28	-



Fig. 3 - The determining the effectiveness of the degree of attack each variant analyzed (manna and gray rot)

From figure 3 it can be seen that the degree of attack recorded in the two pathogens was reduced, due to the climatic conditions, that haven't favored their propagation, on the one hand, and on the other due to the effectiveness of the products tested. This shows that the fungicides above had wheel protected the leaves and the grapes, with a very good fungal effect, shown by over 93% of effectiveness.

From the four possible treatments against manna the best results occurred for the combination of Amisulbrom 0.375 kg /ha with Folpet 0.94 kg / ha, the effectiveness being 98%. For the product against the gray rot of grapes (MCW 3858), the effectiveness value recorded was 93%. The two products, following the favorable results obtained, were presented for approval.

The quantity and quality of the grape harvest was the specific for the variety, with the influence of the tested fungicides (tab. 5). Must had a normal fermentation (spontaneous fermentation), and the wines obtained also had normal qualitative values.

Table 5

The effects of the tested fungicides on the quantity and quality of the grapes

Nr. crt.	The treatment option	Concentration %	The quantity of the grapes / hub (kg)	The sugars content g/L	Total acidity g/L H <sub>2</sub> SO <sub>4</sub>
1.	Amisulbrom 200 SC	0,037	4,40	177	5,2
2.	Amisulbrom 200 SC + Mancozeb 750-	0,037+0,16	4,60	182	5,7
3.	Amisulbrom 200 SC + Mancozeb 750	0,037+0,20	4,80	178	5,6
4.	Amisulbrom 200 SC + Folpet	0,037+0,094	5,10	192	6,1
5.	Moltovin Standard	0,30	5,20	194	6,7
6.	Martor (net.)	-	4,10	176	5,4
7.	MCW 3858, (cyprodinil + tebuconazol)	0,16	4,80	185	5,8
8.	Switch (standard)	0,06	5,00	192	6,2
9.	Martor (netratat)	-	4,60	179	5,2

### CONCLUSIONS

1. In the year 2011 there have been recorded very favorable climatic conditions for the wine growing, in the Viticultural Centre Copou-Iasi.

2. All versions of the products used to combat the *Plasmopara viticola* pathogen showed good results, standing out the combination of Amisulbrom and Folpet, with an effectiveness of 98% and recommended for approval.

3. For the test of the product against the gray rot of grapes, the degree of attack was 0.36%, and the effectiveness of 93%, recommended to be used for combating this pathogen.

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