

# EFFECT OF FOLIAR FERTILIZER „FLORAVIT” ON WINE QUALITY IN THE DEALU BUJORULUI VINEYARD

## EFECTUL FERTILIZANTULUI FOLIAR „FLORAVIT” ASUPRA CALITĂȚII VINULUI ÎN PODGORIA DEALU BUJORULUI

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**Abstract.** *The quality of wine is a growing concern of the winemakers on the competitive market in terms of increasing of demands consumer. Through the performed studies at SCDVV BUJORU using the product, "FLORAVIT" a foliar fertilizer produced by Original Process-France, ECOCERT certificate, natural, effective, adapted to the new European rules, allowed in organic culture technology, was analyzed its effect on the accumulation the compounds of the grapes. The administration of FLORAVIT product was achieved in cultivated vineyards in ecological system (re. EC 889/20080) of Merlot variety. Grape vine becomes resistant to the external aggressions: cold, heat, stress of any kind. FLORAVIT product is efficient in planting of Merlot cultivated in ecological conditions under high temperature and high humidity (the precipitation over multiannual average of the area). This foliar fertilizer, used on Merlot variety, gives good results, enhancing the quality of the grapes and therefore wine quality.*

**Key words:** fertilizer, climate, grapes, wine, polyphenols, anthocyanins.

**Rezumat.** *Calitatea vinului este o preocupare tot mai mare a vinificatorilor pe piața concurențială, în condițiile de creștere a exigențelor consumatorilor. Prin studiile efectuate la SCDVV BUJORU, folosind produsul „FLORAVIT”, un îngrășământ foliar produs de Original Process - Franța, certificat de ECOCERT, natural, eficient, adaptat noilor norme europene, permis în tehnologia de cultură ecologică, s-a analizat efectul lui asupra acumulărilor de compuși din struguri. Administrarea produsului FLORAVIT s-a realizat în plantațiile viticole cultivate în sistem ecologic (re. CE 889/20080) al soiului Merlot. Vița de vie devine rezistentă în fața agresiunilor externe: gerul, arșița, stresurile de orice natură. Produsul FLORAVIT este eficient în plantația de Merlot cultivat în condiții ecologice în condiții de temperatură și umiditate ridicată (precipitații peste media multianuală a zone). Acest îngrășământ foliar, administrat la soiul Merlot, dă rezultate favorabile, potențând calitatea strugurilor și implicit calitatea vinului.*

**Cuvinte cheie:** fertilizant, clima, struguri, vin, polifenoli, antociani.

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## INTRODUCTION

Dealu Bujorului vineyard is located in south-eastern of Moldova, Romania, and has a high win-growing potential especially for producing quality wines.

To the development of an indigenous foliar fertilizer formulations for use in field crops and plantations hortiviticole exposed by drought were made by Borlan Z. and collaborators (1999).

Researches on the effect of autochthon foliar fertilizer on vigor vineyards were made by John M. and collaborators (2000).

A representative high-quality wine for Bujoru Station is obtained from Merlot variety grown in the ecologic system (Simion Cristina et al., 2003).

To obtain quality horticultural production and increase soil fertility, the use of foliar fertilizer is a major goal of modern horticulture. In agrochemical practice of foliar fertilization is determined accurately the need of nutrient consumption and fertilizer of plants nutrients and achieve of concentration of these substances is based on leaf area per unit area (M. Rusu et al., 2005).

## MATERIAL AND METHOD

Experimentation FLORAVIT product was achieved in organically grown vineyards (re.CE 889/20080) on an area of 3 ha of Merlot variety.

Experimental versions:

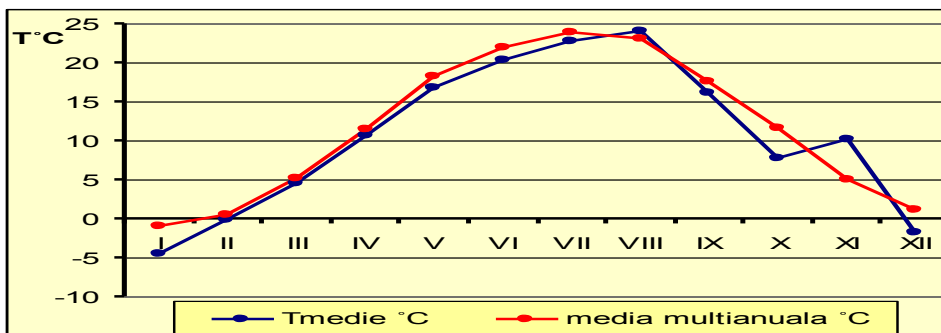
- V1-control, unfertilized (1 ha).
- V2-fertilized FLORAVIT product in the first year (1 ha);
- V3-fertilized FLORAVIT the product two years in a row (1 ha);

As a foliar fertilizer was used FLORAVIT product at a dose of 5 L/ha/phenophase administering solution to 400 liters/ha at the first treatment because of reduced foliage, then the other treatments received 750 liters of solution / ha / phenophase. There have been performed the determinations on the dynamics of quantitative accumulation from grapes in maturation process of grape and of wines in terms of general composition, but predominantly the black compounds.

## RESULTS AND DISCUSSIONS

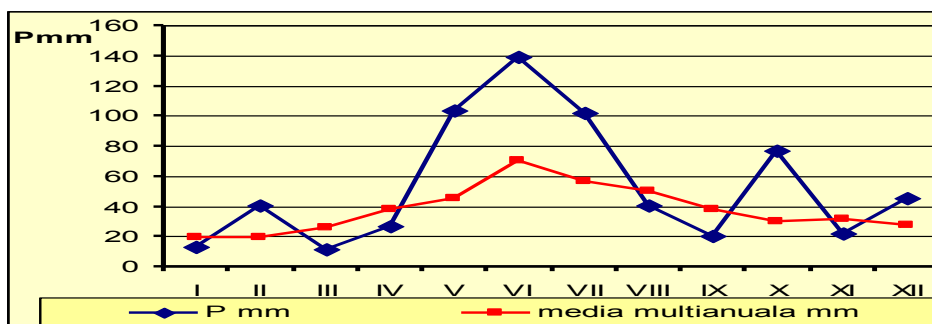
Application of FLORAVIT product was performed mechanically on phenophase of vegetation to the following dates: flower buds (06 May), flowering (04 June), flower in fruit processing (03 Julie) and ripening (05 August).

In 2010 the average temperature of the air was 10.6°C and during the growing season it was 18.5 °C. The maximum average monthly temperature was recorded in August (24.0°C). Compared with the multiannual average, annual average air temperature has decreased by 1.0°C. Throughout the growing was recorded a heat deficit, except for August which showing a surplus of 0.9°C heat (figure 1).



**Fig. 1** - Evolution of average air temperature in 2010 SCDVV Bujoru

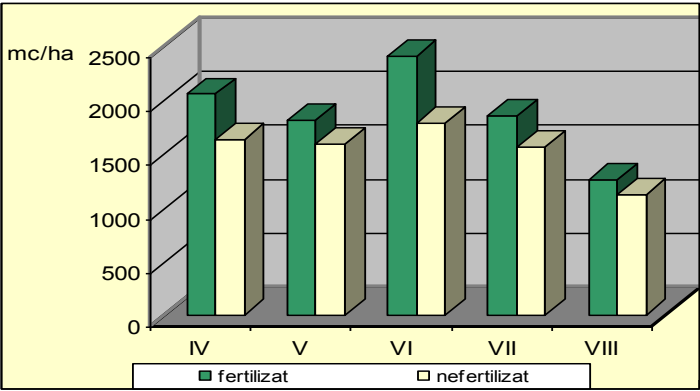
Year 2010 shows a contribution of 639.8 mm of rainfall witch 431.4 mm during the growing season. Compared with the multiannual average, on vegetation during the precipitation deficit was about 38.5 mm (10.9 mm / IV, 9.8 mm / VIII, 17.8 mm / IX) and in winter about 30.8 mm (9.6 mm / I, 14.5 mm / III, 9.7 mm / XI). In the vegetation period is noted in April, August and September by low rainfall and May and June with a surplus intake compared to annual average rainfall (figure 2).



**Fig. 2** - Evolution of monthly rainfall SCDVV Bujoru-2010

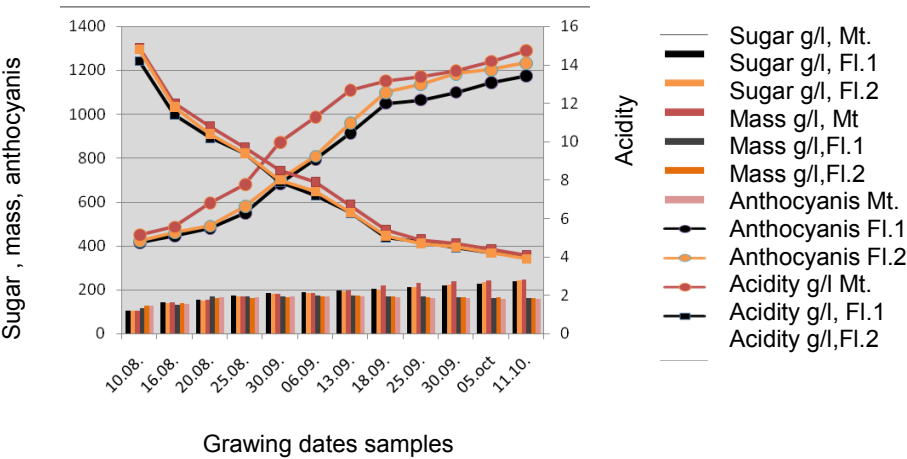
The evolution of humidity was dynamic determined by taking soil samples in every month, on 0-100cm profile, from 20 to 20 cm (fertilized / unfertilized). As a result of weather conditions from 2009, the vegetation period of 2010 begins with a poor reserve of water in soil, the humidity of soil at the beginning of vegetation standing at the 2048 and 1627 m<sup>3</sup>/ha/fertile m<sup>3</sup>/ha/unfertile (Figure 3). Insufficient rainfall from April accentuate the deficit of water from soil, in early June the humidity was much lower than at the beginning of the season of vegetation (1805 m<sup>3</sup>/ha/fertilized and 1589 m<sup>3</sup>/ha/unfertilized). Against of rainfall deficit since 2009 of reduced rainfall winter and diurnal average consumption of the grape vine on during of the vegetation season, humidity of soil in 2010 showed a downward trend since July. The torrential character of rains and reduced capitalization of these led to conservation of their small kept the water shortage throughout the vegetation season.

In August, when the grape vine begins to mature ripe and consumption is significant, the humidity of soil placed at level by 51.11% of the IUA/fertilized and 38.84% respectively of the IUA/unfertilized (IUA = active humidity range).



**Fig. 3 - Dynamics of soil moisture-2010 (m³/ha)**

There have been determinations concerning the quality of production through evolution of dinamics ripening grapes (anthocyanins from the epicarp of the grapes, the content in grape sugar and total acidity)



**Fig. 4 - Dynamics of ripening grapes**

After noticeable as in figure 4 all determined compounds from grapes are quantitatively higher in variants treated with FLORAVIT.

The Merlot variety and Merlot with FLORAVIT (V2-fertilized in the first year of administration) has reached full maturity on the 13.09. at a sugar content of 195 g/L total acidity of 6.3 g/L H<sub>2</sub>SO<sub>4</sub>, 100b mass of 172 g, the amount of anthocyanins in epicarp of grapes by 915 mg/kg and 193 g/L sugar, 6,7 g/L total acidity, mass 100 b 171 g and 960 mg/kg anthocyanins from epicarp of grapes.

The Merlot variety with FLORAVIT (V3-fertilized two years in a row) made full maturity earlier, namely on 06.09. with a sugar content of 186g/L, acidity of 7,4g/L, mass of 100d by 170 g and anthocyanins from epicarp of grapes at a rate of 986 mg/kg.

Among variants of Merlot variety, at harvest, the Merlot - FLORAVIT version (V3) obtained higher values, namely at the sugar content of 245 g/L and anthocyanins in the skin of grapes of 1,289 mg/kg, so there is a difference between experimental variants. At harvest, the quantity of grapes by Merlot with FLORAVIT was 4395 kg/ha and the quantity of grapes by Merlot was about 3675kg/ha. The rate of must from grapes was 70.5% at FLORAVIT - Merlot and about 69.7% at Merlot.

Compositional characteristics of the wines are presented in table 1.

The content of wine in alcohol presents depending on the accumulated amount of grapes sugar at harvest is between 13.9% - 14.1% vol. The total volatile acidity and the pH of wines are within normal limits.

The unreducer extract at the vinified Merlot wine in wooden tubs is between 28.4 to 29.6g/L, respectively blank version is about 28.4g/l, at FLORAVIT variant (V2) it was values of 29,4g/L and FLORAVIT variant (V3) have values of 29.6 g/L, so there is a quantitative increase in variants treated with FLORAVIT. The same character of wine has the unreducer extract at Merlot wine variety vinified in tanks rotating, lower values Merlot wine - stag (29.6 g/L) than that treated with FLORAVIT (30.9g/L).

Table 1

Compositional characteristics of wines

Variant	Alcoh %vol.	Total acidity g/l C <sub>4</sub> H <sub>6</sub> O <sub>6</sub>	Volatile acidity g/l H <sub>3</sub> COOH	Extract g/l	Sugar reduc. g/l	Intensity color. 420+520+620 1 mm	Anthocyanins mg/l	Total polyphenols g/l	pH	Free SO <sub>2</sub> mg/l	Total SO <sub>2</sub> mg/l	Organoleptic apreciation
Merlot-control, tub	13,9	6,9	0,40	28,4	1,6	6,45	320	1,70	3,30	32	98	good
V2-Merlot FLORAVIT, tub	14,1	7,0	0,36	29,4	7,1	6,59	365	1,77	3,47	35	105	very good
V3-Merlot FLORAVIT, tub	14,1	7,1	0,36	29,6	7,4	6,84	379	1,91	3,45	34	102	very good
Merlot control, Roto	13,9	7,1	0,36	29,6	1,3	7,77	410	2,15	3,29	31	99	very good
Merlot FLORAVIT, Roto	14,1	7,1	0,39	30,9	4,5	8,31	460	2,22	3,51	38	80	very good

So, the wines made by maceration-fermentation in rotating metal container are more extractive, more intensely colored, more rich in anthocyanins and total polyphenols because more often placed in contact of the solid phase with the liquid phase than those obtained by maceration-fermentation in open vats.

The analyzed compounds of color (anthocyanins, colour intensity total polyphenols) presents quantitative values superior to variants of wine rotating metal tanks such as: the content in anthocyanins at version Merlot – flag gives values of 410 mg/L and at flag version Merlot vinified in the wooden tubs is 320 mg/L. Also, the colour intensity is 6.45 at the flag variant and about 7.77 to vinified version in rotating tanks of wine and total polyphenols 1,70 g/L at variant with tubs compared with the variant of the vinified version in rotating tanks which is 2.15 g/L. So, from effectuated researches result that at the Merlot variety the favorable results were obtained in variant V3-two years consecutively fertilized with foliar fertilizer FLORAVIT.

In terms of taste, all the wines are considered good and with a high alcohol potential, extractive and with a appreciable intensity of color.

## CONCLUSIONS

1. The water supply in soil is influenced both by rainfall in the previous year as well as those registered during the growing season, and the frequency of torrential rainfall, leading to increased of the water deficit during the growing season.

2. The administration of FLORAVIT foliar fertilizer at Merlot variety give favorable results about wine quality, such quantity of colored compounds (anthocyanins, polyphenols) is superior compared with flag as result of stimulating of the physiological processes under the impact of fertilizer.

3. Wines obtained in rotating metal tanks are appreciated in terms of organoleptic and physical-chemical composition, having a extractivity and color better than wines in wooden tubs.

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