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Special Green Works Influence on Yield Quantity and Quality at Grape Varieties for Flavoured and Semi-flavored Wines from S.C.D.V.V. Blaj

Florentina CIOBANU[1)], Nastasia POP[1)], Maria ILIESCU[2)], Anca BABEŞ[1)], Claudiu Ioan BUNEA[1)], Anca Eva ARDELEAN[1)], Mihai Lucian LUNG[1)], Andreea Flavia TRIPON[1)]

[1)] Faculty of Horticulture, University of Agricultural Science and Veterinary Medicine, 3-5 Manastur Street, Cluj-Napoca, Romania; flo030@yahoo.com.
[2)] Research Station for Viticulture and Enology, 2 G. Baritiu Street, Blaj, Romania.

Abstact. This paper was done in order to establish the influence of special green works (grapes thinning, partial deleafing and grapes bagging) on yield quantity and quality at the varieties: Muscat Ottonel, Neuburger, Traminer roz and Sauvignon blanc, in the ecoclimatic conditions of Târnave Vineyard. Harvesting took place at end of September. To assess the quantity of harvest was set the average number of grapes per vine, average weight of a grape and the vine production. Knowing the number of vines per hectare the yield per hectare was calculated, expressed in t/ha. For these determinations were made direct measurements in the field. Quality of wine varieties can be expressed by mechanical analysis of the grape, determining composition, structure and grain indices. The quality of grapes from the vine represents a very important feature of varieties. This refers to the accumulation of reducing sugars and acidity in the grapes. Carbohydrate concentration, performed at full maturity, is a characteristic of grapes variety, vineyard and harvest year. Analyzing production in terms of variety, there is a superior significant difference at Sauvignon blanc compared to the other three varieties, followed by Muscat Ottonel and Traminer roz. Analyzing the interaction of the two factors (variety, special green works), the highest yields were obtained from Sauvignon blanc V3, followed at insignificant difference by Sauvignon Blanc variants Mt and V2. For all varieties is noted that in relation to the applied green work, the smallest productions were obtained at V1, this being due to the smaller number of grapes per vine. The greatest influence on yield differences were exerted by variety and variety-green work interaction, while the green work has the smallest influence. Thus, Sauvignon Blanc stands out with the highest yields, regardless of the green work used. The amount of sugar at Muscat Ottonel does not differ significantly from any other variety, being very close to the other varieties. Following the accumulation of sugar under the influence of green works, differs significantly superior variant V2, which confirms that the partial defoliation favorises the sugar accumulation. Under the combined action of the two factors, stand out also variant V2 of Traminer roz. Considering the total acidity of the must, after execution of the green works, there is a decrease of acidity to special green work variants. Cumulative influence variety-green work leads to the highest values of all variants, Neuburger, followed by Sauvignon Blanc and Muscat Ottonel.

Keywords: flavoured grapes wine varieties, production, yield quality, mechanical analysis, sugar, acidity.

INTRODUCTION

In viticulture the determinant factor for qualitative production, is the grape variety. By applying an adequate technology and by keeping it in optimal ecoclimatic conditions, it can be fully valorized. Therefore, the elaboration of modern technologies, efficient from an economical point of view, can insure the continuous increase in grape production, quantitatively and qualitatively, and it is a major aim in the specific field. The complex of agro-phyto-technical measures that has as main objective sustaining the qualitative and production

capacity biological potential of grape varieties is very different and is at the basis of the scientific fundaments of differentiated cultural technologies of vines. Within this complex the green works and operations have an essential role in obtaining a better quality of table grapes (Rotaru *et al., 2011*).

The aim of green work application, during the vegetation period, is to equilibrate growth and fructification process (Rotaru *et al.*., 2011). Most of green works and operations influence especially the qualitative side of production (Bucur, 2011).

MATERIALS AND METHODS

The studies were conducted on wine grape varieties: Muscat Ottonel, Neuburger, Traminer roz and Sauvignon blanc, in ecoclimatic conditions of Târnave vineyard, during years 2010 and 2011. Harvesting took place at beginning of October in 2010 and at the end of September in 2011. To assess the quantity of harvest was set the average number of grapes per vine, average weight of a grape and the vine production. Knowing the number of vines per hectare the yield per hectare was calculated, expressed in t/ha. For these determinations were made direct measurements in the field. Quality wine varieties can be expressed by mechanical analysis of the grape, determining composition, structure and grain indices. The quality of grapes from the vine represents a very important feature of varieties. This refers to the accumulation of reducing sugars and acidity in the grapes. Carbohydrate concentration performed at full maturity is a characteristic of grapes variety, vineyard and harvest year. Out of the methods known for sugars determinations from must, it was used the refractometric method. The result is expressed in g/l (sugar grams/must litre). Titration in the presence on phenolphthalein was used to determine the total acidity in must, expressed in g/l H_2SO_4.

RESULTS AND DISCUSSIONS

Tab. 1 shows the influence of variety as well as the green work on the average weight of a grape. Grapes that have the greatest weight are at Sauvignon blanc (101.95 g) and Neuburger (102 g) making significant differences compared to other two varieties (Muscat Ottonel – 86.83 g and Traminer roz – 85 g).

Tab. 1

Influence of variety, green work and of the interaction between variety and green work on the average weight of a grape (g), at SCDVV Blaj, means for years 2010-2011

Green work / Variety	Without special green works	Grapes thinning	Partial deleafing	Grapes bagging	Average per variety
Muscat Ottonel	83.30 h	95.20 de	78.80 i	90.00 g	86.83 B
Neuburger	100.00 c	-	93.00 efg	113.00 a	102.00 A
Traminer roz	78.10 i	90.50 fg	78.10 i	93.30 ef	85.00 B
Sauvignon blanc	103.30 b	104.50 b	96.90 d	103.10 b	101.95 A
Average per green work	91.18 BC	96.73 AB	86.70 C	99.85 A	

DS 5% for two variety means = 15.17 – 16.06
DS 5% for two green works means = 8.69 – 10.03
DS 5% for two V x GW interaction means = 3.10 – 9.70

Note: The difference between any two values followed by at least one common letter is insignificant.

Varietals characteristics are reflected in the interaction between variety and green work, the grapes of the variety Neuburger which was applied bagging operation realizing the highest values for this element, namely 113 g. Of the applied green works, stands out variants V1 and V3, where are obtained close values of grapes weight. The smallest grapes were obtained at variant V2 (78.1 g at Traminer roz, 78.8 g at Muscat Ottonel, 93 g at Neuburger, 96.9 g at Sauvignon Blanc), to which was made partial deleafing.

Grape production is without question the most important indicator in the realization of successive stages in vine fructification, as useful biological trait (Oprea, 2001, quoted by Bunea, 2010). Grapevines productivity depends of variety, soil cultivation, trellising, pruning, plant protection and nutrition (Schaller, 2011).

Production was influenced quantitatively by thinning grapes. This special green work has reduced the number of grapes per vine. Even though we obtained a weight of grape growing in this variant, production was lower (2.07 kg/vine). At Neuburger no thinning was done because the number of grapes per vine was small (14-16 grapes) due to spring frost, which clearly affected this variety.

Tab. 2 gives the production situation on the vine block. Analyzing in terms of variety, there is a superior significant difference in Sauvignon blanc (2.95 kg/vine) than the other three varieties and was followed by Muscat Ottonel (2.45 kg/vine) and Traminer roz (2.42 kg/vine). Analyzing the interaction of the two factors (variety, special green work), the highest yields were obtained at Sauvignon blanc V3 (2.65 kg/vine) followed at insignificant difference by Sauvignon blanc variants Mt (2.42 kg/vine) and V2 (2.40 kg/vine). For all varieties is noted that in relation to the variant, the smallest productions were made in V1 (2.07 kg/vine), this being due to the smaller number of grapes per vine.

Tab. 2

Influence of variety, green work and of the interaction between variety and green work on the average vine production (kg/vine), at SCDVV Blaj, means for years 2010-2011

Green work / Variety	Without special green works	Grapes thinning	Partial deleafing	Grapes bagging	Average per variety
Muscat Ottonel	2.50 cd	2.00 ef	2.60 cd	2.70 cd	2.45 B
Neuburger	1.60 gh	-	1.40 h	1.81 fg	1.60 C
Traminer roz	2.50 cd	1.90 fg	2.50 cd	2.80 bc	2.42 B
Sauvignon blanc	3.10 ab	2.30 de	3.10 ab	3.30 a	2.95 A
Average per green work	2.42 AB	2.07 B	2.40 AB	2.65 A	

DS 5% for two variety means = 0.50 – 0.84
DS 5% for two green works means = 0.58 – 0.60
DS 5% for two V x GW interaction means = 0.31 – 0.70

Note: The difference between any two values followed by at least one common letter is insignificant.

Yield per hectare is influenced by the average weight of a grape, the number of grape on the vine and the number of vines per unit area (Pop, 2010). Within each variety, the highest yield per hectare was obtained in variant 3 (bagging grapes), 10.22 t/ha at Muscat Ottonel, 6.84 t/ha at Neuburger, 10.59 t/ha at Traminer roz and 12.49 t/ha at Sauvignon blanc (Tab. 3).

Tab. 3

Influence of variety, green work and of the interaction between variety and green work on the average production per hectare (t/ha), at SCDVV Blaj, means for years 2010-2011

Green work / Variety	Without special green works	Grapes thinning	Partial deleafing	Grapes bagging	Average per variety
Muscat Ottonel	9.46 cd	7.59 ef	9.85 cd	10.22 cd	9.28 B
Neuburger	6.06 gh	-	5.29 h	6.84 fg	6.06 C
Traminer roz	9.46 cd	7.20 fg	9.47 cd	10.59 bc	9.18 B
Sauvignon blanc	11.74 ab	8.71 de	11.74 ab	12.49 a	11.17 A
Average per green work	9.18 AB	7.83 B	9.09 AB	10.04 A	

DS 5% for two variety means = 1.80 – 3.12
DS 5% for two green works means = 2.21 – 2.40
DS 5% for two V x GW interaction means = 1.40 – 1.91
Note: The difference between any two values followed by at least one common letter is insignificant.

Based on the mechanical composition of grape varieties studied were calculated uvological indices: structure index, index of grains and the grain composition index (Fig. 1).

Pop (2005) define the index of structure as the ratio of grain weight and weight of bunches, typical values ranging from 10-50. The same author writes that grain index is given by the number of grains per 100 g grapes, with values between 25 and 100. Index composition of grain is defined as the ratio of weight pulp and skin weight plus the weight of seeds and has values between 5 and 15.

In control variant of Muscat Ottonel, grain index has the highest value (59.2), which points out those grains are smaller in this case. At all the other three varieties, the highest value for grain index is at variant V2 (between 58.5 at Neuburger and 75.8 at Traminer Roz).

Composition index is close to the limit of 5, which indicates that varieties are designed to provide high-quality wines. Varieties Muscat Ottonel and Neuburger have grape structure index with the highest values in variant V3 (45.9, respectively 33.0), while at Traminer roz and Sauvignon blanc this is done in variant V1 (40.1, respectively 46.5). More the value of the structure index is higher, the grape is more compact.

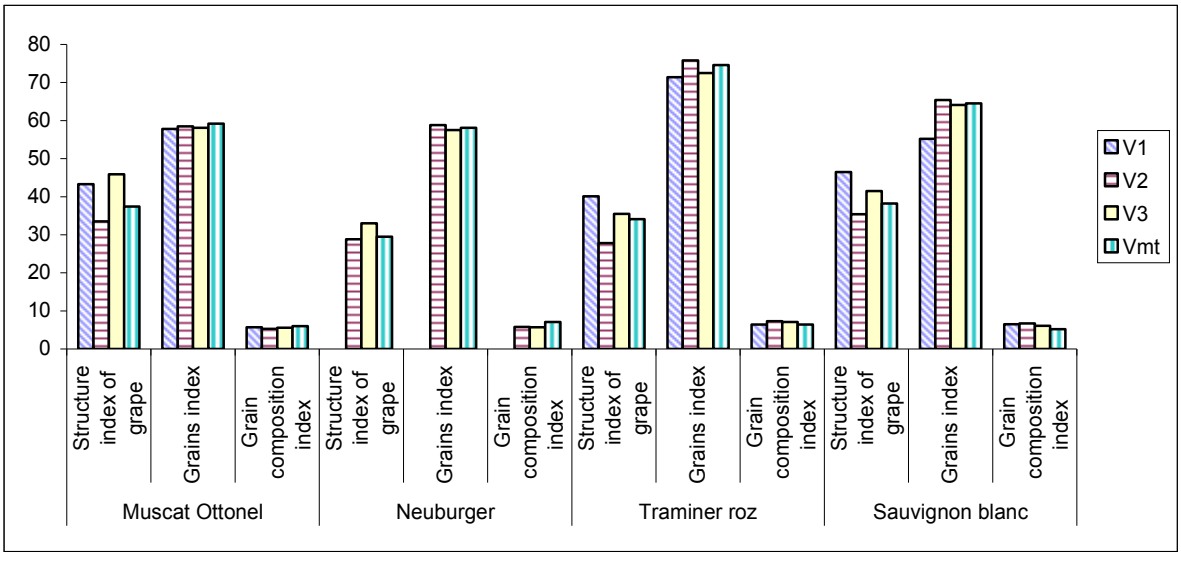

Fig. 1. Uvological indices of studied varieties, at SCDVV Blaj, means for years 2010-2011

The amount of sugar at Muscat Ottonel (204.88 g / l) did not differ significantly from any other variety, being very close to the other varieties. Following the accumulation of sugar under the influence of works, differs significantly superior variant V2 (partial deleafing) 213.38 g/l, which confirms that the partial defoliation promotes sugar accumulation due to sun exposure. Under the combined action of the two factors stand out variant V2 of Traminer roz, variant which has accumulated 227.7 g/l sugar. The lowest values were observed in the control variant Sauvignon blanc, only 194.8 g/l sugar.

Tab. 4

Influence of variety, green work and of the interaction between variety and green work on the must sugar content (g/l), at SCDVV Blaj, means for years 2010-2011

Green work / Variety	Without special green works	Grapes thinning	Partial deleafing	Grapes bagging	Average per variety
Muscat Ottonel	199.00 g	201.20 f	212.80 b	206.50 c	204.88 AB
Neuburger	194.80 i	-	206.50 c	203.30 d	201.53 B
Traminer roz	201.20 f	202.20 e	227.70 a	212.80 b	210.98 A
Sauvignon blanc	194.80 i	195.90 h	206.50 c	203.30 d	200.13 B
Average per green work	197.45 C	199.77 C	213.38 A	206.48 B	

DS 5% for two variety means = 9.43 – 10.10
DS 5% for two green works means = 6.70 – 6.90
DS 5% for two V x GW interaction means = 1.00 – 14.90

Note: The difference between any two values followed by at least one common letter is insignificant.

Botu, 1994 argues that for the determination of grape quality, in addition to determining the sugar content is very important to determine the total acidity of must.

Following acidity under the influence of variety, it is noted that in this feature Neuburger reaches over 4.9 g/l H_2SO_4, and differ significantly superior to the other varieties. Considering the total acidity of the must, after execution of the green works, there is a decrease of acidity to special work variants. Cumulative influence variety-green work leads to the highest values of all variants from Neuburger to Sauvignon Blanc and Muscat Ottonel. The highest acidity is at variety Neuburger (5.1 g/l H_2SO_4 to control variant), and the lowest at Traminer roz (3.6 g/l H_2SO_4 to variant V2).

Tab. 5

Influence of variety, green work and of the interaction between variety and green work on total acidity from must (g/l H_2SO_4), at SCDVV Blaj, means for years 2010-2011

Green work / Variety	Without special green works	Grapes thinning	Partial deleafing	Grapes bagging	Average per variety
Muscat Ottonel	4.10 d	4.40 c	3.90 e	4.30 c	4.18 B
Neuburger	5.10 a	-	4.70 b	5.00 a	4.93 A
Traminer roz	4.10 d	4.00 de	3.60 f	3.90 e	3.90 C
Sauvignon blanc	4.70 b	4.40 c	4.00 de	4.10 d	4.30 B
Average per green work	4.50 A	4.27 AB	4.05 B	4.33 AB	

DS 5% for two variety means =0.23 – 0.27
DS 5% for two green works means = 0.49 – 0.51
DS 5% for two V x GW interaction means = 0.20 – 0.40

Note: The difference between any two values followed by at least one common letter is insignificant.

CONCLUSION

The executions of green works have great influence especially on crop quality. Combined influence of the variety with the special green work applied gives different results both quantitatively and qualitatively. Regarding to sugar accumulation, these achieve the highest values at Traminer roz variety, to which has been applied partial deleafing.

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