

## COMPARISON OF FOUR MERLOT CLONAL SELECTIONS FROM SKOPJE'S VINEYARD REGION, R. MACEDONIA

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### ABSTRACT

*Merlot clonal selections from Skopje's vineyard region, R. Macedonia were studied during the period from 2005 to 2007. The aim was making a comparative examination of some agrobiological and technological characteristics of four Merlot clonal selections (181, 184, 346 u 348), cultivated in same agrotechnical and ampelotechnical measures. Different values for the examined characteristics are gained as a result of the grape variety specifications and ecological conditions during the examination years. During the examination period, Merlot clonal selection 181 has the most stabile yields with varying coefficient of 17,58 and the Merlot clonal selection 348 has the most biggest varying coefficient of 32,8. In the chemical composition of must some significant variations in the compositions of all acids, and insignificant variations in the sugar-glucose are noticed. The total average tasting value of 17.6 points is smallest at the wine produced from clone 184 and biggest at wines produced from clones 181 and 348 with 17.9 points.*

**Key words:** Merlot clonal selections, yield, sugar- glucose, acids, wine

### INTRODUCTION

In the last 10 years in R. Macedonia vineyards reconstruction and improvement of the assortment are done with certified seedling of Merlot, Cabernet Sauvignon, Cabernet Franc, and etc. Studying of the clones and receiving more real knowledge of their agrobiological and technological characteristics is of great importance for the justification of their further cultivation and spreading. In order of population, clones from one selection differentiate with better characteristics of the grape and the quality of produced wines [1]. The clones also differentiate between themselves in certain characteristics (yield, weight of the cluster, sugar content, total acids and anthocyanin), which is a result of the assortment specification and less on the impact of cultivation conditions [2]. Selected Merlot clones which have larger yield, clusters with bigger weight give lower quality of the wine in accordance to less productive Merlot clones [4].

Under conditions of Skopje's vineyard region, the examined 4 Merlot clones 181, 184, 346 u 348 are selected and most represented in France and other European countries which produce wines with recognizable taste of fruit aroma, bigger content of tannin, anthocyanin and etc.

### MATERIAL AND METHOD OF WORK

Four Merlot clonal selections: 181, 184, 346 and 348 were included in the research and were cultivated in same agroecological conditions with application of regular agrotechnical and ampelotechnical measures. The seedling is raised in 2000 with a certified antivirus material from France. The process of cultivation is a fruit-wall with two legged Guyot way of pruning, distance of planting of 2.5m between the lines and 1.3m between the grapevines in line with an optimal strain of 22 eyelets by grapevine. During the vegetation regular agrotechnical and ampelotechnical

measures are applied. 30 grapevines of each clone were included in the studies, three repetitions of 10 grapevines. The yield of kg by grapevine and ha was analyzed as a representative of agrobiological characteristics and from the technological characteristics, the chemical composition of must (content of sugar and total acids), and the quality of the wine through chemical composition and degustation of the same were studied.

The quantity of the harvested grape is determined in a way that the grape is harvested from all 30 grapevines and the yield of grapevine by 1ha is mathematically calculated. The composition of sugar in the must is determined by help of Oechsle Scale, and the composition of total acids is determined by titration of N/4 NaOH with factor 1.0000.

When it is in technological maturity the grape is taken from each clone separately and it is processed in the Institute's winery. The grape mash was sulphated with 80 mg/l liquid SO<sub>2</sub>, and then selected vine yeast *Saccharomices cerevisiae* is added. The time of duration for the maceration was 6 days, and then was pressing with handy winepress, and the produced young wine was put in glasses balloons and in them the alcoholic fermentation was completed. The temperature during the alcoholic fermentation was from 23-25 °C. The wines produced with these procedure were poured off 2 times, and during every pouring off a correction of SO<sub>2</sub> was done so that the free SO<sub>2</sub> is not lower than 25 mg/l and the entire SO<sub>2</sub> is not higher than 100 mg/l. Chemical analysis of the wine is done after the second pouring off and recommended methods of O.I.V (International organization of vine and wine) are used. For determination of the specific weight, the alcohol and the extract in the wine a pycnometer method was used.

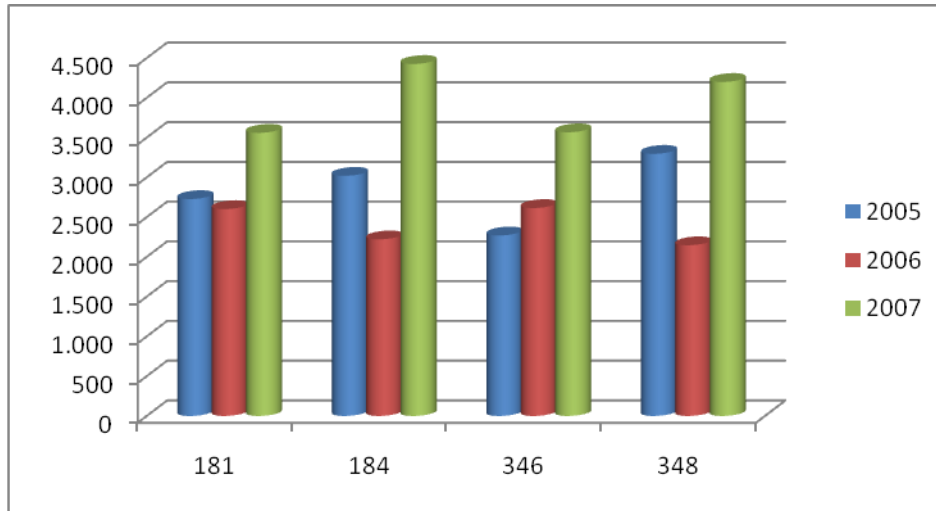
The entire acids were determined by application of titrimetric method with N/4 NaOH, and the content of anthocyanin was done spectrophotometrically according to P. Ribereau-Gayon E. Astonestreet method. The organoleptic grade of wines was done by application of Booch-Womb method.

## RESULTS AND DISCUSSION

The results of the quantity of the harvested grape from the examined Merlot clones are given in table 1. Under same conditions of cultivation, in the examined period (2005/2007), the highest average yield is produced by clones 184 (3.222 kg/vine) and 348 (3.214 kg/vine). After many years, the biggest variation is noticed at the same clones, by variation coefficient of 32.44 (clone 184) and 32.01 (clone 348). With the smallest average yield of 2.816 kg/vine and with biggest stability or the smallest variation coefficient is clone 181. These results graphically are presented in Graph1.

These results are confirmed with the results from the research in INRA-France [6.7]. With highest yield is clone 348 (1.95 kg/vine), and with smallest yield is clone 181 (1.59 kg/vine).

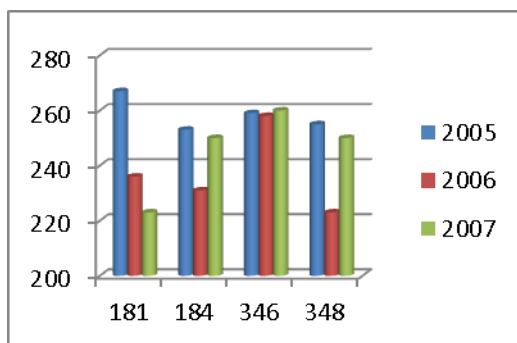
Graf.1 Yield of grape kg/vine



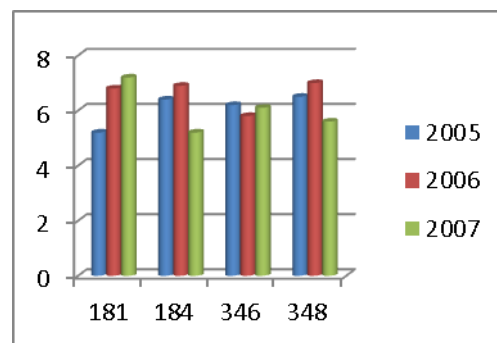
Results for the content of sugar and all acids are presented in Graph 2 and Graph 3. The content of sugar and the acids and their mutual ratio are among the most important parameters for evaluation of the clone's quality. From the studied Merlot clones selections, highest content of sugar of 259 g/dm<sup>3</sup> has clone 346, and lowest content of sugar of 242 g/dm<sup>3</sup> has clone 181.

The clone 346 has average content of the entire acids of 6,0g/dm<sup>3</sup> and clones 181 and 348 .have 6.4 g/dm<sup>3</sup> acid content. Other clones, in the examined period, have 5.2 g/dm<sup>3</sup> acid content at clone 184 in 2007 to 7.2 g/dm<sup>3</sup> at clone 181 in the same year.

Graf. 2 Contents of sugar in the must g/dm<sup>3</sup>



Graf.3 Contents of t. acids in the must g/dm<sup>3</sup>



The results of the chemical analysis of wines from the examined clones are presented in table1. The average content of alcohol during the examined period is 12,25% vol. in wine from the clone 181 in 2006 and 14,38% vol. in wine from the clone 184 in 2007. Differences in the alcohol content between the clones are due to the different content of the sugar in must.

Table 1. Chemical analysis on wine

Element	2005					2006					2007				
	clon					clon					clon				
	181	184	346	348	CV%	181	184	346	348	CV%	181	184	346	348	CV%
alcohol vol%	13.13	13.39	12.65	12.87	2.46	12.25	12.42	13.92	13.05	12.96	13.92	14.38	14.29	13.65	4.42
total extract g/l	23.2	24.8	25.5	25.5	4.38	25.1	26.3	30.2	33.1	12.79	32.8	29.4	33.9	31.3	6.12
extract without sugar g/l	22.2	24.8	24.4	25.5	5.88	25.1	25.0	25.2	26.3	2.38	25.8	24.4	25.9	25.3	2.70
total acids g/l	5.5	5.2	5.3	5.4	2.41	5.5	5.3	5.4	5.4	1.51	5.1	5.2	5.6	5.2	4.20
residual sugar g/l	2.0	1.0	2.1	1.0		1.0	2.3	6.0	7.8		8.0	6.0	9.0	7.0	
antocyanes mg/l	284.2	294.0	276.2	282.3	2.60	274.6	279.4	280.0	286.2	1.70	382.4	285.8	201.9	205.3	31.64

The extract without sugar (dry extract) in wine is characteristic parameter for each selection. In the examined period the extract is 22.2 g/dm<sup>3</sup> in wine of the clone 181 in 2006 and 26.3 g/dm<sup>3</sup> in wine of the clone 348 in 2007.

One of the most significant parameters at the red wines is the wine colour or more specifically the composition of the anthocyanin. The composition of all anthocyanin depends on the weight of the grapevine, maturity level, temperature and the maceration time duration.

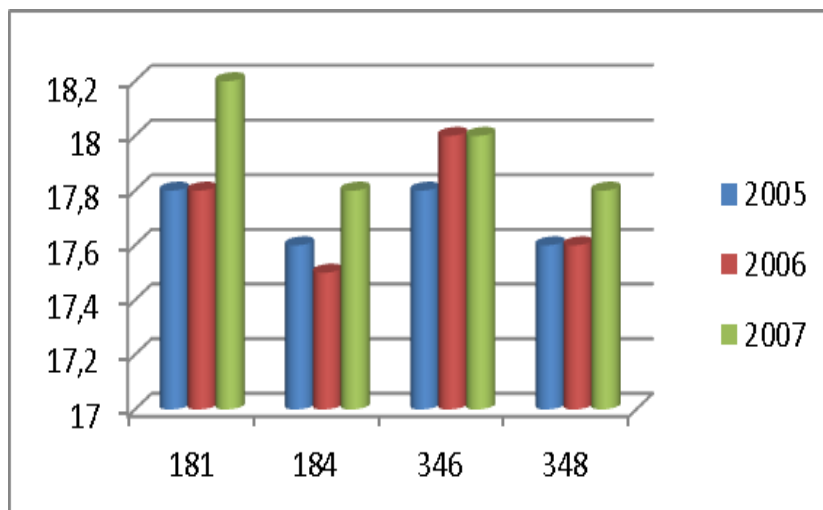
The content of all anthocyanin is from 201.9 mg/l in wine from clone 346 in 2007 to 294 mg/l in wine from clone 184. After years, the biggest variation of the anthocyanin composition in wines is stated in 2007 with a coefficient of 31.64.

Degustation grade of the wine is one of the leading characteristics and together with the chemical analysis determines the wine quality. Points from the degustation of the examined wine are presented in table 2. The average degustation grades are from 17.6 for the wine form clone 184 to 17.9 points for the wines from clones 181 and 348. In the examination years, wines from all Merlot clones have high grading stability, and the variation coefficient is from 0.64 at clone 348 to 1.29 at clone 181 presented in Graph 4.

Table 2 Degustation rating on wine (points)

Clone	2005	2006	2007	2005/2007	CV%
Merlot 181	17.8	17.8	18.2	17.9	1.29
Merlot 184	17.6	17.5	17.8	17.6	0.87
Merlot 346	17.6	17.6	17.8	17.7	0.65
Merlot 348	17.8	18.0	18.0	17.9	0.64

Graph 4 Points from degustation of wines



## CONCLUSIONS

1. The given yields at the examined clones in Skopje's vineyard conditions are in the framework of their selection characteristics.
2. The average sugar content in must is from 242g/dm<sup>3</sup> at clone 181 to 259g/dm<sup>3</sup> at clone 346 and because of that produced wines have high content of alcohol.
3. Wines have relatively high dry extract and it is from 22.2 g/dm<sup>3</sup> in wine at clone 181 in 2006 to 26.3 g/dm<sup>3</sup> in wine at clone 348 in 2007.
4. Anthocyanin in wine is from 201.9 mg/l in wine from clone 346 in 2007 to 382.4 mg/l in wine from clone 181 in 2007 and the result is the intensive red colour that the wine has.
5. Based on the degustation grade which is from 17.6 points at clone 181 to 17.9 points at the wine from clones 181 and 348 they are in the group of most qualitative wines.
6. In the examination period, the highest stability from the results of agrobiological and technological characteristics has clone 346.

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