

YIELD AND QUALITY OF MÜLLER-THURGAU CLONE GM11 OF NIS GRAPE GROWING REGION

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ABSTRACT

This paper presents the results of research variety Müller-Thurgau, clone 11 Gm, in order to determine quality indicators and the possibility of expansion in the vineyards of Southern Serbia. In terms of Nis grape growing region of the test are the most important agro technological and economic characteristics of the clone 11 Gm compared to the standard variety Müller-Thurgau. The test clone exhibited significant differences in yield and quality of grapes.

INTRODUCTION

The grapevine variety Müller-Thurgau is one of the most important varieties in central Europe, particularly in Germany, Austria and also Switzerland (Büscher et al., 1994). That variety spreads in Slovakia, Hungary, Slovenia, and Croatia. In Serbia, the variety Müller-Thurgau is grown on relatively small areas and are still examining its value.

Variety Müller-Thurgau was created in Germany at the beginning of this century. It is assumed that was developed by crossing the Rhine Riesling and Silvana green, but there are also of the opinion that in its creation did not participate both varieties (Eichelsbacher, 1957), it arose from within the seedling obtained by crossing varieties Riesling (Breider, 1952). His data show, however, that Müller-Thurgau is in some respects similar to Riesling but not to Silvaner and the high similarity of the RAPD PCR patterns (85%) indicates too that Riesling is one of the parents of Müller-Thurgau.

In different agro-ecological conditions of cultivation in this variety are separated by numerous clones and in countries where this variety is more important, especially in Germany. Clonal selection is necessary for the development of the biological basis of grapevine varieties to be able to cope with new market and environmental challenges (Werner and Kozma, 2012). This methodology takes into account the genetic variability within cultivars and their sanitary state. The availability of a wide range of selected clones is therefore important so as to enable a good response to natural selection pressure (new pests, climate changes, etc.), to enhance the quality of wines and to maintain genetic variability within cultivars (Moreno-Sanz and Suárez, 2011).

The created clones should be analyzed in different agroecological conditions. They influence the improvement of agrobiological properties of cultivars and wine quality (Avramov, 1991). Therefore, the adequate choice of suitable cultivar/clone is highly important in the raising of vineyard in a certain locality.

The aim of our study was to determine the production and technological value of clone varieties Müller-Thurgau Gm11, its importance and place in the assortment of the production of quality white wines in terms of the regions of Nis in Southern Serbia.

MATERIAL AND METHOD

Investigations were carried out in 2006-2007, on the experimental field of the Center for Viticulture and Enology in Nis (Serbia).

Vineyard where he conducted testing was erected in 1997. Growing form of vine is "Karlovac", planting space 3.0 x 1.2 m, so that the number of 2.78 vines per hectare. On each vine after pruning were left a total of 23 buds per vine. In the course of carrying out experiments in the vineyard were applied standard cultural practices. We assessed the following parameters: phenological observations; movement, growth and fertility of buds and shoots; grape yield per bud, developed and productive shoot, per vine and per hectare, quality of grapes.

Data were statistically analyzed using analysis of variance and LSD test for assessing the significance of the investigated differences.

RESULTS AND DISCUSSIONS

On the experimental plot of the land is forest soil type. The humus content varies from 2.21 to 3.11% of the total N of 0.14 to 0.16%, P₂O₅ has a 3.40 mg, K₂O 36.30 mg per 100 g air-dry soil. The content of the pH value is 5.59 to 6.47, which indicates that it is a land with the neutral reaction. It can be concluded that the physical and chemical properties of soil suitable for growing vines.

During the research period the mean annual air temperature was 12.01°C, a medium vegetation was 18.02°C. The period of the growing season lasted an average of 181 days. During this period, there was about 454 mm of rain. Winter frosts they descended to -15.4°C and did not cause damage to the buds and shoots of test standard varieties and clones (Table 1).

Table 1

The values of the basic indicators of climate of Nis region

Indicator	Year		Average
	2006	2007	
Average annual air temperature (°C)	13.04	10.98	12.01
Mean temperature of the vegetation period (°C)	18.97	171.8	18.02
Annual amount of precipitation (mm)	910.2	538.8	724.5
Precipitation in the vegetation period (mm)	484.3	424.2	454.2
Absolute minimum air temperature (°C)	-12.1	-18.8	-15.4

Phenological observations - weather performance of certain phenophases column 11 Gm in terms of Nis gape growing region, can be seen from the data shown in Table 2.

Table 2

Phenophase development of cv. Müller-Thurgau and clone 11Gm

Variety/ clone	Swelling buds			Flowering			Veraison and maturation			Full ripeness		
	2006	2007	Average	2006	2007	Average	2006	2007	Average	2006	2007	Average
MTst	22.04.	11.04.	16.04.	30.04.	19.05.	24.05.	05.08.	05.08.	05.08.	03.10.	26.09.	29.09.
MTcl	22.04.	11.04.	16.04.	30.05.	19.05.	24.05.	05.08.	05.08.	05.08.	03.10.	29.09.	01.10.

MTst - cv. Müller-Thurgau standard; MTcl - cv. Müller-Thurgau cl. Gm11

Swelling buds on average took place simultaneously in clone 11Gm and the standard variety (16th April). Flowering occurred on average (24th May).

Veraison on average for testing the variety and clone standard started (5th August), a full ripening of grapes appeared in different times, where the difference was 2-3 days. Sivčev and Petrović (2004) are based on the analysis of phenology with the white wine varieties in wine growing area of Grocka found that the variety Müller-Thurgau from the timing of maturation belongs to second epoch.

Table 3

Basic indicators of fertility of tested clone and standard variety

Indicator	Müller-Thurgau standard			Müller-Thurgau cl. 11Gm		
	2006	2007	Average	2006	2007	Average
The number of buds per vine	23.00	23.00	23.00	23.00	23.00	23.00
The number of shoots per vine	19.00	20.00	19.50	18.20	19.10	18.65
LSD 0,05-0,05	0.24-0.61					
The number of fertility shoots per vine	17.50	19.00	18.25	14.20	17.10	15.65
LSD 0,05-0,05	0.41-1.01					
The number of bunch per buds	1.60	1.80	1.70	1.20	1.40	1.30
The number of bunch per shoot	1.70	1.90	1.80	1.40	1.50	1.45
The number of fertility shoot	2.10	2.10	2.10	2.00	1.90	1.95
The number of bunch per vine	36.10	34.60	35.35	29.40	29.50	29.45
LSD 0,05-0,01	0.90-2.11					
Bunch weight (g)	113.70	162.70	138.20	138.04	165.40	151.72

Table 3 shows basic indicators of fertility of tested clone and standard variety. Based on data presented in Table 4 it can be concluded that the yield of grapes per buds and developed the shoot indicates their high productivity.

Table 4

Basic indicators of yield and quality of grapes of tested clone and standard variety

Indicator	Müller-Thurgau standard			Müller-Thurgau cl.11Gm		
	2006	2007	Average	2006	2007	Average
The yield per bud (g)	144.78	191.30	168.04	128.26	166.95	147.60
The yield per shoot (g)	175.26	220.00	197.63	162.08	201.04	181.56
The yield per fertility bud (g)	190.25	231.57	210.91	207.74	224.56	216.15
The yield per vine (kg)	3.33	4.40	3.86	2.95	3.84	3.39
LSD 0.05-0.01	121.19-277.26					
Grape yield (kg ha ⁻¹)	9.25	12.22	10.73	8.19	10.66	9.25
LSD 0.05-0.01	6.33-33.62					
Sugar content of must (%)	23.36	22.56	22.96	17.50	20.98	19.24
Total acid content in the must (g/l)	5.90	5.00	5.45	6.90	5.00	5.95

The yield of grapes per vine and per hectare was depending on the number of bunch per-developed and productive shoot, as well as grape size, and weight of bunches. The highest yield of grapes per vine was achieved in 2007 of standard variety (4.40 kg) and the lowest in 2006 (2.95 kg) in clone Gm 11. Rakonczás (2013), found the variation in yield for the variety Müller-Thurgau. Depending on the test, the yield ranged from 3.60 kg vine⁻¹ (2011) to 5.50 kg vine⁻¹ (2012). The differences in the yield of grapes per vine and per hectare were confirmed as statistically significant and highly significant.

Stroe and Ioana (2015) are studying the qualitative and quantitative characteristics of the German vine varieties in the experimental field in Bucharest found that the variety Müller-Thurgau has an average bunch weight of 92.17 g. In our research of standard variety and of clone Gm 11 was found significantly higher weight of the bunch (138.20 g; 151.72 g) (Table 3).

On the sugar content greatest impact were affected by weather conditions during the investigation. The highest sugar content is made in standard variety in 2006 (23.36%)

and slightly lower in 2007 (22.56%). Average sugar content of the clone Gm 11 amounted to 19.24% (Table 4). Similar values listed Cindrić et al. (2000), Žunić and Garić (2010), etc.

In different systems of pruning Schwab (2005) found that the variety Müller-Thurgau has from 5.8 to 7.0 g/l of total acids in grape juice. In studies in region of Nis determined the average acid content of 5.45 g/l in the variety standard to 5.95 g/l in clone Gm 11 (Table 4).

CONCLUSIONS

In the examined period (2006-2007) in Nis grape growing region, ruled by favorable environmental conditions for the normal development of the grapevine.

Productivity, yield, quality of grapes and vegetative potential Müller-Thurgau clone 11Gm compared with cultivar Müller-Thurgau, significantly varied influenced by weather conditions. The differences in the values of the examined indicators, in most cases were confirmed as statistically significant and highly significant.

Based on the research it can be concluded that the variety Müller-Thurgau clone 11Gm achieved satisfactory results of quantitative and qualitative parameters that can be successfully grown agroecological conditions of the grape growing region of Nis in Serbia.

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