



**THE EFFECT OF PRUNING ON FRUITING CAPACITY OF MICHELE PALIERI
TABLE GRAPE VARIETY GROWING IN TIKVES VINEYARD
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Abstract

The subject of research was the fruiting capacity measured by the table grape variety Michel Palieri, grown in the Tikves vineyards. The aim of this paper was to determine the effect of various types of pruning on fruiting capacity of Michel Palieri variety, and no research have been done for this variety so far. The research lasted three years (2014, 2015 and 2016), and three pruning variants were used (16, 20 and 24 buds/vine).

Different values were obtained for the examined elements primarily as a result of the varietal specificity and the extent of the load of the vines with the native buds. In the years of examination, the percentage of fruiting buds in all variants is quite stable, with insignificant variations.

The coefficient of variation ranges from 2.74 (variant II) to 10.24 (variant III). The average number of bunches per fruiting canes (absolute coefficient) is in the range of 1.3 to 1.4 and with high stability both in variants and in the years of examination.

The average mass of bunches ranges from 401 g (variant II) to 492 g (variant III). After years, significant variation in variants I (28.84) and III (20.25) was observed in the mass of bunches.

Key words: *table grape, pruning, fertility, mass of bunches*

INTRODUCTION

The grapevine is a perennial plant, which remains on the projected vineyard plantation or in one place for almost 25-30 years depending on the correct application and utilization of numerous agrotechnical, ampelotechnical, agrobiological and agro-ecological measures. The grape is one of the most important agricultural crops in the world and special attention is paid to improving the yield and quality of the grapes (Bruhn et al., 1991). In the recent years, the Tikvesh wine-growing region in Macedonia has been introducing a large number of newly created varieties with different agrochemical and technological features. So far, these varieties have not been studied from the aspect of their adaptation to the conditions in this region in Macedonia. Therefore, the subject of this paper was to study in details the effect of the pruning and fruiting capacities of Palieri, one of the large number of newly introduced table grape varieties in the Republic of Macedonia.

The Pallieri table grape variety was discovered by Michel Palieri in Velette, a famous area around Rome, Italy, obtained by crossing Alfonso Labale and Red Malaga. In the grape, there are an average of 2 seeds.

The yield moves in the interval between 15-20 tons / ha. The period of awakening is the third decade of March, and the period of maturation is early September, which classifies it as a late grape variety. The vine is very lush with big, large leaves. The grapes are large, cylindrical - pyramidal, winged, very loose with a mean weight of 450-500 grams. The grain is quite large with a weight of 7 - 8 grams, oval or slice. It is medium resistant variety with large ash powder crop with dark - purple colour. Mesothelium is juicy, sweet in taste, neutral, with sugar content of 14 - 15%. Up to - 15°C the buds do not freeze. Recommended grafting pads for Palieri are: Kober 5 bb, SO4, 5C, Telescope - 8B, Shasla x Berlandieri 41 b. Palieri is a variety with a high-transportability (Z.Bozhinovic 2010).

MATERIAL AND METHODS

Field studies were carried out in the locality "Gornicki" - CA Marena for the table variety Palieri with: Spalding, construction and placement of the rows in the east-west direction, with length of the rows 120 m.

In the studied vineyard plant, the experiment was aimed at determining the influence of the two-fold Gyiv system of pruning with different lengths of the fruiting canes and the impact of the load on the native buds on the yield and the fertility of the buds (V. Dimovska 2011). The vineyard was planted in 2007, with a distance between the vines of 2.30 m and vines in the row of 1 m, with the use of the two-fold Gyiv system of pruning. Palieri was grafted on the Kober 5 BB vineyard, the soil type is a degraded deluvium. In the vineyard there is drip irrigation system, regular feeding and regular use of these agro-technical measures: pruning of mature or cutting out of the variety, download and export of the cut out, fruiting canes, tying, protection from diseases and pests, fertilization, irrigation, etc.

In terms of the experimental location, this variety is in intensive production with regular application of agricultural practices. The necessary green ampelotechnical operations that are carried out during the vegetation are: green pruning, defoliation, punching, barking, and secretion of the canes. Defoliation of this variety is very characteristic by the fact that moderate removal of the leaves at the base of the fruiting canes is carried out, better ventilation and creating a favourable microclimate around the bunches, which enables improvement of the nutritious organic assimilates of the grain and better maturing of the grapes.

In the vineyard, the experiment was set by the selection case method, and the health status and uniformity of the vegetative potential of the vine was good. The three variants of the pruning during the trials were studied on M. Palieri table grape variety (16, 20 and 24 buds per vine (Table 1)). The experiment was set to 30 vines in three iterations for each variant (10 iteration vines), or a total of 90 vines for all variants.

Table 1. The experiment covers the following variants of pruning:

Variants	Pruning	Number of short canes	Number of long canes	Number of buds per vine
Variant I	Short	2x2	2x6	16
Variant II	Control	2x2	2x8	20
Variant III	Long	2x2	2x10	24

The fruiting capacity of the tested varieties was determined and expressed per vine, variant and repetition,

- Untreated buds (%);
- Buds developed in canes (%);
- Native buds (%);
- Fruiting Capacity Coefficient: Potential, Relative and Absolute;
- Productivity of buds (grape weight per vine (g) and
- Average mass of a bunch (g).

The obtained results were statistically processed and represented by a coefficient of variation and standard deviation.

RESULTS AND DISCUSSION

The fruiting capacity of the varieties is an important economic feature and is determined by the fruiting capacity of the buds and the yield. In a large number of table grape varieties, the first 2 to 3 buds per fruiting cane are very

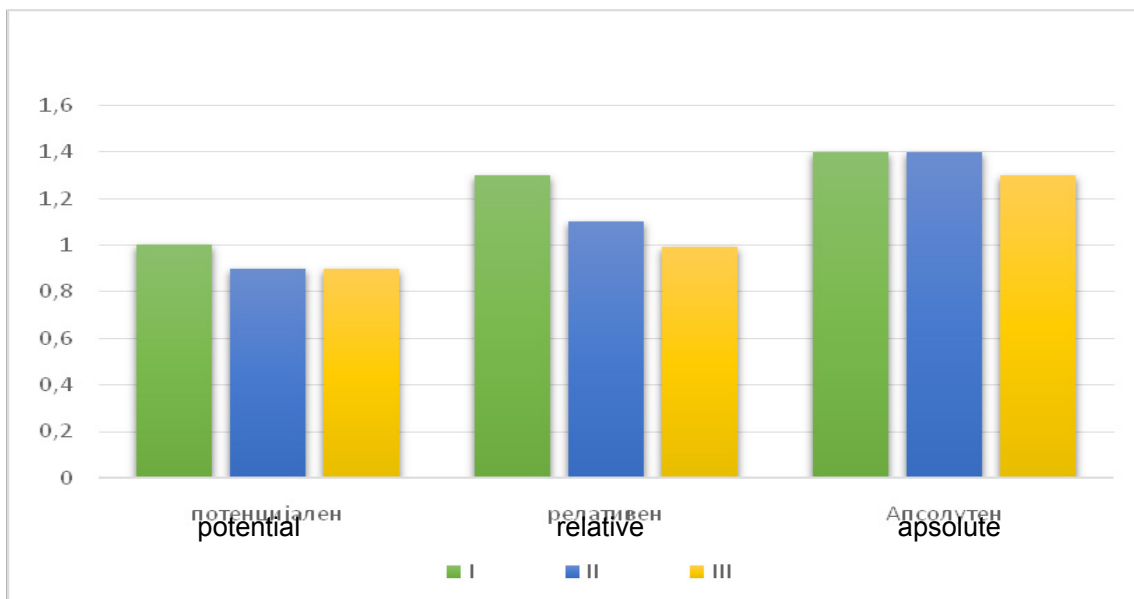
small or not treated at all. Therefore, the fruiting capacity of the buds or canes in vegetation begins to manifest itself in the second or third and even in some varieties the fourth bud, so it is the basic and only reason why mixed or long

pruning is applied to table grape varieties (M. Delic at. al 2017). The obtained results for the fruiting capacity elements of the M. Palieri variety are given in Table 2. Per variants, for all elements of fruiting capacity (untreated, non-native and native eyes), have statistically significant variation in variant III (2x10 + 2x2). Individually, in all variants, statistically significant variation is found in % of untreated buds ranging from 20.6% (variant I) to 25% (variant II) with a variation coefficient of 10.20 (variant II) to 28.12 (variant III). This is the result of the variety and variant, i.e., the number of buds per vine. While in % of native buds, as per variants and so for years, high stability with insignificant variation has been established.

The results obtained for the fruiting capacity coefficients: the potential (number of canes per bud), the relative (the number of bunches per developed bud in the cane) and the absolute coefficient (number of bunches by the native bud) are presented graphically (Graph 1). For a better comparison, the graph gives the average values of the coefficients of fruiting capacity per varieties. The values for all three fruiting capacity coefficients, by variants and years of testing are quite stable, and the differences are statistically insignificant, i.e. with a small coefficient of variation. This suggests that the variety and the way of pruning (the different load on the vine with the native buds), have no effect on the fruiting capacity coefficients of the Palieri variety.

Table 2. Elements of buds fruiting capacity per variants

Variant	Year	Untreated buds (%)	Non-native buds (%)	Native buds (%)
I (2 x 6+2 x 2)	2014	25.0	13.8	60.0
	2015	22.5	16.3	61.3
	2016	14.4	16.3	69.4
	2015/2016	20.6	15.5	63.6
	CV%	26.8	9.33	8.01
	SD	5.54	1.44	5.09
II (2 x 8+2 x 2)	2014	24.5	21.5	54.0
	2015	23.0	20.0	57.0
	2016	28.0	16.0	56.0
	2015/2016	25.2	19.2	55.7
	CV%	10.20	14.83	2.74
	SD	2.57	2.84	1.53
III (2 x 10+2 x 2)	2014	28.3	12.5	59.2
	2015	25.0	21.7	53.3
	2016	15.8	18.8	65.4
	2015/2016	23.0	17.7	59.3
	CV%	28.12	26.62	10.24
	SD	6.48	4.70	6.05



Graph 1. Fruiting capacity coefficient

Table 3. Productivity of the buds in kg: Variant 1 (2x6 + 2x2)

Year	Bud					
	I	II	III	IV	V	VI
2014	0.574	0.738	0.902	0.779	0.902	0.328
2015	0.354	0.561	0.590	0.561	0.502	0.266
2016	0.746	0.533	1.013	0.853	1.013	0.959
2015/2016	0.558	0.610	0.835	0.731	0.810	0.520
CV%	35.21	18.20	26.27	20.77	33.36	74.07
SD	0.20	0.11	0.22	0.15	0.27	0.38

Table 4. Productivity of the buds in kg: Variant 2 (2x8 + 2x2)

Year	Bud							
	I	II	III	IV	V	VI	VII	VIII
2014	0.830	0.568	0.656	0.612	0.787	0.656	0.743	0.524
2015	0.356	0.570	0.570	0.570	0.392	0.712	0.427	0.178
2016	0.410	0.656	0.697	0.533	0.574	0.615	0.738	0.492
2014/2016	0.532	0.598	0.641	0.572	0.584	0.661	0.636	0.398
CV%	48.78	8.40	10.11	6.91	33.83	7.37	28.46	48.04
SD	0.26	0.05	0.06	0.04	0.20	0.05	0.18	0.19

Table 5. Productivity of the bud in kg: Variant 3 (2x10 + 2x2)

Year	Bud									
	I	II	III	IV	V	VI	VII	VIII	IX	X
2014	0.561	0.673	1.009	0.842	0.785	0.449	1.066	0.842	1.122	0.617
2015	1.130	0.699	0.861	0.699	0.807	0.699	0.753	0.807	0.646	0.484
2016	0.680	0.643	0.529	0.454	0.529	0.605	0.756	0.567	0.794	0.529
2014/ 2016	0.790	0.672	0.780	0.665	0.707	0.584	0.858	0.739	0.854	0.543
CV%	37.97	4.17	30.74	29.51	21.86	21.61	20.95	20.27	28.53	12.45
SD	0.30	0.03	0.25	0.20	0.15	0.13	0.18	0.15	0.24	0.07

Fruiting capacity of the buds represents a mass of grapes per bud along the length of the fruiting cane. An important element on the basis of which we can determine the length of the fruiting cane during the pruning and the number of the native eyes (Tadijanović, Đ., 1993). The obtained results for the productivity of the buds are given by variants:

- Table 3 – Variant I (2x6 + 2x2),
- Table 4 – Variant II (2x8 + 2x2),
- Table 5 – Variant III (2x10 + 2x2).

Based on the results obtained in Table 3, in variant I (2x6 + 2x2) we concluded that the productivity of the buds increases from the first (0.558 kg) to the fifth eye (0.810 kg). Per years, statistically significant variation occurs in the first and sixth bud, where the coefficient of variation ranges from 35.21 (first eye) to 74.04 (sixth eye). This is due to the varietal characteristic i.e. the first eye with the lowest fruiting capacity (number and mass of bunches).

The results for the productivity of the bud in variant II (2x8 + 2x2) are given in Table 4. In this variant, the productivity of the eyelids along the length of the fruiting cane is quite stable from first to the seventh bud, and significantly decreases to the last, the eighth bud. It ranges

from 0.532 kg (first bud) to 0.636 kg (seventh bud) average for the study period (2014/2016). In terms of years of testing, the largest variation is observed in the first bud where the coefficient of variation is 48.78. This is due to the varietal characteristic i.e. the first bud with the lowest fruiting capacity (number and mass of bunches).

In Table 5, the results for the productivity of the bud in variant 3 (2x10 + 2x2) are presented. The productivity of the buds along the length of the fruiting cane to the ninth bud is quite stable, and it is significantly decreasing in the tenth bud. After years of testing, in this variant as well, the largest variation was found at the first bud, where the coefficient of variation is 37.97.

The average mass of the bunch ranges from 413 g (variant I) to 492 g (variant III), and after years of testing, a minimum mass of 295 g was obtained in variant I in 2015 and a maximum of 561 g in variant III. The results obtained for the mass of the bunches in our research are significantly higher than the results of Palieri grown in Podgorica-Montenegro (PejovicLj., Vesna Maras, 1998), where the mass of the bunch ranges from 226 g to 374 g. According to the average mass, bunches of all varieties fall into the group of varieties with very large bunches (> 400 g, Bozhinovic, 2010).

Table 6. Mass of bunches (g) by variants and sub-variants

Variant	Year	Mass of a bunch (g)
I (2 x 6+2 x 2)	2014	410
	2015	295
	2016	533
	2014/2016	413
	CV%	28.84
	II (2 x 8+2 x 2)	2014
2015		356
2016		410
2014/2016		401
CV%		10.29
III (2 x 10+2 x 2)		2014
	2015	538
	2016	378
	2014/2016	492
	CV%	20.25
		min
max		561

CONCLUSION

The biological potential, that is, the varietal characteristics and the degree of the load of the vines with native buds (16, 20 and 24 buds per vine), affect the fruiting capacity of the buds in the variety Michel Palieri.

From the examined elements of fruiting capacity, % of native buds, both by variants and after years of examination, there was a high stability, i. e. no statistically significant difference was noted.

The fruiting capacity coefficients: the potential (number of bunches per bud), the relative (the number of bunches per developed bud in the cane) and the absolute coefficient

(number of bunches per native bud), by variants and years of examination are quite stable. The variety and method of pruning (the different load of the vine with the native buds) have no effect on the coefficients of fruiting capacity of the variety Palieri.

The variety has an impact on the first bud productivity of all variants after years of investigation where high variability or high values for the coefficient of variation are noted. Bunches of all varieties, according to the average mass, fall into the group of varieties with very large bunches (> 400 g) which meets the quality criteria for table grapes of this group.

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ВЛИЈАНИЕ НА РЕЗИДБАТА ВРЗ РОДНОСТА НА ТРПЕЗНАТА СОРТА МИШЕЛ ПАЛИЕРИ, ОДГЛЕДУВАНА ВО ТИКВЕШКОТО ВИНОГОРЈЕ

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Резиме

Предмет на истражувањето беше сортата на трпезно грозје *мишел палиери*, одгледувана во тиквешкото виногорје.

Целта беше да се утврди влијанието на начинот на резидба врз елементите на родност кај сортата *мишел палиери*, со оглед на тоа што до сега не се направени истражувања за оваа сорта кај нас. Истражувањето траеше три години (2014, 2015 и 2016 година), а беа користени три варијанти на резидба (16, 20 и 24 окца/лоза).

Добиени се различни вредности за испитуваните елементи, пред сè, како резултат на сортната специфичност и степенот на оптоварување на лозите со родни окца.

Во годините на испитување процентот на родни окца кај сите варијанти е доста стабилен и со незначителни варирања. Коефициентот на варирање се движи од 2.74 (варијанта 2) до 10.24 (варијанта 3). Просечниот број на гроздови по роден ластар (апсолутен коефициент) е во границите од 1.3 до 1.4 и со висока стабилност, како по варијанти така и во годините на испитување. Просечната маса на гроздовите се движи од 401 g (варијанта II) до 492 g (варијанта III). По години, кај масата на гроздови е констатирано значително варирање кај варијантите 1 (28.84) и 3 (20.25).

Клучни зборови: *трпезно грозје, резидба, родност, маса на грозд*