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“Agrosym 2015”**

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Jahorina, October 15-18, 2015, Bosnia and Herzegovina**

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FOREWORD

Agriculture production increased significantly in the second half of the past century as a result of intensification through increasing external inputs first of all energy and agrochemicals per unit of land. To meet the challenges of increasing food demand, ways should be found to improve the productivity, profitability and sustainability of the agricultural and forestry systems.

Industrial agricultural system has led to irretrievably changes in the landscape diversity, soil quality, environment integrity, and natural resource base. This has resulted in major questions worldwide in relation to the sustainability of agricultural production systems. At the field level, the optimization of resource use efficiency is a key to issue to achieve the different goals with respect to food supply, income and protection of the environment.

The most significant damage to natural ecosystems and the environment as a whole is caused by habitat conversion and corresponding climate change, loss of biodiversity and ecosystem functions, soil erosion and degradation, and pollution from fertilizers and pesticides.

Concepts in plant protection have changed in past decades from exclusion or destruction of pest to pest management. Serious problems with pesticides, rapid development of pest resistance, environmental effects of pesticides, and high costs led to the development of new approaches and techniques in pest management based on improved knowledge of pest dynamics and their natural enemies, and the interaction between the pest and the crop.

Many of the papers included in the present Proceedings identify a number of approaches and market-based incentives that would encourage producers to achieve entirely new levels of performance, and as a result raise the awareness of governments, and other stakeholders in the agro-food system. Some governments, too are experimenting very innovative approaches to support or encourage sustainable agriculture. One of the goals of the sustainable agriculture movement is to create farming systems that mitigate or eliminate environmental harms associated with industrial agriculture. That aim can be realized only with adapted agricultural practices to the different agro-ecological conditions (cf. different regional characteristics, soil types, adapted cultivars for low-input or organic production). For our conditions it is important for the conservation of the ecological environment to develop organic production.

The result reported here will be also significant in the dissemination of knowledge to the wider audience about the importance of agriculture and food science, one of the most important strategic scientific areas of the European and many national research strategies.

The 6th International Scientific Agriculture Symposium “Agrosym 2015” made an important contribution to the agriculture practice in different areas. During the four-day symposium (15-18 October 2015), approximately 750 papers were presented to more than 800 participants representing more than 70 countries.

The symposium was made possible through the commitment and contributions of a wide range of partners and cosponsors. We were encouraged by symposium success.

This publication comprises an edited selection of the many papers submitted to the symposium.

It remains only for me to thank all those who have helped to make this Symposium such a great success.

Much appreciation is due to the authors and reviewers of all papers submitted and presented at the symposium, as well as to all symposium participants whose ideas and contributions ensured rich and lively discussion during the various sessions.

East Sarajevo, 03. October 2014.

Dušan Kovačević, PhD

Editor in Chief



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ANALYSIS OF FERTILITY ON THE MERLOT CLONES (*Vitis vinifera* L.), BY APPLYING THE METHOD OF CORRELATION

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Abstract

In this research were included seven clones of the variety Merlot (R-12, R-18, R-3, 181, 184, 348, 346). Fertility of each clone is determined by elements: fertility shoots per vine (%), absolute coefficient (number of clusters per fertile shoot), mass of bunch, and the yield expressed of unit area or kg/m². The obtained results from this work were statistically processed using the SPSS statistical software package 19, from where it can be measure the frequency, the percentage share of data, measures of central tendency (median, standard deviation, dispersion, arithmetic mean), such as graphic representation of data (a histogram). The analysis showed than all clones had larger correlation coefficient or there exists a greater dependence between the mass of the cluster and yields. From all clones, only two of them (R18, 346) proved more than greater dependence or greater correlation coefficient between absolute coefficient and the percentage of fertility shoot. The Merlot clone 348 proved the highest correlation between the mass of the cluster and yields where correlation coefficient is 0.983 which is approximately the value of 1, which indicates a very high connectivity.

Key words: clones, merlot, fertility, correlation coefficient

Introduction

Successful viticulture is based on quality vine varieties that are well adapted to external conditions and contributing to the high economic efficiency. In viticulture there are numerous clones of the grape vines, produced by clone selection. Clone selection is long procedure consists from finding, tagging and detailed describing of the variety on which is registered positive characteristic of a significant property. Clones of some varieties are actually descendants received from the vine variety, in that there are certain positive characteristics, permanent and stable in the next descendants that will grow from year to year. (Chien L. Mark, 2008). After numerous testing and research on the resulting clone, he still carries the name of the variety where it belongs, and despite the name has a certain code or additional name, which would differ from the rest. Basic goals of the modern clone selection is separating a new clones which have to be virus free, to own resistance to the burners, ashtrays, and of course grapes hold better technological properties in relation to the native variet. (M. J. Benz et al., 2006).

Merlot vine variety is very important for the Republic of Macedonia, suggested to produce premium red wines. Merlot population contains many variations, features and clones. (V. Dimovska et. al., 2011).

The clone selection of Merlot is the most represented in France, Italy, Spain. As regards of technological features, selected Merlot clones which have larger yield, clusters with bigger weight give lower quality of the wine in accordance to less productive Merlot clones. (T. Slavtcheva, P. Pourtchev, 2007).

In order of population, clones from one selection differentiate with better characteristics of the grape and the quality of produced wines. (Larry J. Bettiga, 2003). 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. (Matthew W.F. et.al., 2007).

In this study are included seven clones of Merlot (R-12, R-18, R-3, 181, 184, 348, 346). The clones were planted in the period 2009/2011 at the Agricultural Institute in Skopje, introduced from France. The main goal of this work is to compare the relationship or correlation between the mass and yields to individual clones and the correlation between the absolute correlation coefficient and the percentage of fertile shoots per vine.

Material and method

As a material for testing were used seven clones from Merlot: R-12, R-18, R-3, 181, 184, 348, 346 separately have grown in vineyards in the period 2009/2011, by applying appropriate agro-technical and ampelo-technical measures. Clones are introduced as certificated virus free planting material in 2000 from France. The test was performed at the Agricultural Institute in Skopje. The process of cultivation was a fruit-wall with two legged Gio's way of pruning, distance of planting of 2.5m between the lines and 1.3m between the grapevines in line. The clones were cultivated in same agro-ecological conditions with application of regular agro-technical and ampelo-technical measures. The most important parameters analyzed in this research were agrobiological properties, including fertility of shoots, expressed in % of developed and % of fertility shoots and yield of clones expressed in kg/m^2 . After appearance of the shoots and the appearance of the earliest blossoms is determined number of fertility tendrils. These indicators allow the determination of the coefficient of fertility. During the harvesting was determined the number of bunches per vine, i.e yield of grapes expressed in kg/m^2 . The obtained results from this work are statistically processed using the statistical software package SPSS 19, where we have measure for the frequency, the percentage share of data, measures for central tendency (mode, median, standard deviation, dispersion, arithmetic mean) and graphic display of the data (histogram). For the analyzed properties is calculated the correlation coefficient. Dependent variables critical in our work are the yields, a mass, the absolute coefficient of fertility and the percentage of fertility shoots at seven clones of Merlot over a period between 2009 and 2011. Using the software package SPSS 19 is made table display of correlation between mass and yields at individual clones and the correlation between absolute coefficient of fertility and the percentage of fertility shoots at the clones of Merlot. Comparing by the Pearson's coefficient of correlation we can see which parameters have a higher connectivity at the relevant clone. If $\rho = 1$, it means that there is a perfect linear dependence and the growth of the one variable well the other variable is growing. Correlation coefficient ranging between 0.9 and 1 means a very high connectivity. If $\rho = -1$ means that there is a perfect linear dependence, but with a growing the one variable declines other variable.

Results and discussion

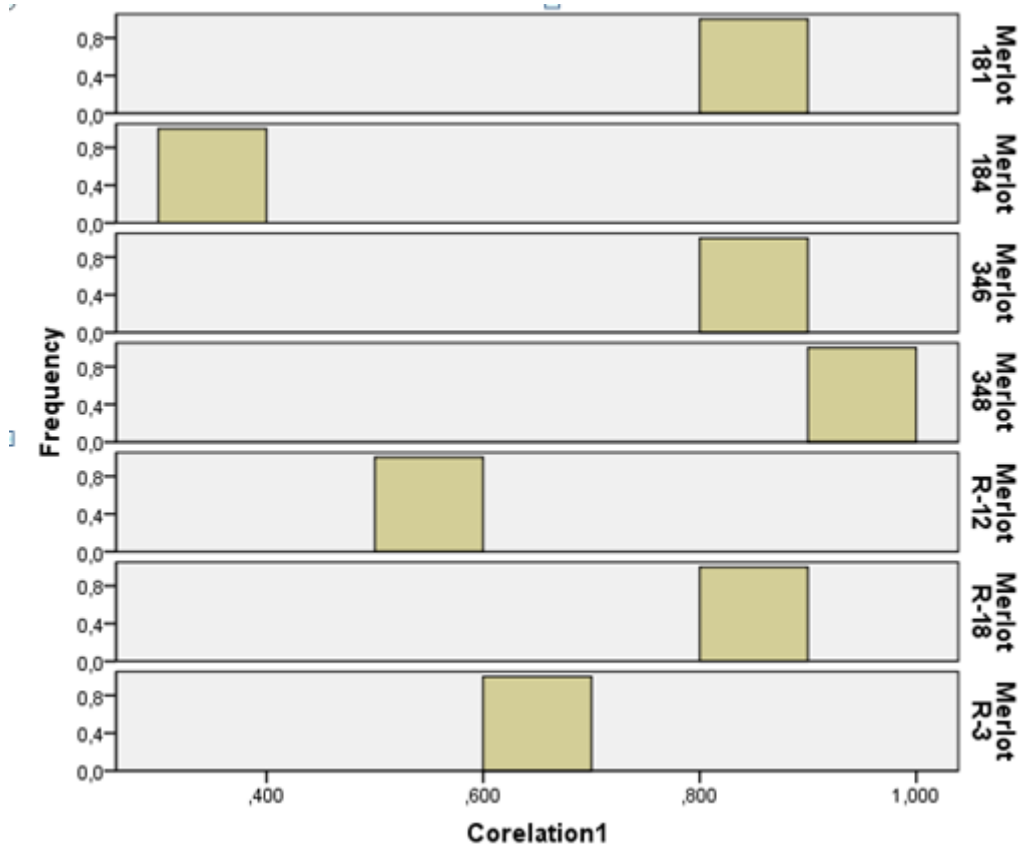
In Table 1. is detailed overview of the main elements of fertility of these seven clones of Merlot, for the period 2008-2010. For all elements is calculated the average value for these three years. Having into account this average value, we can note that in view of fertility shoots maximum value is occurs for the clone R-18, while a minimum value for the clone R-3. It is calculated the average value of the absolute coefficient, which shows again that the clone R-18 has the highest value, while the clone 346 minimum. According to Table 1. the average value for the mass of bunch shows the maximum value for the clone 184, while the minimum value for the clone 346. As an important element in the correlation yield expressed in kg / m^2 is included. The maximum value of the yield, refers to the clone R-18 and R-3, while a minimum value for the clone 181.

Table 1. Elements of fertility

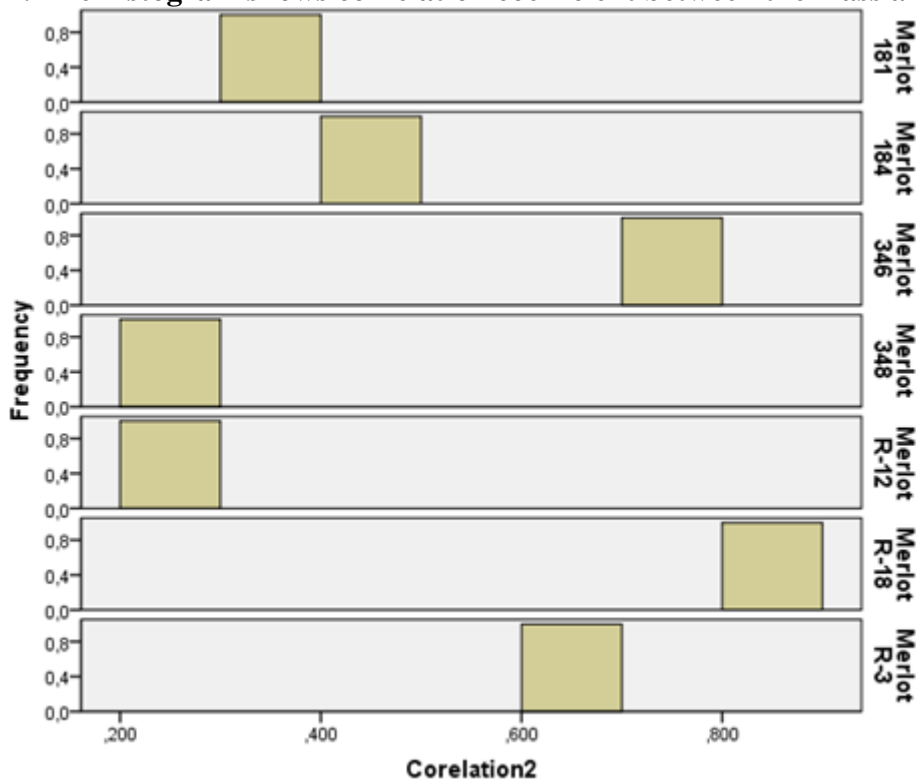
Clone	Year	Fertile shoots per vine (%)	Number of bunches per fertile shoot (absolute coefficient)	Mass of cluster (g)	Yield (kg/m ²)
181	2008	69.47	1.69	124	2.728
	2009	62.28	1.58	145	2.601
	2010	61.19	1.70	170	3.560
	08/10	64.31	1.66	146.3	2.96
184	2008	80.09	1.69	149	3.020
	2009	60.58	1.60	170	2.221
	2010	72.19	1.86	160	4.426
	08/10	70.95	1.72	159.6	3.22
346	2008	74.12	1.36	98	2.270
	2009	56.67	1.63	95	1.615
	2010	66.28	1.60	122	2.565
	08/10	65.69	1.53	105	2.15
348	2008	82.94	1.67	158	3.296
	2009	65.58	1.58	113	2.147
	2010	69.30	1.76	175	4.200
	08/10	72.61	1.67	148.6	3.21
R-12	2008	76.92	1.82	118	3.200
	2009	72.25	1.62	133	3.465
	2010	61.18	1.69	144	2.767
	08/10	70.12	1.71	131.6	3.14
R-18	2008	84.61	2.19	123	3.688
	2009	70.00	1.60	138	3.045
	2010	65.29	1.79	120	3.438
	08/10	73.30	1.86	127	3.39
R-3	2008	73.23	1.98	131	3.407
	2009	57.00	1.45	140	2.752
	2010	58.29	1.88	155	4.025
	08/10	62.84	1.77	142	3.39

Table 2. Display of Pearson's coefficient of correlation received from correlation 1 (mass (g) and yield(kg/m²)) and correlation 2 (fertile shoots per vine (%) and absolute coefficient)

Clones	Corelation 1	Corelation 2
181	,868	,321
184	,332	,441
346	,804	,773
348	,983	,203
R-12	,542	,287
R-18	,851	,849
R-3	,605	,699



Graph. 1. The histogram shows correlation coefficient between the mass and yields



Graph. 2. The histogram shows correlation coefficient between the absolute coefficient and fertile shoots per vine

The first histogram shows that the Merlot 348 have the highest value of the correlation coefficient between the mass and yields while Merlo 184 lowest value. At the next histogram

indicates the correlation coefficient between the absolute coefficient and the percentage of fertility shoots to individual clones. The Merlot R-18 has the highest value of the correlation coefficient and Merlot and 348 and R-12 lowest value.

Conclusion

Under this research can be observed that for all seven shoots of Merlot higher correlation coefficient or greater dependence exists between the mass of the bunch and yields, unlike the percentage of fertility shoots and absolute coefficient of fertility.

From a total of seven shoots of Merlot, only two of them showed greater dependence, or greater correlation coefficient have absolute coefficient of fertility with the percentage of fertility shoots, and the values are close to the correlation coefficient of the mass and yields. In most of the cases it was proven that the correlation between the mass of bunch and the yield is higher, i.e. approximately equal for most clones of Merlot.

For the Merlot clone 348 has proved the highest correlation between the mass of bunch and the yield relative to other clones, where the Pearson's correlation coefficient is 0.983 which is approximately the value 1, indicating a very high connectivity.

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