



Economic Characteristics of Some Newly-Selected Wine Varieties and Vine Clones in Bulgaria

Miroslav IVANOV, Zdravko NAKOV, Iliyan SIMEONOV, Tatyana YONCHEVA
Institute of Viticulture and Enology, 5800 Pleven, Bulgaria, 1 "Kala tepe" str.
Corresponding author: iliannsimeonov@gmail.com

Abstract

During the period 1994-2008, in the Institute of Viticulture and Enology - Pleven, a comparative study of the economic characteristics of newly-selected in Bulgaria wine varieties and vine clones was carried out. It was found that according to the mechanical analysis of the grapes of the studied interspecific varieties, they were typically wine with specific characteristics of the clusters and berries suitable for the production of quality red and white wines. These varieties had high fertility rate and productivity, increased resistance to biotic and abiotic stress and were suitable to be grown on different training systems in all viticultural regions of Bulgaria.

The analyzed data of many years from the grapes physico-chemical analysis of the studied clones of wine varieties showed that they were superior compared to the population of the respective variety mainly in the cluster size and mass and not so much in the berry size. The clones had a more intense rate of sugars accumulation in the grapes, while maintaining a good level of titratable acidity.

The wine quality produced from the clones was better in comparison to wine from the population of the respective varieties.

Key words: vine, wine variety, clone, economic characteristics

Introduction

Grapes and wine quality are directly dependent on the variety and its morphological, agro-biological and technological characteristics. There are two main methods for improvement of the economic features of vine varieties - sexual hybridization and clonal-sanitary selection. Sexual hybridization is still of relevance as a selection method for obtaining new varieties (Valchev, 1978, 1990; Stoev, 1984; Alleweld and Possingham, 1988). Numerous authors point out the importance and prospects of selection as a means to further improve vine resistance to stress factors. Using the method of interspecies hybridization in vine selection, allows new immune and resistant varieties analogues of *Vitis vinifera* L. cultivars to be obtained both from scientific and applied point of view (Ivanov, 2009, 2011).

Of all plants, vine is characterized by the highest propensity to gene mutations. According to Nemeth (1967) and Cosmo et al., (1975) clonal selection is the slowest but the safest selection method for vine. It is based on the genetic diversity within cultivars, mainly due to their perennial phylogenetic development and the gradual

accumulation over time of the genetic mutations in their genotypes, thus populations are a set of variations with positive and negative qualities (Wagner, 1958; Negrul, 1968; Hajdu, 1997; Ulanovsky et al., 2002). Several to dozens of clones are known for each long established variety as the best of them are multiplied and grown in large areas. More than 3000 clones have been described and registered worldwide as the majority of them exceed by 1-1.5 times the yield of the main variety populations (Troshin, 1998, 1999; Clarke and Rande, 2001; Troshin and Nudga, 2004).

The **objective** of this study is to provide ampelographic description of some newly-selected wine grapevine varieties and clones at the Institute of Viticulture and Enology – Pleven, Central Northern Bulgaria.

Material and Methods

The experiment was carried out in the period 1994-2008 in hybrid and clonal sections at the Experimental Base of the Institute of Viticulture and Enology, Pleven.

The white wine grapevine varieties Misket Kaylashki and Plevenska Rosa; the red ones –

Storgozia, Kaylashki Rubin and Trapezitsa and the clones Dimiat 4/24, Pamid 5/76, Merlot 10/27 and Cabernet Sauvignon ILV 1/11 were included in the study. Forty vines were planted of each variety and clone.

The study was carried out with training system modified Mozer and planting distance 3.00/1.30 cm for the wine varieties and clone Cabernet Sauvignon ILV 1/11 and ground training system - single Guillot and planting distance 2.20/1.30 cm for the rest of the clones.

All investigated varieties were obtained through interspecies hybridization and had increased resistance to low winter temperatures and mildew. The ampelographic study of the newly-selected vine varieties and clones was conducted in accordance with the approved methods for the country for investigation of vine species and varieties and clonal selection described in Volume I of the Bulgarian Ampelography (Katerov et al., 1990).

The study was carried out with annual equal number of winter vine eyes, according to varietal characteristics.

Results and Discussion

Data from the grapes physical-chemical analysis of the studied varieties showed that the average mass of a cluster varied from 168.3 g of Trapezitsa to 200.6 g of Storgozia (Table. 1). The cluster size was 12.5/8.5 cm of Plevenska Rosa to 16.0/10.1 cm of Storgozia and of the berry – 12.8/12.0 mm of Storgozia to 16.88/13.75 mm of Trapezitsa. The average mass of 100 berries was relatively higher of Plevenska Rosa – 265.0 g, and the lowest – 177.0 g of Storgozia variety.

The mechanical analysis revealed that these were typical wine grape varieties with specific characteristics of grapes and berries suitable for the production of white and red wines. The ratio of berries in the cluster was high for all varieties within the range from 94.74% for Trapezitsa to 96.59% for Plevenska Rosa. The skins were in the same range, while the lowest ratio of seeds had Plevenska Rosa - 2.66%. Mesocarp had close values for all varieties - from 85.48% in Kaylashki Rubin to 89.83% in Storgozia. The average quantity of sugars and titratable acidity in grapes of the studied varieties was strongly influenced by the weather conditions during the vegetation season and especially at grape-harvest. The values of these indicators during the period of the study were within the range typical of wine varieties as they were from 20.55%/5.65 g/dm³ – Plevenska Rosa to 22.52%/7.09% g/dm³ for Kaylashki Rubin.

From the summarized data of the physical-chemical analysis for many years it was found that

the selected clones exceeded the population of the respective variety mainly in the cluster size and to a lesser extent in berry size. The average mass of a cluster was 404.5 g (Dimiat clone 4/24); 348.5 g (Pamid clone 5/76); 226.3 g (Merlot clone 10/27) and 133.8 g (Cabernet Sauvignon clone ILV 1/11). The cluster size ranged from 21.1/12.2 cm in Dimiat 4/24 to 16.0/8.6 cm in Cabernet Sauvignon ILV 1/11, but in all clones they were within the range typical for the respective variety. The highest average mass of 100 berries had Dimiat clone 4/24 – 460.8 g that made the grapes suitable for fresh consumption. For the other clones it was 136.83 g of Cabernet Sauvignon ILV 1/11, 159.76 g of Merlot 10/27 and 262.50 g of Pamid 5/76.

The mechanical analysis showed that the cluster and berry structure of the newly-selected clones was within the typical indices for the variety. All clones had a high ratio of berries in the clusters - from 94.74% (Cabernet Sauvignon ILV 1/11) to 96.94% (Dimiat 4/24). The berries of Dimiat 4/24 and Pamid 5/76 were characterized by a lower ratio of skins - 6.11% and 6.33% and seeds - 2.19% and 3.03% and naturally higher levels of mesocarp in the berry - 91.70% and 90.64%. In the other two clones the amount of the solid fraction was considerably more. Skins were 10.81% (Merlot 10/27) and 13.17% (Cabernet Sauvignon ILV 1/11), while the seeds - 4.64% and 4.33%. Mesocarp content was lower - 84.55% and 82.50%.

The newly-selected clones had more intensive rate of sugar accumulation, while maintaining a good level of titratable acidity. Dimiat clone 4/24 accumulated enough sugars - 19.32% with titratable acids – 7.01 g/dm³, which made its grapes suitable for the production of quality white wines. Sugars content was lower - 18.24%, and acids – 4.21 g/dm³ as that was typical of the variety. In the other two clones the sugars were 22.74% (Merlot 10/27) and 22.91 (Cabernet Sauvignon ILV 1/11) at a good level of titratable acidity – 6.24 g/dm³ and 7.49 g/dm³.

General assessment of the studied vine varieties and clones

Misket Kaylashki

Misket Kaylashki is very late ripening wine grape variety, obtained through interspecies hybridization in the Institute of Viticulture and Enology - Pleven.

The leaf blade is medium to large, five-partite, medium notched, smooth to slightly reticulated wrinkled surface, often curled up chute-shaped, bare. Vines are characterized by moderate to intense growth. The shoots are inclined to creeping; therefore many lateral shoots

are developed. The variety is distinguished for its very good fertility. The cluster is medium-sized, cylindrical-conical, often winged and loose. Misket Kaylashki is not susceptible to putting forth catkins and milerandage. It is actually resistant to mildew and has increased resistance to grey mould and low winter temperatures.

Misket Kaylashki is suitable for the production of original dry white and dessert wines, and wine distillate, depending on the soil and weather characteristics of the micro-regions where it is grown in the country.

Plevenska Rosa

Plevenska Rosa variety is early ripening white wine grape variety. It is obtained through interspecies hybridization in the Institute of Viticulture and Enology - Pleven.

The leaf blade is medium large, rounded, bare. The vines are distinguished for their intense growth and maturation of the annual shoots. It has high fertility and high yield. The variety is characterized by increased resistance to downy mildew, powdery mildew and gray mould. It is also resistant to low winter temperatures. Cluster is medium-sized, cylindrical, semi-compact, with medium, oval berries.

Quality muscat wines are made from the grapes. Due to its increased resistance to biotic and abiotic stress the variety is suitable for growing on different stem training systems in all vine-growing regions of the country. The grapes yield is of lower cost price and is suitable for the production of organic wine.

Storgozia

Storgozia is medium ripening grape variety, obtained through interspecies hybridization in the Institute of Viticulture and Enology - Pleven.

The leaf blade is average large, oval, often tripartite, slightly notched with a smooth surface. Vines grow moderately intensive and have good maturation of the annual shoots. The fertility of the variety is high. The cluster is medium-sized, cylindrical-conical, semi-compact to compact. The variety is not susceptible to putting forth catkins and milerandage. It is actually resistant to mildew and has increased resistance to grey mould and powdery mildew.

The wines made from that variety are dense, with extract, fresh, with intense red color and light, pleasant fruity flavor. When aged for 1-1.5 years the taste improves significantly due to the well outlined bouquet. The high and constant fertility of Storgozia variety, its actual resistance to fungal diseases and low winter temperatures as well as the good quality wines produced from it,

allow it to be grown in suitable regions and private farms for the production of dry red wines.

Kaylashki Rubin

Kaylashki Rubin variety is medium to late ripening red wine grape variety. It is obtained through interspecies hybridization in the Institute of Viticulture and Enology – Pleven.

Leaf blade is large, thick, longer than wider, slightly pubescent. Cluster is medium-sized, cylindrical, sometimes with one wing, compact with average large, round berries. Vines are characterized by very good growth strength and good maturation of the annual shoots. It is highly resistant to downy mildew, powdery mildew, grey mould and low winter temperatures.

Quality red wines are produced from the grapes, suitable for aging. Distinguished for its increased resistance to biotic and abiotic stress the variety is suitable for growing in all viticultural regions in the country. The grapes yield is of lower cost price and is suitable for the production of organic wines.

Trapezitsa

Trapezitsa variety is early ripening red wine grape variety, obtained through interspecies hybridization in the Institute of Viticulture and Enology – Pleven.

Leaf blade is medium large, thin, rounded, medium notched, tripartite. Cluster is medium-sized, cylindrical, often winged, semi-compact with medium-sized, oval, purplish-red colored, wax covered berries.

Vines are characterized by moderate growth strength and very good maturation of the annual shoots. It is distinguished for its high fertility and yield. The variety has increased resistance to downy mildew, powdery mildew and low winter temperatures.

Red table wines are produced from the grapes. Due to its increased resistance to biotic and abiotic stress Trapezitsa variety is suitable for growing on different stem training systems in all vine-growing regions of the country. The grapes yield is of lower cost price and is suitable for the production of organic wines.

Dimiat Clone 4/24

Dimiat clone 4/24 is late ripening white wine grapevine. It was obtained by selection of positive traits from Dimiat variety population.

The clone differs from the variety population mainly in cluster and berry size. Cluster is medium large to large, conical, often with a wing, semi-compact. Berry is average big to big, oval. Vines are characterized by strong growth, very high fertility and yield. It has a tendency of

overloading, which requires further yield control by removing some of the clusters. The clone is susceptible to downy mildew and powdery mildew and resistant to gray mould. Vines are highly susceptible to low winter temperatures, however they have good recovery ability. They grow and give good yield grafted to Shasla x Berlandieri 41 B, Berlandieri x Riparia SO4 and Rupestris du Lo rootstocks. The clone is characterized by very good sugar accumulation ability.

Its grapes are suitable for the production of quality white wines. Dimiat clone 4/24 wine has straw-yellowish color with a greenish shade, delicate vanilla flavor, pleasant freshness and harmonious taste. Dimiat clone 4/24 could be grown in the North-Eastern viticultural region.

Pamid Clone 5/76

Pamid Clone 5/76 is medium ripening red wine variety. It was obtained by selection of positive traits from Pamid variety population.

The clone differs from the variety population mainly in cluster size and shape. Cluster is medium large to large, cylindrical-conical, often with one, well outlined wing, semi-compact. Berry is average big, round. Vines are characterized by strong growth, very high fertility and yield. It is not susceptible to putting forth catkins and milerandage. It is susceptible to downy mildew and powdery mildew. Vines are averagely resistant to low winter temperatures, however they have very good recovery ability. They grow and give good yield grafted to Shasla x Berlandieri 41 B and Berlandieri x Riparia SO4 rootstocks. The clone is characterized by very good sugar accumulation ability.

Its grapes are suitable for the production of ordinary red and rose dry wines. Pamid clone 5/76 wine is distinguished with its light red color, insufficient freshness due to the low titratable acidity, however it is soft and harmonious, suitable for fast consumption.

Pamid clone 5/76 is suitable to be raised in all viticultural regions in the country.

Merlot Clone 10/27

Merlot clone 10/27 is medium ripening. Its grapes reach technological maturity during the second half of September (21 September). It was obtained by selection of positive traits from Merlot variety population.

The clone is characterized by a larger cluster compared to the population – medium-sized (19.1/9.9 cm), and in some years reaching even (21.1/11.4 cm), conical, winged, with 1 or 2 wings, semi-compact. Vines grow vigorously having high fertility and yield. It is not susceptible to putting

forth catkins and milerandage. The clone is susceptible to downy mildew, powdery mildew and low winter temperatures. It has good fertility when raised on different stem trainings, however in regions with frequent extremely low winter temperatures, it is recommended to be cultivated on ground training system. It gives good yield grafted to Shasla x Berlandieri 41 B and Berlandieri x Riparia SO4 rootstocks. The clone reveals very good sugar accumulation ability. The condition of the grapes must be suitable for producing of quality dry red wines.

Merlot clone 10/27 wine is characterized by intense dark red color with a very well defined specific varietal fruit flavor with a pleasant freshness, full, smooth, harmonious, with a long aftertaste.

Cabernet Sauvignon Clone ILV 1/11

Cabernet Sauvignon Clone ILV 1/11 is late ripening red wine variety. It was obtained through the method of individual selection of positive traits from Cabernet Sauvignon variety population.

The clone differs from the variety population mainly in cluster size and shape. Cluster of Cabernet Sauvignon clone ILV 1/11 is medium-sized, cylindrical-conical or conical, with a well-shaped wing, compact. In the shoots with 3 clusters, the first one has one large, well-shaped wing, the second - one wing, and the third is without a wing. Vines are characterized by vigorous growth, high fertility and productivity. It is not susceptible to putting forth catkins and milerandage. The clone is susceptible to fungal diseases, downy mildew and powdery mildew. It is distinguished for its good resistance to low winter temperatures and recovery ability and therefore it can be grown on different stem training systems in all viticultural regions in the country. It shows good affinity to Shasla x Berlandieri 41 B and Berlandieri x Riparia SO4 rootstocks. When grafted to them Cabernet Sauvignon clone ILV 1/11 annually gives high yield and grapes of very good quality. The clone has very good sugar accumulation ability. The condition of the grapes must be suitable for producing of quality dry red wines.

Cabernet Sauvignon clone ILV 1/11 is characterized by intense dark red color with a very well defined specific varietal fruit flavor with tones of blackberry. It is fresh, dense, harmonious, suitable for aging.

Conclusions

Data from the grapes mechanical analysis of the studied interspecies varieties showed that they were typically wine varieties with specific characteristics of cluster and berry suitable for the

production of white and red wines. These varieties have increased resistance to biotic and abiotic stress and are suitable for growing on different stem training systems in all viticultural regions in Bulgaria.

The analyzed data of many years from the grapes physical-chemical analysis of the studied clones of wine varieties showed that they were superior compared to the population of the respective variety mainly in the cluster size. The clones had a more intense rate of sugars accumulation in the grapes, while maintaining a good level of titratable acidity. The wine quality was better in comparison to wine from the population of the respective varieties.

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