Analysis of perspective grapevine clones for improvement of grapevine fields
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Grapevine (Vitis vinifera L. ssp. sativa D.C.), is the one of the oldest agricultural crops, and each variety consist of an array of clones descended by vegetative propagation from single selected vine grown from a single seedling. The most clones usually very close to each other and within a variety are identical, but some of them show a different forms of accessions, and, that is why, a new divergent phenotypes.

Understanding the relatedness among accessions within one variety is important for efficient management and effective economical improvement of grapeyards. There are different ways of improvements and for most of them, its based on phenological, biochemical and genetic data of selected best one clones. Regarding this, inter-primer binding site (iPBS) markers may help to determine the new clones inside closely related genotypes. Following this two ideas, chemical analysis and wine testing were used to assess the variation of 7 perspective clones of Vitis vinifera L. genotypes which are belonging to 2 varieties (Cabernet Sauvignon and Merlot). Additionally, we have carried out an analysis using inter-primer binding site (iPBS) markers to determine the differences among three most economically important Cabernet-Sauvignon clones (Cabernet-Sauvignon-15A, Cabernet-Sauvignon-15B and Cabernet-Sauvignon-5A) and the control accession.

Three-year studies were conducted to determine agrobiological and chemical properties of perspective clones. The material provided below present an average meaning in conditions of similar growing technology. The yield from one bush of plant according data was: for Cabernet-Sauvignon “Cabernek” – 2.4 kg, Cabernet-Sauvignon-15A – 1.7 kg, Cabernet-Sauvignon-15B – 1.3 kg and Cabernet-Sauvignon-5A – 1.3 kg and Cabernet-Sauvignon control – 1.6 kg, while the increase over the control accession was for “Cabernek” clone – 14.3% and for Cabernet-Sauvignon-15A clone – 7%; for Merlo-343 – 2.9 kg, Merlo-181 – 1.6 kg and Merlot-2 № 49 – 1.6 kg and Merlot control – 1.2 kg, while the increase was an average of 1.5 – 2.3 times compare to the control variety. Regarding to the mass of cluster, in group of Cabernet-Sauvignon, Cabernet-Sauvignon “Cabernek” and Cabernet-Sauvignon-15B increase weight over control accession by 21% and 23% respectively; and in Merlot group only Merlot-2 № 49 outweighed control accession.

The sugar content analysis showed that among the Cabernet-Sauvignon group, all clones increase over the control accession by a mass concentration of sugars: 9% for Cabernet-Sauvignon-5A, “Cabernek” – 8%, Cabernet-Sauvignon-15A – 8.2% and Cabernet-Sauvignon-15B – 23%. In the Merlot group, a similar situation was observed because all the investigated genotypes increase over the control accession for sugar accumulation.

Regarding to the mass concentration of titrated acids, a high value was found in the Cabernet-Sauvignon-15A (8.0 g/dm³) and Cabernet-Sauvignon-15B (8.2 g/dm³), whereas Cabernet-Sauvignon showed 7.83 g/dm³.
Next, we have conducted a wine rating of these clones. The best results during the three years of study were shown by “Cabernek” – 7.85 (out of 10 possible points) and Cabernet-Sauvignon-15A – 7.82 points at Cabernet-Sauvignon group. The wine materials of Cabernet-Sauvignon clones had ruby color, good cohesion and pronounced varietal characteristics in flavor and taste. In Merlot group Merlot-2 № 49 – 7.63 points and Merlot-181 – 7.72 points. Merlot wine materials had a ruby color, a more pronounced aroma with tones of black and red currants, thorns and harmonious, full, with a light tannic taste. The quality of the wine materials testified to the possibility of using these clones for the production of natural red dry wines.

For biological description were chosen ten leaf morphometric traits and examined all clone for search of differences. In spite economical meaning, these properties might be not important for, but together with other traits it is essential for complex analysis and distinction of clones out of control varieties. The Merlot population clones differed from the control variety from 0.6 cm for the Merlo-2 clone № 49 to 6.6 cm for the Merlo-181 clone for most linear characteristics of the leaves (except for angular characters in which the variation was from 0.6° to 20°). Student’s test showed that all the differences are reliable, with the difference between the mean values being high at 1% significance level (P <99%), except for the angle difference α and the ß angle for Merlo-2 clones № 49 and Merlot-343. In the Cabernet-Sauvignon population, clones differed from the control variety in most traits, except the Cabernet-Sauvignon-5A, it was almost identical to the control accession, except the angle ß and the angle α. Student’s test showed that all the differences are reliable, with the difference between the mean values being high at 1% significance level (P <99%), except for the Cabernet-Sauvignon-5A clone and the Cabernet-Sovnion-15B for the angle ß.

The analysis of genetic polymorphism within the Cabernet-Sauvignon group exposed that 75 bands were found totally and 55.21% percentage of polymorphism, thus 41 bands were polymorphic. Meanwhile no private bands were observed. Dendrogram for these genotypes constructed with the Maximum Likelihood method using MEGA7 revealed both likelihood and differences between genotypes.

Summarize, we can conclude that studied clones are simply different. And these differences present as genetically and phenotypically traits. Together, this suggests that the biochemical, phenotype and genetic traits of studied clones are different. And, regarding to the fact that clones exceeded control accession, this implies they are suitable for the yield improvement and economically beneficial. Finally, based on agrbiological results, clones (from both groups) were transferred to Russian State Trial Commission for field trials and registration of these perspective clones.

Keywords: clonal selection, yield, grape yard improvement, sugar content, titrated acids
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