# IMPROVING THE QUALITY OF LOOSE PERLETTE SEEDLESS GRAPE VARIETY THROUGH THE USE OF BIOLOGICALLY-ACTIVE SUBSTANCES

## AMELIORAREA CALITĂȚII RECOLTEI SOIULUI APIREN DE STRUGURI PENTRU MASA LOOSE PERLETTE PRIN UTILIZAREA SUBSTANȚELOR BIOLOGIC ACTIVE

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***Abstract.*** *The culture of table grapes has become a complex issue today; the settlement will depend on the correct choice of varieties for cultivation, harvesting, storage and selling of grapes. Worldwide, the vines' cultivation in the last decade, had subjected a changes of vine assortment but the high results obtain in developed countries now. Without knowing the basic laws of physiological growth and fruiting vines, and methods of adjustment can not be obtained high yields, stable and high quality with low cost and long-term use of the productive capacity of grapes. The objectives of the study include the identification of the influence of the treatment period, the optimal dose of gibberellin on the quantity and quality of grapes and efficiency of table grapes of Loose Perlette variety.*

**Key words:** Loose Perlette, Grapes, Gibberellic acid.

***Rezumat.*** *Cultura soiurilor de masă a devenit o problemă actuală complexă, de soluționarea căreia va depinde de alegerea corectă a soiurilor, cultivarea, recoltarea, păstrarea şi realizarea strugurilor-marfă. Pe plan mondial, cultura viței de vie în ultimul deceniu a suportat mari transformări privind sortimentul, atingând astăzi performanțe remarcabile în țările dezvoltate. Fără cunoașterea legităților fiziologice de bază a creşterii şi fructificării viței de vie în cel mai larg înțeles al cuvântului, ca şi a metodelor lor de reglare, nu se poate de obținut recolte înalte, stabile şi de o calitate înaltă cu cheltuieli mici şi prin folosirea cât mai îndelungată a potențialului productiv al butucului de viță de vie. Scopul investigațiilor include determinarea influenței termenului, dozei optime de aplicare a giberelinei asupra cantității, calității producției, şi, ca rezultat a eficienței economice asupra soiului de struguri pentru masa Loose Perlette.*

**Cuvinte cheie:** Loose Perlette, Struguri de masă, giberelină.

## INTRODUCTION

It is known from ancient times, viticulture and in the future will remain one of the main branches and economically efficient in Moldavian agriculture, but the grapes and their derived products - an important article for export.

Worldwide, Moldova is ranked among states with a traditional wine industry.

In our country, the natural conditions of climate and soil rather favorable for growth and enjoyment of the vine, viticulture is one of the main branches of agriculture.

From 600 thousand hectares (Rapcea M., 2002) of land in slope (with inclination between 5° and 15°), in Moldova every fourth, is occupied by vineyards.

Although in the nutrition may be used the table grapes and the wine varieties, however, the difference between them is considerable. It is based on specific qualities of these varieties - the grapes are higher, with a more beautiful appearance, large berries with a sharp color, crisp texture mainly, a lower acidity and a specific relation between the sugar and acidity content. The specific qualities of grapes in according with market preference evidenced that it is necessary to reflect them in a separate group.

Without basic knowledge of the physiological peculiarities of growth and fructification vine, and their methods of adjustment, can not be obtain high, stable and qualitative yields with low costs and to use a longer period the productive potential of vines.

The technological processes, which have a substantial contribution to improving the quality of grapes, are: use of foliar fertilizers, thinning inflorescences, use growth regulation substances, which unfortunately have a sporadic or does not applicate in current vineyards.

Using the growth biostimulators (Derendovskaia A., Perstniov N. and others, 2003) in the vineyards is running to improve the appearance of grapes, to increase the plant productivity and improve their taste qualities.

The purposes of these investigations include - determining the optimal dose of influence of gibberellic acid on the quantity and quality of grapes, and also on the economic efficiency of grapes.

To achieve the objectives were outlined:

- the study of influence of gibberellic acid dose, on the main direct and indirect indicators of quantity and quality of grapes;
- the economic evaluation of vineyards in depending on the treatment term, applied doses and grape varieties.

## MATERIAL AND METHOD

The studies object in our experience was the Loose Perlette seedless grape grafted on rootstock - Berlandieri x Riparia SO4. The vines are formed by fan unilaterally (evantai unilateral). Planting distance 3,0 m x 1,5 m.

The research was effectuated in 2008 year, with financial support of ASM in according to the financing contract nr.59/ind/2008. The vineyards founded in the spring of 2006 year in the "Sauron" Ltd. To study the dose of gibberellic acid was composed the scheme of experience with variants: 1) Control - $H_2O$, 2) $GA_3$ - 25 mg/l, 3) $GA_3$ - 50 mg/l, 4) $GA_3$ - 100 mg/l. Experience was held in three repetitions with five vines in each plot.

The air temperature, the sum precipitation and the relative air humidity were obtained from the meteorological station of Chisinau.

The soil conditions of the sector was obtained on the basis from experimental research materials by the project of organizing and establishing vineyards in "Sauron" Ltd..

The Application of gibberellic acid was effectuated by dipping inflorescences in solution with different concentration in according to the scheme experience. This method

of application ensures full coverage of the inflorescences with the solution and provides a maximum effect.

In the experiences were carried botanical and ampelographical observations, analysis and evidence, in according to the specialised methods and standards.

Statistical processing of the major indicators was effectuated by the method of dispersion analysis after Dospehov A. (1985).

## RESULTS AND DISCUSSIONS

**Loose Perlette** - *Szölöketek kiralznoje (care este Regina viilor) x Sultanina Marble.* Synonyms: *California 1253 F21, Perlet, Perletta, Szertendrei Magvatlon, Жемчужинка (Jemciujinka).*

Loose Perlette – Californian seedless table grapes, obtained by Professor HP Olmo, 1946. The leaves are large, glabrous beneath. The petioles often painted in bright pink colour. The flowers are hermaphrodite. The bunches of medium sized, berries of medium size, slightly oval, almost round, the berries colour is white with a green tint. The skin is very thin and strong. Flesh crisp, juicy, with a special flavour (lightly muscat).

From bud to maturity is removable 149 days at the sum of active temperatures of 2000-2100°C. The early period of maturation variety. Ripening berries occurs in the second half of August. The Bushes are vigorous. Bountiful harvest. Aging shoots good. Variety has a weak resistance to downy mildew, powdery mildew and frost ($-17^{o}$C).

The bunches have a good transportability capacity. Recommend thin out the clusters after flowering to reduce the density of the bunch. The berries are prone to cracking during maturation in rainy weather. To the best of their colour should be thinning of the leaves in the area of the bunches during their maturation

The grapes of Loose Perlette variety are used for fresh consumption, drying and canning.

The clone FPS 04 of this variety is characterized by the longer growing period - 149 days. In the years with favourable conditions (2008) may be obtain large bunch of grapes. The average weight of grapes was 656 g in the control variant, the berries per bunches - 640,8 (fig. 1, table 1). The bunch structure index - 42,2.

The dimensions of bunches was: length - 23,8 cm, wide at the top - 19,8 cm , middle - 9,5 cm and lower - 5.3 cm.

The number of normally developed berries per bunch - 619 pieces, undeveloped - 98,5, or 13,6%. The berries are of medium size and spherical in shape, white with green tints. The bunches obtained with the specific colour, in the part with the direct sun light. Weight of 100 berries was 138,4 g The composition index of berries (pulp weight / skin weight) was 8,69, the strength of the berries on the crushing is not very high - 784 g force.

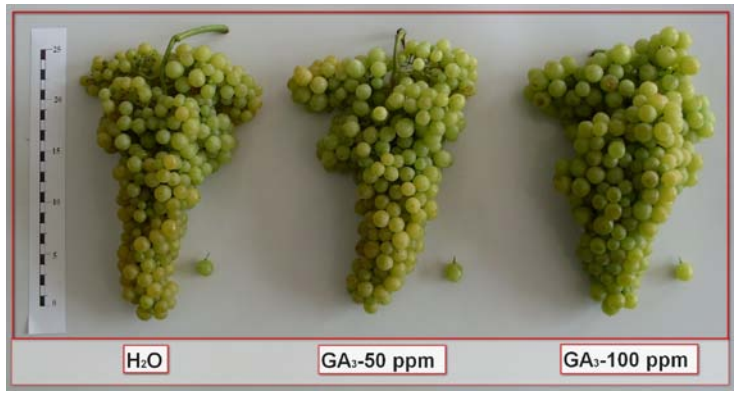


**Fig. 1.** Effect of gibberellin (GA3) on the appearance of bunches and berries of Loose Perlette variety (cl. - FPS 04), "Sauron", Ltd. 2008.
Variants: Control - $H_2O$; $GA_3$-50 mg/l; $GA_3$-100 mg/l.

*Table 1*

***The reaction of Loose Perlette variety for treatment of cauliflowers with gibberellic acid ($GA_3$) on the stage after fecundation period, 2008***

| Indicators | Variants | | | | | |
|---|---|---|---|---|---|---|
| | Control - $H_2O$ | | $GA_3$-50 mg/l | | $GA_3$-100 mg/l | |
| | $\bar{x}$ | % | $\bar{x}$ | % | $\bar{x}$ | % |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Weight of bunches, g | 656,0 | 100,0 | 663,8 | 101,2 | 929,6 | 141,7 |
| berries, g | 640,8 | - | 652,3 | - | 914,9 | - |
| Bunches size, cm | | | | | | |
| - length | 23,8 | - | 23,3 | - | 25,0 | - |
| - width / top | 19,8 | - | 17,3 | - | 17,8 | - |
| mid | 9,5 | - | 10,3 | - | 10,3 | - |
| bottom | 5,3 | - | 5,5 | - | 6,0 | - |
| Peduncle size, mm | 6,4 ± 0,2 | 100,0 | 7,8 ± 0,1 | 121,9 | 8,1 ± 0,4 | 126,0 |
| The number of berries in the bunch, (normal / abnormal), pieces | 619,0 | 100,0 | 481,5 | 77,8 | 504,5 | 81,5 |
| | 98,5 | - | 15,7 | - | 0,0 | - |
| Berry size, mm | | | | | | |
| - length | 14,9 | 100,0 | 15,5 | 104,0 | 17,2 | 115,4 |
| - width | 14,2 | 100,0 | 15,2 | 107,0 | 15,3 | 107,7 |
| Weight of 100 berries, g | 138,4 ± 3,8 | 100,0 - | 158,1 ± 10,1 | 114,2 - | 221,6 ± 9,5 | 160,1 - |
| The index composition of berries (pulp weight / skin weight) | 8,69 | - | 10,43 | - | - | 10,89 |
| The strength of the berries on the crushing, g | 784 | 100,0 | 1272 | 162,2 | 1272 | 162,2 |
| Yield, kg per vine | 5,00 | 100,0 | 5,10 | 102,,0 | 7,10 | 142,0 |
| content of sugars, g/dm$^3$ | 164 | - | 161 | - | 146 | - |
| content of acids, g/dm$^3$ | 9,2 | - | 9,2 | - | 10,6 | - |

Until flowering was remained 7,8 inflorescences per vine. Average production in the control variant was 5 kg per vine. The sugar content - 164 g/dm$^3$, the acidity – 9,2 g/dm$^3$. In general, the vines are characterized by an increased harvest. The bunches are dense, therefore it necessary to apply berry thinning after flowering.

The treatment with gibberellic acid was effectuated in after fecundation phase (berries size 3-5 mm), the concentration of solution from 50 to 100 ppm. The method of treatment which we used was the dipping inflorescences.

It was established that under the influence of gibberellic acid weight increases with 41,7% ($GA_3$-100 mg/l), also the weight of berries per bunches increases, compared to controls. As a result there is increasing structure index of bunches by 1,5 times.

It was reduced the number of berries per bunch by 22,2 ($GA_3$-50 mg/l) and 18,5% ($GA_3$-100 mg/l) and relatively reduced the number of undeveloped grains. The berries becomes spherical-oval and increased their weight. The weight of 100 berries increase by 14,2 and 60,1%, respectively in comparison with control variant. The index composition of the berries increases, because the pulp weight was increased. The strength of the berries on the crushing increased by 1,6 times compared to control.

The treatment of inflorescences with $GA_3$ can lead to increased harvest per vine and change the chemical composition of berries. In the $GA_3$-100 mg/l variant the yield increased by 42%, the sugar content was 146 g/dm$^3$, the titrated acidity content - 10.6 g/dm$^3$. The increasing harvest directly influence on the berry maturation - leads to retention, also leading to reduction of sugar content by 1.9%. This fenomen can be removed if the grapes will be harvested later by 7-10 days. On the 9.09.2008 the sugar content increased by 1.6 times and amounted to 230 g/dm$^3$.

Finally we can say that treatment of the inflorescences of Loose Perlette variety with $GA_3$ result in a number of positive effects, namely increased weight and size of bunches, reducing the number of berries per bunch and increase their size, the peduncle elongates, which result in bunches with a lower density, the strength of the berries on the crushing increased, the harvest increases.

## CONCLUSIONS

1. The treatment with $GA_3$ of grape varieties showed that the influence of these substances on grapes depended on the biological particular of variety and concentration of solution

2. After treatment of inflorescences of Loose Perlette variety with $GA_3$, in the after fecundation phase takes place increasing weight of bunches, berries, can change the bunch structure index. The $GA_3$-optimal concentration was 100 mg/l. The production per vine increases by 42,0-92,3% and improves the quality of berries, compared with control.

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