

# FETEASCA REGALĂ CL.1 IȘ - A VALUABLE CLONE FOR WHITE WINES OBTAINED AT S.C.D.V.V. IASI

## FETEASCĂ REGALĂ CL.1 IȘ – O CLONĂ VALOROASĂ PENTRU VINURI ALBE OBȚINUTĂ LA S.C.D.V.V. IASI

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**Abstract.** *The clonal selection carried out between the vine assortments aims to improve the agro biological and technological characteristics of the local, domestic and valuable varieties, and of the foreign ones introduced in the culture, that make up the traditional assortments of the country's vineyards. By the clonal selection work applied to Feteasca Regala in 2011 resulted the homologation of a new clone, which is characterized by average yields of 4,78 kg/vine, respectively 18,1 tons/ha calculated production, 16 % higher than the population assortment. The potential accumulation of sugars in the must of 208 g/L provides an increase of about 22 % compared to the reference assortment. The wines resulted from processing the grapes is characterized by an alcoholic potential between 11,3 and 12,2 % vol, non reducing extract of 24,6 g/L and 7,9 g/L glycerol, with a typical specific of the Feteasca Regala assortment.*

**Key words:** genotypes indigenous, clone selection, clones

**Rezumat.** *Selecția clonală efectuată în cadrul soiurilor de viță de vie are ca scop îmbunătățirea însușirilor agrobiologice și tehnologice ale soiurilor locale, autohtone, valoroase, sau a celor străine introduse în cultură, ce alcătuiesc sortimentele tradiționale ale podgoriilor țării. Prin lucrări de selecție clonală aplicate în cadrul soiului Fetească Regală, în anul 2011 a fost omologată o nouă clonă, care se remarcă prin producții medii de 4,78 kg/butuc, respectiv 18,1 tone/ha producție calculată, cu 16% mai mari decât soiul populație. Potențialul de acumulare a zaharurilor în must de 208 g/L asigură un spor de cca 22% față de martor. Vinurile rezultate în urma procesării strugurilor se caracterizează printr-un potențial alcoolic cuprins între 11,3 și 12,2 % vol., extract nereducător de 24,6 g/L și 7,9 g/L glicerol, cu tipicitate specifică soiului Fetească regală.*

**Cuvinte cheie:** genotipuri autohtone, selecție clonală, clone

### INTRODUCTION

The autochthonous valuable varieties cultivated today are a permanent source of germplasm, which is very important for the improvement of the biological material cultivated currently. The achievement of some varieties and clones of vine with superior characteristics of production and quality implies a continuous activity of selection and improvement applied within the genotypes of traditional varieties of famous vineyards. Along time, they were submitted to inappropriate cultural measures, genetic erosion, produced because of irregularities occurred in the

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replication of the genome and of the viral infections transmitted through negative multiplication. This is the case of the Fetească regală variety, recommended and authorized for multiplication in the vineyard of Iași, Copou viticultural center, but due to its vocation of adaptability to different climatic conditions, it is currently cultivated in most viticultural areas of the country. Manifesting great variability of characters, the soil was submitted to a rigorous cloning selection, which led to the achievement of 3 valuable clones by the Station of Research and Development for Viticulture and Winemaking of Blaj, the National Institute of Research and Development for Biotechnologies in Horticulture of Ștefănești and the vineyard in Iași, which was homologated in 2011. In Romania, 88 clones of vine were obtained, of which 77 for wine grapes and 11 for table grapes (Damian et al., 2003, 2008, Moldovan et al., 2001, Popa, 2010, Savin et al., 2001).

## MATERIAL AND METHOD

The cloning selection works of the Fetească regală variety were initiated 16 years before, in the plantations cultivated with this variety at the Station of Research and Development for Viticulture and Winemaking of Iași. Initially, from the mother plantation, 16 cloning elites were selected and studied for 3 consecutive years as regards the ampelographic characters, the phytosanitary state, the productive potential and especially the qualitative potential related to the accumulation of sugars, as the purpose was to obtain a quality clone.

The cloning elites that presented stability of the desired characteristics were multiplied by grafting, and the resulted cloned material was used to create the comparative field, with 28 stocks for each elite. In this stage of the cloning selection diagram, we selected 6 cloning elites for future perspective, which were multiplied, ensuring 100 vines of each, with which a contest (verification) field was created, organized in five repetitions for each elite, according to the experimental technique rules and the diagrams of improvement through cloning selection. In order to compare results, the controls used were the average of elites and the variety population. After another 7 years of study, of which 3 years of fructification in the contest plantation, we observed a clone elite, with code 1, which corresponded to the proposed purpose and was tested by the State Institute for the Soil Testing and Registration with the purpose of homologation and whose results are the object of this study (fig. 1).



**Fig. 1** - Fetească regală clona 1 Is

Between 2009 and 2011, which was the final stage of the official diagram of vine clone selection, adopted nationally and internationally, the research continued according to the rules of the State Institute for the Soil Testing and Registration. The characters of distinctiveness of the clone were described in comparison to the population according to the descriptors of the UPOV. Concomitantly we carried out phytosanitary and conservative selection works, serological testing of the presence of the main viruses. For an objective appreciation of the qualitative characteristics of the new clone, we proceeded to vinifying grapes and completely testing the wines obtained from the clone meant for homologation, in comparison to the control varieties.

## RESULTS AND DISCUSSIONS

The climatic conditions in the vineyard in Iași, Copou viticultural center, from the period of time when the clone of the Fetească regală variety was tested are characterized by the presence of cold winters with absolute minimum temperatures under the limit of frost of the vine, namely  $-27^{\circ}\text{C}$  in the air and  $-35^{\circ}\text{C}$  on the surface of the snow layer, which affected for the most part the winter buds. Springs were warmer but with less rain, while summers were very hot, with many days with absolute maximum temperatures over  $30^{\circ}\text{C}$ , and the daily average temperatures from the second half of the vegetation period were favourable to the processes of growth and maturation of grapes.

The beginning of the vegetation process represented the disbudding, between the 23<sup>rd</sup> and the 30<sup>th</sup> of April, and there are no differences between clones, the average of the elites and the population variety, as well as the blooming phenophase between the 4<sup>th</sup> and the 8<sup>th</sup> of June, the beginning of the ripping process between the 30<sup>th</sup> of July and the 8<sup>th</sup> of August, and the technological maturation of grapes in September (table 1). The analysis of the fulfillment of the phonological specter reveals that the new clone of Fetească regală is integrated in the variety characteristics, crossing the vegetation period during 174-178 days.

Table 1

Phenological spectrum

| Variety                    | Disbudding  | Flowering | Grapes ripping | Technological maturity | Fall leaves | During the vegetation, days |
|----------------------------|-------------|-----------|----------------|------------------------|-------------|-----------------------------|
| Fetească regală cl 1 ls    | 23. - 30.04 | 4 - 8. 06 | 30.07 - 6.08   | 15 - 25.09             | 15 - 25.10  | 174 - 178                   |
| Elites average             | 23. - 30.04 | 4 - 8. 06 | 30.07 - 6.08   | 15 - 25.09             | 15 - 25.10  | 174 - 178                   |
| Fetească regală-population | 23. - 30.04 | 4 - 8. 06 | 30.07 - 6.08   | 15 - 25.09             | 15 - 25.10  | 174 - 178                   |

The fertility and productivity of the Fetească regală clone, estimated due to the percentage of fertile sprouts, the coefficients of fertility and the productivity indexes bring out close values of the clone and the average of elites slightly higher than those of the population variety (table 2).

Table 2

Fertility and productivity elements of the Fetească regală cl 1 Is

| Clone / Witness              | Bud loss % | Fertile shoots % | Fertility coefficients |          | Productivity indices |          |
|------------------------------|------------|------------------|------------------------|----------|----------------------|----------|
|                              |            |                  | absolute               | relative | absolute             | relative |
| Fetească regală cl 1 Is      | 48         | 78               | 1,57                   | 1,43     | 220                  | 200      |
| Population variety (witness) | 46         | 72               | 1,48                   | 1,23     | 175                  | 145      |
| Elites average               | 47         | 76               | 1,56                   | 1,39     | 200                  | 178      |

The estimation of certain physiological characteristics revealed that the characteristics of resistance to frost of the clone resemble the ones of the population variety, the bud loss oscillating between 48 and 78%, at temperatures of -27o C in the air and -35o C on the soil. The behaviour upon attack of the cryptogamic diseases, with the application of phytosanitary treatments is specific to the Vinifera variety. The serological tests by the ELISA process confirmed that this clone is free of the main viruses in Romania. There were significant differences between the values of the average mass of a grape and of 100 berries, which are favourable to the clone, in comparison to the control varieties.

The grape production achieved per stock and calculated per hectare supports the characteristic of high productivity of the new creation, in comparison to the population variety. In the researched period of time, the clone Fetească regală-1 Is achieved average productions of 18.1 t/ha, ensuring a harvest increase of 16% in comparison to the population. The harvest increase is also supported by the statistic-mathematical calculus, being distinctly significant.

This clone was submitted to homologation due to its qualitative potential, even if from the production point of view, it is overcome by the average of the elites. The grape and the berry size and the average content of sugar of the unfermented wine (208 g/L) are in favour of the superiority of the grape harvest quality, overcoming the population variety by 22% and the average of the elites by 6%, being ensured statistically-mathematically distinctly significant. This fact reveals the clone potential for wine quality (table 3).

Table 3

Quality and productivity elements of the Fetească regală cl 1 Is

| Clone / Witness              | Grapes production:       |                      |                  | Average weight / grape g | Average weight 100 berry g | Sugar s g/L        | Total acidity g/L H <sub>2</sub> SO <sub>4</sub> | Yield in must % |
|------------------------------|--------------------------|----------------------|------------------|--------------------------|----------------------------|--------------------|--|-----------------|
|                              | effective kg/ vine stalk | calculated t/ha      | harvest increase |                          |                            |                    |  |                 |
| Fetească regală 1Is          | 4,78                     | 18,10 <sup>xxx</sup> | 116              | 140                      | 208                        | 208 <sup>xxx</sup> | 4,8  | 76              |
| Population variety (witness) | 4,13                     | 15,64                | 100              | 118                      | 162                        | 186                | 5,3  | 65              |
| Elites average               | 4,82                     | 18,25                | 117              | 128                      | 198                        | 196                | 5,1  | 74              |

DL towards population:

5% = 0.60;  
1% = 0.86;  
0,1% = 1,31.

5% = 5,48;  
1% = 9,06;  
0,1% = 16,96.

The technological characteristics of the clone are completed by the values of the technological indexes of the grapes resulted from the physical-mechanical analysis of 1 kg of grapes (table 4).

Table 4

**Physico-mechanical composition of 1 kg grapes and technological indices of Fetească regală 1Is clone, compared with control**

| Elements determined                   | Fetească regală 1Is clone | Population variety (witness) |
|---------------------------------------|---------------------------|------------------------------|
| <b>1 kg grapes:</b>                   |                           |                              |
| no. berry normally developed, healthy | 501                       | 580                          |
| berry, g                              | 974                       | 958                          |
| bunch, g                              | 28                        | 42                           |
| must, g                               | 790                       | 730                          |
| volume of must, cm <sup>3</sup>       | 764                       | 653                          |
| marc, g                               | 184                       | 228                          |
| <b>100 berry:</b>                     |                           |                              |
| average weight, g                     | 205                       | 162                          |
| volume, cm <sup>3</sup>               | 165                       | 140                          |
| number of seeds                       | 168                       | 175                          |
| seeds weight, g                       | 6,33                      | 6,8                          |
| skin weight, g                        | 17,76                     | 17,84                        |
| core weight, g                        | 156,82                    | 112,72                       |
| marc weight, g                        | 24,09                     | 24,64                        |
| <b>Technological indices:</b>         |                           |                              |
| structure of the grape index          | 34,78                     | 22,80                        |
| composition of berry index            | 6,51                      | 4,57                         |
| yield index                           | 4,29                      | 3,20                         |

The obtained wines have the characteristics specific to the variety, having an alcohol concentration of 11.3% vol., close to the control variety (11% vol.), are fructuous, stout, rich in non-reducing extract (24.6 g/L) and in glycerol (7.9 g/L), and can be included in the category of the wines of controlled origin (table 5).

Table 5

**Physico-chemical characteristics of wines from grapes vinification Feteasca regală 1Is clone compared with control**

| No. | Physical - chemical parameters | U.M.   | Fetească regală 1Is clone | Fetească regală, population variety |
|-----|--------------------------------|--|---------------------------|-------------------------------------|
| 1   | Alcohol                        | % vol.   | 11,3                      | 11,0                                |
| 2   | Total acidity                  | g/L C <sub>4</sub> H <sub>6</sub> O <sub>6</sub> | 7,2                       | 6,0                                 |
| 3   | Volatile acidity               | g/L CH <sub>3</sub> COOH                         | 0,39                      | 0,45                                |
| 4   | Sugars                         | g/L  | 1,4                       | 0,45                                |
| 5   | Non-reducing extract           | g/L  | 24,6                      | 22,5                                |
| 6   | Total poliphenols              | g/L  | 0,31                      | 0,30                                |
| 7   | pH                             | unit. pH   | 2,98                      | 2,90                                |
| 8   | Glycerol                       | g/L  | 7,9                       | 6,9                                 |

## CONCLUSIONS

1. The cloning selection of the Fetească regală variety, meant for the production of superior white wines resulted in the homologation of the clone of Fetească regală vine cl. 1 IS and the certification by the State Institute for the Testing and Registration of Varieties (405/19.01.2012) and the recommendation for the cultivation in the areas favourable to the vine.

2. The production of grapes achieved per stock and calculated per hectare supports the characteristic of high productivity of the new creation in comparison to the population variety.

3. The obtained wines are high quality wines, fructuous stout wines rich in non-reducing extract, which are characteristics that include them in the categories of wines of controlled origin.

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