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PERFORMING THE FIRST STAGES OF THE CLONAL SELECTION SCHEME IN VICTORIA AND AUGUSTA TABLE GRAPE VARIETIES

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ABSTRACT

This paper presents the realization of the first stages of the Clonal Selection Scheme and obtaining valuable clonal selections: the selections in the populations of the varieties and the multiplication of clonal elites through the superior qualitative traits regarding the technological potential.ualitative traits regarding the technological potential. From the production plantations, 15 clonal elites from the Victoria and Augusta varieties were selected, cultivars known for the special quality characteristics they have. It was aimed, through the selection activity, to obtain a clonal lite from the respective varieties, a selection that would be superior to the population. Thus, clonal elites were selected, which overcame the varieties to which the clonal selection method was applied, by the weight of grapes and berries.

INTRODUCTION

In any process of improvement, the efficiency of the selection is conditioned by the variability of the material with which it is worked, by the degree of heritability of the characters and characteristics of the respective germplasm and by the chance of the breeder to be able to detect the copies corresponding to the objectives pursued. Because, by selection, no new forms are created, but only valuable specimens are retained, the success of the selection depends on the limits of genotypic variability existing within the germplasm. The different weight of genotypic variations and those determined by the environmental conditions depends largely on the way the plants reproduce (Leonte, 2011).

Vegetative reproduction preserves the genetic structure (heterozygous or homozygous), as a result, all individuals belonging to a clone (offspring resulting from vegetative multiplication of a single individual) are genetically identical. A species with vegetative reproduction is made up of populations of biotypes or clones. The diversity of genotypes appears as a result of the mugural variations caused by gene mutations, crossing over somatic and some changes in chromosome structure. It means that by choosing and cloning a part or an entire plant possessing individual characteristics useful economically, adaptively, structurally, ornamentally, the separation from the original population of a clone that can lay the foundation for the development of a new variety is achieved (Crăciun, 1981).

MATERIAL AND METHODS

The varieties subject to clonal selection *Victoria* and *Augusta* are among the most important varieties for table grapes grown in Stefanesti. These cultivars were distinguished by a series of qualitative characteristics, production and adaptability to different environmental conditions.

In order to achieve this objective, was aplieded the Clonal selection scheme for grapevine varieties, approved by ORDER no. 914 of September 19, 2016 issued by the Ministry of Agriculture and Development and published in the Official Gazette no. 745 of September 26, 2016.

The identification, selection and marking of valuable elites has been carried out in plantations for over 20 years.

This consisted in the selection of 15 valuable vegetative descendents, originating from the plants that stood out for their special characteristics within the population.

The main objective pursued through the clonal selection of the varieties studied was to obtain clones with grapes and large grain, which would exceed the plants from the selection plantation (figure 1, 2, 3, 4).

After a three-year field study in the selection plantation of elites plants , through which repeated measurements and analyzes were carried out on each selected individual, it was found that at least one elite was superior to the population in terms of the average weight of bunches and berries.

Observations, determinations, analyzes regarding the clonal elites were carried out individually per vitis plant. Phenological observations - the calendar data for the phases of the vegetative organs are recorded: bleeding (10% of the buds on the wine plant); bud burst; start of flowering, beginning of berry ripening, full physiological maturity of the berry, falling leaves.

Determinations made during the vegetation period on the elite and witness variety: the loading of the buds per plant, the number of viable buds on each plant, percentage of dead buds, the number of shoots (total and fertile), number of inflorescences per plant, number of bunches per plant, the average weight of a bunch, the average weight of a berry, production of grapes per plant.

The dry substance (refractometric) content of the fruits at harvest: the content of the must in sugars g/l; acidity g/l H_2SO4.

RESULTS AND DISCUSSIONS

Within the populations of the two varieties subjected to clonal selection, several elites were selected. In the spring, rooted cuttings were obtained from the grafting cords from the elites plant, which were planted, distinctly, on each elite separately in the comparative field of clones. In the 2020-2021 wine year, determinations were made regarding the fertility of the clonal selections compared to the control, being calculated Cfa and Cfr, % fertility, IPA and IPR. Both Cfa and Cfr as well as IPA and IPR have values below the limits in Augusta which is not characterized by a high fertility like Victoria (63-73%). This is the result of special climatic conditions, with absolute minimum temperature deviations in spring, of an unbalanced water regime. All this strongly impacted the productivity, quality and health indices of the harvest.

Figure1. Clone elite Augusta 7

Figure 2. Clone elite Augusta 10

Figure 3. Clone elite Victoria 9

Figure 4. Clone elite Victoria 11

Quantity and productivity indices Table 1

No.	Cultivar/clone elite	Production		Productivity indices		
		Kg/plant	t/ha	Ipa	Ipr	Production %
1	Augusta	3,6	16,2	299	212	73
2	Augusta	3,7	16,7	257	168	71
3	Augusta	3,2	14,40	247	167	53
4	Augusta	3,5	15,8	259	166	76
5	Augusta	3,0	13,50	227	95	78
6	Augusta	3,0	13,50	348	187	77
7	Augusta	3,8	17,00	555	334	78
8	Augusta	3,6	16,2	613	360	45
9	Augusta	3,9	17	518	333	54
10	Augusta	3,4	15,30	602	271	52
11	Augusta	3,2	14,40	221	149	37

Under the conditions of the 2021-2021 wine year, the clonal selections Augusta 1, 2, 4, 7, 8, 9 achieved the highest amounts of grapes (kg) per vine plant, values between 3,4 – 4,6 kg/vine plant (figure 5). Calculated per ha, these led to values between 18,9-20,7 t/ha (tabel 1).

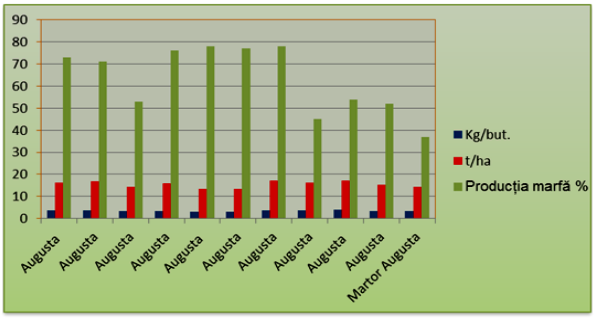

Figure 5. Quantity of grapes kg/vine plant and production per ha expressed in tons

Table 2

Quantity and productivity indices

No.	Cultivar/clone elite	Production		Productivity indices		
		Kg/plant	t/ha	Ipa	Ipr	Production %
1	Victoria	3,4	15,3	615	291	65
2	Victoria	4,2	18,9	530	343	85
3	Victoria	3,7	16,7	462	239	77
4	Victoria	4,3	19,3	585	351	83
5	Victoria	4,4	19,8	585	428	85
6	Victoria	3,5	15,8	796	486	66
7	Victoria	4,6	20,7	676	455	82
8	Victoria	4,3	19,3	564	400	79
9	Victoria	4,6	20,7	715	429	81
10	Victoria	3,6	16,2	483	203	51
11	Control Victoria	3,3	14,8	400	188	51

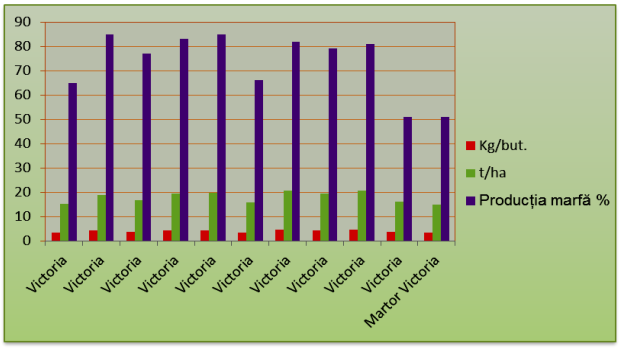

Figure 6. Quantity of grapes kg/vine plant and production per ha expressed in tons

Under the conditions of the 2021-2021 wine year, the Victoria 2,4, 5, 7, 8, 9 clonal selections achieved the highest grape production (kg) per vine plant, varying between 4,2 – 4,6, which proved to be the most highest recorded on plant (figure 6). This value multiplied by 4,500 plants per ha achieves a quantity of 20.7 t/ha (table 2).

Table 3

The quality of the harvest

Cultivar/clone elite	Grape harvest date	The average weight of the bunch g	Weight of 100 berries g	Sugar g/l	Acidity g/l
Augusta	05.09.2021	299,10	290	137	5,9
Augusta	05.09.2021	197,70	191	143	5,7
Augusta	09.09.2021	205,90	198	148	4,7
Augusta	09.09.2021	185,30	179	147	4,9
Augusta	09.09.2021	189,20	184	149	4,4
Augusta	10.09.2021	310,33	885	149	4,3
Augusta	10.09.2021	440,10	890	150	4,0
Augusta	10.09.2021	468,12	800	160	3,7
Augusta	13.09.2021	370,23	897	161	3,5
Augusta	13.09.2021	542,12	700	150	3,9
Media		320,81	521,4	149	4,5
Control Augusta	09.09.2021	184,53	176	140	5,8

Table 4

The quality of the harvest

Cultivar/clone elite	Grape harvest date	The average weight of the bunch g	Weight of 100 berries g	Sugar g/l	Acidity g/l
Victoria	08.09.2021	410,20	320	144	3,3
Victoria	08.09.2021	408,52	370	146	3,2
Victoria	10.09.2021	420,33	390	148	3,0
Victoria	11.09.2021	450,76	495	147	3,2
Victoria	12.09.2021	450,55	380	149	3,1
Victoria	12.09.2021	468,59	798	149	3,0
Victoria	13.09.2021	520,56	385	160	2,9
Victoria	13.09.2021	470,89	750	160	3,0
Victoria	13.09.2021	650,17	678	161	2,8
Victoria	13.09.2021	483,76	778	150	3,9
Media		473,43	534,40	151,4	3,1
Control Victoria	12.09.2021	408,35	368	142	3,5

The Augusta clonal selections, under the conditions of the 2020-2021 wine year, recorded the following qualitative values: the average weight of the bunch 320, 81 g; weight of 100 berries 521, 4 g, sugar 149 g/l and acidity 3, 9 g/ L H_2SO_4. As can be seen from figure 7, the clonal selections Augusta 7, 8, and 10 outclassed the other selections as well as the control in terms of the average weight of the grape, the weight of 100 berries. High values of the sugar content in the must were recorded by the same clonal elites but also a low acidity. The control Augusta recorded the following qualitative values: the average weight of the bunch 184, 53; weight of 100 berries 176 g, sugar 140 g/l and acidity 5, 8 g/L H_2SO_4 (table 3).

The Victoria clonal selections recorded the following qualitative values: the average weight of the bunch 473, 43 g, weight of 100 berries 534, 40 g, sugar 151 g/l and acidity 3, 1 g/L H_2SO_4. Figure 8 is relevant in terms of the value of the

clonal selections, where values of the average weight of the grape between 408,52 and 650,17 g was observed but also high values of the weight of 100 berries, respectively 778 or 798 g.

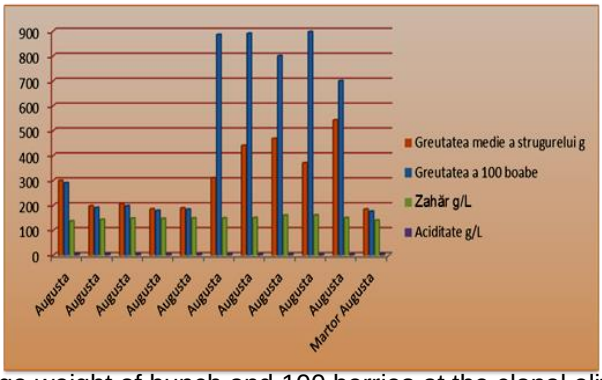

Figure 7. Average weight of bunch and 100 berries at the clonal elites compared to the *Augusta* control

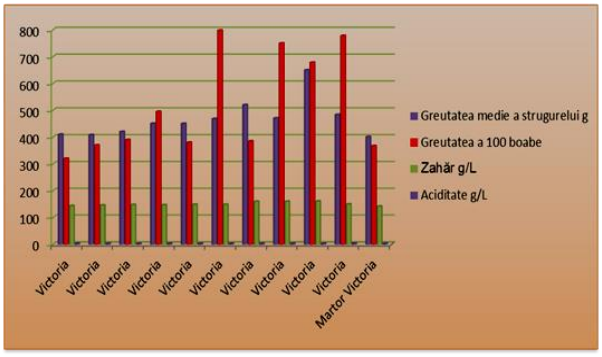

Figure 8. Average weight of bunch and 100 berries at the clonal elites compared to the *Victoria* control

CONCLUSIONS

Clonal selections *Augusta* 7, 8, and 10 outperformed the other selections as well as the control in terms of average grape weight, the weight of 100 berries.

Victoria clonal selections recorded the high qualitative values. All clonal selections outperformed the *Victoria* control in all quality parameters.

ACKNOWLEDGMEN

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