STUDIES ON SOME TECHNOLOGICAL PROPERTIES OF TABLE GRAPE VINE VARIETIES, PAULA AND GELU, GROWN IN THE VINEYARD ECOSYSTEM COPOU IAŞI

STUDII PRIVIND UNELE ÎNSUŞIRI TEHNOLOGICE ALE STRUGURILOR SOIURILOR NOI DE VIŢĂ DE VIE PENTRU MASĂ, PAULA ŞI GELU, CULTIVATE ÎN ECOSISTEMUL VITICOL COPOU

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Abstract. *This paper brings some useful information upon the technological characteristics of the new varieties created at SCDVV Iasi, Paula and Gelu, compared with several local varieties considered witness. Thus, the physical-mechanical analysis determined processing indices of the grapes and the grains, namely: grain index, index of grain structure, grain composition index, resistance to detachment from pedicel grain and grain cracking resistance, the last two indicators serving to measure the table grapes and the grape suitability in terms of transport and storage. The results obtained showed higher values of detachment force from the pedicel and grain cracking for the Gelu variety, of 3.47 (N) and of 19.29 (N), which was higher in comparison to witness varieties. For Paula variety, there were recorded lower values, qualities of resistance to detachment from pedicel and grain cracking and is in a direct correlation with the core composition, thickness and elasticity of the skin.*
Key words: *varieties, grapes, indices, strength*

Rezumat. *Lucrarea de faţă aduce câteva informaţii utile asupra însuşirilor tehnologice ale soiurilor noi create la SCDVV Iaşi, Paula şi Gelu, comparativ cu câteva soiuri autohtone, considerate martor. Astfel, prin analize fizico-mecanice, au fost determinaţi indicii tehnologici ai strugurilor şi boabelor respectiv: indicele bobului, indicele de structură al bobului, indicele de compoziţie a bobului, rezistenţa la desprindere a boabelor de pe pedicel şi rezistenţa la fisurare a boabelor, ultimii doi indici servind la aprecierea soiurilor de masă, sub aspectul pretabilităţii strugurilor la transport şi la păstrare. Rezultatele obţinute în urma cercetărilor efectuate au evidenţiat valori superioare ale forţei de desprindere de pedicel şi de fisurare a boabelor la soiul Gelu, de 3,47(N), respectiv de 19,29(N), superioară soiurilor cu care a fost comparat. Soiul Paula, a înregistrat valori mai scăzute, însuşirile de rezistenţă la desprinderea de pedicel şi de fisurare a boabelor, fiind în corelaţie directă cu consistenţa miezului, grosimea şi elasticitatea pieliţei.*
Cuvinte cheie: *soiuri, struguri, indici, rezistenţă mecanică*

INTRODUCTION

Over the time, there have been many concerns for vine varieties description. By the early nineteenth century, the varieties presentation was

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summarized exclusively at botanical description of vegetative organs, especially leaves and grapes, each author using their own methods and terminology, often confusing (Ravaz, 1902, Branas, 1959, Teodorescu 1939). In order to overcome these shortcoming, in 1984, OIV has unified the methodology for ampelographic description of varieties with IBPGR and UPOV, and has developed new rules of work by establishing three categories of descriptors: 25 for agrobiological characteristics, 94 for ampelographic characters, and 7 for technology characteristics (OIV, 1984, 1997). At table grape varieties, presents interest for valorification and storage some technological properties concerning the resistance of berry at pedicel detachment, which in OIV descriptors is mentioned as a berry ampelographic character, berry crack resistance under a pressure force that occurs during transportation and storage, that can be equated with the firmness (consistency) features of the pulp from the descriptors list as well as berry index, berry composition and grape structure resulting from physico-mechanical analysis of one kilogram grape.

In literature, detachment from pedicel and berry crack resistance are expressed in grams-force (Iftode, 1970, Mihalca, 1978, Calistru şi al., 1997), although it is known that the force is measured in Newtons (N) and is the product of mass and acceleration of gravity, beeing recognized as the only international unit of measurement of force. Through this paper, the authors intend to contribute to the knowledge of technological characteristics, mentioned above, of the new varieties of table grapes Paula and Gelu, created at the SCDVV Iaşi compared to some witness varieties (Milcov, Napoca, Aromat de Iaşi şi Coarnă neagră).

MATERIAL AND METHOD

The biological material used were the grapes harvested at maturity consumption, and determinations were made on 100 berries, 10 berry healthy located in the middle zone of 10 grapes. To measure the strength of the berry pedicel detachment using a device (Figure 1) provided with a alveolus (2) in which the berry is insert (1), clamp mechanism (3) and a thaler (plate) (4) on which are put calibrated masses (5), both set at the end of a lever (8). On plate are put calibrated weights until link dissolution of berry-pedicel occurs. Grape berry due to his weight falls into a receptacle (7), the pedicel being trained in motion by clamping mechanism. Thaler (plate) movement limitation and amortization of gravity force is made by a resort (6). The device is designed so that the force of gravity developed by the masses from the plate to be equal to the detachment force of the berry from pedicel (Fd). Thus F.d. = G = force of gravity, so G = M x g, where M is the mass in kilograms, required for breaking the link bob-pedicel and g = 9.80 m/s ² (acceleration of gravity). Determining experimentaly the mass M, by calculation is obtained the value of detachment force Fd = Mxg = kg. xm / s ² = N. The measures that enter in the calculation relation are expressed in the International System (SI) of units of mass.

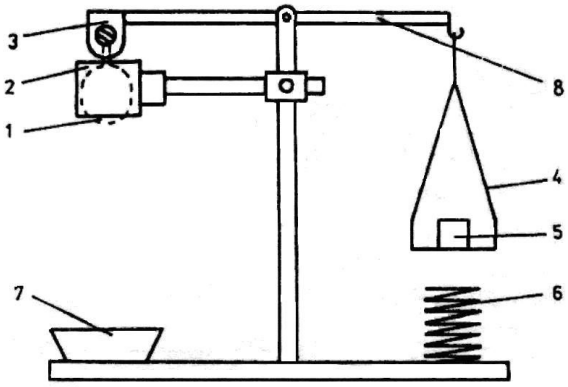

Fig. 1 - Device for measuring the force of berry detachment

Determination of berry cracking force was performed with a device (Figure 2) with a fixed plate (2)in which sits the sample (1), over which acts the force of gravity of the ensemble (fixed plate, stem 4 and pan (thaler) 5) which may not be enough to crack the berries, and therefore on the pan are added calibrated masses (7), until berry bursting occurs.

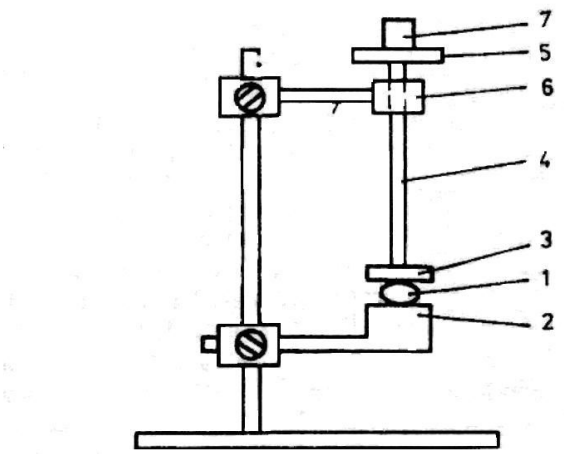

Fig. 2 - Device for determining the force of berry cracking

The force of gravity that compresses the berries is the cracking force (F1) and has the following formula: Ff = G = Go + G, where Go = force of gravity of of the assembly known from construction, Gm = force of gravity due calibrated masses (M - is determined by experiment) and Ff + M = Mo x g x g = N (S.I.). Both devices are own construction of UTI Science, PhD author Baisan I.

By physico-mechanical analysis of one kilogram of grapes were determined other technological indices of berries and grapes which supplement the knowledge

elements of the studied varieties in terms of their suitability for transport, valorification and storage.

RESULTS AND DISCUSSIONS

In the Copou-Iasi vineyard ecosystem the newly varieties created , Paula and Gelu, studied in comparison with reference varieties with close maturation age, have reached specific ampelographic and technology parameters. In terms of technology can be appreciated that they have achieved grapes with large berries, consistent pulp, with sugar accumulation specific for varieties for fresh consumption (table 1).

Table 1

Technological characteristics of the studied varieties compared with the control varieties

Variety	Maturation age of grapes	Sugars g/L	Acidity g/L H_2SO_4	Weight of berry, g	Berry shape	Berry consistency
Paula	II-III-a	160	4,5	3,7	ovoid	SCR*
Gelu	II-III-a	168	3,8	4,2	elliptic	CR**
Napoca (control)	II-III-a	150	3,5	3,7	elliptic-short	CR
Milcov (control)	III-a	165	3,9	2,7	ovoid	SCR
Aromat de Iaşi (control)	II-III-a	190	4,0	2,4	spheric	SCR
Coarnă neagră (control)	IV-a	140	5,4	3,2	elliptic-elongate	CR

*SCR - semicrunchy pulp, **CR - crunchy pulp

The results obtained relating certain physical and mechanical characteristics (Table 2), indicate that these are genetic traits of each variety, but conditioned by the climatic factors that influence both the quantity and quality of the grapes (berry mass, pulp consistency and thickness of the peel, sugar content and acidity). The presented data shows mean values of detachment force of berry from pedicel higher 3.22 (N) at Gelu variety which is superior to compared varieties Napoca 2.10 (N), Milcov2.24 (N) and Coarnă neagră 2.70 (N), the last one being the genitor variety.

At Paula variety, the detachment force was 1.90 (N), below the other varieties, except the variety Aromat de Iaşi 1.32 (N) which is his paternal genitor. It appears that there is a direct relationship between berry weight, pulp consistency and value of detachment force from pedicel, the ones with smaller berry and less crunch pulp, achieved smaller values of this index (Aromat de Iaşi, Milcov) than the varieties with crunch pulp and large berry (Gelu, Coarnă neagră). Determination regarding the resistance to cracking, shows higher values of 3-5 times compared to force of detachment from pedicel, between 4.12 and 16.25 (N).

Better resistance to berries cracking presented Gelu variety 16.23 (N), close to Coarnă neagră 16.25 (N), species with thicker peel and crunchy pulp.

Table 2

The values of physical - mechanical indexes of stadied varieties compared to control varieties

Variety	Detachment force (N)			Berry cracking force (N)		
	min.	max.	average	min.	max.	average
Paula	1,79	2,15	1,90	5,22	5,49	5,35
Gelu	2,87	3,50	3,22	14,55	19,34	16,23
Napoca (control)	1,80	2,58	2,10	8,10	12,28	9,50
Milcov (control)	2,10	2,34	2,24	9,33	10,76	10,15
Aromat de Iaşi (control)	1,16	1,66	1,32	3,78	4,30	4,12
Coarnă neagră (control)	2,56	2,85	2,70	14,13	17,65	16,25

Paula variety with semi crunchy pulp and thin peel achieved a mean value of cracking force of 5.35 (N), superior to paternal genitor, Aromat de Iaşi 4.12 (N).Technological indices resulting from physical - mechanical analysis of grapes, by their one values express the technological, economic and commercial value of studied varieties (table 3).

Table 3

The values of technological indices results from physical - mechanical analysis of one kilogram of grapes

Soiul	Berry index	Composition index of berry	Structure index of grape
Paula	30	8,79	34,75
Gelu	28	10,02	36,03
Napoca (control)	52	4,12	27,6
Milcov (control)	34	6,76	27,6
Aromat de Iaşi (control)	56	4,32	11,6
Coarnă neagră (control)	30	5,47	22,81

Results obtained from the measurements of these indices, shows high levels the of berry index (no. berries/100 g cluster), at the two varieties, Paula (30) and Gelu (28), superior to comparison varieties.

Berry Index composition reached the specific parameters for table grape varieties only at Paula (8.79) and Gelu (10.02), being well below of this to the comparison varieties. Regarding the structure index of grape, its value over 30 at both new varieties which make the research subject, place them in the category of

valuable varieties for table grapes, with well-constituted grapes, with a high berries yield, being superior to new varieties, Milcov şi Napoca (27,6), Coarnă neagră (22,81), Aromat de Iaşi (11,6). Values of physico-mechanical indices corroborated with those of technological indices of grapes, perfects the technological value of new table grape varieties Paula and Gelu, both in terms of grapes production, especially of their suitability for transportation, valorification and storage.

CONCLUSIONS

1. New table grapes varieties, Paula and Gelu, in the Copou - Iaşi vineyard ecosystem have perfect their technological parameters, producing grapes with large berries (3.7 to 5.2 g/grain) with semi crunchy (Paula) and crunchy (Gelu) pulp and with sugar accumulations of 160-168 g/L.

2. Resistance to berry detachment from pedicel was higher at Gelu variety 3.22 (N), with crunchy pulp and large berries who is more suitable to transportation and storage compared to Paula variety, at which that mean value of berry detachment force from pedicel was 1.90 (N), those being in direct correlation with core composition and berry weight.

3. Resistance to berry cracking (N), is a genetic trait of variety, and had the mean value higher at Gelu variety 16.23 (N) versus Paula variety which registered only 5.35 (N), this physical - mechanical feature being in direct correlation with berry weight, core consistency and peel elasticity.

4. Technological indices obtained from physico-mechanical analysis of one kilogram of grapes, by their values, shows that the two varieties may be included in the category of valuable varieties for table grapes, realizing grapes well constituted, with a high yield of berries, superior to those with which they were compared.

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