

## STUDIES ON THE BEHAVIOUR OF NEWLY CREATED GRAPE VARIETIES OBTAINED AT SCDVV IAȘI IN VINE NURSERY

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### Abstract

*The production of vine planting material is one of the main concerns of research units nowadays. In this article, the grape varieties obtained at SCDVV Iași ('Aromat de Iași', 'Paula', 'Gelu', 'Golia') were studied and compared to the control, 'Chasselas doré', variety that has mixed technological aims. Determinations have been made on their behaviour during nursery time: total number of roots, of which those larger than 2 mm in diameter, lengths of roots larger than 2 mm in diameter, length of matured wood of the shoot, thickness of the shoot at the 2nd internode and the yield obtained in the vine nursery in 2018.*

**Key words:** new grape varieties, vine nursery behaviour, number of roots, matured wood.

### INTRODUCTION

Until the middle of the nineteenth century (1863), the vine was not grafted, multiplying it by cuttings. The introduction of different vine varieties in Europe has brought the insect called *Phylloxera*, that has spread to all wine-producing countries, causing the greatest havoc in the history of viticulture (Köse et al., 2014). Used in the beginning as it was discovered in nature, grafting was soon perfected and systematized, in time taking its place in viticulture as well (Bülent et al., 2015, Korkutal et al., 2011).

The production of viticultural material became an intensive concern only after the disaster caused by the appearance of *Phylloxera* (1885) leading to the establishment of future plantations only with grafted vines, with a greater force and a higher production potential. In the field of vineyard propagation, a series of intensive methods have been developed to improve quality, increase production, reduce production costs, and remove the negative influence of natural environmental factors from production scheme (Rizk-Alla et al., 2011).

Some intensive methods, such as culture on nutrient substrate or amelioration soil, have been developed by Romanian scientists, making it a world premiere. After the changes of 1990s, the vine nursery activity decreased to

less than 9%, but the revision of the Law on Wine and Wine (Law 67/1997, Law 244/2002, Law No. 83/2007) emphasized again the importance of producing seedlings. Among the methods used in our country for the production of grafted vines in the field, the most widespread is the planting of earthing-up grafted vines, and lately, using mulch with one or two rows of perforated polyethylene foil (Corbean, 2011).

Vine grafting is a "surgical" operation of transplanting part of a plant onto another part of another plant in order to unite them for cohabitation. As a result, a new integral organism with the desired qualities is obtained. The part to be grafted is called rootstock, and grafting is called graft (Bondarciuc et al., 2013).

The main purpose of the study is to obtain planting material from the newly created varieties in order to propagate them in culture.

### MATERIALS AND METHODS

The research was carried out within the Research and Development Station for Viticulture and Winemaking in Iași in 2018. The grape varieties obtained at SCDVV Iași ('Aromat de Iași', 'Paula', 'Gelu', 'Golia') were studied while 'Chasselas doré' grape variety was used as control.

Table 1. Studied biological material

| Grape variety                   | Genitors   | Author                            | Year of homologation                             |
|---------------------------------|--|-----------------------------------|--|
| ‘Aromat de Iași’                | Free fecundation of Tămâioasă românească seeds   | Dănulescu Dumitru                 | 1980   |
| ‘Paula’                         | Intraspecific sexual hybridation of Bicane x ‘Aromat de Iași’                                  | Calistru Gheorghe<br>Damian Doina | 1997   |
| ‘Gelu’                          | Free fecundation of local grape variety Coarnă neagră and irradiation with X rays of its seeds | Calistru Gheorghe<br>Damian Doina | 1999   |
| ‘Golia’                         | Intraspecific hybridation of Sauvignon x Șarbă   | Dănulescu Dumitru                 | 1999   |
| ‘Chasselas doré’<br>‘(control)’ | Ancient grape variety with uncertain origin. It is supposed to be Swiss.                       | Unknown                           | Cultivated since the<br>11 <sup>th</sup> century |

‘Aromat de Iași’ is a variety of mixed qualities and can be used for table grapes and for wine. It is a variety obtained by free fertilization from seeds of Tămâioasă românească, at SCDVV Iași, being homologated in 1980. It is vigorous, with a medium period of vegetation and medium fertility (Table 1). The grapes are medium-sized, compact, yellow-green in color, with spherical berries, with a medium juicy pulp and slightly aromatic flavor. It is cultivated with good results in the vineyards of N-E of Moldova (Figure 1). It is widely used as it matures early because it has a good resistance to frost (Tardea and Rotaru, 2003).



Figure 1. ‘Aromat de Iași’

‘Paula’ is a variety used for table grapes. It was obtained at SCDVV Iași through intraspecific sexual hybridization of Bicane x Aromat of Iași varieties and was homologated in 1997. It is average in vigour, fertility and vegetation period. The grapes are of medium size, the

berries are not compact, ovoid in form, medium in size, greenish-yellowish with juicy pulp, fragrant (Figure 2). It has a good resistance to frost and drought being introduced into the vineyards of the N-E part of Moldova to expand the range of table grapes (Tardea and Rotaru, 2003).



Figure 2. ‘Paula’

‘Gelu’ is a grape variety used as ‘Paula’ for table grapes, also obtained at SCDVV Iasi by free fertilization of the native variety Coarnă neagră whose seeds were irradiated with X-rays. It was homologated in 1999. It has a medium vegetation period and fertility, medium to high vigour. The grapes are medium-sized, semi-compact, with medium-to-large blue-purple, elliptical berries (Figure 3). The berries have a thick cuticle and the pulp is semi-crisp with neutral taste. It was introduced into the vineyards of N-E Moldavia to complete the range of table grapes, having a

good resistance to frost and drought (Tardea and Rotaru, 2003).



Figure 3. 'Gelu'

'Golia' is a variety used only for wine grapes. It was created at SCDVV Iași, through intraspecific hybridization of Sauvignon x Sarba grape varieties, homologated in 1999. It has a medium-growing vigor with high fertility. The grapes are small-sized, compact, with a small, spherical berry, greenish-yellow, with a juicy pulp. It is used in the Moldavian vineyards (Figure 4) (Rotaru, 2009).

'Chasselas doré' is a grape variety of mixed qualities, just like 'Aromat de Iași', and can be used for both table grapes and wine grapes. It is a very old breed, known since the 11<sup>th</sup> century and its origins are not sure. Most claim it is of Swiss origin, but it is also possible it has a French, Oriental or even Egyptian origin. It has low vigour, high fertility, the vegetation period being medium. The grapes are medium in size, the berry is spherical, medium in size, yellowish-green with dark spots on the sunny side, juicy, with a specific taste (Figure 5). It is resistant to frost and drought, being cultivated in all European countries as well as in New Zealand and California (Tardea and Rotaru, 2003).



Figure 4. 'Golia'

The varieties studied were grafted onto a single rootstock belonging to the Americo-American rootstock group. Selection Oppenheim 4 clone Craciunel 4 (SO<sub>44</sub>) is a super-selection resulting from Berlandieri x Riparia Selection Oppenheim 4 at the Craciunel-Blaj vine-growing resort and was approved in 1974.



Figure 5. Chasselas doré

On the four varieties studied and on the variety taken as a control, a series of determinations



were made: the total number of roots, the number of roots larger than two mm in diameter, the length of roots greater than two mm in diameter, the length of the matured wood, the thickness at the second internode of the matured wood and the yield obtained in the vineyard nursery.

The first determination of the total number of roots was performed by counting all the roots of a plant, followed by measuring the roots with callipers to determine those with a thickness higher than two mm in diameter and the ration between these and the total number of roots. The length of the roots with a diameter higher that 2 mm was measured. The length of the mature wood and its thickness at the second internode were also taken into account. Lastly, the yield of the studied varieties from the nursery was studied.

## RESULTS AND DISCUSSIONS

All the analyses were carried out at the Development and Research Center for Viticulture and Wine-making Iasi. A number of six determinations were performed for each of the four varieties taken into study ('Aromat de Iași', 'Paula', 'Gelu', 'Golia'), and 'Chasselas doré' grape variety as control. The results represent the means of the six determinations.

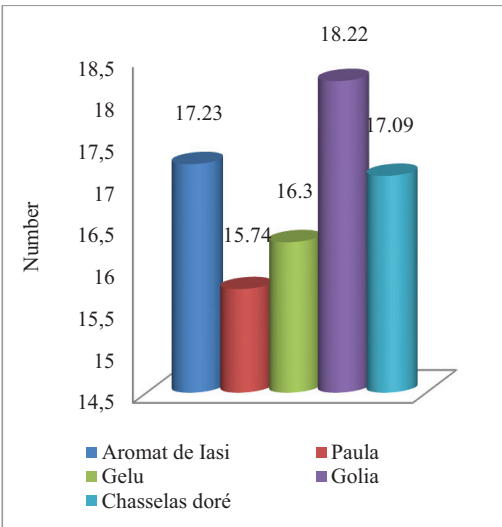


Figure 6. Total number of roots

Regarding the total number of roots (Figure 6), the variety in which the most roots were

formed is 'Golia', with a total of 18.22. 'Aromat de Iași' follows with 17.23, compared to the control, Chasselas doré, with 17.09 roots. 'Paula' grape variety registers the lowest number, respectively 15.74. 'Gelu' variety registers 16.30, with a smaller number of roots than the control variety.

Of the total number of roots formed, those with a diameter greater than two mm were taken into account (Figure 7). Regarding this aspect, it was found that a single variety had a smaller number of roots, 'Golia' (5.27), compared to the control variety that has 5.9 roots. The other three varieties had a larger number of roots bigger than 2 mm in diameter than the control variety, namely, 'Gelu' (6.32), 'Aromat de Iași' (6.28) and 'Paula' (6.12).

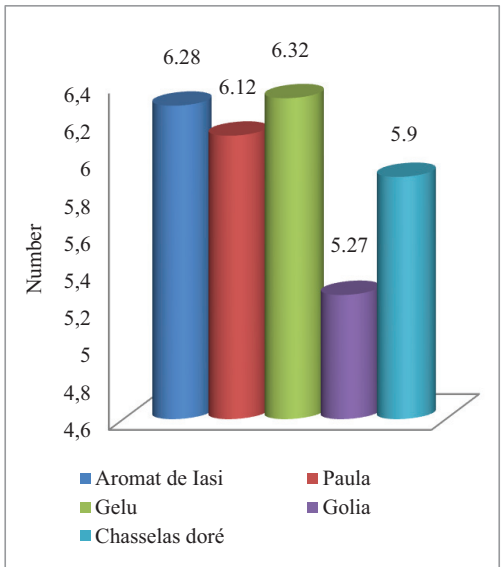


Figure 7. Number of roots larger than two mm in diameter

Another determination made on these varieties was the length of the roots larger than two mm in diameter (Figure 8). Here it was observed that the variety with the largest length of roots is 'Golia' (30.57 cm), followed closely by 'Chasselas doré' (29.83 cm), while the 'Aromat de Iași' (27.83 cm), 'Gelu' (26.47 cm) and 'Paula' (24.53 cm), have roots longer than two mm in diameter, both smaller than the control variety and the other varieties taken into study. The length of the matured wood of the shoot can be seen in figure 9. There is a great

similarity in the order of varieties compared to the control, as well as in the determination of the length of the roots larger than two mm in diameter, the ‘Golia’ variety having the length of 32.35 cm, followed by the control variety (31.62 cm) and, of course, the other three varieties, with a shorter length of matured wood, ‘Aromat de Iași’ (30.63 cm), ‘Gelu’ (30.15 cm), ‘Paula’ (27.9 cm) and ‘Chasselas doré’ (29.83 cm).

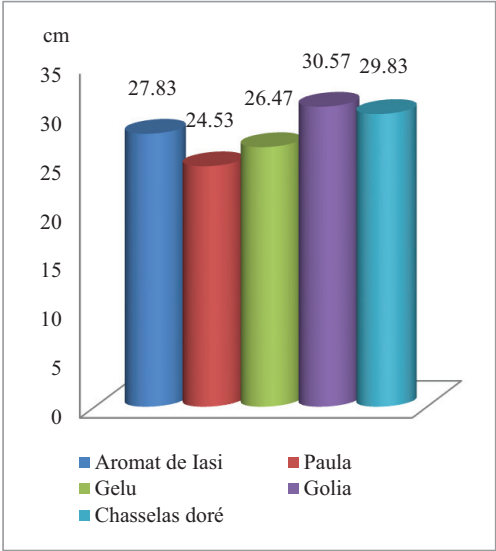


Figure 8. Lengths of roots larger than two mm in diameter

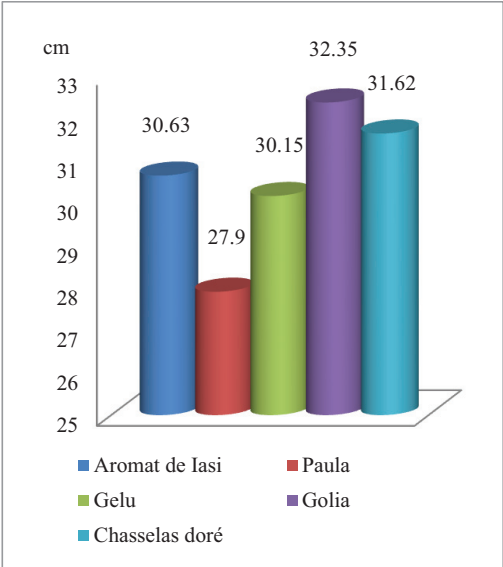


Figure 9. Length of matured wood of the shoot

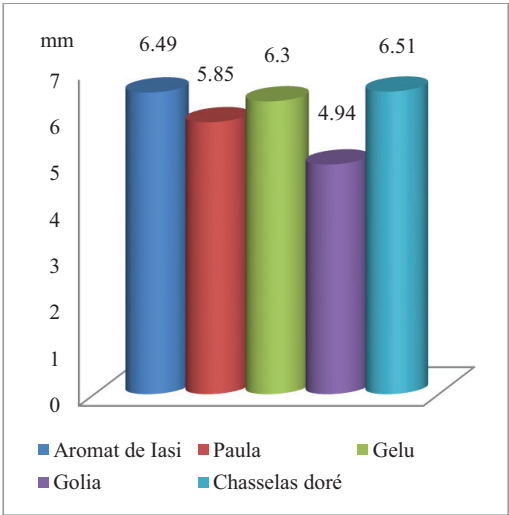


Figure 10. Thickness of the shoot at the 2nd internode

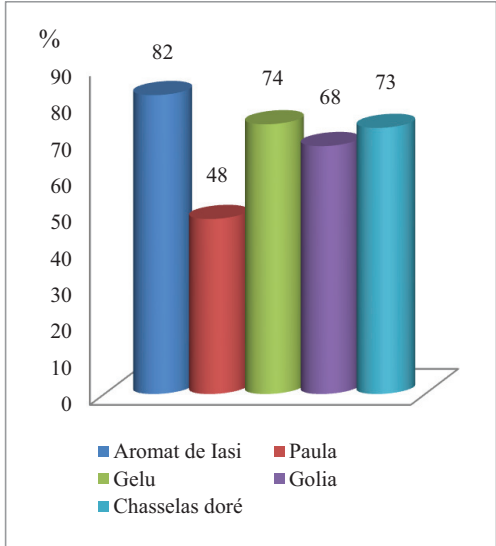


Figure 11. The yield obtained in the vine

The next studied aspect was the thickness at the second internode of the matured wood (Figure 10). Unlike the other determinations, the ‘Chasselas doré’ variety had a thickness of 6.51 mm, larger than all the other varieties studied, followed by ‘Aromat de Iași’ variety (6.49 mm), ‘Gelu’ (6.30 mm), ‘Paula’ (5.85 mm) and last, ‘Golia’ (4.94 mm).

The last analysis was directed towards the yield obtained in the vine nursery (Figure 11). ‘Aromat de Iași’ variety registered 82% and was followed by ‘Gelu’ (74%), these two

varieties having a higher yield compared to ‘Chasselas doré’ (73%). In the other two varieties studied, a lower yield compared to the control was obtained, ‘Golia’ (68%) and ‘Paula’ (48%) respectively.

## CONCLUSIONS

Production of propagating material is one of the most important technological links for the establishment of new vineyards, the quality of which depends on the development and longevity of the newly established plant.

Regarding the vigour of the new plants, it was found that ‘Golia’ variety had the largest number of roots formed, respectively 18.22 while the total length of the matured wood was 32.35 cm.

In terms of material quality, ‘Gelu’ variety showed the best characteristics, with the highest number of roots > 2 mm, an average of 6.32 roots, the thickness at the second internode being 6.30 mm.

The highest yield was achieved in the ‘Aromat de Iași’ variety, respectively 82%, which again reflects its very good behaviour in the nursery.

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