Current Trends in Natural Sciences Vol. 6, Issue 12, pp. 93-98, 2017

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521

Current Trends in Natural Sciences (CD-Rom)
ISSN: 2284-9521
ISSN-L: 2284-9521

MODERNIZATION OF THE TECHNOLOGY FOR OBTAINING WINE PLANTING MATERIAL AT INCDBH STEFANESTI-ARGES

Adriana Bădulescu [1,*], Lidia Ficiu[2], Ana-Maria Radomir[1]

[1] National Research & Development Institute for Biotechnology in Horticulture Stefanesti, Stefanesti City, Bucharest-Pitesti, No. 37, Arges, România
[2] Institute of Research & Development for Viticulture and Vinification Valea Călugărească, Valea Calugaresca, str. Valea Mantei nr.1, Prahova, Romania

Abstract
The production of vines on pots and especially in protected areas will be a real success, due to the fact that planting can be done in the year of grafting, eliminating the production period in the field and further planting can be carried out throughout the vegetation period.
The new varieties and valuable clones as well as the rootstock cuttings used in the experiments were derived from the nucleus of the isolate, which is the national collection of viticulture germplasm made of deviated material by heat therapy and in vitro culture. The variety under study was Argessis, a variety that made the institute known for improving the calves, especially the improvement of table varieties.

Keywords: *biological category, grafting, viticultural propagation material*

1. INTRODUCTION

The rooting of the grafted vines in the vine school has been practiced for over a century. In the last decades, this technology has been upgraded and modernized through new culture systems and by the great mechanization of the works (Corbean et al., 2009). The complex of works applied in the vineyard school includes: land selection, assolation, field preparation, preparation of planting material, planting itself, care work, harvesting, sorting and sorting, keeping and delivering (Hamdan et al., 2010).

2. MATERIALS AND METHODS

The greenhouse in which the experience was installed is a cold greenhouse built in 1987 with an area of 600 square meters, covered with polycarbonate and consists of 6 trawls (4 1,5 m wide and 2 1 m) separated The purpose of the researches carried out in this paper is to find solutions that allow the recommendation of a favorable technology for the rapid multiplication of deficient varieties under the concrete conditions of the institute during this period.
The biological category of the material used for grafting was the initial propagation material. The choice of SO4-4 rootstock was primarily due to its superior behavior on a variety of soil types and, secondly, to the great vigor of growth it imparts to grafting varieties. However, it is a difficult

*Corresponding author, E-mail address: badulescuadriana18@yahoo.com

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521
Current Trends in Natural Sciences (CD-Rom)
ISSN: 2284-9521
ISSN-L: 2284-9521

rootstock in the vine school in the sense that it roots harder, and the triggering of calogenesis at the grafting point is delayed by 1-2 days compared to other rootstocks (Gorjan S. □., 2013).


Figure 1. Material preparation and grafting

Figure 2. The process of stratification and forcing grafted cuttings

The variety under study was Argessis. Very demanded by the viticultural producers due to the requirements of grape vintners, a variety obtained and patented in Ştefăneşti. The technical and material basis at National Research & Development Institute for Biotechnology in Horticulture Ştefăneşti Argeş allowed experiments to be carried out to optimize technological phases as well as to improve the rapid multiplication method of the viticultural material from higher biological categories.

The preparation of the grafting material was done using the classic technology. The grafting was performed mechanically, with DPA 5, which cuts the inverted U-shaped cuttings, and the stratification was done in resinous sawdust, in forcing baskets having the frame and the metal bottom, and the plastic film walls (Tiţa, 2003; 2004; Tita et. al., 2004).

The experimental variants of planting grafted cuttings aimed to determine the momentum and uniformity of the vegetation start of the buds, the maintenance of the callus at the grafting point, the low consumption of carbohydrates in the rootstock reserve, the stimulation of the rhizogenesis of the rootstock for the rapid resumption of the vegetation of the grafted cuttings (Popa, 2012). The study of the quality of the grapevine grafted during the most critical period for the symbiosis - the school of vines - was carried out in the following experimental variants:V_1 - control, planting on semibillons at low planting densities in classical culture (15-20 cuttings per linear meter);V_2 - planting in the greenhouse at high planting densities or intensive crops (45-50 cuttings per square meter);V_3 - planting in nutritious pots at very high planting densities or in superintensive culture (70 - 80 cuttings per square meter).

*Corresponding author, E-mail address: badulescuadriana18@yahoo.com

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521
Current Trends in Natural Sciences (CD-Rom)
ISSN: 2284-9521
ISSN-L: 2284-9521

3. RESULTS AND DISCUSSION

Production of field grafted vines (V_1)

In the billon crop system, two planting methods are used, ie the foil-protected semibillons planting with the partial cover of grafted cuttings. The choice of the cropping system and the method of planting the cuttings in the field is based on the climatic conditions, ie the temperature level in the period immediately following the planting, the physical characteristics of the soil (texture) and the irrigation method used.

Figure 3. Aspect of vineyards in the vegetation period and planting vine

Production of grafted vines at high soil density in greenhouses or unheated solariums (V_2)

The preparation of cuttings for planting, ground preparation and basic fertilization is performed according to the same technological requirements as for the other experimental variants. Planting was done at 24-25 cm between rows and 7-8 cm between cuttings per row. A density of 50 - 55 cuttings per m2 was thus obtained. The production of grafted vines in greenhouses and unheated solariums is characteristic of obtaining the basic biological category.

Figure 4. Appear grafted cuttings planted on sand and planting vine

Production of grafted vines in plastic pots (V_3)

The preparation of cuttings for planting is carried out according to the same technological requirements as for the other experimental variants. Preparation of the nutritional mixture was made during the winter, using mixtures in equal volumes of soil of celery, sand and broom, to which 10% peat was added to improve its water retention capacity. Planting was done on PVC pots. A density of 70-85 cuttings per m2 was thus obtained, depending on the diameter of the vegetation vessel. The production of grafted vines in pots in greenhouses and unheated solariums is characteristic of obtaining vines from the Biological Initial Propagating Material category.

*Corresponding author, E-mail address: badulescuadriana18@yahoo.com

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521
Current Trends in Natural Sciences (CD-Rom)
ISSN: 2284-9521
ISSN-L: 2284-9521


Figure 5. Appear grafted cuttings planted on pots and planting vines

To determine the value of the experiments performed in the three crop technologies, the growth rate of the graft shoots was compared at 30-day intervals, starting June 1 and ending September 1. After this date, the sawing work is done to stimulate wood maturation.

Figure 6. Vine cuttings before hunting

The determination of the growth rate of the shoots was made by direct measurement, having as root the diaphragm of the nodule, and the apical mark the pointed point of the shoots. From the data presented in Figure 7, the growth rate of the shoots in the first step of the determinations is most accelerated to V_3 due to the rapid heating of the nutrient mixture in the bags, slightly lower at V_2 due to the specific conditions in the greenhouse and much weaker at V_3 due to the conditions low atmospheric hygroscopicity and lowered temperatures during the spring 2017 nights.
The average length of the shoots varies between 10.1 cm. at V_1 and 16.4 cm. to V_3 30 days after planting. Growth explosions are recorded in stage II (between 30 and 60 days) when the shoots had a mean size of 46.2 cm. to V_3 compared to 30.2 cm. to V_1.
After 60 days the situation is reversed. Increases slow down to V_3 due to edafic limited volume and are more accelerated to V_1 and V_2 due to the fact that roots can explore a higher edafic volume, and lower plant density exposes more leaves to direct sunlight radiation. The photosynthetic contribution of leaves exposed to incident radiation is clearly superior to those that are partially exposed or shaded.
The maximum length of the shoots was determined at the end of August, before making the first hawk. Thus, the shoots V_1 had, on average, 73.0 cm, V_2 85.5 cm, and V_3 63.1.
In figure 8 graphically shows the evolution of the diameter increase of the shoots base in the three variants of culture with different densities.
In the first step of the determination the differences in thickness of the shoots are insignificant among the experimental variants, and the increasing order of the thickness of the shoots on the experimental variants is: V_1, V_2, V_3. At the two following determinations, the order of the variants changes in favor of the variant planted with the greenhouse in the greenhouse, followed by the

*Corresponding author, E-mail address: badulescuadriana18@yahoo.com

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521

Current Trends in Natural Sciences (CD-Rom)
ISSN: 2284-9521
ISSN-L: 2284-9521

variant with the vines planted in the field and therefore with the vines planted in the pots. At the last determination, the largest thickness had the shoots of the vines raised in the field, followed by the variants with the beef on the soil in the greenhouse and the one with the pots in the pots.

Table 1. The average dimensions of the vines harvested in the experimental variants

Specification	V1	V2	V3	STAS requirements
A. Cane				
Large diam (cm)	4,5	4,2	3,5	minimum 3 mm
Length matured (cm)	35	30	30	not specified
B.Roots				
Number of roots with ϕ > 2,2 mm	5	4	3	minimum 3 roots radially arranged
Total number of roots	6	10	11	not specified

From the data presented in Table 1 it results that in all three variants there are obtained grafted vines that exceed the minimum requirements imposed by the legislation in force. All three variants are accepted by European legislation. There are significant differences between the thickness of the hearts and the number of roots thicker than 2.2 mm. in favor of vines planted in the field and between the total number of roots in favor of vines planted with nutritious pots.

4. CONCLUSIONS

1. Romanian legislation harmonized with that in the European Union requires appropriate technologies for superior biological categories in the certification process of the propagating material of the viticulture.
2. Maintaining the research, improvement and pre-imprinting of the vine propagation material of National Research & Development Institute for Biotechnology in Horticulture Ştefăneşti-Arges obliges the institute to develop the technical-material base and the application of the leading technologies for the Biological category Initial material of viticulture multiplication.
3.In order to obtain the initial propagation material intended for the establishment of the mother plantations, the intensive technology of rapid multiplication of new varieties and valuable clones is recommended.

5. ACKNOWLEDGEMENTS

The financing was carried out with the support of the ADER 2020 Sectorial Program, MADR, project 3.3.9: "Maintenance of the vine propagation material - the initial biological propagation material, Basis and Certificate".

6. REFERENCES

Corbean, D., N. Pop, A. Babeş, A. Comşa (2009). Research on new methods of forcing management for production of grafted vines at S.C. Richter Tehnologii Viticole S.R.L. Jidvei, *Bulletin U.S.A.M.V.* Cluj-Napoca.

Gorjan, S.Ş. (2013). Evaluarea potențialului agrobiologic al unor resurse genetice de viță-de-vie în Podgoria Drăgăşani. Teză de doctorat, Universitatea din Craiova [Evaluation of the agrobiological potential of some genetic resources of vineyards in Dragasani Vineyard. PhD Thesis. University of Craiova]

Hamdan, A-J.S., Basheer-Salimia, R. (2010). Preliminary Compatibility between Some Table- Grapevine Scion and Phylloxera-Resistant Rootstock Cultivars, *Jordan Journal of Agricultural sciences*, 6 (1), 1-10.

Popa, A. (2012). Viticultura din Oltenia între reconstrucție şi dezvoltare [Viticulture in oltenia between reconstruction and development]. Ed. Alma Cariova.

Tița, I., (2003). Stație pilot pentru producerea materialului săditor viticol din categorii biologice superioare [Pilot station for the production of viticultural material of superior biological categories], Ed. Tipnaste, Pitești, 6-42.

*Corresponding author, E-mail address: badulescuadriana18@yahoo.com

Current Trends in Natural Sciences (on-line)
ISSN: 2284-953X
ISSN-L: 2284-9521

Current Trends in Natural Sciences (CD-Rom)
ISSN: 2284-9521
ISSN-L: 2284-9521

Tiţa, I., Dumitriu, I.C., Buciumeanu, E., Vişoiu, E., Smaranda Gh., Costescu, A., Guţă, C. (2004). Producerea materialului de înmulțire viticol din categorii biologice superioare, *Programul AGRAL-Cercetarea pe filiera agroalimetară din România în contextul european*, Bucureşti. [Production of viticultural propagation material from higher biological categories, AGRAL-Research program on agro-limestone branch in Romania in the European context, Bucharest]

Tiţa, I. (2004). Producerea materialului de înmulțire viticol din categorii biologice superioare [Production of viticulture propagating material of higher biological categories], Ed. Tipnaste, Piteşti, 112-123.

*Corresponding author, E-mail address: badulescuadriana18@yahoo.com