SUBSTRATES UTILIZATION TO ASSESS ROOTEDNESS CAPACITY AND VIABILITY BUDS AT SOME GRAPE VARIETIES

Gheorghe Cristian Popescu*

*University of Pitesti, Str. Targu din Vale Nr. 1, Pitesti
E-mail: christian_popescu2000@yahoo.com

Abstract
The cultivated grapevine (*Vitis vinifera* L.) is a fruit crop of enormous economic importance with over eight million hectares planted in vineyards worldwide. Table grapes and wines represent a considerable share of the economy in many grape and wine-producing countries. During the dormant, due to low temperatures and how to prepare grape for entrance in winter time, wood annual increases and buds may be adversely affected. The way how the vines passed by dormant period can affect the buds and wood viability and rooting ability of vine cuttings. In this study were tested on different culture substrates vine cuttings belonging to a noble variety and a hybrid vines: Merlot and Isabella. Noble grapes are a term used to describe the international variety of grapes that are most recognizable for the top quality wine they produce. In this paper was determinate total dry matter of vine cuttings, humidity of biological material, vine cuttings rooting capacity and viability status buds cuttings placed on three nutritional substrates.

Keywords: grape, rootedness, bud viability, growing substrate

1. INTRODUCTION

The grapevine *(Vitis vinifera* L.*)* belongs to the family Vitaceae, which comprises about 60 inter-fertile wild Vitis species distributed in Asia, North America and Europe under subtropical, Mediterranean and continental–temperate climatic conditions (Terral et al. 2010).
Resistance of different organs of the vine is also different, so the buds frost resistance is influenced by culture technology, production levels, climatic conditions of the current year, but also the genotype (Mos and Dobrei, 2011). Winter buds or winter eyes, are able to support temperatures of -18 ± 3 ° C, depending on variety. The degree of buds damage is influenced by physiological, genetical, ecoclimatic and agrotechnical factors (Dobrei and Mos, 2010).
During vine's repose period, temperature is the main stress factor, which influences plant growth and development, as well as the level and quality of next year's yield (Ciobanu et al. 2011). Dobrei A. et al. (2011) report a study on the behaviour of some table grape cultivars cultivated on family vineyards. The percentage of viable nodes varied between 72% in the grape cultivar Muscat de Adda and 84% in the grape cultivar Victoria. Nodes affected by frost for studied varieties were located in all grape cultivars towards the tip of the stem, portions that are usually pruned (Dobrei et al., 2011). During freezing studies of 'Concord' grape *(Vitis labrusca* L.), bud viability significantly affected callus formation, adventitious root initiation, and root dry weight during regrowth assays conducted to assess freezing injury (Barney, 1992).
Bud viability is direct influenced by low temperatures registered during winter month. Winter bud is afected starting with a noxious minimum of -18ºC (±3), depending on biological traits of diferent grape varieties. By determing buds viability, yield for the on-going year can be aproximated. For a corect pruning knowing the position of viable buds on shoot lenght, becomes necesary. In temperatures conditions of 2009-2010 winter, three of the four studied varieties (Muscat Ottonel, Sauvignon blanc, Traminer roz) had over 50 % viable main buds, while Neuburger was strongly afected by frost and had only 25.90% viable main buds (Ciobanu et al. 2011).

2. MATERIAL AND METHOD

The experiment was carried out at the University of Pitesti. The purpose of this work was to assess rootedness of grape cuttings on different substrates and buds viability for grape noble *Vitis vinifera L*. Cv Merlot and a grape hybrid Isabella (*Vitis vinifera* x *Vitis labrusca*). Grape cultivars were cultivated on family vineyards. The biological material was represented by cuttings with three buds from Merlot and Isabella grape varieties.

Experimental variants content of culture substrate were represented by (fig. 1):

- V1: 75% perlite + 25% manure;
- V2: 25% perlite + 75% soil plantation;
- V3: 50% perlite + 50% soil plantation.

Figure 1. Experimental variants

In this paper were determinate total dry matter of vine cuttings, humidity of biological material, vine cuttings rooting capacity and viability status buds cuttings placed on three nutritional substrates.

Determination of moisture content and total dry matter was conducted by the method of drying oven at 105° C. Biometric observations were carried out on the ability to put rooted cuttings rootedness is performed counting and measuring roots. Bud viability was emphasized by cultivating cuttings in different growing media. Bud viability was analyzed by the vegetation buds.

3. RESULTS AND DISCUSSIONS

Humidity of biological material is a important indicator for efficiency of vine cuttings that will be used for breeding. A percent more than 40% for humidity of vine cord is a good sign that the vine cuttings can be used for multiplication. The humidity of vine cord had a higher value for Merlot cultivar (fig. 2).

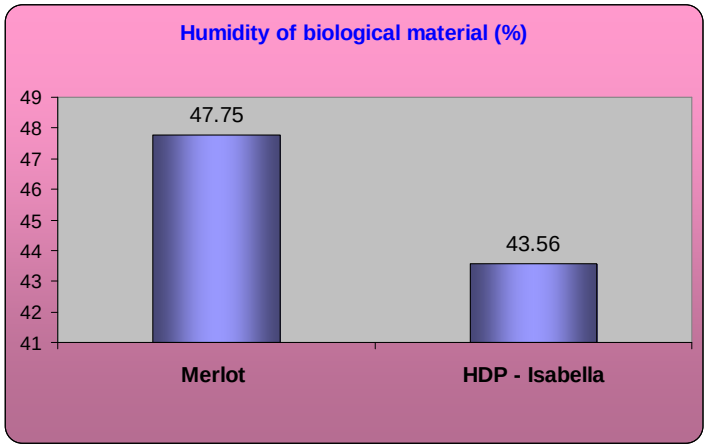

Figure 2. Humidity of biological material (%)

Figure 3 show the value obtained for total dry matter determination. Regarding total dry matter we registered the higher value for Isabella vine hybrid (54,66 %). Results suggest that vine cords harvested from family vineyard have a optimum content of total dry substance.

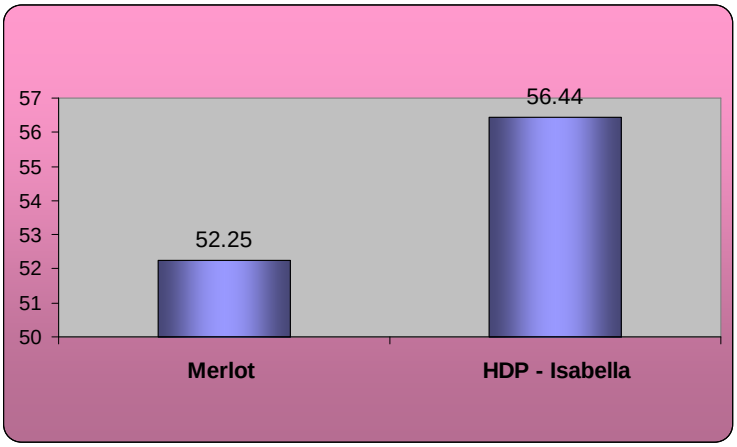

Figure 3. Total dry matter (%)

The rooting capacity of studied cultivars was appreciated by cultivation the vine cuttings on three variants of culture substrate. In this experiment we used for culture substrate three components in different percents: perlite, manure and soil from vine plantation. Regarding the average length of root we observed the higher value for both cultivars under the influence of V1 experiment that is represented by 75% perlite and 25% manure (fig. 4). In the same time, the experimental variant with 75% perlite and 25% manure has led to the largest number of roots (fig. 5). The length of root was varied from 2 to 5,4 roots for Merlot vine cultivar and from 1,5 to 3 roots for Isabella vine hybrid. Rooting capacity of cuttings is a criterion for the evaluation of the breeding capacity. The behaviour of rooting capacity is presented by figure 7.

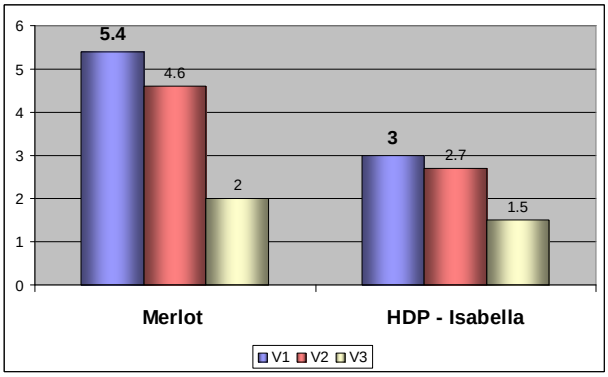

Figure 4. The average length of roots (cm)

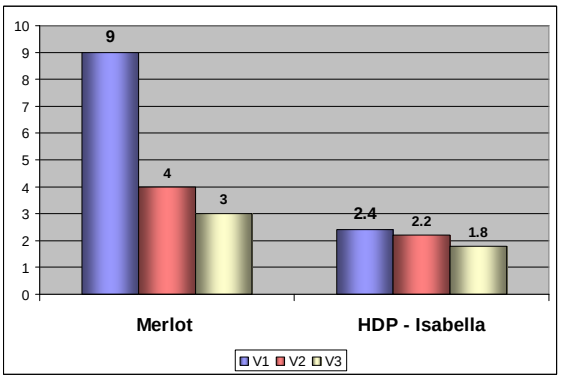

Figure 5. The average number of roots (cm)

Each vine cuttings was examined concerning the viability and the fertility of buds from the winter eyes on each experimental substrate (fig. 6). The determination of vine buds viability is very important to calculate the buds loss and buds load. The viability degree is also important for estimation of grape yields. For Merlot vine cultivar the viability degree of buds varied from 70,5% in the variant V2 to 83,3% in the experimental variant V3 while for Isabella vine hybrid the viability degree was between 72,3% and 76,8% (fig. 6).

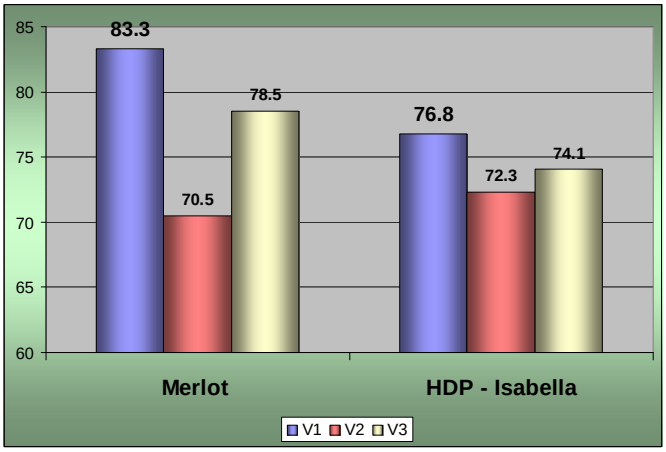

Figure 6. Buds viability (%)

Figure 7. Expression of rooting capacity - Merlot

4. CONCLUSIONS

The dry matter content of vine cuttings recorded higher values for Isabella vine hybrid. Expression capacity of the root system was more pronounced for Merlot cultivar under the influence of nutritional substrate of the experimental variant V1. Percentage viability of buds was varied between 70.5% and 83.3% for Merlot, while the Isabella vine hybrid bud viability ranged between 72.3 and 74.1.

5. REFERENCES

Barney D.L. (1992) Effects of bud viability and minimum temperatures on regrowth assays of grape wood during freezing studies, Hortscience, Vol. 27(12)

Ciobanu F., Pop N., Farago M., Calugar A., Hodor D. (2010) The Influence of Ecoclimatic Conditions on Wood Maturation and Bud's Viability, at Some Grape Varieties for Quality Wine, from Vineyard Târnave, Bulletin UASVM Horticulture 67(1)

Dobrei A., Mălăescu Mihaela, Ghiță Alina, Drăgunescu Anca, Ciucur A. (2011) On the behaviour of some table grape cultivars cultivated on family vineyards. Journal of Horticulture, Forestry and Biotechnology Vol. 15(2) 66- 69.

Dobrei A., Mos V. (2010) Research on assurance of viticultural biodiversity, by using local varieties and biotypes of Buzias-Silagiu area", Journal of Horticulture, Forestry and Biotechnology, vol 14, Ed. Agroprint Timişoara, p.189 - 194

Terral F.J., Tabard E., Bouby L., Ivorra1 S., Pastor T., Figueiral I., Picq S., Chevance J.B., Jung C., Fabre L., Tardy C., Compan M., Bacilieri R., Lacombe T., This P., (2010) Evolution and history of grapevine (Vitis vinifera) under domestication: new morphometric perspectives to understand seed domestication syndrome and reveal origins of ancient European cultivars. Annals of Botany 105, p. 443–455