RESEARCH ARTICLE (Open Access)

Effect of the Substrate during the Transplanting Phase on the Growth of Rooted Cuttings

FADIL THOMAJ[1]*, KOZETA BREGU[1]

[1] Agricultural University of Tirana, Department of Horticulture & Landscape Architecture

Abstract

In addition to the cultivar's rooting ability, it is important to ensure that the rooted cuttings will have a rapid growth rate in order to meet the standard and reduce seedling costs. Under this experiment we tested the effect of 6 different substrates, or substrate compositions on the growth rate of rooted cuttings through a randomized experimental design. Several variants as in following described were evaluated; V1= 35% blackpeat+45% blonde peat+20% vermiculite, V2= 66% compost (composted manure)+34% clean river sand, V3= 50% black peat+15% sand+35% compost, V4= 20% black peat+20% blond peat+20% sand+40% compost, V5= 28% blond peat+28% coconut fibres+14% vermiculite+30% compost, V6= 28% blond peat+28% coconut fibres+14% sand+30% compost. The composition of substrate at the transplant time had a strong influence on the growth of rooted cuttings during the nursery stage. Variants V1, V2, V4 and V6 show the best results. However, considering the fact that it is composed by only localy available materials, V2 was considered as the most economic variant.

Keywords: *Different substrates, rooted cuttings, peat, compost, vermiculite, the nursery stage*

1. Introduction

In Albania, olive growing is a lead sector in the agricultural development policies. This is favored by the presence of a fairly diversified terrain; the presence of favorable climatic conditions and the tradition inherited from generations for the cultivation of the olive tree. [7]

In this context, nowadays the olive tree in Albania occupies the first place with about 40% in the structure of all fruit trees and provdies about 29% of the production of fruit trees, excluding the vine. Olive oil is a highly popular product nowadays in the Albanian market and worldwide.

The production of seedlings is one of the most important links for the growth of this plant with special values. The duration for the production of standard seedlings with nebulization technology varies from 2 to 2.5 years [6,7]. In addition to the cultivar's rooting ability, it is important to ensure rapid growth rates to meet the standard and reduce seedling cost. The substrate used for transplantation also has a significant impact in this regard [1,2,3,4,5]

2. Material and Methods

In this study was tested the influence of 6 different substrates on seedling growth in the first year after rooting in accordance with the following scheme:

V1 = 35% black peat; 45% blonde peat; 20% vermiculite

V2 = 66% compost (compostable manure); 34% pure river sand

*Corresponding author: Fadil Thomaj; E-mail: fthomaj@ubt.edu.al

Special Issue of the Conference:Agriculture a Life Science with Roots in Applied Biology; 3-4 Dec.2020. (Accepted for public. 18.01.2020)
***ISSN**: 2218-2020, © Agricultural University of Tirana*

V3 = 50% black peat; 15% sand; 35% compost
V4 = 20% black peat; 20% blonde peat; 20% sand; 40% compost
V5 = 28% blonde peat; 28% coconut fiber; 14% vermiculite; 30% compost
V6 = 28% blonde peat; 28% coconut fiber; 14% sand; 30% compost

Figure 1. Rooted cuttings, transplanted to different substrates.

U. Kuq cultivar seedlings were placed on the above substrates.For transplantation, plastic bags with a volume of 2 kg were used.For each substrate 100 rooted seedlings were transplanted, while the measurements were performed on 40 seedlings obtained in the shape of a "W" respecting the randomness of sampling.The measurements were performed in three vegetation periods;July 20, September 20 and October 20.The data obtained were subjected to statistical analysis (ANOVA) and Tukey-Kramer test.

3. Results and Discussion

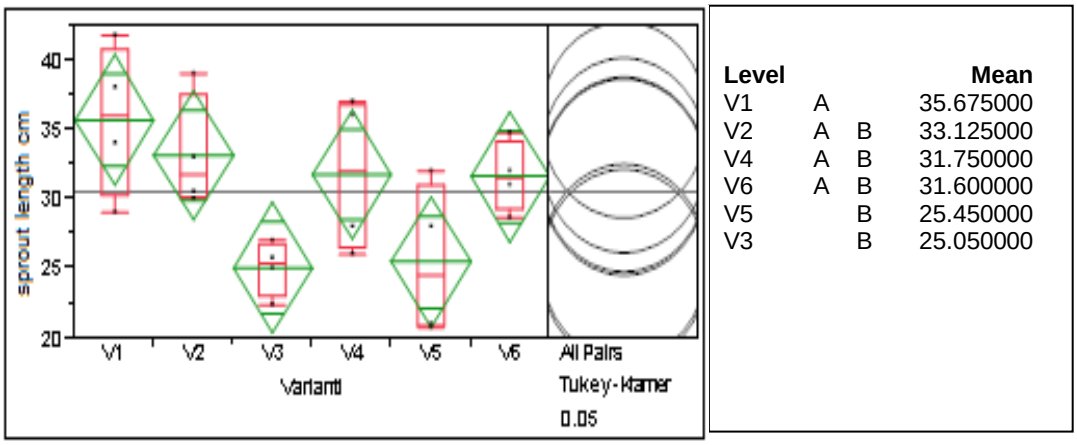
The data obtained during the vegetative period show that the variants;1, 2, 4 and 6 provided a better growth of the main shoot.From the four aforementioned variants, V1 has provided results that differentiates it from the other variants. Following it is ranked the V2 variant.Given the composition of each variant and their cost, V2 and V4 are cheaper and provide good results in the growth rates of young seedlings.V2 had faster rates from the first phase of growth;about one month after transplantation.Variants 3 and 5 provided the worst results.

Table 1. Influence of the transplant substrate on seedling growth indicators in the nursery stage.

Variants	No. sprouts	Sprout length cm			No. of leaves		
		20/07	20/08	20/09	20/07	20/08	20/09
V1	1.04	5.44	22.44	35.56	10.6	24.52	33.4
V2	1.04	17.32	26.9	34.04	18.12	25.6	32.72
V3	1.08	8.12	16.8	25.4	10.8	20.6	25.2
V4	1	5.84	21.8	31.72	10.64	20.96	27.08
V5	1	6.26	13.68	25.24	5.82	17.56	23.32
V6	1	8.24	16.92	31.8	12.88	18.12	29.96

The greatest number of branches are found in variants 1,2 and 3, but the differences are insignificant between them and other variants.

One way Analysis of sprout length cm By Variants



Level			Mean
V1	A		35.675000
V2	A	B	33.125000
V4	A	B	31.750000
V6	A	B	31.600000
V5		B	25.450000
V3		B	25.050000

Figure 2. Influence of different substrates (variants) on the growth of shoots

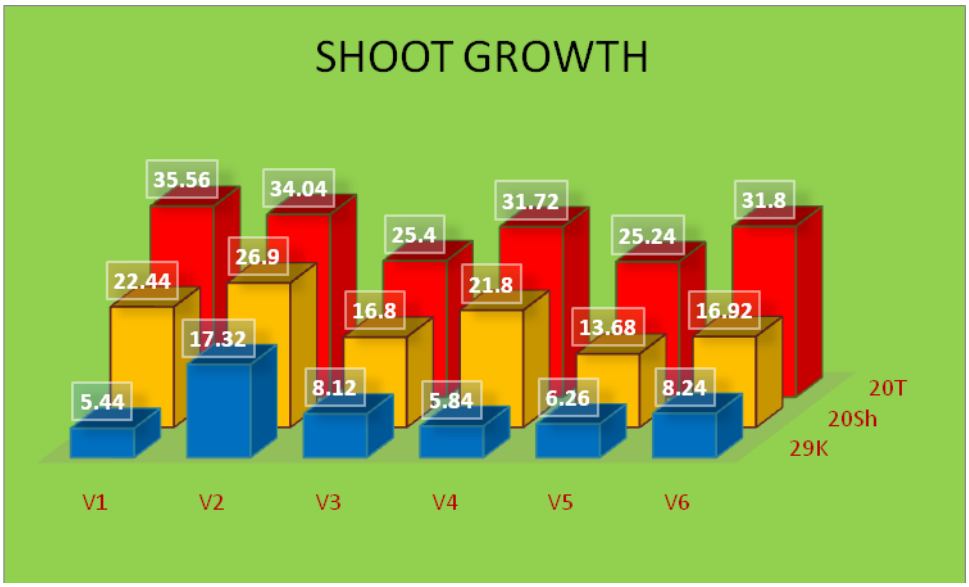


Figure 3. Growth dynamics of seedlings in different substrates.

4. Conclusions

After the analysis of the data regarding the impact of different substrates during transplantation, on the growth rates of the seedling it is concluded that:

– The composition of the substrate at the time of transplantation affects the growth
–
–
– of the new seedling in the nursery phase.The V1, V2, V4 and V6 variants give the best results.
– V2, is the cheapest variant as it eliminates the components of other substrates that are imported products

5. References

1. **Caruso T., Vito S. 2012.** Organizzazione vivaistica e certificacione. (Collana divulgativa dell'Accademia , Spoleto,Vol.XI; 4-21)
2. **Cimato A., Sani G., Attilio C., Marzi L. 2001**. Polvere di cocco in vivaio nei substrati artificiali degli olivi. Informatore Agrario, 44, 53–55.
3. **Khabou W. 2002**. The effect of physico-chemical characteristics of substrate on the cinetic growth of young olive plants in the acclimatization phase: vegetative growth. Acta Hort., 586: 883-886
4. **Mehri H., Mhanna K., Soltane A. 2013.**RootgrowthofArbequinaCuttings as influenced by organicandinorganicsubstratesunder the conditionsofAl_Jouf (KSA) (Amer. J.P . Phys. 8(2)74-83)
5. **Peixe A., Raposo A., Lourenc R.., Cardoso H, Macedo E. 2007(a)**. Coconut water and BAP successfully replaced zeatin in olive (Olea europaea L.) micropropagation (Scientia Horticulturae 113 ; 1–7)
6. **Petruccelli R., Micheli M., Proietti P., Tommaso Ganino T. 2012**. Moltiplicazione dell'olivo e vivaismo olivicolo in Italia (*Italus Hortus* 19 (1), 3-22)
7. **Thomaj F. 2012.**Ullishtaria(Botimet Kumi – Tirana; (22-24;138 – 146)