

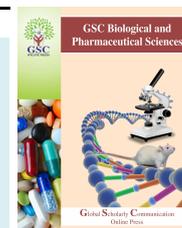


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(RESEARCH ARTICLE)



Layering - an effective way of intensive propagation of grapevine seedlings

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Abstract

Presented hereby the survey results conducted on the study of one of effective ways of intensive propagation of grapevine seedlings – layering way. The production and quality indicators of layers which are layered horizontally from two-year old mother bushes and rooted at the end of growth period have been compared to traditional way of seedling production. According to experiment results, grapevine seedlings production by layering way per area unit has showed preference over traditional method. Quality indicators have been observed according to standard requirements level.

Keywords: Grapevine; Mother bush; Cutting; Seedling; Rhizogenesis; Regeneration

1. Introduction

It is obvious that in recent years a particular attention is paid to the development of viticulture in the republic and to increase the amount of industrial vineries. The implementation of the plan fixed by state for creating new vineries annually and reconstructing the present low rentable used vineries are causing to a great need for millions of seedlings. The practical solution for these tasks – is to apply modern intensive technologies in each farm of grapevine seedling production [1].

In the cultivation of grapevine seedlings the intensive seedling production technologies such as layering (horizontal, vertical), grafting and cultivation from meristem by *in vitro* method are widely used throughout the world [2].

As our surveys show, seedling production from hardwood cuttings remains as a main method in the republic. Although rhizogenesis and regeneration processes of cuttings occur normally in this method of seedling production, the efficacy of seedling production by area unit is much lower. Considering this, the research have been conducted to analyse the preferences of layering which allow to increase seedling production by area unit.

2. Material and methods

In the experiment black Kishmish variety of grapes seedlings were cultivated from hardwood cuttings and by layering, and these methods were compared with each other. In the first method hardwood grape cuttings were planted in experimental area under 70×20 cm scheme. In each variant 200 pieces of cuttings were planted by four repetitions. For getting seedlings by horizontal layering the brooks were dug with depth 20-25 cm along the rows around mother bushes. The shoots inside the bush were lied into these brooks and covered with soil in such way that developed shoots in each node remained uncovered (Picture-1). Experimental plants were cultivated according to generally accepted

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method (fertilizing and irrigation norms) [3]. The experiment was conducted using “The methodics of accounts and phenological observations on conducting experiments with fruit and berry plants” recommended by Buriyev and Yenileyev [4]. Grapevine seedlings were evaluated according to present standard during the growth [5].



Figure 1 The production of grapevine seedlings from hardwood cuttings and by horizontal layering

The roots were formed in each node of shoots covered with soil and shoots were formed in each bud in horizontal layering. In autumn this shoot was uncovered not destroying its root system and each node was separated into parts in such way that each of them could define a standard seedling.

3. Results and discussion

Our researches conducted on the study of impact of cultivation conditions and methods of clone mother bushes of black Kishmish variety of grapevine on the production and quality of layer seedlings have enabled us to determine the preference of growing plants in protected area condition. When black Kishmish variety seedlings were propagated by horizontal layering, they developed faster than the seedlings from hardwood cuttings due to their dependence on mother bushes and nutrient chain connected with parent plants.

According to surveys, first roots were observed in layered shoots after 25-30 days from the time they were dug in soil and layer shoots got additional feed by autophyte condition besides mother bush. And this allowed to further development of vertical shoots of each node which remained on soil surface.

Mean length of main node of the seedlings produced by this method reached to 102.7 cm at the end of vegetation (November) and average 4 side-shoots formed in each plant. While the seedlings were produced from hardwood cuttings by traditional method, these indicators were relatively 84.5 cm, and side-shoots 3 pieces. Layer seedlings had advantage by the length of shoots and the number of side-shoots as well.

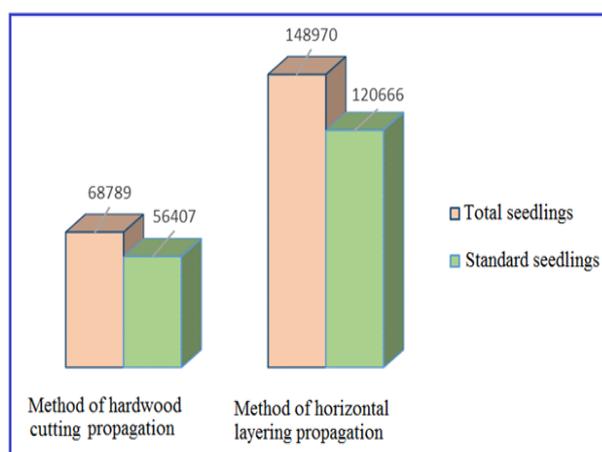


Figure 2 Yield indicators of seedlings by horizontal layering propagation and hardwood cutting production

It is known that the efficacy of each agrotechnical measure is valued by the production of finished product and its quality indicators. At the end of growing period the analysis of seedling production and its quality indicators showed that in the

variant of planted hardwood cutting total seedling production made average 68789 pcs per ha, while by horizontal layering average 148970 pcs of rooted layer seedlings were obtained per ha of nursery (Figure 2).

Selection of grapevine seedlings according to standard requirements showed that 82% of total seedlings cultivated from hardwood cuttings consisted qualitative seedlings (the first and second). While in horizontal layering this indication was relatively 81%, here the most important point is that although the standard seedling yield had the same parameters, in horizontal layering method due to the abundance of seedlings 2, 1 times more, the standard seedlings were two times higher than traditional seedling production.

4. Conclusion

The cultivation of grapevine seedlings by horizontal layering allowed to get the seedling yield with 102.7 cm of main shoot length and with 4 side-shoots at the end of vegetation. But by this time the seedlings propagated from hardwood cuttings had these indicators relatively 84.5 cm and 3 pieces.

Moreover the horizontal layering enables to obtain standard seedling yield of 120666 pieces per ha by area unit of nursery, and this is 2, 1 times more than traditional seedling production method.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

No conflict of interest declared.

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