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ACCLIMATIZATION OF IN VITRO PROPAGATED CHERRY KRIMSKY-5 (VSL-2) GRAFTS TO OPEN FIELD

Saimnazarov Yuldash Bekmirzaevich[1], Amirov Murodulla Shavkat ugli[2]
[1]*Doctor of Biological Sciences, Professor, Institute of Rice Researches*
[2]*Master,Tashkent State Agrarian University, Tashkent, Uzbekistan.*

ABSTRACT
In the article, the acclimatization of microclonal propagated cherry Krimsky-5 grafts in different nutrient environments was studied. In this case, grafts were grown on substrates such as "Agrobalt-S", "Agrobalt-V" peat and "Bioghumus" at an air temperature of 25°C and relative humidity of 65-70%. Also, growth and development of microplants in open field conditions, growth dynamics of height and body diameter, number of leaves, leaf surface and root system development indicators are highlighted.
KEY WORDS: *Cherry, microclonal propagation, acclimatization, greenhouse, biometric measurements, phenological observations.*

INTRODUCTION

Acclimatization is described as climatic adaptation of a living organism, especially a plant, to a new environment or getting used to the environment [1,4]. Acclimatization of microclonal propagated plants to greenhouse and field conditions is very important because microclonal propagated incubator conditions and greenhouse or field conditions are very different. Seedlings or branches grown *in vitro* are kept free from stress and in a uniform microclimate with optimal conditions for plant reproduction. Seedlings in cultivation containers, develop and feed heterotrophically in low-light and aseptic conditions, in an environment containing sufficient amounts of sugars and nutrients, and in an atmosphere with high humidity [3]. As a result of these conditions, seedlings with unusual morphological, anatomical and physiological characteristics develop. When microclonal shoots or seedlings are transferred from incubators to the greenhouse, they may rapidly wither or die from the change in environment unless adequate precautions are taken to acclimatize them [6]. When transferring from *in vitro* conditions to *in vivo* conditions, the aforementioned shortcomings must be considered. Successful acclimatization technologies should provide growth in greenhouse or field conditions with low humidity, strong light, autotrophic nutrition, and aseptic environment. Although there are specific methods of acclimatization for some plants, there are technologies common to all plants [5].

MATERIALS AND METHODS

The experiments were carried out in the research institute of horticulture, viticulture and winemaking named after Academician M. Mirzaev within the framework of the practical international cooperation project UZB-Ind-2021-84 - "Enrichment of plant genetic resources in Uzbekistan and India and increasing the scientific potential of researchers". The growth of microclonally propagated Krymsky-5 grafts of cherry was observed from February 11th to February 25th on three different substrates in the acclimatization room. Rooted micro-plants were separated from the nutrient medium, and the residues of the nutrient medium stuck to the root system were washed in running water. Micro-plants were transferred to polystyrene cassettes containing substrates such as "Agrobalt-S", "Agrobalt-V" peats and "Biogumus" and stored in plastic bags in an acclimatization room. In acclimatization, air temperature was 250C and relative humidity was 70%. During the first four days of cultivation, the covers of the cells were not opened. On the fifth day of acclimatization, microplants were watered. As the upper leaf buds grow, watering is reduced. The full growth phase gradually transitioned into the nursery phase with significantly longer watering intervals. The composition of peat and biohumus used in the process of acclimatization of the Krimsky-5 graft of cherry were as follows:
"Agrobalt-S" peat moisture content is 65%, the content of mineral substances is N-120 mg/l, P_2O_5 80 mg/l, K_2O 140 mg/l, Mg-30 mg/l, Ca-170 mg/l and microelements Cu-9 mg/kg, Mn-40 mg/kg, Zn- 9 mg/kg, Co-0.001 mg/kg. Organic matter was 90% and the pH value was 5.5-6.6.

"Agrobalt-V" peat moisture - 65%, no mineral additives. Organic matter was 95%. pH indicator was -3.0-4.2.

"Biohumus" N-0.9 -3.0%, P_2O_5 1.3-2.5 mg/kg, K_2O 1.2-2.5 mg/kg, Mg-0.5-2.3 mg/kg , Ca-4.5-8 mg/kg, Fe-0.5-2.5% and microelements Su-3.5-5.1 mg/kg, Mn-60-80 mg/kg, Zn- 28- 35 mg/kg, humus was 10-12%. Organic matter is 40-60% and the pH value was 6.5-7.2 [6].

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RESULTS AND DISCUSSION

In the conducted experiments, the length of the graft when planted on February 11 in Agrobalt-S peat on the Krimsky-5 graft on February 25 in the MS (Murasige and Skug) control medium was 5.7 cm, 11.8 leaves and 3.5 cm^2 of leaf surface.

The height of the Krimsky-5 graft in the DKW (Driver and Kuniyuki) nutrient medium was 6.3 cm, the number of leaves was 12.0 pcs. Also, it was noted that the leaf level is 0.2 cm^2 higher.

In MS_{tak} (Murasige and Skug, improved) nutrient medium, the length of Krimsky-5 graft grew from 3.2 cm to 5.8 cm, the number of leaves was 12.2 pieces, the leaf area was 3.7 cm^2, and the height of the graft compared to the control variant was 0.1 cm. Also, it was observed that the number of leaves is 0.4 pieces and the leaf surface was 0.2 cm^2 higher.

The height of the graft in WPM (Woody plant medium) medium is 5.3 cm, the number of leaves was 11.5 pieces and the leaf area was 3.7 cm^2, compared to the control variant, the height of the graft is 0.4 cm and the number of leaves is 0.3 less and it was noted that the leaf surface was 0.2 cm^2 higher.

During the acclimatization of cherry cuttings, when the height of Krimsky-5 cuttings planted on "Agrobalt-B" peat was observed from February 11 to February 25 in the control medium MS, they grew from 3.1 to 4.2 cm, the number of leaves was 11.5, the leaf surface was 3.5 cm^2.

In DKW nutrient medium Krimsky-5 graft height was 4.1 cm, the number of leaves was 12.1 pieces and leaf surface was 3.6 cm^2, comparing to the control variant, it was observed that the height of the graft was 0.1 cm lower, the number of leaves was 0.6 pieces and the leaf surface was 0. 1 cm^2 was higher.

In MS_{tak} and WPM media, graft height was 4.2 cm, leaf number and leaf surface increased to 12.5 and 3.8 cm^2, respectively compared to the control, graft height was the same with leaf number (0.7) and leaf area (0.3 cm^2) was observed to be higher.

А Б

Figure 1. Growth (A) and growth length (B) of Krimsky-5 grafts on Agrobalt-S peat.

When the height of Krimsky-5 grafts planted in "Bioghumus" was observed from February 11 to February 25, it grew from 3.0 to 3.6 cm in MS control medium, the number of leaves was 11.5, and the leaf area was 3.5 cm^2. The height of the graft grew by 3.6 cm in DKW, option 3 MS_{tak} and WPM nutrients, the number of leaves was 10.0 pieces and the leaf area was 3.6 cm^2, compared to the control option, the height of the graft was the same, the number of leaves was 1.5 pieces less and leaf surface was observed to be higher by 0.1 cm^2.

The growth dynamics of growth of height and body diameter, the number of leaves, the level of leaves and the development of the root system were studied *in vitro.*

According to the results of the study, the bruising of the cherry planted in the open field in the Krimsky-5 graft was studied in 4 different options and 4 repetitions.

100 grafts were planted in each variant. According to the results of the study, the microclonal reproduction *in vitro* made 95.6% of cherry grafting Krimsky-5 (VSL-2) in open field conditions.

The growth length, width, number of leaves and leaf area of the graft under field conditions were observed from April to September. The growth length of the graft in the Krimsky-5 graft variant 1 MS in the control nutrient medium increased from 21.9

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cm in April to 84.8 cm in September, and the graft width was 7 .8 mm, the number of leaves was 40.0 and the leaf area was 32.5 cm^2.

In variant 2 in the Krimsky-5 graft on DKW medium, the growth length increased from 31.9 cm in April to 131.3 cm in September, the width of the graft was 9.8 mm, the number of leaves was 41.1, and the leaf area was 33.4 cm2 compared to the control variant, it was noted that the growth length of the graft was 46.5 cm higher, the width was 2 mm, the number of leaves was 1.1 pieces, and the leaf surface was 0.9 cm^2 higher.

In option 3 MS_{tak} and option 4 WPM mediums, graft growth length increased from 39.3 cm in April to 107.2 cm in September, width 9.5 mm, leaf number 35.6 and leaf area 29.7 cm^2 growth was observed, compared to the control variant, the growth length of the graft was 22.4 cm, the width was 1.7 mm higher, the number of leaves was 4.4 pieces and the leaf area was 2.8 cm^2 less.

In variant 1, the growth length of the Krimsky-5 graft in the control nutrient medium MS increased from 24.4 cm in April to 82.5 cm in September, the graft width was 6.4 mm, the number of leaves was 42.3, and the leaf area was 32.6 cm^2.

In the variant 2 DKW medium of Krimsky-5 graft the growth length increased from 25.6 cm in April to 82.5 cm in September, the graft width was 7.4 mm, the number of leaves was 44.1, and the leaf area was 35.6 cm^2. Comparing to the control variant, the growth length of the graft was the same, the width was 1 mm, the number of leaves was 1.8 pieces and the leaf surface was 3 cm^2 higher (Figures 1 and 2).

The growth length of the graft in the variant 3 MS_{tak} nutrient medium increased from 42.1 cm in April to 110.8 cm in September, the width increased to 8.6 mm, the number of leaves increased to 38.5 pieces, and the leaf area increased to 30.9 cm2, compared to the control option. in comparison, it was noted that the growth length of the graft was 28.3 cm, the width was 2.2 mm higher, the number of leaves was 3.8 pieces and the leaf surface was 1.7 cm^2 less.

Variant 4 WPM media showed a growth length of 41.3 cm in April to 117.2 cm in September, width 9.8 mm, number of leaves 42.7 and leaf surface 33.2 cm^2 compared to control. 34.7 cm, 3.4 mm higher in width, 0.4 more leaves and 0.6 cm^2 more leaf surface.

The growth length of Krimsky-5 grafts in the control medium of variant 1 MS increased from 23.4 cm in April to 85.6 cm in September, the width was 7.1 mm, the leaves were 40.2 pieces, and the leaf surface was 31.4 cm^2.

Krimsky-5 graft on Variant 2 DKW nutrient medium, growth length increased from 38.1 cm in April to 106.7 cm in September, width 8.6 mm, number of leaves 42.4 pieces and leaf area 33.9 cm2, control compared to the variant, the growth length of the graft was 21.1 cm, the width was 1.5 mm higher, the number of leaves was 2.2 more and the leaf surface was 2.5 cm^2 more.

CONCLUSIONS

The highest growth rate for the Krimsky-5 grafts of cherries prepared in different nutrient media was in the DKW nutrient medium "Agrobalt-S" peat, the growth length was 6.3 cm, the number of leaves was 12.0 pcs. was found to be the most effective peat. In substrates such as "Agrobalt-V" peat and "Bioghumus" the growth length of the graft was determined by the growth of 3.4 cm, the number of leaves up to 10.0 pieces and the leaf surface up to 1.9 cm^2. It was found that the substrates such as "Agrobalt-V" peat and "Bioghumus" are ineffective for the growth of Krimsky-5 graft.

According to the results of the research, the cherry grown in different nutrient mediums was studied in field conditions on the Krimsky-5 graft from April to September, and when the boimetric measurements were calculated, it grew well in the DKW nutrient medium, with the growth length was 31.9 cm, the width was 2.2 mm in September 131 3 cm, 9.8 mm wide, 41.1 leaves and 33.4 cm^2 leaf area were observed.

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