5. Столяров Владислав Олимпийское воспитание. Теория и практика. [Книга]. - Москва : Национальное образование, 2014. - стр. 402.

6. Столяров Владислав Современный олимпизм и олимпийская педагогика: достижения, проблемы, перспективы [Книга]. - Москва : ПЛАНЕТА, 2018. - стр. 528.

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EFFICIENCY AND QUALITY INDICATORS OF IN VITRO PROPAGATION OF HIGH-YIELDING MULBERRY VARIETIES AND HYBRIDS

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Abstract: This article describes the hybrid of Oshima I2N2 (Morus bombycis Koidz.) × SANIISH-25 (Morus multicaulis Perr.), Obtained by crossbreeding of mulberry tree, which is widely used in production in Uzbekistan. The specificity of the variety and the development of each clone were studied in the process of different effects on the growth and development of mulberry in standard nutrient media in vitro from the selected Jarariq 9 varieties.

Our study found that when we planted 3 clones in a new environment, leaving one joint, the third apical part grew better than the 2nd medium clone, but the 3rd clone growth and root rate, which was cut close to the 3rd nutrient medium, was higher than the 1st and 2nd clones.

Key words: Mulberry (Morus sp.), micropropagation, in vitro screening, M.Bombycis Koidz, M.Multicaulis Perr., M.Nigra L., M.Alba L.

It is no secret that today there are all the conditions for scientific and practical research using the domestic potential for further development of the economy of Uzbekistan. Our research is in vitro micro propagation of mulberry tree varieties and hybrids suitable for our climatic conditions. Our results are a scientific and practical demonstration of the advantages and effectiveness of traditional multiplication methods and high quality indicators.

Due to the fact that silkworm breeding in the country can be exported in a very short time - 30-35 days, now it is planned to re-feed silkworms 3-4 times. In order to fulfill the set plans, there is a need to further increase the number and variety of mulberry trees. It is not necessary to use fertile land to expand mulberry fields, as the mulberry tree is drought tolerant and can grow even in areas with high salinity or salinity. Farmers always plant mulberry trees on both sides of the roadside ditches and on the other side of the border to prevent cotton and grain fields from being washed away by the ditches in the downpour. In the provinces, you have seen mulberries planted in two rows on both sides of the bush, because the mulberry tree is planted to consume the fruit and, most importantly, to use the leaves to feed the silkworm. Due to the efforts of representatives of the silk industry, great opportunities are opening up for the development of silkworm breeding.

However, there are a number of problems in the process. The scarcity of mulberry plantations, which are the main food for silkworms and the fact that their existing ones have become unusable, is one of them. It is no secret that in some districts of the country the productivity of mulberry trees has significantly decreased due to negligence in the implementation of agro-technical measures. In addition, mulberry disease and pest control measures are not carried out in a timely and quality manner.

The head of state instructed the Ministry of Agriculture, "Uzbekipaksanoat" Association, regional governors and heads of relevant departments to allocate land for the establishment of mulberry groves, renovate the old ones, and use water-saving technologies. The goal is to increase cocoon production to 21,000 tons next year and 30,000 tons by 2025.

Based on this, by the end of 2022, it is planned to plant 20,000 hectares of new mulberries and renew 10,000 hectares of obsolete mulberries.

Mulberry propagation is mainly of two types: from traditional vegetative cuttings or by grafting and from seed. In these methods, it is not possible to grow any amount of high-yielding plants without the diseases we expect. The traditional method of propagating mulberries does not give an increase in economic efficiency. A group of scientists from the University of Taif in Saudi Arabia (2014) (Attia O Attia, Eldessoky Sdessoky, Ehab I El-Hallous & Hanan F Shaaban) also pointed out that reproduction through breeding work is also time consuming.

In India, Bangladesh, Pakistan and a number of other Asian countries, the mulberry tree is the only food for silkworms, longevity, soil erosion protection, plant protection from downpour, the use of fruit as a natural nutrient for small animals and birds during ripening considering the economic potential of mulberry , a group of Indian scientists have pointed out that most research is being done on mulberry trees to create high-

yielding, disease-resistant, nutritious mulberry varieties adapted to the natural climate. Kunjupillai Vijayan. A. Tikader and others. 2011. Article · June 2011 DOI: 10.1007/978-3-642-20447-0_5

Researchers in China, India, Japan and Korea, where silkworm breeding is practiced, are also working on genetic improvement through mulberry selection, genomic and breeding resources, as well as conservation, collection, use and transmission of valuable wildlife to future generations.

Propagation of mulberry varieties is one of the effective methods of micro clonal propagation by modern advanced in vitro method. Micro clonal reproduction allows reproduction at any time of the year.

Over the past decade, scientists have advocated the high efficiency of propagation of several tropical and subtropical fruit trees from cell tissue (Agarwal et al., 2004; Tsukamoto et al 2007 ; Perez Tornero et al..,2010; Skiada et al ., 2010).

In our research, we began with the development of in vitro method, which is effective and of great importance in the development of mulberry breeding, selection of high-yielding disease-resistant mulberry varieties and hybrids in the regions of the country.

Jarariq-9 variety and Uzbek hybrid were selected for the experiment.

Several experiments were carried out to introduce the selected mulberry varieties and hybrids into the culture.

Cut green shoots of mulberry are left in running water overnight and then rotated in a magnetic stirrer in a soapy solution for 30 minutes.

To sterilize the cut green shoots for propagation, cleaning was carried out in several different solutions and an acceptable one was selected.

After cleaning the cut green shoots from bacteria and fungi, experiments on the introduction of culture began in the shortest time period possible.

The work process was carried out in a special laminar-box. Pre-distilled water and various prepared nutrient media were sterilized and prepared in an autoclave for the pre-work process.

The next task we need to determine is to select the optimal one for in vitro propagation of mulberry in a medium prepared at different concentrations.

When preparing the nutrient medium in a volume of 1 liter, 20 mg / l of each mother solution is taken and mixed with half the amount of distilled water. The sucrose is dissolved in the rest of the water. Macro- and micro-nutrients and sucrose solutions are poured together, physiologically active additives are added, the pH is increased to 5.6-5.8, and agar is added.

Samples from all mulberries were selected according to the age of the mulberry. Samples were taken from young seedlings planted from fresh seeds, 2–3-year-old and 10–15-year-old mulberries. As a result of the experiments, it was determined that the most suitable specimen for

propagation was taken from 2-3-year-old mulberries, and the process was planned to continue in these samples. This is because the results of in vitro propagation of 2-3-year-old mulberry tree green shoots with a high rate in our experimental results were studied.

Modifications to various components in our prepared nutrient medium, such as phyto-hormones, vitamins, sucrose, and other supplements, have different effects on the growth and development of mulberry.

It has been pointed out that in plant tissue proliferation; a number of experiments are required to select the optimal norm for the growth of each plant cell tissue (Skoog & Miller 1957).

Muhammad Akram and Fahim Aftab, both scientists at the Department of Botany at the University of Punjab in Pakistan, also cited Morus alba L.'s 2012 study on in vitro reproduction of white mulberry.

At the time of introduction of mulberry into the culture, it was found that the varieties depend on the varietal characteristics. Although the growing parts of the mulberry were taken at the same time and introduced in the same environment, the thickening of the stem of the Balkhi mulberry and Shotut variety caused tissue damage and this affected the stem.

Mulberry soaked in special solutions is transplanted into a sterilized nutrient medium in a laminar-box. Before planting, mulberry is sterilized, soaked in water and the crushed areas are cut off. The nutrient medium was also in different concentrations and the effect of mulberry on the sterile environment was studied.

The cut genotype of the Uzbek hybrid was transplanted into the nutrient medium at 7 days. In this case, at 12–15 days, bluntness was observed in the root part, and the root began to emerge. Only the transition from a hormone-free environment to a sterile state was used.

The plant, which was planted on April 6, was cloned on May 16. Leaving one joint, 3 clones were removed from each seedling in the jar and planted in the prepared nutrient medium. The original material was put back into growing.

On May 16, 3 cuttings were taken from each shoot at 3 weeks of age from the mother material in the arrow state, where the in vitro micro-reproduction of the mulberry was transferred to the new medium and we were able to get 12 cuttings from 4 seedlings.

In the process of micro propagation of mulberries, the specificity of the variety and the development of each clone have been studied and the study continues. Because after the apical part of the plant was cut, the 2nd joint showed slow growth, the 3rd joint developed from the lateral bud, and the growth from the lateral bud in the 4th joint also gave a very good indication. Micro-cloning was performed at 3 weeks and 4 weeks after the introduction of mulberry into the culture. Different sections of mulberry were used as

planting material. The apical part of the mulberry, the first joint and the second joints were planted separately.

Our research showed that when we planted 3 clones in a new environment, leaving one joint, the third apical part grew better than the 2nd medium clone, but the 3rd clone growth and root rate, which was cut close to the 3rd nutrient medium, was higher than the 1st and 2nd clones. These indicators are illustrated in the table. The results of our research in Table 1 show the growth rates of the apical part of the 1st end of the hybrid of Uzbekistan.

Table 1

Analysis of growth rates when cloning Uzbekistan hybrids.

№	Chosen for the experiment	Repition	The time of planting	Initial state	Results obtained after 14 days 20.04			Results obtained after 24 days 30 .04		
					Height, sm	Root length, sm	Number of roots, pieces	Height, sm	Root lenght, sm	Number of rots, pieces
	1st part apical	1	06 0.4	1.5	6.6	1.1	4	10.2	2.3	6
		2	06.04	1.5	7	0.9	4	10.9	2.1	7
		3	06.04	1.5	6.5	0.8	5	10.1	2.0	7
	Average		06.04	1.5	6.7	0.93	4.3	10.9	2.13	6.66

Table 2

The growth rates of the 2nd middle part of the hybrid of Uzbekistan are covered.

№	Chosen for the experiment	Repition	The time of planting	Initial state	Results obtained after 14 days 20.04			Results obtained after 24 days 30 .04		
					Height, sm	Root lenght, sm	Number of roots, pieces	Height, sm	Root length, sm	Number of roots, pieces
	2nd medium part	1	06 0.4	1.5	6.0	0.7	3	9.9	2.1	5
		2	06.04	1.5	5.1	0.6	2	9.8	1.9	6
		3	06.04	1.5	5.9	0.7	3	10	2.3	4
	Average		06.04	1.5	5.7	0.67	2.66	9.9	2.1	5

Table 3

The growth rates of the hybrid part of Uzbekistan close to the 3rd lower environment are given.

№	Chosen for the experiment	Repetition	The time of planting	Initial state	Results obtained after 14 days 20.04			Results obtained after 24 days 30 .04		
					Height, sm	Root lenght, sm	Number of roots, pieces	Height, sm	Root length, sm	Number of roots, pieces
	3rd part close to the lower environment.	1	06 0.4	1.5	7.1	1.5	4	11.2	3.3	8
		2	06.04	1.5	7	1.3	5	10.9	2.9	7
		3	06.04	1.5	6.9	1.4	5	11.1	3.1	8
	Average		06.04	1.5	7	1.4	4.6	11.06	3	7.6

Each jar was filled with 100 ml of nutrient medium and 25 ml of nutrient medium was calculated for each clone rod. In this case, phytohormones were used. In the second experimental variant, the growth rates of seedlings planted on May 3 were found to be higher than on April 6. Growth rates were found to be higher as the transplants adapted to the nutrient medium. Table 4 shows a comparative table of averages of clones planted in 3s. The highest rate was the 3rd clone growth rate, which was close to the nutrient medium.

Table 4

This table shows the average values of Tables 1-2-3 from the hybrid of Uzbekistan

№	Chosen for the experiment	The time of planting	Initial state	Results obtained after 14 days 20.04			Results obtained after 24 days 30 .04		
				Height, sm	Root length, sm	Number of roots, pieces	Height, sm	Root length, sm	Number of roots, pieces
1	The average of the 1st part apical	06.04	1.5	6.7	0.93	4.3	10.9	2.13	6.66
2	The average of the 2nd medium part	06.04	1.5	5.7	0.67	2.66	9.9	2.1	5
3	The average of the 3rd part close to the lower environment	06.04	1.5	7	1.4	4.6	11.06	3	7.6

The process of rooting of mulberry can last for 20-25 days if the nutrient medium is chosen correctly, if the nutrient medium for the plant is chosen correctly, but there are not enough conditions and the specificity of the variety is not taken into account this figure might get delayed to 30-35 days. It has also been discovered that it is also important to take into account the room temperature.

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Reference:

1. Қўчқоров.Ў, Умаров Ш.Р, Холматов.Д.И, Жўраев.М. Жаҳонда яратилган тут навларининг Ўзбекистонда ташкил этилган коллекциясидаги, навлари, шакллари ва дурагайлари, 2-жилд, Тошкент-2012. 12-29 б. (Kochkarov.O, Umarov Sh.R., Kholmatov.D.I, Juraev.M. Varieties, forms and hybrids of mulberry varieties created in the world in Uzbekistan, Volume 2, Tashkent-2012. 12-29 p)

2.Kanwar et al., 2010.Agarwal et al., 2004;Tsukamoto et al 2007 ;Perez Tornero et al..,2010; Skiada et al .,2010. Thorpe et al..,1991

3.Абдуллаев У. Тутчилик. Т.: Меҳнат, 1991 й. 99-100 б. (Abdullaev U. Mulberry growing. T.:Mehnat, 1991. 99-100 p)

4.М.И.Гербинская., А.Пулатов. Основные способы вегетативного размножения щелковицы. Т.: Фан, 1975. С.45-47.

5. Muhammad Akram. Faheem Aftab. Department of Botany, University of the Punjab, Lahore-54590, Pakistan *Corresponding author: faheem. botany@.pu.edu.pk Pak. J. Bot., 44: 285-289, Special Issue March 2012.

6. Mirzaeva Yo.Ya. Khujamshukurov N. A. Kuchkarova D. X. International Journal of Current Microbiology and Applied Sciences ISSN: 2319-7706 Volume 9 Number 4 (2020) Journal homepage: http://www.ijcmas.com. 3152-3161 б

7. Kunjupillai Vijayan. A. Tikader Morus.Article · June 2011 DOI: 10.1007/978-3-642-20447-0_5 Central Silk Board . International Journal of Bio-Technology and Research (IJBTR) ISSN(P): 2249-6858; ISSN(E): 2249-796X Vol. 4, Issue 2, Apr 2014, 15-22 © TJPRC Pvt. Ltd.