PROPAGATION TECHNOLOGY OF FAST GROWING PAULOWNIA TREE BY IN VITRO CLONE METHOD UNDER UZBEK CONDITIONS

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Abstract
The article deals with the issues of Pavlownias reproduction methods, both generative and cloning methods. Advantages and disadvantages of these methods are given.

Introduction

Paulownia seedlings as a reforestation resource. Forest resources are an important resource of the biosphere. Forest resources include not only timber, they should include such useful properties as the ability to improve human health, conserve water supplies, regulate the climate, and resist soil erosion. Seedlings to create protective "green belts" around cities. Thanks to the accelerated growth and large leaves, especially in the first years of development, Paulownia converts CO2 into oxygen many times faster than any other tree. Paulownia is not fastidious to the quality of soil, easily adapts to different types of soil.

Extraordinary qualities of Paulownia, such as fast growth, large size of leaves, beautiful crown, abundant flowering and unpretentiousness, make it exceptionally suitable for creation of parks and gardens.

Modern technologies of plantation cultivation of Paulownia for production of industrial wood allow to get 400-600 m3 of quality industrial wood from area of 1 hectare in 5 years period.

And in Uzbekistan a special role is given to Pavlovnia. In the Republic Pavlonia is planted around factories, industrial enterprises, squares, boulevards, along highways, etc. On the initiative of President of the Republic of Uzbekistan Sh. Mirziyoyev the state project "Yashil makon" was launched where up to 2030 yearly 200 million tree saplings will be planted on the territory of the republic. And this project has been elevated to the rank of state policy.

What are the differences in propagation of Pavlovnia from seeds or by vegetative means (in vitro). There are other methods for propagating plants besides simply sowing seeds that are also suitable for Paulownia propagation. However, each of these methods has advantages and disadvantages

The generative method refers to propagation using the sexual reproductive organs of plants, i.e., seeds. It is a classic method that allows Paulownia to produce a large number of offspring from a single plant, especially if there is a rich selection of seeds.

The biggest disadvantage is that in our latitudes, the first flowering of Paulownia does not occur before four, often five years, and full fruiting usually occurs much later. In the process of generative reproduction, the genome of the mother plant and the father plant are introduced

in half and recombined. Each individual seed thus possesses a completely unique genome, but certain characteristics are permanently transferred, which makes targeted plant breeding possible!

The advantage of this breeding of Pavlovnia is that the offspring (seedlings) are genetically identical to the parent plant. These are what are known as "clones." This term may be known to many in connection with genetic engineering and may seem like something highly technical and unnatural, but it is not.

Many plants reproduce mainly or exclusively in this way. Such a method is common in the mushroom kingdom. The best known example is probably the potato, which can form flowers and seeds, but whose reproduction occurs almost exclusively through vegetatively formed tubers. The potato field thus consists of countless plants with the same genome!

This allows certain hereditary traits of the selected mother plant to be passed on. Therefore, all offspring are, as far as possible, identical to the ancestral plant and homogeneous plants are created. However, vegetative propagation not only transmits positive traits, but it can also have negative consequences, especially those that were overlooked when selecting the mother plant. At worst, it can affect factors that are only evident in old age or wood characteristics that only become apparent when the tree is harvested.

Because vegetative propagation, whether by root cutting or in vitro, always results in the parent plant tissues, diseases are inevitably inherited as well. This risk can be minimized by using controlled healthy parent material. The reason for this is that the material may be latently infected with one or more viruses without any recognizable symptoms. Only molecular diagnostic methods can remedy this situation. However, they, in turn, are usually only able to detect viruses that are known and for which specific recognition sequences are available in the genome.

These effects are particularly noticeable in propagation through root cuttings. The degradation of growth and health observed here throughout the breeding generations is often attributed to age and generation, which is only indirectly true. This is because age alone does not cause such degradation, but rather contributes to the accumulation of such latent diseases with each step of their spread over time.

The laboratory of De Nova Agro Ltd. at Tashent State University carries out work on multiplication of various plant species by biotechnological methods. As a result of studies, it was found that plants that were obtained by multiplication in tissue culture in vitro develop better than those that were obtained from seeds.

The benefits of using Pavlovnia propagated by cloning for landscaping:1.The accelerated metabolism that accompanies rapid growth and large leaves make Pavlovnia a veritable oxygen factory. In its ability to purify the air, Pavlovnia is a champion over any other tree. 2.Paulownia has a branched tap root that reaches up to 9 meters. This makes it much more

resistant to winds. 3.Resistance to winds is actively used to create windbreaks, erosion control plantations, restoration of burned forests.

Extraordinary qualities of Paulownia, such as fast growth, big size of leaves, beautiful crown, abundant flowering and unpretentiousness make it extremely suitable for creation of parks and gardens. have a number of advantages: they are absolutely free from diseases and viruses; they are genetically uniform, as they were propagated from the same material and plants develop faster.

Currently, "De Nova Agro" Ltd. at Tashent State University is conducting research to develop a method of introducing in vitro and accelerated microclonal multiplication of Pavlovnia haploides (R.tomentosa) plants.

We selected sterilization conditions for in vitro introduction of different plant explants: apical meristem, leaves, petioles, stems and internodes on Murasige-Skuga universal nutrient medium (MS).

The following schemes of explants sterilization were used. First method: washing in soapy water (2-5 min); rinsing under running water (2-5 min); sterilization with 70% ethanol solution (1-2 min); sterilization with 1.2-1.5% sodium hypochlorite solution (5 min); triple rinsing in sterile distilled water (15 min). The second method used 0.5% sodium hypochlorite solution. In the third method, sterilization with 0.5% sodium hypochlorite solution was carried out with an exposure time of 7 minutes.

According to the results of the experiments, the first method of sterilization revealed that 100% sterility of all types of explants was achieved, but the explants themselves were damaged, while the sterilizing agent should destroy all surface microorganisms from plant material as much as possible, but should not damage the explants. In the second case, 70% of explants were infected, and the time of action of the sterilizing agent was insufficient for the destruction of surface microorganisms. In the third sterilization method, 100% sterility of explants was observed and no damage was detected.

Thus, it was found that the best explants for in-vitro culture and plant regeneration were the apical meristem and internodes of the plant. Callus formation on these explants began after 7-9 days, and regeneration was observed after two weeks (see Fig.). The beginning of root formation was observed after 6-8 days. The obtained regenerant plants 3-5 cm in height after washing from the agar were transferred to cups for root system development with peat.

Currently, work is underway to optimize the composition of nutrient media in order to increase the frequency of callus formation and plant regeneration.

Conclusion:

Both methods of plant propagation have their advantages and disadvantages. Due to generative seed production, we will get a lot of genetically heterogeneous progeny. Genetic dispersion

minimizes disease risks on large plantings. However, maximum productivity will not be achieved.

Vegetative plants are very homogeneous with each other and can optimally utilize the potential of the terrain by precise selection of mother plants. However, errors in selection can have a fatal effect later on, as the risk of catastrophic events damaging the plantation increases. In addition, vegetative propagation promotes the spread of diseases, especially viral infections, resulting in degradation as the number of generations increases.

Literature Used

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