

## DETERMINATION OF INDICATORS OF ROOTING OF PAPER TREE (*BROUSSONETIA POPYRIFERA L.*) FROM ONE-YEAR CUTTINGS

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<https://doi.org/10.5281/zenodo.8273174>

**Abstract.** *In this article, the results of the research on the evaluation of the parameters of propagation of paper tree seedlings from cuttings are presented, experimental works on growing paper tree seedlings by vegetative method in 4 types of options were carried out. Sand (control), biosulphate, hydroxide and root energy stimulants were used as growing media. The temperature of the experiment area was monitored. During the rooting of cuttings, it was observed that the temperature of the region was 18-24°, air humidity was 40-50%, and sand humidity was 30-40 degrees depending on the temperature (based on the indicators of the soil moisture measuring device). It was observed that the parameters of vegetative rooting of paper tree seedlings are in 3-5 days. Taking into account plant transpiration and evaporation of water into the air, 15-20 liters of water were poured in 10-12 days, and the duration and watering norms of vegetative rooting, as well as root length and leaf indicators of rooted seedlings information on.*

**Keywords:** *paper tree (Broussonetia papyrifera L.), vegetative propagation, sand, air humidity, biosulfate, hydroxide and root energy, green cuttings of the plant.*

**Introduction.** Today, it is important to expand the range of plants used in forestry and greening on a global scale. Special attention is paid to the cultivation of forest plants, the fuller use of their medicinal and decorative properties, and the use of them in landscape design by planting them in forestry lands and around cities. Among these plants, the paper tree is a tree that grows well in Europe and Southeast Asia, due to its useful properties and practical use.

Development of agrotechnics for reproduction of forest plants and introduced plants, especially paper tree, and establishment of plantations remains one of the urgent issues today.

In the countries of the world, scientific and research work on improving the bioecological characteristics and breeding methods of landscaping and ornamental plants is widely developed. A number of scientists on the introduction and breeding of landscape plants, including N.I. Kolesnikova, F.N. Rusanov, L.V. Yaskina. etc. have excelled in their scientific work. Greening of ornamental plants introduced in the conditions of Central Asia and Uzbekistan has been studied by scientists for many years. Including, N. I. Denisov (2004), O. V. L. Holonec (2007), F. N. Rusanov, M.R.Q. – 2009, K.Saito Agroforestry systems – 2009, H.W.Ryu – 2010, I.Slavkina, I.V. Belolipov, N.I. Shtonda, A. P. Siorba 2015, A. V. Shutka (2015), K. O. Mkhitarian (2016), N. A. Trusheva (2019), Y. V. Dyachenko, etc., have carried out many scientific works on the development of the field.

In the process of studying the problem, it was found that no studies have been conducted on the relationship of paper tree (*Broussonetia papyrifera L.*) plants to environmental factors in the conditions of Uzbekistan, the selection and statistical analysis of their promising forms in

greening, the development of methods for creating promising varieties by carrying out selection work [7].

Accordingly, the propagation of the paper tree in the conditions of Uzbekistan and the development of agrotechnics for the establishment of plantations is an urgent issue. Propagation of this tree species is effective in greening woodlands, highways, degraded lands, many landscaped gardens and residential areas.

The fruits of the paper tree (*Broussonetia papyrifera* L.), native to Japan and China, contain various substances, their chemical composition, ethanol and aqueous extracts were analyzed for antioxidant activity. The fruit of this plant has been found to contain high protein.

When breeding a plant, it is necessary to know its bioecological features specific to its type. It is necessary to evaluate whether the generative or vegetative method is effective in plant propagation. Our experiments have shown that the most effective method is to propagate the paper tree from vegetative cuttings. As a result of our experiments, the duration of vegetative rooting and watering norms are determined.

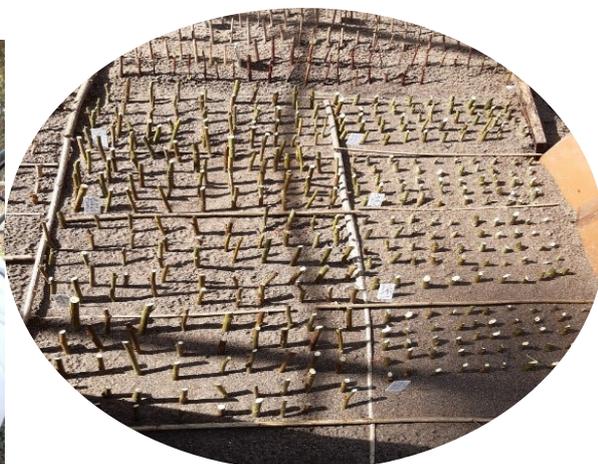
**Materials and methods.** Research method. The bioecological parameters of the paper tree (*Broussonetia papyrifera* L.) selected for the experiment were studied. In the experimental area, cuttings were carried out by placing the cuttings in biosulphate, hydroxide and root energy stimulators. Sand was taken as a control option and the results were compared to the control option. During the experiments, the indicators of rooting, as well as the speed of rooting and its durability in the variants were determined. The process of new leaf formation in rooted cuttings was evaluated. The temperature of the experimental area was monitored. During the rooting of the cuttings, the temperature indicator is required to be 18-24 °C. Air humidity

It should be 40-50%. Soil and sand moisture should be 30-40 degrees depending on the temperature (based on the indicators of the soil moisture meter (WaterScout SM 100)).

**Research results.** Observations were made and recorded in 3-5 days in order to determine the indicators of vegetative rooting of the paper tree. Taking into account plant transpiration and evaporation of water into the air, 3-5 ml of water was poured on 4 hectares of land in 20 days for each option. Thanks to these observations, the duration of vegetative rooting and irrigation norms were determined.

Taking into account that the methods of propagation of paper tree seedlings are not the same, the experiments were carried out in several variants.

As a result of observations, Paper tree (*Broussonetia papyrifera* L.) was selected for propagation.





**Figure 1. Experimental process in the Tashkent Botanical Garden named after Academician F.N.Rusanov.**

In the Tashkent Botanical Garden named after Academician F.N.Rusanov, experiments were carried out in 20 days from paper tree cuttings in 4 variants and from seeds, based on irrigation standards. Experiments were carried out to study the growth, rooting rate, leaf release processes and development indicators of variants under the influence of water, biosulfate, hydroxide and root energy stimulators.



**Figure 2. A process of tracing options from the pen of the paper tree.**

According to the results of monitoring, the following was determined:

- 21 of the 30 pens placed in the control water option are primary
- In the 20-day measurement, the length of the roots was 2-3 cm.
- 17 out of 30 cuttings placed in the biosulphate stimulator, the length of the roots was 1-2 cm in the initial measurement.
- 17 of the 30 cuttings placed in the hydroxide stimulator had roots of 1-1.5 cm in initial measurement.
- 20 of the 30 cuttings placed in the Root Energy stimulator had roots of 1.5-2.5 cm in initial measurement.

*Table 1*

**Effects of different stimulants on rooting and leafing of paper tree cuttings (20 days).**

Option number	Indicators of rooting		New shoots and leaves. (During the rooting period. 30-60 days) 5 points. H3 New buds and leaves.
	Root strength and thickness. 5 points. H <sub>1</sub>	Rooting speed. 5 points. H <sub>2</sub>	
water control	4.0	4.0	4.2
Biosulfate is a stimulant	3.0	3.2	3.0
Hydroxide is a stimulant	2.8	2.7	2.8
Root energy stimulyator	3.8	3.5	3.5



**Figure 3. A procedure for determining the growth parameters of paper tree cuttings.**

### Conclusion and Recommendations.

In the course of research, it can be concluded that vegetative propagation of paper tree gives good results. Based on the results of the experiments, air temperature indicators of 18-22°C, relative air humidity of 40-50% are necessary indicators for cuttings to take root and produce new leaves. For reproduction in sand, soil and other similar compounds, it is recommended to use special containers (made of wood) or special plastic containers 15-20 cm high, 0.5x1.0, 1.x1, 1x2 meters in size. All options for paper tree propagation, except for cuttings placed in the soil, gave results in the range of 70-90%. Among them, it is recommended to breed in the option of hydroxide and control water with the highest index. In order not to damage the roots of the plant, it is recommended that the temperature of the water used for irrigation be 18-22 °C, depending on the air temperature.

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