Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

THE EFFECT OF BIOLOGICALLY ACTIVE POLYMER PREPARATIONS ON THE ROOTING CHARACTERISTICS OF MULBERRY CUTTINGS UNDER THE CLIMATIC CONDITIONS OF SURKHANDARYA REGION

M. Bobomurodov
Senior Lecturer, Termez State University of Engineering and Agrotechnologies

G. Allanazarova,
Assistants, Termez State University of Engineering and Agrotechnologies

Abstract

Vegetative propagation of mulberry (Morus) trees is a key factor for increasing cocoon yield and improving silk quality. Biologically active polymer preparations are an effective means of enhancing the rooting ability of cuttings and promoting root system development. In the study, cuttings from the varieties Jarariq-10, Jarariq-9, SANIISH-25, Mustaqillik-18, and Tajik Seedless were treated with the preparation and planted. The results showed that Jarariq-10 and Jarariq-9 exhibited the highest rooting percentages (80% and 76%, respectively) and well-developed root systems, providing a practical basis for vegetative propagation recommendations.

Keywords: Mulberry, cuttings, vegetative propagation, biologically active polymer, root system.

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

Annotatsiya:

Mulberry (tut) daraxtlarining vegetativ yo‘llar bilan ko‘paytirilishi pilla hosildorligini oshirish va sifatini yaxshilashning muhim omilidir. Biologik faol polimer preparatlar qalamchalarning ildiz olish qobiliyatini oshirish va ildiz tizimini rivojlantirishda samarali vosita sifatida ishlatiladi. Tadqiqotda Jarariq-10, Jarariq-9, SANIISH-25, Mustaqillik-18 va Tojikiston urug‘siz navlaridan olingan qalamchalar preparat bilan ishlov berilib ekildi. Natijalar Jarariq-10 va Jarariq-9 navlarida eng yuqori ildiz olish darajasini (80 % va 76 %) va rivojlangan ildiz tizimini ko‘rsatdi, bu vegetativ ko‘paytirish bo‘yicha amaliy tavsiyalar uchun asos bo‘ladi.

Аннотация:

Вегетативное размножение деревьев шелковицы (Morus) является важным фактором повышения урожайности коконов и улучшения качества шелка. Биологически активные полимерные препараты эффективно повышают способность черенков к образованию корней и способствуют развитию корневой системы. В исследовании черенки сортов Jarariq-10, Jarariq-9, SANIISH-25, Mustaqillik-18 и Tajik Seedless были обработаны препаратом и высажены. Результаты показали, что Jarariq-10 и Jarariq-9 продемонстрировали наибольший процент укоренения (80% и 76% соответственно) и хорошо развитую корневую систему, что служит практической основой для рекомендаций по вегетативному размножению.

Introduction

Vegetative propagation of mulberry (Morus) trees is a key factor for increasing cocoon yield and improving silk quality. Biologically active polymer preparations are an effective means of enhancing the rooting ability of cuttings and promoting the development of the root system. In field experiments conducted at “Termiz Agro-pilla” LLC, cuttings from the varieties Jarariq-10, Jarariq-9, SANIISH-25,

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas
Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)
ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

Mustaqillik-18, and Tajik Seedless were treated with the preparation and planted. The results showed that Jarariq-10 and Jarariq-9 exhibited the highest rooting percentages (80% and 76%, respectively) and well-developed root systems, providing a practical basis for vegetative propagation recommendations.

The **root** is considered an active organ of the plant, participating in the formation of organic substances from mineral substances in the soil. According to their formation, mulberry roots are divided into **primary (embryonic) roots** and **adventitious roots.** The first root that appears when mulberry is propagated from seed is called the **primary (embryonic) root,** while the root formed when mulberry is propagated by cuttings is called an **adventitious root**.

During the rooting process, the maturity of the cuttings, their physiological condition, and the age of the tissues are of great importance. When cuttings are prepared from young trees, their rooting ability is usually higher. The rooting of cuttings taken from different parts of the shoots depends on the degree of lignification of those shoots.

Twenty days after planting the cuttings, the swelling and development of buds on them is considered a positive sign. Within 10–15 days, a **callus** forms at the lower cut surface of the cutting. The formation of callus promotes proper healing of the cut surface and positively affects the activity of meristematic cells.

One of the main problems in vegetatively propagated plants is the formation of callus. Therefore, in our experiments we attempted to use a preparation that accelerates callus formation in mulberry cuttings. The **"GLEDAN" preparation** encapsulates the cuttings, thereby protecting them from the external environment and accelerating their sprouting due to the polysaccharides and biologically active substances contained in its composition.

On **March 27, 2019**, 50 cuttings from the newly introduced and zoned mulberry varieties **Jarariq-10, Jarariq-9, SANIISH-25, Tajik Seedless, and Mustaqillik-18** were planted in the field experimental area of **"Termiz Agro-pilla" LLC**, after being treated with a biologically active polymer preparation.

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

With the emergence of the first thin roots, yellow-colored growths appeared on the surface of the cuttings (Figure 1). These growths gradually spread along the cutting and change in color from brownish to a clear red.

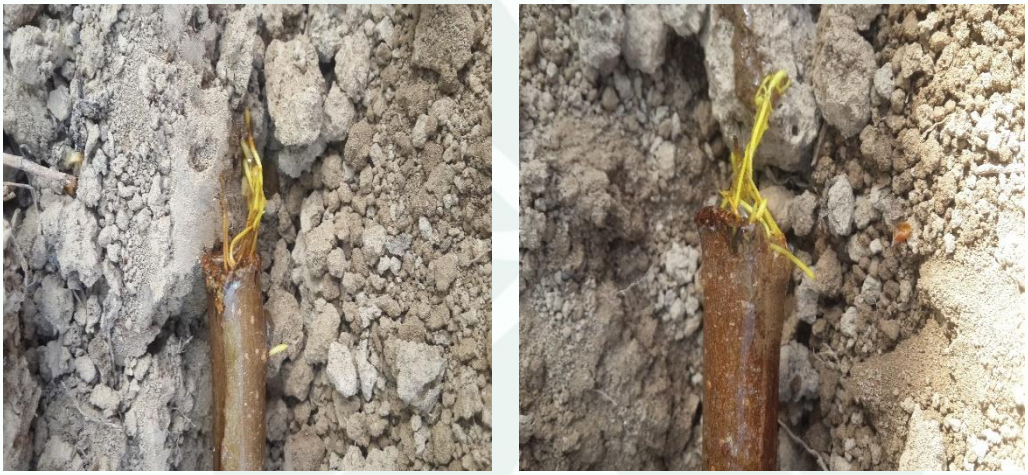

Figure 1. Formation of yellow growths on the surface of the cuttings.

("Termiz Agro-pilla" MChJ dala tajriba maydoni, 12.04.2025.) The average rooting process of the cuttings was observed after 40–50 days, varying according to the varieties (Table 1), and the shoots that developed from the buds emerged above the soil surface.

Table 1. Rooting of cuttings treated with biologically active polymer preparation.

Mulberry Variety	Planted Cuttings, pcs	Rooted Cuttings, pcs	Rooting, %
Jarariq-10	50	40 ± 1.02	80
Jarariq-9	50	38 ± 0.97	76
SANIISH-25	50	31 ± 0.79	62
Mustaqillik-18	50	32 ± 0.81	64
Tajik Seedless (control)	50	25 ± 0.63	50

("Termiz Agro-pilla" MChJ dala tajriba maydoni, 11.05.2025)

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas
Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)
ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

In our experiment, **50 cuttings were planted for each mulberry variety**, and their rooting performance is shown in the table:

- **Jarariq-10:** 40 cuttings rooted, **80%**
- **Jarariq-9:** 38 cuttings rooted, **76%**
- **SANIISH-25:** 31 cuttings rooted, **62%**
- **Mustaqillik-18:** 32 cuttings rooted, **64%**
- **Tajik Seedless (control variety):** 25 cuttings rooted**, 50%**

Among the studied varieties, **Jarariq-10** and **Jarariq-9** showed the highest rooting percentages.

In the conditions of Uzbekistan, mulberry trees continue to grow even in **September**. Initially, seedlings grown from cuttings lagged in growth compared to seedlings grown from seeds. Later, in the second half of the growing season, the growth accelerated due to the strong development of the root system, and by the end of the growing season, the seedlings grown from cuttings showed higher growth performance (Table 2).

Mulberry roots branch extensively compared to the shoots. In autumn, the above-ground growth of the mulberry slows down earlier than the roots, meaning that even after leaf fall, root growth continues until late autumn. In spring, root growth starts earlier.

The development of mulberry roots, their external and internal structure, is directly related to the functions they perform. Mulberry roots are divided into **primary, secondary, and growing roots**. The primary and secondary roots include the main root as well as lateral roots up to the third and fourth order. These roots spread sideways and penetrate deep into the soil, forming the basis of the plant's root system, with lengths ranging from **30 cm to several meters** and thickness of several centimeters.

Growing and lateral roots are thinner and shorter (from 3 mm to several cm). Lateral roots branch strongly, producing very fine rootlets. Mulberry roots are highly adaptive, growing towards the most favorable soil conditions. Therefore,

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas
OPEN ACCESS JOURNALS

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

the **formation and distribution of roots in the soil** depend on soil properties, groundwater depth, agrotechnical practices, and the specific variety of mulberry.

Table 2. Development of the root system of mulberry cuttings during the growing period

Tut navlarining nomi	Tana asosining yo‘g‘onligi, mm	Ildizning chuqur kirib borishi, sm	Ildizlarning atrofga tarqalish kengligi, sm
Jarariq 10	21,0	120,0	100,5
Jarariq 9	20,0	115,3	96,8
Saniish 25	17,5	108,8	82,6
Mustaqillik 18	18,0	110,0	75,4
Tojikiston urug‘siz (qiyoslovchi)	17,0	100,2	68,3

(“Termiz Agro-pilla” LLC Field Experimental Site, 18.11.2025)

As seen from **Table 2**, when analyzing the results of cuttings treated with the biologically active polymer preparation in terms of root system development, **Jarariq-10** and **Jarariq-9** varieties showed the highest performance.

- For **Jarariq-10**, the stem base diameter was **2.1 cm**, root depth reached **120.0 cm**, and lateral root spread was **100.5 cm**.
- For **Jarariq-9**, the stem base diameter was **2.0 cm**, root depth reached **115.3 cm**, and lateral root spread was **96.8 cm**.
- In the control variety, the stem base diameter was **1.7 cm**, root depth **100.2 cm**, and lateral root spread **68.3 cm**.

These results indicate that cuttings of Jarariq-10 and Jarariq-9 not only develop stronger roots but also achieve greater root depth and lateral spread compared to the control variety.

REFERENCES

1. O‘zbekiston Respublikasi Prezidentining 2017-yil 7-fevraldagi «O‘zbekiston Respublikasini yanada rivojlantirish bo‘yicha Harakatlar strategiyasi to‘g‘risidagi» PF-4947-son farmoni.- Toshkent, 2017.

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas
OPEN ACCESS JOURNALS

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

2. O‘zbekiston Respublikasi Prezidentining 2018 yil 12 yanvardagi «Respublika ipakchilik tarmog‘ini yanada rivojlantirish chora-tadbirlari to‘g‘risida» gi PQ-3472-son qarori. – Toshkent, 2018. 5-b
3. O‘zbekiston Respublikasi Prezidentining 2018 yil 20 martdagi «Pillachilik tarmog‘ini yanada rivojlantirish bo‘yicha qo‘shimcha chora-tadbirlar to‘g‘risida» gi PQ-3616-son qarori. – Toshkent, 2018. 1-4-b.
4. O‘zbekiston Respublikasi Prezidentining 2018 yil 20 avgustdagi «Pillachilik tarmog‘idagi mavjud imkoniyatlardan yanada samarali foydalanish chora-tadbirlari to‘g‘risida» gi PQ-3910 sonli qarori. – Toshkent, 2018.
5. O‘zbekiston Respublikasi Vazirlar Mahkamasining 2017 yil 11 avgustdagi “2017-2021 yillarda pillachilik tarmog‘ini kompleks rivojlantirish chora-tadbirlari dasturi to‘g‘risida” gi 616-sonli qarori. – Toshkent, 2017. 1-4-b.
6. Abdullaev U. Tutchilik. - Toshkent: Mehnat, 1991. 7-9-b.
7. Valiyev.S.T. Tutning tanlab olingan navlikka nomzod nomerlari ustida seleksiya ishlarini davom ettirishning ahamiyati. // O‘zbekiston TTITI ning 80 – yillik munosabati bilan o‘tkazilgan xalqaro ilmiy – texnikaviy anjuman materiallari. – Marg‘ilon, 2017. –B. 43 – 46.
8. Valiyev.S.T. Tutning tanlab olingan navlikka nomzod nomerlari ustida seleksiya ishlarini davom ettirishning ahamiyati. // «To‘qimachilik sanoati korxonalarida ishlab chiqarishni tashkil etishda ilm-fan integratsiyalashuvi o‘rni va dolzarb muammolarni yechimi» mavzusidagi xalqaro ilmiy-texnikaviy anjuman. – Marg‘ilon, 2017. 27-28 iyul. –B. 43-46.
9. Valiyev.S.T., Rajabov.N.O. Tut ipak qurti hayotchanligi va pilla mahsuldorligiga yangi tut navlarining tasiri. // IITI ning 90 – yillik munosabati o‘tkazilgan respublika ilmiy – texnikaviy anjuman materiallari. – Toshkent, 2017. –B. 72 – 74.
10. Valiyev.S.T., Xolmatov.D.I., G‘iyosova.Sh. Tut ipak qurti hayotchanligi va pilla mahsuldorligiga yangi tut navlarining tasiri. // IITI ning 90 – yillik

Eureka Open Access Journals
Open Access | Peer Reviewed | International Journals | Multidisciplinary Areas
OPEN ACCESS JOURNALS

Eureka Journal of Agricultural Science & Bio-Innovation (EJASB)

ISSN 2760-4969 (Online) Volume 2, Issue 3, March 2026

https://eurekaoa.com/index.php/7

munosabati bilan o‘tkazilgan respublika ilmiy – texnikaviy anjuman materiallari. – Toshkent, 2017. –B. 74 – 81.

11. Valiyev.S.T., Rajabov.N.O. Tutning yangi sinovdan o‘tayotgan seleksion nomerlarining ipak qurtining biologik va texnologik ko‘rsatkichlariga tasiri. // “Respublikada chorvachilikni rivojlantirish istiqbollari” mavzusidagi respublika ilmiy-amaliy konferensiyasi materiallari. –Toshkent, 2019. –B. 268-271.