Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

Technology of Growing Pomegranate (Punica granatum L.) Seedlings in the Soil and Climatic Conditions of the Boyovut District

Ibrohim S. Jolbekov
Gulistan State University, Acting Associate Professor, PhD in Agricultural Sciences
Maktuba B. Abduqodirova
Gulistan State University, Student of Fruit and Viticulture Department

Abstract: This article scientifically investigates and improves effective technologies for growing pomegranate seedlings from cuttings under the soil and climatic conditions of the Boyovut district. According to the experimental results, it was determined that using a mixed substrate (sand + peat + gray soil in a 1:1:1 ratio) combined with a temperature regime of +25…+27 °C significantly increases the rooting percentage of the cuttings, enhances the volume and length of the root system, and improves the internal density (dry matter content) and survival rate of the seedlings. The highest results were observed in the 9th variant (Qozoqi pomegranate variety + mixed substrate + +25…+27 °C). This research provides evidence-based recommendations for the intensive cultivation of pomegranate seedlings in the Boyovut district, aimed at improving their quality and resilience.

Keywords: *Pomegranate (Punica granatum L.), seedling production technology, propagation from cuttings, substrate mixture, temperature regime, rooting percentage, root system, survival rate, Boyovut district, Qizil anor (Red pomegranate), Wonderful, Qozoqi pomegranate, serozem (gray) soil, wind erosion.*

Introduction

Fruit production is one of the most important and promising sectors of agriculture in the Republic of Uzbekistan. This field plays a significant role in providing the population with high-quality food products, increasing export potential, and ensuring employment in rural areas. Specifically, pomegranate cultivation has gained particular importance as a rapidly developing sector in recent years. The pomegranate fruit is renowned for its unique nutritional and medicinal properties, containing 8–21% sugar, 0.5–5% organic acids, Vitamin C, phenolic compounds, antioxidants, and other biologically active substances. In addition to being consumed fresh, it is widely used in the production of juices,

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

concentrates, dried products, and in the pharmaceutical, food, and cosmetic industries.

The development prospects of this sector are defined in the Resolution of the President of the Republic of Uzbekistan No. PP-4575, dated January 28, 2020, "On measures to implement the tasks identified in the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030."

Furthermore, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 791, dated October 4, 2018, "On measures to increase pomegranate production and develop the sector in the Fergana region," emphasizes the establishment of pomegranate-growing farms, assisting private sector representatives, conducting scientific research in cooperation with research institutes, developing pomegranate seedlings and products based on innovative resource-saving technologies, and comprehensively developing processing to enhance export potential and increase public employment and income levels.

In 2024, more than 61.5 thousand tons of pomegranates were produced across Uzbekistan, and the volume of exports shows significant growth. In the Syrdarya region, the Boyovut district is one of the leading areas for fruit and berry production. The district's sharply continental climate, hot and dry summers, and long growing season (180–225 days) create favorable conditions to a certain extent for heat-loving plants like the pomegranate. The soils are primarily serozem (gray soil) and loamy-serozem types, with pH levels within the suitable range for pomegranate plants.

However, the low annual precipitation (200–300 mm), limited water resources, the strong influence of the "Bekabad wind," and the risk of soil erosion necessitate the precise adaptation of pomegranate seedling cultivation technology to the specific soil and climatic conditions of the region. While current research provides general information on the agrotechnics of pomegranate cultivation, there is a lack of comprehensive scientific work on cultivation technologies (propagation from cuttings, substrate selection, maintenance, winter protection, and anti-erosion measures) fully adapted to the specific conditions of the Boyovut district. This situation negatively impacts the survival rate and quality of seedlings, as well as the future productivity of orchards.

Therefore, the relevance of this research is highly significant.

The Objective of the Research:

The scientific investigation and improvement of effective technologies for growing pomegranate seedlings under the specific soil and climatic conditions of the Boyovut district.

Research Tasks:

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

1. To conduct a deep comparative analysis of the soil and climatic conditions of the Boyovut district in relation to the biological and ecological requirements of the pomegranate plant.
2. To adapt the technology of growing pomegranate seedlings from cuttings and other methods to the specific natural conditions of the region.
3. To establish nursery preparation methods and determine optimal substrate mixtures, as well as irrigation, fertilization, and maintenance regimes.
4. To develop a system of measures for protection against winter frosts, anti-wind erosion strategies, and control methods against major diseases and pests.
5. To test the effectiveness of the proposed technology in experimental fields, evaluate it from an economic perspective, and prepare recommendations for its practical implementation.

The Object of the Research:

Pomegranate varieties cultivated under the conditions of the Boyovut district (Qizil anor, Wonderful, Qozoqi anor, Achchiq dona, and others) and the technologies employed for their seedling production.

The Subject of the Research:

The processes of growing pomegranate seedlings under the soil and climatic conditions of the Boyovut district and the agrotechnical methods for their improvement.

Research Methods:

Field experiments, laboratory analyses, statistical and comparative analysis, and graphical methods.

Results and Discussion:

2.4.1. Research Location and Natural Conditions

The research was conducted during 2024–2025 at an experimental site located in the "Dehqonobod" neighborhood of the Boyovut district, Syrdarya region. The experimental area covers 0.6 hectares, and the natural conditions are characteristic of the Boyovut district:

1 Climate: Sharply continental. The average temperature in July is $+26.5…+28$ °C, and the average temperature in January is $-2.5…-3.5$ °C. Annual precipitation is 210–280 mm. The vegetation period lasts 195–215 days. There is a strong influence of the "Bekabad wind" (velocity 15–30 m/s, reaching up to 40 m/s on some days).

2 Predominantly serozem (gray) and loamy-serozem soils, with a pH range of 7.0–7.8. The mechanical composition of the soil is light and medium loam.

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

The experiment was conducted in both natural open fields and partially controlled conditions (mist chamber)..

2.4.2. Research Materials

Three pomegranate varieties, which are widespread and promising in the Boyovut district, were studied in the research:

1 Qizil anor (local variety)
2 Wonderful (foreign variety)
3 Qozoqi anor (local variety)

Cuttings were taken from healthy, 1–2-year-old branches of fruit-bearing orchards, with a length of 20–25 cm and a diameter of 0.7–1.0 cm. A total of 360 cuttings were selected from each variety.

2.4.3. Experimental Scheme

The experiment was conducted based on three primary factors:

1. Variety type (3 types)
2. Soil (substrate) type
3. Temperature regime during the rooting period

Each variant was repeated 4 times. A total of 108 experimental plots were established.

Table 2.4.1.

Experimental Variants in the Conditions of Boyovut District

№	Variant	Pomegranate Variety	Soil (Substrate) Type	Temperature Regime During Rooting	Number of Replications
1	V1	Qizil anor	Gray soil (Natural Boyovut serozem)	+18…+20 °C	4
2	V2	Qizil anor	Loamy-serozem (Natural Boyovut)	+18…+20 °C	4
3	V3	Qizil anor	Mixed substrate (sand + peat + gray soil 1:1:1)	+18…+20 °C	4
4	V4	Wonderful	Gray soil (Natural	+22…+24 °C	4

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

			Boyovut serozem)		
5	V5	Wonderful	Loamy-serozem (Natural Boyovut)	+22…+24 °C	4
6	V6	Wonderful	Mixed substrate (sand + peat + gray soil 1:1:1)	+22…+24 °C	4
7	V7	Qozoqi anor	Gray soil (Natural Boyovut serozem)	+25…+27 °C	4
8	V8	Qozoqi anor	Loamy-serozem (Natural Boyovut)	+25…+27 °C	4
9	V9	Qozoqi anor	Mixed substrate (sand + peat + gray soil 1:1:1)	+25…+27 °C	4
10	Control	3 varieties	Gray soil	+15…+28 °C	4

Based on the climatic indicators of the Boyovut district, the research results demonstrated a direct influence of temperature and substrate composition on the rooting percentage and overall quality of the seedlings. Compared to the control group (Variant 10), the awakening of cuttings and the formation of the root system were significantly accelerated in the artificially controlled environment.According to the findings, Variant 9 emerged as the most optimal solution. In this variant, the "Qozoqi anor" variety was cultivated at a temperature of +25…+27 °C using a mixed substrate consisting of sand, peat, and gray soil. Consequently, this specific variant achieved the highest rooting rate, with the total length and surface area of the roots significantly outperforming all other variants. This proves that the combination of high temperature and a well-aerated, nutrient-rich soft growth medium is the most effective technological solution for pomegranate cuttings.Furthermore, Variant 6 for the "Wonderful" variety and Variant 3 for the "Qizil anor" variety yielded the best results within their respective groups. However, in terms of overall productivity and root system development, Variant 9 was identified as the most recommended option for the intensive cultivation of pomegranate seedlings under the specific conditions of the Boyovut district.

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

2.4.4. Seedling Cultivation Technology.

The cuttings were prepared in October and planted between March 15 and 25. The planting process was carried out at a 45° angle to a depth of 15–18 cm.
During the rooting period, the cuttings were maintained under various temperature regimes:
1 Low-temperature variant: +18…+20 °C
2 Optimal temperature variant: +22…+24 °C
3 High-temperature variant: +25…+27 °C
Humidity levels were strictly maintained at 80–90%. Irrigation was conducted using a drip system every 3–5 days, depending on the soil moisture content. Once the root system was established, the seedlings were transplanted into polyethylene bags. The hardening-off phase was conducted outdoors during April and May. For winter protection, the seedlings were buried in the soil at a depth of 20–25 cm in November.

2.4.5. Kuzatuv va o‘lchov parametrlari

Table 2.4.2.

Key Observation Parameters

№	Observation Parameter	Measurement Timing & Method	Purpose (In Boyovut conditions)
1	Rooting percentage (%)	Counting on days 45 and 60	Assessing root formation in different media
2	Number and length of roots (cm)	60-day-old sprouts	Root development under temperature influence
3	Seedling height and leaf count	90-day-old sprouts	Impact of temperature/soil on vegetation
4	Survival rate (%)	After hardening and winter protection	Resistance to wind, cold, and temperature flux
5	Dry matter content (%)	Laboratory analysis (90 days)	Impact of fertility on internal seedling density

During this research, systematic observations were conducted to determine the development of pomegranate cuttings and their degree of adaptation to the conditions of the Boyovut district.First, observations were made regarding the rooting percentage to determine the viability of the cuttings after planting. On the 45th and 60th days of planting, the cuttings in each variant were inspected individually to count how many had taken root and begun to sprout. This allowed for an analysis of how Boyovut's serozem (gray) soils and various

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

temperature regimes influence the awakening of the cuttings.In the next stage, work was carried out to study the quality of the root system. On the 60th day of the experiment, the number and length of the roots were measured. The primary goal of this observation was to scientifically prove how increasing the temperature (e.g., to +25…+27 °C) contributes not only to an increase in the number of roots but also to how deeply and firmly they penetrate the soil layers.Subsequently, measurements of seedling height and leaf count were conducted to evaluate the above-ground part of the plant. These observations, performed on 90-day-old sprouts, demonstrated the extent to which temperature and soil composition accelerate the vegetation process. A high leaf count was recorded as a key indicator of the plant's high capacity for nutrient accumulation.As one of the most critical parts of the experiment, the survival rate of the seedlings was studied. The seedlings were recounted after undergoing a special hardening-off process and after enduring Boyovut's severe winter frosts and strong winds. This observation helped identify which variety or cultivation method is most resilient to the vagaries of the district's climate.In the final stage, laboratory analyses were conducted to determine the dry matter content, assessing the internal quality of the seedlings. The amount of dry matter accumulated in the tissues of 90-day-old plants was studied. Through this analysis, it was determined how temperature and soil fertility ensure the internal "sturdiness" of the seedling—essentially its future immunity against drought and diseases.

Conclusion

Based on the research conducted and the results obtained, the following conclusions were drawn regarding the cultivation of pomegranate seedlings and the improvement of their quality and resilience under the conditions of the Boyovut district:

1. In the light serozem (gray) soils and sharply continental climate of the Boyovut district, the temperature regime and substrate composition serve as the primary controlling factors in the rooting and vegetation processes of pomegranate cuttings.
2. The rooting and growth performance of pomegranate cuttings are directly related to the genetic characteristics of the varieties; the local "Qozoqi anor" variety demonstrated the most intensive development under high temperatures (+25…+27 °C) and an optimized nutrient medium.
3. Improving the substrate composition (1:1:1 ratio of sand, peat, and gray soil) increases the volume and length of the root system. This, in turn, accelerates

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

the accumulation of dry matter in the plant tissues, ensuring the internal sturdiness and durability of the seedling.

4. Among the experimental variants, the highest indicators were recorded in Variant 9. Seedlings grown under these conditions significantly outperformed the control variant in terms of rooting percentage, leaf count, and overall height.

5. The synergy between temperature and substrate allowed the seedlings to develop a high survival rate (immunity) against Boyovut's unfavorable climatic factors, including severe winter frosts and strong winds.

References

1. Fayziyev, J.N. (2020). Scientific Substantiation of Technology for Increasing the Yield and Quality of Seedless Grape Varieties under the Conditions of Uzbekistan. Author's abstract of the dissertation. Tashkent. pp. 5–18.
2. Egamberdiyev, P.E. (2023). The Influence of Bud Loading on Grape Yield and Quality in the Cultivation of Table Grape Varieties Using the Overhead Trellis (Voish) Method. Dissertation. Tashkent. pp. 52–85.
3. Сапаева, З. Ш., & Абдуллаева, Б. А. (2021). Влияние низкотемпературной обработки некоторых сортов винограда на их аминокислотный состав. Молодой ученый, (22), 117-120.
4. Файзиев, Ж. Н., Эгамбердиев, П. Э., & Жўлбеков, И. С. Ў. (2022). УЗУМНИНГ ХЎРАКИ КАТТА ҚЎРҒОН НАВИНИ ВОИШ УСУЛИДА ЕТИШТИРГАНДА КУРТАК ЮКЛАМАЛАРИНИ ҲОСИЛДОРЛИК КЎРСАТКИЧЛАРИГА БОҒЛИҚЛИГИ. Academic research in educational sciences, 3(Speical Issue 1), 254-257.
5. Ergashovich, E. P., Mardonovich, K. F., Ogli, J. I. S. O. A. D. U., Shavkatovich, A. A., Djumanazarova, S. D., & Raimovna, R. D. (2022). Effect of buds particle on productivity and quality when growing Katta Kurgan table variety grapes by voish method.
6. Jo'lbekov, I., Ungarov, A., Umrzoqova, I., & Adhamov, A. (2023). UZUMNING SANOATBOP NAVLARINI YETISHRISH USULLARIGA DOIR MAVZULARNI INNOVATSION TEXNOLOGIYALARDAN FOYDALANGAN HOLDA TASHKIL ETISH. Евразийский журнал технологий и инноваций, 1(6), 89-93.
7. Rakhmatov, O., Zhulbekov, I. S., & Kabulov, I. M. (2023). Experimental study of a drying installation for drying melon with IR-radiation. In E3S Web of Conferences (Vol. 443, p. 02005). EDP Sciences.
8. Жўлбеков, И. С. Ў. (2024). УЗУМНИНГ ШАРОБОП

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026

НАВЛАРИНИНГ ХУСУСИЯТЛАРИ ВА УЛАРДАН ТУРЛИ НАВЛИ ШАРОБ ТАЙЁРЛАШ ТЕХНАЛОГИЯЛАРИ. Central Asian Journal of Multidisciplinary Research and Management Studies, 1(7), 158-165.
9. Khujakulov, F., Egamberdiev, P., Julbekov, I., Abduraimov, D., & Ungarov, A. (2023). The dependence of grape feeding on the productivity indicator and harvest quality of rizamat and large dry varieties.
10. Sultanov, K., Egamberdiev, P., & Khujakulov, F. (2024). THE DEPENDENCE OF THE AMOUNT OF ORGANIC MATTER ON THE DEVELOPMENT OF THE ROOTS OF GRAPE VARIETIES. American Journal Of Agriculture And Horticulture Innovations, 4(03), 15-20.
11. Kamoliddin, S., Pulatjon, E., & Ibrohim, J. (2024). DEPENDENCE ON THE MECHANICAL COMPOSITION OF THE APPLICATION OF GROWTH SUBSTANCES TO THE GROWING VARIETIES OF GRAPES. Universum: технические науки, 8(3 (120)), 37-40.
12. Weizhou, Z., O‘G, J. L. I. S., Qizi, S. S. I., Qizi, J. R. F. O., & Qizi, O. G. X. (2025). UZUM KO ‘CHATLARINI EKISH SXEMASI VA NAVLARNI JOYLASHTIRISH. Central Asian Journal of Academic Research, 3(4), 94-97.
13. Sattarov, K., Eshmurodov, D., Mamatkulova, M., Julbekov, I., & Kharsika, I. (2025). The impact of active packaging and nanocoatings on the safety and shelf life of dairy products. Scientific Journal'Animal Science & Food Technologies', 16(2).
14. Эгамбердиев, П. Э., Хужақулов, Ф. М., Жулбеков, И. С. Ў., & Абдураимов, Д. У. Ў. (2025). ЗАВИСИМОСТЬ ПРИМЕНЕНИЯ РЕГУЛЯТОРОВ РОСТА НА МЕХАНИЧЕСКИЙ СОСТАВ ЯГОД СТОЛОВЫХ СОРТОВ ВИНОГРАДА. Universum: технические науки, 6(12 (141)), 31-35.
15. O‘G, J. L. I. S., & Qizi, U. I. S. (2025). UZUMNI HOSILDORLIGI VA SIFATIGA ORGANIK VA MINERAL O ‘G ‘ITLARNING TA’SIRI. Central Asian Journal of Academic Research, 3(4-3), 61-66.
16. Weizhou, Z., O‘G, J. L. I. S., Qizi, S. S. I., Qizi, J. R. F. O., & Qizi, O. G. X. (2025). UZUM KO ‘CHATLARINI EKISH SXEMASI VA NAVLARNI JOYLASHTIRISH. Central Asian Journal of Academic Research, 3(4), 94-97.
17. Жулбеков, И. С. У. (2025). ВЛИЯНИЕ ЦИТОГУМИНОВОГО ВЕЩЕСТВА НА РАЗМЕР ЯГОД И МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ КИШМИШНЫХ СОРТОВ ВИНОГРАДА. Universum: технические науки, 4(1 (130)), 9-11.

Academicia Review-A Multidisciplinary Online Journal
ISSN (Online): 3070-6726
Website: https://academicia.org
Volume 2, Issue 4, April, 2026