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DETERMINATION OF BUD TAKE RATES AT DIFFERENT GRAFTING PERIODS OF APRICOT SCIONS GRAFTED ONTO VARIOUS ROOTSTOCKS UNDER THE CONDITIONS OF THE KHOREZM REGION

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Abstract.

This article investigates the field bud take rates of apricot scions grafted onto various rootstocks—wild apricot, Myrobalan 29, Myrobalan 29C, Best, and Druzhba—at different grafting periods. During the study, the relationship between bud take rates and air temperature, as one of the major environmental factors, was scientifically analyzed.

According to the results, Myrobalan 29C and Myrobalan 29 demonstrated higher bud take rates, while wild apricot and Druzhba rootstocks were distinguished by their slower development and high environmental adaptability. The Best rootstock exhibited moderate and balanced growth characteristics.

The findings of this study are of significant scientific and practical importance for selecting suitable rootstocks adapted to the regional climatic conditions.

Keywords:

Wild apricot, Myrobalan 29, Myrobalan 29C, Best, Druzhba, bud grafting, grafting periods.

Introduction

Under the conditions of Uzbekistan, one of the main methods used for propagating fruit tree seedlings is bud grafting. Fruit tree seedlings propagated through bud grafting are distinguished by their high survival rates, vigorous growth, and high yield of standard-quality planting material. Depending on the region, bud grafting is generally carried out during the summer months.

It is difficult to determine the exact dates for the beginning and end of the bud grafting period, as these depend closely on the climatic conditions of the region, the age and genetic characteristics of the rootstocks, and the degree of maturity of the shoots of the grafted varieties.

Grafting fully developed but still physiologically inactive rootstocks too early is risky, as it may cause premature bud break, followed by the death of the buds during winter. Conversely, if grafting is performed too late (at the end of August), the buds may not have sufficient time to establish themselves and develop properly before the onset of winter, which is also one of the factors contributing to frost damage [27, p. 76; 184, p. 68].

Materials and Methods

The primary method used for propagating fruit trees is bud grafting. In his work *“Methods and Techniques of Bud Grafting in Fruit Trees,”* Robert Sharrock describes several grafting techniques, including T-budding and patch budding.

Based on these recommendations and the methodology described by Robert Sharrock, the present experiment was conducted using the selected grafting technique.

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Experiment 1. Effect of grafting method and timing on bud take rate

Healthy apricot rootstocks exhibiting uniform growth and free from diseases were selected for the experiment. Soil conditions, irrigation, and plant care practices were maintained as uniform as possible throughout the experimental period.

Healthy, well-developed shoots containing viable buds belonging to the required cultivars were collected. The origin of both the rootstocks and the scion shoots was recorded.

Bud grafting was performed using the T-budding method in accordance with the designated experimental treatments. Each seedling was labeled with its corresponding treatment number.

Following grafting, the grafting sites were regularly inspected, adequate moisture levels were maintained, and weeds were removed. Particular attention was paid to ensuring that the tying material did not exert excessive pressure on the grafted buds.

After grafting, the following parameters were assessed at predetermined intervals:

- Bud take rate (percentage of successfully established buds);
- Bud break and subsequent growth;
- Shoot length;
- Stem diameter.

Experimental Treatment Design

The experimental treatments were established according to the selected grafting methods and grafting dates.

For example, an experimental design comprising three grafting methods and three grafting periods can be developed as follows.

Each experimental treatment can be arranged in at least three replications. The number of seedlings should be determined according to the available experimental resources and the requirements of statistical analysis. The grafting dates should be adjusted to local climatic conditions and the physiological condition of the rootstocks.

Calculation of Results

The graft take rate is determined using the following formula:

$T=nN×100T=Nn×100$

Where:

T – graft take rate (%);

n – number of successfully established buds;

N – total number of grafted buds.

Example: A total of 50 buds were grafted, of which 41 successfully established:

$T=4150×100=82\%T=5041×100=82\%$

Thus, the graft take rate is **82%**.

Research Results

In the Khorezm region, which is one of the northern regions of Uzbekistan, bud grafting is generally carried out in late August and early September. In the present study, 50 seedlings of each apricot rootstock type were selected for the experiment.

When the Arzami apricot cultivar was bud-grafted onto 50 standard wild apricot rootstock seedlings on August 20, a total of 33 buds successfully established. During the autumn assessment, 17 grafted buds were found to have died. Thus, out of the 50 grafted seedlings, 33 seedlings survived, corresponding to a bud take rate of **66%**.

When bud grafting was performed during the third ten-day period of August on another 50 apricot rootstock seedlings, 35 seedlings successfully established. During the autumn assessment, 15 grafted buds were observed to have died. Consequently, the graft take rate was **70%**, while the remaining 30% (15 seedlings) failed to establish successfully.

For buds grafted during the first ten-day period of September, the bud take rate reached **76% (38 seedlings)**, whereas 24% (12 seedlings) failed to establish.

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The observations indicate that buds grafted on September 10 demonstrated a higher take rate than those grafted on August 20. Specifically, the number of successfully established buds increased by 5 seedlings, while the proportion of failed grafts decreased by 10 percentage points.

The Myrobalan 29 rootstock, one of the rootstocks obtained from an in vitro laboratory for the experiment, was evaluated using 50 seedlings. When the Arzami apricot cultivar was bud-grafted onto this rootstock on August 20, a positive result was obtained in 39 out of 50 seedlings, corresponding to a bud take rate of **78%**. Unfortunately, 11 seedlings failed to establish successfully.

When bud grafting was performed on August 30 using the Myrobalan 29 rootstock, subsequent assessment showed that 41 buds had successfully established.

The results obtained from the experiment conducted on September 10 demonstrated that 43 Arzami buds had successfully established.

Another rootstock evaluated in the experiment was Myrobalan 29C. When the Arzami cultivar was grafted onto 50 Myrobalan 29C rootstock seedlings on August 20, the assessment revealed that 40 buds had successfully established. Unfortunately, 10 grafted seedlings failed to establish.

For seedlings grafted on August 30, a total of 41 successfully established plants were obtained, while 9 grafted seedlings failed to develop successfully.

Similarly, among the seedlings grafted on September 10, 43 successfully established plants were recorded, whereas 7 seedlings failed to establish.

Results obtained using the Best rootstock

According to the experimental results obtained with the Best rootstock, bud grafting performed on August 20 resulted in 26 successfully established seedlings. However, the remaining 24 buds failed to establish.

When the Arzami apricot cultivar was grafted onto the final rootstock, Druzhba, the results obtained on August 20 showed that 28 seedlings successfully established, while 22 seedlings failed to survive.

According to the results recorded on August 30, a total of 30 seedlings successfully established, whereas 20 seedlings failed to survive.

When bud grafting was performed on September 10, 33 seedlings successfully established, while the remaining 17 seedlings failed to survive.

Table 1.

Effect of Grafting Dates on the Bud Take Rate of the Arzami Apricot Cultivar Grafted onto Different Rootstocks (2026).

Grafting date	Total number of grafted buds	Number of successfully established buds
Wild apricot rootstock (control)		
August 20 (control)	50	33
August 30	50	35
September 10	50	38
Myrobalan 29 rootstock		
August 20 (control)	50	39
August 30	50	41
September 10	50	43
Myrobalan 29C rootstock		
August 20 (control)	50	40

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August 30	50	41
September 10	50	43
Druzhba rootstock		
August 20 (control)	50	28
August 30	50	30
September 10	50	33
Best rootstock		
20-avgust	50	26
30-avgust	50	29
10-sentyabr	50	31

Source: Results of the authors' field experiments, 2026.

Conclusion

Based on the results of the conducted research, the following conclusions were drawn:

Myrobalan 29 and Myrobalan 29C demonstrated the highest bud take rates and can be considered highly suitable rootstocks for the Arzami apricot cultivar.

Wild apricot and Druzhba showed moderate bud take rates and can be classified as moderately suitable rootstocks for the Arzami cultivar.

Best demonstrated comparatively lower bud take rates and can be considered a less suitable rootstock for the Arzami apricot cultivar under the studied conditions.

The overall results indicate that Myrobalan 29 and Myrobalan 29C are the most promising rootstocks for propagating the Arzami apricot cultivar under the climatic conditions of the Khorezm region.

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