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TRANSITION PERIODS OF THE PHENOPHASE PROCESSES OF THE INTRODUCED GRAPE CULTIVARS

Fayziev Jamoliddin Nasirovich,
Dsc in Agriculture, Professor

Kurbanova Sarvinoz Anvar kizi,
Junior Research Fellow Research Institute of Horticulture,
Viticulture and Winemaking named after Academician M. Mirzaev

Abstract
In the article, the periods of transition of phenological phases of the introduced grape cultivars are studied. Growth phases, budding and branch growth; bloom; the growth of bunches; the ripening of bunches; the periods of shedding of leaves are determined. It was noted that the shortest growing season (117-118 days) of the introduced grape varieties for food was observed in the Chukurak and Husayni Kelin Barmak grape varieties. The longest duration (147-153 days) was observed in the Mirney, Hurmane kyzil, Kara janjal and said gulyami varieties, while the intermediate indicator (124-143 days) was observed in the Ak hussayni, Kadu hussayni and Husayni kelin barmak grape varieties.

Keywords: Vine, food, variety, vegetation, phenophase, bud, bulge, bunch, flowering, ripening.

Introduction

It includes processes such as the growth, development, and fruiting of a vine throughout the year. In early spring, the plant begins with the movement of sap (flow of water from the cut, damaged part of the branches), and then the buds wake up; branches, leaves, flowers develop, the vine blooms, buds form, clusters develop and ripen, branches ripen, growth stops and leaves are shed (leaf fall begins).

The growth period mainly consists of 6 phenological phases: sap movement; the growth of branches and inflorescences; bloom; the growth of bunches; the ripening of bunches; shedding of leaves (leaf fall). Dividing the growing season into such phases makes it possible to determine the necessary agrotechnical measures for each phase, harvest the crop in a timely manner, and prepare the vine for winter. The beginning and continuation of each phase depends on factors such as external environmental conditions, variety characteristics, age of vines [9; 52–53-p.].

It should be emphasized that the issue of the annual growth period of vines has not been sufficiently scientifically studied. For example, the winter dormancy period of the vine and the duration of the bud dormancy period are not clearly defined.

The duration of individual phases of the growth cycle is also not sufficiently clear, and differentiation is often characterized primarily by morphological characteristics of the plants. Knowing the periods of transition of the phases of the vine plant's development cycles in certain conditions of the farm is an important economic sign that has not only theoretical, but also production value. This is because vine care is carried out based on the plant's developmental period

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and the timing of the phases.

At various times, many CIS and foreign researchers have dealt with the issues of transitioning the growth phases of vine [2; 3–6-p.]; [3; 3–5-p.]; [4; 11–18-б.]. According to A.M. Negrul and E.I. Mokhova [7; pp. 26–29], it is necessary to conduct regular phenological observations in each vineyard in order to learn about the biological characteristics of varieties and their environmental requirements.

Sh. Temurov [9; pp. 3–110] has repeatedly noted the importance of the timing of the transition of growth phases in order to select the best grape varieties for environmental conditions and to determine the timing of agrotechnical measures.

Material and methods. Observations were conducted on the transition periods of phenological phases in the following grape varieties: Ak Khusaini, Said Gulyami, Khusaini Egri, Kara janjal, Khusaini Kelin Barmok, Sovetsky Stolovii, Rizaga, Kzyl Khusaini, Khusaini Murgalniy fergan, Mirniy, Khurmane Kyzyl, Chukurak, and Kadu Khusaini.

The research was carried out in 2022-2024 at the Academician M. Mirzaev Research Institute of Horticulture, Viticulture and Winemaking.

The experiments were developed by Kh. Ch. Boriev, N. Sh. Enileev and others "Methodology of calculations and phenological observations during experiments with fruit and berry-bearing plants", [1; 64-p, M.A. Lazarevskiy "Methods of botanical description and agrobiological study of grape varieties" [5; 347-400-b], V.F. Moiseychenkov "Methodology of records and observations in experiments with fruit and berry crops" [6; 21-28-b] provide information on the use of agricultural products in agriculture.

Research results. The results of the study of phenological phases in introduced grape varieties showed that the earliest bud swelling (6/IV -12/IV) was observed in the varieties Husayne Kelin Barmok, Kara janjal, Rizaga, and Chukurak. Although in some years, depending on climatic conditions, the bud swelling period differs significantly from the specified period, the above-mentioned indicator was maintained across the varieties. Compared to other varieties, the buds of the Ak Husayni, Husayni Egri, and Kyzyl Husayni varieties swelled somewhat later (20/IV-26/IV). The bud swelling (14/IV-17/IV) of the varieties Said Gulyami, Sovetsky Stolovy, Hurmane Kyzyl, Husayni Murgalniy Ferghan, Mirney and Kadu Husayniy was within the range of the indicated varieties (Table 1).

Table 1 Bud swelling dates for food grape varieties (2022-2024)

O/n	Varieties	2022	2023	2024	Average
1.	Aq husayni – control	21/IV	19/IV	20/IV	20/IV
2.	Said Gulyami	15/IV	13/IV	17/IV	15/IV
3.	Husayni egri	17/IV	20/IV	22/IV	20/IV
4.	Kora zhanjal	10/IV	11/IV	15/IV	12/IV
5.	Husayni Kelin Barmok	4/IV	6/IV	8/IV	6/IV
6.	Sovetsky Stolovy	14/IV	12/IV	18/IV	15/IV
7.	Rizaga	11/IV	15/IV	10/IV	12/IV
8.	Qizil Husayni	25/IV	27/IV	26/IV	26/IV
9.	Husaini Mugalniy fergan	13/IV	15/IV	17/IV	15/IV
10.	Mirney	14/IV	13/IV	17/IV	15/IV
11.	Khurmane qizil	15/IV	13/IV	14/IV	14/IV
12.	Chukurak	7/IV	13/IV	15/IV	12/IV
13.	Kadu Husayni	18/III	16/IV	17/IV	17/IV

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The results of monitoring the flowering process in food grape varieties showed the following indicators: early (17-20/V) flowering was noted in the varieties Kadu Hussein, Hussein Kelin Barmok, Kyzyl Hussein, and Said Gulyami. Late flowering (22-24/V) was noted in the varieties Husayne Egri, Rizaga, Chukurak, and Mirney. Flowering in the middle period (20-21/V) was observed in the varieties Sovetsky stolovy, Ak hussayni, Husayni murgalniy fergan, Khurmane kyzyl and Kara janjal. In terms of flowering time, these varieties took an intermediate place between the indicated groups.

Table 2 Flowering dates for food grape varieties (2022-2024)

O/n	Varieties	2022	2023	2024	Average
1.	Aq husayni – control	19/V	21/V	19/V	20/V
2.	Said Gulyami	20/V	19/V	18/V	19/V
3.	Husaini egri	24/V	22/V	21/V	22/V
4.	Kora janjal	21/V	19/V	24/V	21/V
5.	Husayni Kelin Barmok	20/V	19/V	18/V	18/V
6.	Sovetsky Stolovy	18/V	22/V	23/V	21/V
7.	Rizaga	23/V	24/V	22/V	23/V
8.	Kizil Husaini	17/V	19/V	18/V	18/V
9.	Husaini Mugalniy fergan	17/V	21/V	20/V	20/V
10.	Mirney	23/V	24/V	25/V	24/V
11.	Khurmane kizil	19/V	21/V	20/V	20/V
12.	Chukurak	21/V	25/V	23/V	23/V
13.	Kadu husaini	18/V	16/V	17/V	17/ V

The data in the table show that the average difference in flowering time across years for the same varieties was greater than the difference in bud swelling time. It should be noted that the timing of bud swelling does not correlate with the timing of flowering.

The ripening period of the bunches in the grape varieties differs among themselves, and they are as follows:

varieties which began ripening early (8/VII-10/VII) – Chukurak and Husayni Egri;

Varieties with medium ripening (21/VII-25/VII) – Ak Husayni, Kora janjal, Mirney, Khurmane Kizill, Said Gulyami, Husayni Kelin Barmok and Kadu Husayni;

varieties with late ripening (5/VIII-20/VIII) – Sovetsky Stoloviy, Rizaga, Kyzil Husayne and Husayne Murgalnyi Fergan.

Table 3 Dates of ripening of bunches of seedless varieties of grapes (2022-2024 years)

O/n	Varieties	2022	2023	2024	Average
1.	Aq husayn – control	21/VII	23/VII	18/VII	21/VII
2.	Said Gulyami	16/VII	20/VII	24/VII	20/VII
3.	Husaini egri	6/VII	12/VII	7/VII	8/VII
4.	Kora janjal	18/VII	25/VII	24/VII	22/VII
5.	Husayni Kelin Barmok	13/VII	15/VII	10/VII	13/VII
6.	Sovetsky Stolovy	24/VIII	20/VIII	25/VIII	23/VIII
7.	Rizaga	8/VIII	5/VIII	3/VIII	5/VIII
8.	Kizil Husaini	6/VIII	5/VIII	2/VIII	4/VIII
9.	Husaini Mugalniy fergan	12/VIII	11/VIII	10/VIII	11/VII
10.	Mirney	16/VII	10/VII	8/VIII	11/VII
11.	Khurmane kizil	17/VII	25/VII	22/VII	21/VII
12.	Chukurak	8/VII	12/VII	9/VII	10/VII
13.	Kadu husaini	15/VII	20/VII	24/VII	20/VII

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Observations have shown that the onset of fruit set in seedless grape varieties is almost always correlated with their flowering time.

It was found that the annual variation in ripening time for individual varieties was 7-11 days in the first group, 3-5 days in the second group, and 2-3 days in the third group. However, the above-mentioned regularity regarding the precocity of these varieties remained (Table 4).

Table 4 Periods of complete ripening of bunches of grape varieties (2022-2024 years)

O/n	Varieties	2022	2023	2024	Average
1.	Aq husayni – control	22/VIII	21/VIII	25/VIII	23/VIII
2.	Said Gulyami	26/VIII	29/VIII	10/IX	14/IX
3.	Husaini egri	17/VIII	14/VIII	16/VIII	16/VIII
4.	Kora janjal	26/VIII	25/VIII	24/VIII	25/VIII
5.	Husayni Kelin Barmok	17/VII	16/VII	19/VII	17/VIII
6.	Sovetsky Stolovy	15/VIII	16/VIII	13/VIII	15/IX
7.	Rizaga	8/ IX	5/ IX	6/IX	6/ IX
8.	Kizil Husaini	22/ IX	23/ IX	21/ IX	22/ IX
9.	Husaini Mugalniy fergan	12/ IX	16/ IX	10/ IX	13/ IX
10.	Mirney	20/VIII	22/VIII	21/VIII	21/VIII
11.	Khurmane kizil	26/VIII	27/VIII	25/VIII	26/VIII
12.	Chukurak	7/VIII	12/VIII	10/VIII	7/VIII
13.	Kadu husaini	23/VIII	21/VIII	19/VIII	21/VIII

Varieties were also divided into the following 3 groups according to the full ripening of the clusters:

Early ripening varieties (7/VIII-16/VIII) are Husayni Egri and Chukurak varieties;

mid-ripening varieties (17/VIII-23/VIII) – Husayni Kelin Barmok, Mirney, Kara janjal, Khupmane Kyzil, Kadu Husayni and Ak Husayni;

Late-ripening varieties (6/IX-22/IX) – Rizaga, Khusaini Murgalniy fergan, Sovetsky Stolovy, Said Gulyami, and Kizil Khusaini varieties.

In order to clearly visualize the beginning of the vegetation phases of Food grape varieties, the following summary table is presented (see Table 5).

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Table 5 Transition periods of vegetation phases in food grape varieties (2022-2024)

O/n	Varieties	Swelling of buds	Flowering	The ripening of bunches	Complete ripening of bunches	Vegetation period duration, days
1.	Aq husayni – control	21/IV	20/V	21/VII	23/VIII	124
2.	Said Gulyami	15/IV	19/V	20/VIII	14/IX	152
3.	Husaini egri	20/IV	22/V	8/VII	16/VIII	118
4.	Kora janjal	12/IV	21/V	22/VII	25/VIII	135
5.	Husayni Kelin Barmok	17/IV	18/V	13/VII	17/VIII	122
6.	Sovetsky Stolovy	15/IV	21/V	23/VII	15/IX	153
7.	Rizaga	12/IV	23/V	5/VII	6/ IX	147
8.	Kizil Husaini	26/IV	18/V	4/VIII	22/ IX	149
9.	Husaini Mugalniy fergan	15/IV	20/V	11/VII	13/IX	151
10.	Mirney	15/IV	24/V	11/VII	21/VIII	128
11.	Khurmane kizil	14/IV	20/V	21/VII	26/VIII	134
12.	Chukurak	12/IV	23/V	10/VII	7/VIII	117
13.	Kadu husaini	18/IV	23/V	20/VII	7/IX	143

According to the duration of the vegetation period from the beginning of buds swelling to the complete ripening of the bunches, grape varieties were conditionally divided into 4 groups:
early ripening varieties (117-118 days) – Chukurak, Husayni egri;
avarage ripening varieties (124-143 days) – Aq husayni, kadu husayni and Husayni kelin barmoq;
medium-late ripening varieties (128-152 days) – Rizaga, Kyzil Husayni, Husayni Murgalni Fergan and Sovetsky Stolovi;
late ripening varieties (147-153 days) - Mirney, Hurmane kizil, Kara janjal and Said gulyami.

Conclusion

Knowing the phases of the growth cycle of introduced food grape varieties and the necessary agrotechnical measures for each phase will allow for timely harvesting, as well as preparing the vine for winter.

Based on the analysis, the shortest vegetation period (117-118 days) was recorded for the Chukurak and Husayni Kelin Barmok grape varieties. The longest duration (147-153 days) was observed in the Mirney, Hurmane kyzil, Kara janjal and Said gulyami varieties, while the intermediate indicator (124-143 days) was observed in the Ak hussayni, Kadu hussayni and Husayni kelin barmaq grape varieties. In addition, medium-late ripening (128-152 days) varieties Rizaga, Kyzyl Husayni, Husayni Murgalni Fergan and Sovetsky Stolovi were also identified.

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