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ФЕНОЛОГИЯ ФИСТАШКОВЫХ ДЕРЕВЬЕВ В ОЛТИАРИКСКОМ РАЙОНЕ ФЕРГАНСКОЙ ОБЛАСТИ (РЕСПУБЛИКА УЗБЕКИСТАН)**Эшанкулов Б.И., Хужаев О.Т.¹, Пернеев А.Н.², Холматова С.Курбонбой кызы³**¹Научно-исследовательский институт лесного хозяйства Республики Узбекистан²Жалал-Абадский научный центр Национальной академии наук Кыргызской Республики³Ферганский государственный университет**ФЕРГАНА ОБЛУСУНУН ОЛТИАРИК РАЙОНУНДАГЫ ПИСТАЧКА ДАРАКТАРЫНЫН ФЕНОЛОГИЯСЫ (ЎЗБЕКИСТАН РЕСПУБЛИКАСЫ)****Эшанкулов Б.И., Хужаев О.Т.¹, Пернеев А.Н.², Холматова С.Курбонбой кызы³**¹Ўзбекистон Республикасынын Токой чарба илим-изилдөө институту²Кыргыз Республикасынын Улуттук илимдер академиясынын Жалал-Абад илимий борбору³Фергана мамлекеттик университети**PHENOLOGY OF PISTACHIO TREES IN OLTARIQ DISTRICT OF FERGANA REGION (REPUBLIC OF UZBEKISTAN)****Eshankulov B.I., Khuzhaev O.T.¹, Perneev A.N.², Kholmatova S.Qurbonboy qizi³**¹Research Institute of Forestry of the Republic of Uzbekistan²Jalal-Abad Scientific Center of the National Academy of Sciences of the Kyrgyz Republic³Fergana State University

Аннотация. Изучение фенологических процессов позволяет в дальнейшем управлять возможностями использования данного растения. Кроме того, знание фенологических процессов способствует более целенаправленному использованию растений в различных целях и повышению влияния на качественные показатели. В результате становится возможным повышение урожайности и улучшение качественных характеристик. Фенологические наблюдения за деревьями фисташки настоящей (*Pistacia vera* L.), проведённые в Алтыарыкском районе Ферганской области, могут в будущем способствовать увеличению урожайности и улучшению качества продукции фисташки в данном регионе.

Ключевые слова: фисташка настоящая, орехоплодные культуры, селекционер, орошаемые земли, сельское хозяйство, горные и предгорные районы, лес, фермерское хозяйство, фенология.

Аннотация. Фенологиялык процесстерди изилдөө келечекте бул өсүмдүктү пайдалануу мүмкүнчүлүктөрүн башкарууга мүмкүндүк берет. Мындан тышкары, фенологиялык процесстерди билүү өсүмдүктөрдү ар кандай максаттарда багыттуу пайдаланууга жана сапаттык көрсөткүчтөргө таасирин жогорулатууга өбөлгө түзөт. Натыйжада түшүмдүүлүктү жогорулатуу жана сапаттык мүнөздөмөлөрдү жакшыртуу мүмкүн болот. Фергана облусунун Алтыарык районунда чыныгы писта дарагы (*Pistacia vera* L.) үчүн жүргүзүлгөн фенологиялык байкоолор келечекте бул аймакта пистанын түшүмдүүлүгүн жогорулатууга жана продукциянын сапатын жакшыртууга салым кошо алат.

Негизги сөздөр: чыныгы писта, жаңгактуу өсүмдүктөр, селекционер, сугат жерлер, айыл чарбасы, тоолуу жана тоо этектериндеги райондор, токой, фермердик чарба, фенология.

Abstract. Studying phenological processes allows future management of the utilization potential of this species. In addition, understanding phenological patterns increases the ability to use plants for various purposes and to influence quality indicators. As a result, productivity and quality parameters can be improved. Phenological observations of pistachio trees in Oltiariq District of Fergana Region may contribute to enhancing pistachio productivity and nut quality in this area in the future.

Keywords: pistachio, nut crop, breeder, irrigated land, agriculture, mountains and foothills, forest, farm enterprise, phenology.

Introduction. Pistachio (*Pistacia vera* L.) has always attracted the attention of breeders due to its valuable nuts. The leading pistachio-producing countries of the world – Iran, USA, Turkey, and Syria – cultivate high-yielding varieties with excellent nut quality. Because these pistachio cultivars enjoy high demand in the global market, many other countries are also expanding pistachio cultivation [3; 4].

Uzbekistan is considered the homeland of pistachio; however, the main irrigated lands of the country are used primarily for agricultural crops. Therefore, mountain and foothill areas have been allocated for pistachio and other nut-bearing species (almond, walnut, pecan). In addition, lands unsuitable for agricultural crops are also being allocated for establishing pistachio plantations and orchards [1]. Interest among growers in cultivating pistachio in such challenging areas and their confidence in obtaining yields has contributed to the development of pistachio cultivation. Currently, a team of young researchers at the Forestry Research Institute collaborates with forest and farm enterprises to conduct research in newly established pistachio orchards. Independent researchers and PhD candidates actively participate in these studies. The experiences, including positive and nega-

tive results of farmers interested in establishing pistachio orchards, are carefully analyzed. The pistachio plantation located in Oltiariq District of Fergana Region, established under the leadership of Bayqoziyev Ruzmat Tolipovich at the “RANU-BHN” farm enterprise, deserves particular attention. The primary reason is that the plantation was established from seed progeny of foreign pistachio cultivars.

Method of the research. The phenology of pistachio trees was studied according to the method of Chernova G.M. (2004) [2].

Results of the research. The pistachio plantation studied in Oltiariq District was previously uncultivated virgin land and had not been planted with crops for the past decade. The site has a 6° slope, located at an elevation of 509–510 m above sea level. The soil is typical grey soil with gravel content, with partial irrigation available. Seedlings with a closed root system grown from pistachio seeds were planted in 2014.

Phenological observations were conducted on randomly selected rows of pistachio trees. According to three years of observations, leaf emergence and flowering begin almost simultaneously during the second ten-day period of April. Table 1 presents the phenology of pistachio trees studied.

Table 1.

Phenological indicators of pistachio trees in Oltiariq District of Fergana Region (2021–2023) (“RANU-BHN” farm enterprise)

№	Tree	Bud swelling	Leaves				
			Initial leaf emergence	Full leaf expansion	Initial yellowing	Initial leaf fall	Full leaf fall
1.	FO-1♀	2.04	14.04	22-30.04	25.09	10.10	20-30.10
2.	FO-2♀	2.04	14.04	23-30.04	26.09	12.10	20-30.10
3.	FO-3♀	2.04	15.04	22-30.04	26.09	12.10	20-30.10
4.	FO-4♂	29.03	11.04	21-30.04	23.09	10.10	20-30.10
5.	FO-5♂	28.03	11.04	21-30.04	24.09	10.10	20-30.10
6.	FO-6♀	2.04	15.04	23-30.04	17.09	3.10	20-30.10
7.	FO-7♂	29.03	11.04	21-30.04	23.09	8.10	20-30.10
8.	FO-8♀	2.04	15.04	24-30.04	16.09	1.10	20-30.10
9.	FO-9♀	2.04	14.04	24-30.04	25.09	10.10	20-30.10
10.	FO-10♂	30.03	11.04	21-30.04	24.09	10.10	20-30.10

According to Table 1, 60% of trees showed bud swelling in the first ten-day period of April, and 40% in the third ten-day period of March. Initial leaf emergence was observed in trees where sap flow began in the third ten-day period of March, and it corresponded to the second ten-day period of April. Full leaf expansion occurred by the third ten-day period of April. Initial yel-

lowing and leaf fall occurred in August–September, and full leaf fall was observed in the second half of October. These phenological observations indicate that the studied trees are seed progeny of cultivated pistachio varieties.

Generative organ phenology of these pistachio trees was also studied in Oltiariq District of Fergana Region.

Table 2.

Phenological phases of pistachio trees in Oltiariq District (2021–2023)
("RANU-BHN" farm enterprise)

№	Tree	Bud swelling	Flowering		Fruit			
			Initial flowering	Full flowering	Fruit set	Initial ripening	Full ripening	Full fruit fall
1.	FO-1♀	9.04	16.04	20-24.04	18-22.05	20.09	1-10.10	20-30.10
2.	FO-2♀	9.04	16.04	20-24.04	18-22.05	20.09	1-10.10	20-30.10
3.	FO-3♀	8.04	16.04	20-24.04	18-22.05	15.09	22-30.10	20-30.10
4.	FO-4♂	7.04	14.04	18-22.04	-	-	-	-
5.	FO-5♂	6.04	13.04	18-22.04	-	-	-	-
6.	FO-6♀	9.04	16.04	20-24.04	18-22.05	20.09	1-10.10	20-30.10
7.	FO-7♂	6.04	13.04	18-22.04	-	-	-	-
8.	FO-8♀	9.04	16.04	20-24.04	18-22.05	18.09	24-31.10	20-30.10
9.	FO-9♀	8.04	16.04	20-24.04	18-22.05	20.09	1-10.10	20-30.10
10.	FO-10♂	6.04	13.04	22-22.04	-	-	-	-

Generative bud activity began 6–7 days later than vegetative buds; however, flowering coincided with leaf emergence, occurring in the second and third ten-day periods of April. Male flowers bloomed for 1–2 weeks. Fruit set occurred approximately one month after flowering. Full nut ripening began in the second ten-day period of September, although in some trees it occurred earlier. Early flowering does not necessarily result in early ripening. Although phenological

stages were generally similar, differences were observed in leaf shape, shoot formation, nut color and size, and maturation time.

Conclusion. Field experiments and phenological observations indicate that pistachio growth and development under the conditions of Oltiariq District – in low-fertility, gravelly soils with partial irrigation – occur within biologically typical time frames for the species. Studying these phenological processes provides valuable information for future research.

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