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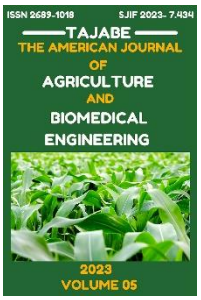

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Research Article

THE TRANSITION PERIODS OF PHENOLOGICAL PHASES AND YIELD INDICATORS IN NEW DEVELOPED LEMON VARIETIES AND HYBRIDS

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ABSTRACT

In this article, the transition periods of phenological phases and yield indicators in lemon varieties and hybrids are studied. During research, the beginning of bud opening of lemon varieties was observed from February 23 (Meyer). Flowering in the varieties began on March 11, in the first-fruits of Uzbekistan and the yielding variety of Uzbekistan. Average duration of flowering in varieties was 41 days. The second growth period of shoots (16/V-30/V) began, the duration of which was 26-36 days. The beginning of fruit ripening in varieties and hybrids of lemon was determined on October 14 in the first variety of Uzbekistan and hybrid No. 34-85. For the first time, full ripening of fruits was found in hybrid No. 34-85 (4/X1).

KEYWORDS

Lemon, phenological phases, variety, hybrid, flowering, development, growth period.

INTRODUCTION

In the world, citrus crops are grown in more than 90 countries, covering an area of more than 8.0 million ha. More than 116.0 million tons of products are grown. These are mainly tropical and subtropical regions.

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Brazil, USA, Spain, Italy, Japan. Mexico, China, India, Israel, Argentina, Turkey, Morocco, the 13 countries mentioned above grow 81% of citrus fruits, and the remaining 80 countries grow 19% of the product. According to FAO, 13,861 thousand tons of lemons were produced in the world, including India - 2,108,000 tons, Mexico - 2,147,700 tons, Argentina - 1,228,700 tons, China - 1,313,400 tons, Brazil - 1,126.7 thousand tons, the USA - 8,346.1 thousand tons, and Uzbekistan in 2021 to 12 foreign countries worth 3.8 million. Exported 3.7 thousand tons of lemons worth US dollars [5, 6, 8, 9].

The lemon plant is 3-7 m tall, the trunk is wide, the branches are thorny, some are thornless, the leaves are thick, light green, oblong-ovate, the flowers are bisexual, white, fragrant, the fruit is ovoid, sometimes round, the average weight is 120-400 g. The bark is yellow, smooth or rough. Mesophyll 8-12 segments, pale yellow, juicy, sour. The juice contains 3.5-8.1% acid (mainly citric acid), 1.9-3.0% sugar, vitamin C (45-140 mg per 100 g), RR and V and pectin substances, iron, phosphorus , there are potassium, calcium, magnesium salts. It is mainly eaten wet, used in the preparation of confectionery, juice, lemonade, citric acid[1, 2, 3, 9].

It is propagated from lemon cuttings and grafting. It is planted in the garden in a scheme of 2.5x4 m. It gives a harvest in the 3-4th year after transplanting. Lemon is a heat-loving, light-loving and moisture-demanding plant. Fruits and unripe branches at -1.5-2°C are affected by frost at -5-6°C. It develops well at an air temperature of 17-18°C. Lemon produces abundantly in humus-rich, well-draining, light soils [3, 4, 5, 6, 7].

In our research, phenological observations were made on variety samples with valuable economic traits from foreign and domestic breeding sources and clones of lemon. Meyer, M.Mirzaev, native of Uzbekistan and new hybrids of lemon were selected.

Materials and methods. The observations were carried out in the lemon groves of the scientific-research institute of horticulture, viticulture and winemaking named after Academician M. Mirzaev. In the studies, the specific characteristics of the development of lemon varieties were determined by the All-Union Fruit Research Institute named after I.V. Michurin "Program and methodology for sorting fruit and nut crops" in 1973, "Fruits, Berries and Fruits" developed by the All-Russian Research Institute of Fruit Crop Selection and the method and program of researching varieties of nut plants" (Orel 1999) are studied according to the methods. F.F. Matskov's method is used to determine heat resistance, M.A. Solovev's method to determine cold resistance of shoots, V.L. Vitkovsky's methods to determine the growth dynamics of seedlings and one-year branches of lemon varieties, and V.A. Kolesnikov's methods to study the root system.

Results and discussion. Vegetation in citrus plants started 10-15 days earlier due to the early arrival of spring in the years of research. Among the lemon cultivars, the beginning of bud opening was observed from February 23 in the Meyer cultivar and on February 30 in the #1-17-3-20 hybrid. Bud growth in the beginning of March in Meyer variety and hybrid No. 1-17-1-20, No. 34-85, March 3, first-fruits of Uzbekistan, Uzbek harvester variety March 4, M. Mirzaev, No. 1-17-2-20, No. 1 -17-3-20, started on March 5th. Blooming in varieties began on March 11, in the first-fruits of Uzbekistan and in the yielding variety of Uzbekistan, flowering in lemon varieties ended on April 23 (table 1).

Table 1.

Transitional periods of phenological phases in lemon varieties and hybrids.

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(Field experiments, the Scientific Research Institute of Horticulture, Viticulture and Winemaking named after. Academician M. Mirzaev, 2022)

№	Lemon varieties	Year	Bud opening	The beginning of the growing season	Flovering		Vegetation period					Duration
					Beginning	End	II Beginning	II End	Duration, day	III Beginning	III End	
1.	Limon Meyera *(control)*	2020	23/II	3/III			16/V	19/VI	27			
2.	M.Mirzaev	2020	28/II	5/III			18/V	19/VI	29	28/IX	2/XI	38
3.	O‘zbekiston to‘ng‘ichi *(Control)*	1985	26/II	4/III	11/III	23/IV	30/V	25/VI	26			
4.	O‘zbekiston hosildori	2015	28/II	4/III	11/III	23/IV	21/V	26/VI	36			
5.	№1-17-1-20	2020	29/II	3/III			30/V	29/VI	29			
6.	№1-17-2-20	2020	27/II	5/III			24/V	29/VI	35			
7.	№1-17-3-20	2020	30/II	5/III			21/V	25/VI	32			
8.	№ 34-85	2015	28/II	3/III	11/III	23/IV	21/V	17/VI	27			
9.	№ 74	2020	30/II	5/III			23/V	17/VI	24			

Average duration of flowering in varieties was 41 days. The second growth period of shoots (16/V-30/V) began, the duration of which was 26-36 days. It was found that the duration of the third growth period was extended to 38 days only in M.Mirzaev's hybrid (28/IX).

In observations, the beginning of fruit ripening in new and control lemon varieties and hybrids was determined on October 14 in the first variety of Uzbekistan and hybrid No. 34-85. The first full ripening of fruits was observed in hybrid No. 34-85 (4/X1). The duration of ripening in varieties "No. 34-85" and "Uzbekistan yielder" was 20 to 23 days. In the studies conducted to determine the biological productivity of new varieties and hybrids, among the new varieties (No. 34-85), which gave a good yield, the average yield was 3.3 kg per tree, that is, the average yield per hectare was 55.4 t/ha. formed The productive variety of Uzbekistan was 2.3 kg from one bush and 37.9 c/ha from one hectare. The first variety of Uzbekistan made 2.2 kg from one bush, that is, the productivity per hectare was 36.3 tons/ha(Table 2).

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Table 2.

Productivity and ripening periods of varieties and hybrids of lemon

(Field experiments, the Scientific Research Institute of Horticulture, Viticulture and Winemaking named after. Academician M. Mirzaev, 2022)

№	Lemon varieties	The beginning of the ripening period	Full ripening	Duration	The average number of fruits, bush/piece	Average fruit weight, gr	Productivity	
							kg/pc	c/ha
1.	O‘zbekiston to‘ng‘ichi *(Control)*	14/X	5/XI	21	28	79	2,2	36,3
2.	O‘zbekiston hosildori	17/X	10/XI	23	33	72	2,3	37,9
3.	№1-17-1-20							
4.	№1-17-2-20							
5.	№1-17-3-20							
6.	№ 34-85	14/X	4/XI	20	40	84	3,3	54,5
7.	№ 74							

Conclusion

In conclusion, it should be noted that in the year of observation, the beginning of bud burst in lemon varieties was observed from February 23 (Meyer). Flowering began in the varieties on March 11, in the first-fruited varieties of Uzbekistan and the productive variety of Uzbekistan. The average duration of flowering of the varieties was 41 days. The second period of shoot growth began (16/V-30/V), the duration of which was 26-36 days. The beginning of fruit ripening in lemon varieties and hybrids was determined on October 14 for the first variety of Uzbekistan and hybrid No. 34-85. The first full ripening of fruits was observed in hybrid No. 34-85 (4/X1).

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