

THE EFFECT OF DIFFERENT SUBSTRATES ON THE FORMATION AND DEVELOPMENT OF LEMON SEEDLINGS ROOTS

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Abstract. This article provides information on the development, growth, enlargement of the root system and the activation of physiological processes taking place in them during the maintenance of lemon seedlings on different substrates, and the production of high-quality seedlings that meet the standard requirements.

Key words: lemon, seedling, root, number of roots, root length, peat.

Аннотация. в данной статье представлена информация о развитии корневой системы, росте и активации физиологических процессов, происходящих в них при содержании саженцев лимона на различных субстратах, а также получении качественных саженцев, соответствующих требованиям стандарта.

Ключевые слова: лимон, саженец, корень, количество корней, длина корня, торф.

Annotatsiya. Ushbu maqolada turli substratlarda limon ko‘chatlarini parvarishlashda ildiz tizimini rivojlanishi, o‘si-shi va ularda kechadigan fiziologik jarayonlarni faollashuvi natijasida standart talablariga mos va yuqori sifatli ko‘chatlar yetishtirish to‘g‘risida ma‘lumotlar keltirilgan.

Kalit so‘zlar: limon, ko‘chat, ildiz, ildizlar soni, ildizlar uzunligi, torf.

Introduction. Today, in our republic, lemon groves are established and maintained on large areas. In these areas, a number of reforms are being carried out in terms of growing citrus plants, introducing new varieties brought from abroad, increasing production and export volume due to the expansion of their area.

The lemon plant is 3-7 m tall, the stem 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, some are round, the average weight is 120-400 g.

It is propagated from lemon cuttings and grafting. It is planted in the garden in a scheme of 2.5 x 4 m. It gives a harvest in the 3-4th year after transplanting. Lemon is a heat-loving, light-loving and moisture-demanding plant. At -1.5-2°C, the fruit and unripe branches are hit by the cold of the bush at -5-6°C. It develops well at an air temperature of 17-18°C. It produces abundantly in light soils rich in lemon humus and well drained (O. P. Kulkov, 1986).

The lemon plant is mainly propagated by vegetative (cutting). Vegetative method - it is said to regenerate the mother plant from a piece taken from a somatic part of the mother plant. In this case, the grown seedling fully preserves all the biological characteristics of the mother plant (Kolesnikov, 1979).

When the lemon plant is propagated from green cuttings, they have a unique compact appearance, which makes them suitable for growing not only in greenhouses, but also in trenches and indoor conditions (offices, classrooms). (Samoladas, 1978). Lemon cuttings belong to the group of moderately rooted plants, and cuttings form roots slowly and in different periods (Yermakov, 1981).

When rooting lemon cuttings, substrates consisting of two layers are used. The lower layer serves as food, and the upper part holds the cuttings firmly (Babaeva, 1983; Fakhrutdinov, 1993).

When using two-layer substrates (upper layer of clean sand, lower layer of humus) in conditions of artificial fog, cuttings may

rot due to increased moisture in the lower layer (Tarasenko, 1987). It is recommended to plant lemon green cuttings in artificial fog conditions in 10x5 cm and 10x7 cm scheme, 2-2.5 cm deep on two-layer special substrates (Fakhrutdinov, 1994).

Research materials and method. Researches were conducted in 2023, Tashkent region, Tashkent district, Tashkent scientific-experimental station, Meyer variety of lemon.

Phenological observations of lemon seedlings were carried out based on the methods of Kh. Buriyev et al. (2014) «Methodology of calculations and phenological observations in conducting experiments with fruit and berry-bearing plants». Also, the statistical analysis of the obtained data was carried out according to the Microsoft Excel computer program and the method of B. A. Dospehov [1].

Research results. In 2023, in different options (conventional method in sand (control); 100% peat; 100% coconut husk; 50% peat + 50% coconut husk; 30% peat + 30% coconut husk + 40% rotted manure; 25 % rotted manure + 25% agroperlite + 25% vermiculite + 25% soil) scientific and research work was carried out to study the formation of roots of lemon seedlings grown in resource-efficient technologies (table).

According to the results of the study, the total number of roots of 2023 lemon seedlings planted in option 6 was greater than that planted in the traditional method in sand. In this case, the traditional method is the total number of roots in the variant planted in sand.

There were 48.7 units, and 68.7 units (112%) were planted in the options planted with 25% rotted manure + 25% agroperlite + 25% vermiculite + 25% soil.

In the remaining options (100% peat; 50% peat + 50% coconut shavings; 30% peat + 30% coconut shavings + 40% rotted manure;) it was found that the number of roots of lemon seedlings reached from 27.3 to 61.3.

The length of the roots of lemon seedlings was also studied.

Table.

Root formation and development of lemon seedlings on different substrates
Small field experiments (Tashkent scientific-experimental station, Meyer variety of lemon) 2021-2023.

№	Options	Number of roots, pcs				Total number of roots, pcs	Relative to control, %	Root length, sm				Total root length, sm	Relative to control, %
		primary root	secondary root	tertiary root	lateral root			primary root	secondary root	tertiary root	lateral root		
1	The traditional method is sand (control)	3	26	6	13,7	48,7	79,3	55	154	22,3	87	319	65,6
2	100% peat	4	14,3	0,7	8,3	27,3	52,6	88,3	73	1,4	58,7	216,3	57,1
3	100% coconut husk	4,7	27	2,3	27,3	61,3	100	99,7	161,2	7,3	218,3	486,5	100
4	50% peat + 50% coconut husk	5,7	29,3	0	21,3	56,3	91,8	93	165,3	10	160	418	86
5	30% peat+30% coconut husk + 40% rotted manure	5	19	1,3	26,7	52	100	98	87,3	11,3	181,7	378,7	100
6	25% rotted manure + 25% agroperlite + 25% vermiculide+ 25% soil	4,3	35	15,7	13,7	68,7	112	104,7	251,7	54,2	109	519	106,8

It was observed that the length of primary roots reached 55 sm, secondary roots 154 sm, tertiary roots 22.3 sm, and lateral roots reached 87 sm in seedlings grown under control.

The root length of lemon seedlings in the option planted with 25% rotted manure + 25% agroperlite + 25% vermiculite + 25% soil reached the highest result of 519 sm. In this case, the length of primary roots is 104 sm, secondary roots 251 sm, tertiary roots 54.2 sm and lateral roots 109 sm.

Also, good results were obtained in lemon seedlings grown in 100% coconut husk. The total root length was 486.5 sm, of which the length of primary roots was 99.7 sm, secondary roots were 161.2 sm, tertiary roots were 7.3 sm, and lateral roots were

up to 218 sm.

In the remaining option (100% peat; 30% peat + 30% coconut husk + 40% rotted manure;) the length of primary roots is 88.3-98 sm, secondary roots are 73-87.3 sm, tertiary it was found that roots reached 1.4-11.3 sm and lateral roots reached 58.7-181.7 sm.

Conclusions. Studies on the development of the root system of lemon seedlings revealed that lemon seedlings propagated in 16x16 polyethylene pots and planted in 100% coconut and 25% rotted manure + 25% agroperlite + 25% vermiculite + 25% soil (substrate) it is possible to grow high-quality lemon seedlings that meet standard requirements.

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