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EFFECT OF VARIOUS PREPARATIONS FOR PLANT ROOTING ON OLIVE CUTTINGS

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ВЛИЯНИЕ РАЗЛИЧНЫХ ПРЕПАРАТОВ ДЛЯ УКОРЕНЕНИЯ РАСТЕНИЙ НА ЧЕРЕНКИ ОЛИВЫ

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Abstract. The effect of different rooting agents on the propagation of olive plant by means of cuttings was investigated in a comparative manner. Experimental research works were carried out in the greenhouse complex of the Absheron Experimental Station. Olive plant cuttings from different varieties were taken as the object of the study. Rooters (IST and naphthenic acids) were used to influence the rapid rooting of cuttings and the increase in the number of lateral roots. During the conducted experiments, different results were obtained in different variants. It was observed that indolyl acetic acid and naphthenic acid were more effective on olive cuttings in comparison with the control option. Based on the conducted studies, it was found that rooting of cuttings was accelerated as a result of the effect of rooters. Results were more successful in the indolyl acetic acid variant than in the other variants. So, under the influence of 100 cuttings IST, 96 cuttings in Agbaba variety, 87 in Jigirina variety, 93 in Pikvales variety, and 89 cuttings in Azerbaijani olive were observed. Under the influence of naphthenic acid, rooting occurred in 92 of 100 cuttings of Agbaba variety, 87 of Jigirina variety, 85 of Pikwales variety, and 91 of Azerbaijani olives. As a result, it was determined that for the rapid development of the olive plant, cuttings should be taken from healthy and well-nourished trees and indolyl acetic acid should be used as a rooting solution.

Аннотация. Сравнительным образом исследовано влияние различных укоренителей на размножение растений маслины черенками. Экспериментальные исследовательские работы проводились в тепличном комплексе Апшеронской опытной станции. В качестве объекта исследования были взяты черенки растений маслины разных сортов. Для влияния на быстрое укоренение черенков и увеличение количества боковых корней использовались укоренители (IST и нафтеновые кислоты). В ходе проведенных экспериментов были получены разные результаты в разных вариантах. Было отмечено, что индолилуксусная кислота и нафтеновая кислота были более эффективны на черенках маслины по сравнению с контрольным вариантом. На основании проведенных исследований было установлено, что укоренение черенков ускорялось в результате воздействия укоренителей. Результаты были более успешными в варианте с индолилуксусной кислотой, чем в других вариантах. Так, под воздействием 100 черенков IST наблюдалось 96 черенков сорта Агбаба, 87 черенков сорта Джигирина, 93 черенков сорта Пиквалес и 89 черенков азербайджанской оливы. Под воздействием нафтеновой кислоты укоренение произошло у 92 из 100 черенков сорта Агбаба,

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87 черенков сорта Джигирина, 85 черенков сорта Пиквалес и 91 черенка азербайджанской оливы. В результате было определено, что для быстрого развития растения оливы черенки следует брать со здоровых и хорошо удобренных деревьев, а в качестве раствора для укоренения использовать индолилуксусную кислоту.

Keywords: olive, Absheron peninsula, propagation, biological reagents.

Ключевые слова: олива, Апшеронский полуостров, размножение, биологические реагенты.

Azerbaijan is included in the group of countries with high potential for olive cultivation in terms of favorable climate and land resources. The Absheron Peninsula has a very favorable opportunity for the development of this plant [1].

There are several convenient methods of olive propagation. So olive can easily be propagated by seeds, cuttings, shoots. The most effective method of olive propagation is through cuttings. According to the results obtained when C. S. Mammadov conducted cuttings propagation experiments, it was found that this method is a more efficient propagation method [3].

According to the research conducted by J. Mammadov, the amount of oil in olive fruits was 3.0-4.8% higher in the years when fertilizer was applied compared to the control. The fat content of the fruits was higher in the three-fed variants. This is on average 0.1-1.1% more than the indicators of other nitrogen-fed variants. Thus, since the soils of the Absheron Peninsula have a severe shortage of nitrogen, the application of nitrogen fertilizer in the background of phosphorus-potassium leads to a high yield every year, and this is considered one of the main requirements of agrotechnics [4].

The use of some biologically active reagents has always been relevant and important for the acceleration of rooting in plants propagated by cuttings. In his research work, Jigarevich determined that some growth substances have a positive effect on the development of roots during pen propagation. These substances are called growth substances or auxins [7].

Auxins were first discovered by the German scientist F. Keglin. Keglin isolated this acid in crystalline form urine in 1935. The empirical formula of auxins is the acid $C_2H_{32}O_5$. These substances accelerate the growth of the stem, leaves and root system in plants. At the same time, it stimulates the formation of roots and callus in pens [2].

Mikaladze confirmed the effective results of the application of hetaroxins for better rooting of cuttings with his researches in Abkhazia and Kakheti [10].

The influence of growth factors on the development of the olive plant has been studied by some world scientists. Morettini, who conducted research on the olive plant in Italy, confirmed that fruit loss in olives in July and September, reaching 70-75%, is caused by nutritional deficiencies [14].

In his research on the leaves and flowers of the olive plant, Bouat investigated the changes of N, P, K and Ca in the leaves and flowers along with the fruit throughout the year. observed [11].

Gonzalez determined that the accumulation of K in the fruit in the olive affects the change of the amount in the leaf and the decrease of the yield in the next year because this condition disturbs the balance between N/K and Ca/K in the branches [12].

Gonzalez determined that the reduction of potassium and calcium was lower in the olive plant during March-October [13].

Apart from being a plant of food and industrial importance, olive is also of great importance as a medicinal plant. Cultivation of this plant is also economically very favorable. Olive oil can

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always maintain its market importance in comparison with other vegetable oils. Due to its high nutritional value and medical importance, it has always been among the economically efficient plants. The difference between the olive plant and other fruit plants is that each olive seedling planted gives its first harvest starting from the third year, and reaches full harvest in the fifth and sixth years of cultivation, and can produce an important product for farming and sale. With the increase in the demand for olive oil in the world, the issue of increasing the area of olive groves is one of the main tasks. Thus, finding ways to meet the demand for olive seedlings is still relevant today. For this reason, we set ourselves the main goal of investigating the effect of growth substances on the reproduction of olive plant cuttings. The main goal of our study is to determine the effect of the application of various growth substances that affect the quick rooting of the olive plant [5-9].

Object and methodology of the research

Experimental research works were carried out in the Greenhouse of the Absheron Experimental Station. The cuttings were planted in substrates consisting of a mixture of peat and perlite in the ratio of 1:1. The temperature in the greenhouse was +15,+25^{0}C, and the humidity was 67-86%.

Cuttings obtained from healthy and productive trees of Agbaba, Jigirina, Pikvales and Azerbaijan's Olive varieties of the olive plant were taken as the object of the study. Biologically active reagents (IBA and naphthenic acid) were applied to influence the rapid rooting of varieties. The research work was carried out based on the accepted methodology of the Russian Scientific-Research Institute of Horticulture and Viticulture named after I. V. Michurin. That is, according to Y. V. Tyurin, humus was determined by the CO_2-calcimetric method, ammonia nitrogen-Nessler reagent dissolved in water, and pH was determined by the potentiometric method in water [6].

Analysis and discussion

The main importance of olive plant cutting reproduction is that it retains the characteristics of the parent tree and fruiting occurs in a shorter period of time. One of the most important conditions when growing cuttings is the correct selection of the trees from which the cutting material is supplied. Thus, one of the important conditions is the selection of the cuttings from trees that are provided with good nutrients, watered on time and free from parasites, diseases and pests. It was observed that rooting is more in cuttings obtained from young trees than in old trees. Olive cuttings are available in three forms. Cuttings from young shoots from the bottom of the tree, cuttings from the middle part of the tree, and cuttings from the buds that develop at the top of the tree. The cuttings from which part of the tree is obtained has its effect on the results. Cuttings supplied in spring should be obtained from the middle part of the tree. The cuttings taken in summer and autumn, and the supply of shoots from the bottom of the tree, gives more effective results. The cuttings obtained in the summer months should be supplied with the shoots of the previous year, and the cuttings obtained in the summer and autumn months should be supplied with the shoots of the same year. Getting spring cuttings in March-April, and autumn cuttings in August-September shows an effective result.

Experiments were carried out on Agbaba variety, Jigirina variety, Pikvales variety and Azerbaijani olive variety in the greenhouse complex of Absheron Experimental Station in 3 variants. The first variant is control, the second variant is Indolyl acetic acid, and the third variant is Naphthenic acid (heteroauxin).

The supply of cuttings should be done once every 2-3 years from perennial branches. The supply of the cuttings can last from February 15 to the end of March. The supply of the cuttings can

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be started from December in the years when there is no frost and mild weather. The cuttings are cut from straight, greenish, smooth-skinned branches with a diameter of 1.5-2.5 cm. The obtained cuttings should be 25-30 cm long. The buried cuttings should be more than 5 cm above the ground surface. Olive cuttings were stored in indolyl acetic acid and naphthenic acid solution before being transferred to the experimental area. During the experiment, 100 olive cuttings were taken in each variant. The results were different in different options.

The cuttings we delivered at the end of March were prepared for planting. The cuttings we obtained were placed in water in containers to prevent water loss. Later, these cuttings were cleaned of extra leaves in a shady place and two or three leaves were kept on them.

Table 1

THE NUMBER OF CUTTINGS ROOTED UNDER THE INFLUENCE OF ROOTERS
(100 pieces)

The name of the variety	*Control*	*Naphthenic acid*	*Indolyl acetic acid*
Agbaba variety	78	92	96
Jigirina variety	75	87	87
Pikvales variety	67	85	93
Azerbaijan’s Olive	63	91	89

The tip of the cuttings is sealed with paraffin tape and this is one of the measures taken to prevent water loss after planting. In the control variant, cuttings were planted by soaking them in ordinary water. To plant the cuttings, a drainage layer of 3 cm thick coal particles was prepared in the pots and a 1:1 peat-perlite mixture was added to it. The cuttings were planted in these pots keeping 5 cm outside (Figure).

Figure. Study of the effect of growth substances on olive pens

To prepare indolyl-acetic acid solution, first, 1 g of indolyl-acetic acid is dissolved in 100 ml of ethyl alcohol, then diluted with 125 ml of distilled water. We keep the prepared cuttings in this solution for 5-10 seconds. Then we put the cuttings aside for a few minutes so that the alcohol leaves the cuttings.

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Table 2

THE NUMBER OF ROOTS UNDER THE INFLUENCE OF THE ROOTER

The name of the variety	*Control*		*Naphthenic acid*		*Indolyl acetic acid*	
	Number of lateral roots	*The length of lateral roots, sm*	*Number of lateral roots*	*The length of lateral roots, sm*	*Number of lateral roots*	*The length of lateral roots, sm*
Agbaba	8-9	6-7	14-16	6-8	21-23	9-10
Jigirina	9-10	4-5	12-14	6-8	20-22	8-10
Pikvales	10-12	4-5	15-17	6-7	19-21	7-9
Azerbaijan's Olive	8-10	5-6	13-16	7-8	21-22	9-11

The cuttings are also planted in pots with a peat-perlite mixture. In the case where naphthenic acid is applied, the cuttings kept for 12 hours in a 0.001% solution of naphthenic acid were planted in a peat-perlite mixture substrate. As can be seen from the table, according to the results obtained for the varieties, the most successful result was observed with the effect of indolyl acetic acid.

Conclusion

Based on the results of the conducted research, it was found that the rooting of cuttings was accelerated due to the effect of active reagents and the number of lateral roots formed was greater in comparison with the control variant. The most development of lateral roots was observed in the variant where we applied indolyl acetic acid.

Thus, 96 cuttings in Agbaba variety, 89 cuttings in Azerbaijani olive, 87 cuttings in Jigirina variety, and 93 cuttings in Picvales variety showed rooting, and the number and length of lateral roots were more than other variants.

When 100 cuttings were treated with naphthenic acid, 92 cuttings were rooted in Agbaba, 91 in Azerbaijan olive, 87 in Jigirina, and 85 in Picvales problem. In this variant, the number and length of lateral roots were greater than in the control variant. Although this variant is inferior to the variant with indolyl acetic acid in terms of its effectiveness, it is quite superior to the control variant. As a result, it was determined that in order for the olive plant cuttings to develop lateral roots, the cuttings should be supplied from healthy and well-nourished trees and these cuttings should be kept in indolyl acetic acid solution.

In the case where we act with naphthenic acid, the amount and concentration of the solution should not exceed the prescribed dosage limit. Otherwise, when the specified amount is exceeded, the growth and development of the roots in the olive plant is weakened.

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