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Growth and Development of Olive Plants (*Olea europaea* l.) Depending on Offshoot Graftings

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Abstract: ***In this scientific article an experimental material has been provided on the study of grafting period of olive offshoots of Nevaldilo and Gemlik varieties for the cultivation of sorted clonal plants from them. Research has shown that the optimal timing of offshoot grafting of both varieties of olives in the conditions of Surkhandarya region of the Republic of Uzbekistan is the first decade of June. In rooting period of olives grafting optimal condition is provided for rhizogenesis of the root and overground parts of cultivated plants.***

Keywords: olive plant, grafting, root system, rhizogenesis, callus

1. Introduction

Successful grafting of most woody and shrubby species depends on graft preparation period. Different types and species of plants have their own particular periods of optimal grafting. In some types and species which have difficult rooting the grafting is of short duration and coincides with particular periods of offshoot growth, in some of species it coincides with intensive growth phase, and in others with the end of intensive growth phase. For the group of plants which have short-term dormancy, grafting practically can be done during the whole vegetation period. Olive is also included to this group. On grafting period depends not only quickset rooting, but also root formation time, bud germination in the quickset, developing stages of root and overground parts, offshoot maturing and plant overwintering [1;2;3;4;5;6].

2. Methods of research

Influence of grafting period of olive offshoots on plant development has been investigated on two types: Gemlik and Nevaldilo. Green quickset with 4-5 buds cut from middle part of sorted mother offshoot has been planted for experiment. Before planting quickset was processed with IAA (Indole acetic acid) solution in concentration of 50 mg/l within 12 hours. Quickset planting has been conducted during four periods: the first one – at the end of May, the second – first decade of June, the third is second decade of June and the forth one – the first decade of July. The planting scheme is 10x10 cm.

3. Results and Discussion

The observation for development of mother plant of olive showed that the occurrence of the first growing offshoots of both species was faster after bud exploding. The growth of separate olive offshoots lasted till November. More intensive growth of offshoots was observed in April and May, and their growth reached to 0,5 - 1,0 cm in length. In the middle of June offshoot growth dampened down.

In Gemlik sort intensive growth period finished earlier than in Nevaldio sort (*fig. 1).*

Depending on planting duration, callus formation in quickset began in 5-9 days. Formation of first roots were observed within 9-15 days, more often 10-12 days; massive root formation was in 9-20 days, most parts in 16-18 days. Beginning of offshoot growth was noticed in 18-30 days, more often in 22-25 days, that is, difference on rhizogenesis of root system period between sorts were little *(Tab.1).*

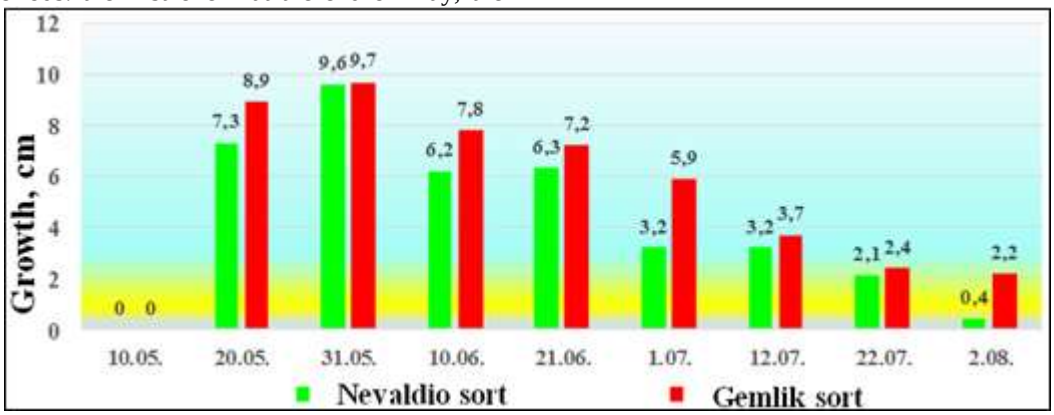

Figure: Dynamics of offshoot growth of parent plants of olive in vegetation period

Table 1: Phases of olive plants development according to offshoot grafting period, (2016-2017)

Date of grafting	The number of days from planting cuttings to:				
	Beginning of callus formation	Beginning of rooting	Massive root formation	Beginning of offshoot growth	Rooting rate, %
Nevaldilo type					
25.05	8	12	17	20	97
10.06	6	12	18	20	82
20.06	6	10	16	22	87
10.07	6	10	14	22	83
Gemlik type					
25.05	8	12	17	20	98
10.06	6	10	15	18	89
20.06	6	8	12	20	89
10.07	6	8	14	18	82

Rooting rate of quicksets in all periods of planting of olive quicksets was 90-97% in the experiment.

In all periods of quickset planting of both sorts rootstock development was high as there was observed 2,7-3,9 branching order with large quantity of roots of first order - 19,3-32,6 pcs, overall length from 7,3 to 13,3 m. and root volume from 7,3 to 13,3 cm^3. The most powerful root system of seedlings developed in an early period of grafting, that is, when planting in May 25. Total length of the root in this experiment variant was 1,5 – 3 times more compared to other grafting periods. In late periods of grafting root size and volume of plant reduced. Grafting from July 10 showed 1,3-1,6 times less root formation in the first order of nursery plant, length was 2,3-2,9 times less and rootstock volume 1,5-1,8 times less than the grafting of offshoot of May 25.

Cutting the time of vegetation of olive seedlings caused to decreasing total parameters of plant development. Plant height grafted in June 10 was 2,9 - 4,1 times less than the planted one in May 25, overall growth of offshoot was 4,5 times less relatively *(Tab. 2).*

Table 2: Influence of period of green quickset planting in substratum for development of overground part of olive plants. (an average in one plant), 2016-2017 years

Date of quickset planting	Plant height, cm	first order of offshoot		second order of offshoot		Total length of offshoot growth, cm	Anabolic surface, cm^2
		Quantity, pcs	length, cm	Quantity, pcs	length, cm		
Nevaldilo sort							
25.05	81,9	3,5	25,6	2,4	18,4	133,76	846,0
10.06	77,5	3,2	20,5	1,7	15,7	92,29	770,1
20.06	58,9	3,0	16,6	1,6	12,3	69,48	651,0
10.07	19,8	1,8	10,5	1,4	5,4	26,46	614,0
Gemlik sort							
25.05	77,8	3,4	20,5	2,3	16,1	106,73	745,2
10.06	75,3	3,2	16,8	1,8	15,1	80,94	733,2
20.06	58,0	3,1	12,0	0,8	12,0	46,8	663,4
10.07	26,5	2,0	10,5	0,5	10,5	16,25	557,8
LSD_{05cm}				25,5			

Earlier planting quickset in substratum order with total length increase stimulated development of anabolic surface of plant leaves 2,4-3,6 times in comparison with quickset planting of July 10.

4. Conclusions

Thus, from the results of the research we can conclude the following:

1) Optimal time for planting green quicksets of olive in substratum and for its rooting is the third decade of May, and optimal conditions for vegetation and development of nursery plants are provided in the first decade of June.
2) In the first decade of June planting Nevaldilo and Gemlik sorts olive quicksets in the artificial substrata enables to achieve standard seedlings within 5-6 months of vegetation.

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