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Short Communication

Effect of Different Sizes of Olive Cutting on Growth Capacity

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ABSTRACT

The experiment "Effect of Different Size of Olive Cutting on Rooting" was conducted at Dargai Malakand Agency in collaboration with Agriculture Extension Department of Khyber Pakhtunkhwa. Three different sizes (15, 20 and 25 cm) of olive variety Coratina cuttings were studied in randomized Complete Block Design replicated four times. All the three cuttings were statistically different from each other. Maximum number of shoots per plant (3.25), shoot length (4.50 cm), and number of roots per plant (2.00) were recorded in cutting size of 25 cm, while minimum number of shoots per plant (2.00), shoot length (2.75 cm), and number of roots per plant (1.00) were recorded in 15 cm cutting. Maximum root length (4.00 cm) and percent plant survival (60%) were recorded in 15 cm cutting, while minimum root length (3.00 cm) and percent plant survival (35%) were recorded in 25 cm cutting. Summing up 25 cm cutting was found effective on the studied parameters as compared to other sizes of olive cuttings.

Key words: Growth, Olive cuttings, rooting, cutting size.

1. Introduction

Olive (*Oleaeuropia L.*) belongs to family Oleaceae and order Scraphulariales. *Oleachrysophylla* has been reported as the ancestor of *Oleaeuropea*.Most of the Olive species can be successfully grown in tropical and subtropical environmental conditions. Olive varieties thrive well and the tree produces a good crop in the climate where there are chilling winters **[1]**. The olive, a symbol of prosperity and peace is a subtropical evergreen tree but requires chilling for fruiting like other deciduous fruit plants. The tree is relatively slow growing but very long lived, some specimens reportedly being over 1000 years old. It attains a height of 3 to 15 m or even more. The wood is resistant to decay and if top dies, a new trunk will often grow from the roots **[2]**. Most extensive cultivation of olive is done in countries like Spain, Italy, Greece Portugal and Tunisia. Arabs gave a wide publicity and planted olives in any suitable territory of the Mediterranean basin they captured because of its commercial and religious importance **[1]**. Cutting is simple and rapid method of propagation to maintain genetic uniformity and come into bearing earlier than those raised from seeds. The yield is uniform and stable in vegetative propagated plants. Olive can be propagated by hard wood or semi hard wood cuttings **[3]**. Olive trees are killed to the ground by temperature below about -11^{0}C. Most but not all cultivars require at least two months of chilling (daily) fluctuating temperature between 1.5 ^{0} C to 15.5 ^{0}C for the flowers to initiate in the buds. The trees bloom in mid spring, about eight weeks after the flower buds have been initiated **[4]**. Olive trees grow well on many different kind of soil, from rocky shallow hillsides to deep fertile valley soil, from acid to fairly alkaline soils. They tolerate considerable salinity and boron. They do not withstand a poor drained soil however quickly die if water stand around their roots for few weeks. To obtain satisfactory tree growth in production, moderate annual nitrogen fertilizer application is required together with irrigation through the summer. In some soils olive responded to potassium and boron fertilizer **[5]**. The olive tree is not tolerant to poorly aerated soil. Olive can grow and bear on poor, shallow or gravely soil somewhat better than for trees of most orchard species. An appreciable part of olive crop of the world is on soil good enough for other farming except grazing. It will produce larger crops. However on good, deep orchard soil if climatic conditions are favorable. The tree is also little more tolerant of salt in the soil than the trees of most other orchard species. This may be partly or entirely because of its tolerance of a low water supply. Olives needs well-drained soils with pH 7.0 to 8.0 **[5]**. Olive culture represents an important economic factor for countries where olive is cultivated, because it allows exploiting agricultural land not always suitable for other crops and because it facilitates the settlement of communities in new areas, thus contributing to the conservation and safeguard of environment. Olive being a hardy and generous tree can satisfy food requirements by supplying edible fruits and vegetable oil with a high biological value **[6]**. Khyber Pakhtunkhwa has been blessed with various climatic and soil factors, due to which all sort of tropical,

subtropical and temperate fruit trees can be grown here. Olive being a subtropical tree can be grown successfully in the subtropical mountainous regions of Khyber Pakhtunkhwa and Baluchistan [1]. The common nursery growers propagate olives from hard wood cutting of unknown size. So the percent survival of the cutting is below optimum level and therefore the growers face socio-economic problems in propagating olives. In order to educate the growers to get maximum profit, given different sizes cuttings were planted in sand, silt and FYM under the agro climatic conditions of Malakand.

2. Materials and Methods

The experiment on different size of olive cuttings for rooting was carried out at Dargai (Malakand Agency) Agriculture Extension Department of Khyber Pakhtunkhwa during April 2003.First a mixture of sand, silt and FYM @ 1:1:1 was filled in plastic bags and the cuttings were planted in them. The bags were placed in polyethylene shade house to arrest humidity and minimize evapo-transpiration. The bags were irrigated through moist irrigation system.

The experiment was laid out in RCB (Randomized Complete Block) design. There were three treatments and in each treatment 15 olive cuttings were planted and replicated 4 times. Data on number of shoots per plant of five randomly taken plants from each treatment in each replication was counted and mean was computed. For data on shoot length (cm) from each replication in each treatment select five plants randomly and measured with measuring tape from base to the tip of the plant and then average was calculated. Data on number of roots per plant of five randomly taken plants from each treatment in each replication as counted through a simple counting method and mean was computed. For data on root length (cm) from each replication in each treatment select five plants randomly and measured with measuring tape from base to the tip of the plant and then average was calculated.

Total plant survival at the end of experiment was counted and percent survival was computed by the following formula: ***Percent plant survival= Total plants survived/Total plants sprouted (100***). All the data noted on plant growth parameters was subjected to analysis of variance process to confirm

differences among various growing media, irrigation interval and their interactions. Least significant difference (LSD) test was used for mean differences where the results were significant. Computer statistical software MSTATC was applied for calculating both ANOVA and LSD [7].

3. Results and Discussions

3.1 Number of shoots per plant

Data on number of shoots per plant were statistically interpreted as an analysis of variance and placed in Table-1. The data revealed that there was significant difference among different size of olive cuttings. Maximum numbers of shoots (3.25) were obtained on 25 cm cutting while minimum numbers of shoots (2.00) were obtained on 15 cm cutting. This might be due to the fact that more area for shooting was there in 20cm length as compared to 15cm length, while in the remaining lengths the area were greater than 20cm, but those lengths could not maintain themselves because of the higher transpiration. This might also be due to the fact that maximum cutting size has greater number of buds and thus results in formation of maximum number if shoots. These results are lower in range fromShakir et al.,[8] who recorded up to 8.30 maximum number of shoots plant^{-1}.

3.2 Shoot length

Data regarding shoot length presented in Table-1 revealed that there was significant effect of cutting on shoot length. Maximum shoot length (4.50 cm) was obtained on 25 cm cutting while minimum shoot length (2.75 cm) was obtained on 15 cm cutting.This might be due to the fact that there was a competition among more shoots (as respond earlier) and have tried to capture more resources, hence got maximum shoot length. These results are at par with that in accordance with that of Ehsan et al., [9] who recorded highest shoot length 2.16cm for 20 cm cutting.

3.3 Number of roots per plant

The data collected on number of root per plant presented in Table-1 was processed for statistical analysis and non-significant difference was revealed among different size of cuttings. Maximum number of roots (2.00) was obtained on 25 cm cutting and minimum number of roots (1.00) was obtained on 15 cm cutting.This might be due to the fact that due to maximum number of shoots per plant in 25 cm cutting auxin which is responsible for root production was produced in higher concentration while it was less in 15 cm cutting [10].

3.4 Root length

The data collected on root length presented in table-1 was processed for statistical analysis and non-significant difference was revealed among different size of cuttings. The maximum root length (4.00 cm) and minimum root length (3.00 cm) was obtained on 15 cm and 25 cm cuttings respectively. Maximum root length might be due to fact that in 15 cm cutting there were less number of roots as compared to 25 cm cutting and thus the plant was in stress and to get more nutrients it elongates its roots. Root length grows downward and is very effective in absorbing moisture and nutrient for plant growth. The results

Table-1, Number of shoots per plant, shoot length, number of roots per plant, root length and percent plant survival as effected cutting size.

Cuttings	Number of shoot per plant	Shoot length	Number of Root per plant	Root length	Percent plant survival
T_1= 15 cm	2.00 b	2.75 b	1.00	4.00	60.00 a
T_2= 20 cm	2.50 ab	3.75 ab	1.25	3.75	55.00 a
T_3= 25 cm	3.25 a	4.50 a	2.00	3.00	35.00 b
Significance	*	*	*	*	*

*significance at α =0.

are in line with Shakir et al.,**[8]** who found maximum root length 7.01 in 15cm cutting length.

3.5 Percent plant survival

Data regarding percent plant survival is presented in Table-1. Statistical analysis of the data revealed that there was significant variation among different size of cutting. The maximum plant survival was 60% on 15 cm lengthy cutting, while the minimum plant survival was 35% on 25 cm cutting. This variation in the plant survival might be due to the fact that after the elongation of its roots it gets nutrient and water for its survival and also this length had contributed significantly better for most of the parameters like shoot length, number of shoot and root length. Similar results were reported by **[8]** who investigatedmaximum plant survival 36.29% in 15cm cutting length.

4. Conclusion

From the above experiment below conclusions are made:

- The 25 cm cutting gave maximum number of shoots per plant, shoot length and number of roots per plant.
- The maximum root length and survival percent was found best in 15 cm cutting.

Recommendations

From the present research study it is concluded that :

- For maximum number of shoots per plant, shoot length and roots per plant 25 cm cutting while for maximum root length and percent plant survival 15 cm cutting should be used. Overall we can say that 15-25 cm cutting is recommended for better growth.

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