Asian Journal of Plant Sciences

ISSN 1682-3974

science alert

ANSInet
an open access publisher
http://ansinet.com

Asian Journal of Plant Sciences 4 (5): 455-457, 2005
ISSN 1682-3974

A Study on Root Formation of Four Olive Varieties by Application of Hormone

Nalan Türkoglu and Mesut Durmus
Department of Horticulture, Faculty of Agriculture, University of Yüzüncü, Yil, 65080, Van,Turkey

Abstract: In this study four olive varieties were tried to root under mist condition in Mugla province. Olive cuttings were taken at three times; February, April and June, respectively. Four different solutions of Indole butyric acid (IBA) (0, 2500, 5000 and 10000 ppm) were used as root formation hormones. Half of the cuttings were scratched at their bottom and then planted, the other half were directly planted. Then root formation and development were observed. The best performance according to root number, root length, leaf number and shoot length was obtained from the varieties, Gemlik and Manzanilla while the worst performance was obtained from the variety Domat. It was concluded that hormone application increases the rooting. This increase was especially significant in higher concentrations. Scratched cuttings at bottom and cuttings taken on February and April were rooted best.

Key words: Olive, cuttings, IBA, rooting

INTRODUCTION

The olive was a native to Asia Minor and spread from Iran, Syria, Turkey and Palestine to the rest of the Mediterranen basin 6000 years ago. It is among the oldest known cultivated trees in the world. Olive can be propagated by rooting leafy cuttings under mist[1]. Many factors that effect root initiation and development have been discovered resulting in the development have been discovered resulting in the development of treatments to promote rooting of difficult-to root olive cultivars. Poor rooting limits the commercial production of potentially important olive cv. Domat conducted various trials on olive propagation and reported that two node cutting from mist propagation taken in spring and autumn responded well to a 2500 ppm IBA dip especially in the spring for two successive years[2]. The cutting taken in March had given better rooting than the cuttings taken in September or December. Better rooting of 70% was produced by IBA at 3000 ppm in September or December. Nagash[3] reported rooting success of olive cutting treated with 20 or 40 mg IBA cutting was 75 and 90% differences in rooting success, speed of rooting and root numbers between the control and the IBA treatments were significant. Low concentration of IBA significantly increased the root length and higher concentration more number of root cuttings were produced.

In olive keeping, not using modern methods, renewing old trees making the necessary keeping in normal standards cause a respective fall in the amount and the quality of the product. In olive fields with old trees, supplication of young trees should be made. The recent studies show that, in order to supply desired amount of young trees, taking out is the best method. The purpose of this study was to determine the factors effecting the growing of the roots of suckers, trying to find out the suitable conditions to produce young trees easily and quickly.

MATERIALS AND METHODS

This study was carried out for 2001-2002 years in Muğla. Domat type of olive used in this study originates from Akhisar district of Manisa and is a standard olive type. This place hold the 1.4% of the existing trees in Turkey. This type is good in giving early and systematic fruit and is waterable in entansive olive production. Gemlik type, originates from Gemlik district of Kocaeli, is a standart type. Manzanilla type is also a standard type belonging to Cordoba in Spain[4]. But Hamza Celebi is not a standard type originates from Nizip district of Gaziantep.

In the cuttings of IBA (Indole Butiric Acid) is used as rooting hormone in 0, 2500, 5000 and 10000 ppm concentrations as a solutions. The cuttings are taken out in three different times like 10th of February, 7th of April and 16th of June. The hardwood cuttings are taken out from the lower and middle bases of the suckers 4 to 6 leaf, 15 to 18 cm in length and 4 to 8 mm in diameter. In the study, before planting the cuttings are plunged into

Corresponding Author: Nalan Türkoglu, Department of Horticulture, Faculty of Agriculture, University of Yüzüncü, Yil, 65080, Van,Turkey

hormone solution in their lower 1.5 cm parts for 5 sec and than planted 6 to 7 cm deep in the earth. This study was designed for incidental depended trying and functional design.

RESULTS AND DISCUSSION

Duncan in this study on opposite types in root sizes found that there is no difference between Gemlik, Manzanilla and Hamza Celebi types where for every type, 360 Gemlik type is used and in the end it is seen that in Domat type 6, in Hamza Celebi 6, in Manzanilla 56 and in Gemlik there are 117 cuttings developing roots (Table 1).

In the cuttings taken 28% of the ones at 13th February, 46.9% of ones in 7th of April of the ones in 16th of June, development in the ones taken in April are found to be the best (Table 2).

It is found out that hormone application is a stimulating factor in putting out roots and the best rooting is found to be made at 10000 ppm dose of hormone at 28.3% (Table 3).

In the comparison to define the effects of hormone doses on root length, it is found out that, there is no difference between 10000 and 5000 ppm hormone doses in terms of root length where a relatively big difference between 2500 and control (0) dose is seen in this respect (Table 4).

It is found out that, Gemlik type with Manzanilla and Hamza Celebi types produces roots easily and quickly where Domat type has difficulty doing this. The root lengths of the types are found to have parallelism with their root amounts. As the amount and the length of the types are taken into consideration, it is found that, the best root developing type is Gemlik, second and third are Manzanilla and Hamza Celebi and the least is Domat type. Besides, the study of Canözer[4] shows that Gemlik and Manzanilla types put out root every season and give good solutions.

Contrary to this, Domat type cuttings are found to have problem in putting out root in every season and not having good solutions. Besides, in the studies held by Shoboul and Mendilcioğlu[5], Epstein and Wiesman[6] and Çelik and Özkaya[7], it is found that Gemlik and Manzanilla types put out root easily where Domat type can't put out root easily.

It is detected that the roots keep growing when the amount of hormone given increases and they stay short when it is no more used.

Table 1: Comparison of types on developing root numbers

Cultivars	Observation frequency	Average
Domat	16	0.58724[a]
Gemlik	117	0.85557[b]
Manzanilla	56	0.85468[b]
Hamza Celebi	54	0.82579[b]

There is 0.5%difference between the averages shown with different letter

Table 2: Comparison of the cutting raking time for root amounts

Cuttings Taking time	Observation frequency	Rooting average	Average
10th February	135	28.1	0.85083[a]
7th April	225	46.9	0.83395[b]
16th June	23	48	0.74065[b]

There is 0.5% difference between the averages shown with different letter

Table 3: Comparison of hormone doses for root amount

Hormone dose (ppm)	Observation frequency	Average of rooting	Average
0	16	4.40	0.69101[a]
2500	69	19.20	0.81608[b]
5000	96	26.70	0.83657[b]
10000	102	28.30	0.86729[b]

There is 0.5% difference between the averages shown with different letter

Table 4: Comparison of hormone doses amount for root lengths

Hormone dose (ppm)	Observation frequency	Average
0	360	0.08583[a]
2500	360	0.45056[b]
5000	360	0.69306[c]
10000	360	0.78333[c]

There is 0.5% difference between the averages shown with different letter

Table 5: Comparison of the length of suckers for types

Types	Observation frequency	Average
Domat	360	0.01778[a]
Gemlik	360	0.47000[b]
Manzanilla	360	0.42639[b]
Hamza Celebi	360	0.14111[c]

There is 0.5% difference between the averages shown with different letter

In the cuttings taken out both in 7th of April and 10th of February are found to have good root amounts and lengths where the ones taken out at early summer, according to Loreti[1], 12 types out of 28 January, February, March, April, May and October are the times to have a good rooting, the cuttings taken out in the time of vegetative growing are the best, Gini[8] reported that the best rooting took place in the young trees taken out in spring. Shoboul[5] shows the cuttings taken out in autumn rather than spring have the best rooting. Pudluzhni[9] shown the best time to take cutting is October, Natividade and Coelhe[10], Canözer and Özkülahçi[11] reported the ones taken in the spring are the best, Aydinli[12] studied between the beginning of February through the mids of April and from the end of July, to the beginning of

September. In these studies the cuttings taken out at 10th of February and 7th of April have bigger percentage of rooting. In the cuttings taken out in the times of good amount and number of root, the length of suckers are found to have increased gradually.

Results showed that sucker length of Gemlik and Manzanilla is found where there is a respective difference between Domat and Hamza Celebi types is seen. The best sucker development is made in Gemlik type with the average of 0.47000 and the worst in Domat type with the average of 0.01778 (Table 5).

Cutting the lower parts of young trees is found to have stimulating the development of the length of root and sucker. This is proved with the study by Kaşka and Yilmaz[13].

In this study about the factors effecting the putting out roots in young trees, it is found out that, Gemlik and Manzanilla types produce roots easily and develop well, Hamza Celebi type put out root easily but not like those of Gemlik and Manzanilla types, Domat type produce roots difficultly. Also, it is found out that, hormone usage increases the rooting, as hormone intake increases, the percentage in growth in roots increases, the cuttings taken out at 10 th of February and 7th of April has a big percentage of producing roots.

REFERENCES

1. Loreti, F. 1962. Indagini sull imprego di sostanze rizogene thelle propagazione dell olive Per talea conia tecnica della frutticultura. Anno., 24: 638-645.
2. Rahman, N., A.A. Awan, G. Nabi and A. Zaffer, 2002. Root initiation in hardwood cuttings of olive cultivar. Coratina using different concentration of IBA. Asian J. Plant Sci., 1: 563-564.
3. Nagash, L., 2003. Vegetative propagation of the threatened African wild olive. New Forests 4286, 26: 137-146.
4. Canözer, O., 1991. Standart olive cultivars catalog. Agricultural Production and Development Manager, Publication Department Presidency, Ankara.
5. Shoboul, A. and K. Mendilcioglu, 1985. Propagation of the olive's seed and cuttings. Ege. Univ. Agric. Fac., pp: 49-60.
6. Epstein, E. and Z. Wiesman, 1987. Metabolism and transport of Indole 3. Butyric acid in cuttings of olive. Heart. Abst., 51: 753.
7. Celik, M. and M.T. Ozkaya, 1999. Easy and hardly rootings olive cultivars anatomic structure. III: National Hortic. Congress, Turkey, Ankara, pp: 663.
8. Gini, G., 1981.Variation in the rooting potential during the annual cycle of development in the olive. Heart Abst., 51: 753.
9. Pudluzhni, D.F., 1940. Propagation of the olive tree by cuttings. Soviet tropics. Russian, pp: 41.
10. Natividade, J.V. and J.M.N.S. Coelhe, 1946. Vegetative propagation of the olive. Argon. Lusit., pp: 123.
11. Canözer, O. and E. Ozküllahci, 1992. Determined of the rooting hormone concentration. I: National Hortic. Cong. Ege. Univ. Agric. Fac., pp: 169.
12. Aydinli, N., 1995. Quince,morus and olive cuttings rooting under low tunnel and uncovered land. Master Thesis, Uludag Univ. Agric. Fac. Bursa, pp: 14-17.
13. Kaska, N. and M. Yilmaz, 1974. Horticultural growing techniques. Cukurova Univ. Agric. Fac. Pub. 79, Adana, pp: 259-304.