

ROOTING IN THE SEMIHARDWOOD CUTTINGS OF OLIVE (*OLEA EUROPEA L.*) THROUGH THE USE OF EXOGENOUS HORMONES

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Abstract. Investigations were carried out at research garden of the Pakistan Council of Scientific and Industrial Research, Laboratories, Peshawar, during 1974, to find out the best root promoting hormones for root initiation and economic propagation of olive, *Olea europea L.* cultivar *Leceino* cuttings. Three growth regulators namely, Indole 3-acetic acid, Indole 3-butyric acid and 1-Naphthalene acetic acid each with 3000, 6000 and 9000 PPM in 50% alcohol were used as "Quick Dip" method on the semihardwood cuttings of the afore-said species. Better rootings (22.25%) were produced with Indole 3-butyric acid at 6000 PPM as compared to I.A.A. and NAA. The non-treated cuttings totally failed to produce any roots. The number and length of roots per cutting were greater with 9000 PPM of Indole butyric acid. In general the effect of 1-Naphthalene acetic acid was found comparatively inferior to Indole 3-acetic acid and Indole 3-butyric acid.

Introduction. Wild olive (*Olea cuspidata*) locally called "Kau" growing in Pakistan extensively, is of no commercial importance. The wide geographical distribution of wild olive thus clearly permits the plantation of European olive to our environmental condition. European olives produce high yield of fruit per tree, having bigger fruit, rich in oil. The oil has a medicinal value and is also used as cooking oil. The species produces valuable wood as well. The Govt. of Pakistan is making efforts to establish large scale plantation of European olives in the provinces to meet the acute shortage of edible oil and fat in the country.

Studies carried out in the past have shown that "growth regulators" perform various physiological activities in plant species. Several synthetic hormones are now being used in the initiation of rooting in the cuttings of various fruit species, these are Naphthalene acetic acid, Indole butyric acid, phenyle acetic acid, Indole acetic acid, Sucrose, Sulphur, Potassium per manganate etc.

Propagation of olive from seed is difficult (4), while no special method was developed in this region to multiply the species vegetatively. Keeping in view the economic nature of the species, a research project was started at the research garden of P.C.S.I.R., Laboratories, Peshawar, to find out the best root promoting hormones for root initiation and accelerating nursery operations for the above species.

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Review of Literature. Chandler (1) reported better rooting in the cuttings of olive after using IBA at 4000 PPM in 50% alcohol. Khan and Khan (4) reported the work of Blommaert and Hortman. They reported high success of rooting after applying IBA at 4000 PPM in 50% alcohol by dipping their basal ends for a second in this mixture; Khan (2) according to Condit and Kinman also observed fair rooting with IBA at 4000 PPM in 50% alcohol. Khan and Khalidy (3) treated soft wood cuttings of olive variety (Shatwai) with IBA at 3000 PPM and obtained good results. Tombesi (7) carried out experiment with IBA+NAA on the cuttings of olive varieties Dolce and Agogia. He observed that IBA+NAA at 2000 PPM gave better results and increased root length. Konarli (5) obtained 20-30 per cent success in cultivar Trilye and 32.5 to 45 per cent in cultivar Izmir Sofralik after treatment with IBA at 3000 to 4000 PPM respectively. It was also observed that 6000 PPM of IBA increased number of roots per cutting. Porlingis and Therios (6) found that IBA did not effect rootings in juvenile cuttings of olive but effected rootings in adult cuttings with IBA at 4000 PPM. It was also observed that IBA increased the number of roots per cutting.

Materials and Methods. The experiment was laid out at the research garden of P.C.S.I.R., Laboratories, Peshawar during 1974. Nine to twelve inches long semihardwood cuttings of olive cultivar Leccino having 2-3 leaves each were collected from the Agricultural Research Institute, Tarnab, Peshawar, during the end of February, 1974. Growth promoting regulators namely, Indole 3-acetic acid, Indole 3-butyric acid and 1-Naphthalene acetic acid each with 3000, 6000 and 9000 PPM in 50% alcohol were used on these cuttings. After treatment the cuttings were planted in flat beds containing a mixture of canal silt and garden soil to which 2 pounds of urea and one pound of super phosphate were added. The cuttings were planted 4-5 in. deep in slanting position at a distance of 10 in. both ways. The cuttings were shaded from 15th of March till the completion of the experiment. The experiment was laid out in the complete randomized block design with four replications.

The characters like rooting of cuttings, number and length of roots per cutting were studied. For study of root growth the plants were dug out after 75 days from the date of planting (4). A trench was made 5 inches from the sprouted cuttings. The root system was then exposed by washing the soil with spraying machine. Every precaution was taken to dig out the plant with their roots intact.

Results and Discussion. The results in case of rooting of cuttings, number and length of roots per cutting were obtained, which are as under:

1: *Rooting of cuttings.* Data given in the following Table reveal that Indole 3-butyric acid at 6000 PPM resulted maximum root initiation followed by Indole 3-butyric acid at 3000 PPM. The results are significant at 5% level. The observations are in agreement with the findings of Chandler (1), Khan (2), Khan and Khalidy (3), Khan and Khan (4), Konarli (5), Porlingis and Therios (6), and Tombesi (7).

Table

Showing effect of growth promoting substances on rooting of cuttings and number and length of roots per cutting.

Treatments	Average percent of rooting	No. of roots per cutting	Root length per cutting (Cms)
Control.	--	--	--
IAA 3000 PPM	5.00	1.25	0.33
IAA 6000 PPM	7.25	5.00	1.23
IAA 9000 PPM	10.00	4.00	0.93
IBA 3000 PPM	12.25	4.25	1.72
IBA 6000 PPM	22.25*	7.00	2.32
IBA 9000 PPM	7.25	11.12	3.80
NAA 3000 PPM	2.50	1.50	0.46
NAA 6000 PPM	5.00	1.75	0.34
NAA 9000 PPM	--	--	--

*Significant at 5% level L.S.D: 5%: 10.58

2. *Number and length of roots per cutting.* Data in the above Table show that Indole 3-butyric acid at 9000 PPM and Indole 3-butyric acid at 6000 PPM increased the number of roots and length of roots per cutting. Similar results have been reported by Konarli (5), Porlingis and Therios (6) and Tombesi (7).

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