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Root Initiation in Hard Wood Cuttings of Olive Cultivar Coratina Using Different Concentration of IBA

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Abstract: In the trials hard wood cutting of olive variety coratina were treated with different concentrations of indole butyric acid (IBA) i.e., 0, 1000, 2000 and 3000 ppm. Maximum root number 8.0, root length 7.2 cm, rooting percentage (80 %), survivals percentage 60 % and shoot length 15 cm was obtained in cuttings treated with 3000 ppm of IBA and minimum root number 4.00, root length 4.2 cm, rooting percentage (50), survivals percentage 60 and shoot length 12.50 cm was recorded in control treatment.

Key words: Olive cuttings, IBA, concentration, coratina

Introduction

The olive is locally called "Zatton". Wild olive (*Olea cuspidata*) locally called "Kau" is of no commercial importance except as fodder. The common olive (*Olea europaea*) of family Oleaceae very widely grown since ancient times in area of the Mediterranean climate for its edible fruits in the oil expressed from them (Giiani, 1968).

Briccoli (1989) 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 (nearly 80 %) in the second experiment various concentrations of IBA and or NAA were used. Combining the auxin was not advantageous. NAA was similarly effective at 1000, 2000 and 4000 ppm, but was more effective in spring than autumn. Ibrahim *et al.* (1991) treated hard wood cutting of Ascolano and Frantoio with IAA, IBA and NAA at either 500 or 1000 ppm concentrations, which resulted into better rooting in olive. The cuttings taken in March had given better rooting than the cuttings taken in September or December. Khattak *et al.* (1981) reported 22.55 % rooting in the semihard wood cuttings of olive cultivar leccino when treated with IBA at 6000 ppm, the number and length of roots/cutting was increased with 9000 ppm of this hormone. Khattak *et al.* (1991) propagated olive cv. Leccino from hardwood cuttings by the use of IBA and IAA each with 1500, 3000 and 6000 ppm for 5 sec. duration as quick dip. Better rooting of 70 % was produced by IBA at 3000 ppm. Low concentration of IBA significantly increased the root length and at higher concentration more number of root/cuttings were produced. Lasareishvili and Zanaishvili *et al.* (1991), reported that softwood olive cuttings in July, shoots 20-25 cm long taken from mother trees were cut in half, each cutting having 1-2 leaf pairs. The apical and basal cuttings, treated with IBA at 0.005 % for hours were rooted under mist. They started callusing 18-20 and 24-26 days, respectively, after insertion and formed roots 40-45 and 48-52 days respectively after insertion.

Materials and Methods

The experiment was conducted at Agricultural Research Institute, Tarnab, Peshawar during the year 2000. In the experiment, effect of different concentration of IBA on root initiation and development of hard woodcutting was studied. Four different concentrations i.e., 0, 1000, 2000 and 3000 ppm of IBA were

used. For preparation of cuttings and its plantation in plastic bags, first hardwood cuttings of *olea europaea* were obtained. These cuttings were made in uniform size of 5-6 inches with at least two leaf per cutting. In preparation of cutting first cut was given at the lower and just below the bud in order to accelerate the healing of the wound at the upper end. These cuttings were then buried in horizontal position in the sand in the month of May. The cuttings were placed in shady place and a gunny bag was placed over the sand, which were kept in moist condition. After three month the cutting were taken out from the sand in the month of July and data were recorded on number of root, root length and percent rooting.

Then these cutting were planted in the plastic tube and data were recorded on shoot length and percent plant survivals. Before plantation, the lower end of the plastic bag was punched with a punching machine. These hole in the bags will not only improve the drainage but will also improve aeration and microbial activity. After planting of cutting in bags, these tubes were covered with plastic sheet under partial shade condition. The experiment was laid at randomized complete block design with four replications. Ten cuttings per treatment were used.

Results and Discussion

Maximum number of roots per cutting was recorded when cutting were treated with 3000 ppm IBA concentration, while minimum number of roots were noted in control treatment (Table 1). The maximum number of roots in IBA treated cutting may be due to its effect on cell wall turgidity, which accelerates cell division. This results confirms the findings of Troncoso *et al.* (1972), who observed that IBA at 3000 to 3500 ppm was most suitable for rooting in olive cutting. Root length shows that maximum root length was recorded at 3000 ppm of IBA concentration followed closely by cutting dipped in 2000 ppm of IBA, while minimum root length was recorded in cutting of control treatment (Table 1). It is in agreement of Khattak *et al.* (1981), who reported that root length growth was increased with increase of hormone doses. In case of shoot length per cutting (Table 1). Maximum shoot length was recorded in cuttings of olive plant treated with 3000 ppm concentration of IBA, while minimum shoot length was recorded in cutting dipped in distilled water (control treatments). The maximum shoot length in cutting treated with 3000 ppm of IBA may be due to large number of root in IBA

Table 1: Effect of different concentration of IBA on number of root, root length shoot length, percent rooting and plant percent survivals

IBA conc. (ppm)	Root no.	Root length	Rooting (% age)	Plant survival (% age)	Shoot length
0	4.00c	4.2b	50a	40	12.5c
1000	5.00c	6.5a	60ab	45	15.0b
2000	7.00b	7.0a	70bc	57	15.8ab
3000	8.00a	7.2a	80c	59	16.0a

Coefficient of variation for shoot length, no. of roots, root length and survivals percentage 0.844, 1.808, 9.58 and 20 respectively
Means with same letter do not differ significantly at $P > 0.05$ IBA: Indole butyric acid

treated cutting, which absorbed more nutrients and ultimately it may produce more growth as compared to roots in cuttings of control treatments. Maximum rooting percentage was obtained in cutting dipped in 3000 ppm of IBA concentration and minimum value for rooting percentage was noted when the cutting were dipped in control treatments, the similar result was also reported by Khattak *et al.* (1991), who reported that better rooting (70%) in olive hardwood cutting were produced by IBA at 3000 ppm. Data (Table 1) regarding percent plant survival shows that maximum percent plant survivals were obtained in cutting treated with 3000 ppm of IBA and minimum plant survivals were obtained in control treatment, these finding are in conformity with that of Gautam and Chauhan (1991), achieved the greatest field survivals of 65 % with concentration of IBA.

Generally, indole butyric acid at 3000 ppm concentration produced more root number, shoot length, rooting percentage, survivals percentage and shoot length as compared to control and other lower concentration.

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