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Effect of IBA concentration on the production of coratina olive plant

Ayesha Ameen[1*], Jalil Ahmad[2] and Shahid Raza[2]

[1]*Lahore Garrison University, Lahore Palistan*
[2]*University of Agriculture Faisalabad, Pakistan*

QR Code

***Correspondence Info:**
Ms. Ayesha Ameen
Department of Biological Sciences,
University of South Asia, Lahore

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Abstract

The effect of different concentrations of indole butyric acid (IBA) at 4g/L and 0.12/31.2 ml hardwood and semi hardwood cuttings of coratina olive was observed. Cuttings were taken in the month of February from coratina plant and dipped for 10 seconds in the required IBA solutions. The highest survival percentage, shoot formation, number of roots formation was maximum in 4g/L treated hardwood cuttings. The maximum numbers of branches were observed in hardwood cuttings as compared to softwood cuttings. It was concluded that either type of olive cutting treated with IBA solution 4g/L showed best results to propagate coratina olive.

Keywords: coratina olive, IBA, Cuttings.

1. Introduction

The olive tree *olea europea* is valuable for its beauty and fruit. *olea europea* is locally known as zaitoon, it belongs to a family of oleaceae. The olive can be consumed as fruit and it has a high nutritional and medicinal value. 20-30 percent of the fresh weight of olive fruit contains oil [1]. Olive has been a part of Mediterranean civilization in 3000 B.C. hundreds of olive cultivars have been selected over the centuries for adaptation to various climates and soil types. Some cultivars are best for oil production. The major cultivars used for oil production include, cornicabra, empeltre, arbequina and lechin [2]. Oleic acid is present in the oil and increases its nutrition by its therapeutic effect [3]. The seeds can be used to grow olive with higher rate of germination. These processes are slow and take some time to become a mature plant. Scientist suggested that other methods of propagation should be tried to get mature olive fruit early. Olive trees can survive under unfavourable conditions but not necessarily being productive. The olive plant used biennial bearing phenomena [4].

The rapid way of propagation is cutting using hardwood and semi hardwood. The olive plants synthesize three main auxin hormones for root initiation. The main endogenous hormones are IBA and IAA. These growth regulators induce initiation and development. The role of IAA and IBA in primary root initiation is well understood but their role in lateral rooting is still needs an area of research. The lateral rooting in olive is induced by IBA. The present study is therefore, planned to evaluate the performance of different types of olive cuttings treated with different concentrations of Indole Butyric Acid (IBA) [1].

Auxins are growth promoters in plants. They are naturally present, are being synthesized now a days. In commercial olive propagation IAA is not used as rooting promoter. The synthetic growth regulator IBA used for olive growth. IBA is non-toxic to the hardwood and semi hardwood cuttings. It is very essential to initiate the root in plant species [5].

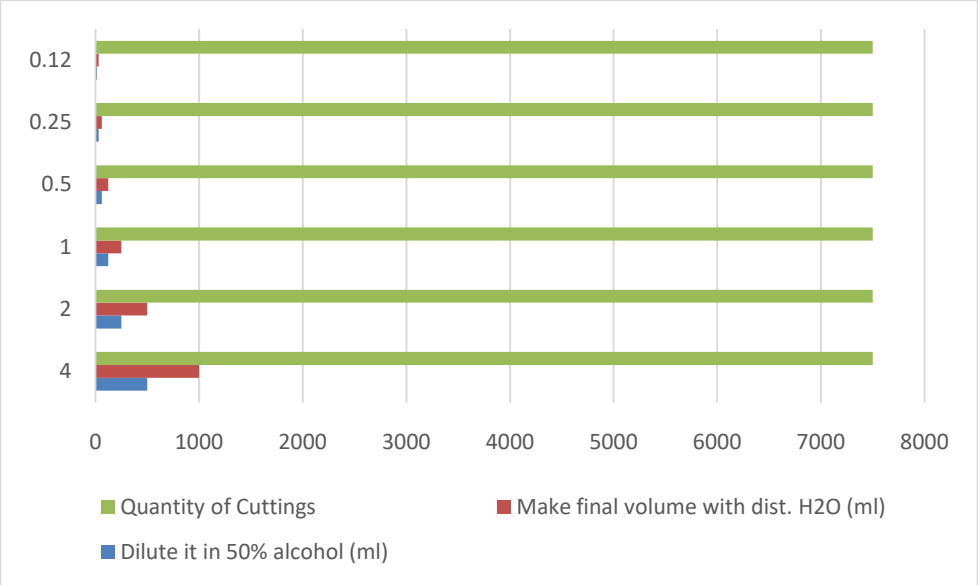
2. Methodology

The experiments were conducted at Manga Mandi Lahore Pakistan. A randomized complete block design was used with two replications. Hardwood and semi hardwood cuttings were done from coratina cultivar of olive. These cuttings were treated with six different IBA concentration (Table 1).

Table 1: Preparation of IBA solution for olive cuttings

IBA required (g)	Dilute it in 50% alcohol (ml)	Make final volume with dist. H_2O (ml)	Quantity of Cuttings
4	500	1000	7500
2	250	500	7500
1	125	250	7500
0.5	62.5	125	7500
0.25	31.2	62.5	7500
0.12	15.6	31.2	7500

Figure 1: Concentration of IBA



The experiments were conducted in february. Different quantity of uniform cuttings (4-6 inches) were used for each treatment (Table 1). The temperature at the time of plantation was 15 degree celcius and humidity was 70%. The Bhal media was used for plantation of coratina with adjusted pH of 5.5- 6.5. the data was recorded for plant survival percentage, number of shoots and roots [1].

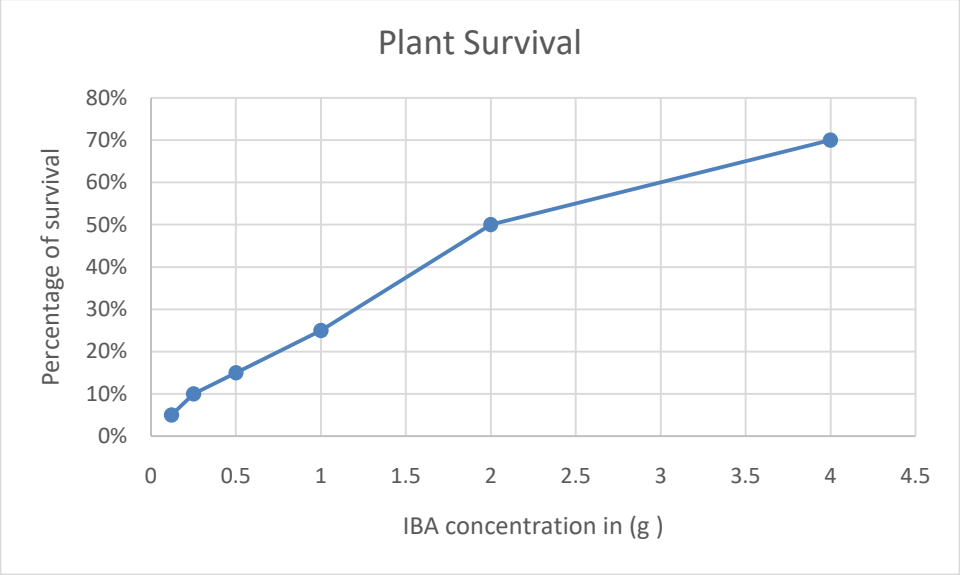
3. Results and Discussion

There was significant effect of IBA concentration on the percentage of plant survival. The effect of cutting type and IBA concentration interaction was not significantly differ. Highest plant surviaval rate of coratina was observed 70% with IBA concentration used 4g/ L as shown in Figure 2.

Table 2: Percentage of surviuval with different IBA treatments

IBA required (g)	Volume	Plant Survival
4	1000	70%
2	500	50%
1	250	25%
0.5	125	15%
0.3	62.5	10%
0.1	31.2	5%

Figure 2: Percentage of surviuval with different IBA treatments

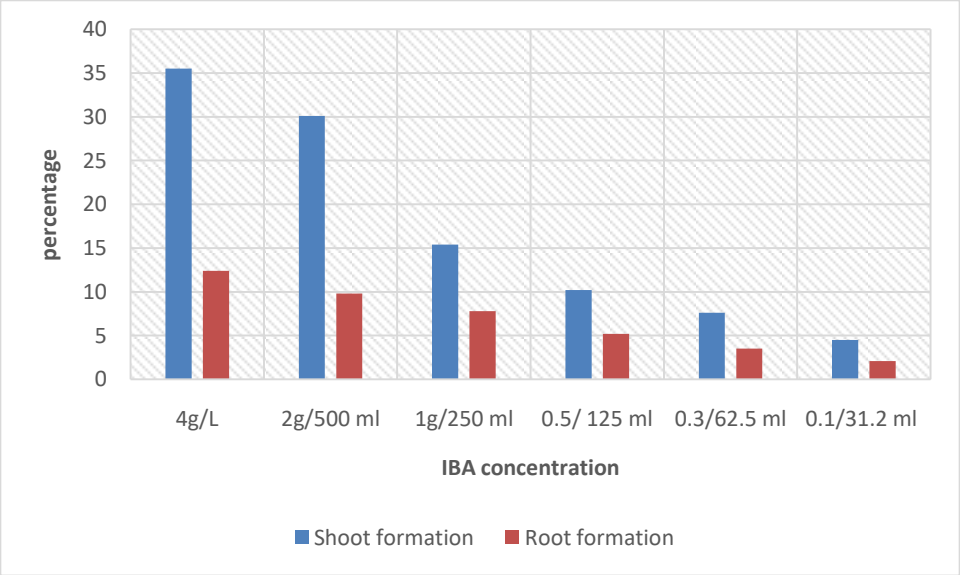


The minimum number of plant survived was observed in IBA treatment 0.12/ 31.2 ml. these results are with the findings of siddique and hussain 2007[6], the plant survival with hight IBA concentration can link directly to the growth regulators capacity. This capaciy generate the adventitious roots. These roots are of great importance because they obsorb nutrients from soil and these nutrients are helpful in plant survival. The shoots were observed almost same in all treatments with IBA, siddique and hussain 2007[6] reported that the reason of non significant shoots in all treatments is the same cutting length. The variation in root development was observed in all IBA treatments. The maximum roots were shown by treatments with high IBA concentration and minimum were observed in the least Treated IBA concentration. Aini et al[8] (2009), reported that the induction of adventitious roots can be observed in high IBA concentration treatments. The cambial activities in root induction can be increased by using high IBA concentration [7].

Table 3: Comparison of shoot and root formation treated with different IBA conecentration

Treatments	Shoot formation	Root formation
4g/L	35.5	12.4
2g/500 ml	30.1	9.8
1g/250 ml	15.4	7.8
0.5/ 125 ml	10.2	5.2
0.3/62.5 ml	7.6	3.5
0.1/31.2 ml	4.5	2.1

Figure 3: Comparison of shoot and root with different IBA concentration

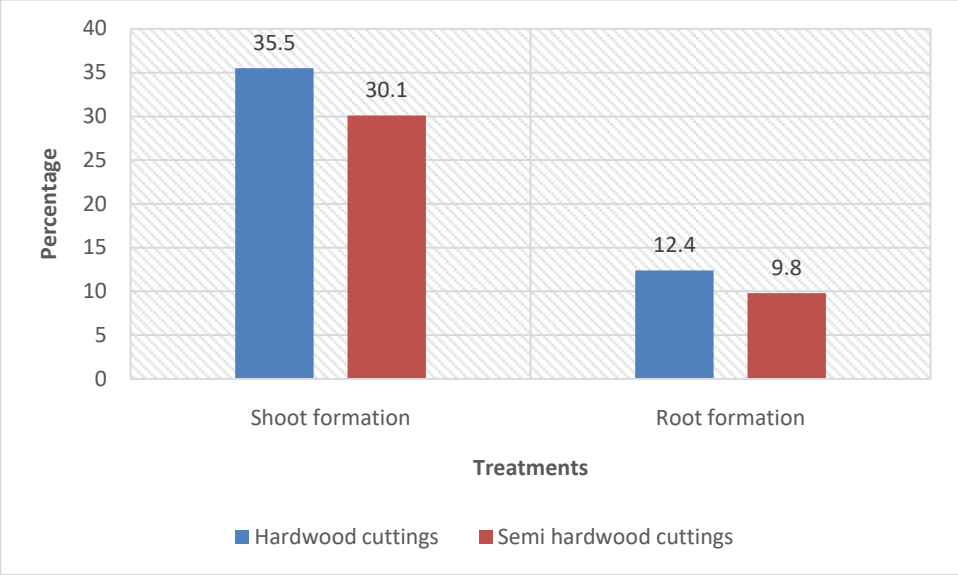


The shoot formation (leaves and branches) were observed in treatment cutting with hardwood and least was observed in semi hardwood treatments (Figure 4).

Table 4: Comparison of shoot and root formation in hard wood and semi hard wood cuttings

Treatments	Shoot formation	Root formation
Hardwood cuttings	35.5	12.4
Semi hardwood cuttings	30.1	9.8
Significance	**NS**	**NS**

Figure 4: Comparison of shoot and root formation in hard wood and semi hard wood cuttings



4. Conclusion

It was concluded from this study that the IBA concentration to promote plant growth in Olive cultivar coratina must be 4g/L used for minimum 7500 cuttings. It increased the survival rate of the plant and maximum adventitious root initiation. The maximum shoot formation was observed in hardwood cutting and minimum was observed in semi hard wood cuttings.

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