ORIGINAL ARTICLES

Cutting Propagation Possibilities of Natural Cherry Laurel (Prunus laurocerasus L.) of Turkey

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ABSTRACT

Cherry Laurel (Prunus laurocerasus L.) is a species in the genus Prunus, native to the regions bordering the Black Sea in Southwestern Asia and Southeastern Europe, from Albania and Bulgaria east through Turkey to the Caucasus Mountains and northern Iran. It is widely spread out in the North-East part of Turkey and there are many cultivars. This species has an important and economical value for medicinal and pharmacy industry. Determining suitable conditions for cutting propagation is too important for economical propagation. In this study propagation of cherry laurel with cutting was investigated. The cuttings were treated with 2, 4, 6 and 8 g/l of Indole-3-butryric acid (IBA). Rooting stage was completed in the greenhouse under mist propagation unit. The results were evaluated after 60 days. All the data were evaluated using the analysis of variance (ANOVA) and the groups that showed variance were then subjected to the Duncan test with a significance value p<0.05. The rooting rate (%), average root number (roots/plant), average root length (cm), fresh and dried root weight (g) was determined. The rooting rate (87.50%) was the highest in 2 g/l IBA but difference is not important statistically. The average root number (54.99 roots/plant) was taken from 2 g/l IBA again and it was important statistically. Number of root was decreased with the increasing doses. The longest roots (1.35 cm) occurred with 2 g/l IBA dose and the root development was better without any callus. The root development was good again for 4000 ppm IBA secondly and this dose was gave more branches and leaves at rooting stages. In the higher doses of IBA, roots became breakable and callus rate was higher. Roots were shortened with higher doses. These roots were demaged while tranfering to soil. All IBA doses increased the rooting traits compared with control. There was no difference for fresh weight of roots in different doses. It was changeable. For dry weight, difference was important by statistically, so that 2 and 4 g/l IBA gave the highest value.

Key words: (Prunus laurocerasus L., ex vitro culture, Indol-3-butyric acid)

Introduction

Prunus laurocerasus L. is an evergreen shrub and is highly characteristic of the Black Sea Region, especially in North and South Anatolia (Kolayh et al. 2003). Historically, the species was first described by a French researcher, P. Belan in 1546 in Northeast of Turkey and was subsequently brought Europe (Ercişi, 2004).

This space has an important and economical value for health and pharmacy. Leaves, stones and fruits are used part of Prunus laurocerasus. It is a good diet fruit that gives fullness. When it is eaten with stones, has a fall down effect for kidney stones. Powder of stones is very good for bronchitis. It supplies blood acid-base balance. The body bones become stronger with it. The fruit has antioxidant effect. Lauracerin was supplied from fruits.

Prunus laurocerasus is very decorative and preferable tree. Trees have a strong root system and should be grown in different soil type. It has been widely planted as an ornamental plant in temperate regions and

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has become naturalized widely in some areas. Most forms are tough shrubs that can cope with difficult growing conditions, such as shadow and dry places and respond well to pruning. Normally people grow it like a border trees, there is not closed orchards and as a result of insufficient cultural treatments, productivity is very low.

This species became more popular in recent years. Pomological traits, physiological properties (Nardini, 2002), chemical composition of fruits and leaves (Santamaur, 1998; Jetter and Schaeffler, 2001; Kolaylı et al., 2003), medicinal effects (Pieroni, 2000) were investigated.

The leaves are dark green, leathery shiny, 5-15 cm long, and 4-10 cm broad. The flower buds appear in early spring and open in early summer. The flower types are different from other prunus. It gives flowers in bunch, racemes types of 30-40 flowers, each flower 1 cm diameter, with five creamy-white petals and yellowish stamens. The fruit is very small cherry in 1-2 cm diameter, turning red to black when ripe. Some types ripen in August but some types are become edible ripening stage in early or middle autumn. Before maturity fruits are astringent, but become sweet and reasonably pleasant when fully ripe. Stem and branches are very strong and durable to cold weather but flowers open in the early spring and should be effect from spring frost.

Leaves, stones and fruits are used part of cherry laurel. It is a good diet fruit. The fresh leaves are antispasmodic, narcotic and sedative. Powder of stones is very good for bronchitis too. The fruit has antioxidant effect. Lauracerasin was extracted from fruits. It has very common use traditionally in north part of Turkey as a fruit.

Researches have just started for selection of high productive cultivars of Prunus laurocerasus. After that stage, economical propagation methods and suitable growing conditions need to be determined for selected cultivars. Prunus laurocerasus generally produce by seeds (Simancik, 1970; Kamenicka and Rypak, 1981), but genetically deformations occur on these trees so it is not prefer. It is an important plant which is used for cure of many diseases so far not much data are available for ex vitro culture. The aim of the present investigation was to determine cutting rooting capacity of Prunus laurocerasus with different IBA (Indol-3-butyric acid) doses.

Materials and Methods

Plant material and cutting preparation

One-year-old cherry laurel shoots (50-70 cm in length) were collected in March (year 2007) from native growing mother plant in Kocaeli/Turkey. Two-three cutting with one-half leaves and 15-20 cm in length were obtained from each shoot in the collecting day. The large leaves were clipped of one-third or one half of the tips to reduce water loss in rooting stage.

Cutting treatments

After wash in running tap water, cuttings were surface-sterilized by immersion in a 10% (v/v) aqueous solution of “Domestos” commercial bleach solution and rinsed three times in tap water. IBA (Indole-3-butyric acid) solution at 2, 4, 6 and 8 g/l was freshly prepared dissolving IBA powder in an ethanol/water (%50). Cuttings were immediately (10 s) dipped in IBA solution wetting 2 cm of their basal end. Control treatment was made by dipping the lower end of the cuttings for 10 s in 50% ethanol solution.

Rooting treatments were as follows:
(a) 10 s dipping in IBA (2 g/l)
(b) 10 s dipping in IBA (4 g/l)
(c) 10 s dipping in IBA (6 g/l)
(d) 10 s dipping in IBA (8 g/l)
(e) 10 s dipping in ethanol/water solution (%50) (control)

After treatment the cuttings were placed 5 cm deep in perlite on a bench of a rooting greenhouse equipped with an automatic mist system.

Sampling scheme and statistical analysis

Sampling of cuttings was performed at 60 days after the beginning of rooting treatments and was scored for rooting percentage (%), root number per cutting (roots longer than 5 mm in length) (root/plant), average lengths of the roots (cm) and dry and fresh weight (g) of roots. Surviving cuttings were harvested and root fresh weight recorded directly. Dry weight was recorded after oven drying at 85 °C for 48 hours (Percival and Sheriffs, 2002).
The experiments were conducted in Randomized Plot Design with three replicates. All the data were evaluated using the analysis of variance (ANOVA) and the groups that showed variance were then subjected to the Duncan test with a significance value $P\leq0.05$.

Results and Discussion

Cherry laurel cuttings rooted successfully. The number of roots and dry weight of roots increased significantly when cuttings were treated with 2 g/l IBA (54.99 root/plant and 0.348 g dry weight) as compared to the other IBA doses and control treatments.

The mean rooting percentage, root length and fresh weight of roots were similar for cuttings treated with different concentrations of IBA. When cuttings were treated with various concentrations of IBA, rooting percentage varied from 70.83 (with 8 g/l IBA) to 87.50 (with 2 g/l IBA). The mean rooting percentage was 58.33% for control cuttings. All IBA doses increased the rooting rate according to control. The length of roots varied between 1.18 cm and 1.35 cm for IBA concentrations and is higher than control (1.09 cm), but the difference was not statistically important (table 1).

Table 2 showed that dry weight was statistically affected by application of IBA doses and the highest value was observed for roots formed with 2 g/l IBA. Fresh weight was increased by the high doses of IBA because of succulent structure and callus formation on roots but difference was not important statistically.

The present study showed that application of auxin improved rooting traits. For successful root induction cuttings need to treat with IBA (Stefancic et al., 2007). The same results have been reported on many prunus spp. (Sharma and Aier, 1989; Tewfik, A.A., 2002). The promoting effect varied with auxin concentrations in this study and same results was observed in other researches too (Sharma and Aier, 1989). 2 g/l IBA gave the highest rooting percentage and root quality, so it was recommended for cutting propagation of laurel cherry. Some sweet and sour cherry rootstocks were rooted in 2 g/l IBA too (Christov and Koleva, 1995). Higher concentrations of IBA caused some problem on root traits, with callus on root and succulent structure of root. However some Nemaquard peach rootstock gave the highest rooting percentage at 6 g/l IBA treatment compared with 4 g/l and 2 g/l IBA (Tewfik, 2002), the inhibitory effect caused by high IBA concentrations on peach (Tworkoski and Takeda, 2007).

Since appropriate auxin treatment could produce good rooting response, cutting propagation has proven to be an effective method for production of cherry laurel and 2 g/l IBA was recommended. The rooting percentage and the quality of formed roots could be strongly influenced by varieties (Stanica, 2007). and seasonal variation. This result will be reference for the next studies of cherry laurel.

Conclusion

Results of this study provide a basis ex vitro culture of cherry laurel but, the average length of roots was very short. The average number of roots was high but most of them just 5 mm length and was very breakable structure. The type of auxin and concentration could change the rooting characters. The rooting substrate is also important for rooting habit. As it is a rich source of protein, sugar, ascorbic acid, minerals and antioxidants. P. laurocerasus is important for health benefits and is well worth further studies. For that reason, in further researches, the optimum cutting collecting time, types of auxin, mother plants maturity, rooting medium should be investigated.
Resources


