



Short Communication

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Hormones Affected Cutting Propagation of *Cupressus sempervirens* 'Stricta'

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ABSTRACT

Cupressus sempervirens 'Stricta' is a member of Cupress family, also called Italian cypress or Mediterranean cypress, native to the eastern Mediterranean region. It has been widely cultivated as an ornamental tree all over the world because of its evergreen, drought resistant, heat tolerant, pH adaptable, salt tolerant and narrow-straight-tall habit. To meet the increasing market demands, we carried out the stem cutting propagation in January and treated with different types and various concentration hormones: liquid KIBA 1000, 3000, 8000 mg/L and powder Hormodin #1, #2, #3. Hormone has a significant effect on rooting percentage. The highest rooting percentage, 56.25%, was obtained under the treatment of KIBA 3000 mg/L, 28.13% and 30.25% for KIBA 1000 mg/L and 8000 mg/L, respectively. Cuttings treated with Hormodin had rooting percentage from 25%, 37.5%, 53.125% under Hormodin #1, #2, #3 respectively. Hormodin #3 yielded 23.75, which was the highest mean number of roots in all treatments. The total length of roots under treatment KIBA 3000 mg/L, Hormodin #2 and Hormodin #3 was 101.20, 103.46 and 109.29 cm respectively, which had significant different to other treatments. Both KIBA and Hormodin could increase the rooting percentage and the recommended should be KIBA 3000 mg/L and Hormodin #3.

Introduction

Cupressus sempervirens L. 'Stricta' also called Italian cypress or Mediterranean cypress, is a member of Cupress family, and native to the eastern Mediterranean region, is widely cultivated as an ornamental tree all over the world because of

its evergreen, drought, heat, and salt tolerance, wide pH adaptability, and narrow upright habit (Dirr and Heuser, 2012). It is a medium-sized coniferous evergreen tree to 35m tall, with a conic crown with level branches and variably loosely hanging branchlets. Italian cypress is very long-lived, with some trees reported to be over 1000

years old. It is also known for its very durable and scented wood, which can be used as doors and furnitures. In cosmetics, it is used as astringent, firing, anti-seborrheic, anti-dandruff, anti-aging and as fragrance (Farjon, 2013). To meet the increasing market demand, we carried out the rooting experiment of adult stem cuttings in January.

Materials and methods

Plant materials: Hardwood cuttings of *Cupressus sempervirens* L. 'Stricta' were obtained from full flush growth of plants. Cuttings were placed into water immediately after being removed from mother plants. They were trimmed to 10-15cm and leaves of the bottom 3-5cm were stripped, and then were treated with various concentrations of different rooting hormones.

Experimental treatments: All cuttings were treated with I: Control (no hormone); II: K-IBA at 1,000 ppm; III: K-IBA at 3,000 ppm; IV: K-IBA at 8,000 ppm; V: Hormodin #1(1,000 ppm); VI: Hormodin #2 (3,000 ppm); VII: Hormodin #3 (8,000 ppm); For the application of liquid hormone, cutting were dipped into the concentrations for 10-15seconds, then air dry for at least 10 minutes before placing them into the rooting media. For powdery Hormodin (produced by OHP. Inc.), cuttings were dipped into water first and then dusted with powder.

Treated hardwood cuttings were randomly inserted into 32-cell plug trays filled with the rooting media,

with contained Fafard 3L Mix (main ingredients: peat moss and bark) and perlite at 1:1 (V:V). The cuttings were thoroughly watered before placing them on the mist bench. The mist bench was covered with 70% shade cloth and the mist system was set for 20 sec every 20 min at the first week, then 10 sec every 20 min thereafter.

Experimental design: A randomized complete block design was used in this experiment with 4 replicates for each treatment and 8 subsamples (cuttings) per replicate per treatment. Rooting percentage, number of roots, average length of roots, and total root length were collected after 6 months. All data were analyzed with SAS and mean separations were run with LSD ($\alpha=0.05$).

Results and discussion

Rooting hormone had significant effects on rooting of Italian cypress and all treated cuttings had greater rooting percentages, number of roots, and longer total root length than that of the control after six months (Table 1 and Fig. 1). The highest rooting percentage, 56.3%, was obtained under the treatment of KIBA at 3000 mg/L and both higher and lower concentrations reduced the rooting percentage and rooting quality. Cuttings treated with powdery hormone had rooting percentages from 25.0%, 37.5%, and 53.1% for Hormodin #1, #2, #3, respectively. Hormodin #3 has the highest rooting percentage in powdery hormone. Comparing the liquid with powdery hormone, the cutting of Italian cypress is sensitive to liquid hormones.

Table 1. Effect of hormone on rooting percentage and quality of *Cupressus sempervirens* L. 'Stricta'

Treatment	Rooting (%)	Number of Roots	Root Length (cm)	Total Root Length (cm)
Control	15.63C	11.25C	2.96C	69.12C
KIBA 1K	28.13C	12.00C	5.13A	81.99B
KIBA 3K	56.25A	18.50B	5.47A	101.20A
KIBA 8K	31.25BC	12.75C	3.20C	56.86D
Horm #1	25.00C	10.25C	3.11C	57.02D
Horm #2	37.50ABC	19.50B	4.07B	103.46A
Horm #3	53.13AB	23.75A	4.62AB	109.29A

*Different letters in the same column indicate a significant difference at $\alpha = 0.05$



Fig. 1: Rooting of *Cupressus semperviens* L. 'Stricta' (Italian Cypress) hardwood cuttings under selected treatment (clock wise: Horm#2, Horm#3, KIBA 8K, KIBA 3K).

As shown in Table 1, application of rooting hormone did significantly affect the root quality. Hormodin #3 treatment produced the highest number of roots (23.75) per cutting, which was significant higher than other treatments. KIBA at 3000 mg/L obtained the longest average root length (5.47), and KIBA at 1000 mg/L yielded 5.13. Both of them had a significant different with the other treatments. The longest total length of roots, 109.29cm, was produced using Hormodin #3. Hormodin #2 and KIBA at 3000mg/L also had significant results than other treatments.

From the above results, growers should apply 8000 mg/L IBA talc or 3000 mg/L KIBA to root adult stem cuttings of *Cupressus semperviens* 'Stricta'. It is possible to had higher rooting percentage with juvenile stem cuttings and post-

chilling period for adult stem cuttings.

Conclusion

Commercial production of *Cupressus semperviens* 'Stricta' could be regenerated from hardwood stem cuttings treated by rooting hormones. Hormone types, application methods, and concentrations did significantly affect the rooting of *Cupressus semperviens* 'Stricta' cuttings. To better rooting percentage and higher quality of liners, powdery Hormodin #3 and liquid K-IBA at 3,000 ppm is recommended for hardwood cuttings.

Conflict of interest statement

Authors declare that they have no conflict of interest.

Acknowledgement

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