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**(*Cupressus sempervirens* var. *horizontalis*)**

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(*Cupressus sempervirens* var. *horizontalis*)

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Van den Driessche)

Shaw      Rose      Haase  
.(      Kohmann      Floistad

.(      Sagheb-Talebi)

.(      Krasowski)

(C.

*sempervirens* var. *horizontalis*)

Paliwal)

.(      Kannan

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Wightman

(      Hosseini)

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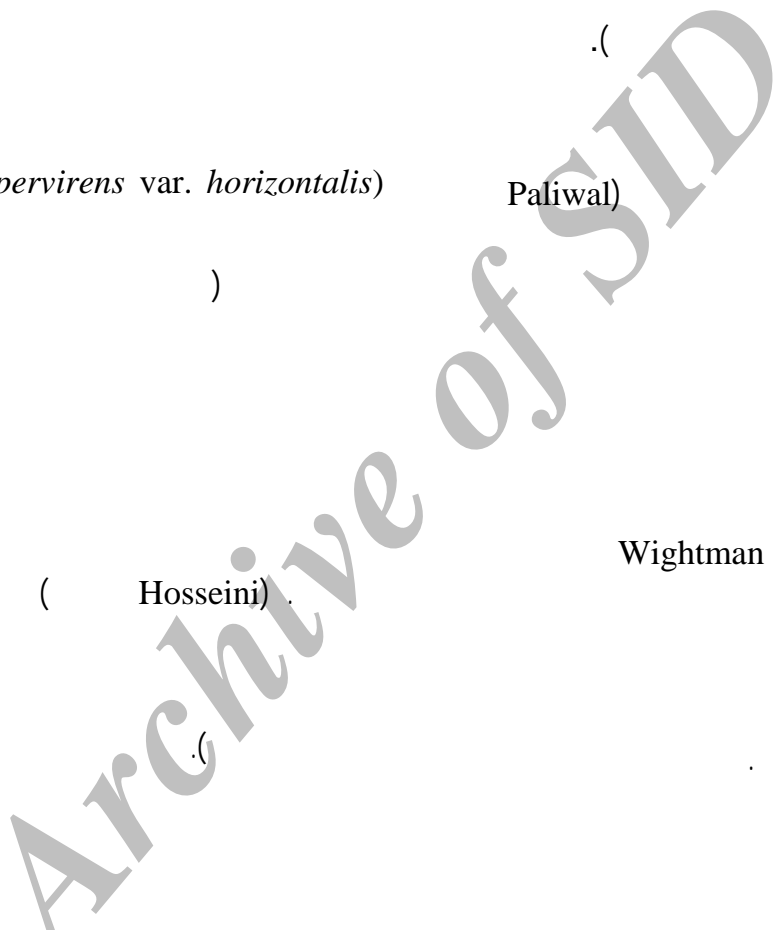
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(A) :

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<b>K</b> (ppm)	<b>P</b> (ppm)	<b>N</b> (%)	<b>EC</b> ( )	<b>pH</b>	(%)	
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Tukey-HSD  
( Zar )

( / )

Sternberg)

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( Jayaraman )

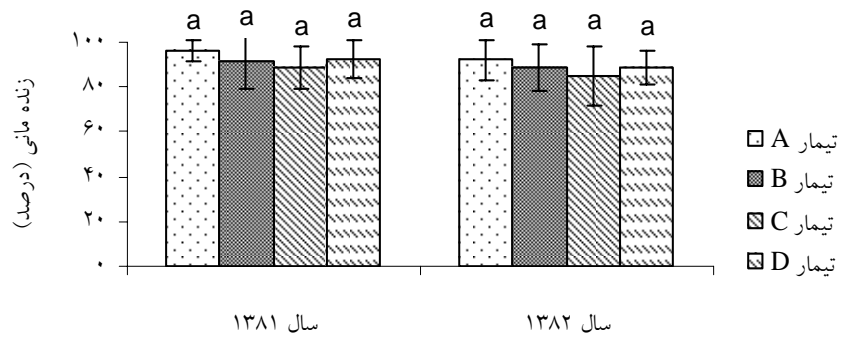
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Shapiro-Wilk

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D: ( : : )

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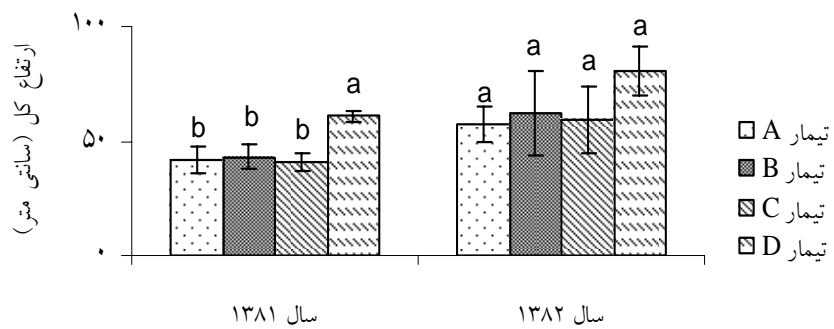
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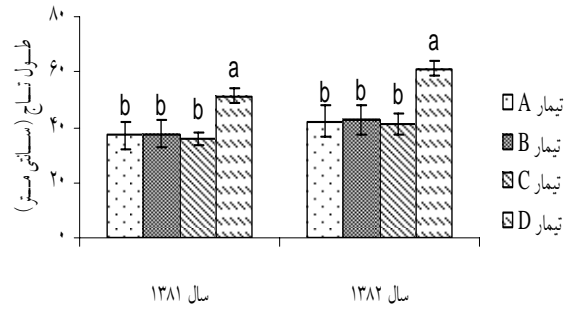
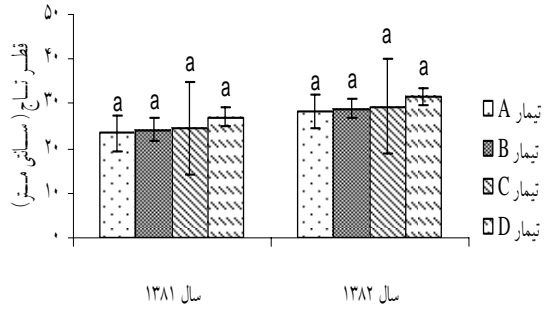
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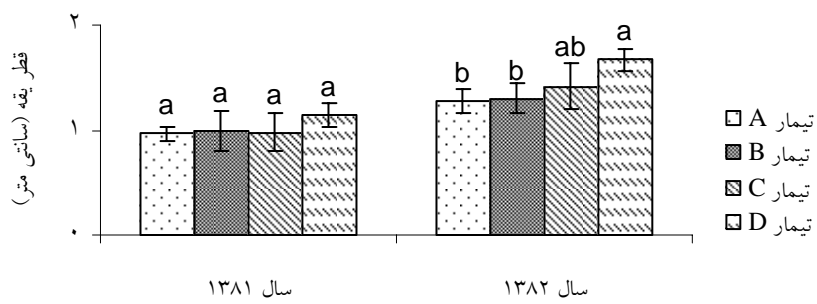


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D C

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Tukey (HSD)



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( ) Hassan

( ) Jacobs  
Douglas-fir

N.P.K (15:9:12)

( Carlson) ( Binkley Fisher)

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( ) Jacobs . A (: )  
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( Sternberg)

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9- Carlson, W.C., 1981. Effects of controlled-release fertilizers on the shoot and root development of outplanted western hemlock (*Tsuga heterophylla* Raf. Sarg.) seedlings. Can. J. For. Res., 11: 752–757.

10- Fisher, R. F. & Binkley, 2000. Ecology and Management of Forest Soils. John Wiley & Sons, Inc, 489pp.

...

- 11- Floistad, I. S. & K. Kohmann, 2004. Influence of nutrient supply on spring frost hardiness and time of bud break in Norway spruce (*Picea abies* (L.) Karst.) seedlings. *New Forests*. 27: 1-11.
- 12- Haase, D. L. & R. Rose, 1997. Forest seedling nutrition from the nursery to field. Symposium Proceedings. Nursery Technology Cooperative. Oregon State University.
- 13- Hassan, H.A., S.M. Mohamed, E.M. Abo El Ghait & H. H. Hammad, 1994. Physiological Studies on *Cupressus sempervirens* L. Seedling. 11 Growth and growing media. *Annals of Agricultural Science*, Moshtoher, Egypt. 32 (1) 497 – 509.
- 14- Hosseini, S. M., 1998. Iranian native conifers decline due to wind, drought and diseases. Proceedings of IUFRO conference, Austria, 59-63.
- 15- Jacobs, D. F., R. Rose, D. L. Hasse & P. D. Morgan, 2003. Influence of nursery soil amendments on water relations, root architectural development, and field performance of Douglas-fir transplants. *New Forests*, 26: 263-277.
- 16- Jayaraman, K., 1998. A statistical manual for forestry research. FORSPA - FAO publication. 241pp.
- 17- Krasowski, M. J. & R. J. F. Elder, 2000. Opportunities for Improvements to Reforestation Success. Extension Note 43. Ministry of Forest Research Program.
- 18- Oliet, J. A., R. Planelles, F. Arthero & D. F. Jacobs, 2005. Nursery fertilization and tree shelters affect long-term field response of *Acacia salicina* Lindl. Planted in Mediterranean Semi-arid conditions. *Forest Ecology and Management*. 215: 339-351.
- 19- Paliwal, K. & D. Kannan, 1999. Growth and nutritional characteristics of four woody species under nursery conditions and growth after transplantation in semi-arid environments. *Journal of Arid Environments*. 43: 131-141.
- 20- Sagheb-Talebi, K. 2005. Rehabilitation of temperate forests in Iran. in: J. A. Stanturf and P. Madsen (eds.) *Restoration of boreal and temperate forests*. CRC Press, 397- 407.
- 21- Shaw, T. M., J. A. Moore & J. D. Marshall, 1998. Root chemistry of Douglas-fir seedlings grown under different nitrogen and potassium regimes. *Can. J. For. Res.*, 28: 1566-1573.
- 22- Sternberg, M., A. Danin & I. Noy-meir, 2000. Effect of clearing and herbicide treatment on coniferous seedling establishment and growth in newly planted Mediterranean forests. *Forest Ecology and Management*, 48:179-184.
- 23- Van den Driessche, R. 1992. Changes in drought resistance and root growth capacity of container seedlings in response to nursery drought nitrogen and potassium treatments. *Canadian Journal of Forestry Research*, 22 (5): 740-749.
- 24- Wheater, C. P. & P. A. Cook, 2002. Using statistics to understand the environment, Routledge Publication, 245 pp.
- 25- Wightman, K. E., T. Shear, B. Goldfarb & J. Haggard, 2001. Nursery and field establishment techniques to improve seedling growth of three Costa Rican Hardwoods. *New Forests*, 22: 75 – 96.
- 26- Zar, J. H. 1999. *Biostatistical analysis*. Prentice Hall International, Inc., 660 pp.

## Influence of nursery soil amendment on growth and survival of Cypress (*Cupressus sempervirens* var. *horizontalis*) seedling in an afforestation area

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### Abstract

Influence of nursery soil amendment was studied on growth and survival of Cypress (*Cupressus sempervirens* var. *horizontalis*) seedling in an afforestation area. For this purpose, at first Cypress seedlings (1+1) were grown at four soil treatments including 1) nursery non-amended soil (control), 2) nursery non-amended soil and pure sand (1:1), 3) nursery non-amended soil, pure sand and organic matter (1:1:1), 4) nursery non-amended soil, pure sand and organic matter (1:1:2). Then, the seedlings were transplanted into an afforestation area located in a semi-arid region (Marzan-Abad, north of Iran with elevation of 300 m a.s.l.) and planted in holes with suitable depth. The research was set up as randomized complete blocks design with four replications. The results of first year revealed that seedlings grown in "nursery non-amended soil, pure sand and organic matter (1:1:2)" had greatest total height and crown length; however survival, collar diameter and crown diameter were not affected by soil treatments. In the second year, no significant differences were detected in total height, survival and crown diameter of seedlings treated on different soils, but contrary to first year, the seedlings grown in "non-amended soil, pure sand and organic matter (1:1:2)" obtained the greatest collar diameter. Based on the results of this research, nursery non-amended soil, pure sand and organic matter (1:1:2) can be suggested as suitable treatment in order to advance the establishment and growth of Cypress seedlings in the research site and the similar areas.

**Keywords:** Collar diameter, Crown length, Cypress, Soil amendment, Survival, Total height

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