
Picea pungens 'Koster'

(// : // :)

(*Picea pungens* 'Koster')
(*P. excelsa*)

IBA

IBA

()

()

()

()

(*Picea pungens* 'Koster')

()

()

P. pungens cv.)

P.)

(Koster

(*P. abies* L.)

(*sitchensis*

P. omorika

()

()

()

()

()

()

()

(*Juniperus horizontalis*)

()

Cummins

Indolebutyric acid

Blomme et al

Grafting

Hartmann et al

Spliced Side grafting or Side Veneer grafting

.()

)

.(

Pseudotsuga) (*Pinus taeda*)
 (*Picea abies*) (*mensiezii* Peat)

.() (moss

() .() ()

() .()

.() ()

()

.() /

() .()

.() ()

.() .()

Archive of SID

— (*Cedrus deodara*)

Hamman
 Anne et al

Beeson & Proebsting
 MacDonald
 Copes & Mandel
 Naphtaleneacetic acid

... (*Picea pungens* 'Koster')

(*Abies alba*)

IAA NAA IBA

/ /

/ /

/ IAA /

()

-NAA

IBA

()

()

()

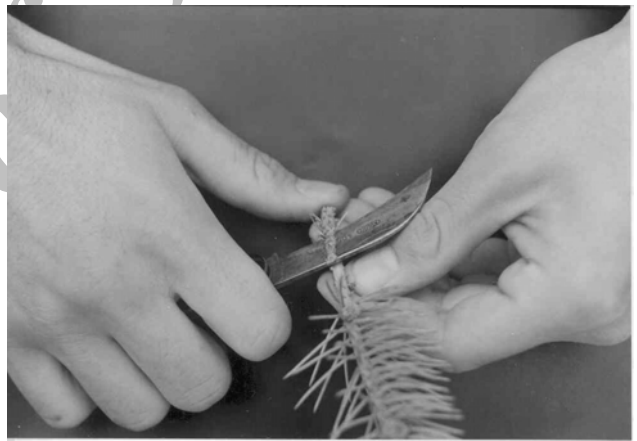
()

() ()

Picea excelsa

Charcoal

Side veneer grafting



IBA NAA

/

/

/

NAA IBA

IBA

NAA

)

.(

.()

)

(

.()

.()

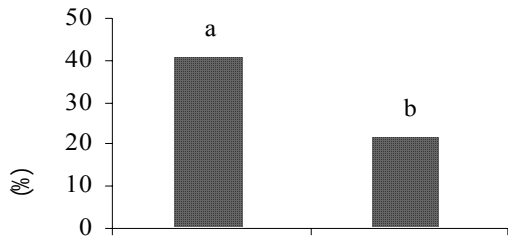
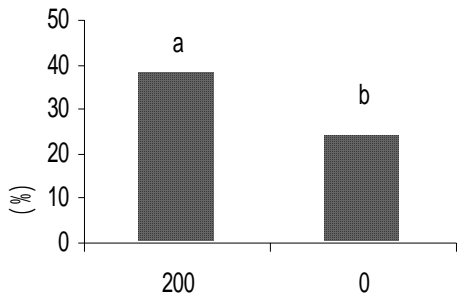
)

(

() ()
() ()

()

() ()



Beeson

Kroin

Posedaru & Stanciu

Quick-dip Method

.()

()

Archive of SID

.()

.()

()

.()

.()

.()

/

(%)		()	(%)	
/ ab	/ ab	/ b	۱۰ ab*	C :
/ ab	b	b	۰ c	N1: NAA
/ ab	/ ab	/ b	۶/۶۶ bc	N2 : NAA
/ a	ab	/ ab	۶ bc	N3 : NAA
/ ab	/ ab	/ b	۴ b	N4 : NAA
/ a	/ ab	/ a	۱۶/۶۶ ab	B1 : IBA
/ a	/ a	/ ab	۱۶/۶۶ ab	B2 : IBA
/ a	/ a	/ ab	۱۶/۶۶ ab	B3 : IBA
a	/ ab	/ ab	۲۶/۶۶ a	B4 : IBA
/ ab	/ a	/ ab	۱۶/۵۴ ab	Tb1: / IBA
/ b	b	b	۰ c	Tb2: IBA
/ ab	/ ab	/ b	۳ b	Tn1: / NAA
/ b	b	b	۳ b	Tn2: NAA

%

*

IBA

(% /)

()

()

IBA

()

%

IBA

(%)		()	(%)		
/ a	/ a	/ a	/ a*		
/ a	/ a	/ b	/ a		

%

*

IBA

()

(.)

IBA

()

(.)

()

(.)

()

()

(.)

()

()

Anne et al

.()

.()

IBA

()

IBA

.()

()

/

.()

()

()

IBA

/

.()

.()

- 2- Anne, M., M. Wagner., J. T. Fisher and G.A. Fancher, 1989. Vegetative propagation of 10-year-old Blue spruce by stem cuttings, Landis, T. D., Technical coordinator.
- 3- Arteca, R.N., 1997. Plant Growth Substances: Principles and Applications. The Pennsylvania State University.
- 4- Beeson, R.C. and W.M. Proebsting, 1989. Physiology and culture of *Picea pungens* 'Hoopsi'/picea grafts, ONW. Newsl. 13:9.
- 5- Blomme, R., 1987. The grafting of conifers–VII, Verbodsnieuws Voor de Belgische Siertaelt, 31(9):591-595.
- 6- Copes D.L. and N.L. Mandel, 2000. Effects of IBA and NAA treatments on rooting Douglas-fir stem cuttings, New Forests, 20:249-257.
- 7- Cummins, N.J., 1997. Rooting hormones may increase grafting success, Pomona, Volume 2, No. 34.
- 8- Garanovich, J.M. and M.V. Shurvko, 2002. Optimization of the technology for vegetative propagation of spruce in Belarus, Lesnoe khozyaistvo, 5:32-33.
- 9- Hamann A., 1998. Adventitious root formation in cuttings of loblolly pine (*pinus taeda* L.): developmental sequence and effects of maturation, Trees, 12:175-180.
- 10- Hartmann, H. T., D.E. Kester, and F.T. Davies, 1990. Plant Propagation, Principles and Practices, 5th ed. Prentice-Hall, Inc. 647 pp.
- 11- Kroin J., 1992. Advances using Indole-3-butyric acid (IBA) dissolved in water for rooting cuttings, transplanting and grafting, International Plant Propagators' Society, Eastern Region, 42nd Annual Meeting.
- 12- MacDonald, B., 2000. Practical Woody Plant Propagation for Nursery Growers, Timber Press. 669 pp.
- 13- Mateev, V., 1988. Anatomical details in the grafting of Norway spruce. Gorsko Stopanstvo, 44(5):11-13.
- 14- Meneve, I. and W. Istas, 1975. Conifer grafting trial, Reveue de L'Agriculture, 28(4):829-844.
- 15- Posedaru, A. & N. Stanciu, 2002. Studies on graft propagation of ornamental coniferous trees, Cercetari Scientific – Horticultura, 47-59.
- 16- Raulston, J.C. & K.E. Tripp, 1992. Rootstocks for ornamentals production in the southern united states, SNA Research Conference - Vol.37.
- 17- Selby, C. and S. J. Kennedy, 1992. Adventitious root formation in hypocotyl cuttings of *Picea sitchensis*, The influence of plant growth regulators, Newphytol, 120: 453-57.
- 18- Shamet, G.S. and S. D. Bhardwaj, 1995. Vegetative propagation of deodar, spruce and silver-fir using stem cuttings under intermittent mist, Van Vigyan 33(2): 80- 84.
- 19- Wigmore B.G. and G.H. Woods, 2000. Cultural procedures for propagation of rooted cuttings of Stika spruce, Western Hemlock and Douglas-fir in British Columbia, B.C. Ministry of forests.
- 20- www.Pehuen.tripod.com/Grafting.html, 2003. Side wedge grafting, step by step in conifers.

Asexual Propagation of *Picea pungens* 'Koster' through Cuttings, and grafting under Various Hormonal Treatments

S. Reezi^{*1}, R. Naderi², A. Khalighi³, Z. Zamani⁴, V. Etemad⁵

¹ Ph.D, student, University of Tehran, I. R. Iran

² Assistant professor, University of Tehran, I. R. Iran

³ Professor, Faculty of Agriculture, University of Tehran, I. R. Iran

⁴ Associate professor, Faculty of Agriculture, University of Tehran, I. R. Iran

⁵ Assistant professor, Faculty of Natural Resources, University of Tehran, I. R. Iran

(Received: 15 Jan 2005, Accepted: 20 June 2005)

Abstract

In order to study the asexual propagation of blue spruce clone, two separate studies were designed and carried out. Two common grafting methods under two hormonal treatments on *Picea excelsa* L. through on RCB design (RCRD) were performed. Cuttings were prepared at two different times of year and under different hormonal treatments as Analysis of compound with three replications in each trial. In the first treatment, the hormone application on scions, caused a 15% improvement in graft success as compared to control. Side wedge grafting caused a 19% increase in grafting improvement as compared to side veneer grafting. In the second trial, hormone treatments showed a significant difference in all the rooting indices at 5% level. Also the interaction effect of time on adventitious root development demonstrated a significant difference. The highest rooting percent, the most adventitious roots number and the most callused cuttings were obtained through applying 8000, 4000 and 2000 ppm IBA, respectively. The highest mean of root length was obtained by applying 2000 ppm IBA in July.

Keywords: *Picea*, Side veneer grafting, Side wedge grafting, Indolebutyric acid, Naphtaleneacetic acid, Cutting, Callus

* Corresponding author:

Tel:

, Fax:

E-mail: sreezi57@yahoo-com